



EUROPEAN DIAGNOSTIC
REFERENCE LEVELS FOR
PAEDIATRIC IMAGING

WORKSHOP

October 15-17, 2015

Lisbon School of Health Technology/
Escola Superior de Tecnologia da
Saúde de Lisboa
Lisbon, Portugal



PROGRAMME

coordinated by the
ESRF
EUROPEAN SOCIETY
OF RADIOLOGY



WELCOME MESSAGE

Dear colleagues,

On behalf of the PiDRL Project, I am delighted to extend warm greetings to everyone attending this workshop. PiDRL is intended to agree on a methodology for establishing and using diagnostic reference levels (DRLs) for paediatric imaging, and update and extend the European DRLs to cover more types of examinations. The main task is to develop European guidelines on DRLs for paediatric imaging covering a wide range of procedures such as plain radiography, fluoroscopy, CT and fluoroscopically-guided interventional procedures. We have organised this workshop to subject the draft European guidelines to comments and critical review from a larger audience. We will also discuss a range of topics pertaining to difficulties and opportunities in the field of optimisation of radiation protection of paediatric patients.



The organising committee has worked hard to develop a stimulating scientific programme. This event provides a unique opportunity for all participants to exchange ideas and share their knowledge and experience. Moreover, I hope you will take some time to explore the beautiful city of Lisbon. There are many exciting places to visit and a variety of restaurants to enjoy Portuguese cuisine.

I would like to express my sincere thanks to the Lisbon School of Health Technology (ESTeSL) for providing generous support and hosting the PiDRL Workshop at their premises. Special thanks also go to everybody who has been involved in the creation of the PiDRL Workshop and has contributed to organizing this meeting. Last but not least, thank you for attending the PiDRL Workshop!

A handwritten signature in black ink, appearing to be 'John Damilakis', written in a cursive style.

Prof. John Damilakis
PiDRL Project Scientific Coordinator

PiDRL Workshop kindly hosted by

Escola Superior de Tecnologia da Saúde de Lisboa -
ESTeSL (Lisbon School of Health Technology)
Av. D. João II, lote 4.69.01, Parque das Nações
1990-096 Lisbon
Portugal



Organising Office

European Society of Radiology
Neutorgasse 9
1010 Vienna
Austria
Phone: +43 (1) 533 40 64-0
Fax: +43 (1) 535 70 41
Email: eu-affairs@myesr.org

Scientific Committee

John Damilakis (ESR, GR), chair
Hannu Järvinen (STUK, FI)
Graciano Paulo (EFRS, PT)
Maria Perez (WHO, CH)
Erich Sorantin (ESPR, AT)
Virginia Tsapaki (EFOMP, GR)
Jenia Vassileva (IAEA, AT)
Peter Vock (ESR, CH), co-chair

Local Organising Committee

Graciano Paulo (IPC - ESTESC, Coimbra Health School, Coimbra, PT), chair
Maria do Carmo Baptista (Dr. Campos Costa, Porto, PT)
Rita Carneiro (Hospital D. Estefânia, Lisbon, PT)
Luis Lança (ESTeSL, Lisbon School of Health Technology, Lisbon, PT)
Joana Santos (IPC - ESTESC, Coimbra Health School, Coimbra, PT)

Registration Desk

The Registration Desk opens on Thursday, October 15, 2015 at 11:00
and is manned during the workshop hours.



