Report on the European Society of Radiology EUROSAFE Imaging Program

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Medical Imaging Section
Report on the European Society of Radiology (ESR) EUROSSAFE Imaging Program

- CT Evolution
- Hybrid Imaging
- Dosimetry
- Communication of Risk
- ESR & its partners within European Commission projects
- EUROSSAFE Imaging
- Radiation Protection of the Patient
Early CT scanner

• 1972-2000;
  ➢ slice thickness of 10mm
  ➢ interslice gap of 10mm or more
    o single body areas:
    o chest, head or pelvis
New scanners

- Slice thickness around 1mm
- Overlapping slices
- Imaging protocols include chest, abdo, pelvis
New scanners

Multi Detector Computed Tomographic scanners (MDCT):

- quick 10-20 sec per image, ~ 15 min for complete scan
- patient friendly, cf MRI
- modality of choice for many physicians
- hybrid scanning (CT + PET/SPECT)
Hybrid imaging
PET/CT
SPECT/CT
CT Usage

Total CT Procedures recorded by Medicare Australia

Year
Total No. of CT Procedures
612,438 682,343 799,696 795,715 889,159 945,636 1,005,020 1,142,261 1,224,572 1,304,236 1,398,348 1,522,798 1,575,283 1,798,389 2,086,210 2,103,734 2,172,948
Effective Doses Resulting from Selected Diagnostic Medical Examination

Typical Effective Radiation Doses from Medical Procedures and Other Activities
Trends in Average Effective Doses Resulting from Selected Diagnostic Medical Examination in Countries of Health Care Level 1

In general most modalities have seen a decrease in effective radiation doses, whereas CT has predominately increased.

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Chest radiography</td>
<td>0.25</td>
<td>0.14</td>
<td>0.14</td>
<td>0.07</td>
</tr>
<tr>
<td>Abdomen X-ray</td>
<td>1.9</td>
<td>1.1</td>
<td>0.53</td>
<td>0.82</td>
</tr>
<tr>
<td>Mammography</td>
<td>1.8</td>
<td>1.0</td>
<td>0.51</td>
<td>0.26</td>
</tr>
<tr>
<td>CT scan</td>
<td>1.3</td>
<td>4.4</td>
<td>8.8</td>
<td>7.4</td>
</tr>
<tr>
<td>Angiography</td>
<td>9.2</td>
<td>6.8</td>
<td>12</td>
<td>9.3</td>
</tr>
</tbody>
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Data are average effective dose per examination in mSv.\(^1\)

\(^1\)UNSCEAR Report 2008
NCRP Report 160
Dose to US population from medical imaging.

<table>
<thead>
<tr>
<th>Modality</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Computed Tomography</td>
<td>49%</td>
</tr>
<tr>
<td>Nuclear Medicine</td>
<td>26%</td>
</tr>
<tr>
<td>Interventional Radiology</td>
<td>14%</td>
</tr>
<tr>
<td>General Radiology &amp; Fluoroscopy</td>
<td>11%</td>
</tr>
</tbody>
</table>
UNSCEAR 2008 Report

- CT Contributes ~ 35% of collective dose
- accounts only for 5% of all diagnostic and interventional procedures
  - increase use of hybrid scanners
    - CT + PET/SPECT
      - CT dose component plus radiopharmaceutical
        - procedures >10mSv each
Doses in CT imaging

• Patients can exceed 100mSv effective dose in a relatively short period of time from a small number of scans.
• It is possible to get skin injuries form CT imaging.
Need a consistent message to the public and patients about radiation risks and medical imaging
The **European Society of Radiology** is an apolitical, non-profit organisation, dedicated to promoting and coordinating the scientific, philanthropic, intellectual and professional activities of Radiology in all European countries. The Society's **mission** at all times is to serve the health care needs of the general public through the support of science, teaching and research and the quality of service in the field of Radiology.
ESR’s Vision: personalised patient-centric medicine in clinical settings.

**GPS Approach:**

**G**lobalisation (detailing all the steps and involving all stakeholders)

**P**ersonalisation (patient-centric)

**S**afety
“while there is a need to increase access to radiological services for millions of needy patients, an increase trend towards inappropriate medical exposure to ionising radiation has been observed”
ESR is working with a number of partners in European Commission projects.

EUROPEAN MEDICAL ALARA NETWORK (EMAN) – building a sustainable bridge between researchers, health professionals and policy makers

Focus on Optimisation
European Society of Radiology

ESR is working with a number of partners in European Commission projects.

MEDRAPET – Medical Radiation Protection Education and Training

A study on the implementation of the Medical Exposure Directive’s requirements within the European Union
ESR is working with a number of partners in European Commission projects. PiDRL – European Diagnostic Reference Levels for Paediatric Imaging

- Development of the methodology and the European Guidelines
- Update and expansion of European DRLs in paediatric imaging
- Organisation of a European workshop on DRLs in paediatric imaging
ESR is working with a number of partners in European Commission projects.

Referral Guidelines for Imaging

........review the situation in the EU Member States regarding the fulfilment of their obligations under the Medical Exposure Directive Article 6.2 (97/43/EURATOM), which requires Member States “to ensure that recommendations concerning referral criteria for medical exposures, including radiation doses, are available to the prescriber of medical exposures”.

References and data sources:

EUROSAFE IMAGING

WHAT -> a program to support and strengthen medical radiation protection across Europe following a holistic, inclusive approach.
WHY - there are 24 official languages in Europe. Some countries are highly developed others less. This aligns with the distribution of medical imaging equipment.
How- The European Atomic Energy Community (Euratom) was formed and started regulating medical radiation protection in the 1990’s. Its directives are binding on member states.
EUROSAFE IMAGING

How-

• A treaty was signed to create a standardized X-ray image across Europe.
• Development of quality criteria for image quality and patient dosimetry.
• Establishment of DRLs -> main tool for optimization in patient radiation protection.
Overall Objective of the ESR/Eurosafef896 imaging program:

• Promote appropriateness in radiological imaging
• Maintain radiation doses within diagnostic reference levels
• Promote the use of up-to-date equipment
Overall Objective of the ESR/Eurosafe imaging program:

- Using the ‘as low as reasonably achievable’ principle to further reduce doses while maintaining the image quality needed for clinical purposes.
- Improving communication with patients.
## Radiation Protection of the Patient

<table>
<thead>
<tr>
<th>Europe</th>
<th>Australia</th>
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</table>
| **Legal requirement for the radiation protection of the patient.**  
  - Europe: EURATOM Directive  
  - Associated EURATOM Legislation | **Legal requirement for the radiation protection of the patient.**  
  - Code & Safety Guides (RPS14)  
  - State/Territory: Legislation |
| **European Referral Guidelines.** | **No national Referral Guidelines (DIP in use WA)** |
| **National benchmarks for radiation doses: DRLs for all modalities.** | **DRLs:**  
  - established for MDCT  
  - established for Nuc Med (under review)  
  - interventional, radiology/mammography being established |
| **Teamwork.** | **Teamwork?** |
THANK YOU

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