



United Nations Scientific Committee  
on the Effects of Atomic Radiation



# UNSCEAR's global medical exposure surveys –a practical demonstration of the new online data collection platform

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**UNSCEAR secretariat, Austria**



X Congreso Regional Latinoamericano IRPA  
de Protección y Seguridad Radiológica

*"Radioprotección: Nuevos Desafíos para un Mundo en Evolución"*



# UNSCEAR's mandate



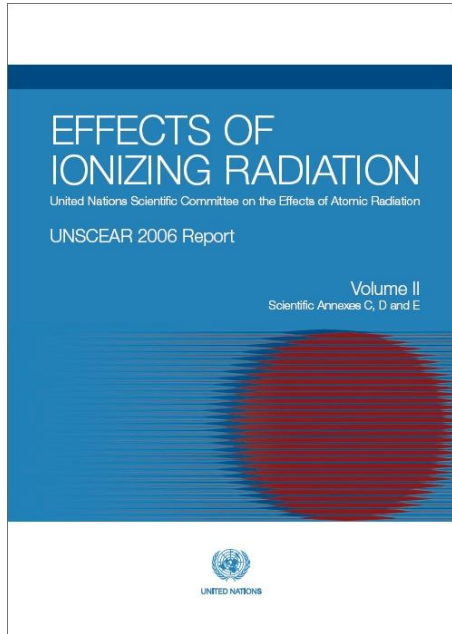
- Established by UN General Assembly (GA) resolution in 1955
- Assess levels, effects & risks of ionizing radiation
- Disseminate findings to UN GA, scientific community & public
- Scientists from 27 UN Member States
- Other states & organizations provide relevant data
- Holds annual sessions in Vienna
- UNEP arranges secretariat and provides support

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# UNSCEAR's role in radiation protection



**UNSCEAR**  
Scientific basis

*issues  
levels  
impact  
trends*



**IAEA, WHO, ILO, FAO etc.**

- Safety standards
- Protection programmes

*implemented by  
Member States*

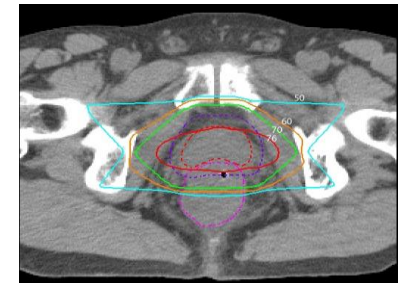
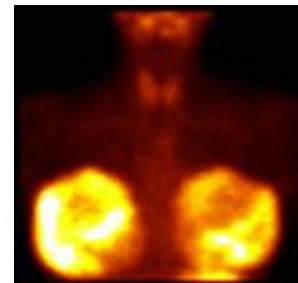
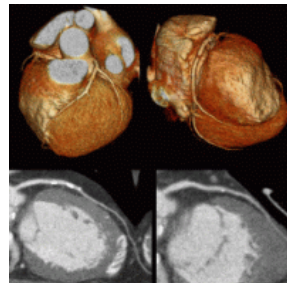
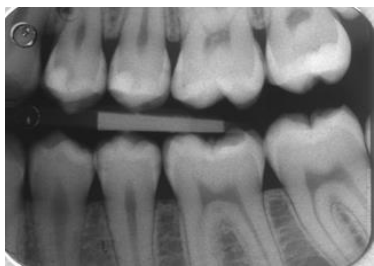


## To assess:

- global estimates of level of exposure and frequency, with breakdowns by medical procedure, age, sex, health care level, and country;
- trends in practice (including those relatively fast-changing);
- supporting related information on equipment and staffing levels.



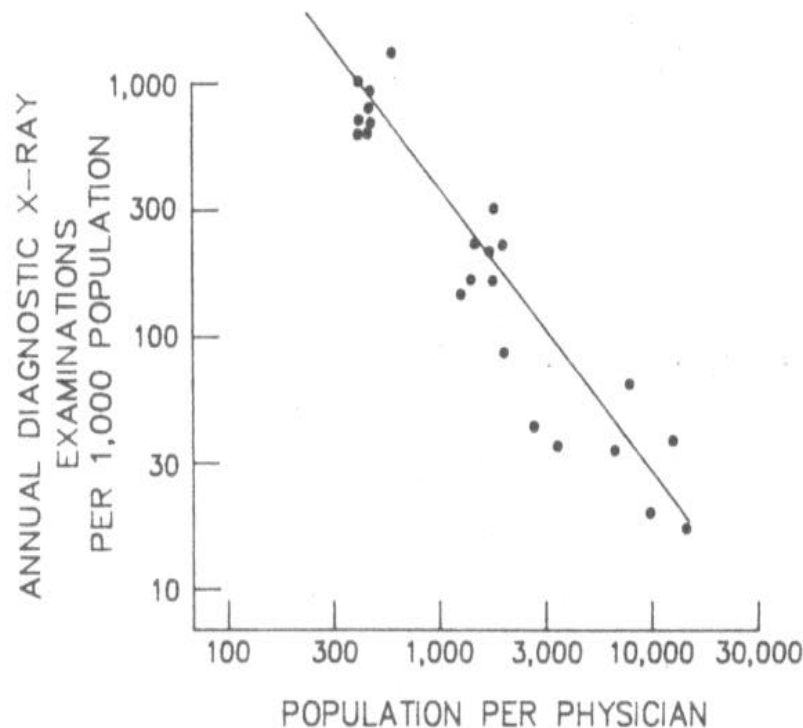
- Diagnostic radiology
  - Plain radiography, fluoroscopy, CT and DEXA
  - Image guided interventional procedures
- Nuclear medicine
  - Gamma camera, PET/CT and NM treatments
- Radiation therapy
  - External beam therapy and brachytherapy





## Analytical model to extrapolate to a global level of medical radiological exposure

- Estimating the frequency of medical radiation usage on a worldwide basis
- Number of **physicians per population** correlates with the number of medical radiological devices and procedures
- Grouping of countries by health care systems / levels



[Mettler et al.: Analytical Modelling of Worldwide Medical Radiation Use. Health Physics. 52(2):133-141, 1987]



