

IAEA guidance and resources for improving radiation protection education and training of radiographers and other health professionals

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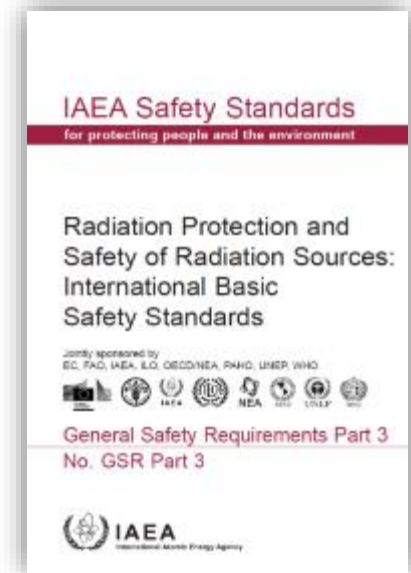
RER 9147: Enhancing Member States' Capabilities for Ensuring Radiation Protection of Individuals Undergoing Medical Exposure (2018-2021)



IAEA Technical Cooperation Division for Europe

Objective:

To improve the implementation of the framework of radiation protection in medical uses of ionizing radiation, and enhance the national capabilities for medical exposure control in compliance with requirements of the GSR Part 3 (International Basic Safety Standards)



IAEA statutory function



To establish standards of safety

Safety Fundamentals

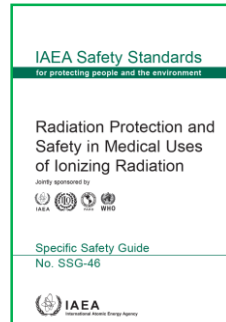
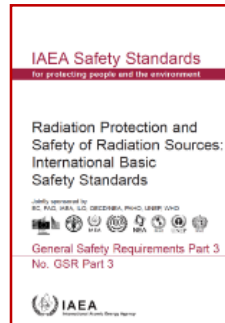
Safety Requirements

Safety Guides

Principles

"Shall"

"Should"

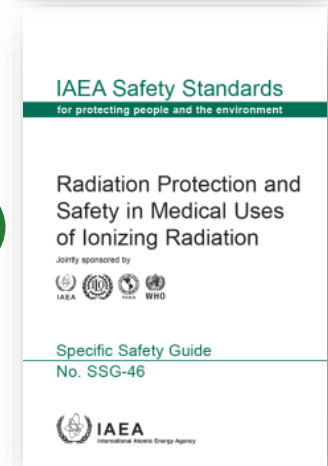


To provide for the application of these standards



IAEA Safety Standards

- ◆ **GSR Part 3: International Basic Safety Standards**
 - Published 2014, replacing the old BSS
 - Set basic requirements for protection and safety
 - Mandatory for MS receiving technical assistance from the IAEA
 - Used as template for many national regulations
- ◆ **Safety Guide on Radiation Protection and Safety in Medical Uses of Ionizing Radiation (SSG-46)**
 - Provides guidance on fulfilling the BSS requirements in medical settings
 - Published October 2018



Key staff for radiation protection



Radiological medical practitioner

- Radiologists
- Nuclear medicine physicians
- Radiation oncologists
- Other doctors using X-rays

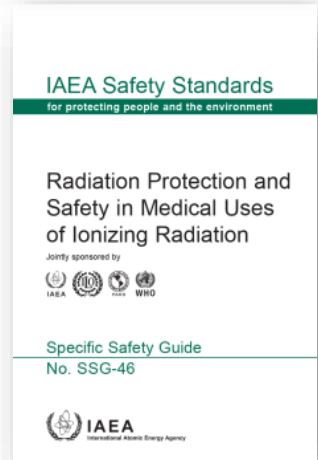
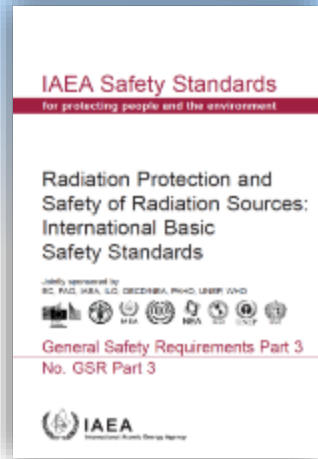
Medical radiation technologists

Radiographer, RTT, NM technologist, ...

