World Health Organization

Paediatric Radiology: which are the challenges?

Dr Maria del Rosario Perez

Department of Public Health, Environmental and Social Determinants of Health

Exposition aux rayons X en imagerie médicale: quels défis? ARRAD 2017, Genève, 02-02-2017

World Health Organization: function

The WHO is the UN agency with a specific public health mandate as the directing and coordinating authority of *international health work*

World Health Organization

The WHO 3-level structure

194 Member States
Ministries of Health

Headquarters
Geneva

6 Regional Offices

150 Country Offices

IARC, Lyon

World Health Organization

World Health Organization objective

- **Objective**:

attainment by all peoples of the *highest possible level of health*

The concept of HEALTH for the World Health Organization

"Health is a complete state of physical, mental and social well-being, and not merely the absence of disease or infirmity"

WHO's Constitution (1948)

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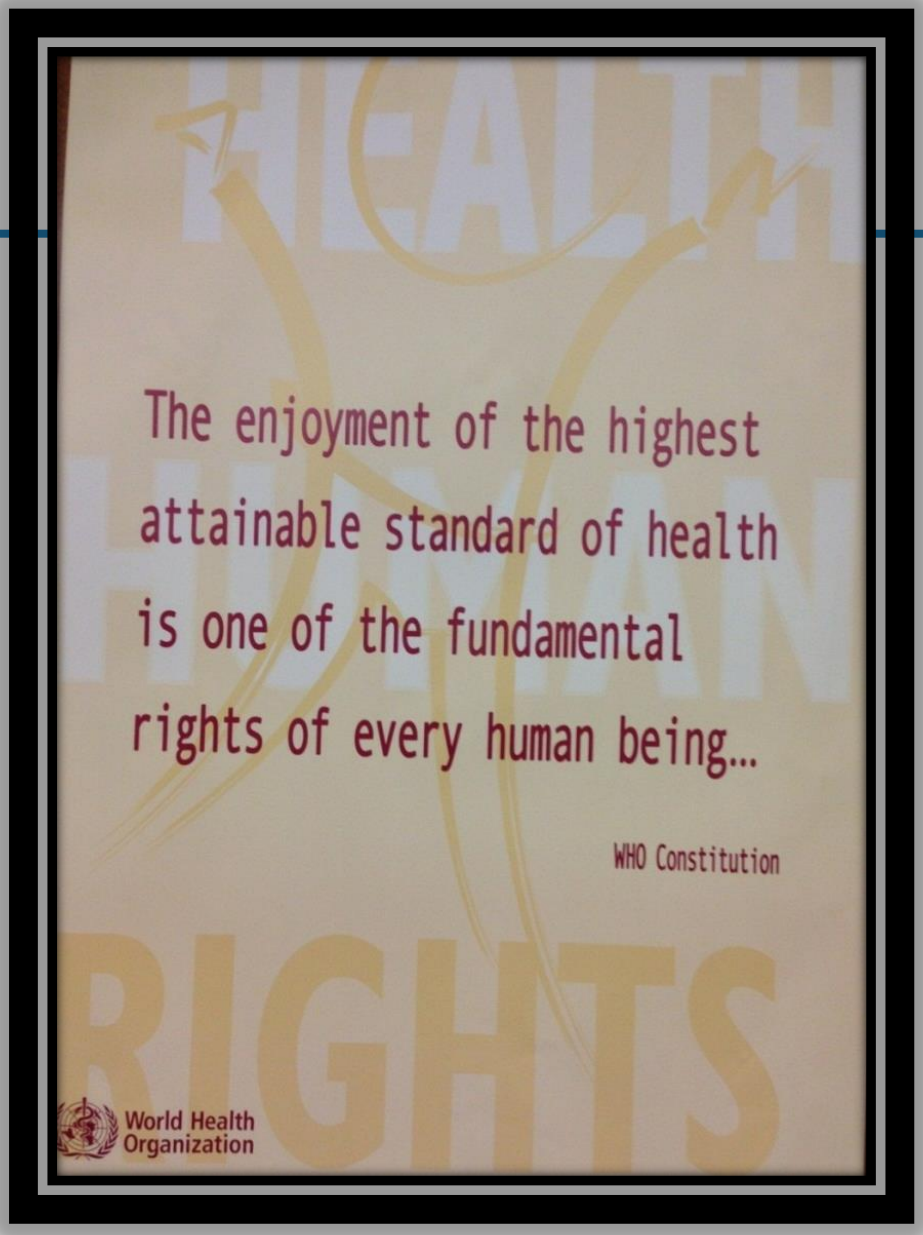
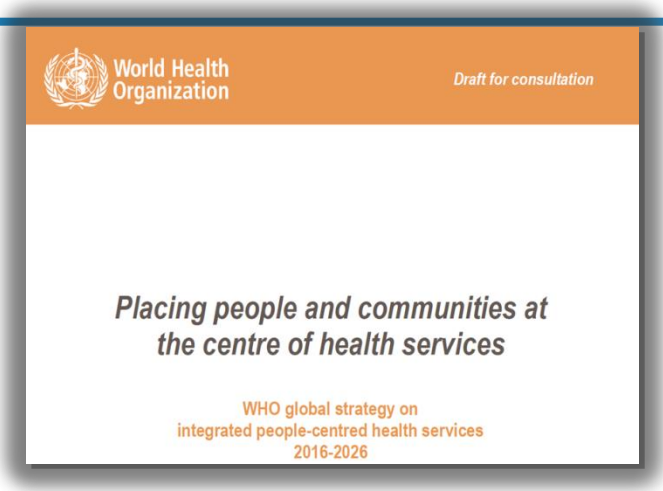


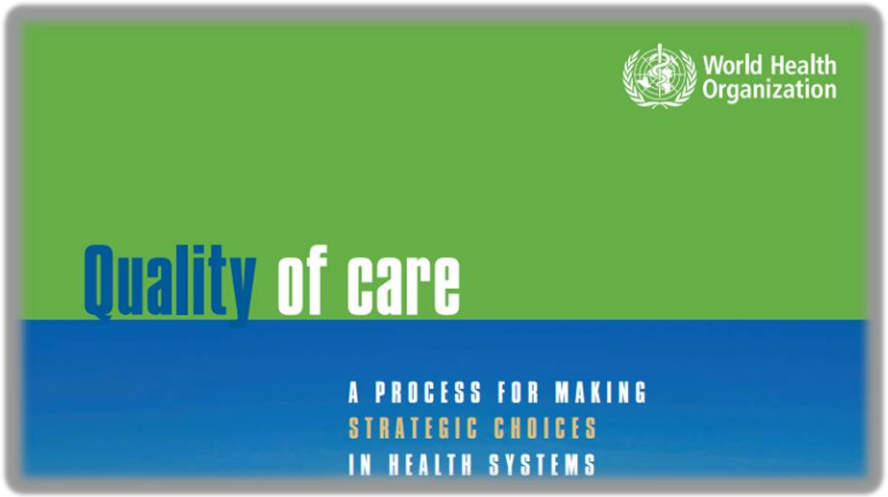
Health is a human right

The right to health includes access to timely, acceptable, and affordable health care of appropriate quality

Health Care Quality Dimensions

- Safety
- Effectiveness
- Patient-centeredness
- Timeliness
- Efficiency
- Equality





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Good medical practice encompasses radiation safety

- Health service delivery is one of the building blocks of health systems.
- Good health services are those which deliver safe and effective health interventions to those that need them, when and where needed, with minimum waste of resources.
- **Radiation safety in medicine** is part of health care quality and contributes to health systems strengthening.

