BY JOHN DAMILAKIS AND GUY FRIJA

EUCLID project carries out study to establish clinical DRLs for Europe

It is well known that different image quality is needed for different clinical indications of the same anatomical area. For this reason, diagnostic reference levels (DRLs) should be established for a given clinical indication rather than anatomical area.

EUCLID | European Study on Clinical DRLs

The European Commission (EC) launched the 'European study on clinical diagnostic reference levels for x-ray medical imaging' (EUCLID) project in August 2017 to provide up-to-date clinical DRLs. The main objectives of the project are: to conduct a European survey to collect data needed for the establishment of DRLs for the most important x-ray imaging tasks in Europe (from the radiation protection perspective), and to specify up-to-date DRLs for these examinations. A workshop will be organised by the end of 2019 to disseminate and discuss the results of this project. An External Advisory Panel has been set-up to be consulted on the main project activities and outcomes.

During the first months of EUCLID, a comprehensive review was carried out to identify the status of existing clinical DRLs for CT, interventional radiology (IR) and radiography in Europe and beyond. This was done by analysing recent studies, standards and publications. Information about existing clinical DRLs was collected from national competent authorities and other organisations involved in the project. The findings have been taken into consideration during the finalisation of the list of clinical indications for which EUCLID is going to establish DRLs (Tables 1 and 2).

EUCLID has developed and implemented an EU-wide survey to collect data from 20 participating hospitals from 13 different European countries. The data is collected using a secure online web application for building and managing online surveys and databases. All data shall be continuously reviewed until the end of the data collection period (beginning of 2019) in an attempt to avoid inaccurate records. Data will be prepared for the analysis to be sure that they are in the correct format and truthful.

Moreover, a Scientific Board has been set up for the verification of data collected for the establishment of clinical DRLs. Board members are representatives of national regulatory authorities and national scientific/professional societies from the countries in which data is being collected. Twenty-fifth percentiles, medians, and 75th percentiles for dose quantities and dose indices will be calculated for each of the clinical indications and procedures. CT DRLs will be defined in terms of $CTDI_{vol}$ and DLP (Dose length Product). IR DRLs will be defined in terms of KAP (Kerma Area Product), cumulative air kerma at the patient entrance reference point, fluoroscopy time, and total number of images. EUCLID will also investigate the possibility of defining IR DRLs in terms of complexity as well. Data analysis methodology is currently being discussed and will be finalised in consultation with the External Advisory Panel and the Scientific Board.

The clinical DRLs for Europe established by the EUCLID project will be published by the end of 2020.

Further project information is available at www.eurosafeimaging.org/euclid.

John Damilakis is full professor and chairman at the Department of Medical Physics, Faculty of Medicine, University of Crete, Greece. He is president of the EURAMED research platform, vice-president and president-elect of the International Organization for Medical Physics (IOMP) and immediate past-president of the European Federation of Organizations for Medical Physics (EFOMP). He is the project manager of EUCLID.

Guy Frija is Professor Emeritus at Université Paris Descartes (FR), Professor at McMaster University (CA), radiologist consultant at the Paris Georges Pompidou European Hospital (FR), and Chair of EuroSafe Imaging, a multi-stakeholder and holistic approach to radiation protection, an initiative of the ESR. He is the co-project manager of EUCLID.

Clinical task	Anatomical location	Procedure
Stroke Detection or exclusion of a haemorrhage	Head	All Phases
Chronic sinusitis Detection or exclusion of polyps	Neck	All Phases
Cervical spine trauma Detection or exclusion of a lesion	Spine	All Phases
Pulmonary embolism Detection or exclusion	Thorax	All Phases
Coronary calcium scoring Risk stratification	Coronary Arteries	All Phases
Coronary angiography Vessels assessment	Coronary Arteries	All Phases
Lung cancer Oncological staging First and F-up	Brain Thorax Liver	All Phases
Hepatocellular carcinoma Oncological staging	Liver	All Phases
Colic /abdominal pain Exclusion or detection of a stone	Abdomen	All Phases
Appendicitis Detection or exclusion	Abdomen	All Phases

Table 1: List of CT clinical indications

Clinical task	Anatomical location	Procedure
Arterial occlusive disease of iliac arteries Angiographic diagnosis and endovascular treatment of arterial stenosis or occlusion causing intermittent claudication or ischaemia	Pelvis	Recanalisation & Stenting
Localisation and treatment of hepatocellular carcinoma TACE: transarterial chemoembolisation	Liver	Transarterial (chemo)embolisation of tumour vasculature and feeding hepatic arteries
Arterial occlusive disease of femoropopliteal arteries Angiographic diagnosis and endovascular treatment of arterial stenosis or occlusion causing intermittent claudication or ischaemia	Lower extremity	Recanalisation and angioplasty +-stenting
Biliary drainage Localisation of biliary obstruction and percutaneous treatment of biliary obstruction	Abdomen	Percutaneous transhepatic cholangiography and biliary drainage

Table 2: List of interventional radiology procedures

EuroSafe Imaging Session

Thursday, February 28, 16:00–17:30, Room N

EU 2 Diagnostic reference levels (DRLs) based on clinical indication

Moderators: G. Frija; Paris/FR
G. Simeonov; Luxembourg/LU

- **Chairperson's introduction**
  G. Frija; Paris/FR
- **European Commission perspective**
  G. Simeonov; Luxembourg/LU
- **One shoe does not fit all: clinical indication based DRLs**
  G. Frija; Paris/FR
- **Experience from the EUCLID (European study on clinical DRLs) Project**
  J. Damilakis; Iraklion/GR
- **Experience with a national survey based on clinical indications**
  S.J. Foley; Dublin/IE
- **Update of the national DRLs for CT in Switzerland**
  S.T. Schindera; Aarau/CH
- **Discussion**

This session is part of the EuroSafe Imaging campaign.