WORKSHOP PROGRAMME

DAY 1 Thursday, OCTOBER 15

13:00-13:05 Welcome by host - Lisbon School of Health Technology (ESTeSL)

João Lobato (ESTeSL President, PT)

13:05-13:15 00 - Welcome by ESR and presentation of EuroSafe Imaging context

Guy Frijia (ESR, Chair of EuroSafe Imaging Steering Committee, FR)

ROUND TABLE 1:

PiDRL Project Presentation

Moderators: Peter Vock (ESR, CH), Graciano Paulo (EFRS, PT)

13:15-13:30 01 - Welcome - Overview of the PiDRL Project

John Damilakis (ESR, Scientific Coordinator of PiDRL, GR)

13:30-13:45 02 - The importance of European guidance for the establishment and use of DRLs for paediatric imaging

Georgi Simeonov (European Commission, LU)

13:45-14:00 03 - WP1: Development of the European PiDRL guidelines

Hannu Järvinen (STUK, FI)

14:00-14:15 04 - WP2: Update and expansion of European DRLs in paediatric imaging

John Damilakis (ESR, Scientific Coordinator of PiDRL, GR)

14:15-14:30 Discussion

ROUND TABLE 2:

Current Status in DRLs for Paediatric Imaging in European Countries

Moderators: John Damilakis (ESR, Scientific Coordinator of PiDRL, GR), Annalisa Trianni (Udine University Hospital, DICOM Working Group 2, IT)

14:30-14:50 05 - Summary of DRLs for paediatric imaging in European countries based on the DDM2 data and the results of the PiDRL specific questionnaire

Hannu Järvinen (STUK, FI)

14:50-15:10 06 - Radiographic and fluoroscopic paediatric DRLs: Data from the literature

Virginia Tsapaki (EFOMP, GR)

15:10-15:40 Coffee break

15:40-16:00 07 - The current situation of dose and DRLs for fluoroscopically guided procedures in children

Claudio Granata (ESPR, IT)

16:00-16:20 08 - CT paediatric DRLs: Data from the literature

Shane Foley (EFRS, IE)

16:20-16:40 09 - Paediatric imaging and the establishment of European DRLs

Virginia Tsapaki (EFOMP, GR)

16:40-17:00 Discussion

17:00-17:20 10 - The establishment of CT DRLs in Portugal

Moderator: Raija Seuri (STUK, FI)

Speaker: Joana Santos (Coimbra Health School, PT)

ABSTRACT PRESENTATIONS:

National Developments of Paediatric DRLs

Moderators: Erich Sorantin (ESPR, AT), Andreas Jahnen (LIST, LU)

17:20-17:28 11 - A decade of pediatric DRLs in France: Assessment and perspectives

David Célier (Institut de Radioprotection et de Sécurité Nucléaire, FR)

17:28-17:36 12 - Implementation of Diagnostic Reference Levels for children in Dutch clinical practice

Harmen Bijwaard (National Institute for Public Health and the Environment - RIVM, NL)

17:36-17:44 13 - Impact of new national diagnostic reference levels (DRL) for pediatric CT examinations

Hannu Järvinen (Radiation and Nuclear Safety Authority - STUK, FI)

17:44-17:52 14 - Patient radiation doses and reference levels in paediatric interventional radiology

Bouchra Habib Geryes (Hôpital Universitaire Necker Enfants Malades, FR)

17:52-18:00 15 - Initial paediatric LDRLs at the main public hospital in Malta for common paediatric examinations

Maria Busuttil (University of Malta, MT)

18:00-18:08 16 - Establishment of national Diagnostic Reference Levels (DRLs) for pediatric patients

Sotirios Economides (Greek Atomic Energy Commission, GR)

18:08-18:16 17 - PiDRLs for dental lateral cephalograph - study of one central care district in Finland

Heli Larjava (Central Finland Health Care District/Medical Imaging, FI)

18:30 Welcome reception and opening of poster exhibition



WORKSHOP PROGRAMME

DAY 2 Friday, OCTOBER 16

ROUND TABLE 3:

How to Establish and How to Use DRLs

Moderators: Hannu Järvinen (STUK, FI), Claudio Granata (ESPR, IT)

