2021 Annual Report

Established in Stockholm 27 July 1928

ICRP 2021 Annual Report

ICRP Reference Number 4894-2199-3008
August 2022

www.icrp.org
UK Charity Number 1166304

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CANADA

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CHAIR'S FOREWORD

2021 was another challenging and rewarding year for ICRP as we experienced significant changes and tremendous success while continuing to navigate the pandemic. Before discussing this in more detail, however, let me first acknowledge and thank the many dedicated volunteers on our Task Groups, Committees, and Main Commission who moved on from ICRP at the conclusion of the 2017-2021 term. Their efforts paved the way towards the planned review and revision of the System of Radiological Protection.

While there were so many who were instrumental in our successes over the years, I would especially like to thank Chair Claire Cousins and Vice-Chair Jacques Lochard for their leadership and vision that guided ICRP for over a decade. We wish them the best in their next chapter, and we are confident that their passion, input, and experience will continue to be available to us in some capacity in the years to come.

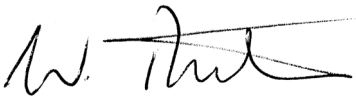
Looking ahead, we're excited that our new term (2021-2025) includes about 40% new members who are bringing new energy and fresh perspectives to ICRP. We have recently embarked on a decade-long journey to review and revise the System of Radiological Protection, which is going to require more engagement, resources, collaboration, and effort than we have ever undertaken. We invite the international radiological protection community to play a constructive role in this process, and we're looking forward to working with them.

Of course, to know where you're going, you need to acknowledge where you've been. In this report, you will see many of the highlights that guided us through the last year. We released two significant open-access papers, "Keeping the ICRP Recommendations Fit for Purpose" and "Areas of Research to Support the System of Radiological Protection", which will both serve as foundational and guiding documents for the revision of the System.

In October, we hosted the "Future of Radiological Protection" Digital Workshop, which included 63 live and on-demand presentations, and 1500+ registrants from almost 100 countries. There was a flexible fee to attend, and by making it optional, those with limited financial resources were still able to access and participate. This model turned out to be quite successful. As we strive for attendance equity, accessibility, and inclusiveness at all ICRP events, you can expect to see similar fee structures at our digital events moving forward. Many key messages and important topics from the Workshop summarised in another open access paper published in the Journal of Radiological Protection.

Our Main Commission was able to meet face-to-face in November 2021 in Frankfurt, Germany, for the first time since the start of pandemic, which provided a sense of optimism that future in-person gatherings were not too far away. It is with that optimism in mind, that we look forward to welcoming the global RP community to Vancouver, British Columbia (7-10 November 2022) for the 6th International Symposium on the System of Radiological Protection, ICRP 2021+1. It's hard to believe that this will mark our first major in-person event in almost three years. With so much happening between then and now, and the critical role it will play in the review and revision of the System, we sincerely hope that professionals and organisations from around the world will strongly consider participating.

See you in Vancouver,



Werner Rühm
ICRP Chair

2021 HIGHLIGHTS

ICRP launched a major review of the System of Radiological P rotection with the aim to develop revised General Recommendations that would replace the 2007 Recommendations of ICRP in about a decade. While the System is robust and has performed well, it must adapt to address changes in science and society to remain fit for purpose. Two open-access papers invited interested individuals and organisations to engage in the open process: Keeping the ICRP Recommendations Fit for Purpose (Clement, et al.) and Areas of Research to Support the System of Radiological Protection (Laurier, et al.).

For the first time since 2019, the ICRP Main Commission was able to meet in person, in Frankfurt in November.

The first major opportunity to react to the invitation to engage in the review and revision of the System, the Future of Radiological Protection Digital Workshop, was held online 14 October – 3 November. With 63 live and on-demand presentations, the event attracted about 1500 people from 100 countries. An open access Summary of the 2021 ICRP Workshop on the Future of Radiological Protection (Rühm, et al.) was published in early 2022.

On March 11th, ICRP issued a statement 'Ten Years after the Fukushima Daiichi Accident', remembering the tragic losses, reflecting on progress made, considering challenges that still lie ahead, and committing to continue learning from the experience.

ICRP 2021, the 6th International Symposium on the System of Radiological Protection was postponed due to pandemic travel restrictions. It was renamed ICRP 2021+1, and rescheduled to 7-10 November 2022, still in Vancouver, Canada.

Two new emeritus members were appointed: Madan Rehani (Committee 3) and Jean- François Lecomte (Committee 4). This honorary distinction recognises extraordinary contributions to ICRP and is conferred for life.

