

## Traceability in Medical X-ray Imaging Dosimetry

TraMeXI project aims to harmonize and standardize calibration and measurement procedures to ensure traceability and accurate dosimetry in medical X-ray imaging.

X-ray imaging, covering diagnostic and interventional examinations, saves countless lives but form the largest component of exposure to artificial ionizing radiation in Europe.



Accurate and consistent quantification of patient radiation exposure with calibrated dosimetry equipment is essential to ensure safety to patients.

### TRACEABILITY CHAIN



### NEEDS

- The assessment of patient exposure is incomplete:
  - The reference radiation qualities used for calibrations do not represent the conditions at clinical X-ray facilities.
  - The change of dosimeter response between calibration and clinical conditions is not well known.
- X-ray multimeters are commonly used, but validated procedures for their calibration and use are missing.

## OBJECTIVES

### WP 1 Radiation qualities

- To review a range of radiation qualities (anode, filtration, tube voltage) relevant in medical imaging.
- To propose an update of reference qualities used for calibrations and X-ray system testing.

### WP 2 Dosimeter classification

- To investigate the performance of commercially available dosimeters.
- To propose updated limits of variation to define specific requirements for reference and field-class dosimeters.

### WP 3 X-ray multimeters (XMMs)

- To test XMMs extensively under calibration and clinical conditions.
- To harmonize calibration and measurement procedures for quantities used in quality assurance of X-ray systems.

### WP4 Validation

- To establish and validate updated calibration and comparison procedures.
- to get international recognition for new calibration services

## IMPACT

IAEA TRS 457  
IEC 61267  
IEC 61674  
IEC 61676

- The project will provide input for development of international **standards and guidance**.
- Updated procedures are implemented in **calibration laboratories** at different levels of the traceability chain.
- Regulators** can refer to updated standards and protocols in the regulations that support implementation of Council Directive 2013/59/EURATOM.



- Industry** will benefit from the improved demonstration of dosimeter performance supporting broader acceptance of their results.
- Medical physicists are **end-users** of the dosimeters, calibrations and measurement protocols.
- Ultimate beneficiaries in a society are the **patients**.

## PROGRESS BEYOND STATE OF THE ART

- Updated and standardized reference radiation qualities applied in the calibrations and relevant use.
- Evaluation of dosimeter performance is standardized to support the selection of a fit for the purpose equipment.
- Calibration and measurement procedures for XMMs are harmonized and the results are traceable and comparable.

The outcome of the project forms a **new foundation for X-ray imaging dosimetry** and provides input for international implementation **through update of IEC standards and IAEA TRS-457**.

Traceability and accurate dosimetry in medical X-ray imaging are ensured.