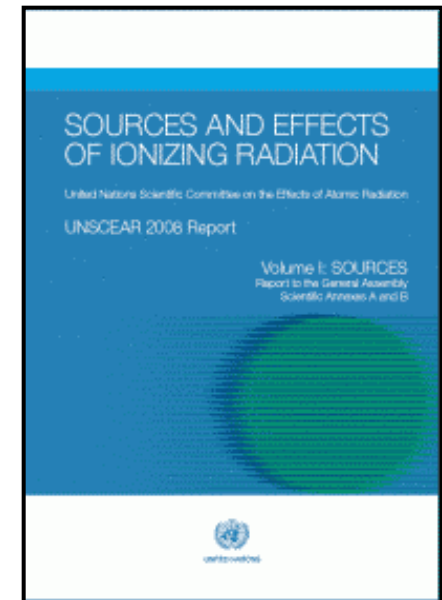
## UNSCEAR's model to global estimate medical exposures

HCL I : > 1000 physicians / 1 Mil. population

HCL II : 334 and 1000 physicians / 1 Mil. population

HCL III : 100 and 333 physicians / 1 Mil. population

HCL IV : < 100 physicians / 1 Mil. population





# Population dose estimation

- ***E (Effective dose)*** is used for expressing stochastic risk to radiation workers and to whole population
  - Given by:  $E = \sum_T w_T H_T$   
where equivalent dose to tissue or organ,  $H_T$ , is weighted by dimensionless tissue weighting factor  $w_T$ .
- Effective dose concept applies only to dose levels in radiology and nuclear medicine and is **NOT** appropriate to assess dose levels in radiation therapy.



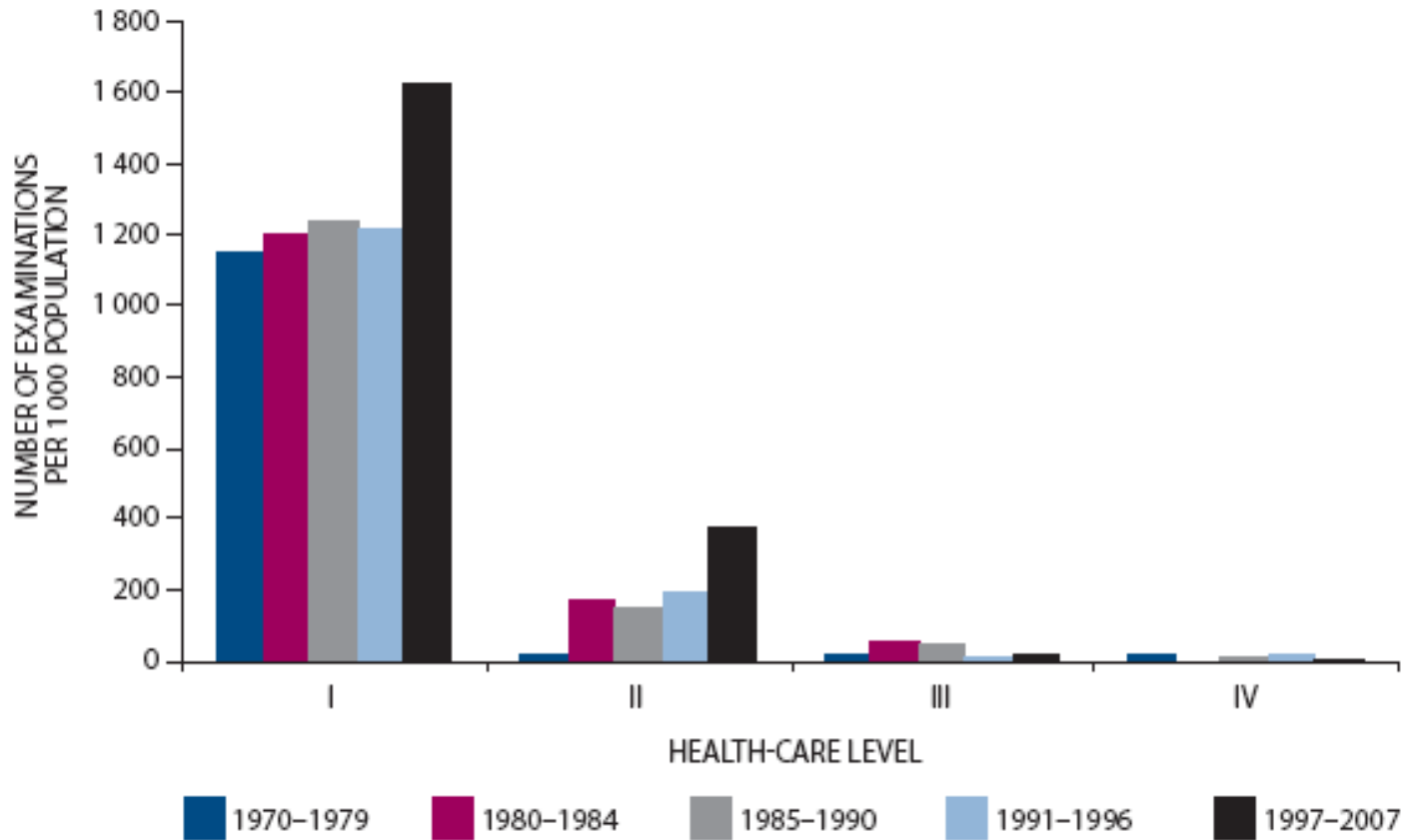


# Population dose estimation

- ***S (Collective effective dose)*** is summation, over all types of examinations, of mean effective dose ( $E_e$ ) for specific examination type multiplied by number of examinations ( $n_e$ )
  - Given by:  $S = \sum E_e n_e$
  - $n_e$  = number of annual frequencies (expressed as number of examinations per 1,000 population)
- "It is possible...to use effective dose and even collective dose for medical diagnostic exposure as long as this is done only for comparative purposes and for the **same** or **similar** patient **populations**, and it would require additional considerations or significant corrections if we try to use them to compare with other populations." [UNSCEAR 2000]



