

International Resources and Programs for Medical Physicists for Training in Radiation Protection

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Learning Objectives

1. To learn about educational resources and training programs in the area of radiation protection of patients and medical radiation protection
2. To understand how medical physicist can interact more efficiently with clinical colleagues using radiation protection as a tool.

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Changing scenario in Radiation Protection

- Prior to 2000: Occupational Radiation Protection (ORP) dominating the field of radiation protection
- Significant improvements in ORP, minimal problems with latest: Cataract
- Current century: Focus on Radiation Protection of Patient (RPOP)

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Changing scenario
Previously: You have to work whole life with radiation, whereas the patient may undergo procedure only few times



Now

Cumulative life time dose
patient>>> staff life time dose

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International Resources from

- IAEA
- ICRP
- European Commission (EC)
- WHO, UNSCEAR
- Some professional societies:
IOMP/IRPA/EFOMP

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National resources (outside the scope of this session)

- NCRP
- Image Gently
- Image Wisely
- RSNA
- AAPM

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Resources

FREE download

- Power point slides
- Publications
- Webinars
- eLearning material
- Presentations

Not FREE

- Publications

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Programs

- IAEA Training Programs: For participants from developing countries. Trainers from developed countries.
- IOMP supported training activities

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International Resources from

- IAEA
- ICRP
- European Commission (EC)
- WHO, UNSCEAR
- Some professional societies:
IOMP/IRPA/EFOMP

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Website <http://rpop.iaea.org>

IAEA | Radiation Protection of Patients (RPOP)

Search RPOP: GO

Home Information for: Additional Resources Special Groups Member Area About Us Our Work IAEA.org

Be Informed About the Safe Use of Ionizing Radiation in Medicine
Information to help health professionals achieve safer use of radiation in medicine for the benefit of patients

Information for: Health Professionals, Member States, Patients, Additional Resources, Publications, International Standards, Training, Special Groups, Pregnant Women, Children, Member Area, Member States Area, Durable Management Area

Latest Literature
Fernandes, M.B., Bagnato, A., Pierre, S.A., Scialo, C.D. Jr., Rangel-Sau, E., Pearce, M.S., Preminger, C.M., Radiation exposure in the acute and short-term management of vestibular at 2 academic centers, J. Unit. 18 2 Feb. 2009; 666-672.
Keeley, F.A., Jr., Thornton, M., Radiation safety: implications for urologists and patients, J. Unit. 18 2 Feb. 2009; 643-644.
Vano, E., Ubeda, C., Leyton, F., Miranda, P., Gonzalez, L., Staff Radiation Doses in Interventional Cardiology: Correlation With Patient Exposure, Pediatr. Cardiol. (Lan. 2009).

Did You Know That...
3. It is safe to have an X-ray provided the examination is carefully justified and radiation protection principles are observed.

Latest News
New Publications on Better Imaging Techniques released
Downloaded FREE three new publications on radiation protection in nuclear imaging techniques (PET/CT, Cardiac CT and CT colonography).
Cardiologists' Newsletter
Next issue of the Newsletter of the Asian Network of Cardiologists in Radiation Protection is now available.

Upcoming Events
Meeting planned to prepare contents for patient information part of this website, Vienna, 4-5 May 2009
Meeting to discuss framework for patient information, draw guidelines and prepare contents
Meeting for Smart Card for long term record of patient doses, Vienna, 27-29 April 2009
The first meeting on this project will be held in IAEA Vienna.

First page of Google search
20 million hits/y, ~0.4 million visits/y, 190 countries

How to reach RPOP website

- Google search: Direct on various pages
- *radiation protection in.....pregnancy, ...mammography, ...fluoroscopy, ...CT, ...radiology, ...nuclear medicine, ..radiotherapy, ...cardiology, ...children, ...dental radiology, ...DEXA, ...PET/CT, ...interventional radiology, ...fluoroscopy, ...gastroenterology, ...urology, ...orthopedic surgery...*
- Trough iaea.org: Long [Navigation vs search]

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Translation

Nuclear English Español

IAEA | Radiation Protection of Patients (RPOP)

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Home Information for: Additional Resources Special Groups Member Area About Us Our Work IAEA.org

Be Informed About the Safe Use of Ionizing Radiation in Medicine
Information to help health professionals achieve safer use of radiation in medicine for the benefit of patients

Information for: Health Professionals, Member States, Patients and Public, Additional Resources, Publications, International Standards, Training | Poster | Movie, Special Groups, Pregnant Women, Children, RPOP Newsletter