Medical physicists

- Qualified in one or more sub-fields

The education, training, qualification and competence of the health professionals underpin radiation protection and safety in medical uses of ionizing radiation



Medical radiation technologist (SSG-46)



The medical radiation technologist is usually the interface between the radiological medical practitioner and the patient, and his or her skill and care in the choice of techniques and parameters determines to a large extent the practical realization of the optimization of radiation protection and safety for a given patient's exposure in many modalities.



Medical radiation technologist (definition)



A health professional, with specialist education and training in medical radiation technology, competent to perform radiological procedures, on delegation from the radiological medical practitioner, in one or more of the specialties of medical radiation technology.

- ① Competence of persons is normally assessed by the State by having a formal mechanism for registration, accreditation or certification of medical radiation technologists in the various specialties (e.g. diagnostic radiology, radiation therapy, nuclear medicine). States that have yet to develop such a mechanism would need to assess the education, training and competence of any individual proposed by the licensee to act as a medical radiation technologist and to decide, on the basis of either international standards or standards of a State where such a system exists, whether such an individual could undertake the functions of a medical radiation technologist, within the required specialty.



Project on Radiation Protection E&T of Medical Radiation Technologists/Radiographers in cooperation with



Three phases

Phase 1: Survey to understand the status (launched in October)

Phase 2: Meeting 23-25 November to identify problems, share knowledge and propose solutions and actions

Phase 3: Webinars 1-3 December to disseminate results and actions



Project on Radiation Protection E&T of Medical Radiation Technologists/Radiographers in cooperation with



Scope

- Academic education
- Postgraduate E&T
- Clinical training
- Continuous professional development



Is this E&T sufficient to acquire needed knowledge, skills and competences to work independently and take the responsibility for quality and safety?



Webinar Series on Radiation Protection Education and Training of Medical Radiation Technologists/ Radiographers

Webinar 1: Education and Training of Radiographers in TC Europe region: Good practices, problems and solutions

Jonathan McNulty
EFRS President



Jonathan Portelli
Malta



Joana Santos
Portugal



Shane Foley
Ireland



Graciano Paulo
Portugal



Request for an IAEA support from the TC meeting



The screenshot shows a Zoom meeting in progress. The main area is a grid of 20 video thumbnails. The participants are: Jlenia VASSIL... (Host...), abakas, Graciano Paulo, Shane Foley, Ainars Bajinskis, Anna Zagorska, ANTONESCU ELISABE..., Aurika Vandkaviciene, Anna Zagorska, Daniela Rizova, Desislava Kostova-Letterova, Ina Moldovanu, Ionescu STANUCA, Kostadinka, Mehmet ERKEK, Nejc Makis, Racheru Mihaela, Ketevan Jariashvili, David Nadareishvili, Jonathan Portelli, Mehim Jusufbegovic, Ceren Ozturk, and Miriam DE... (Cohost...). The control panel on the right includes a list of participants with icons for mute, video, and chat, a 'Mute all' button, a 'Chat' section with a message from Miriam DE... and a text input field set to 'Everyone'.

Request for an IAEA support from the TC meeting



- ◆ Develop guidance document for the education and training of radiographers in radiation protection, including recommended curricula, trainers' competence, equipment needed for practical training, and other important components to improve radiographers competence in radiation protection.
- ◆ Develop video courses and other learning resources for different modalities.
- ◆ Expert support to national activities and trainings.



Radiation Protection in Medicine



Implementation of Safety Standards



International Action Plan for the Radiological Protection of Patients

Developed after the Málaga Conference (2001); the Steering Panel to review the implementation involved: IAEA, WHO, PAHO, UNSCEAR, ICRP, EC, IEC, ISO, IOMP, IRPA, ISRO, ISRRT, WFNMB

Education and training

Action: to complete the development of a standard syllabus and packages for training in the application of safety standards.