Madan Rehani

Jean-François Lecomte

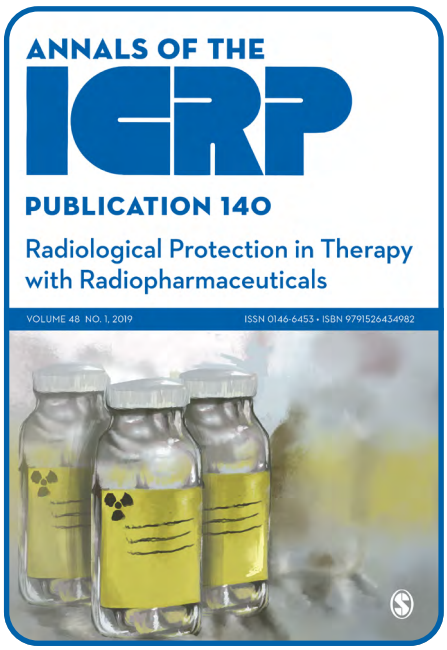
Three draft publications were released for public consultation:

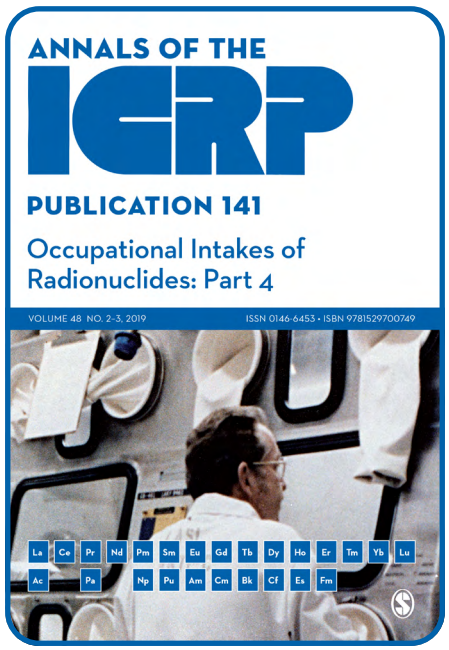
- Occupational Intakes of Radionuclides: Part 5
- Occupational Radiological Protection in Brachytherapy
- Radiological Protection in Veterinary Medicine

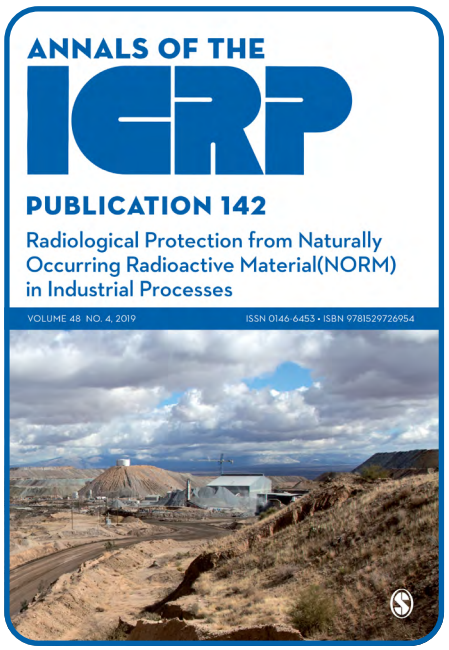
Five new publications were released:

- Proceedings of the International Conference on Recovery after Nuclear Accidents: Radiological Protection Lessons from Fukushima and Beyond
- ICRP Publication 150 Cancer Risk from Exposure to Plutonium and Uranium
- ICRP Publication 149 Occupational Radiological Protection in Brachytherapy
- ICRP Publication 148 Radiation Weighting for Reference Animals and Plants
- ICRP Publication 147 Use of Dose Quantities in Radiological Protection

On the first of January, the free-to-access library of ICRP publications was extended to the 2019 issues of Annals of the ICRP thanks to the many organisations and individuals that supported the Free the Annals initiative. The following publications were released to the public:







THE SYSTEM OF RADIOLOGICAL PROTECTION

ICRP develops the System of Radiological Protection for the public benefit. The System takes account of the latest scientific knowledge, ethical values, and practical experience. It is the basis of standards, legislation, guidance, programmes, and practice worldwide.