- 09:00-09:20 18 - The role of and the need for DRLs: Where they are useful**
Raija Seuri (STUK, FI)
- 09:20-09:40 19 - Which paediatric examinations should have DRLs? Frequency of paediatric examinations and contribution of paediatric examinations to the collective dose**
Erich Sorantin (ESPR, AT)
- 09:40-10:00 20 - Paediatric DRLs for diagnostic and interventional radiology: Establishment and application**
John Damilakis (ESR, Scientific Coordinator of PiDRL, GR)
- 10:00-10:20 21 - Automatic dose data management and DRLs**
Andreas Jahnen (LIST, LU)
- 10:20-10:40 22 - Improving radiation dose management using DICOM tools**
Annalisa Trianni (Udine University Hospital, DICOM Working Group 2, IT)
- 10:40-11:00 23 - Methods of using DRLs**
Hilde Bosmans (EFOMP, BE)
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- 11:00-11:30 Coffee break**
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- 11:30-11:50 24 - Impact of using DRLs in paediatric imaging**
 Moderator: Shane Foley (EFRS, IE)
 Speaker: Maria Perez (WHO, Member of the PiDRL Expert Advisory Panel, CH)
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- ABSTRACT PRESENTATIONS:**
PiDRLs and Patient Doses from Paediatric Procedures
 Moderators: Stephen Evans (EFOMP, UK), Dean Pekarovic (EFRS, SI)
- 11:50-11:58 25 - Radiation exposure from Pediatric Cardiac Catheterization in France**
Helene Baysson (IRSN, Laboratory of Epidemiology, FR)
- 11:58-12:06 26 - Improvement of Pediatric CT protocols in Dalarna County, Sweden**
Mats Stenström (Mora Hospital, SE)
- 12:06-12:14 27 - A Decade of Experience towards Establishing Pediatric clinical Imaging Guidelines, Diagnostic Reference levels and Medical Exposure Control in Kenya**
Jeska Sidika Wambani (Kenyatta National Hospital, KE)

- 12:14-12:22** **28 - Towards the standardization of pediatric cranial CT protocols: A Belgian multicenter study**
Timo De Bondt (Antwerp University Hospital, BE)
- 12:22-12:30** **29 - American College of Radiology (ACR) CT Dose Index Registry: A Resource for Pediatric CT Diagnostic Reference Levels**
Donald Frush (Duke Medical Center, US)
- 12:30-12:38** **30 - Dose Reference Levels For Paediatric Thorax CT: Can Image Quality Be Achieved While Maintaining Dose Reduction For Different Body Mass Indices?**
Shahed Khan (University College London, Department of Physics, UK)
- 12:38-12:46** **31 - Diagnostic Reference Levels for paediatric conventional imaging obtained using DoseWatch: A road for optimization**
Luis Alejo (Medical Physics Department, Hospital Universitario La Paz, ES)
- 12:46-12:54** **32 - A review of current local dose area product levels for paediatric fluoroscopy in a South African tertiary referral hospital as compared to standard international guidelines**
Mauritz Venter (University of Witwatersrand, ZA)
- 12:54-13:02** **33 - Patient specific paediatric dose assessment in dental Cone Beam Computed Tomography via Monte Carlo calculations**
Andreas Stratis (Katholieke Universiteit Leuven, BE)
- 13:02-13:10** **34 - A three centre European study of the feasibility of establishing diagnostic reference levels in paediatric cardiac interventional radiology**
Louise Rainford (University College Dublin, IE)
- 13:10-13:18** **35 - A comparison of age and weight groupings for establishing local DRLs in paediatric cardiac catheterisation examinations**
Shane Foley (University College Dublin, IE)
- 13:18-13:26** **36 - A comparison of patient weight, age and diameter grouping/ categorisation for establishing diagnostic reference levels in paediatric CT**
Shane Foley (University College Dublin, IE)
- 13:26-13:34** **37 - Estimation of Local Diagnostic Reference Levels for paediatric Brain CT**
Vanessa de Sousa (Serviço de Medicina Nuclear - Hospital Garcia de Orta, PT)
- 13:34-13:42** **38 - Orthopantomography and lateral cephalometry Diagnostic Reference Levels in paediatrics and the influence in eye lens dose**
Joana Santos (Coimbra Health School, PT)
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- 13:45-14:30** **Lunch break**