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EXECUTIVE BOARD
131st session
Geneva, 28–29 May 2012

EB131/1 Rev.1
29 May 2012

Agenda

The new International BSS were adopted by the WHO in May 2012

6. Technical and health matters

6.1 Pandemic Influenza Preparedness Framework for the sharing of influenza viruses and access to vaccines and other benefits

Document EB131/4

6.2 Radiation protection and safety of radiation sources: International Basic Safety Standards

Document EB131/11

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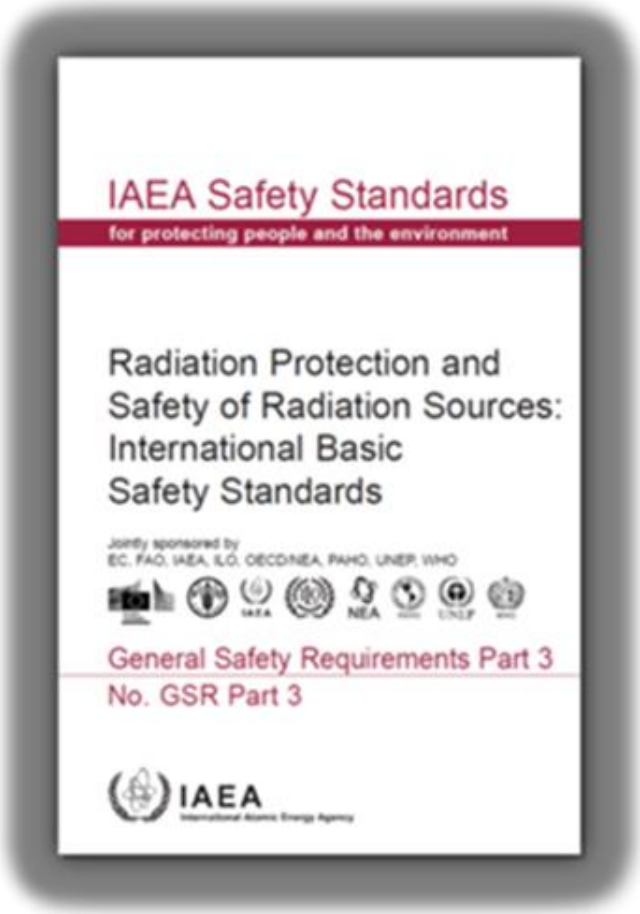
Current challenge: supporting the implementation of the BSS



International BSS and Euratom BSS

- Both the **International BSS** and the **EURATOM BSS** have a robust set of safety requirements concerning radiation safety in medical exposures.
- Both mention the special considerations for children
- European countries are currently working on the transposition of the BSS, already thinking about the implementation

International BSS requirement 3.166: special considerations for optimization

- Registrants and licensees shall ensure that the particular aspects of medical exposures are considered in the optimization process for (among others) :
  - **Paediatric patients** subject to medical exposure;
  - Exposure of the **embryo or fetus**, in particular for radiological procedures in which the abdomen or pelvis of the pregnant female patient is exposed to the useful radiation beam or could otherwise receive a significant dose;
  - Exposure of a **breastfed infant** as a result of a female patient having undergone a radiological procedure with radiopharmaceuticals.

Medical Exposures

- The largest contributor to the exposure of the population from artificial sources (**95%**) only exceeded world-wide by natural background as a source of exposure.
- Almost equal to natural background as a source of exposure to the population in US (NCRP Report 160), similar trend in other countries…

Annually worldwide

3,600 million X-ray exams (> 300 million in children)

7.5 million radiation oncology treatments

37 million nuclear medicine procedures

Radiation in Health Care

- The use of ionizing radiation in medical imaging saves lives.
- Advanced imaging technology has opened new horizons for clinical diagnostics and has improved patient care.
- In many cases interventional radiology prevents the need for more invasive procedures.

Radiation benefits and risks

- Benefits for patients gain recognition the use of radiation in the diagnosis and treatment of human diseases increases.

- While every day applications of ionizing radiation in health care help millions of patients worldwide, inappropriate use may result in unnecessary and preventable radiation risks in patients and staff.

Radiation Protection in health care

- Need to control and minimize health **risks**, while maximizing the **benefits.**

- Achieving this balance is a major challenge in RP in medicine.

- This is PARTICULARLY IMPORTANT in **paediatric patients**.

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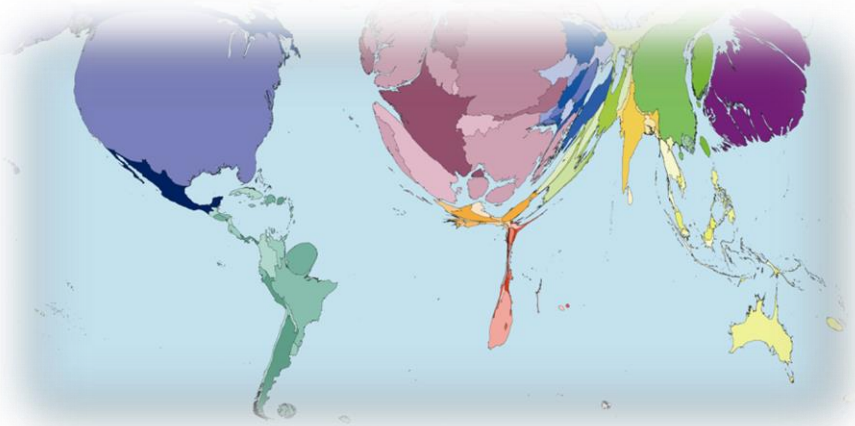
Radiation protection in health care: other challenges

- **Low level of awareness** of radiation doses and associated risks vs. benefits in the medical sector
- **Lack of integration** of health care delivery, strategies and regulations (e.g. radiation safety, patient safety, medicines, medical devices, health technologies)
- **Huge disparities in access** to services, technologies and resources between and within countries
- **Limited dialogue/cooperation** between professional societies, health authorities and radiation protection regulators at national level


COST OF DIGITAL X-RAY AFFECTS POOR PATIENTS

Ahmedabad Mirror | Jun 10, 2015, 02.00 AM IST



RP in in Paediatric Imaging: major challenges

- Children are not small adults (unique considerations)
- Justification of paediatric procedures: imaging guidelines
- Optimization of protection: “child-sizing”- paediatric DRLs
- Prevention of unintended exposures and adverse events
- Radiation risk communication and risk/benefit dialogue

Children are not small adults !!!!!

