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

- 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

- 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**

- 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