Action: to train the trainers involved in national training programmes using the above mentioned packages.

Action: to arrange for a review of the syllabus for the Agency training courses in medical radiation physics by appropriate professional bodies and to publish the results.

Action: to explore the potential uses of information technology and distance learning, identifying application areas and types of information technology.

Information exchange

Action: to explore mechanisms for widely disseminating information related to the protection of the patient.

Action: to collect and disseminate, using the Agency's International Reporting System for Unusual Radiation Events (RADEV), information about accidental medical exposures, including, as far as possible, information about events that did not have clinical consequences but from which prevention-relevant lessons can be drawn.

Assistance

Action: to support Member States in the gradual transition from the basic to advanced stages of implementation of the BSS.

Action: to promote the formal recognition of medical physicists responsible for the radiological protection of patients as health professionals.

Action: to promote - through the provision of advice about the functions, responsibilities and training of technologists - recognition of the impact of technologists involved in day-to-day procedures on the radiological protection of patients.

Action: to continue current activities in radiotherapy concerned with the traceability of dose measurements and with audit services, including the development of local expertise, and to extend these services to diagnostic radiology and nuclear medicine.

Guidance

Action: to finalize the existing draft practice-specific guidance documents, seeking input from professional bodies, international organizations and national authorities responsible for the radiological protection and medical care of patients..

Action: to provide guidance to donors, recipients and NGOs on the safety issues related to the transfer of second-hand equipment.

Implementation of Safety Standards

Bonn Call to Action (2012)

- Bonn Conference (2012), organized by the IAEA in cooperation with WHO
- 10 actions to improve radiation protection in medicine in the next decade



BONN CALL FOR ACTION

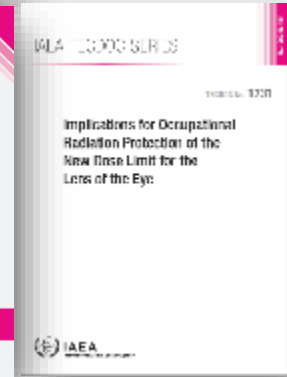
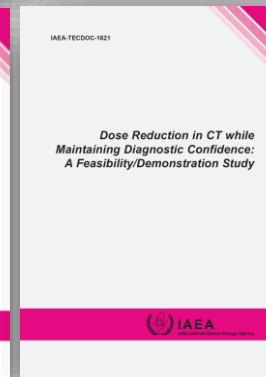
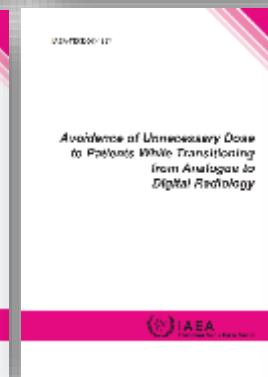
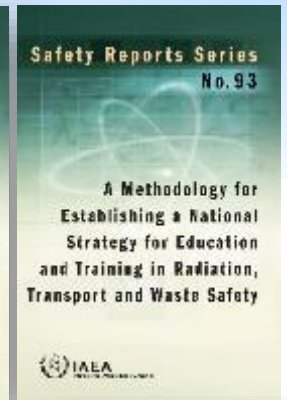
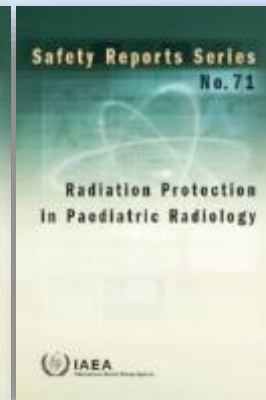
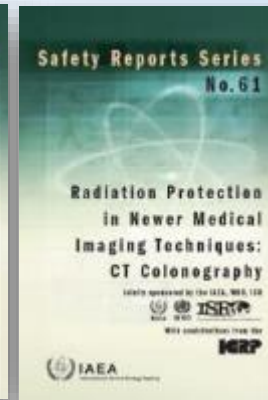
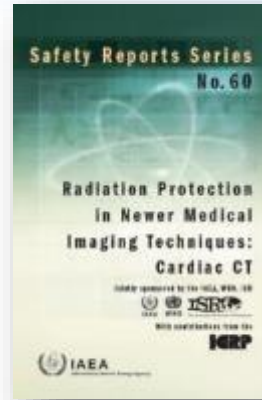
10 Actions to Improve Radiation Protection
in Medicine in the Next Decade