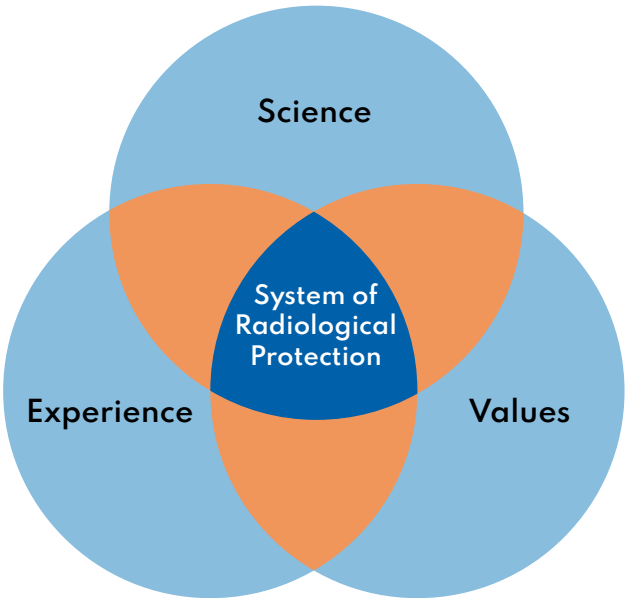
The objective of the System is to contribute to an appropriate level of protection for people and the environment against the harmful effects of ionising radiation exposure without unduly limiting the individual or societal benefits of activities involving radiation.

The System of Radiological Protection is based on the latest science, social and ethical values, with over a century of experience since the discovery of ionising radiation.

ICRP recommendations are used worldwide by intergovernmental and nongovernmental advisory and standard setting agencies; government regulatory authorities; educational, scientific, and healthcare institutions; operators; individual professionals; and others with an interest in radiological protection.

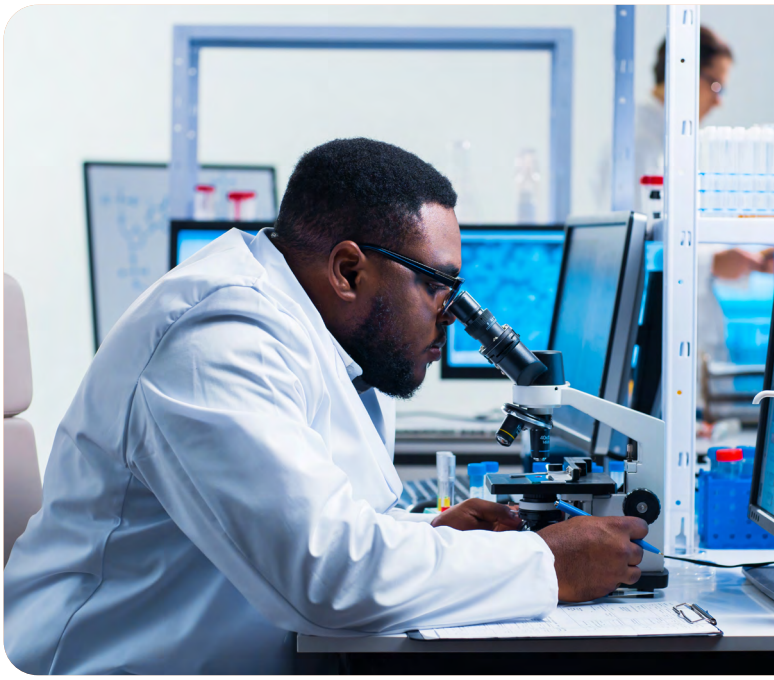
The IAEA International Basic Safety Standards for Protection against Ionising Radiation and for the Safety of Radiation Sources is based heavily on ICRP recommendations, as are the similar European Basic Safety Standards. The International Labour Organization Convention 115, Radiation Protection Convention, General Observation 2015, refers specifically to the recommendations of ICRP.

The System of Radiological Protection forms the basis of radiological protection standards, regulations, programmes, and practice world-wide



RADIOLOGICAL PROTECTION FOR THE NEXT GENERATION

More than a decade since the current fundamental recommendations were released, ICRP has opened a review and revision of the System of Radiological Protection, ensuring it continues to protect people, animals, and the environment for the next generation.



THE FUTURE OF RADIOLOGICAL PROTECTION DIGITAL WORKSHOP

ICRP is comprised of over 300 of the world's leading radiation experts. We are the "keepers" of the System of Radiological Protection, but the System exists for those who use it to protect patients, workers, the public, and the environment. Collaboration with the people it impacts the most is essential.

This workshop created an opportunity to engage in the review and revision of the System of Radiological Protection, in particular based on two open-access papers recently published by ICRP:

Keeping the ICRP Recommendations Fit for Purpose (Clement, et al.)