Latest Literature Did You Know That... Latest News Upcoming Events

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Country / Territory	Sessions	% Sessions
1. United States	126,044	26.17%
2. Spain	33,885	7.04%
3. Mexico	32,147	6.67%
4. United Kingdom	31,934	6.63%
5. Colombia	18,541	3.85%
6. India	18,266	3.79%
7. Argentina	14,854	3.08%
8. Canada	14,781	3.07%
9. Australia	13,970	2.90%
10. Chile	11,960	2.48%

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Home > Training

Free Material **As power point slides**



- Diagnostic and Interventional Radiology** →
- Radiotherapy** →
- Nuclear Medicine** →
- Prevention of Accidental Exposure in Radiotherapy** →
- Cardiology** →
- PET/CT** →
- Paediatric Radiology** →
- Digital Radiology** →
- Doctors using fluoroscopy outside radiology (Urologists, Gastroenterologists, Orthopaedic surgeons etc.)** →

Русский

About 40,000 downloads/yr

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RPOP

Lectures/Slides

All 23 modules (ZIP of 28 files, 89.29 Mb)

- 00. Principles of Radiation Protection and Motivation for the Course (10,548 KB)
- 01. Overview of radiation protection in diagnostic radiology (1,147 KB)
- 02. Radiation units and dose quantities (2,193 KB)
- 03. Biological effects (7,386 KB)
- 04. International system of radiation protection (871 KB)
- 05. Interaction of radiation with matter (10,586 KB)
- 06. X-ray production (6,517 KB)
- 07. X-ray beam (1,877 KB)
- 08. Factors affecting image quality (16,119 KB)
- 09. Medical exposure BSS (1,739 KB)
- 10. Patient dose assessment (1,050 KB)
- 11. Quality assurance (673 KB)
- 12. Shielding and X-ray facility design (1,047 KB)
- 13. Occupational exposure: Part 1 (1,240 KB)
- 13. Occupational exposure: Part 2 (5,493 KB)
- 14. Radiation exposure in pregnancy (1,101 KB)
- 15. Optimization of protection in radiography: Part 1 (12,399 KB)
- 15. Optimization of protection in radiography: Part 2 (1,207 KB)
- 16. Optimization of protection in fluoroscopy: Part 1 (5,554 KB)
- 16. Optimization of protection in fluoroscopy: Part 2 (1,480 KB)
- 17. Optimization of protection in interventional radiology: Part 1 (1,045 KB)
- 17. Optimization of protection in interventional radiology: Part 2 (1,480 KB)
- 18. Optimization of protection in CT (3,460 KB)
- 19. Optimization of protection in mammography (880 KB)
- 20. Optimization of protection in digital radiology (3,045 KB)
- 21. Optimization of protection in paediatrics (6,113 KB)
- 22. Optimization of protection in dental radiology (5,086 KB)
- 23. Organizing a QA program in diagnostic radiology (1,170 KB)

Practicals

All exercises (ZIP of 28 files, 59.2 Mb)

RPOP on Twitter

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- 23. Organizing a QA program in diagnostic radiology (1,170 KB)

Practicals

All exercises (ZIP of 28 files, 59.2 Mb)

- 12. Shielding and X-ray facility design: Part 1 (1,196 KB)
- 12. Shielding and X-ray facility design: Part 2 (8,126 KB)
- 13. Optimization of protection in radiography: Part 1 (4,102 KB)
- 13. Optimization of protection in radiography: Part 2 (492 KB)
- 15. Optimization of protection in radiography: Part 3 (1,057 KB)
- 15. Optimization of protection in radiography: Part 4 (486 KB)
- 15. Optimization of protection in radiography: Part 5 (520 KB)
- 15. Optimization of protection in radiography: Part 6 (984 KB)
- 15. Optimization of protection in radiography: Part 7 (3,862 KB)
- 15. Optimization of protection in radiography: Part 8 (499 KB)
- 15. Optimization of protection in radiography: Part 9 (511 KB)
- 16. Optimization of protection in fluoroscopy: Part 1 (9,843 KB)
- 16. Optimization of protection in fluoroscopy: Part 2 (8,186 KB)
- 16. Optimization of protection in fluoroscopy: Part 3 (8,113 KB)
- 16. Optimization of protection in fluoroscopy: Part 4 (3,167 KB)
- 16. Optimization of protection in fluoroscopy: Part 5 (788 KB)
- 16. Optimization of protection in fluoroscopy: Part 6 (1,334 KB)
- 18. Optimization of protection in CT (2,121 KB)
- 19. Optimization of protection in mammography: Part 1 (515 KB)
- 19. Optimization of protection in mammography: Part 2 (1,327 KB)
- 19. Optimization of protection in mammography: Part 3 (731 KB)
- 19. Optimization of protection in mammography: Part 4 (568 KB)
- 19. Optimization of protection in mammography: Part 5 (528 KB)
- 19. Optimization of protection in mammography: Part 6 (1,610 KB)
- 19. Optimization of protection in mammography: Part 7 (6,196 KB)
- 19. Optimization of protection in mammography: Part 8 (1,367 KB)
- 19. Optimization of protection in mammography: Part 9 (510 KB)
- 19. Optimization of protection in mammography: Part 10 (518 KB)