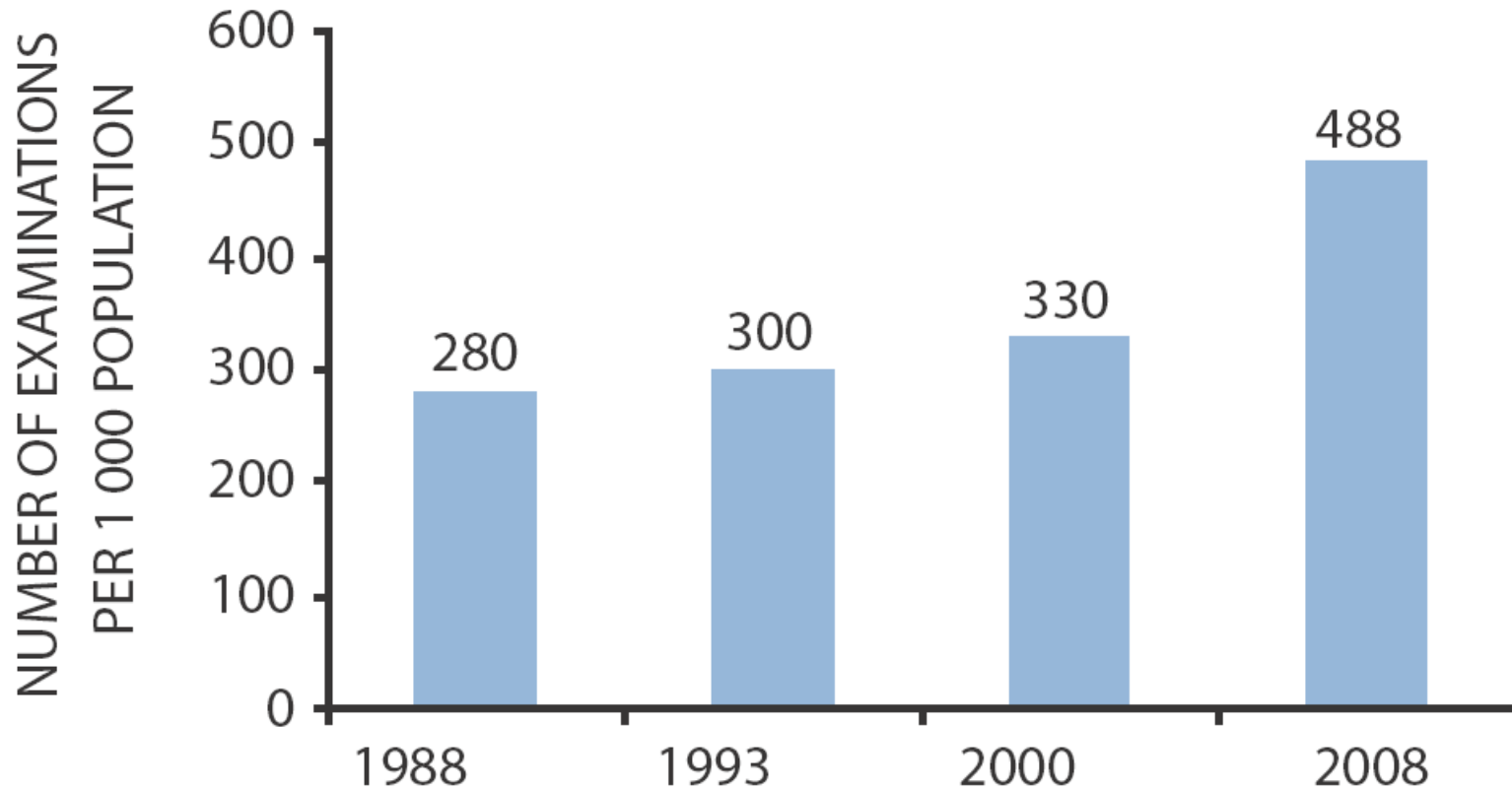
# Diagnostic radiology: Trend in annual frequency by HCL



[UNSCEAR 2008 Report]



# Diagnostic radiology: Trend in annual frequency



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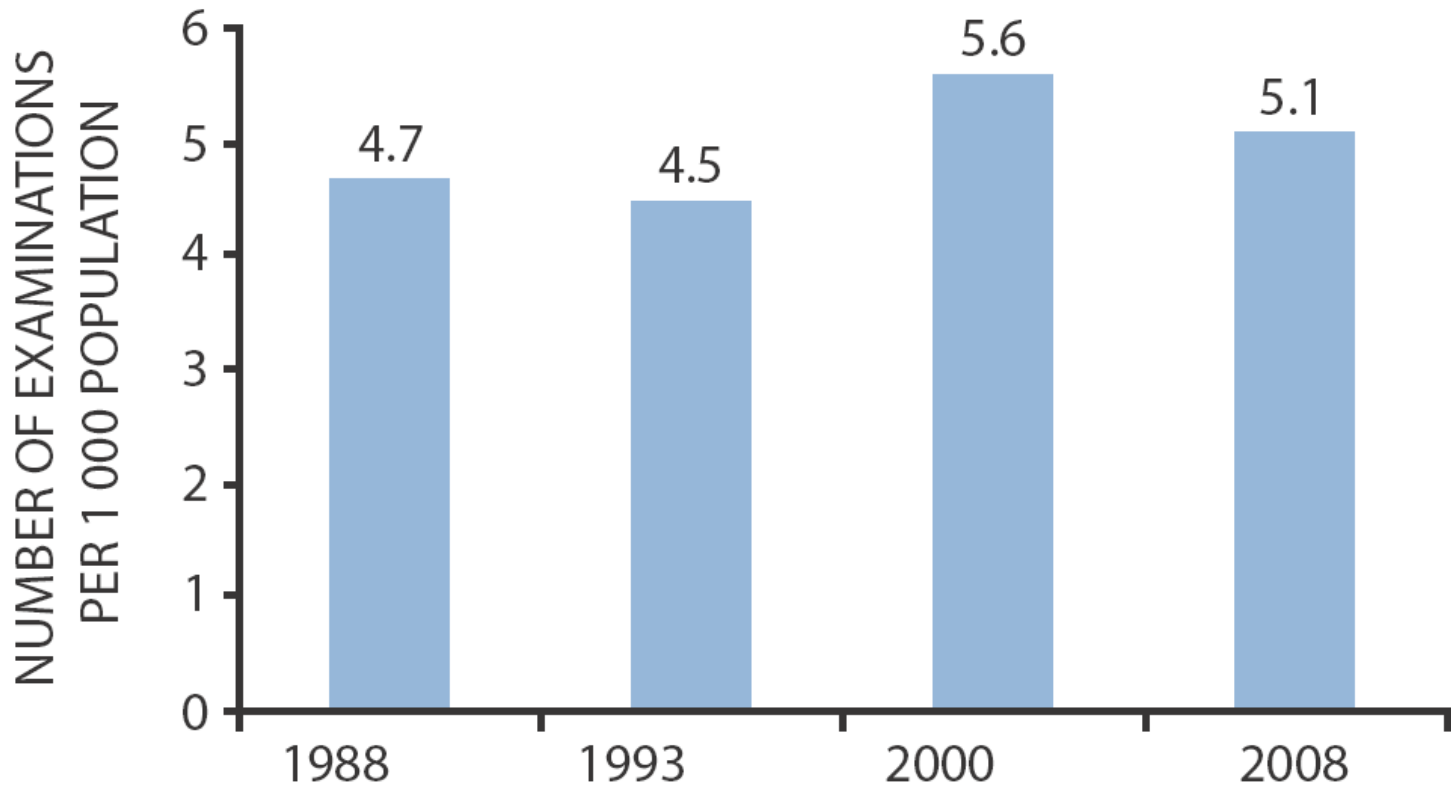
[UNSCEAR 1988, 1993, 2000, 2008 Reports]