Areas of Research to Support the System of Radiological Protection (Laurier, et al.)

The digital workshop took place 14 October to 3 November 2021. It included two Live Sessions per day, on 19-20 October 2021, as well as 43 On-Demand Presentations that were available from 14 October 2021 until 3 November 2021.

63
PRESENTATIONS

10,000
PRESENTATION VIEWS

1,500
DELEGATES
FROM
100
COUNTRIES

The event was summarised in the open-access paper:

Summary of the 2021 ICRP Workshop on the Future of Radiological Protection (Rühm, et al.)

Recordings of all live session and on-demand presentations for this event can be viewed at

www.icrp.org/events

FINANCES

	2018	2019	2020	2021
INCOMING RESOURCES				
Contributions Received	1 111 734	1 017 495	761 044	864 963
Royalties	229 585	124 153	198 793	226 562
Other	0	0	89 279	128 171
Total Incoming Resources	1 341 319	1 141 648	1 040 116	1 219 696
RESOURCES EXPENDED				
Promotion of Radiological Protection	430 422	781 865	315 982	379 066
Governance Costs	509 784	494 158	438 986	482 716
Other Resources Expended	(6 832)	34 531	4 744	52 326
Total Resources Expended	933 374	1 310 554	759 712	914 108
NET MOVEMENT IN RESOURCES	407 945	(168 906)	280 404	305 588
TOTAL FUNDS CARRIED FORWARD	659 313	490 407	770 811	1 076 399

THE INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION

11	25	32	93	150	334
ACTIVE MENTORSHIPS	ACTIVE TASK GROUPS	FORMAL RELATIONS	YEARS IN OPERATION	NUMBERED PUBLICATIONS	MEMBERS

Originally established at the Second International Congress of Radiology in 1928 as the International X-ray and Radium Protection Committee, today ICRP is an independent international charity registered in the UK, relying on financial contributions and support from governments, industry, agencies, foundations, and individuals from around the world.

ICRP consists of the Main Commission, the Scientific Secretariat, four standing Committees, and Task Groups established as needed to undertake specific work. Members come from over 40 countries and all disciplines relevant to radiological protection. They are invited to join ICRP as independent experts on a volunteer basis for four-year terms. Representatives of organisations in formal relations with ICRP are regularly invited to both advise the Main Commission and to participate in meetings of the Committees. Individuals from these organisations may be invited to be members of Task Groups or to review drafts of work in progress where their expertise is particularly relevant.

This structure supports a rigorous system of peer review. The work of Task Groups is reviewed by the relevant Committee(s), and then reviewed and approved by the Main Commission. During development, most reports are circulated to several organisations and individual experts for critical review and all are posted for public consultation through the ICRP website.

MAIN COMMISSION

SCIENTIFIC SECRETARIAT

COMMITTEE 1
EFFECTS

COMMITTEE 2
DOSE

COMMITTEE 3
MEDICINE

COMMITTEE 4
APPLICATION

TASK GROUPS

MAIN COMMISSION

The Main Commission consists of the Chair and up to twelve other members. The Main Commission is the governing body, setting the policy and programme of work, and approving all official publications.

Werner Rühm
Chair

Donald Cool
Vice-Chair

Dominique Laurier
Committee 1 Chair

François Bochud
Committee 2 Chair

Kimberly Applegate
Committee 3 Chair

Thierry Schneider
Committee 4 Chair

Simon Bouffler
Member

Kun Woo Cho
Member

Gillian Hirth
Member

Michiaki Kai
Member

Senlin Liu
Member

Sergey Romanov
Member

Andrzej Wojcik
Member

SCIENTIFIC SECRETARIAT

The Scientific Secretariat manages the daily business of ICRP, and the Scientific Secretary often represents ICRP at international meetings.

