

# **El programa del OIEA sobre Protección radiológica en medicina**

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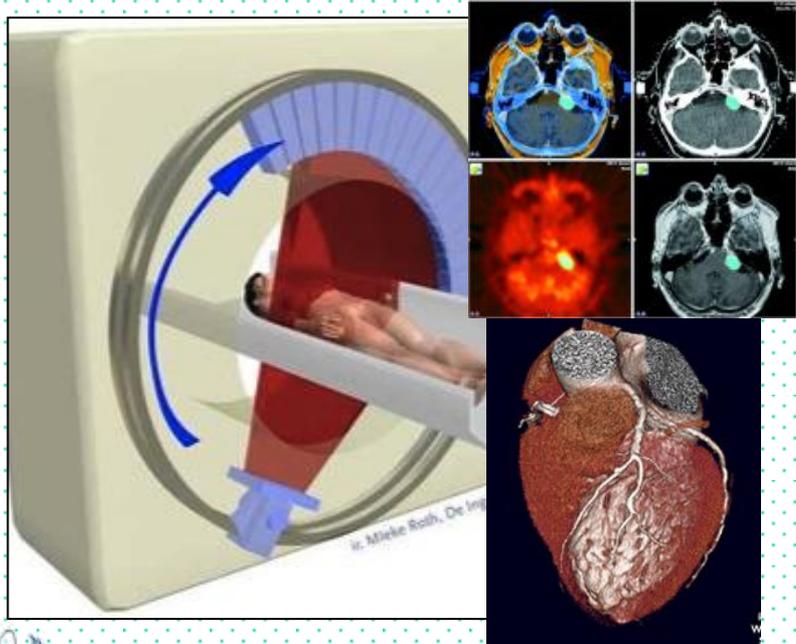
Ola Holmberg, PhD, Jenia Vassileva, PhD, Debbie Gilley, PhD



# Importancia de la exposición médica

- El **beneficio** del uso médico de la radiación es **extraordinario** (más de **3.700 millones** de exámenes diagnósticos por imagen al año y **cinco millones** de nuevos tratamientos anuales de radioterapia)

diagnóstico



terapia



# Importancia de la exposición médica

- Ese extraordinario beneficio hace que la **exposición médica sea también la mayor de todas las de fuentes artificiales de radiación**

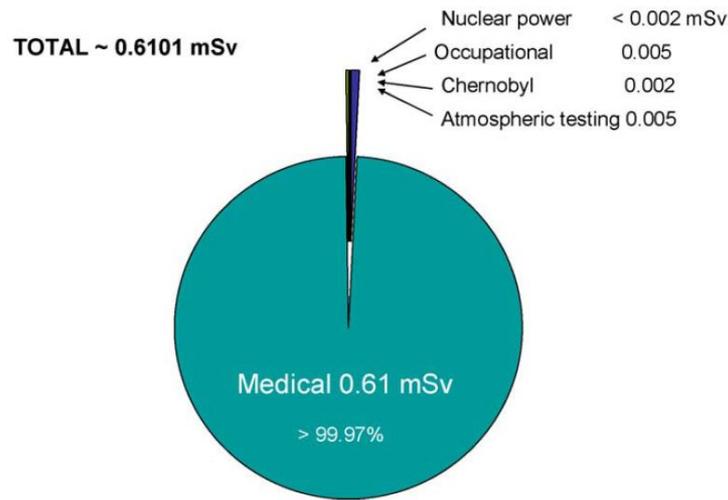


Fig. 1. Estimated per caput effective dose to the worlds population in 2007 from man-made exposures [1].

La exposición de los pacientes es el **99,97%** del total

# Importancia de la exposición médica

- Durante más de **medio siglo** la atención de la comunidad de protección radiológica se enfocó en reducir esta parte

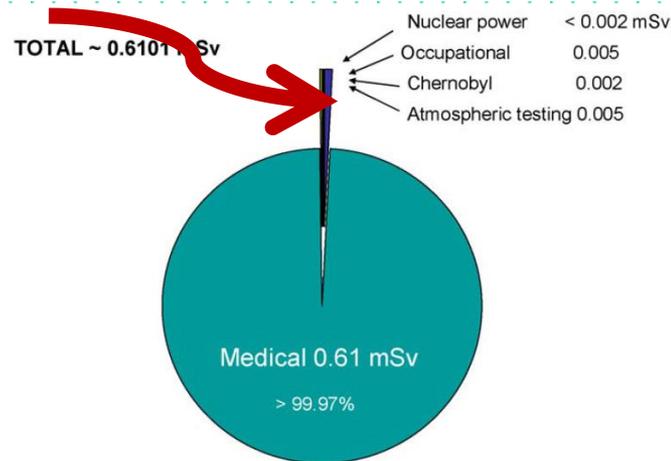


Fig. 1. Estimated per caput effective dose to the worlds population in 2007 from man-made exposures [1].

- La protección de los pacientes estaba excluida de las normas internacionales hasta que ...

# En los años 80 y 90 aumentó la atención hacia la exposición de los pacientes

- Estudios en los 80: exposición para diagnóstico mayor que la necesaria
- En los 90 se pusieron de manifiesto radiolesiones en intervenciones guiadas por imagen de rayos X
- Publicaciones de eventos graves, incluso mortales, en radioterapia



**Accidental Overexposures of Radiotherapy Patients in San Jose Costa Rica**

**Ottawa** Pub goes all-American

### Short-staffing led to dosage error

...An Ottawa hospital department was short-staffed by about half at the time that a calculation error was made that caused hundreds of cancer patients to receive lower than required radiation doses over three years.

...The individual who made the error on the machine, which checked every prescription, has since retired.