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# Nuclear medicine: Trend in annual frequency

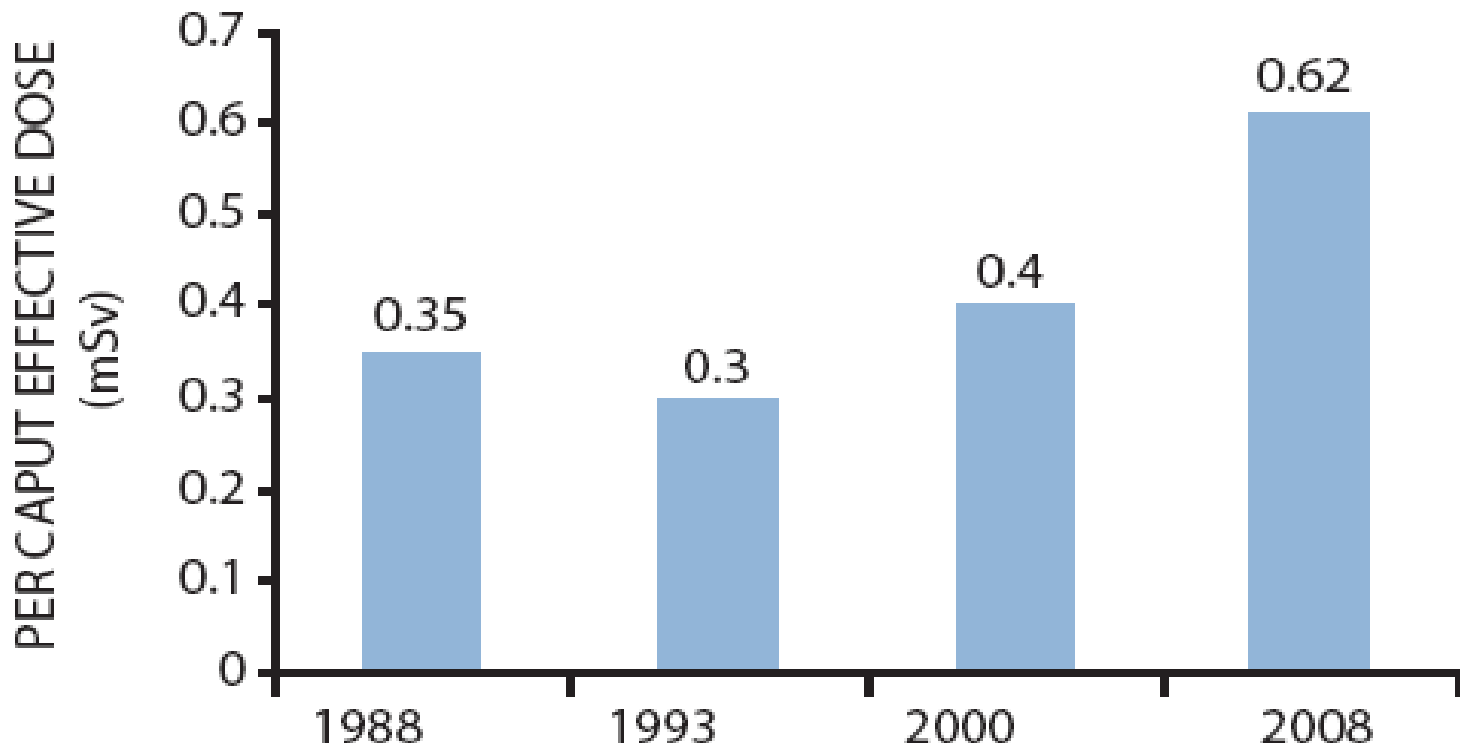


UNSCLEAR SURVEY

[UNSCLEAR 1988, 1993, 2000, 2008 Reports]