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Power Point Slides (not pdf)

IAEA Radiation Protection of Patients (RPOP)

Home Information for Additional Resources Special Groups Member Area

Information for Health Professionals

Member States

Patients

Home > Training > Free Material

Paediatric Radiology

Training material developed in collaboration with Image Gently

Lectures/Slides

All 10 modules (ZIP of 10 files, 40.92 Mb)

- 01. Why Talk About Radiation Protection during Radiological Procedures in Children (4,290 KB)
- 02. Understanding Radiation Units (5,544 KB)
- 03. Radiation Protection of Children in Screen Film Radiography (8,748 KB)
- 04. Radiation Protection of Children in Digital Radiography (2,951 KB)
- 05. Radiation Protection of Children in Fluoroscopy (2,537 KB)
- 06. Radiation Protection of Children During Computed Tomography (6,597 KB)
- 07. Radiation Protection of Children in Interventional Radiology and Cardiology (3,003 KB)
- 08. Standards and Guidelines in Radiological Procedures in Children (6,304 KB)
- 09. Quality Assurance in Paediatric Radiological Procedures (1,497 KB)
- 10. Organization of a Paediatric Radiology Department (6,194 KB)

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Diagnostic and Interventional Radiology

Training material developed in collaboration with

- World Health Organization (WHO)
- Pan American Health Organization (PAHO)
- International Labour Organization (ILO)
- International Society of Radiology (ISR)
- International Organization for Medical Physics (IOMP)
- International Society of Radiographers and Radiological Technologists (ISRTT)

Русский

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field of patient protection.

Please see below the list of available courses:

If you wish to receive a certificate:

1. Register with NUCLEUS
2. Confirm the email link received after your registration
3. Once your IAEA Nucleus account is activated, click on <http://elearning.iaea.org/m2/course/index.php?categoryid=75> and select one of the courses
4. Enroll yourself in the course
5. After viewing the material, take the course quiz/quizzes. If you answer correctly at least 80%, you can obtain a certificate of completion.

webinars RPOP

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Free Webinars - Radiation Protection of Patients - International Atomic ...
<https://rop.iaea.org/RPOP/RPoP/Content/AdditionalResources/...webinars/index.htm>
 Participate in our free webinars on hot topics from the radiation protection in medical uses of ionizing radiation, and take the opportunity to learn from the world's ...
 You've visited this page 4 times. Last visit: 9/10/16

IAEA webinars on topics from radiation protection in ... - IAEA RPOP
<https://rop.iaea.org/RPOP/RPoP/Content/News/2-IAEA-webinars.htm>
 The Radiation Protection of Patients Unit of the IAEA has started a new initiative: free webinars on topics in radiation protection in medical uses of ionizing ...

Upcoming webinar jointly with LatinSafe: How to ... - IAEA RPOP
<https://rop.iaea.org/RPOP/RPoP/...webinars/...webinar/index.htm>
 Upcoming webinar jointly with LatinSafe: How to implement a CT dose optimization program (in Spanish) (29 June 2017, 4 pm CET) ...

Radiation Protection of Patients
<https://rop.iaea.org/>
 RPOP celebrates sending the 100th update to its subscribers ... Smart Card project, Bonn Call for Action, RPOP Free Webinars, Safety in Radiation Oncology.

Free Series of Joint Webinars on Imaging for Children: Using the ...
<https://rop.iaea.org/RPOP/RPoP/Content/News/2017-2-free-webinars.htm>
 The Radiation Protection of Patients Unit of the IAEA is continuing in its successful initiative: free