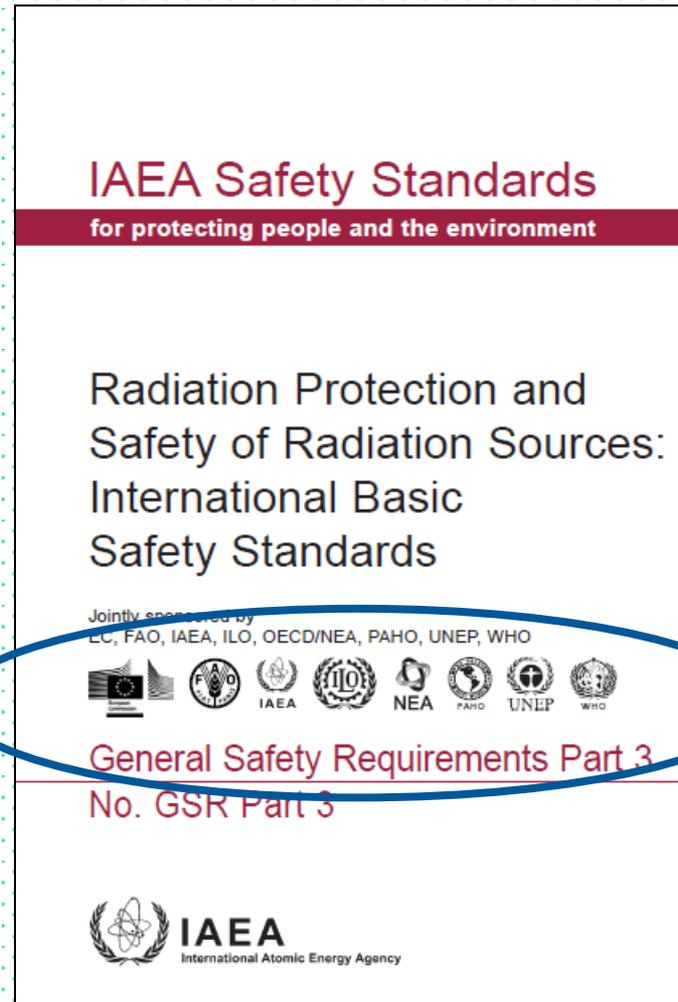
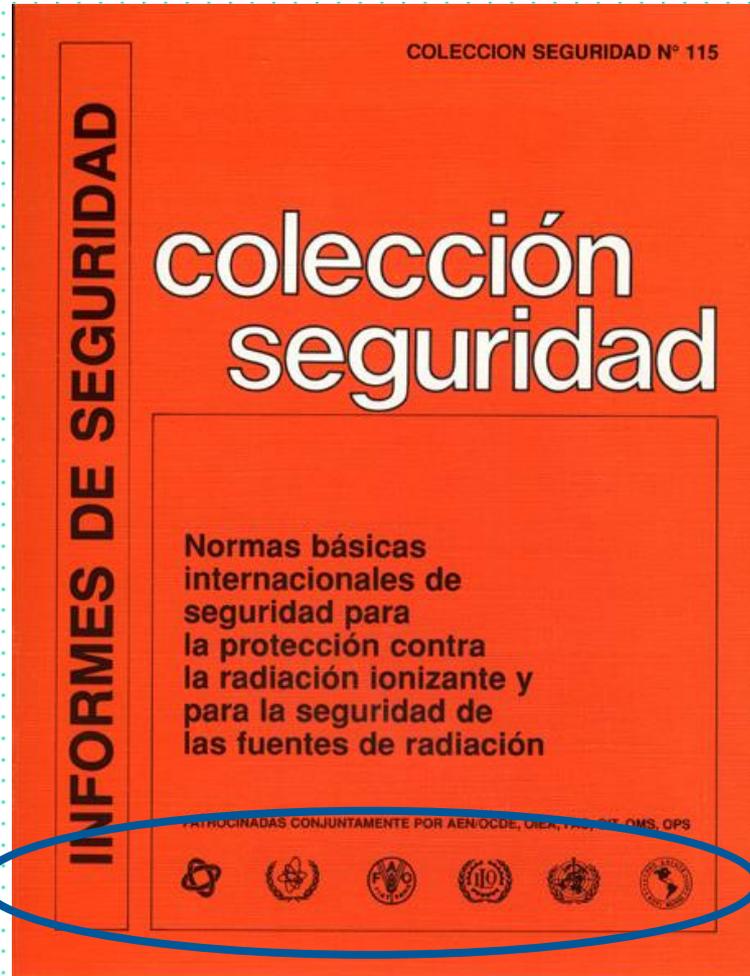
...The report makes two recommendations — to double level staffing, especially for medical physics departments of medical centers.

### Radiation Errors Reported in Missouri

By WALT BOGDANICH and REBECCA R. RUIZ  
Published: February 24, 2010

A hospital in Missouri said Wednesday that it had overradiated 76 patients, the vast majority with brain cancer, during a five-year period because powerful new radiation equipment had been set up incorrectly even with a representative of the manufacturer watching as it was done.

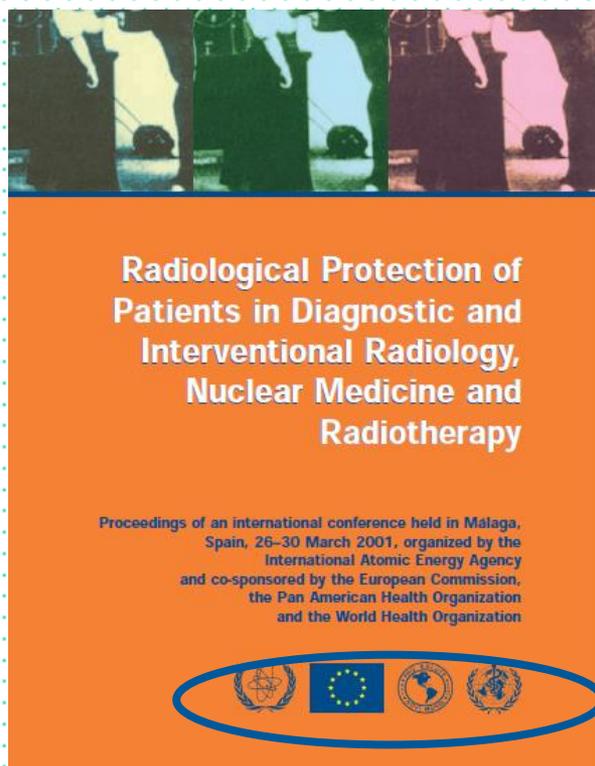
# ... de este modo, a partir de 1996 se incorporaron requisitos internacionales para la exposición médica