Christopher Clement
Scientific Secretary & CEO

Hiro Fujita
Assistant Scientific Secretary

Lynn Lemaire
Executive Administrator

Kelsey Cloutier
Head of Stakeholder Engagement and Communications

Charlotte White
Brand and Digital Media Specialist

Toshihiro Higuchi
Historian

COMMITTEE 1 EFFECTS

Considers the effects of radiation action from the subcellular to population and ecosystem levels, and assesses implications for protection of people and the environment

READ NOW
2021
C1 Meeting
Summary

Dominique Laurier, Chair
Gayle Woloschak, Vice-Chair
Christophe Badie, Secretary

Christelle Adam-Guillermin
Elizabeth Ainsbury
Tamara Azizova
Dimitry Bazyka
Agnès Francois
Manoor Prakash Hande
Michael Hauptmann
Kotaro Ozasa
Preetha Rajaraman
David Richardson
Yoshiya Shimada
Mikhail Sokolnikov
Quanfu Sun
Ludovic Vaillant
Richard Wakeford

COMMITTEE 2 DOSE

Develops dosimetric methodology for the assessment of internal and external radiation exposures for use in the protection of people and the environment

READ NOW
2021
C2 Meeting
Summary

François Bochud, Chair
Francois Paquet, Vice-Chair
Maria Antonia Lopez, Secretary

Martin Andersson
Volodymyr Berkovskyy
Denison de Souza Santos
Augusto Giussani
Derek Jokisch
Chan Hyeong Kim
Mukund Shrinivas Kulkarni
Stephanie Lamart
Choonsik Lee
Junli Li
James W. Marsh
Nina Petoussi-Henss
Tatsuhiko Sato
Tracy Smith
Alexander Ulanowski

COMMITTEE 3 MEDICINE

Addresses protection of persons and unborn children when ionising radiation is used in medical diagnosis, therapy, and biomedical research, as well as protection in veterinary medicine

READ NOW
2021
C3 Meeting
Summary

Kimberly Applegate, Chair
Colin Martin, Vice-Chair
David Sutton, Secretary

Marie-Claire Cantone
John Damilakis
Makoto Hosono
Aurelie Isambert
Mika Kortesniemi
M. Mahesh
Josep M. Martí-Climent
Jin Chul Paeng
Claudia E. Ruebe
William Small
Aste Sovik
Isabelle Thierry-Chef
Ivan Williams
Weihai Zhuo

COMMITTEE 4 APPLICATION

Provides advice on the application of the Commission's recommendations for the protection of people and the environment in an integrated manner for all exposure situations

READ NOW
2021
C4 Meeting
Summary

Thierry Schneider, Chair
Nicole Martinez, Vice-Chair
Jacqueline Garnier-Laplace, Secretary

Julie Burtt
Min Baek
Nobuhiko Ban
Yann Billarand
Analia Canoba
Eduardo Gallego
Daniele Giuffrida
Catrin Baureus Koch
Yahong Mao
Andy Mayall
Anne Nisbet
Sergey Shinkarev
John Takala
Hiroko Yoshida
Friedo Zölzer

TASK GROUPS

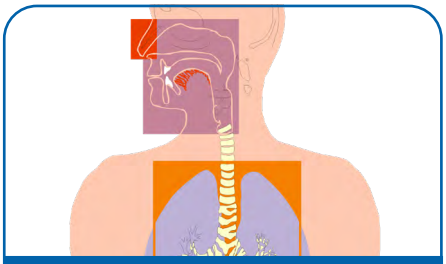
Active as of 31 December 2021

TG 36

Radiation Dose to Patients in Diagnostic Nuclear Medicine

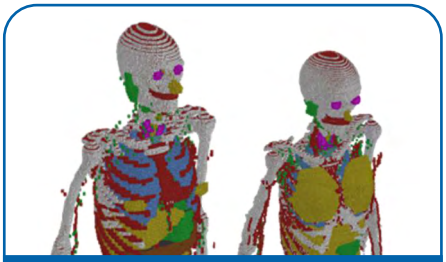
TG 91

Radiation Risk Inference at Low-dose and Low-dose Rate Exposure for RP Purposes



TG 95

Internal Dose Coefficients



TG 96

Computational Phantoms and Radiation Transport

TG 97

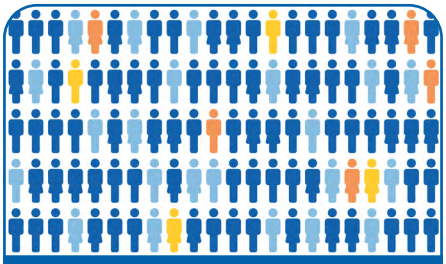
RP for Surface and Near Surface Disposal of Solid Radioactive Waste

TG 98

Exposures Resulting From Contaminated Sites From Past Industrial, Military and Nuclear Activities

TG 99

Reference Animals and Plants (RAPs) Monographs



TG 102

Detriment Calculation Methodology

TG 103

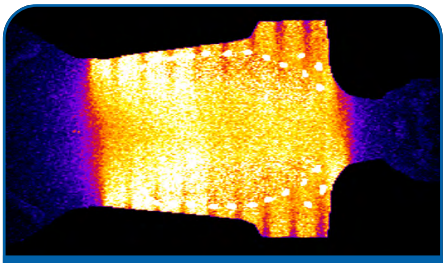
Mesh-type Reference Computational Phantoms (MRCP)