Radiation protection of children requires specific considerations

Children & environmental threats

- Children are inherently more sensitive to environmental hazards:
  - physical, physiological, cognitive immaturity;
  - > proportion of proliferating cells;
- Prenatal life has periods of exquisite sensitivity to the effects of toxic agents
  - even small exposures can significantly affect developmental processes;
- Children have a longer life-span to develop long-term health effects like cancer

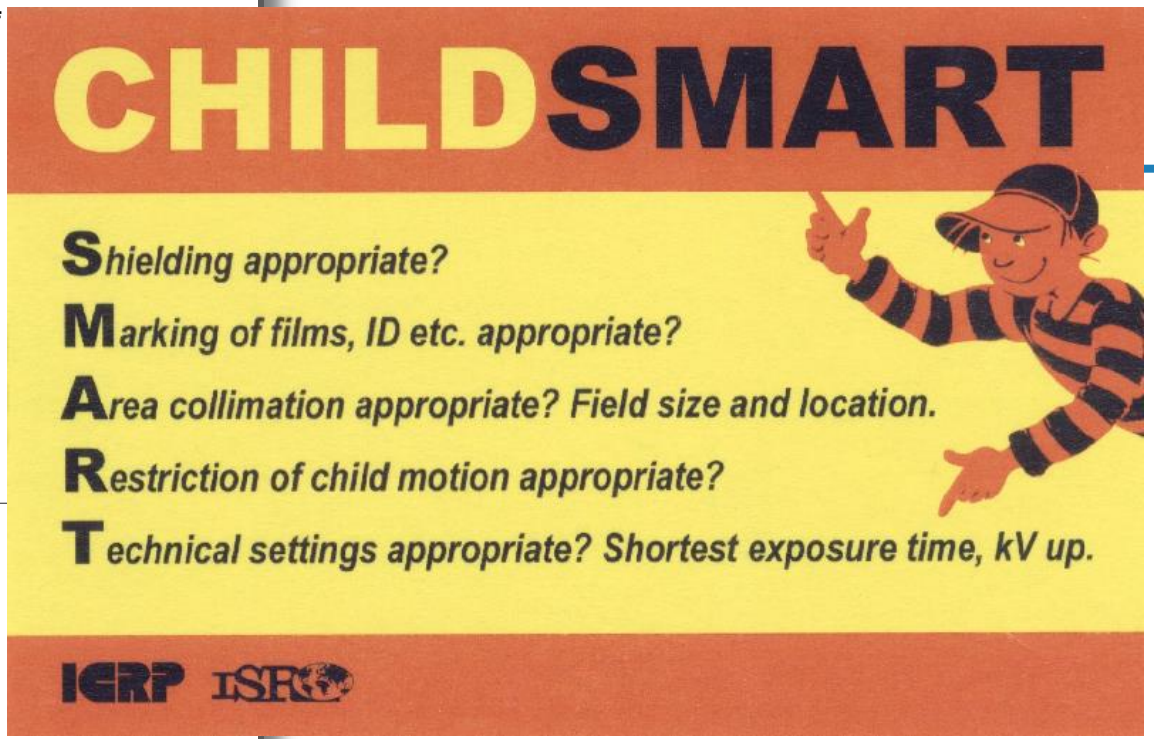
This report contains the collective views of an international group of experts and does not necessarily represent the decisions or the stated policy of the World Health Organization

Rational use of diagnostic imaging in paediatrics

Report of a
WHO Study Group

World Health Organization
Technical Report Series
757

World Health Organization, Geneva 1987



Although radiation protection in paediatric imaging has been addressed by international organizations since longtime ago, in the last decade this became a topic of concern for scientists and health professionals

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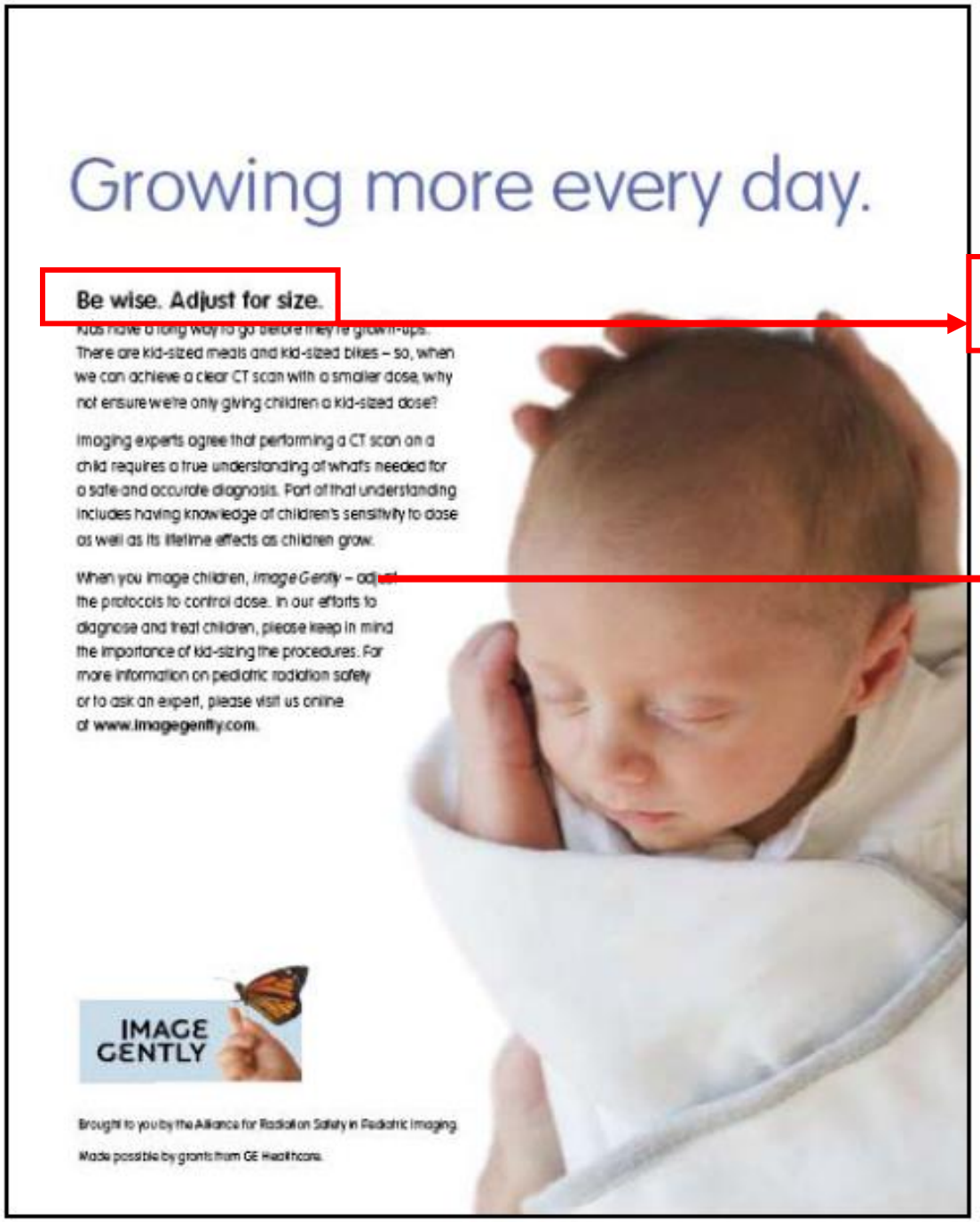
Image Gently 2007



Be wise, adjust for size

When you image children, kid-size the procedure, adjust the protocols to control dose,….

image gently℠

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image gently℠

The Alliance for Radiation Safety in Pediatric Imaging

CT Campaign (2008)

One size does not fit all !