ORGANISMO INTERNACIONAL DE ENERGIA ATOMICA, VIENA, 1997

# Primera Conferencia Internacional y Plan de acción

- **Primera** Conferencia Internacional Málaga (2001)
- 800 participantes de 88 países
- Organismos internacionales y sociedades profesionales



## International Action Plan for the Radiological Protection of Patients

International Atomic Energy Agency

The Action Plan has been developed in consultation with the following organizations of the United Nations system:

Pan American Health Organization

World Health Organization

United Nations Scientific Committee on the Effect of Atomic Radiation

The other organizations and professional bodies involved in the preparation of the draft Action Plan were: the European Commission, the International Commission on Radiation Units and Measurements, the International Commission on Radiological Protection, the International Electrotechnical Commission, the International Organization for Medical Physics, the International Organization for Standardization, the International Radiation Protection Association, the International Society of Radiation Oncology, the International Society of Radiographers and Radiological Technologists, the International Society of Radiology, and the World Federation of Nuclear Medicine and Biology.

# Plan de acción: sitio Web especializado ...

Sitio Web especializado – <http://rpop.iaea.org>

Información para

- Profesionales de la salud
- Para los pacientes
- Estados Miembros

IAEA | Protección Radiológica de los Pacientes

Buscar RPOP:  IR

Inicio Información para Recursos Adicionales Grupos Especiales Member Area Registrarse Sobre Nosotros Nuestro Trabajo IAEA.org

**Infórmese sobre el Uso Seguro de las Radiaciones Ionizantes en Medicina**

Información para ayudar a los profesionales de la salud a utilizar con mayor seguridad la radiación en medicina para beneficio de los pacientes

<b>Información para</b> Profesionales de la salud Estados Miembros Pacientes y Público	<b>Recursos Adicionales</b> Publicaciones Normas Internacionales Capacitación	<b>Grupos Especiales</b> Mujeres Embarazadas Niños	<b>Member Area</b> Member States Area Drafts Management Area
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**Acciones para proteger a los Pacientes en:**

- Radiología
- Radioterapia
- Medicina Nuclear
- Fluoroscopia de intervención
- Cardiología de Intervención
- Otras especialidades y modalidades de imagen

**Publicaciones recientes**

**Sabía Usted que...**

**Últimas Noticias**

**Próximos Eventos**

**Traducido al español**

ROSENBLATT E M D, ACUÑA O, ABDEL-WAHAB M, The Challenge of Global Radiation Therapy: An IAEA Perspective: Int J Radiat Oncol Biol Phys. 91 4 (15 March 2015) 687-9. Abstract »

BORDIER C, KLAUSZ R, DESPONDS L, Patient dose map indications on interventional X-ray systems and validation with Gafchromic XR-RV3 film: Radiat Prot Dosimetry. 163 3 (Feb 2015) 306-18. doi: 10.1093/rpd/ncu181. Epub 2014 Jun 17. Abstract »

SPAMPINATO MV, TIPNIS S, TAVERNIER J, HUDA W, Thyroid doses and risk to paediatric patients undergoing neck CT examinations: Eur Radiol. (2 Feb 2015). [Epub ahead of print] Abstract »

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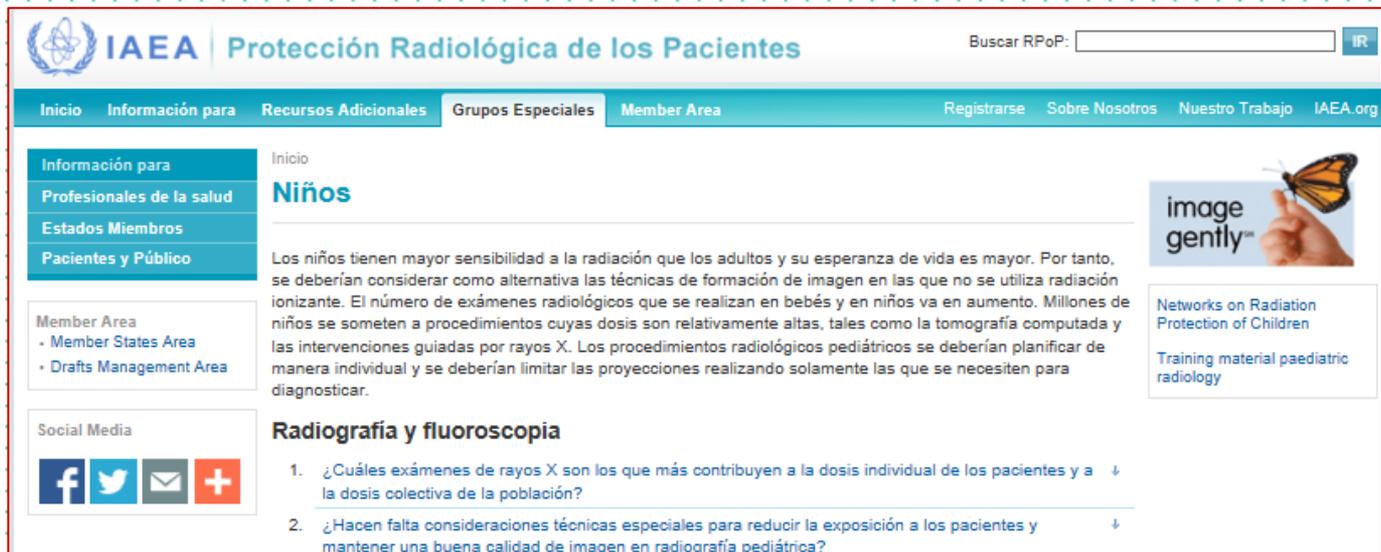
RPOP

Me gusta 3575

RPOP on Twitter

IAEA

# Ejemplo



The screenshot shows the IAEA website page for 'Protección Radiológica de los Pacientes'. The page features a navigation menu with options like 'Inicio', 'Información para', 'Recursos Adicionales', 'Grupos Especiales', and 'Member Area'. A search bar is located at the top right. The main content area is titled 'Niños' and contains a paragraph about the sensitivity of children to radiation. Below this, there is a section for 'Radiografía y fluoroscopia' with a list of questions. On the right side, there is a sidebar with an 'image gently' logo and links to 'Networks on Radiation Protection of Children' and 'Training material paediatric radiology'.