TG 105

Considering the Environment When Applying the System of RP

TG 106

RP for Activities Involving Mobile High Activity Sources



TG 108

Optimisation of RP in Digital Radiography, Fluoroscopy, and CT in Medical Imaging

Click on a Task Group to learn more about their work

TASK GROUPS

Active as of 31 December 2021

TG 109

Ethics in RP for Medical Diagnosis and Treatment

TG 110

RP in Veterinary Practice

TG 111

Factors Governing the Individual Response of Humans to Ionising Radiation

TG 112

Emergency Dosimetry

TG 113

Reference Organ and Effective Dose Coefficients for Common Diagnostic X-Ray Imaging Examinations

TG 114

Reasonableness and Tolerability in the System of RP

TG 115

Risk and Dose Assessment for RP of Astronauts

TG 116

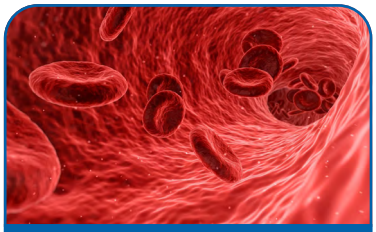
RP Aspects of Imaging in Radiotherapy

TG 117

RP in PET and PET/CT

TG 118

Relative Biological Effectiveness (RBE), Quality Factor (Q), and Radiation Weighting Factor (wR)



TG 119

Effects of Ionising Radiation on Diseases of the Circulatory System and Their Consideration in the System of RP

TG 120

RP for Radiation Emergencies and Malicious Events

TG 121

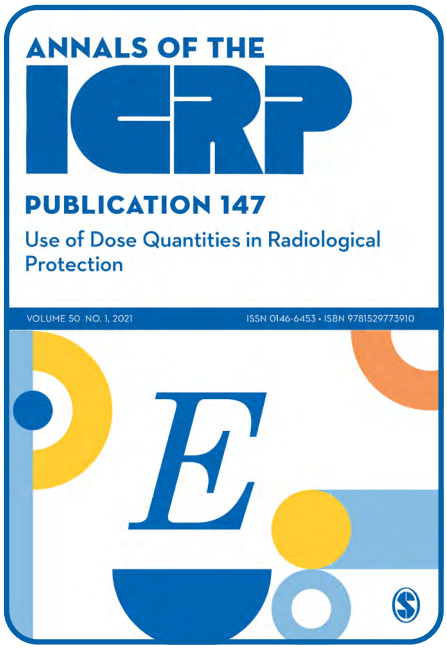
Effects of Ionising Radiation Exposure in Offspring and Next Generations

Click on a Task Group to learn more about their work

PUBLICATIONS RELEASED IN 2021

Annals of the ICRP is the authoritative source of recommendations and guidance written by the International Commission on Radiological Protection. It was established in 1977 and is published by SAGE UK.

Thanks to the many organisations and individuals that supported the Free The Annals initiative, two years after publication all issues are free to download. The latest issues are available by subscription or can be purchased individually from SAGE.

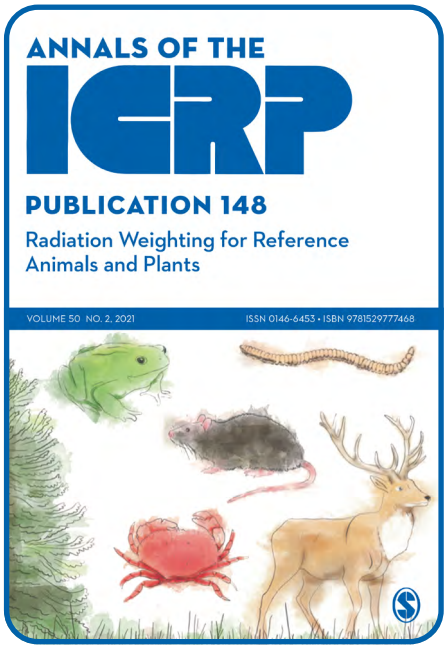


PUBLICATION 147

Use of Dose Quantities in Radiological Protection

Recommended citation
ICRP, 2021. Use of dose quantities in radiological protection. ICRP Publication 147. Ann. ICRP 50(1).