# Diagnostic radiology: Trend in per caput effective dose



UNSCLEAR SURVEY

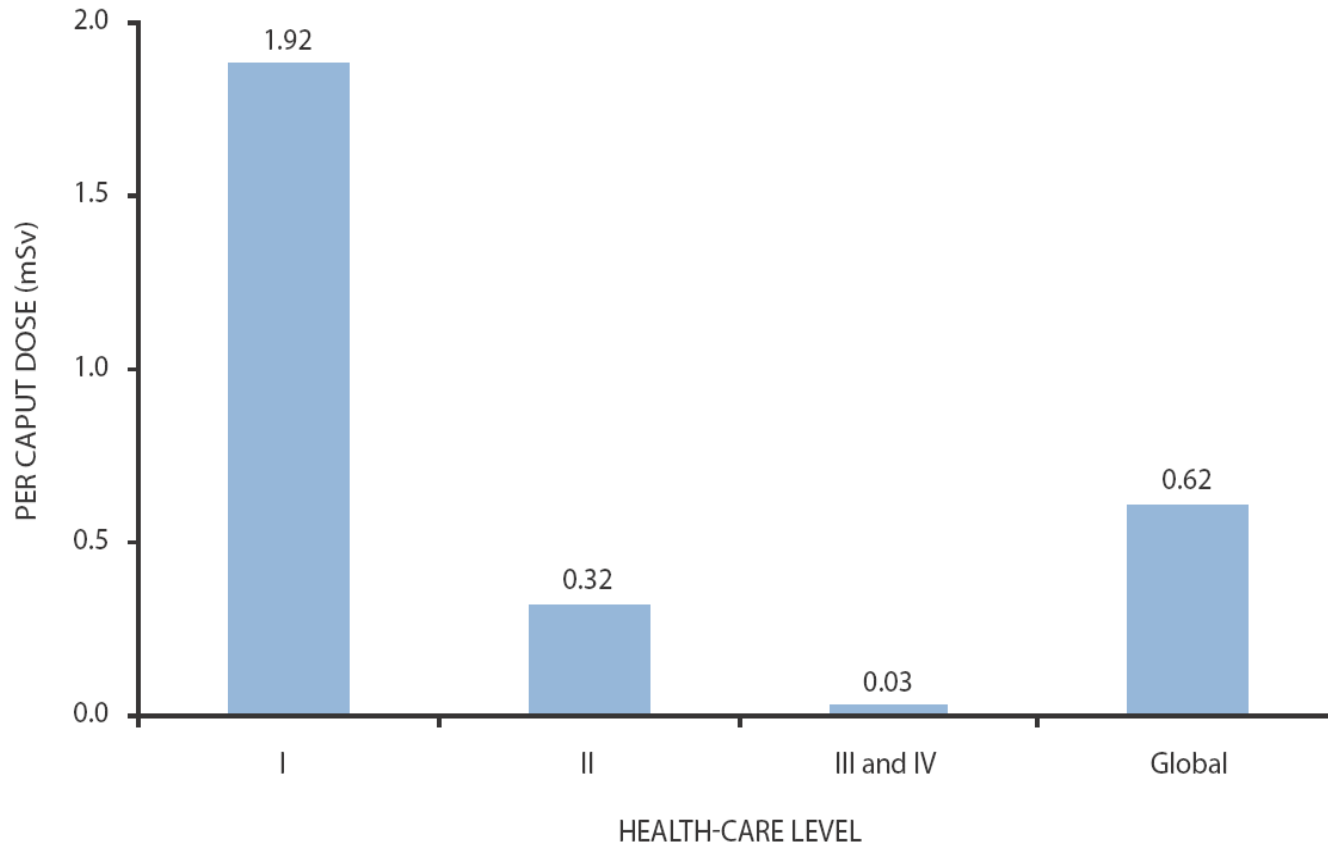
[UNSCLEAR 1988, 1993, 2000, 2008 Reports]

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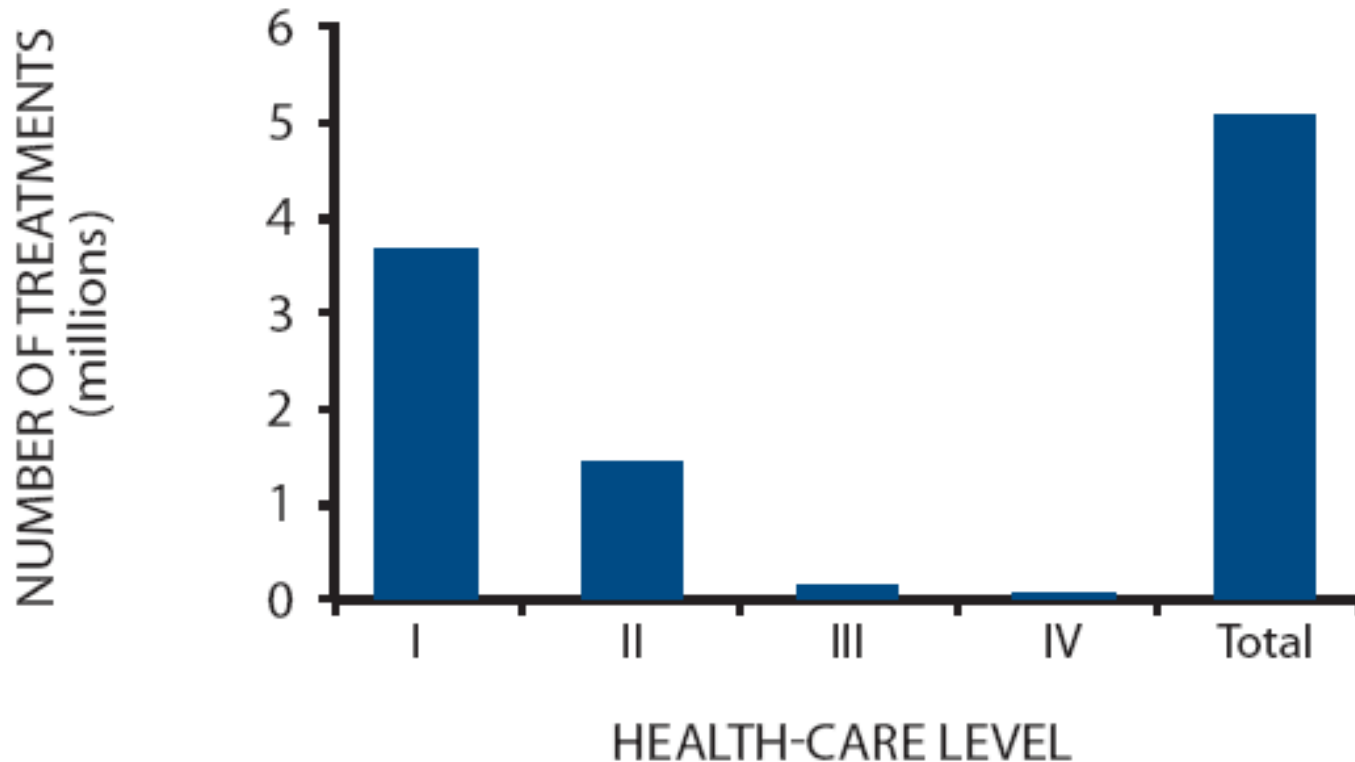
# Diagnostic radiology: Annual average per caput effective dose