IAEA | Protección Radiológica de los Pacientes

Buscar RPOp:  IR

Inicio Información para Recursos Adicionales Grupos Especiales Member Area Registrarse Sobre Nosotros Nuestro Trabajo IAEA.org

Información para  
Profesionales de la salud  
Estados Miembros  
Pacientes y Público

Member Area  
• Member States Area  
• Drafts Management Area

Social Media  


Inicio

## Niños

Los niños tienen mayor sensibilidad a la radiación que los adultos y su esperanza de vida es mayor. Por tanto, se deberían considerar como alternativa las técnicas de formación de imagen en las que no se utiliza radiación ionizante. El número de exámenes radiológicos que se realizan en bebés y en niños va en aumento. Millones de niños se someten a procedimientos cuyas dosis son relativamente altas, tales como la tomografía computada y las intervenciones guiadas por rayos X. Los procedimientos radiológicos pediátricos se deberían planificar de manera individual y se deberían limitar las proyecciones realizando solamente las que se necesiten para diagnosticar.

### Radiografía y fluoroscopia

1. ¿Cuáles exámenes de rayos X son los que más contribuyen a la dosis individual de los pacientes y a la dosis colectiva de la población? ↓
2. ¿Hacen falta consideraciones técnicas especiales para reducir la exposición a los pacientes y mantener una buena calidad de imagen en radiografía pediátrica? ↓

image gently™ 

Networks on Radiation Protection of Children

Training material paediatric radiology

### 3. ¿Se pueden prevenir las radiolesiones?

En la mayoría, si no en todos los casos, la respuesta es: "sí", se pueden prevenir al menos las lesiones más graves. La experiencia en un centro en el que los cardiólogos habían recibido formación en materia de protección radiológica y se controlaba al equipo mediante un programa de control de calidad, indica que no se presentaron lesiones en piel, ni siquiera en pacientes que habían tenido entre 5 y 7 intervenciones de PTCA, además de otras 5 a 14 angiografías [VA1].

10. ¿Cómo reduzco yo la dosis en CT pediátrica de abdomen? ↓
11. ¿Qué medidas de seguridad se recomiendan para las personas que sujetan al niño durante un examen de CT? ↓

1. ¿Cuáles exámenes de rayos X son los que más contribuyen a la dosis individual de los pacientes y a la dosis colectiva de la población?

# Plan de acción: sitio Web especializado ... material de enseñanza

The image shows a screenshot of the IAEA website's 'Protección Radiológica de los Pacientes' section. The page features a navigation menu with options like 'Inicio', 'Información para', 'Recursos Adicionales', 'Grupos Especiales', and 'Member Area'. A search bar is located in the top right corner. The main content area is titled 'Profesionales de la salud' and contains six categories, each with a representative image and a label: 'Radiología', 'Fluoroscopia de intervención', 'Radioterapia', 'Cardiología Intervencionista', 'Medicina Nuclear', and 'Otras especialidades y modalidades de obtención de imagen'. A prominent red banner with the text 'Traducido al español' is overlaid across the middle of the page. The footer includes social media icons for Facebook, Twitter, Email, and a plus sign for additional platforms.

IAEA | Protección Radiológica de los Pacientes

Buscar RPoP:

Inicio Información para Recursos Adicionales Grupos Especiales Member Area Registrarse Sobre No

Información para Profesionales de la salud

Inicio

**Profesionales de la salud**

Radiología

Radioterapia

Medicina Nuclear

Fluoroscopia de intervención

Cardiología Intervencionista

Otras especialidades y modalidades de obtención de imagen

Estados Miembros

Pacientes y Público

Member Area

- Member States Area
- Drafts Management Area

Social Media

f t e +

**Traducido al español**

Radiología

Fluoroscopia de intervención

Radioterapia

Cardiología Intervencionista

Medicina Nuclear

Otras especialidades y modalidades de obtención de imagen

# Plan de acción: material de enseñanza...

- Material para lograr un efecto multiplicativo de manera uniforme y coherente

Approved Training Package  
IAEA Training Material on  
Radiation Protection in Cardiology

Lessons from injured patients.  
Immediate buildup of dose for steeply angled high dose areas (a single large patient not recognized).  
Lesions required grafting.

Aorta  
Left Main Coronary Artery  
Left Circumflex  
Left Anterior Descending  
Right Coronary Artery

Threshold

Factors affecting patient doses (I)

THE USE OF THE ANTICATTER GRID

↑

INCREASED PATIENT ENTRANCE DOSE BY A FACTOR OF 2 TO 6

improper filtering

proper filtering

Physical factors which impact to radiation management  
Thicker tissues absorb more radiation

in collaboration with World Health Organization IAEA The Society for Cardiovascular Angiography and Interventions

Version: April 2009  
Training material also available for free download from [www.iaea.org](http://www.iaea.org)

Draft Training Package  
IAEA Training Material on  
Radiation Protection in PET/CT

in collaboration with World Health Organization IAEA The Society for Cardiovascular Angiography and Interventions

Version: August 2006

# Actividades de **cooperación técnica** con los Estados Miembros

Region	Project Title	IAEA Technical Cooperation Project Information		
		Field	Number	1st year of approval
Africa	Strengthening Technical Capabilities for Patient and Occupational Radiation Protection in Member States	12	RAF9053	2014
Asia	Strengthening Radiation Protection of Patients in Medical Exposure	12	RAS9065	2012
Asia	Strengthening Radiation Protection Infrastructure and Technical Capabilities for the Safety of Workers, Patients and the Public	12	RAS9075	2014
Europe	Strengthening Member State Technical Capabilities in Medical Radiation Protection	12	RER9132	2014
Latin America	Strengthening National Infrastructure for End-Users to Comply with Regulations and Radiological Protection Requirements	12	RLA9075	2014