WORKSHOP PROGRAMME

ROUND TABLE 4: Establishing DRLs for Paediatric Non-cardiac and Cardiac Fluoroscopically Guided Procedures

Moderator: Jenia Vassileva (IAEA, Member of the PiDRL Expert Advisory Panel, AT)

14:30-14:50 39 - Establishing DRLs for IR paediatric non-cardiac procedures

Peter Vock (ESR, CH)

14:50-15:10 40 - PiDRL dose survey for paediatric cardiac procedures

Hannu Järvinen (STUK, FI)

15:10-15:30 Discussion

15:30-16:00 Coffee break

ROUND TABLE 5: The Role of International and National Organisations in Establishing and Promoting the Use of DRLs for Paediatric Imaging

Moderators: Hilde Bosmans (EFOMP, BE), Virginia Tsapaki (EFOMP, GR)

16:00-16:20 41 - International Commission on Radiological Protection (ICRP)

John Damilakis, on behalf of Eliseo Vaño (ICRP, Member of the PiDRL Expert Advisory Panel, ES)

16:20-16:40 42 - International Atomic Energy Agency (IAEA)

Jenia Vassileva (IAEA, Member of the PiDRL Expert Advisory Panel, AT)

16:40-17:00 43 - World Health Organization (WHO)

Maria Perez (WHO, Member of the PiDRL Expert Advisory Panel, CH)

17:00-17:20 44 - Heads of the European Radiological Protection Competent Authorities (HERCA)

Jürgen Griebel (HERCA, DE)

17:20-17:40 45 - Public Health England (PHE)

Sue Edyvean (PHE, Member of the PiDRL Expert Advisory Panel, UK)

17:40-18:00 46 - Image Gently (Alliance for Radiation Safety in Pediatric Imaging)

Donald Frush (Image Gently, US)

18:00-18:20 Discussion

18:30-19:30 Poster exhibition - Meet the poster authors

DAY 3 Saturday, OCTOBER 17

ROUND TABLE 6:

European Diagnostic Reference Levels for Paediatric Imaging. The View of European Societies

Moderators: Maria Perez (WHO, Member of the PiDRL Expert Advisory Panel, CH), Sue Edyvean (PHE, Member of the PiDRL Expert Advisory Panel, UK)

09:00–09:20 47 - European Society of Radiology (ESR)

Peter Vock (ESR, CH)

09:20–09:40 48 - European Federation of Radiographer Societies (EFRS)

Graciano Paulo (EFRS, PT)

09:40–10:00 49 - European Society of Paediatric Radiology (ESPR)

Catherine Owens (ESPR, UK)

10:00–10:20 50 - European Federation of Organisations for Medical Physics (EFOMP)

Stephen Evans (EFOMP, UK)

10:20–10:40 Discussion

10:40–11:10 Coffee break

11:10–12:20 Panel discussion

Coordinator: John Damilakis (ESR, Scientific Coordinator of PiDRL, GR)

Participants: Hannu Järvinen (STUK, FI), Catherine Owens (ESPR, UK), Maria Perez (WHO, CH), Graciano Paulo (EFRS, PT), Raija Seuri (STUK, FI), Georgi Simeonov (EC, LU), Jenia Vassileva (IAEA, AT)

12:20–12:30 Summary and conclusions

John Damilakis (ESR, Scientific Coordinator of PiDRL, GR)



POSTER EXHIBITION

P01 - Development of a valid consent policy for Radiological Imaging procedures in Irish (HSE) Hospitals

Gerard Brassil (University Hospital Limerick, IE)

P02 - Dose optimization and image quality in children's CT imaging using Adaptive Statistical Iterative Reconstruction (ASIR)

Triantafyllia Makri (Radiological Imaging Department, Children's Hospital of Athens "Agia Sofia", GR)