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Image Gently: Radiation exposure in children with congenital and acquired heart disease: An overview of risks and strategies for multi-modality optimization	Prof. Kevin Hill	9 May 2017, 3 pm CET	Recording	
Image Gently: Progress and challenges in CT education and advocacy	Prof. Kimberly E. Applegate, Mr. Dean Pekarovic, Ms. Hanna Muller and Ms. Caren Swenson	4 April 2017, 3 pm CET	Recorded broadcast	
Image Gently: Optimization of radiography in children – the case of chest radiographs	Prof. Kimberly E. Applegate (Panelist) Ms. Ms. Beatrix Kotz (Panelist)	23 February 2017, 3 pm CET	Recorded broadcast	
Strategies for Communicating Radiation Risk for Medical Imaging in Children	Prof. Donald Frush	15 December 2016, 3 pm CET	Recorded broadcast	
Radiation exposure of the pregnant and breastfeeding patients in nuclear medicine	Assoc. Prof. Sigrid Leide-Svegborn	13 October 2016, 2 pm CET	Recorded broadcast	
Managing X-ray exposure to pregnant patients	Prof. John Damiakis	14 July 2016, 2 pm CET	Recorded broadcast	
Approaches to estimating radiation exposure to the lens of the eye during interventional procedures (SPANSIS)	Prof. Eliseo Vano	4 May 2016, 3 pm CET	Recorded broadcast	
Radiation induced skin injuries in interventional procedures	Dr. Madan Rehani	5 April 2016, 3 pm CET	Recorded broadcast	
Approaches to estimating radiation exposure to the lens of the eye during interventional procedures	Prof. Eliseo Vano	9 March 2016, 3 pm CET	Recorded broadcast	List of references
Is cataract a real risk to those working in interventional suites?	Dr. Madan Rehani	4 February 2016, 3 pm CET	Recorded broadcast	

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FAQs and Posters

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IAEA Radiation Protection of Patients (RPOP)

Home > Health Professionals > Other Specialties & Im... > Radiation and cataract

Radiation and cataract : Staff protection

What is RLOD?

- 1. Which part of the eye does cataract affect?
- 2. Is cataract caused by ionizing radiation different from that caused by age?
- 3. Is it possible to diagnose radiation-induced eye lens injuries?
- 4. Is there a unique system of classification of radiation induced opacities?
- 5. How to treat cataract?
- 6. How much radiation dose to the eye lens is necessary for the production of radiation injuries?
- 7. How soon after a radiation exposure can one expect to see radiation-induced eye lens injuries?
- 8. Is there a specific dose limit for eyes?
- 9. Which health professionals are at risk of radiation induced eye lens injury?
- 10. Which factors can affect eye lens dose in fluoroscopy procedures?
- 11. How can I manage eye lens exposure and prevent eye lens injuries?
- 12. How efficient are personal protection tools?
- 13. Is there a risk of cataract after several years of work in a catheterization laboratory?
- 14. What are the typical eye lens doses associated with diagnostic and therapeutic interventional procedures?
- 15. How can eye lens dose be measured more effectively?
- 16. Is there a correlation between staff eye lens doses and patient dose?

1. Which part of the eye does cataract affect?

There are three predominant forms of cataract depending on their anatomical location (Fig.1) in the eye lens: cortical, nuclear and posterior sub-capsular (PSC). As a person ages, any one type, or a combination of any of these three types, can develop over time. The most common form of age-related cataract, caused primarily by

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IAEA Radiation Protection of Patients (RPOP)

Home > Health Professionals > Other Specialties & Im... > Radiation and cataract

Radiation and cataract : Patient protection

What is RLOD?

- 1. Which X ray procedures and clinical conditions are associated with elevated eye lens doses to the patient?
- 2. What are typical eye lens doses to patients associated with diagnostic and interventional procedures?
- 3. How can I manage eye lens dose and prevent injuries in patients?

1. Which X ray procedures and clinical conditions are associated with elevated eye lens doses to the patient?

In procedures such as head CT, paranasal sinus CT, temporal bone and orbital CT and neuro-interventional procedures, the eye is most likely in the field of the primary X-ray beam and thus will have the potential to receive a higher dose if appropriate techniques to optimize protection of the eye are not used. Table 2 lists radiation dose to the eye in different examinations and procedures. As is apparent, when the eye is not in the primary beam (for examinations of body areas excluding the head), the scattered radiation dose is very small.

Patients with recurrent and chronic conditions are among those who require frequent examination. As an example, 26% of patients with hydrocephalus receive radiation dose to lenses higher than 150 mSv within 3 years [37]. In paediatric patients, repeated head CT examinations result in average cumulative dose to lens of the eye of 26 mSv over a few years, but it can be as high as 1.3 Gy [38].

Page Top ↑

2. What are typical eye lens doses to patients associated with diagnostic and interventional procedures?

Typical values in terms of absorbed dose to the patient's lens of the eye per procedure are presented in Table 2 below.

Table 1. Typical eye lens doses to patients' eyes for various X-ray procedures in children and adults*

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10 Pearls: Radiation protection of *patients* in fluoroscopy

<http://rpop.iaea.org>

Translation into many languages

10 Pearls: Radiation protection of *patients* in fluoroscopy

1. Maximize distance between the X-ray tube and the patient to the extent possible.
2. Minimize distance between the patient and the image receptor.
3. Minimize fluoroscopy time.
4. Use pulsed fluoroscopy with the lowest frame rate possible to obtain images of acceptable quality.
5. Avoid exposing the same area of the skin in different projections.

