Παρουσίαση της νέας οδηγίας για τα ΔΕΑ στον παιδιατρικό πληθυσμό

EC RP Publication 175: MEDRAPET guidelines

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PiDRL

EUROPEAN DIAGNOSTIC REFERENCE LEVELS FOR PAEDIATRIC IMAGING

PiDRL Project: Need to establish a methodology

There is a need to consolidate what is available and to provide guidance on what actions are needed in using DRLs to further enhance radiation protection of children. The European Commission recognised this need and approved a project on DRLs for paediatric patients in December 2013.

The project has received funding from the European Commission under tender no. ENER/D3/91-2013.

PiDRL Project

This 27-month project was aiming at:

– Agreeing on a methodology for establishing and using DRLs for paediatric imaging

– Updating and extending the European DRLs to cover more procedures and a wider patient age/weight range based on current knowledge.

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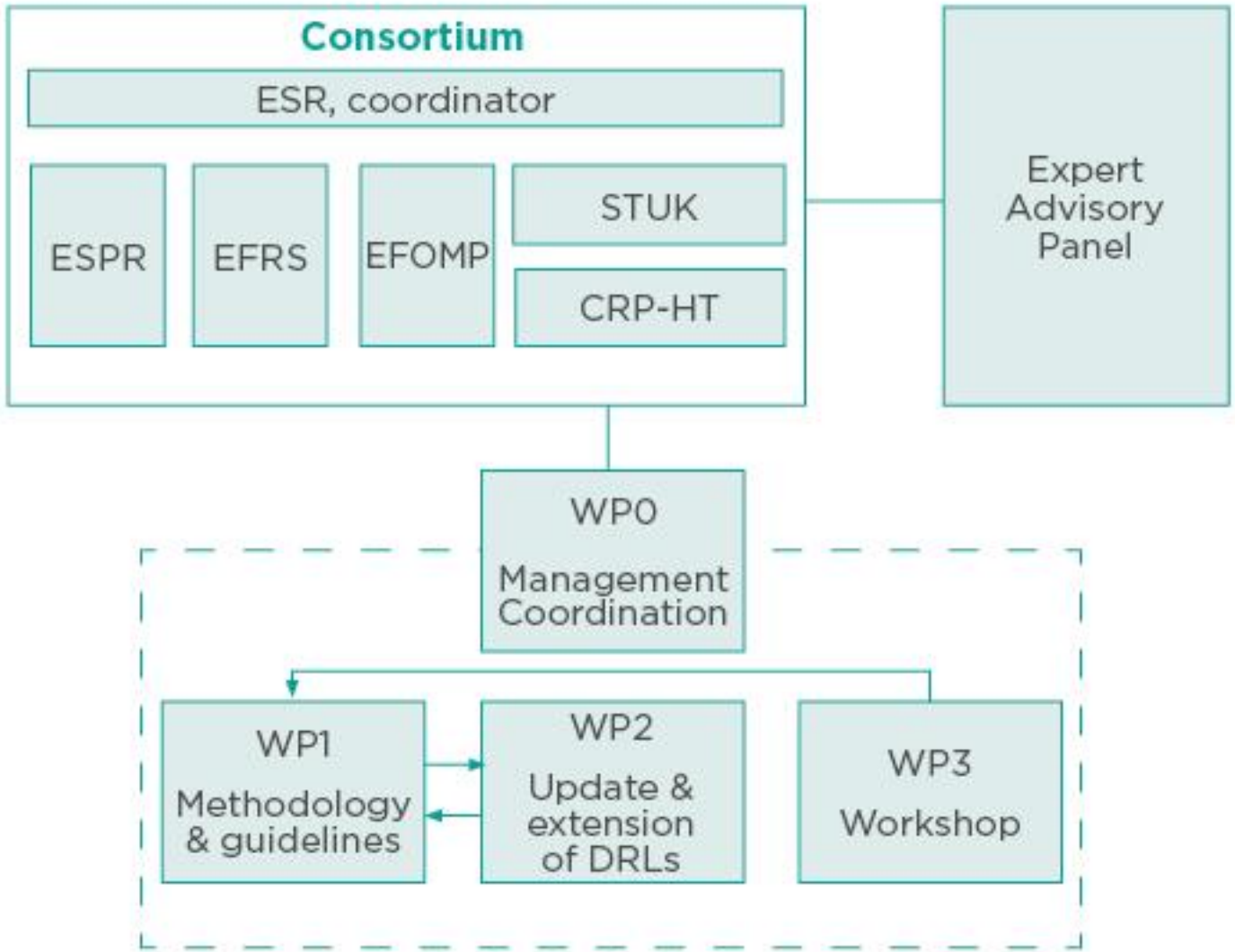