"Back to Basis" CR/DR Campaign (2012)

image gently®

The Alliance for Radiation Safety in Pediatric Imaging

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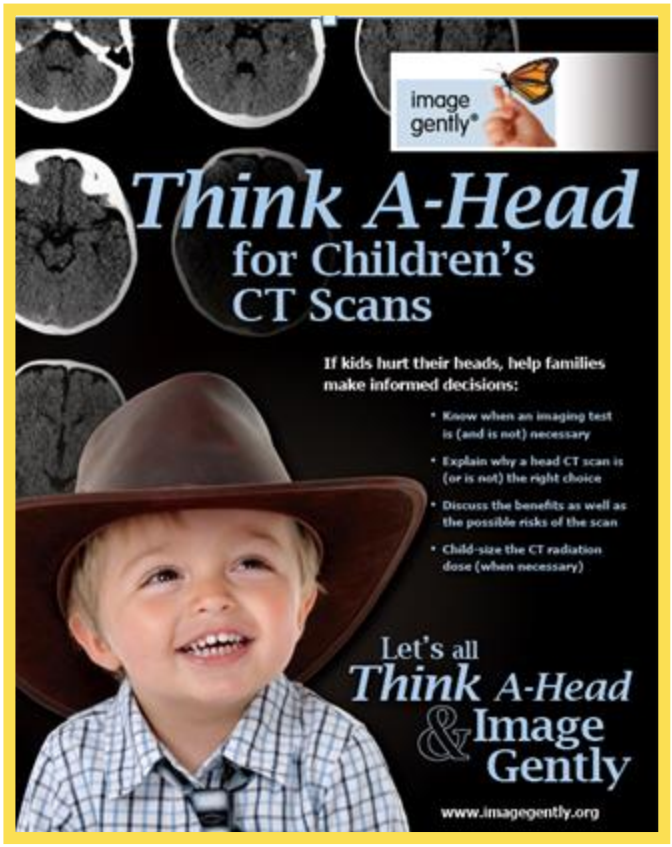
Joint Campaign Image Gently-Image Wisely

“Think A-Head”
Pediatric Head Trauma Campaign (Nov 2016)



“Think A-Head” on Children’s CT Scans: if kids hurt their heads, help families make informed decisions:

- ✓ Know when an imaging test is (and is not) necessary
- ✓ Explain why a head CT scan is (or is not) the right choice
- ✓ Discuss the benefits as well as the risks of the scan
- ✓ Child-size the CT radiation dose (where necessary)

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“Have-A-Heart”

new Image Gently Campaign

(to be launched during 2017)

Kids with heart disease need special care.

And like all children, they are more sensitive to radiation.

So when these kids need imaging:

- ✓Choose heart ultrasound, MRI or another exam that does not use radiation (when appropriate)
- ✓Child-size CT, fluoroscopy and nuclear medicine exams
- ✓And, during catheterization:
  - Lower the frame rate
  - Lower the magnification
  - Lower the camera
  - Limit field-of-view (collimate) and
  - Leave the anti-scatter grid out (in younger children)

Medical imaging Saves Lives –
The care we provide now can last a lifetime

Have-A-Heart – *Image Gently!*

.

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2012

Radiation exposure from CT scans in childhood and subsequent risk of leukaemia and brain tumours: a retrospective cohort study

Mark S Pearce, Jane A Salotti, Mark P Little, Kieran McHugh, Choonsik Lee, Kwang Pyo Kim, Nicola L Howe, Cecile M Ronckers, Preetha Rajaraman, Sir Alan W Craft, Louise Parker, Amy Berrington de González

Summary

Background Although CT scans are very useful clinically, potential cancer risks exist from associated ionising radiation, in particular for children who are more radiosensitive than adults. We aimed to assess the excess risk of leukaemia and brain tumours after CT scans in a cohort of children and young adults.

Methods In our retrospective cohort study, we included patients without previous cancer diagnoses who were first examined with CT in National Health Service (NHS) centres in England, Wales, or Scotland (Great Britain) between 1985 and 2002, when they were younger than 22 years of age. We obtained data for cancer incidence, mortality, and loss to follow-up from the NHS Central Registry from Jan 1, 1985, to Dec 31, 2008. We estimated absorbed brain and red bone marrow doses per CT scan in mGy and assessed excess incidence of leukaemia and brain tumours cancer

Lancet 2012; 380: 499–505

Published Online June 7, 2012 http://dx.doi.org/10.1016/S0140-6736(12)60815-0

See Comment page 455

See Perspectives page 465

Institute of Health and Society (M S Pearce PhD, J A Salotti PhD, N L Howe MSc) and Northern

BMJ

2013

BMJ 2013;346:f2360 doi: 10.1136/bmj.f2360

RESEARCH

Cancer risk in 680 000 people exposed to computed tomography scans in childhood or adolescence: data linkage study of 11 million Australians


OPEN ACCESS

John D Mathews *epidemiologist*[1], Anna V Forsythe *research officer*[1], Zoe Brady *medical physicist*[12], Martin W Butler *data analyst*[3], Stacy K Goergen *radiologist*[4], Graham B Byrnes *statistician*[5], Graham G Giles *epidemiologist*[6], Anthony B Wallace *medical physicist*[7], Philip R Anderson *epidemiologist*[89], Tenniel A Guiver *data analyst*[8], Paul McGale *statistician*[10], Timothy M Cain *radiologist*[11], James G Dowty *research fellow*[1], Adrian C Bickerstaffe *computer scientist*[1], Sarah C Darby *statistician*[10]

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ARTICLE

2013

ONLINE FIRST

The Use of Computed Tomography in Pediatrics and the Associated Radiation Exposure and Estimated Cancer Risk

JAMA Pediatr.
Published online June 10, 2013.
doi:10.1001/jamapediatrics.2013.311

Diana L. Miglioretti, PhD; Eric Johnson, MS; Andrew Williams, PhD; Robert T. Greenlee, PhD, MPH; Sheila Weinmann, PhD, MPH; Leif I. Solberg, MD; Heather Spencer Feigelson, PhD, MPH; Douglas Roblin, PhD; Michael J. Flynn, PhD; Nicholas Vanneman, MA; Rebecca Smith-Bindman, MD

Importance: Increased use of computed tomography (CT) in pediatrics raises concerns about cancer risk from exposure to ionizing radiation.

Objectives: To quantify trends in the use of CT in pediatrics and the associated radiation exposure and can-

to 25% of abdomen/pelvis scans, 6% to 14% of spine scans, and 3% to 8% of chest scans. Projected lifetime attributable risks of solid cancer were higher for younger patients and girls than for older patients and boys, and they were also higher for patients who underwent CT scans of the abdomen/pelvis or spine than for patients who un-

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2014

Circulation
JOURNAL OF THE AMERICAN HEART ASSOCIATION

American Heart Association

Cumulative Radiation Exposure and Cancer Risk Estimation in Children with Heart Disease

Jason N. Johnson, Christoph Hornik, Jennifer S. Li, Daniel K. Benjamin, Jr., Terry Yoshizumi, Robert E. Reiman, Donald P. Frush and Kevin D. Hill

Circulation. published online June 9, 2014;
Circulation is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 2014 American Heart Association, Inc. All rights reserved.
Print ISSN: 0009-7322. Online ISSN: 1524-4539

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EPI-CT (2017?)