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10 Pearls: Radiation protection of *patients* in fluoroscopy

1. Maximize distance between the X-ray tube and the patient to the extent possible.
2. Minimize distance between the patient and the image receptor.
3. Minimize fluoroscopy time.
4. Use pulsed fluoroscopy with the lowest frame rate possible to obtain images of acceptable quality.
5. Avoid exposing the same area of the skin in different projections.
6. Larger patients or thicker body parts trigger an increase in entrance surface dose (ESD).
7. Oblique projections also increase ESD.
8. Avoid the use of magnification.
9. Minimize number of frames and one-time to clinically acceptable level.
10. Use collimation.

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10 Pearls: Radiation protection of *staff* in fluoroscopy

1. Use protective devices!
2. Make good use of time-distance-shielding (TDS) principle.
3. Use ceiling suspended screens, lateral shields and table curtains.
4. Keep hands outside the primary beam unless totally unavoidable.
5. Only 1-5% of radiation falling on the patient's body exits the other side.
6. Keep X-ray tube under the patient table and not over it.
7. Use personal dosimetry.
8. Update your knowledge about radiation protection.
9. Address your concerns about radiation protection to radiation protection specialists (medical physicists).

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10 Pearls: Radiation protection for *children* in interventional procedures

1. Remember: Some tissues of a growing child are more sensitive to radiation than adult.
2. Discuss with parents before the procedure.
3. Increase awareness among your team members through the use of a pre-procedure safety checklist.
4. Plan the procedures in detail and in advance to avoid improper or aborted runs or other repeated exposures.
5. Protect the patient's thyroid, breast, eyes and gonads where possible.
6. Use optimal technique.
7. Use "last image hold" rather than additional exposures, where appropriate.
8. Increase distance between patient and the X-ray tube and decrease distance between patient and image receptor.
9. Use dose recording and dose reduction technologies in equipment.
10. Review and record radiation dose after the procedure.

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Language	Patient	Staff
		
English	10 pearls on radiation protection of patients in fluoroscopy Download PDF	10 pearls on radiation protection of staff in fluoroscopy Download PDF
عربي (Arabic)	الآثار العظيمة: الوقاية الإشعاعية للمرضى من التصوير الإشعاعي Download PDF	الآثار العظيمة: الوقاية الإشعاعية لفرق التصوير الإشعاعي Download PDF
Български (Bulgarian)	10 златни правила: Радиационна защита на пациентите при скопия Download PDF	10 златни правила: Радиационна защита на персонала при скопия Download PDF
中文 (Chinese)	十大要訣：X射线透视中患者的放射防护 Download PDF	十大要訣：X射线透视中职业人员的放射防护 Download PDF
Hrvatski (Croatian)	10 Zlatnih Pravila—Zaštita bolesnika od zračenja u dijaskopiji Download PDF	10 Bisera: Zaštita osoba od zračenja pri dijaskopiji Download PDF
Deutsch (German)	10 Tipps: Strahlenschutz für Patienten bei Durchleuchtung Download PDF	10 Tipps: Strahlenschutz des Personals i.d. Durchleuchtung Download PDF
Ελληνικά (Greek)	10 χρυσά κανόνες: Ακτινοπροστασία ασθενών κατά την ακτινοσκόπηση Download PDF	10 χρυσά κανόνες: Ακτινοπροστασία προσωπικού κατά την ακτινοσκόπηση Download PDF
Français (French)	10 Recommendations: Radioprotection des patients en fluoroscopie Download PDF	10 Recommendations: Radioprotection du personnel en fluoroscopie Download PDF

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עברית (Hebrew)	10 כללי הגנה מרדיוסיום נוסף פסיון Download PDF	10 כללי הגנה מרדיוסיום נוסף פסיון Download PDF
Indonesia (Indonesian)	10 Mutiara: Proteksi Radiasi Bagi Pasien pada fluoroskopi Download PDF	10 Mutiara: Proteksi Radiasi Bagi Staf Pada Fluoroskopi Download PDF
Italiano (Italian)	10 Regole d'oro: Radioprotezione del paziente in fluoroscopia Download PDF	10 Regole d'oro: radioprotezione degli operatori in fluoroscopia Download PDF
한국어 (Korean)	10개 황학: 투시검사 시 환자의 방사선 방어 Download PDF	10개 황학: 투시검사 시 종사자의 방사선 방어 Download PDF
Македонски (Macedonian)	10 Златни правила: Заштита на пациентите од радијација при флуороскопија Download PDF	10 Златни правила: Заштита од радијација на персоналот при флуороскопија Download PDF
Монгол үсэг (Mongolian)		10 Шингүүд санам: Рентген харалтын үед ажиглагчид үзүүлэх цацаргийн хамгаалалт Download PDF
Polski (Polish)	10 zasad: Ochrona radiologiczna pacjenta podczas fluoroskopii Download PDF	10 zasad: Ochrona radiologiczna personelu podczas fluoroskopii Download PDF
Português (Portuguese)	10 Recomendações para proteção de pacientes em fluoroscopia Download PDF	10 Recomendações para a proteção do staff em fluoroscopia Download PDF
Русский (Russian)	10 Способов радиационной защиты пациентов Download PDF	10 Способов радиационной защиты персонала Download PDF
српски (Serbian)	10 Bisera: Zaštita pacijenata u fluoroskopiji Download PDF	10 Bisera: Zaštita osoba u fluoroskopiji Download PDF
Español (Spanish)	10 Recomendaciones para protección de pacientes en fluoroscopia Download PDF	10 Recomendaciones para la protección del staff en fluoroscopia Download PDF
Svenskt (Swedish)	10 råd: Strålskydd för patienter vid genomlysning Download PDF	10 råd: Strålskydd för personal vid genomlysning Download PDF