# Estas actividades de cooperación están bien documentadas en publicaciones

Radiation Protection Dosimetry (2009), Vol. 136, No. 2, pp. 118–126  
Advance Access publication 17 August 2009

doi:10.1093/rpd/ncp144

SCIENTIFIC NOTE

PATIENT DOSES IN CT EXAMINATIONS IN 18 COUNTRIES:

IN  
AGI

W. E.  
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J. S. V

## Radiation Exposure to Patients During Interventional Procedures

ENERGY

in 20  
Proje

### IAEA Survey of Pediatric CT Practice in 40 Countries in Asia, Europe, Latin America, and Africa: Part 1, Frequency and Appropriateness

Jenia Vassileva<sup>1</sup>, Madan M. Rehani<sup>2</sup>, Humoud Al-Dhuhli<sup>3</sup>, Huda M. Al-Naemi<sup>4</sup>, Jamila Salem Al-Suwaidi<sup>5</sup>, Kimberly Applegate<sup>6</sup>, Danijela Arandjic<sup>7</sup>, Einas Hamed Osman Bashier<sup>8</sup>, Adnan Beganovic<sup>9</sup>, Tony Benavente<sup>10</sup>, Tadeusz Bieganski<sup>11</sup>, Simone Dias<sup>12</sup>, Leila El-Nachef<sup>13</sup>, Dario Faj<sup>14</sup>, Mirtha E. Gamarra-Sánchez<sup>15</sup>, Juan Garcia-Aguilar<sup>16</sup>, L'ubka Gbelcová<sup>17</sup>, Vesna Gershan<sup>18</sup>, Eduard Gershkevitch<sup>19</sup>, Edward Gruppetta<sup>20</sup>, Alexandru Hustuc<sup>21</sup>, Sonja Ivanovic<sup>22</sup>, Arif Jauhari<sup>23</sup>, Mohammad Hassan Kharita<sup>24</sup>, Siarhei Kharuzhyk<sup>25</sup>, Nadia Khelassi-Toutaoui<sup>26</sup>, Hamid Reza Khosravi<sup>27</sup>, Helen Khoury<sup>28</sup>, Daniela Kostova LeBoucq<sup>29</sup>, Juan Kostov<sup>30</sup>, Lester Li<sup>31</sup>, Talita Marafioti<sup>32</sup>, Patricia Mora<sup>33</sup>, Wilbroad Muhogori<sup>34</sup>, Esti Shelly<sup>35</sup>, Karapet Stepanian<sup>36</sup>, Zaman<sup>37</sup> and Dejan Zonta<sup>38</sup>

### IAEA survey of paediatric computed tomography practice in 40 countries in Asia, Europe, Latin America and Africa: procedures and protocols

Jenia Vassileva • Madan M. Rehani •  
Kimberly Applegate • Nada A. Ahmed •  
Humoud Al-Dhuhli • Huda M. Al-Naemi

# Estudio para Evaluar las dosis de radiación y opacidades en cristalino del ojo (RELID)

## Ejercicios de evaluación realizados

No	Place (City, Country)	Dates	Regional/National organization	Links
1	Bogota, Colombia	25-26 Sept.2008	SOLACI <sup>1</sup>	<a href="#">RELID report Colombia [English], [Español]</a>
2	Kuala Lumpur, Malaysia	17-19 April 2009	NAHM <sup>2</sup>	<a href="#">RELID report Malaysia</a>
3	Montevideo, Uruguay	16-17 April 2009	SOLACI <sup>1</sup>	<a href="#">RELID report Uruguay [English], [Español]</a>
4	Varna, Bulgaria	11-12 July 2009	NCRRP <sup>3</sup>	<a href="#">RELID report Bulgaria</a>
5	Sofia, Bulgaria	13-15 July 2009	NCRRP <sup>3</sup>	<a href="#">RELID report Bulgaria</a>
6	Bangkok, Thailand	23-24 December 2009		<a href="#">RELID report Thailand</a>
7	Buenos Aires, Argentina	11-13 August 2010	SOLACI <sup>1</sup>	<a href="#">RELID report Argentina [English], [Español]</a>
8	Kuala Lumpur, Malaysia	6-7 May 2011	NAHM <sup>2</sup>	<a href="#">RELID Malaysia</a>

<sup>1</sup>SOLACI: Latin American Society on Interventional Cardiology

<sup>2</sup> NHAM: National Heart Association of Malaysia

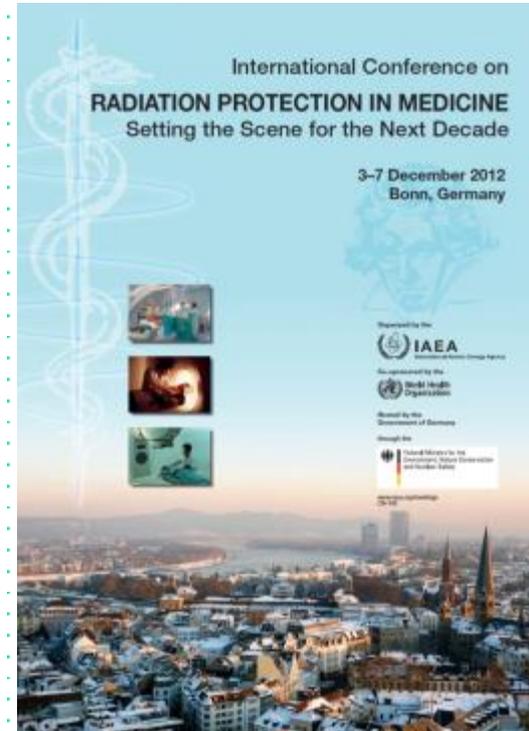
<sup>3</sup>NCRRP: National Centre of Radiation Biology and Radiation Protection



# Segunda Conferencia Internacional sobre la Protección radiológica de los pacientes

## Bonn Conference (2012)

- 536 participants
- 77 Member States and
- 16 organizations represented



# “Llamada a la acción desde (la Conferencia de) Bonn” sobre la Protección radiológica de los pacientes

- Pronunciamiento conjunto OIEA y OMS con **un decálogo de acciones principales**
- Que pasa a ser la línea maestra del Plan de Acción
- Y de las actividades de cooperación técnica en los Estados Miembros