Authors on behalf of ICRP
J.D. Harrison, M. Balonov, F. Bochud, C. Martin, H-G. Menzel, P. Ortiz-Lopez, R. Smith-Bindman, J.R. Simmonds, R. Wakeford

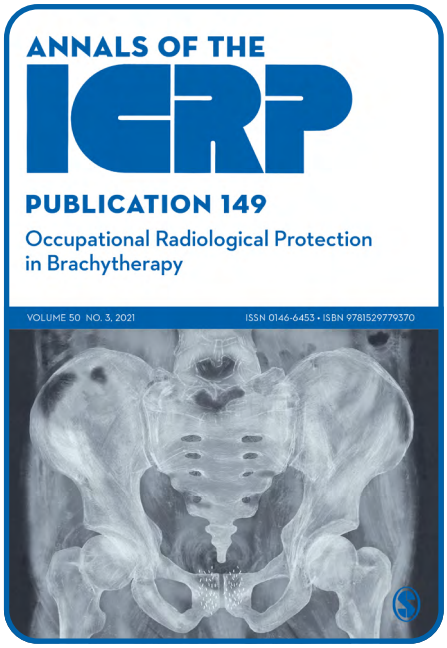


PUBLICATION 148

Radiation Weighting for Reference Animals and Plants

Recommended citation
ICRP, 2021. Radiation weighting for Reference Animals and Plants. ICRP Publication 148. Ann. ICRP 50(2).

Authors on behalf of ICRP
K. Higley, A. Real, D. Chambers

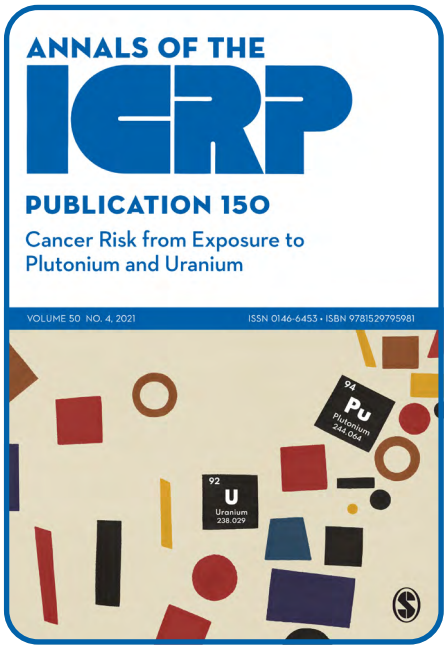


PUBLICATION 149

Occupational Radiological Protection in Brachytherapy

Recommended citation
ICRP, 2021. Occupational radiological protection in brachytherapy. ICRP Publication 149. Ann. ICRP 50(3).

Authors on behalf of ICRP
L.T. Dauer, C. Baureus Koch, J.M. Cosset, M. Doruff, A. Damato, F. Guedea, P. Scalliet, B. Thomadsen, L. Pinillos-Ashton, W. Small

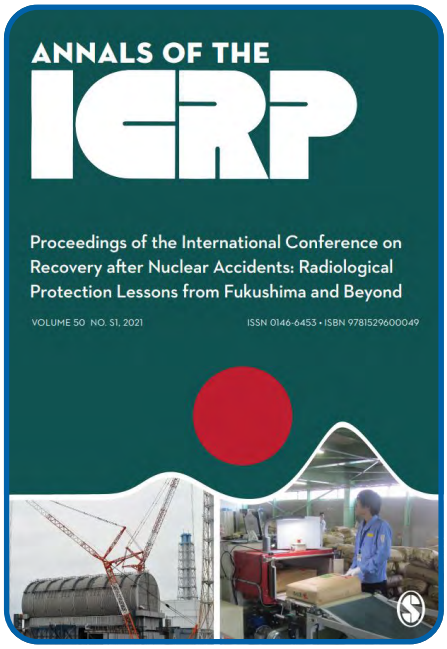


PUBLICATION 150

Cancer Risk From Exposure to Plutonium and Uranium

Recommended citation
ICRP, 2021. Cancer risk from exposure to plutonium and uranium. ICRP Publication 150. Ann. ICRP 50(4).

Authors on behalf of ICRP
M. Tirmarche, I. Apostoaei, E. Blanchardon, E.D. Ellis, E. Gilbert, J.D. Harrison, D. Laurier, J.W. Marsh, M. Sokolnikov, R. Wakeford, S. Zhivin



Proceedings of the International Conference on Recovery after Nuclear Accidents: Radiological Protection Lessons from Fukushima and Beyond

Recommended citation
ICRP, 2021. Proceedings of the International Conference on Recovery after Nuclear Accidents: Radiological Protection Lessons from Fukushima and Beyond. Ann. ICRP 50(S1), 2021.