Strengthen radiation protection education and training of health professionals

- ❑ Prioritize radiation protection education and training for health professionals globally, targeting professionals using radiation in all medical and dental areas;
- ❑ Further develop the use of newer platforms such as specific training applications on the Internet for reaching larger groups for training purposes;
- ❑ Integrate radiation protection into the curricula of medical and dental schools, ensuring the establishment of a core competency in these areas;
- ❑ Strengthen collaboration in relation to education and training among education providers in health care settings with limited infrastructure as well as among these providers and international organizations and professional societies;
- ❑ Pay particular attention to the training of health professionals in situations of implementing new technology.

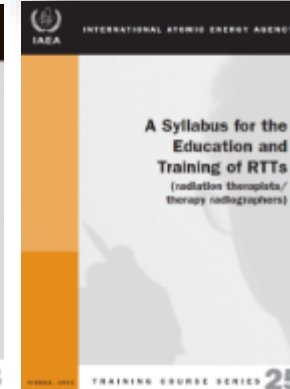
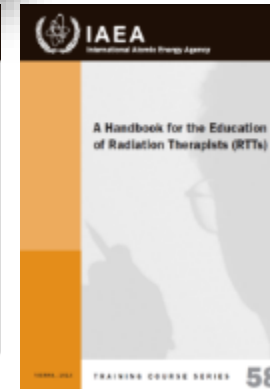
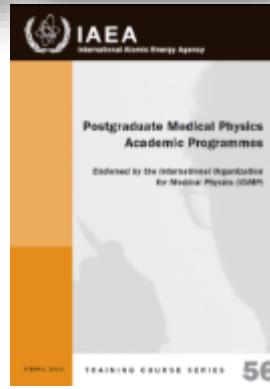
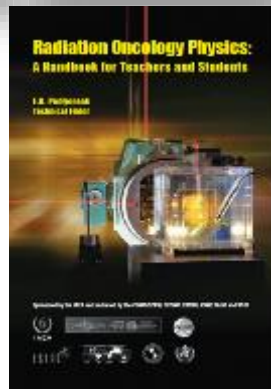
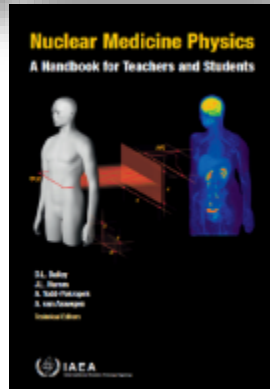
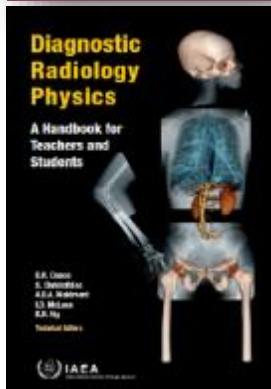
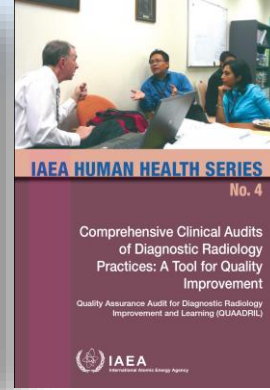
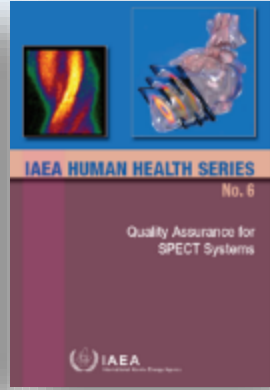
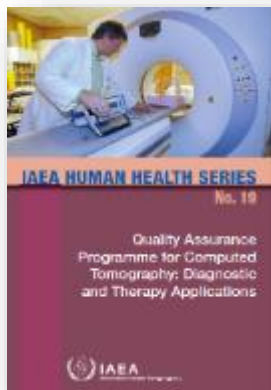
Guidance – Safety series