Traducido al  
español  
y portugués



**BONN CALL FOR ACTION**  
10 Actions to Improve Radiation Protection  
in Medicine in the Next Decade

# Generar conciencia de las dosis acumuladas



Proyecto del OIEA para registrar las dosis de cada paciente

## Objetivos:

- Desarrollar metodos para registrar el historial de las dosis de cada paciente
- Elegir el contenido que ayude en **la justificación y la optimización.**
- Promover la normalización de los registros en todos los países
- Cooperar con los fabricantes en desarrollar hardware y software para llevar cuenta de las dosis

# 20-30 % de las exploraciones diagnósticas son innecesarios

Establecer mecanismos para que se apliquen **las guías profesionales y criterios de uso** de la radiación en diagnóstico por imagen

**60 participantes de 40 países**

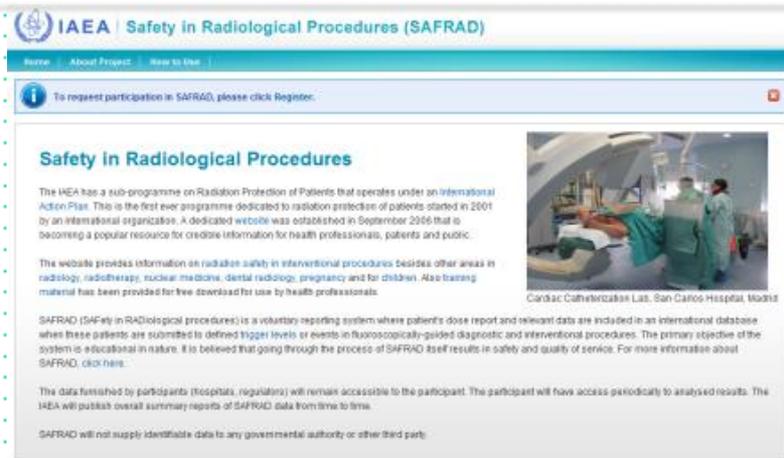


# Recopilar y compartir información sobre incidentes con fines educativos

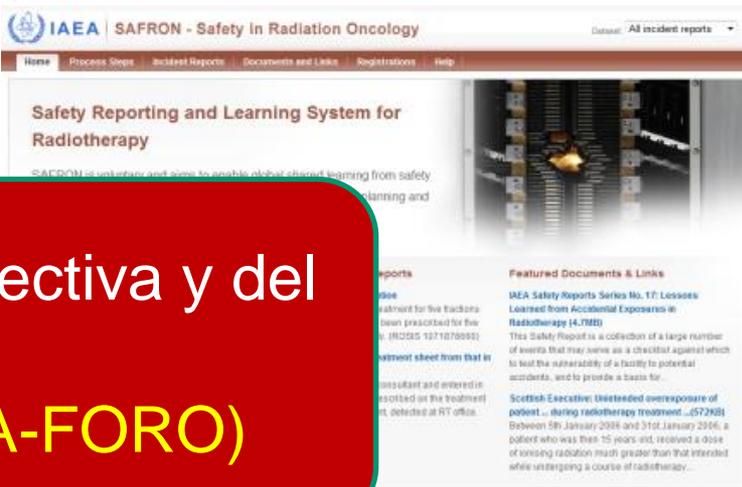
- Bases de datos de incidentes
  - Anónimas y voluntarias
  - Educativas, aprender de los errores
- SAFRAD para intervenciones guiadas por rayos X
- SAFRON para radioterapia,

Integración de la información retrospectiva y del análisis anticipativo

SAFRON-SEVRRRA (Sinergia OIEA-FORO)

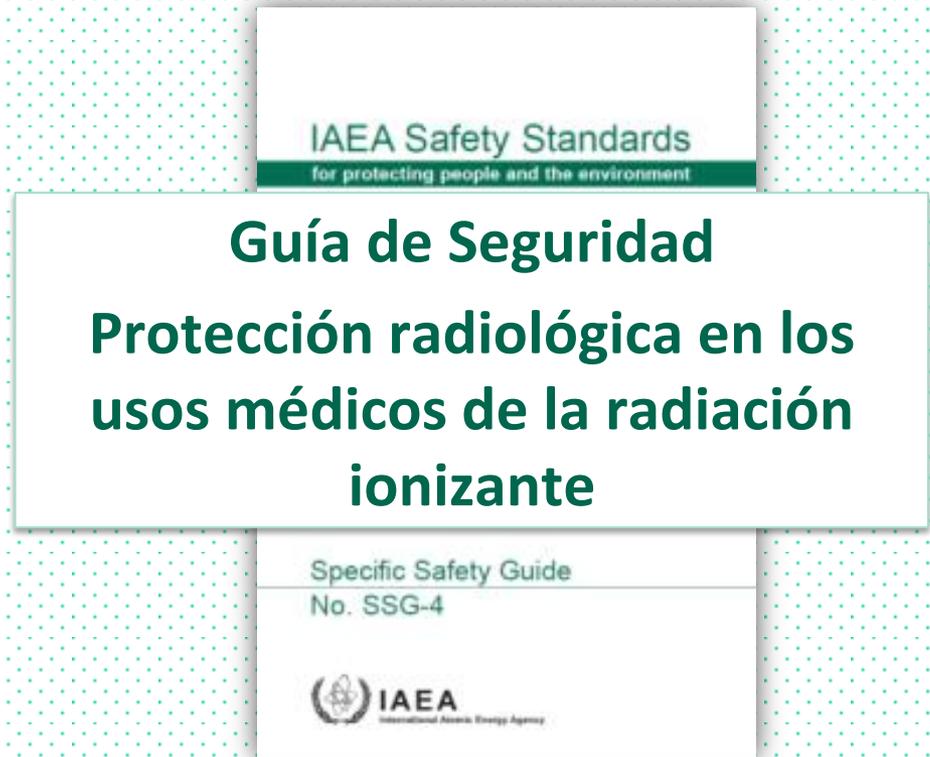
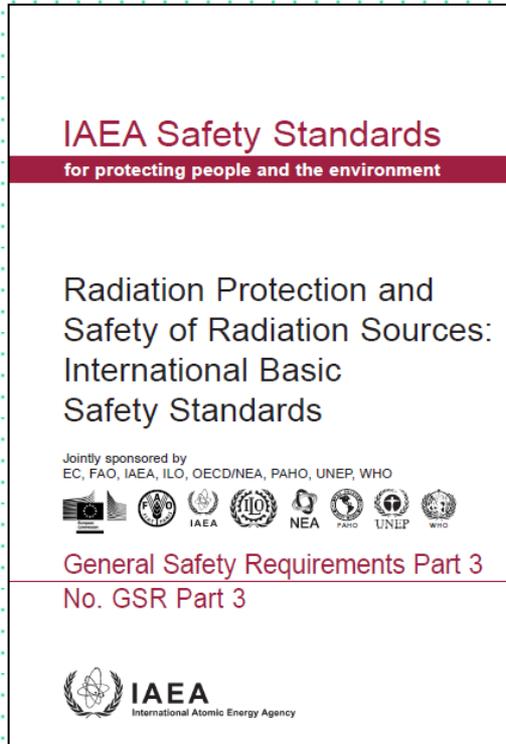