**[UNSCEAR 2008 Report] (Evaluation period 1997-2007)**



# Radiotherapy: Annual number of treatments per HCL



[UNSCEAR 2008 Report] (Evaluation period 1997-2007)



# Summary

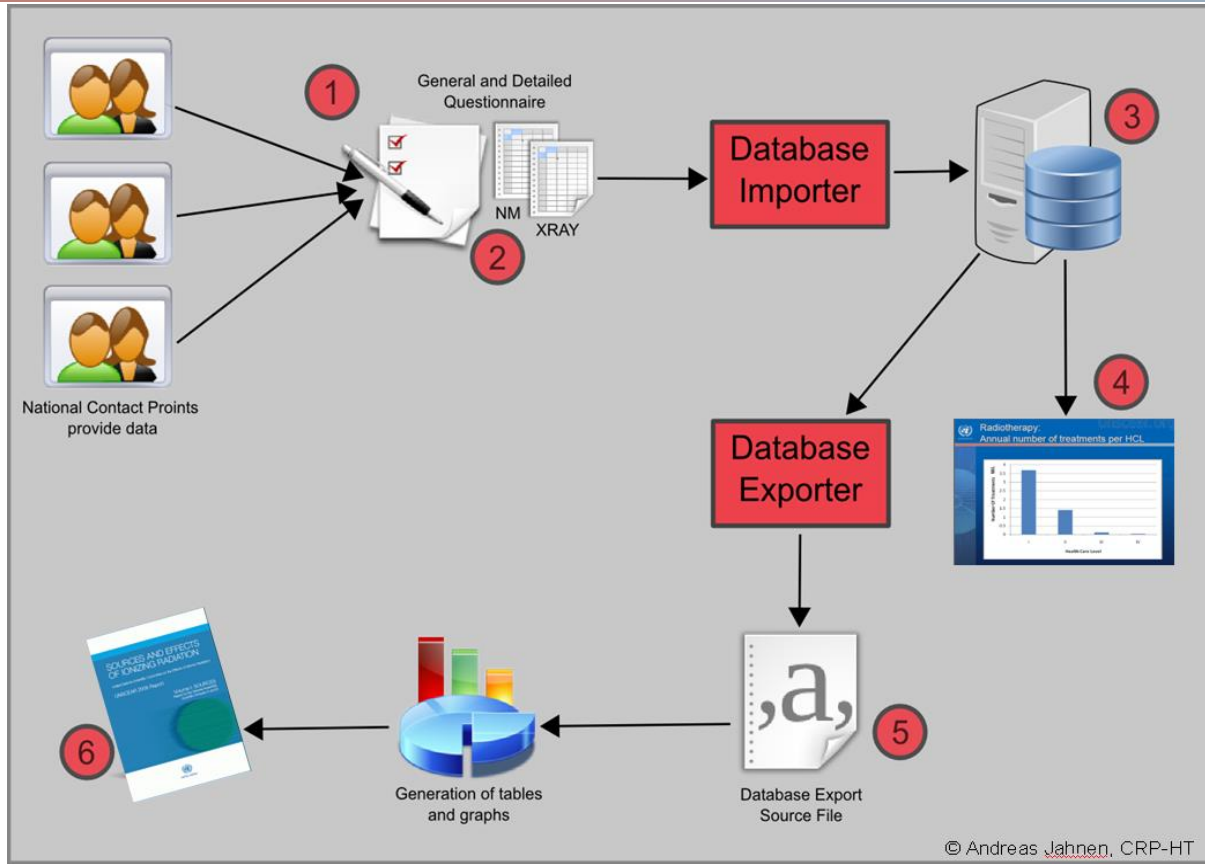


- Medical exposure remains by far largest artificial source of exposure and continues to grow significantly.
- Distribution of medical exposures is uneven among countries and regions:  
24% of world population receive:
  - 65% of all diagnostic examinations;
  - 90% of all nuclear medicine procedures;
  - 70% of total radiation therapy treatments.
- The information are based mainly on HCL I countries.
- UNSCEAR seeks to improve the data collection process and the global assessment methodology.





# Electronic data collection process



NCP download templates (1) and provide data (2). Data are imported into the UNSCEAR Medical Exposure Database (3). [Selected information are accessible on the portal (4)]. Exports (5) can be created at any time and used for reporting (6).



- **Data collection via excel templates; available on platform**
  - Radiology including Interventional Procedures;
  - Nuclear Medicine;
  - Radiotherapy.
- **Data requested are questionnaire sheets:**
  - General Information
  - Staffing and equipment
  - Frequency and age/sex distribution
  - Dosimetry



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World Health  
Organization

Version 1.0 RD 2014

Please read the further instructions given as comments. They become visible when moving the mouse cursor on the cells.

## General information

### Country information

Country code	458
Date of submission	generated on upload
Year (period)	
Population	
Population (survey base)	

### Contact information

Contact information	DR. PIRUNTHAVANY
---------------------	------------------

### GENERAL NOTES FOR COMPLETION OF THE QUESTIONNAIRES

The Global Survey of Medical Radiation Usage and Exposure consists of three questionnaires:

- (1) **Radiological Diagnostic** requesting information on examination frequencies and on estimated average patient dose per examination including variations of the dose quantities (standard deviations). Estimates of effective dose - if available - are demanded;
- (2) **Nuclear Medicine** requesting information on mean activities of radiopharmaceutical administered to patients including variations (standard deviation) and information on the major types of procedures of diagnostic examinations or therapeutic treatments. Estimates of effective dose - if available - are also demanded; and
- (3) **Radiotherapy** requesting information on numbers of treatments and typical dose values

General Info & contacts RD

Staff & Devices RD

Freq. & Dose RD (GovernmentHosp)

Freq. & Dose RD (Private Hosp)

Age & Sex RD ...



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World Health Organization

Version 1.0 RD 2014

Please read the further instructions given as comments. They become visible when moving the mouse cursor on the cells.

