Challenges in traceability of medical dosimetry: proposals for updates in X-ray imaging, nuclear medicine and radiation protection

Paula Toroi[1], Teemu Siiskonen[1], Andrew Fenwick[2]

[1]STUK – Radiation and Nuclear Safety Authority, Vantaa, Finland, [2]NPL -National Physical Laboratory, Teddington, UK

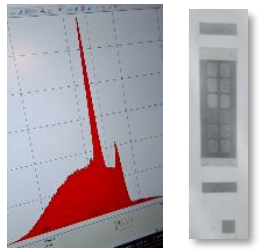
Purpose: IEC and ISO standards and IAEA protocols define requirements for dosimeters and their calibration. However, the recent technical developments require new approaches and data.

Methods: Current situation in X-ray imaging, radiation protection and nuclear medicine were reviewed under IAEA CRP E24024 and three EURAMET projects.

Conclusions: The results provide an overview of state-of-the art and recommendations that should be considered when standards and dosimetry procedures are updated.

Impact:

- New procedures proposed.
- New services established.
- Uncertainties decreased.



XMM = X-ray multimeter

RESULTS

X-ray imaging dosimetry:

- New reference radiation qualities: RQR+Cu-filters.
- New requirements and classification for dosimeters: introduction of reference-class.
- New proposals to cover XMM quantities: HVL, total filtration, irradiation time, mean peak voltage.

Radiation protection dosimetry:

- Better specification for standard radiation qualities.
- New conversion coefficients for dose equivalent quantities, including Am-241.
- Recommendations for future standardization needs.

Nuclear medicine dosimetry:

- New traceability routes planned.
- Data collected to improve uncertainty estimations.

=>IEC 61627
=>IEC 61674
=>IEC 61676
+new ones

=>ISO4037
+harmonized use of IEC standards

Implementation of IEC 63465

EUROPEAN PARTNERSHIP
Co-funded by the European Union

METROLOGY PARTNERSHIP | EURAMET

www.tramexi.com	https://lmri-met.github.io/sites-guideradpros/	https://etrainproject.org/
22NRM01 TraMeXI 06/2023 – 05/2026	22NRM07 GuideRadPROS 06/2023 – 05/2026	24RPT01 Etrain 06/2025 – 05/2028