GLOBAL SUPPORTERS

The contributions from these organisations allow ICRP to further our programme of work, paving the way for the advancement of the system of radiological protection globally. Want to join this growing list of organisations at the forefront of radiological protection? **Contact us.**

Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety

FANR
الهيئة الاتحادية للرقابة النووية
Federal Authority for Nuclear Regulation

IAEA
International Atomic Energy Agency

Innovative Solutions for Energy and Environment
JANUS
JAPAN NUS CO., LTD.

Canadian Nuclear Safety Commission | Commission canadienne de sûreté nucléaire

Health Canada | Santé Canada

European Commission

ANDRA
Agence nationale pour la gestion des déchets radioactifs

Australian Government
Australian Radiation Protection and Nuclear Safety Agency

CSRP
中国辐射防护学会
China Society of Radiation Protection

IRSN
INSTITUT DE RADIOPROTECTION ET DE SÛRETÉ NUCLÉAIRE

Strål säkerhets myndigheten
Swedish Radiation Safety Authority

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra
Swiss Confederation

Federal Department of Home Affairs FDHA
Federal Office of Public Health FOPH

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra
Swiss Confederation

Eidgenössisches Nuklearsicherheitsinspektorat ENSI
Inspection fédérale de la sécurité nucléaire IFSN
Ispettorato federale della sicurezza nucleare IFSN
Swiss Federal Nuclear Safety Inspectorate ENSI

JAEA

放影研
RERF

QST

KARP
Korean Association for Radiation Protection

DSA Norwegian Radiation and Nuclear Safety Authority

CSN CONSEJO DE SEGURIDAD NUCLEAR

NEI
NUCLEAR ENERGY INSTITUTE

SUBI

NEA
NUCLEAR ENERGY AGENCY

IRPA

REACTOR INSTITUTE DELFT

GEISLAVARNIR RÍKISINS
ICELANDIC RADIATION SAFETY AUTHORITY

stuk

JRIA Japan Radioisotope Association

Danish Radiation Protection Authority (SIS)

ORGANISATIONS IN FORMAL RELATIONS

ICRP maintains formal relations with other organisations with an interest in radiological protection through specific agreements, or by granting Special Liaison status to organisations whose work is relevant to ICRP's mandate. Organisations currently in formal relations with ICRP are shown below.

Conference of Radiation Control Program Directors, Inc. Est. 1968

EUROPEAN ALARA NETWORK

EURAMED
European Alliance for Medical Radiation Protection Research

EANM EUROPEAN ASSOCIATION OF NUCLEAR MEDICINE

European Commission

EFOMP
EUROPEAN FEDERATION OF ORGANISATIONS FOR MEDICAL PHYSICS

ENISS

NERIS

EURADOS

EUROPEAN RADIOECOLOGY ALLIANCE

ESR
EUROPEAN SOCIETY OF RADIOLOGY

EUTERP
Training & Education in Radiation Protection

HERCA
HEADS OF THE EUROPEAN RADIOLOGICAL PROTECTION COMPETENT AUTHORITIES

FORO
Foro Iberoamericano de Organismos Reguladores Radiológicos y Nucleares

IEC International Electrotechnical Commission
Electrical Equipment in Medical Practice (IEC/TC62)

IEC International Electrotechnical Commission
Nuclear Instrumentation (IEC/TC45)

industriall global union

ISOE
Information System on Occupational Exposure

IAEA
International Atomic Energy Agency

ICRU
INTERNATIONAL COMMISSION ON RADIATION UNITS AND MEASUREMENTS · ESTABLISHED IN 1925 ·

ILO International Labour Organization

International Organization for Medical Physics
IOMP

IRPA

ISRRT
INTERNATIONAL SOCIETY OF RADIOGRAPHERS & RADIOLOGICAL TECHNOLOGISTS

ISR
The International Society of Radiology

MELODI

NCRP National Council on Radiation Protection and Measurements

NEA
NUCLEAR ENERGY AGENCY

UNSCEAR

World Health Organization

WORLD NUCLEAR ASSOCIATION

ICRP2021+1

7-10 NOV 2022 • VANCOUVER

Come for the waves,
Stay for the mountains.
See you at ICRP2021+1.

6th International Symposium on the System of Radiological Protection

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