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IAEA

Dosimetry & Medical Physics

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Nuclear Medicine

The Medical Physicist

Training Events

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International Medical Physics Certification Board

IAEA references

Medical Physics is the application of physics to medicine. It uses physics concepts and procedures in the

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Audiolides - Roles and Responsibilities of a Clinically Qualified Medical Physicist

Tutorial videos for Quality Control tests on PET/CT scanners

Quality Assurance e-learning module for SPECT systems

Train the trainers Workshop on Medical Physics Support for Nuclear or Radiological Emergencies

TLD Irradiation Tutorial for participants in the IAEA/WHO Postal Dose Audit

Video Tutorial to Determine the Absorbed dose to Water for High Energy Photon Beams

IAEA support to Medical Physics VideoSlides

Nuclear Medicine Handbook slides

Diagnostic Radiology Handbook slides

Radiation Oncology Handbook slides

Slides and presentations from IDOS 2010

Transitioning from 2-D Radiation Therapy to 3-D Conformal Radiation Therapy and Intensity Modulated Radiation Therapy

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IAEA Publications

Radiation Therapy Program Implementation

Dosimetry

Treatment planning

Acceptance tests and commissioning of radiotherapy equipment

Equipment related Quality Assurance

Patient related Quality Assurance

Topics of special interest

Quality audit in radiotherapy

Radiation Protection

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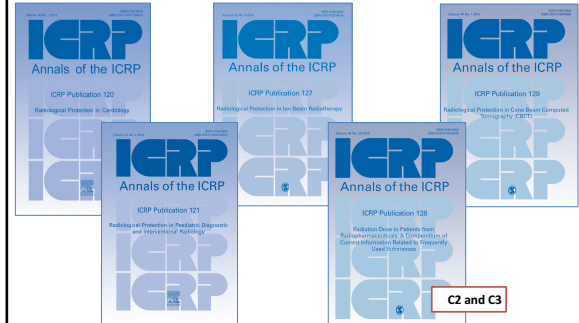
International Resources from

- IAEA
- ICRP
- European Commission (EC)
- WHO, UNSCEAR
- Some professional societies:
IOMP/IPRA/EFOMP

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ICRP Committee 3: The most recent documents



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ICRP C3 most recent publications

- P120. Radiological Protection in **Cardiology**. Ann. ICRP 42(1), 2013.
- P121. Radiological Protection in **Paediatric Diagnostic and Interventional Radiology**. Ann. ICRP 42(2), 2013.
- P127. Radiological Protection in **Ion Beam** Radiotherapy. Ann. ICRP 43(4), 2014.
- P128. Radiation Dose to Patients from **Radiopharmaceuticals**: A Compendium of Current Information Related to Frequently Used Substances. Ann. ICRP 44(2S), 2015 (with Committee 2).
- P129. Radiological Protection in **Cone Beam** Computed Tomography (CBCT). Ann. ICRP 44(1), 2015.

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Current Work Plan (a) of Committee 3

- WP on Diagnostic reference levels (DRLs) in Medical Imaging. *In press* (E. Vano).
- WP on Occupational radiation protection issues of interventions guided by radiological imaging. *Undergoing public consultation* (P. Ortiz).
- TG 36 (with C2): Radiation dose to patients from radiopharmaceuticals (D. Nosske and S. Mattsson).
- WP on Radiological Protection in Therapy with Radiopharmaceuticals (Y. Yonekura and S. Mattsson).
- WP (with C1) on Radiological Protection in Medicine in relation to the Individual Response to Ionising Radiation (M. Bourguignon).