Free download at http://www-pub.iaea.org/books/IAEABooks/Serial_Publications

j.vassileva@iaea.org

Guidance – Human Health Series



Free download at http://www-pub.iaea.org/books/IAEABooks/Serial_Publications

j.vassileva@iaea.org



In person training:

- Courses
- Workshops
- Fellowships, Scientific visits



Online-based activities:

- Training resources on RPOP website
- E-learning
- Webinars
- Outreach materials complementing training
- Online information and learning systems

In person training



- Training courses and workshops
- Fellowships
- Individual and group scientific visits

In 2019: 48 regional and national training courses and workshops with 1450 participants under the regional and national TC projects



Free training material

13 free training packages

- Power Point slides
- Material reflects IAEA standards and international consensus
- All available in English, some in Spanish and Russian
- For free download and use by trainers
- May be copied, distributed, displayed, incorporated in customized presentations

Training material

- Diagnostic and interventional radiology →
- Digital radiology →
- Paediatric radiology →
- Radiation dose management in computed tomography (CT) →
- Radiotherapy →
- Radiotherapy: Prevention of accidental exposure →
- Safety and quality in radiotherapy →
- Nuclear medicine →
- Cardiology →
- PET/CT →
- Doctors using fluoroscopy outside radiology (Urologists, Gastroenterologists, Orthopaedic surgeons etc.) →
- Dental radiology →

<https://www.iaea.org/resources/rpop/resources/training-material>

Free training material

Digital radiology



Lectures →

Lectures:

- 01. Fundamentals of Digital Radiography
- 02. Exposure indicators and patient dose estimation in CR and DR
- 03. Optimization in CR and DR
- 04. Optimisation of Digital Fluoroscopy
- 05. Digital Radiographic Image Processing
- 06. Avoiding Artefacts in Computed Radiography
- 07. Avoiding Artefacts in Digital Radiography
- 08. Optimising DR Displays
- 09. Picture Archival and Communication System (PACS)
- 10. Practical Exercises
- Clinical Problems Oriented Flowcharts
- Topics & Objectives

Paediatric radiology



Lectures →

Lectures (in Spanish) →

Lectures:

- 01. Why Talk About Radiation Protection during Radiological Procedures in Children
- 02. Understanding Radiation Units
- 03. Radiation Protection of Children in Screen Film Radiography
- 04. Radiation Protection of Children in Digital Radiography
- 05. Radiation Protection of Children in Fluoroscopy
- 06. Radiation Protection of Children During Computed Tomography
- 07. Radiation Protection of Children in Interventional Radiology and Cardiology
- 08. Standards and Guidelines in Radiological Procedures in Children
- 09. Quality Assurance in Paediatric Radiological Procedures
- 10. Organization of a Paediatric Radiology Department

Cardiology



Lectures →

Lectures (Russian) →

Lectures:

- 01. Why talk about radiation protection in cardiology?
- 02. Talking about radiation dose
- 03. What radiation effects are possible? (besides skin injuries)
- 04. X ray production and angiography equipment
- 05. Patient dose management: Part 1-2
- 06. Standards and guidance
- 07. Occupational exposure and protective devices
- 08. Image quality in cardiac angiography
- 09. Optimization of radiation protection in cardiology
- 10. Radiation protection in paediatric interventional cardiology
- 11. Cardiac CT - radiation doses, dose management and practical issues
- 12. Examples of Good & Bad Practice (physical factors): Part 1-2