### Frequencies and mean dose values from radiological examinations

Modality category	Examination category	Number of examinations	Representation [%]	Mean dose per exam [Gy cm <sup>2</sup> ]	Other dosimetric quantity	Variation [SD]	Mean effective dose [mSv]	Sample size
Projectional radiography (without contrast media)	Head (skull & facial bones)	312	Skul AP/PA		2.092	1.230		
	Head (soft tissue)	268	Skull LAT		1.615	1.149		
	Neck (cervical spine)							
	Neck (soft tissue)							
	Chest (thoracic spine)							
	Chest/Thorax (lungs PA & LAT)	681	Chest		0.203	0.176		
	Chest (shoulder girdle & ribs)							
	Mammography							
	Mammography (screening)							
	Lumbar spine							
	Lumbo-sacral joint only							
	Abdomen	440				3.868	2.781	
	Pelvis & hips (bone)	371	Pelvis AP		2.888	2.066		
	Pelvis (soft tissue)							
	Limbs and joints							
	Whole spine (trunk)							
	Skeletal survey (head & trunk)							
Dental intraoral								
Dental panoramic								

General Info & contacts RD

Staff & Devices RD

Freq. & Dose RD (GovernmentHosp)

Freq. & Dose RD (Private Hosp)

Age & Sex RD ...



Age and sex distribution of patients undergoing radiological examinations (optional)

Modality category	Examination category	Number of treatments per age [y] group and sex																																			
		0-1		2-4		0-4		5-9		10-14		0-14		15-19		20-24		25-29		30-34		35-39		10-39		40-44		45-49		50-54		55-59		60-64			
		male	female	male	female	male	female	male	female	male	female	male	female	male	female	male	female	male	female	male	female	male	female	male	female	male	female	male	female	male	female	male	female	male	female		
Projectional radiography (without contrast media)	Head (skull & facial bones)																																				
	Head (soft tissue)																																				
	Neck (cervical spine)																																				
	Neck (soft tissue)																																				
	Chest (thoracic spine)																																				
	Chest/Thorax (lungs PA & LAT)																																				
	Chest (shoulder girdle & ribs)																																				
	Mammography																																				
	Mammography (screening)																																				
	Lumbar spine																																				
	Lumbo-sacral joint only																																				
	Abdomen																																				
	Pelvis & hips (bone)																																				
	Pelvis (soft tissue)																																				
	Limbs and joints																																				
	Whole spine (trunk)																																				
	Skeletal survey (head & trunk)																																				
	Dental intraoral																																				
	Dental panoramic																																				
	Other (please specify)																																				
Other (please specify)																																					
Radiography and fluoroscopy (mostly with contrast media)	Gastrointestinal tract (barium studies)																																				
	Gastrointestinal tract (defecography)																																				
	Biliary tract (cholangiography)																																				
	Biliary tract (ERCP)																																				
	Biliary tract (cholecystography)																																				
	Uro-genital tract (IVU)																																				
	Uro-genital tract (kidney, bladder & urethra)																																				
	Myelography																																				
	Arthrography																																				
	Cerebral angiography																																				
	Cardiac angiography																																				
	Thoracic angiography																																				
	Abdominal angiography																																				
	Pelvic angiography																																				
	Peripheral angiography																																				
	Lymphangiography																																				
	Other (please specify)																																				
Other (please specify)																																					



- **Data submission via online platform; upload function**
  - Note Verbale to Missions in Vienna invited MS to nominate a National Contact Person (NCP) for UNSCEAR; ~40
  - NCPs are requested to submit data officially via platform;
  - Technical experts are allowed to register to the platform;
  - NCPs and experts can access submission on country page;
  - Additional material is valued as supporting information;
  - All contributions will be acknowledged at the relevant UNSCEAR Reports to the General Assembly; and
- Countries don't providing information will be extrapolated.



# Preguntas?



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de Protección y Seguridad Radiológica

*"Radioprotección: Nuevos Desafíos para un Mundo en Evolución"*




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## UNSCEAR Global Survey

### On Medical Radiation Usage and Exposure from 2006 onwards

The United Nations Scientific Committee on the Effects of Atomic Radiation (  [UNSCEAR](#) ), established by the United Nations General Assembly in 1955 to assess and report levels and effects of all sources of ionizing radiation conducts regular Global Surveys of Medical Radiation Usage and Exposure.

This online platform is to support governments and international organizations to provide national and regional data on the use of radiation in medical diagnosis and treatment for the UNSCEAR Global Survey on Medical Radiation Usage and Exposure from 2006 onwards.

National Contact Persons (NCPs) are invited to [register here](#) to be able to access the protected area before they can download the questionnaires for official data submission. Additional national experts can be registered to support the NCPs. All contributions will be acknowledged by UNSCEAR in the relevant report to the UN General Assembly.

UNSCEAR is grateful to the (  [World Health Organization](#) ) for establishing arrangements for cooperation which resulted in developing a common medical questionnaire for this survey and to the (  [European Commission](#) ) for permitting the use of the outcomes of the (  [DoseDataMed II project](#) ).

Please read further [instructions](#), [background](#) information and [help](#) if you are interested in using this platform.





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## Registration of new users

Please fill in the information requested below to register on the UNSCEAR online [survey](#) platform. UNSCEAR needs to validate your request before you will be able to use the system. The validation process could take some time.

Make sure you supply a valid e-mail address as it will be used for providing your password and as your login identification.

[Register](#)

E-Mail

(Firstname Lastname)

Name

(incl. International Dialing Prefix)

Phone number

Organization

Address

ZIP

City





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**survey.unscear.org**

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(Select your country)

Country

Countries are requested to nominate a National Contact Person (NCP) via official channels to the UNSCEAR secretariat either by mail or fax (+43 1 260605902) to coordinate the national submission.

Please select from the list below for which discipline(s) you are contributing to the data collection process and if you are the National Contact Person. Multiple-choice is possible.

**National Contact Person**

**Diagnostic Radiology (RD)**

**Nuclear Medicine (NM)**

**Radiotherapy (RT)**

Please fill all letters into the right hand box below in order to prevent SPAM.



Register



## Update your account profile

You only need to complete those fields you wish to change. You may not change your user name.  
Data in this form may only be updated after the next login.

### User Profile

Username

Name

E-Mail

Phone number

Organization

Address

ZIP

City

New password

once again





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## Login

You are currently not logged in! Enter your authentication credentials below to log in. You need to have cookies enabled to log in.