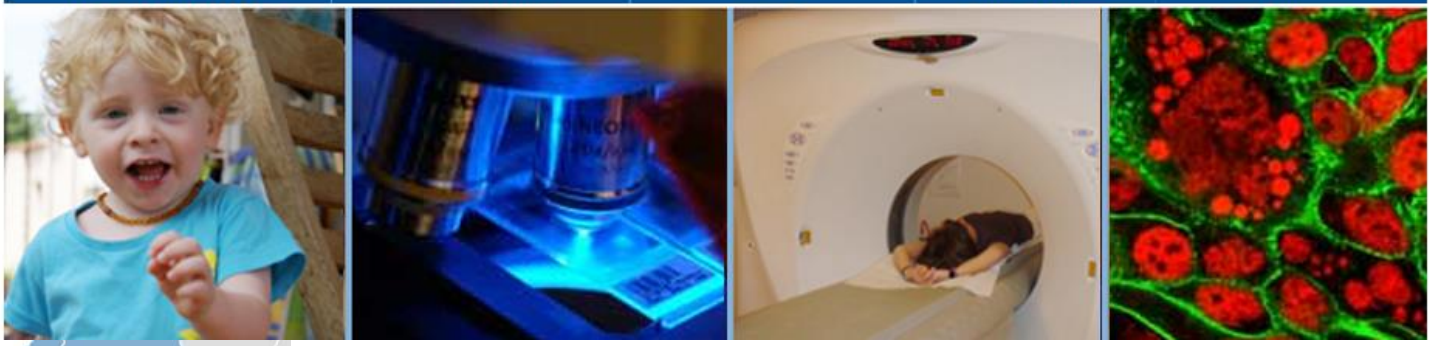
International Agency for Research on Cancer

World Health Organization

EPI-CT:
International pediatric CT scan study

EPI-CT

NEWS AND EVENTS | CONSORTIUM | SCOPE | PUBLICATIONS | MEMBERS



Specific objectives of the project are to:

- Establish a large multinational cohort of paediatric patients who received CT scans
- Describe patterns of use of CTs over time and between countries
- Develop individual estimates of organ-specific doses from paediatric CT scans using improved methods for dose estimation for paediatric patients
- Evaluate the radiation-related risk of cancer in this cohort and pilot test biological markers of CT-irradiation effects
- Develop methods to characterize quality of CT images in relation to the corresponding examination dose
- Provide recommendations for a "harmonized" approach to CT dose optimization for paediatric patients in Europe

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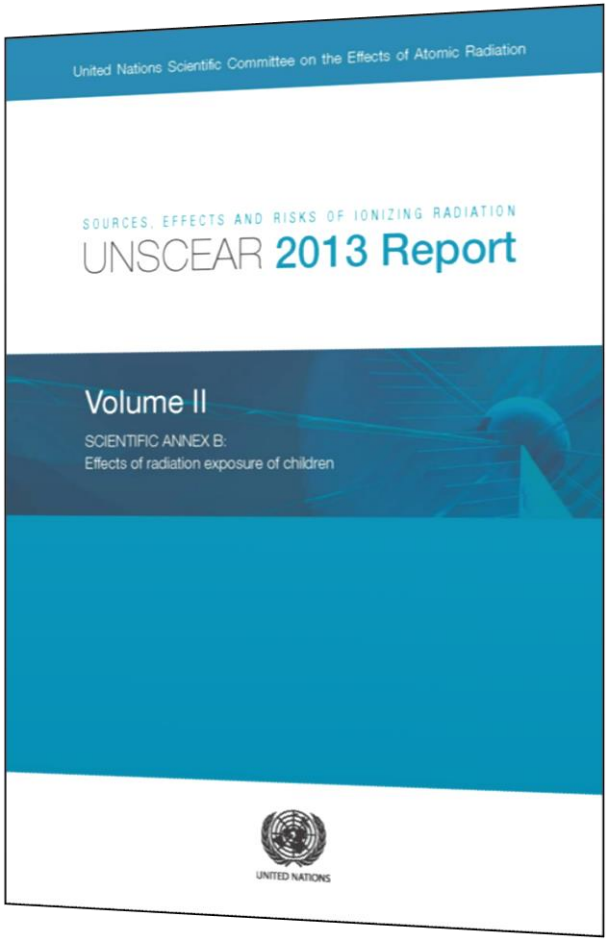
UNSCEAR 2013 Report: Effects of radiation exposure of children



(b) The Committee has reviewed evolving scientific material and notes that radiogenic tumour incidence in children is more variable than in adults and depends on the tumour type, age and gender. The term "radiation sensitivity" with regard to cancer induction refers to the rate of radiogenic tumour induction. The Committee reviewed 23 different cancer types. Broadly, for about 25 per cent of these cancer types, including leukaemia and thyroid, skin, breast and brain cancer, children were clearly more radiosensitive. For some of these types, depending on the circumstances, the risks can be considerably higher for children than for adults. Some of these cancer types are highly relevant for evaluating the radiological consequences of accidents and of some medical procedures;

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UNSCEAR 2013 Report on effects of radiation exposure of children (II)

) For about 15 per cent of the cancer types (e.g. colon cancer), children appear to have about the same radiosensitivity as adults. For about 10 per cent of cancer types (e.g. lung cancer), children appear less sensitive to external radiation exposure than adults. For about 20 per cent of cancer types (e.g. oesophagus cancer), the data are too weak to draw a conclusion regarding any differences in risk. Finally, for about 30 per cent of cancer types (e.g. Hodgkin's disease and prostate, rectum and uterus cancer), there is only a weak relationship or none at all between radiation exposure and risk at any age of exposure;

(d) At present, projections of lifetime risk for specific cancer types following exposure at young ages are statistically insufficient. Estimates currently do not adequately capture the known variations, and additional studies are needed;

(f) Because of all the above considerations, the Committee recommends that generalizations on the risks of effects of radiation exposure during childhood should be avoided. Attention should be directed to specifics of the exposure, age at exposure, absorbed dose to certain tissues and the particular effects of interest;

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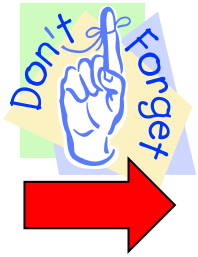
Appropriateness in medical imaging: *"Best Test First !"*

- When choosing a procedure utilizing ionizing radiation, the **benefit/risk balance** must be carefully considered.
- Need to consider whether clinical evaluation or other imaging modalities (*e.g. US, MRI*). could answer the clinical question
- Cost, local expertise, available resources, accessibility and patient values have to be considered in addition to efficacy.

Reducing unnecessary radiation exposures

- The benefit outweighs the risk when the procedure is:
  - appropriately prescribed
  - properly performed.

- This is not the case if there is no clinical indication or the radiation dose is higher than necessary for the clinical purpose (e.g. adult protocols used for imaging children)
  - ***Do the right procedure !***
  - ***Do the procedure right !***



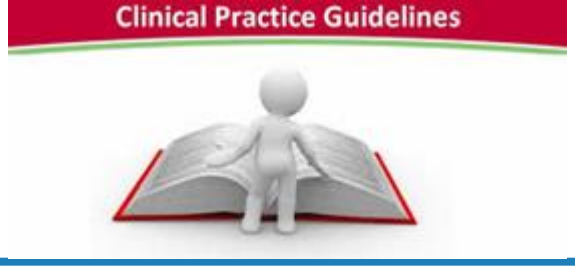
JUSTIFICATION

OPTIMIZATION

Evidence Based Medicine

- Evidence-based medicine (**EBM**) is about integrating the clinical expertise and the best scientific evidence, in making decisions about the care of patients
  - *Even excellent external evidence may be inapplicable to or inappropriate for an individual patient; and*
  - *Without best available scientific evidence, medical practice may become rapidly out of date.*
  - *Patient values/ expectations have to be considered*

Referral Guidelines for Medical Imaging



- **Referral guidelines for medical imaging** provide information on which procedure is most likely to yield the most informative results, and whether another modality is equally or more effective, and therefore more appropriate.

- These guidelines support the practice of evidence-based medicine and form a foundation to guide **appropriateness in prescribing diagnostic imaging services**

- A medical imaging examination is useful if its outcome — either positive or negative — influences management of the patient or strengthens confidence in the diagnosis.

