

Next Steps in Advancing the System of Radiological Protection



ICRP 2021⁺¹

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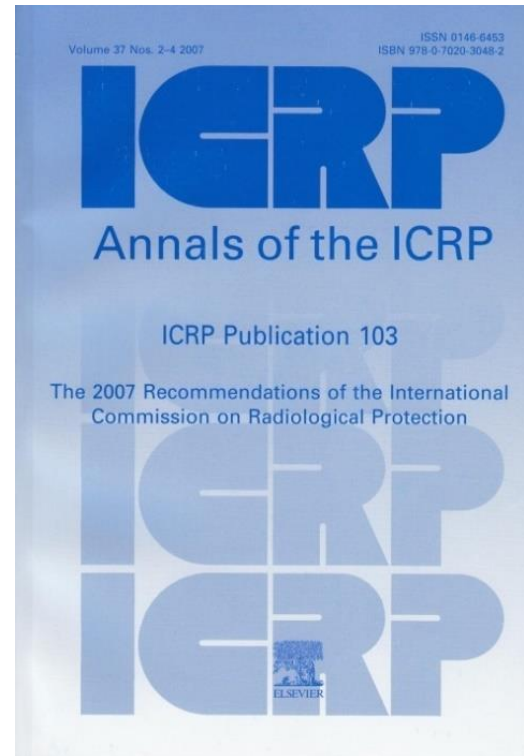
System Review Launched: The Next Decade

Since 2019: The new big project of the ICRP

Review and revision
of the last General
Recommendations –

ICPR Publication 103
fro 2007

**Together with all who
are interested in
radiological protection**



Identify **basic open questions (“building blocks”)**: essential work required for the next general recommendations

Key Milestones so far (open access papers)

Keeping the ICRP recommendations fit for purpose

Clement et al 2021 J. Radiol. Prot. 41 1390
www.doi.org/10.1088/1361-6498/ac1611

Paper 1: Thoughts from ICRP & invitation to contribute



Areas of research to support the system of radiological protection

Laurier et al 2021 Radiat Environ Biophys 60, 519–530
www.doi.org/10.1007/s00411-021-00947-1

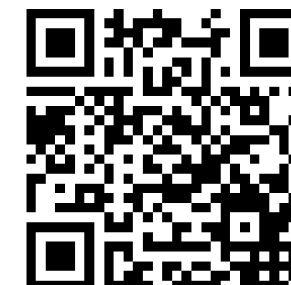
Paper 2: Thoughts from ICRP & invitation to contribute



Summary of the 2021 ICRP workshop on the future of radiological protection

Rühm et al 2021 J. Radiol. Prot. 42 023002
www.doi.org/10.1088/1361-6498/ac670e

Basically, feedback on Paper 1



Current status

ICRP Workshop on the Review and Revision of the System of Radiological Protection Research Priorities

International and regional views of SLOs on “Areas of Research” paper (Laurier et al.).

Open Access paper is currently being prepared (**Paper 4**)

Vancouver Call for Action to Strengthen Expertise in Radiological Protection Worldwide

Discussed with organisations in formal relations with ICRP

List of topics ICRP has identified as a priority to review to prepare the next General Recommendations

Discussed with organisations in formal relations with ICRP

European Radiation Protection Week 2022



Will be published on the ICRP website and as open access paper in due course (**Paper 5**)



It seems that most of the topics are included

Plan for the Future

It appears that with this – together with the key topics raised at this Symposium - the first phase of the journey towards the review and revision of the RP System is coming to an end (i.e., to publish ideas of the ICRP, stimulate discussion, and collect the feedback from the international RP community on the topics to be reviewed)

Of course we continue to listen and are open for any additional/new ideas!!