<https://www.iaea.org/resources/rpop/resources/training-material>

RPOP e-Learning

Launched end 2016 >12,000 users to date



*Radiation Dose Management in
Computed Tomography*

In English, Spanish and Russian,
French to come



*Safety and Quality
in Radiotherapy*

In English, Spanish and Russian



*Radiation Protection in
Fluoroscopy Guided
Interventional Procedures*

In English



*Tips and Tricks: Radiation
Protection in Radiography*

In English

New e-Learning material under development

- Diagnostic Reference Levels
- Radiation Protection in Dental Radiology
- Radiation Protection in interventional procedures - practical tutorials
- Dose management in CT (part II)

COMING SOON



RPOP webinars



resources

Year: [dropdown] Search: [input] [button: search]

- RPOP Home
- International Safety Standards
- Publications
- Porters and leaders
- Born Call for Action platform
- Smart Card
- RELD Study
- Training material
- Webinars
- Online Training
- Databases and Learning Systems

Date	Topic	Image
10 October 2018	Dose and quality assessment of X-ray devices for interventional angiography and cardiology	
5 September 2018	Radiation protection in interventional radiology: practical hints and tricks	
22 June 2018	Dose in Trophoblasts in TC	

Since February 2016 →  **57** webinars covering various topics →  **over 10,000** participants attended from **100** Member States

- Online lectures on topics in radiation protection of patients and staff
- In English, Spanish, Portuguese, Russian
- Held in cooperation with Image Gently, ESR (EuroSafe Imaging), LatinSafe, EFRS, IOMP, CIRSE
- Free registration and attendance
- Recording available for viewing

<https://www.iaea.org/resources/rpop/resources/webinars>

Public website <http://rpop.iaea.org>



Radiation Protection of Patients (RPOP) – the leading resource for health professionals, patients and public on the safe and effective use of radiation in medicine. To access the Spanish version of the site click [here](#).

For health professionals



Health professionals can find answers to frequently asked questions about different medical procedures and the safe use of ionizing radiation in medicine.

Radiology
Radiotherapy
Nuclear medicine
Interventional procedures
Dentistry
Other specialities and imaging modalities

For patients and public



Patients, their caretakers, and the public can learn about what to expect during medical examinations that involve ionizing radiation.

X-Rays
Computer tomography (CT)
Interventional procedures
Nuclear medicine
Radiotherapy
Brachytherapy

[Bonn Call for Action Platform](#) >

Resources

[Training](#)

[Webinars](#)

[Safety in Radiation Oncology \(SAFRO\)](#)

[Safety in Radiological Procedures \(SAFRAD\)](#)

[Posters and leaflets](#)

[Publications](#)

[RPOP Newsletter](#) >

Contact

Annually: over 500 000 pageviews

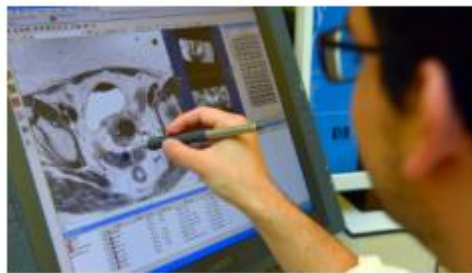
- ◆ Contains useful information and FAQs for health professionals, patients and public
- ◆ Links to resources: training material, posters, webinars, videos, etc.

Public website <http://rpop.iaea.org>



2 entries: for Health professionals and for Patients and public

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[Bonn Call for Action Platform](#) >

Resources

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[Safety in Radiological Procedures \(SAFRAD\)](#)

[Posters and leaflets](#)

[Publications](#)


 [RPOP Newsletter](#) >

Contact

- Answers to the frequently ask questions
- Links to resources: training material, posters, webinars, videos, etc.

Public website <http://rpop.iaea.org>

Home / Resources / Radiation Protection of Patients









Health Professionals

Health professionals can learn about a safe use of ionizing radiation in medicine. This section answers frequently asked questions about different medical procedures and provides links to further resources such as to reporting and learning systems.