ACR - Abdominal pain in children

Variant 4: **Fever, leukocytosis, possible appendicitis, atypical presentation in children (less than 14 years of age).**

Radiologic Procedure	Rating	Comments	RRL*
US abdomen RLQ	8	With graded compression.	O
CT abdomen and pelvis with contrast	7	May be useful following negative or equivocal US. Use of oral or rectal contrast depends on institutional preference. Consider limited RLQ CT.	☢☢☢☢
X-ray abdomen	6	May be useful in excluding free air or obstruction.	☢☢
US pelvis	5		O
CT abdomen and pelvis without contrast	5	Use of oral or rectal contrast depends on institutional preference. Consider limited RLQ CT.	☢☢☢☢
MRI abdomen and pelvis without and with contrast	5	See statement regarding contrast in text under "Anticipated Exceptions."	O
CT abdomen and pelvis without and with contrast	4	Use of oral or rectal contrast depends on institutional preference. Consider limited RLQ CT.	☢☢☢☢
MRI abdomen and pelvis without contrast	4		O
X-ray contrast enema	3		☢☢☢☢
Tc-99m WBC scan abdomen and pelvis	2		☢☢☢☢

Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate

*Relative Radiation Level

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RCR The Royal College of Radiologists

iRefer Making the best use of clinical radiology



Home | About the guidelines | Adults | Paediatrics | Search guidelines GO | Logout

Referral guidelines | Paediatrics | Gastrointestinal system | Acute abdominal pain in children

Related Guidelines

- Chest & cardiovascular system
- ENT/head & neck
- Gastrointestinal system
- Musculoskeletal system
- Urogenital & adrenal

- P21: Intussusception in children
- P22: Ingested foreign body in children
- P23: Blunt abdominal trauma in children
- P24: Projectile vomiting in infants
- P25: Recurrent vomiting in children
- P26: Persistent neonatal jaundice
- P27: GI bleeding (per rectum) in children
- **P28: Acute abdominal pain in children**
- P29: Constipation in children
- P30: Palpable abdominal/pelvic mass in children

Investigation	Dose	Recommendation [Grade]	Comment
US	None	Indicated [B]	There are many causes of acute abdominal pain. US is a useful first investigation but needs to be guided by clinical findings.
AXR	☢	Specialised investigation [C]	AXR is rarely of value and is best performed under specialist guidance. Generally AXR is not undertaken before US.
CT	☢☢☢	Specialised investigation [B]	Although CT is more sensitive than US for the diagnosis of appendicitis, specificities are similar and the strategy for imaging should take into account radiation dose and clinical features.
MRI	None	Indicated only in specific circumstances [B]	Following abdominal US, when TVUS is not feasible, MRI is occasionally helpful for evaluating pelvic masses in girls.

RCR: Abdominal pain in children

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Optimization of protection

- Optimization of protection in medical exposures requires the management of the **radiation dose** to the patient to be **commensurate with the medical purpose**.

- Methods for **dose reduction** should be applied and protocols should be tailored according to patient size and level of acceptable noise for a given clinical indication (important in paediatric CT).

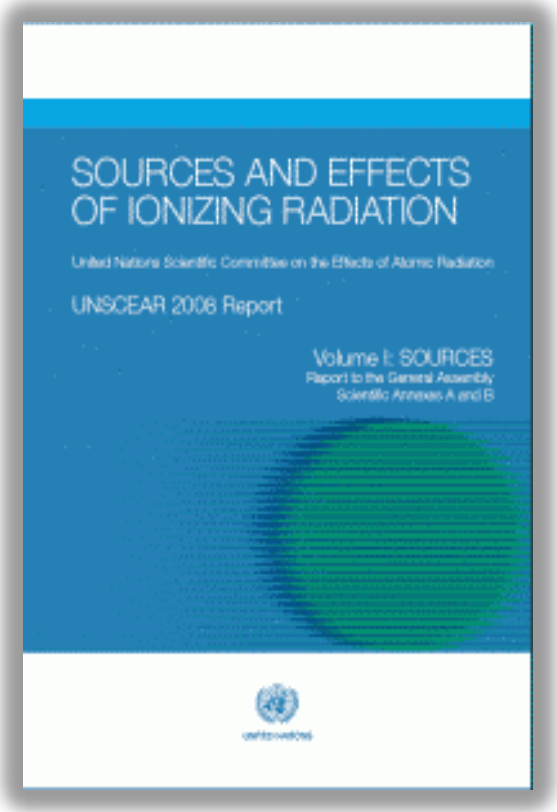
- The optimization of protection is applied at two levels:
  1. the design, construction and selection of equipment, software and installations; and
  2. the working procedures (operational parameters).

Optimization in diagnostic procedures
Diagnostic Reference Levels

- Neither individual dose limits nor individual dose constraints are applicable to RP of patients.
- **Diagnostic Reference Levels** (**DRL**s) for a particular procedure are used to ensure that doses do not deviate significantly from those achieved at peer departments for that procedure (unless there is a known, relevant, and acceptable reason for the deviation).
- **DRLs** apply in radiodiagnosis, nuclear medicine, interventional radiology, to groups of patients rather than individual patients.
- Although their numerical values are **ADVISORY,** the establishment and use of **DRLs** concept is a safety requirement in the **new BSS**
- Establishment of paediatric DRLs (**PiDRLs**) is a priority

Radiation safety in health care: unintended and accidental exposures

- **UNSCEAR 2008 Report: *"Sources and effects of ionizing radiation"* Volume II**
  Annex C - Radiation exposures in accidents
  - UNSCEAR has reviewed radiation accidents within a period of >60 years (1945-2007);
  - A large number of fatalities (46) and the highest number of cases of acute injuries (623 cases) was due to accidents occurred during the use of radiation in health care.
  - Other accidents either not recognized or not reported may have occurred.



Mostly radiotherapy accidents

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151 CT sequences over 65 minutes

Parents sue California hospital over pediatric CT radiation overdose

By Cynthia Keen
AuntMinnie.com staff writer
November 20, 2008

A rural California hospital is being sued by parents of a child who underwent a CT exam during an emergency department visit for a neck injury. The parents allege that their 23-month-old boy received radiation burns and has permanent chromosomal damage due to excessive radiation exposure from the CT scan, which took over an hour to perform.

The incident allegedly took place on January 23, 2008, at Mad River Community Hospital in Arcata, a rural town of 17,000 located 290 miles north of San Francisco. Television news anchorman Sam Shane of CBS 13 of Sacramento broke the story on October 30.

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Unintended exposures may also happen in nuclear medicine, interventional radiology, and…in **paediatric diagnostic imaging** !!

Education, training, Q&A, RP culture

California Department of Public Health spokesman Ken August told Tam that the state of California will determine whether any state or federal laws were violated. A hospital in violation can be fined up to $25,000, a fine that will increase to $100,000 in January 2009.

The lawsuit has a case management conference set for February 4, 2009. The hospital will not comment due to pending litigation, and the California Department of Public Health did not explain the six-month delay before suspending Knickerbocker's license to either CBS 13 or the *Times-Standard*.