P03 - Impact of a chest radiography dose optimization program (DOP) in a Neonatology Department (ND)

Cláudia Martins (Faculdade de Medicina da Universidade de Lisboa, PT)

P04 - Adherence to a chest radiography dose optimization program (DOP) in a Neonatology Department (ND)

Cláudia Martins (Faculdade de Medicina da Universidade de Lisboa, PT)

P05 - Cone Beam CT radiation dose in paediatric diagnostic cardiac catheterization procedures

Eva Corredoira (Hospital Universitario La Paz, ES)

P06 - Paediatric radiation doses from conventional X-ray thorax examinations at the Queen Silvia Children's Hospital in Gothenburg, Sweden

Maria Hultenmo (Department of Medical Physics and Biomedical Engineering, Sahlgrenska University Hospital, Gothenburg, SE)

P07 - Low Dose CT of the Paranasal Sinus

João Casimiro (Hospital Dona Estefânia, PT)

P08 - Diagnostic Reference Levels for Port Catheter Implantation in Paediatric Patients

Paula G. Castañón (University Hospital la Princesa, Madrid, ES)

P09 - Review of Dose Reference Levels in Paediatric Multidetector Computed Tomography

Paula G. Castañón (University Hospital la Princesa, Madrid, ES)

P10 - Estimation of pediatric radiation doses from abdomen-pelvis CT examinations utilizing age-specific scanning protocols

Vasileios Syrgiamiotis (General Childrens Hospital Agia Sophia MRI-CT Department, GR)

P11 - Protocol and Size Specific DRL for pediatric CT: a local approach

Alberto Mari (SOD Fisica Sanitaria AOU Ospedali Riuniti, IT)

P12 - Dose assessment in Pediatric Head CT

João Pinheiro (University of Algarve, PT)

P13 - Dose evaluation in newborns at a Neonatal Intensive Care Unit

João Pinheiro (University of Algarve, PT)

P14 - CT scan dose reduction: An Optimization of acquisition protocols in Pediatric neuroradiology

Filomena Batalha (Radiology Department of Pediatrics D. Estefânia Hospital - CHLC, Lisbon; MSc Student at Applying Health Radiations Master, branch of Radiation Protection, PT)

P15 - Paediatric CT Dose survey in Andalusia

Esther Angulo (Hospital U. Puerta del Mar de Cádiz, ES)

P16 - Optimizing protocols in radiology diagnostic procedures in neonatology

Esther Angulo (Hospital U. Puerta del Mar de Cádiz, ES)

P17 - Survey of Radiation Doses in Paediatric Radiography in Estonia

Jelena Subina (Environmental Board, Radiation Safety Department, EE)

P18 - Head CT Paediatric Diagnostic Reference Levels: analysing two different methods

Joana Santos (Coimbra Health School, PT)

PROJECT INFORMATION

Despite a large number of studies available from European countries, European diagnostic reference levels (DRLs) for paediatric patients are only available for some common radiological examinations. There is a need to consolidate what is available and to provide guidance on what actions are needed for using DRLs to further enhance the radiation protection of children.

The European Commission has approved the PiDRL project (www.pidrl.eu) 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.

The 27-month project started in December 2013 and is led by the **European Society of Radiology (ESR)** in close collaboration with the following consortium members:

- **European Society of Paediatric Radiology (ESPR)**
- **European Federation of Radiographer Societies (EFRS)**
- **European Federation of Organisations for Medical Physics (EFOMP)**
- **Finnish Radiation and Nuclear Safety Authority (STUK)** with **Luxembourg Institute of Science and Technology (LIST)** as subcontractor

The “European Guidelines on DRLs for Paediatric Imaging” are the final outcome of the PiDRL Project and will be published in early 2016. The prefinal draft will be available for stakeholder comments during the month of October 2015.



The project has received funding from the European Commission under contract no. ENER/2013/NUCL/SI2.671441.