Currently, 30 Active ICRP Task Groups

- TG36 Radiopharmaceutical Doses
- TG91 Low-dose and Low-dose Rate Exposure
- TG95 Internal Dose Coefficients
- TG96 Computational Phantoms and Radiation Transport
- TG97 Surface and Near Surface Disposal
- TG98 Contaminated Sites
- TG99 Reference Animals and Plants Monographs
- TG103 Mesh-type Computational Phantoms
- TG105 The Environment in the System of RP
- TG106 Mobile High Activity Sources
- TG108 Optimisation in Medical Imaging
- TG109 Ethics in RP in Medicine
- TG110 Veterinary Practice
- TG111 Individual Response to Radiation
- TG112 Emergency Dosimetry
- TG113 Dose Coefficients for X-ray Imaging
- TG114 Reasonableness and Tolerability
- TG115 Risk and Dose for Astronauts
- TG116 Imaging for Radiotherapy
- TG117 PET and PET/CT
- TG118 RBE, Q, and w_R
- TG119 Diseases of the Circulatory System
- TG120 Radiation Emergencies and Malicious Events
- TG121 Offspring and Next Generations
- TG122 Detriment Calculation for Cancer
- TG123 Classification Radiation-induced Effects
- TG124 The Principle of Justification
- TG125 Ecosystem Services
- TG126 Human Biomedical Research
- TG127 Exposure Situations and Categories of Exposure

~20 Building Blocks now being addressed

TG36 Radiopharmaceutical Doses

TG91 Low-dose and Low-dose Rate Exposure

TG95 Internal Dose Coefficients

TG96 Computational Phantoms and Radiation Transport

TG97 Surface and Near Surface Disposal

TG98 Contaminated Sites

TG99 Reference Animals and Plants Monographs

TG103 Mesh-type Computational Phantoms

TG105 The Environment in the System of RP

TG106 Mobile High Activity Sources

TG108 Optimisation in Medical Imaging

TG109 Ethics in RP in Medicine

TG110 Veterinary Practice

TG111 Individual Response to Radiation

TG112 Emergency Dosimetry

TG113 Dose Coefficients for X-ray Imaging

TG114 Reasonableness and Tolerability

TG115 Risk and Dose for Astronauts

TG116 Imaging for Radiotherapy

TG117 PET and PET/CT

TG118 RBE, Q, and w_R

TG119 Diseases of the Circulatory System

TG120 Radiation Emergencies and Malicious Events

TG121 Offspring and Next Generations

TG122 Detriment Calculation for Cancer

TG123 Classification Radiation-induced Effects

TG124 The Principle of Justification

TG125 Ecosystem Services

TG126 Human Biomedical Research

TG127 Exposure Situations and Categories of Exposure

Additional Topics Identified by the MC

May initiate this term (ca 2023/2024)

- Individualisation of dose, risk, and protection
- Dose limits / protection of the individual
- Non-cancer effects beyond cardiovascular
- Sources and impacts of uncertainties
- RP in space

May initiate early next term (ca 2024/25)

- Primary aim, human and non-human objectives
- The principles of protection
- Protection of non-human biota
- Integration of RP of the environment
- Practical implications of ethics in RP

- Revised detriment & its application
- Dosimetry system consistency
- Justification in medicine
- Justification in occupational exposure for the fetus, pregnant women, and lactating women

May initiate late next term (ca 2027/28)

- RP in medicine (new P105)
- Education and training
- Communication
- Compendium of dose coefficients
- Dose/risk coefficients for molecular radiotherapy

Has been continuously developed by the MC and is probably not yet the end of the story ...

Topics Relevant for Effects and Risks

P115 Lung Cancer Risk from Radon and Progeny and Statement on Radon

P118 Early and Late Effects of Radiation in Normal Tissues and Organs – Threshold Doses for Tissue Reactions for RP

P150 Cancer Risk from Exposure to Plutonium and Uranium

P152 Radiation Detriment Calculation Methodology

TG91 Risk at Low-dose and Low-dose Rate Exposure

TG99 Reference Animal and Plant (RAP) Monographs

TG105 Considering the Environment when Applying the System of RP

TG111 Factors Governing Individual Response to Radiation

TG115 Risk and Dose Assessment for RP of Astronauts

TG119 Diseases of the Circulatory System

TG121 Effects of Exposure in Offspring and Next Generations

TG122 Update of Detriment Calculation for Cancer

TG123 Classification of Radiation Effects on Human Health

 Relevant ICRP Reports already published

 Active ICRP Task Groups (TGs)

