41st Meeting of the Radiation Safety Standards Committee
21 – 24 November 2016

Agenda Item: R5.4
Development of a Safety Report on
Recording, tracking, and managing patient exposure
data in medical imaging

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The use of ionizing radiation in medical imaging has brought significant benefit to medicine and to human health

• Increased utilization of medical imaging
• Increased use of medical imaging modalities that offer improved medical benefit but also increased patient exposure and radiation risk
Background

- Marked increase in both individual patient doses as well as in collective effective doses from medical imaging sources of radiation.

- While these increased utilizations are largely justified based on the derived benefit, the consequent increased exposures necessitate a higher degree of oversight on radiation protection for patients.
Further increasing use of imaging technology among medical professionals with limited expertise in radiation protection and the rising complexity and diversity of imaging systems and features (such as hybrid imaging systems).

Calls for and the development of patient exposure data monitoring solutions as support to the optimization of patient protection.

The exposure data management systems provide objective information to health care professionals and authorities who are responsible for ensuring justified and optimized use of radiation.
The deployment of exposure data management systems has not been universal, and even amongst the implementations, there has been a large degree of diversity.

Need for advice from a credible source with clarity on a focused strategy about how exposure data management systems should be designed and used towards the ultimate goal of improving radiation protection and patient care.
Justification for the production of the document

• GSR Part 3 placed additional requirements on managing patient exposure from diagnostic use of ionizing radiation.
  – performing and documenting dosimetry of patients
  – determining typical doses to patients for common diagnostic radiological procedures and for image guided interventional procedures,
  – performing regular local assessments, based on the measurements, for those radiological procedures for which Diagnostic Reference Levels (DRLs) have been established.

• Safety Guide on Radiation Protection and Safety in Medical Uses of Ionizing Radiation (DS399)
  – does not address details to deal with these requirements.
Justification for the production of the document

• The IAEA Technical meetings in April 2015 and June 2016 highlighted the lack of definitive guidelines on this subject and requested the IAEA to prepare a publication that provides consolidated information and advice.

• Publication in the Safety Report series

Recording, tracking, and managing patient exposure data in medical imaging
Objective

• To offer consolidated information and advice for recording, tracking, and managing patient exposure data in medical imaging for improved radiation protection of patients.
• This includes metrics for patient exposure, mechanisms and processes for data collection and use, and practical implementation considerations.
**Scope**

- **To provide specific guidelines** for ensuring radiation protection with regard to medical exposure.
- **It covers radiological procedures in:**
  - diagnostic radiology (including dentistry);
  - image guided interventional procedures;
  - nuclear medicine;
  - imaging in radiation therapy.
- **Some of these radiological procedures may be carried out in other medical specialties:**
  - cardiology, vascular surgery, urology, orthopaedic surgery, obstetrics and gynaecology, emergency medicine, gastroenterology, etc
- **The target audience** is health professionals, medical physicists, radiation protection experts, regulators, radiographers and referring medical practitioners.
Cooperation

• The cooperation in developing the Safety Report is expected from:
  – IAEA Department of Human Health
  – International Commission on Radiological Protection (ICRP)
  – World Health Organization (WHO)
  – United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR)
  – Working Group 28 (Physics strategy) of DICOM standard co-chaired by the European Federation of Organizations for Medical Physics (EFOMP) and American Association of Physicists in Medicine (AAPM).
Structure

1. Introduction

2. Specification of patient exposure data
   2.1. Cohort and individual focus
   2.2. Input levels of exposure data
   2.3. Data integrity: data quality and accuracy
   2.4. Advanced metrology

3. Data recording and collection
   3.1. Data to be collected
   3.2. Manual vs electronic means
   3.3. Classification of radiological examinations and procedures
   3.4. Data integrity: ensure proper data handling

4. Data evaluation, analysis, and use
   4.1. Typical doses and diagnostic reference levels (DRLs)
   4.2. Investigating individual patient exposures
   4.3. Improved clinical operation
   4.4. Tracking individual patient exposure history
   4.5. Population dose estimations
   4.6. Use of dose data for decision support

5. Data handling and workflow system
   5.1. Strategies (recording – collecting – analyzing)
   5.2. Needed features
   5.3. Interoperability, provision of services across countries
Structure

6. Implementation considerations
   6.1. Organizational structure
   6.2. Frequency of review
   6.3. Prioritization of modalities and data
   6.4. Training of constituents, first-time and annual updates
   6.5. Restriction of use

7. Communication
   7.1. Patient (and parent for pediatric patients)
   7.2. Medical radiological technologists
   7.3. Referring physicians
   7.4. Radiological medical practitioners
   7.5. Medical physicists
   7.6. Administration
   7.7. Professional societies and organizations
   7.8. Authorities

8. Annexes
   8.1. Imaging process description, referral and decision support
   8.2. Technical aspects of data handling and workflow system

9. References
# Provisional schedule

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Action requested from RASSC

• No actions, for information