

International Symposium on Standards, Applications and Quality Assurance in Medical Radiation Dosimetry (IDOS 2019)



Tuesday 18 June 2019 - Friday 21 June 2019

IAEA - Vienna International Centre

Scientific Programme

Radiation dosimetry measurement standards for imaging, therapy and radiation protection

Mutual Recognition Arrangement (MRA) drawn up by the International Committee for Weights and Measures (CIPM), and ionizing radiation comparisons and calibrations.

Standards for absorbed dose to water, air kerma, activity measurements, ambient and personal dose equivalent

Basic data for dosimetry, including the new quantities described in International Commission on Radiation Units and Measurements (ICRU) Report 90 of 2017 (*Key Data for Ionizing-Radiation Dosimetry: Measurement Standards and Applications*)

New water and graphite calorimeter developments (small fields, protons, and heavier ions)

Standards for radionuclide activity measurements in quantitative imaging

Standards for brachytherapy: reference air kerma and absorbed dose to water

New developments in standards

New data for kilovoltage X ray diagnostic and therapy dosimetry

Computational methods in dosimetry

Reference dosimetry and comparisons in external beam radiotherapy

Status of international dosimetry protocols in radiotherapy dosimetry, e.g., the updating of *Absorbed Dose Determination in External Beam Radiotherapy: An International Code of Practice for Dosimetry Based on Standards of Absorbed Dose to Water* (Technical Reports Series No. 398, IAEA, Vienna, 2000; hereinafter referred to as “TRS-398”), *Dosimetry of Small Static Fields Used in External Beam Radiotherapy* (Technical Reports Series No. 483, IAEA, Vienna, 2017)

New developments in national calibration protocols

Beam quality (non-standard beams, flattening filter-free beams)

Perturbation and correction factors

Updates in kilovoltage X ray therapy

Reference dosimetry and comparisons in brachytherapy

Dissemination and clinical use of standards

Status of brachytherapy dosimetry protocols

New radiation sources for brachytherapy (implantable X ray tubes, mixed radionuclide sources, electronic brachytherapy, etc.)

Dosimeters for brachytherapy

Reference dosimetry and comparisons in diagnostic radiology

Status of international dosimetry protocols in dosimetry, e.g., *Dosimetry in Diagnostic Radiology: An International Code of Practice* (Technical Reports Series No. 457, IAEA, Vienna, 2007; hereinafter referred to as “TRS-457”)

Calibration of diagnostic radiology detectors (mammography and computed tomography (CT) chambers, air kerma–area product meters (KAP), beam quality measuring devices)

Reference dosimetry and comparisons in nuclear medicine

Alpha therapy standards
Carbon-11 for positron emission tomography (PET) dosimetry
Patient specific dosimetry and PET
Selective internal radiation therapy travelling standards
Contamination monitors (calibration and measurement)

Clinical dosimetry in X ray imaging

Need for an update of the international dosimetry protocol in X ray diagnostic radiology (TRS-457) and recommendations contained in *Patient Dosimetry for X Rays Used in Medical Imaging* (ICRU Report 74)
Beam quality measurements
Hospital calibration of dosimeters (KAP meters and other devices)
Developments in clinical dosimetry (incl. digital radiology, mammography, CT (incl. cone beam), fluoroscopy, interventional radiology, and dental radiology)
Dose management and dose optimization (incl. diagnostic reference levels)
Patient specific dosimetry
Reducing uncertainty in the use of patient dosimetry protocols
Mathematical phantoms for dose calculations (incl. patient size corrections)
Foetal and paediatric dosimetry
Dose reduction techniques
Digital Imaging and Communications in Medicine (DICOM)-based dose reporting; quality assurance of dose of imaging devices

Clinical dosimetry in radiotherapy

Issues in beam commissioning and modelling for dose calculation
Verification of treatment planning process (algorithms, data input, dose verification, etc.) in external beam and brachytherapy
Dosimetry for imaging devices used in image-guided radiation therapy
Dosimetry of special procedures (intra-operative radiation therapy, total body irradiation)
In-vivo dosimetry
Patient specific dosimetry
Out-of-field dosimetry
Three-dimensional dosimetry
Dosimetry in the presence of magnetic fields

Clinical dosimetry in nuclear medicine

Calibrations and procedures for measurements of activity (*Quality Assurance for Radioactivity Measurements in Nuclear Medicine* (Technical Reports Series No. 454, IAEA, Vienna, 2006))
Imaging device simulations

Quantitative imaging (phantoms and procedures)
Pharmacokinetic models for dosimetry and cellular level dosimetry
Pre-clinical (translational) dosimetry
Dosimetry for paediatric studies (mathematical phantoms)
Patient-specific dosimetry
Imaging-based dosimetry (PET, single photon emission computed tomography (SPECT))
Dosimetry for targeted radionuclide therapy (peptides, antibodies, small molecules)
Dosimetry for new radiopharmaceuticals for use in therapy (including alpha emitters)

Independent dosimetry quality audits

Dosimetry audits in radiotherapy (national and international dosimetry audit networks, postal and on-site audits in reference and non-reference conditions using simple and semi-anatomical phantoms)
Credentialing for clinical trials through the use of phantoms
Comprehensive audits (diagnostic radiology, nuclear medicine, radiotherapy)
Audits of advanced technologies in radiotherapy
Dosimetry audits for secondary standards dosimetry laboratories
Optimization and dosimetry in radiology

Radiation protection dosimetry

Use of radiation protection quantities (effective and equivalent dose, internal dosimetry)
Occupational dosimetry for medical workers (incl. pregnant staff)
Dosimetric characterization of medical workplaces (brachytherapy, PET/CT, interventional radiology, etc.)
Measurement techniques around pulsed sources
Personal dosimetry comparisons
Eye, extremity and skin dosimetry

Dosimetry for proton and light ion beams in radiotherapy

Implementation of ICRU Report 78 (*Prescribing, Recording, and Reporting Proton-Beam Therapy*)
Update of the international dosimetry protocol TRS-398
Basic data for dosimetry
Perturbation and correction factors
Calibration of beam monitors
Neutron dosimetry

Detector technology and applications in dosimetry

Features and limitations of modern detectors for reference and relative dosimetry
Commissioning of detectors
Challenges and advantages of closed dosimetry systems ("black-box")
Type testing of detectors

Other related topics

Microdosimetry

Nanodosimetry

Dosimetry of small animal irradiators

Collective effective dose and patient risk

Global medical and occupational exposure estimation

Quality management of secondary standards dosimetry laboratories