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Things we don't know about DRLs
or
Things we have to agree on DRLs

How do we define LDRLs, NDRLs, EDRLs?

What measurement quantities should we use?

What information is needed besides the actual patient dose data?

How do we categorize paediatric patients?
Grouping according to age?, weight?, circumference?
BMI? cross-sectional area? Other?

Which countries and which examinations have reliable DRLs?

Which examinations should have DRLs?

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Things we don't know about DRLs
or
Things we have to agree on DRLs

How to deal with the low frequency of examinations and the need to collect data for several patient age/weight/size groups?

How frequently should DRLs be reviewed and updated?

What is the role of data-management technology?

How should DRLs be used?

Should we incorporate clinical indications in setting DRLs?

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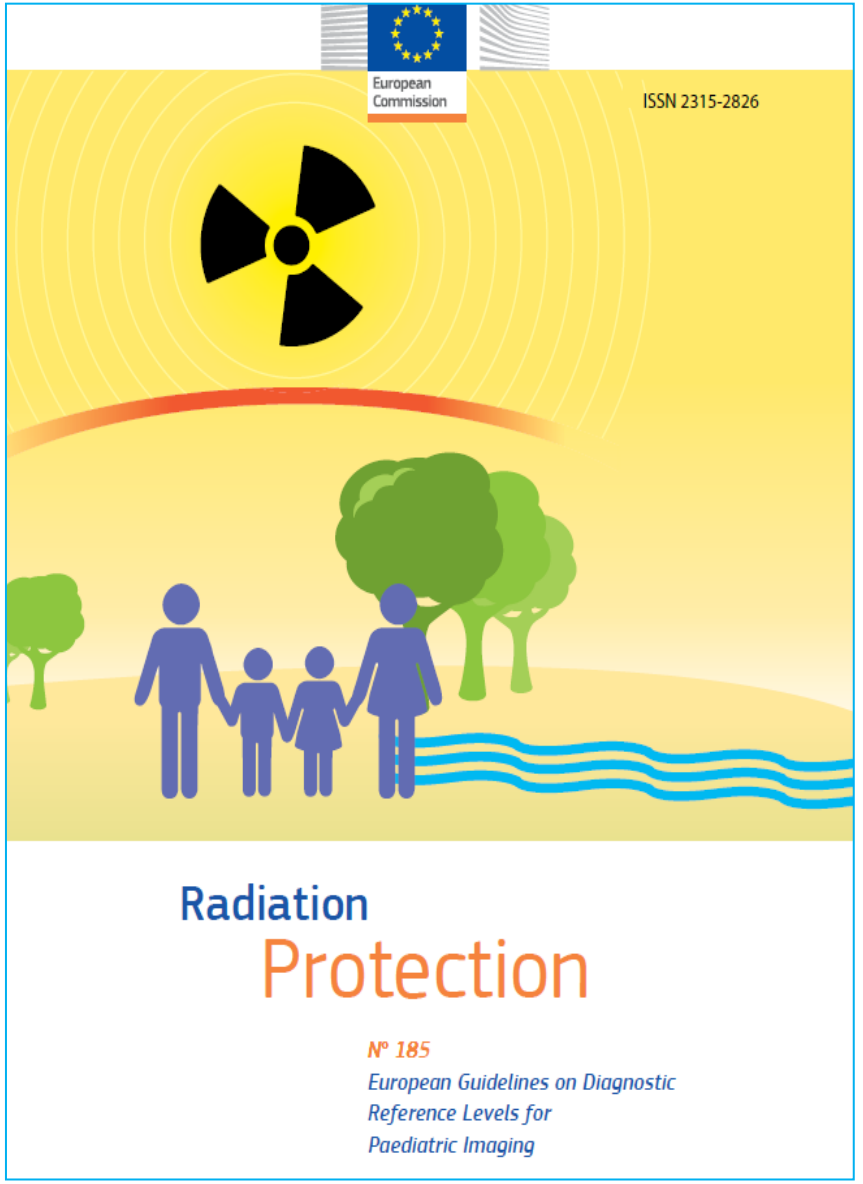
European Guidelines on DRLs for Paediatric Imaging