Login

**E-Mail**

**Password**

Remember me

You don't have an account yet? Just get one: [Register](#)

Forgotten your password? Get a new one: [Set new password](#)

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## UNSCEAR Global Survey

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### On Medical Radiation Usage and Exposure from 2005 onwards

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This internet platform is to support governments and international organizations to provide national and regional data on the use of radiation in medical diagnosis and treatment for the [UNSCEAR Global Survey](#) on Medical Radiation Usage and Exposure from 2005 onwards.

National Contact Persons (NCPs) are invited to [register here](#) to be able to access the protected area before they can [download](#) the questionnaires for official data submission. Additional national experts can be registered to support the NCPs. All contributions will be acknowledged by UNSCEAR in the relevant report to the UN General Assembly.

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Please read further [instructions](#), [background](#) information and [help](#) if you are interested in using this platform.

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## Malaysia (Asia Pacific; ISO Number 458)

Find below all files related to your individual data collection process. Please download your country specific templates. After completing the data collection, please upload the file(s). You can follow the data processing steps in the dedicated sections below. Please use the comment area at the end of the page for questions and messages from/to the experts.

[Edit](#)

### Download Data Templates

Please download the following templates and fill them with the data you have available.

- [malaysia\\_unscear\\_survey\\_nuclearmedicine\\_v1\\_0.xls](#)
- [malaysia\\_unscear\\_survey\\_radiology\\_v1\\_0.xls](#)
- [malaysia\\_unscear\\_survey\\_radiotherapy\\_v1\\_0.xls](#)

[Edit](#)

### Upload Collected Data Files

Please upload the file(s) using the media files upload function.

Media File Upload

Select file to upload:  No file selected.

Overwrite existing file

The uploaded data will be processed by our data collection system and reviewed by a panel of scientific experts. Find below the files in the different processing steps:

[Edit](#)

#### Uploaded

Filename	Filesize	Last modified	Last modified by
<a href="#">malaysia_malaysia_unscear_survey_radiology_v1_0_11_mei_2014.xls</a>	355.0 KIB	2014/05/11 11:43	

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## Upload of supporting Documents

You have the possibility to upload additional documents to support the evaluation of the transmitted data. E.g. documents about how you collected data or publications that where the basis for your data.

Media File Upload

Select file to upload:  No file selected.

Overwrite existing file

Filename	Filesize	Last modified	Last modified by
 freq_dose_rd.xlsx	24.7 KiB	2014/05/12 11:47	drpirunthavany@moh.gov.my

Page generated 6:49 2-May-2014

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Enter your comment. Wiki syntax is allowed:





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## Background

**The UNSCEAR online data collection platform is currently being tested in some countries and will be available to all UN Member States very soon.**

UNSCEAR systematically collects information obtained through population-based surveys on the use of radiation in medicine and the associated exposure. National Regularity Authorities and more recently Ministries of Health, due to the cooperation with the [World Health Organization](#), are allowed to submit data officially to the UNSCEAR secretariat.

These surveys are used to identify trends in radiation exposure and thus serve as an early warning sign of potential safety issues that might require special attention. They can also be used to identify gaps in treatment capabilities and possible unwarranted dose variations for the same radiological procedure.

UNSCEAR has established this online data collection platform to enable the direct download/upload of the survey questionnaires (country specific templates). National contact persons (NCP) are invited to [register here](#) to be able to access the protected area before they can make an official submission.

UNSCEAR produces detailed reports for the United Nations General Assembly which are highly regarded as authoritative reviews examining radiation exposure from natural sources and artificial sources. The UNSCEAR secretariat plans to publish first results of the current survey in the 2015 Report.

All UNSCEAR publications are available free online and all contributors will be acknowledged.







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## Instructions

This platform manages the official submissions to UNSCEAR's Global Survey of Medical Radiation Usage and Exposure.

**Before using this platform, please carefully read the instructions below describing the data collection process!**

### 1. Registration

To be able to access the protected area, it is necessary to register on this platform first. Please click the '**Register**' button at the top right of the screen. Registration is open to all those responsible for providing data to UNSCEAR's Global Survey of Medical Radiation Usage and Exposure. You are asked to register using a valid email address and details about your institution and profession. Also, you have to indicate the country for which you are providing data. Official submission of data is only allowed by a National Contact Person (NCP), who needs to be nominated to UNSCEAR via official channels. Furthermore, it is possible to register other persons (experts) to support their NCP. They don't need to be nominated but should provide their contact details and indicate their specialization.

If you have any questions in this regard, please [contact us](#).

Once you have registered, you will receive a confirmation email.

### 2. User validation

The UNSCEAR secretariat will validate user information before providing access to the platform! This validation could take a few days as registration details may be checked by phone or email. The validation process includes assignment to the country and region that will be used to generate your country specific data templates.

Once the account is validated, you will receive an email with your personalized password.





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## News

### IRPA Workshops

UNSCEAR - in cooperation with IRPA and WHO - plans to organize hands-on workshops at the following IRPA regional conferences:

- [Asian and Oceanic Congress on Radiation Protection in Kuala Lumpur, Malaysia \(12-16 May 2014\)](#) [Link](#)
- [European IRPA Congress in Geneva, Switzerland \(23-27 June 2014\)](#) [Link](#)
- [African Regional IRPA Congress in Rabat, Morocco \(13-17 September 2014\)](#) [Link](#)
- [Latin American IRPA Conference in Buenos Aires, Argentina \(12-17 April 2015\)](#)

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## Contact

Please use the contact form below and select the question category in order to make it easier for us to answer.

### Contact Details

Full Name: \*

E-mail: \*

Organization (optional):

Country (optional):

Please select an category \* General Request

Question / Feedback: \*

# survey@unscear.org

Please fill all letters into the right hand box below in order to prevent SPAM.







## Conclusion



- The new UNSCEAR data collection platform aims to increase the numbers of countries providing data by facilitating the collection process and providing a long term archive.
- Due to the expected increased participation (HCL II-IV) and an a new estimation model taking health economic factors into account an improved estimation of the overall global medical exposure is expected.
- The collaboration with International Organizations (e.g. IAEA, WHO, FORO) and professional societies (e.g. IRPA, IOMP, ISR) is essential to profit from existing experiences and to avoid duplication of efforts.



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# UNSCEAR GLOBAL SURVEY ON MEDICAL EXPOSURE

## A USER MANUAL

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