 Additional topics identified by the MC

Individualisation of dose, risk, and protection

Non-cancer effects beyond cardiovascular

Sources and impacts of uncertainties

Revised detriment & its application

Topics Relevant for Dosimetry

P110 (with ICRU) Adult Reference Computational Phantoms
P123 Assessment of Radiation Exposure of Astronauts in Space
P128 Radiation Dose to Patients from Radiopharmaceuticals
P133 The ICRP Computational Framework for Internal Dose Assessment for Reference Adults: Specific Absorbed Fractions
P136 Dose Coefficients for Non-human Biota Environmentally Exposed to Radiation
P143 Paediatric Computational Reference Phantoms
P144 Dose Coefficients for External Exposures to Environmental Sources
P145 Adult Mesh-type Reference Computational Phantoms
P147 Use of Dose Quantities in RP
P148 Radiation Weighting for Reference Animals and Plants
P130, 134, 137, 139, 151 Occupational Intakes of Radionuclides Series

TG36 Dose to Patients in Diagnostic Nuclear Medicine
TG95 Internal Dose Coefficients
TG96 Computational Phantoms and Radiation Transport
TG103 Mesh-type Reference Computational Phantoms
TG112 Emergency Dosimetry
TG113 Dose Coefficients for Diagnostic X-ray Imaging
TG118 RBE, Quality Factor, and Radiation Weighting Factor

Individualisation of dose, risk, and protection

Sources and impacts of uncertainties

Dosimetry system consolidation

Compendium of dose coefficients

Dose/risk coefficients for molecular radiotherapy

Topics Relevant for the Ethical Foundation

P103 2007 Recommendations of the ICRP

P138 Ethical Foundations of the System of RP

P122 RP in Geological Disposal of Long-lived Solid Radioactive Waste

P146 RP of People and the Environment in the Event of a Large Nuclear Accident

TG109 Ethics in RP for Medical Diagnosis and Treatment

TG114 Reasonableness and Tolerability in the System of RP

Primary aim, human & environment objectives

Protection of other non-human biota

Practical implications of ethics in RP

Topics Relevant for the Environment

P108 Environmental Protection - the Concept and Use of Reference Animals and Plants

P114 Environmental Protection: Transfer Parameters for Reference Animals and Plants

P124 Protection of the Environment under Different Exposure Situations

P136 Dose Coefficients for Non-human Biota Environmentally Exposed to Radiation

P148 Radiation Weighting for Reference Animals and Plants

TG99 Reference Animal and Plant (RAP) Monographs

TG105 Considering the Environment when Applying the System of RP

TG121 Effects of Exposure in Offspring and Next Generations

TG125 Ecosystem Services in Environmental RP

Protection of other non-human biota

Sources and impacts of uncertainties

Integration of RP of the environment

Topics Relevant for Concepts & Implications

P103 2007 Recommendations of the ICRP

P104 Scope of RP Control Measures

P122 RP in Geological Disposal of Long-lived Solid Radioactive Waste *

P126 RP against Radon Exposure *

P132 RP from Cosmic Radiation in Aviation *

P142 RP from Naturally Occurring Radioactive Material (NORM) in Industrial Processes *

P146 RP of People and the Environment in the Event of a Large Nuclear Accident *

* Relating to exposure situations

TG98 Exposures from Contaminated Sites from Past Activities *

TG114 Reasonableness and Tolerability in the System of RP

TG124 The Principle of Justification

TG125 Ecosystem Services in Environmental RP

TG126 Biomedical Research

TG127 Exposure Situations and Categories of Exposure *

Primary aim, human & environment objectives

The principle of optimisation of protection

Dose limits / protection of the individual

Protection of other non-human biota

Justification in medicine

Justification and optimisation for the fetus, premature infant & neonate

Individualisation of dose, risk, and protection

RP in medicine (new Publication 105)

RP in space

Education and training

Communication

Some Further Indication of the Future ...



ICRP

THANK YOU!

www.icrp.org

Topics Relevant for Effects and Risks



Additional topics identified by the MC



Relevant ICRP Reports already published



Active ICRP Task Groups (TGs)

Individualisation of dose, risk, and protection

Non-cancer effects beyond cardiovascular

Sources and impacts of uncertainties

Revised detriment & its application

P115 Lung Cancer Risk from Radon and Progeny and Statement on Radon

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