The screenshot shows the homepage of the IAEA Safety in Radiological Procedures (SAFRAD) website. The header includes the IAEA logo and the title 'IAEA | Safety in Radiological Procedures (SAFRAD)'. Below the header, there is a navigation menu with 'Home', 'About Project', and 'How to Use'. A prominent blue banner contains the text: 'To request participation in SAFRAD, please click Register:'. The main content area features the title 'Safety in Radiological Procedures' and a sub-header 'Safety in Radiological Procedures'. The text describes the IAEA's sub-programme on Radiation Protection of Patients, established in 2001, and mentions that a dedicated website was established in September 2006. It also states that the website provides information on radiation safety in interventional procedures and offers training material for free download. A photograph of a medical professional in a catheterization lab is shown on the right. Below the main text, there is a section for 'SAFRAD (SAFety in RADiological procedures)' which is a voluntary reporting system. It mentions that data is submitted to defined trigger levels or events in fluoroscopically-guided diagnostic and interventional procedures. The primary objective is educational. It also notes that data remains accessible to the participant and that the IAEA will publish overall summary reports. A final note states that SAFRAD will not supply identifiable data to any governmental authority or other third party.



The screenshot shows the homepage of the IAEA SAFRON - Safety in Radiation Oncology website. The header includes the IAEA logo and the title 'IAEA | SAFRON - Safety in Radiation Oncology'. Below the header, there is a navigation menu with 'Home', 'Process Steps', 'Incident Reports', 'Documents and Links', 'Registrations', and 'Help'. A prominent blue banner contains the text: 'Safety Reporting and Learning System for Radiotherapy'. The text describes SAFRON as a voluntary system and aims to enable global shared learning from safety incidents. It mentions that SAFRON is a voluntary system and aims to enable global shared learning from safety incidents. Below the main text, there is a section for 'Incident Reports' and a section for 'Featured Documents & Links'. The 'Featured Documents & Links' section includes 'IAEA Safety Reports Series No. 117: Losses Learned from Accidental Exposures in Radiotherapy (4,792)' and 'Scottish Executive: Unintended overexposure of patient - during radiotherapy treatment... (57268)'. A photograph of a radiotherapy treatment room is shown on the right.

# Guía para la aplicación de las Normas internacionales



- Publicación a principios de 2016

# Instrumentos de ayuda

## Posters

### 10 Pearls: Radiation protection of *patients* in fluoroscopy

- 1. Maximize distance between the X ray tube and the patient to the extent possible**

X ray tube
- 2. Minimize distance between the patient and the image receptor**
- 3. Minimize fluoroscopy time**

Keep records of fluoroscopy time for every patient
- 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**

Vary the beam entrance port by rotating the tube around the patient

Figure adapted from L. K. Wagner

RPOP  
Radiation Protection of Patients

Related Poster:  
10 pearls! Radiation protection of *staff* in fluoroscopy  
[http://www.iaea.org/~/media/iaea/pdfs/publications/10\\_pears\\_staff\\_radiation\\_protection.pdf](http://www.iaea.org/~/media/iaea/pdfs/publications/10_pears_staff_radiation_protection.pdf)

Page 1 of 2  
Fluoroscopy  
Patient Radiation Protection

<http://rpop.iaea.org>

### 10 Pearls: Radiation protection of *patients* in fluoroscopy

- 6. Larger patients or thicker body parts trigger an increase in entrance surface dose (ESD)**

ESD: 1 unit, 2-3 units, 4-6 units, 8-12 units
- 7. Oblique projections also increase ESD**

Be aware that increased ESD increases the probability of skin injury

$h_1 < h_2 < h_3$
- | INTENSIFIER<br>Field of view (FOV) | RELATIVE PATIENT<br>ENTRANCE DOSE RATE<br>FOR SOME UNITS |
|------------------------------------|--|
| 12" (32 cm)                        | 100  |
| 9" (22 cm)                         | 200  |
| 6" (16 cm)                         | 300  |
| 4.5" (11 cm)                       | 400  |

**8. Avoid the use of magnification**

Decreasing the field of view by a factor of two increases dose rate by a factor of four
- 9. Minimize number of frames and cine runs to clinically acceptable level**

Avoid using the acquisition mode for fluoroscopy

Documentation should be performed with last image hold whenever possible and not with cine images
- 10. Use collimation**

Collimate the X ray beam to the area of interest

RPOP  
Radiation Protection of Patients

Related Poster:  
10 pearls! Radiation protection of *staff* in fluoroscopy  
[http://www.iaea.org/~/media/iaea/pdfs/publications/10\\_pears\\_staff\\_radiation\\_protection.pdf](http://www.iaea.org/~/media/iaea/pdfs/publications/10_pears_staff_radiation_protection.pdf)

Page 2 of 2  
Fluoroscopy  
Patient Radiation Protection

<http://rpop.iaea.org>

# اللائى العشر: الوقاية الإشعاعية للمرضى من التنظير الإشعاعي

1. رقم بزيادة المسافة بين أنبوب الأشعة  
المرضى. 3. القصر عند الحاجة.