Related resources

- 🔗 Bonn Call for Action platform
- 🔗 Training material
- 🔗 Webinars in radiation protection
- 🔗 Safety in Radiation Oncology (SAFRON)
- 🔗 Safety in Radiological Procedures (SAFRAD)
- 🔗 Outreach materials about radiation protection

 Radiology	 Radiotherapy	 Nuclear medicine
 Interventional procedures	 Dentistry	 Other specialities and imaging modalities

Outreach materials complementing training

- “10 Pearls” Posters in over 20 languages
- For free download and use

Materials for download

- Poster - Building awareness in pregnancy →
- Trifold - Delivering Safe Radiotherapy is in your Hands →
- Poster - 10 Pearls: Radiation protection of patients in CT →
- Poster - 10 Pearls: Appropriate referral for CT examinations →
- Poster: 10 Pearls: Radiation protection for children in interventional procedures →
- Poster - 10 Pearls: Radiation protection of patients in fluoroscopy →
- Poster - 10 Pearls: Radiation protection of staff in fluoroscopy →



<https://www.iaea.org/resources/rpop/resources/posters-and-leaflets>

Outreach materials complementing training



Pregnant?

or think you could be?

Please tell the staff before an X ray or nuclear medicine procedure

What you need to know

Unborn babies are more sensitive to radiation

Risk depends on stage of pregnancy, type of procedure and the amount of radiation used

Diagnostic radiological procedures are safe under most circumstances even during pregnancy

DO's and DON'T's

Don't avoid the procedure if it is important for your health

Do ask the medical staff what measures will be taken to reduce any risk

Do seek advice before the procedure if you are concerned

Do ask if a pregnancy test is needed.

<https://rpop.iaea.org>

ВИЕ СТЕ БРЕМЕННА ИЛИ Е ВЪЗМОЖНО ДА СТЕ БРЕМЕННА?

Уведомете за това на нашия персонал преди на р нуклеарна медицина процедура

怀孕了? 或认为你可能怀孕了?

请在接受X射线或核医学检查之前告诉工作人员。

<https://rpop.iaea.org>

КАКВО ТРЯБВА ДА ЗНАЕТЕ?

Плодът в утробата на майката е по-чувствителен към облъчването

Vous êtes enceinte ou pensez

您需要知道的事情 胎儿对辐射更敏感。

风险取决于妊娠阶段 检查类型

大多数情况下 诊断放射线 检查类型

能做什么 如果你怀孕了 请务必询问

<https://rpop.iaea.org>

Ce qu'il faut savoir

Les bébés dans le ventre de leur mère sont plus sensibles aux rayonnements.

Les risques varient selon le stade de la grossesse, le type d'acte et les doses de rayonnements administrés.

Les risques de radiologie diagnostique sont la du temps sans danger, même pendant la grossesse.

¿Está embarazada o cree que puede estarlo?

Por favor, informe al personal médico antes de someterse a una radiografía o a un procedimiento de medicina nuclear.

Debe saber que

El feto es más sensible a la radiación.

Los riesgos dependen del estado de gestación, del tipo de procedimiento y de la cantidad de radiación utilizada.

En la mayoría de los casos los procedimientos radiológicos de diagnóstico no entrañan riesgos, ni siquiera en el embarazo.

Recomendaciones

No deje de someterse al procedimiento si es importante para su salud.

Pregunte al personal médico las medidas que se tomarán para reducir los riesgos.

Si está preocupada, pida consejo antes de someterse al procedimiento.

Pregunte si ha de realizarse una prueba de embarazo.

<https://rpop.iaea.org>

Available in 25 languages

<https://www.iaea.org/resources/rpop/resources/posters-and-leaflets>

j.vassileva@iaea.org

Outreach materials complementing training



IAEA International Atomic Energy Agency

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Safe Medical Imaging for Children

Safe Medical Imaging for Children

can help keep them still and relaxed to ensure quality imaging.