RP No 185, 2018

https://ec.europa.eu/energy/en/radiation-protection-publications



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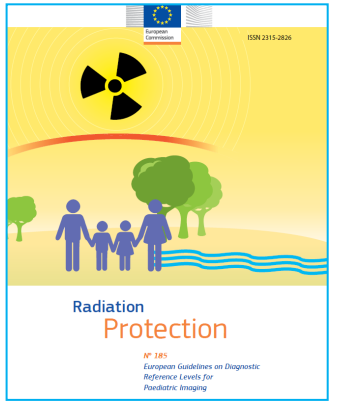

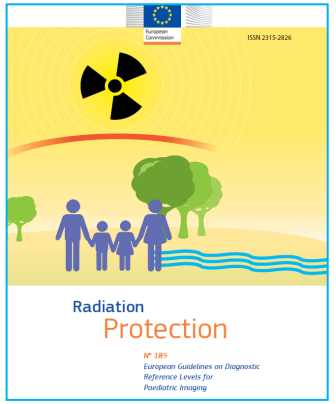

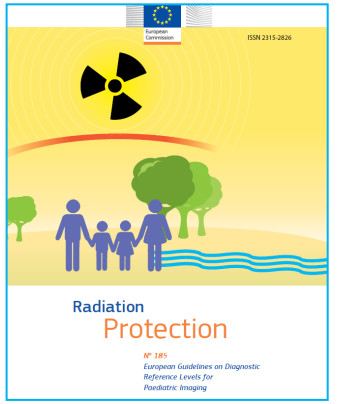

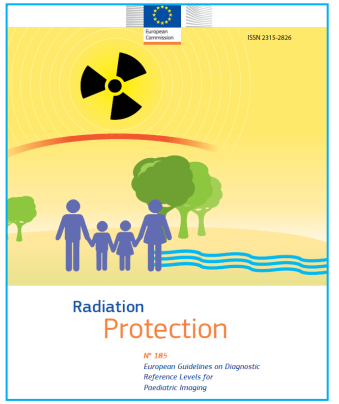

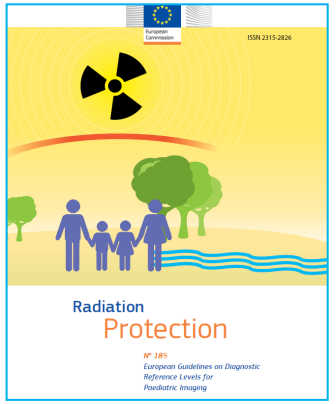

Radiography and fluoroscopic examinations where DRLs should be set

Anatomical region	Projection(s) or procedure
Radiography	
Head (skull)	AP/PA
	LAT
Thorax (chest)	AP/PA
Abdomen	Abdomen-pelvis AP
Pelvis	Pelvis/hip AP
Cervical spine	AP/PA
	LAT
Thoracic spine	AP/PA
	LAT
Lumbar spine	AP/PA
	LAT
Whole spine/Scoliosis	AP/PA
	LAT
Fluoroscopy	
Urinary tract	Micturating/Voiding cystourethrography (MCU/VCU)
Gastro-intestinal tract	Upper GE-examinations
	Contrast enema

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CT examinations where DRLs should be set