WHO Global Initiative on Radiation Safety in Health Care Settings

Diagnostic radiology

Interventional radiology

Radiotherapy

Nuclear Medicine

This initiative is currently focused on supporting the implementation of the ***"Bonn Call for Action"***

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Recommendations of the 2nd International Conference on RP in Medicine

Bonn Call for Action

10 actions to improve radiation protection in medicine in the next decade

3rd International Conference on RP in Medicine to be held in **Vienna, Austria, 11-15 December 2017**, organized by the IAEA and co-sponsored by WHO

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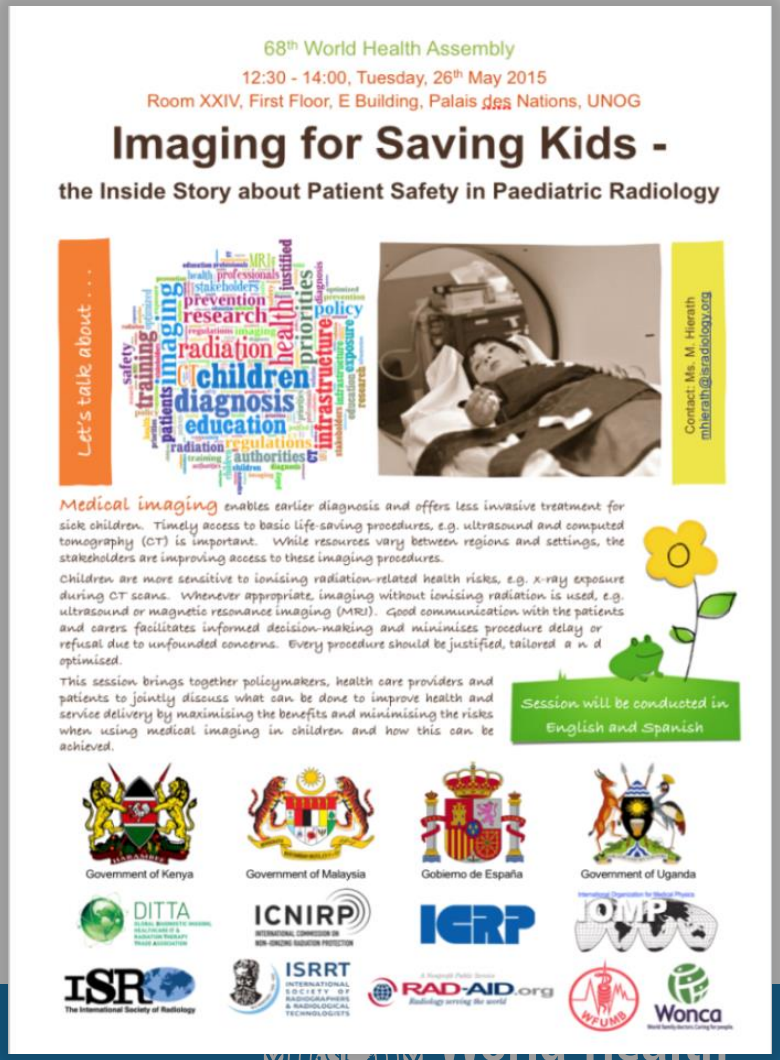
Bonn Call for Action

1. Enhancing implementation of justification of procedures
2. Enhancing implementation of optimization of protection and safety
3. Strengthening manufacturers' contribution to radiation safety
4. Strengthening RP education and training of health professionals
5. Shaping & promoting a strategic research agenda for RP in medicine
6. Improving data collection on radiation exposures of patients and workers
7. Improving primary prevention of incidents and adverse events
8. Strengthening radiation safety culture in health care
9. Fostering an improved radiation benefit-risk-dialogue
10. Strengthening the implementation of safety requirements (BSS) globally

hhttp://www.who.int/ionizing_radiation/about/14-2649_bonncallforaction.pdf?ua=1
ttps://rpop.iaea.org/RPOP/RPoP/Content/News/bonn-call-for-action-joint-position-statement.htm

Side Event "Imaging for saving kids" at the 68th World Health Assembly (2015)

Health authorities, health care providers (radiologists, medical physicists, radiographers), manufacturers, and patients' representatives
4 Member States and 9 NGOs in Official Relations with WHO



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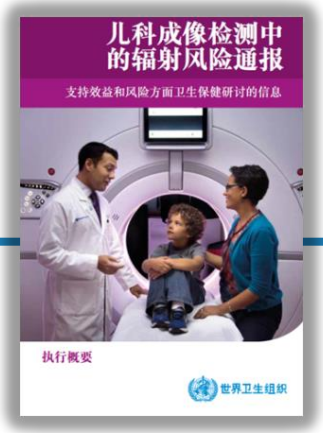
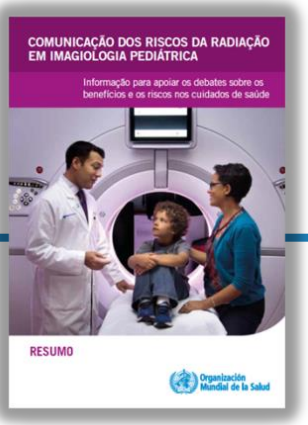
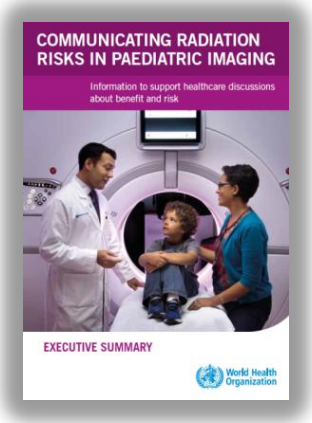
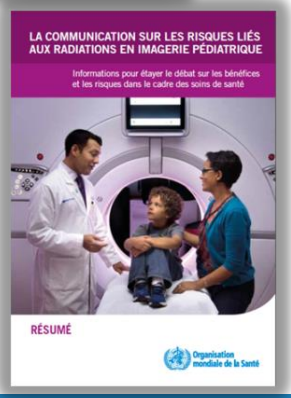


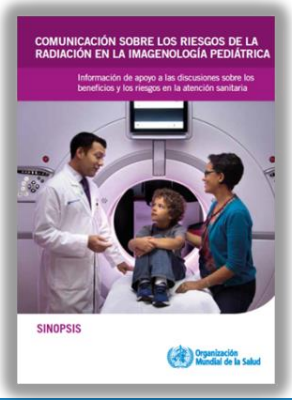


Document in English

Executive Summary in 7 languages







http://www.who.int/ionizing_radiation/pub_meet/radiation-risks-paediatric-imaging/en/

World Health Organization

Contents & structure

Chapter 1: Scientific background

Chapter 2: Radiation protection concepts and principles

Chapter 3: Risk-benefit dialogue

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Typical radiation doses in paediatric procedures