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- ICRP 112, Preventing accidental exposures from new external beam radiation therapy technologies (0.8 Mb)
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- ICRP 117, Radiological protection in fluoroscopically guided procedures outside the imaging department (2.2 MB)
- ICRP 113, Education and training in radiological protection for diagnostic and interventional procedures (1.1 Mb)
- ICRP 120, Radiological protection in cardiology (0.2 MB)
- ICRP 121, RP of children (0.2 MB)
- ICRP 127, RP in Ion Beam RT (0.5 MB)
- ICRP 129, RP in CBCT (0.3 MB)

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These downloads replace ICRP CD1, CD2 and CD3 which are now out of print. These free downloads are for Windows operating systems, including Win 7, on 32 and 64 bit machines.

ICRP Database of Dose Coefficients: Workers and Members of the Public; Ver. 3.0
Available as a Windows setup file named [ICRPDOSE_setup.exe](#).

ICRP Database of Dose Coefficients: Embryo and Fetus; Ver. 2.0
Available either as a Windows setup file named [ICRPFC02_setup.exe](#) or as a self-extracting file named [ICRPFC02_SelfExtract.exe](#).

ICRP Database of Dose Coefficients: Radionuclides in Mother's Milk; Ver. 2.0
Available either as a Windows setup file named [ICRPFC03_setup.exe](#) or as a self-extracting file named [ICRPFC03_SelfExtract.exe](#).

If the Help utility is not available for CD2 and CD3 it may be necessary to download from a program from Microsoft. See the ReadMe.txt file in the installation folder after installing these databases.

Please note that the dose coefficients in the first of the downloadable CDs listed above are the same as those in ICRP Publication 119 "Compendium of Dose Coefficients based on ICRP Publication 60". Although the downloadable CDs will be of practical use, the above-noted ICRP Publication will be the definitive and reference able compendium of these coefficients.

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A new way to visually convey level of dose

Table 4.1. Typical patient dose levels (rounded) from vascular surgical procedures.

Procedure	Relative mean effective dose to patient		Relative mean radiation dose to patient*	Reported values			
	0	mSv 35		Fluoroscopy time (min)	Entrance skin dose (mGy)	Dose-area product (Gy·cm ²)	Effective dose (mSv)
EVAR			F,G	21	330-850	60-150	8.7-27
Venous access procedures			B	1.1-3.5	8-24	2.3-4.8	1.2
Renal/visceral angioplasty (stent/no stent)			G	20.4	1442	208	54
Iliac angioplasty (stent/no stent)			G	14.9	900	223	58

Rehani et al. ICRP Publication 117. Radiological protection in fluoroscopically guided procedures performed outside the imaging department. 2010



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Table 4.2. Typical patient dose levels (rounded) from Urological procedures.

Procedure	Relative mean effective dose to patient		Relative mean radiation dose to patient*	Reported values
	0	mSv 35		Fluoroscopy (min)
IVU/IVP			C,D	na**
Cystometrography			B	n
Cystography			B	n
Excretion urography/MCU			C	n
Urethrography			B	n
PCNL			A	6-12
Nephrostomy			D	13-20
ESWL			B	2.6-3.4
Kidney stent insertion			E	/
Ureteric stent placement			E	/

Table 4.6. Typical patient dose levels (rounded) from gastroenterology and hepato-biliary

Procedure	Relative mean effective dose to patient		Relative mean radiation dose to patient*	Reported values
	0	mSv 35		Fluoroscopy (min)
ERCP (diagnostic)			C,D	2-3
ERCP (therapeutic)			E,F	5-10
Biopsy			E	na**
Bile duct stenting			E	na**
PTC#			D	6-14
Bile duct drainage			F,G	12-26
TIPS***			F,G	15-93
Intrahepatic hepatic biopsy			D	6.8

*A<1 mSv; B=1 to <2 mSv; C=2 to <3 mSv; D=3 to <10 mSv; E=10 to <20 mSv; F=20 to <35 mSv
** not available

Table 4.5. Typical patient dose levels from gynaecological procedures

Procedure	Relative mean effective dose to patient		Relative mean radiation dose to patient*	Reported values
	0	mSv 35		Fluoroscopy (min)
Pelvimetry, conventional			A	na**
Pelvimetry, digital			A	0.2-0.8
fluorography			A	0.85
CT Pelvimetry			A	0.10-1.4
HSG			A	na**
UAE***			A	0.020-1.1
*A<1 mSv; B=1 to <2 mSv; C=2 to <3 mSv; D=3 to <10 mSv; E=10 to <20 mSv; F=20 to <35 mSv				
Pelvis			A	na**
Hip			A	0.020-1.1
Shoulder			A	na**
Knee			A	na**
Other extremities			A	na**
Hand/wrist			B,C	0.20-0.55
Distal radius plate osteosynthesis			na**	1.8***
Osteosynthesis of malleolar fracture			na**	1.5***
Plate osteosynthesis of tibial plateau fracture			na**	1.2***
Arthroscopy for ACL reconstruction			na**	0.9***
Tibial intramedullary nailing			na**	5.7***
Intra-articular nailing of hip			na**	6.3***
Distal femoral fracture			na**	6.3***

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International Resources from

- IAEA
- ICRP
- European Commission (EC)
- WHO, UNSCEAR
- Some professional societies: IOMP/IRPA/EFOMP

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 The European Commission has issued publications since 1976 to provide important information on ionising radiation and radiation protection ... The seminar's proceedings are published as part of the Radiation Protection Series.