Anatomical region	Procedure
Head	Routine Paranasal sinuses Inner ear/internal auditory meatus Ventricular size (shunt)
Neck	Neck
Chest	Chest
	Cardiovascular CT angiography
Abdomen	Abdomen (upper abdomen)
	Abdomen+pelvis
Trunk	Whole body CT in trauma
Spine	Cervical spine
	Thoracic spine
	Lumbar spine

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Fluoroscopically-guided procedures

- Cardiac procedures
  - Patent Ductus Arteriosus (PDA) occlusion
  - Atrial Septal Defect (ASD) occlusion
  - Pulmonary valve dilatation
  - Diagnostic cardiac catheterization
- Non-cardiac procedures
  - Peripherally inserted central catheter (PICC)

For the following non-cardiac procedures, further studies should be carried out to confirm the feasibility of LDRLs:

- Embolization (arterio-venus malformation, trauma, iatrogenic, portal); there is probably a need for anatomical separation (all excluding head+neck+spine); the DRL should include the whole treatment in case of multiple sessions
- Embolization (arterio-venus malformation, trauma, iatrogenic) head/brain+neck+spine
- Sclerotherapy (vascular malformations, cysts); the DRL should include the whole treatment in case of multiple sessions
- Arteriography (anatomical separation needed: head/neck, trunk, extremities)

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Recommended grouping of patients for paediatric DRLs

Recommended weight groups (intervals) for body examinations	Recommended age groups (intervals) for head examinations
< 5 kg 5 - < 15 kg 15 - < 30 kg 30 - < 50 kg 50 - < 80 kg	0 - < 3 months 3 months - < 1 y 1- < 6 y ≥ 6 y

For body examinations, in the transition period until data from weight-based patient dose surveys becomes available, age can be used as an additional grouping parameter and for the purpose of comparing proposed new weight-based DRLs with earlier age-based DRLs (trend analysis).

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Approximate equivalence of weight and age groups for the purpose of comparing weight-based DRLs with age-based DRLs

Description	Weight group	Age group based on weight-for-age charts	Most common age groups used for the NDRLs (or equivalent)
Neonate	< 5 kg	< 1 m	0 y
Infant, toddler and early childhood	5 - < 15 kg	1 m - < 4 y	1 y
Middle childhood	15 - < 30 kg	4 - < 10 y	5 y
Early adolescence	30 - < 50 kg	10 – < 14 y	10 y
Late adolescence	50 - < 80 kg	14 - < 18 y	15 y

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European DRLs for radiography and fluoroscopy

Radiography and fluoroscopy			
Examination	Age or weight group	EDRL	
		$K_{a,e}$, mGy	P_{KA}, mGy cm^2
Head AP/PA	3 months-<1 y		215
	1-<6 y		295
	≥6 y		350
Head LAT	3 months-<1 y		200
	1-<6 y		250
Thorax AP/PA**	<5 kg		15
	5-<15 kg	0,06	22
	15-<30 kg	0,08	50
	30-<50 kg	0,11	70
	50-<80 kg		87
Abdomen AP	<5 kg		45
	5-<15 kg		150
	15-<30 kg	0,40	250
	30-<50 kg	0,75	475
	50-<80 kg		700
Pelvis AP	15-<30 kg		180
	30-<50 kg		310
MCU	<5 kg		300
	5-<15 kg		700
	15-<30 kg		800
	30-<50 kg		750*

*Based on 4 NDRLs, range 400-2000 mGy cm^2; **AP/PA: DRL applies to both AP and PA projections

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European DRLs for computed tomography

Computed tomography			
Exam	Age or weight group	EDRL	
		$CTDI_{vol}$, mGy	**DLP, mGy cm**
Head	0-<3 months	24	330
	3 months-<1 y	28	400
	1-<6 y	40	600
	≥6 y	50	750
Thorax	<5 kg	2,7	45
	5-<15 kg	2,5	75
	15-<30 kg	4,1	100
	30-<50 kg	4,8	155
	50-<80 kg	6,9	200
Abdomen	<5 kg		95
	5-<15 kg	5,7	155
	15-<30 kg	5,4	210
	30-<50 kg	7,3	360
	50-<80 kg	14	580

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That's all Folks!