64 units 16 units 4 units 1 unit



Search RPOP:

- Information for Health Professionals
- Member States
- Patients and Public

Home > Posters

### Fluoroscopy

#### Radiation Protection in fluoroscopy

Language	Patient	Staff
English	10 pearls on radiation protection of patients in fluoroscopy <a href="#">Download PDF</a>	10 pearls on radiation protection of staff in fluoroscopy <a href="#">Download PDF</a>
عربي (Arabic)	اللائى العشر: الوقاية الإشعاعية للمرضى من التنظير الإشعاعي <a href="#">Download PDF</a>	اللائى العشر: الوقاية الإشعاعية لفريق التنظير الإشعاعي <a href="#">Download PDF</a>
български (Bulgarian)	10 златни правила: Радиационна защита на пациентите при скопия <a href="#">Download PDF</a>	10 златни правила: Радиационна защита на персонала при скопия <a href="#">Download PDF</a>
中文 (Chinese)	十大要诀：X射线透视中患者的放射防护 <a href="#">Download PDF</a>	十大要诀：X射线透视中职业人员的放射防护 <a href="#">Download PDF</a>
Hrvatski (Croatian)	10 Zlatnih Pravila—Zaštita bolesnika od zračenja u dijaskopiji <a href="#">Download PDF</a>	10 Bisera: Zaštita osoblja od zračenja pri dijaskopiji <a href="#">Download PDF</a>
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עברית (Hebrew)	10 כללי הזהב להגנה מטופל בשיקוף <a href="#">Download PDF</a>	10 כללי הזהב להגנה הצוות מקרינה בשיקוף <a href="#">Download PDF</a>
Indonesia (Indonesian)	10 Mutiara: Proteksi Radiasi Bagi Pasien pada fluoroskopi <a href="#">Download PDF</a>	10 Mutiara: Proteksi Radiasi Bagi Staf Pada Fluoroskopi <a href="#">Download PDF</a>
Italiano (Italian)	10 Regole d'oro: Radioprotezione del paziente in fluoroscopia <a href="#">Download PDF</a>	10 Regole d'oro: radioprotezione degli operatori in fluoroscopia <a href="#">Download PDF</a>

### 10 χρυσοί κανόνες: Ακτινοπροστασία ασθενών κατά την ακτινοσκόπηση

1. Μεγιστοποιήστε την απόσταση ανάμεσα στη λυχνία ακτίνων X και τον ασθενή κατά



### 10 златни правила: Радиационна защита на персонала при скопия

Намалването на дозата на пациента винаги води до намалване и на дозата на персонала

Преобразувател на образа

Правилно!

Преобразувател на образа

Грешно!

5. Само 1% - 5% от лъчението, падащо върху тялото на пациента, преминава през него и формира образа.

Стойте от страната на преминалото лъчение (от страната на преобразувателя на образа), където достига само 1% до 5% от падащото лъчение и част от разсеяното от тялото лъчение.

Преобразувател на образа

Правилно!

Преобразувател на образа

Грешно!

6. Работете със скопична уредба, при която рентгеновата тръба е под масата с пациента, а не над нея.

Системите с тръба под масата осигуряват по-добра защита от разсеяно лъчение.

7. Използвайте индивидуални дозиметри

Използвайте поне два дозиметъра:

- Един под престилката на нивото на гърдите
- Един над престилката на нивото на рамото или очите
- Допълнителен дозиметър тип пръстен за процедури, при които ръцете са близо до първичния рентгенов сноп

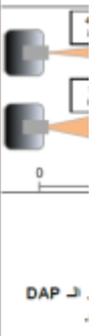
Дозиметрите с отчитане в реално време са много полезни.

8. Опреснявайте знанията си по радиационна защита.

9. Ако имате въпроси, обърнете се към специалистите по радиационна защита.

10. ЗАПОМНЕТЕ

- Контролът на качеството на рентгеновата скопична уредба гарантира нейната безопасност и стабилност.
- Спознаяте добре вашата уредба! Правилното използване на възможностите на уредбата ще ви помогне да намалите облъчването на пациентите и на персонала.
- Използвайте автоматичен инжектор.



3. Ελαττωθείτε

Διατηρήστε ακριβώς DAPIKA



5. Αποφεύγετε ίδιες περιοχές της διαφοράς

Μεταβάλλετε εισόδους περιστρώσεων ακτίνων Χ



Angola	Establishing a Medical Exposure Control Programme to Avoid Unnecessary Exposure of Patients	ANG9004	12	2012
Bahrain	Improving Radiological Protection of Patients	BAH9002	12	2012
Bosnia and Herzegovina	Strengthening Radiation Protection in Medicine	BOH9005	12	2014
Brazil	Supporting National Assessment of Quality Control and Radiation Protection in Interventional Cardiology Departments	BRA9056	12	2012
Costa Rica	Strengthening of Quality Management and Radiation Protection in Nuclear Medicine, Radiology and Radiotherapy at the Caja Costarricense de Seguro Social	COS9007	12	2012

**En América Latina, actualmente la cooperación en la protección de los pacientes forma parte de un proyecto regional (RLA9075), vigente de 2014 a 2017**

	Establishing a National Dose Register			
Palestine	Supporting Education and Training in Radiation Protection and Medical Physics	PAL9007	12	2014
Senegal	Strengthening Capacities for Monitoring Radiation Protection in Medical Settings	SEN9005	12	2014
Singapore	Developing a National Medical Guidance Dose Code of Practice	SIN9020	12	2014
Sri Lanka	Strengthening Radiation Protection in Diagnostic Radiology and Promoting Audit and Safe Use of Diagnostic Medical Radiation	SRL9010	12	2014
United Arab Emirates	Strengthening the National Programme on Patient Radiation Safety and Dosimetry	UAE9011	12	2014

# En resumen





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Muchas gracias por su atención