Related Resources

- International Conference on Radiation Protection in Medicine: Advancing Change in Practice, 11-15 December 2017
- Radiation Protection of Patients (RPP)



IAEA International Atomic Energy Agency

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Medical Imaging: The Right Test at the Right Time

Medical Imaging: The Right Test at the Right Time

Related Resources

- International Conference on Radiation Protection in Medicine: Advancing Change in Practice, 11-15 December 2017
- Radiation Protection of Patients (RPP)



IAEA International Atomic Energy Agency

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Medical Imaging in Pregnancy

Medical Imaging in Pregnancy

Related Resources

- International Conference on Radiation Protection in Medicine: Advancing Change in Practice, 11-15 December 2017
- Radiation Protection of Patients (RPP)
- Special actions for patients



IAEA International Atomic Energy Agency

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Protecting Patients in Dentistry

Protecting Patients in Dentistry

Related Resources

- International Conference on Radiation Protection in Medicine: Advancing Change in Practice, 11-15 December 2017
- Radiation Protection of Patients (RPP)
- Special actions for patients

Short videos
> 1 million views

RPOP safety reporting and learning systems



SAFRON: Safety in Radiation Oncology



The screenshot shows the SAFRON website header with the IAEA logo and the text "SAFRON Safety Reporting and Learning System for Radiotherapy". Below the header is a navigation menu with items like Home, Process Steps, Incident Reports, Documents and Links, Historical Reports, and Help. A search bar is located in the top right corner. The main content area features a featured incident report titled "Safer use of radiation in radiotherapy through learning and reporting" with a sub-header "SAFRON aims to enable global shared learning from safety related events and safety analysis in order to improve the safe planning and delivery of radiotherapy". Below this are sections for "Featured Incident Reports" and "Featured Documents & Links".

SAFRAD: Safety in Radiological Procedures



Safety in Radiological Procedures

The IAEA has a sub-programme on Radiation Protection of Patients that operates under an International Action Plan. This is the first ever programme dedicated to radiation protection of patients, started in 2001 by an international organization. A dedicated website was established in September 2008 that is becoming a popular resource for credible information for health professionals, patients and public.

The website provides information on radiation safety in interventional procedures, besides other areas in radiology, radiotherapy, nuclear medicine, dental radiology, pregnancy and foetal dosimetry. Also learning material has been provided for free download for use by health professionals.

SAFRAD (SAFeTy in RAdiologIcal procedures) is a voluntary reporting system where patients' dose reports and relevant data are included in an international database when these patients are subjected to selected bigger events or events of fluoroscopically-guided diagnostic and interventional procedures. The primary objective of the system is educational in nature. It is believed that going through the process of SAFRAD itself results in safety and quality of service. For more information about SAFRAD [click here](#).

The data furnished by participants (hospitals, regulators) will remain accessible to the participant. The participant will have access periodically to analysed results. The IAEA will publish overall summary reports of SAFRAD data from time to time.

SAFRAD will not supply identifiable data to any governmental authority or other third party.



Cardiac Catheterization Lab, San Carlos Hospital, Madrid

Monthly RPOP newsletter



Subscribe for the monthly RPOP newsletter to receive updates



Radiation Protection of Patients (RPOP) – the leading resource for health professionals, patients and public on the safe and effective use of radiation in medicine. To access the Spanish version of the site click [here](#).

For health professionals



Health professionals can find answers to frequently asked questions about different medical procedures and the safe use of ionizing radiation in medicine.

Radiology
Radiotherapy
Nuclear medicine
Interventional procedures
Dentistry
Oral specialists and imaging medicine

For patients and public



Patients, their caretakers, and the public can learn about what to expect during medical examinations that involve ionizing radiation.

IRBys
Computed tomography (CT)
Interventional procedures
Nuclear medicine
Radiotherapy
Brachytherapy

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Action Platform

Resources

- Training
- Webinars
- Safety in Radiation Oncology (SARFONE)
- Safety in Radiological Procedures (SARPAD)
- Posters and leaflets
- Publications

RPOP Newsletter

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RPOP Newsletter

Thank you for your interest in the Radiation Protection of Patients (RPOP) newsletter. Sign up if you would like to receive monthly updates on the safe and effective use of radiation in medicine. We look forward to sending you our latest news and information!

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