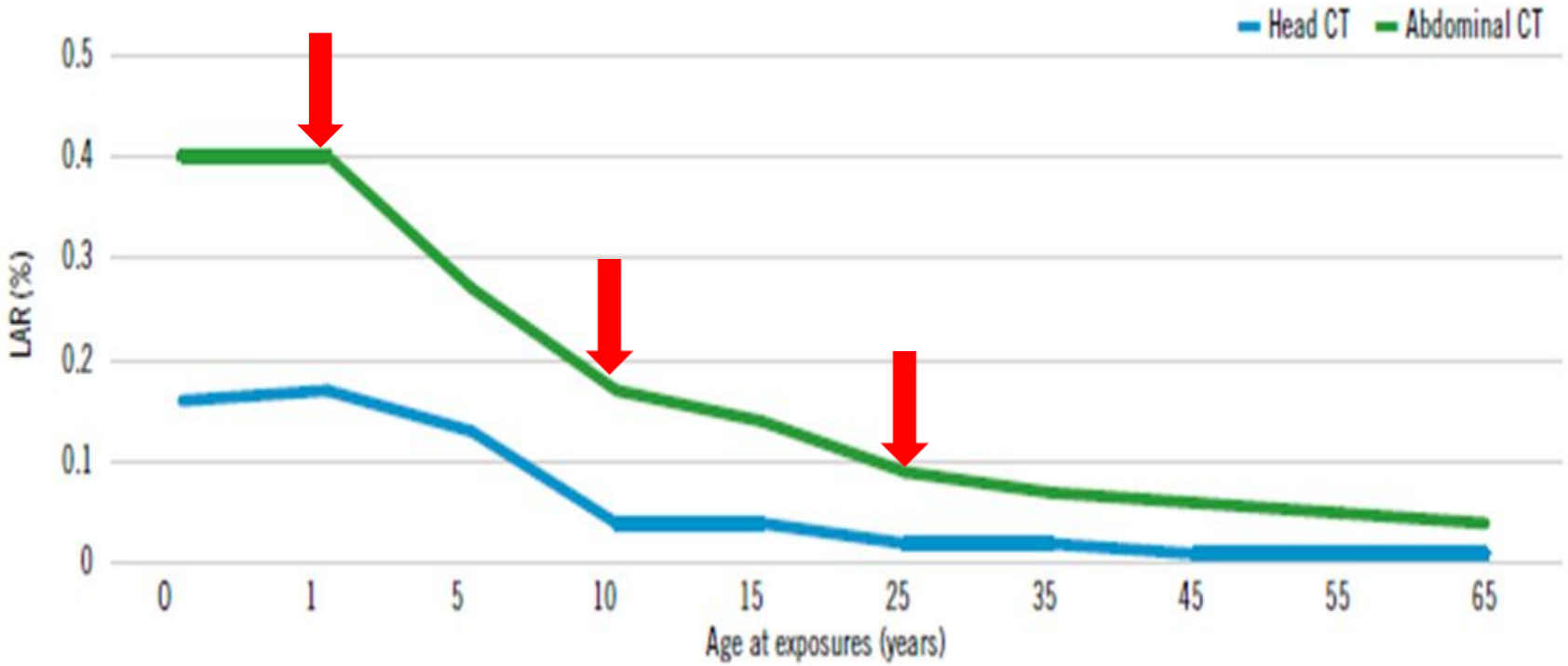
Diagnostic procedure	Equivalent number of chest X-rays	Equivalent period of exposure to natural radiation[b]	Typical effective dose (mSv)
Chest X-ray (single PA film)			
Adult	1	3 days	0.02[c]
5-year-old	1	3 days	0.02[c]
CT head			
Adult	100	10 months	2[c]
Newborne	200	2.5 years	6
1-year-old	185	1.5 years	3.7
5-year-old	100	10 months	2[d]
10-year-old	110	11 months	2.2
Paediatric head CT angiography[f]	250	2 years	5
CT chest			
Adult	350	3 years	7[c]
Newborng	85	8.6 months	1.7
1-year-old	90	9 months	1.8
5-year-old	150	1.2 years	3[d]
10-year-old	175	1.4 years	3.5

Table 4. Typical effective doses for diagnostic imaging examinations and their equivalence in terms of number of chest X-rays and duration of exposure to natural background radiation[a]

Chapter 1: Scientific background

Section 1.2

Figure 9: Sex-averaged lifetime attributable risk of cancer incidence associated with radiation exposure during head and abdominal CT, as a function of the age at exposure



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Chapter 2: Radiation protection concepts and principles

2.1 Appropriate use of radiation in paediatric imaging

Box 2.1 Possible reasons for inappropriate ionizing-radiation procedures in children

- Low awareness of radiation doses & associated risks
- Appropriateness criteria/imaging referral guidelines not available or ignored
- Insufficient, incorrect or unclear clinical information provided for justification
- Lack of confidence in clinical diagnosis & over-reliance on imaging
- Consumer's demand (patient's and/or family's expectations)
- Self-referral, including requesting inappropriate additional imaging studies
- Concern about malpractice litigation (defensive medicine)
- Pressure to promote and market sophisticated technology
- Lack of dialogue/consultation between referrers and radiologists
- Not considering or aware of more appropriate imaging modalities that do not use ionizing radiation (e.g. ultrasound or MRI, when available)
- Too frequent or unnecessary repeat examinations
- Pressure from referring clinicians or other specialists
- Reliance on personal or anecdotal experience not supported by evidence-based medicine
- Pressure to perform (e.g. quickly processing patients in the emergency department)
- Lack of availability of alternate imaging resources-expertise and/or equipment (e.g. to perform ultrasonography beyond regular working hours)
- Inappropriate follow-up imaging recommendations from imaging expert reports.

Section 3.1

Practical tips to support the risk-benefit dialogue

Natural, reversible, well understood, clear benefit, voluntary, controllable, certain, familiar, immediate effects, not affecting: children, pregnant women and/or future generations

Human-made, irreversible, poorly understood, unclear benefit, imposed, uncontrollable, uncertain, unfamiliar, delayed effects, affecting: children, pregnant women, future generations

Chapter 3: Risk-benefit dialogue

Section 3.1 Q&As

c) What medical imaging procedures use ionizing radiation?

- The most common radiological imaging procedures utilizing ionizing radiation are: conventional radiography, computed tomography (CT), fluoroscopy, and nuclear medicine examinations, including positron emission tomography (PET) and single-photon emission computed tomography (SPECT), as well as hybrid techniques combining these modalities (e.g. PET-CT).

d) What medical imaging procedures do not use ionizing radiation?

- Two common imaging techniques that do not utilize ionizing radiation are ultrasound and magnetic resonance imaging (MRI).

e) Why can't we do a procedure that does not use radiation instead?

- Your child's physician (e.g., paediatrician, family physicians) can talk with the imaging specialist to get help in determining which type of test might be best.
- We have considered using examinations that do not require radiation, but we have determined that they will not give us the necessary information.
- Following careful consideration of your child's unique medical needs, this is the best procedure to answer the clinical question.
- While there are other procedures that do not use radiation, this procedure will best provide us with the information needed to inform our treatment plan.

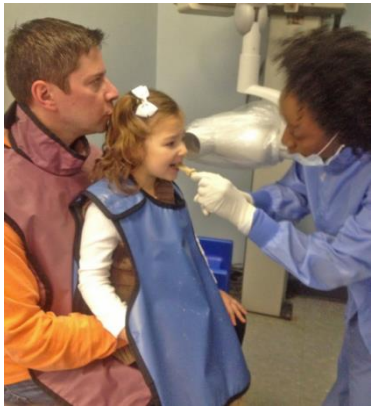
f) Does my child need it? Does she/he need it now?

- The referring medical practitioner and radiologist have done a risk–benefit analysis for the recommended imaging procedure. They have considered alternative tests, and this specific procedure is recommended to aid in diagnosis and/or treatment of your child.
- Although some conditions may be self-limiting and tests for such conditions may be postponed, other conditions will need investigation sooner to help with the care of your child.

In summary: Radiation Protection in Paediatric Imaging

Justification - appropriate referral, development, adoption/adaptation and use of Clinical Imaging Guidelines (CIGs), clinical decision support systems at the point of care.

Optimization – child-sizing protocols in diagnostic radiology, image guided interventional procedures and nuclear medicine, establishment and update of diagnostic reference levels (DRLs).




Merci
Beaucoup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