Radiation protection series publications - European Commission
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 Radiation protection series publications. The European Commission has issued publications on radiation protection since 1976. They can be found below with their Radiation Publication Series (RP) number.

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 These "European Guidelines on Medical Physics Expert" have been ... legislation for radiation protection (Council Directive 2013/59/Euratom) considerably.
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東日本大震災後の原子力事故による放射線被ばくのレベルと影響に関するUNSCLEAR 2013年報告書
国連科学委員会による今後の作業計画を指し示す **2016年白書**（英語版及び日本語版が利用可能）

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Radiation Safety Culture in Medicine

Medical physicists have responsibility for patient protection as described in International Basic Safety Standards (BSS). Additionally, medical physicists may share responsibility for occupational protection, as described in BSS. A series of over exposures in last few years have brought the need for safety culture in use of ionizing radiation in medicine.

While medical physicists in large part of the world are involved in day-to-day strengthening of safety culture, IOMP's role has been in:

- revision of BSS and with its content on Safety Culture
- review of Safety Guide of IAEA and as in training course on implementation of safety guide
- organizing a session in World Congress on Medical Physics & BME, June 2015, Toronto on Implementation of BSS and Safety Culture in Medicine under the lead of Madan Rehani.

Further, IOMP along with IRPA and WHO jointly organized following workshops

1. First Regional Workshop on Radiation Protection Culture in Medicine held in Buenos Aires on 11th April 2015 for Latin American countries. IOMP was represented by Dr Simone Kudulovic Renha represented IOMP. A brief abstract is available here.

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Education and Training

IRPA promotes excellence in the practice of radiation protection through national and regional Associate Societies for radiation protection professionals. Education and Training (E&T) is a key factor in establishing effective national radiation protection programmes. The IRPA E&T Plan has three objectives:

- cooperation with international and regional organizations dealing with E&T in Radiation Protection;
- internal stimulation of E&T by organizing discussion forums during IRPA Congresses; and

Resources

The role of IRPA in education and training of radiation protection professionals.pdf	17 kb	2012-12-02
IRPA Contribution to E T Activities for Radiation Protection Professionals.pdf	2483 kb	2012-12-02

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Latest News

- Chief radiotherapy physicist, Gloucestershire Oncology Regional Cancer Treatment Service, Gloucestershire, North Somerset, New Zealand 09-06-2017
- Head of Radiotherapy Physics - Dorset Cancer Centre, UK 04-06-2017
- Royal Marsden, NHS Foundation Trust is looking for a RT physicist 07-05-2017
- EFOMP announces the 2nd Workshop dedicated to young scientists working in Medical Physics in September 07-05-2017
- Professionals of Technological Statistics 04-05-2017

Publications

On the page we list the various publications that EFOMP has produced. Our policy statements are produced to offer guidelines on the appropriate general responsibilities, organisational relationships and roles of workers in the field of Medical Physics. They are produced by experts mainly from medical physics societies in Europe. Other documents carry the approval of EFOMP but are not classed as Policy Statements. In addition EFOMP produces a Newsletter and European Medical Physics News, which carry articles of interest to the European Medical Physics Community.

EMP News

Latest European Medical Physics annuality

- EMP News Autumn 2016
EMP News Autumn 2016
Created on: 23-11-2016
- EMP News Winter 2015
Created on: 18-01-2016

Policy Statements

- Policy Statement No.7.1
The European Federation of Organisations for Medical Physics, Policy Statement No. 7.1: The roles, responsibilities and status of the medical physicist including the criteria for the staffing levels in a Medical Physics Department

EFOMP Journals

- The official journal of EFOMP is *Physics in Medicine: The European Journal of Medical Physics*
- EFOMP also sponsors 4 other journals:
 - Clinical and Physiological Measurements
 - European Radiology
 - Physics in Medicine and

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Recap

- RPOP versus ORP
- Resources from IAEA: Free .ppt slides, posters, eLearning material, webinars
- ICRP: Free till P28, some others. Free Educational ppt slides, CD material
- European Commission (EC): Free downloads
- WHO, UNSCEAR: Free downloads
- Some professional societies: IOMP/IRPA/EFOMP: Free material

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Thank You

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