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IAEA
International Atomic Energy Agency

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

Organized by the

International Atomic Energy Agency (IAEA)

in cooperation with the

American Association of Physicists in Medicine (AAPM)
Asia–Oceania Federation of Organizations for Medical Physics (AFOMP)
International Bureau of Weights and Measures (BIPM)
European Association of Nuclear Medicine (EANM)
European Federation of Organisations for Medical Physics (EFOMP)
European Society of Radiology (ESR)
European Society for Radiotherapy and Oncology (ESTRO)
European Radiation Dosimetry Group (EURADOS)
Global Clinical Trials Radiation Therapy Quality Assurance Harmonization Group (GHG)
International Commission on Radiological Protection (ICRP)
International Commission on Radiation Units and Measurements (ICRU)
International Organization for Medical Physics (IOMP)
International Organization for Standardization (ISO)
Medical Physics for World Benefit (MPWB)
South East Asian Federation of Organizations for Medical Physics (SEAFOMP)
Society of Nuclear Medicine and Molecular Imaging (SNMMI)
Union for International Cancer Control (UICC)
United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR)

IAEA Headquarters
Vienna, Austria

18–21 June 2019

Announcement and Call for Papers

A. Background

The objective of the International Atomic Energy Agency's (IAEA's) programme on human health is to enhance the capabilities in Member States to address needs related to the prevention, diagnosis and treatment of health problems through the application of nuclear techniques. The mandate arises from Article II of the IAEA Statute: "the Agency shall seek to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world".

Accurate measurements in radiation dosimetry are vital in a wide range of medical and industrial applications where the results of measurements are critical in decisions relating to human health and the safety of radiation workers and members of the public. The development of standards by primary standards dosimetry laboratories followed by their dissemination to secondary standards dosimetry laboratories and to end-users ensures the traceability of measurements to the International System of Units (SI). Dosimetry codes of practice (or protocols) are used in conjunction with the dosimetry standards to ensure optimized use of radiation in medicine. Uniformity is equally important in dosimetry, especially for collaborative multi-centre studies or clinical trials.

In radiation protection, the uncertainty in the dosimetry may be greater than for therapy and diagnostic X rays, but proper traceability of the measurements with a defined level of uncertainty is no less important. In recent years, new developments have occurred in dosimetry standards, audits and quality assurance (QA) guidance, especially in the fields of external radiotherapy, brachytherapy, nuclear medicine and diagnostic radiology.

There is a need for scientific exchange at the international level and for a comprehensive review of the status of dosimetry and applications in medical dosimetry.

B. Purpose and Objectives

The major goal of the symposium is to provide a forum at which advances in radiation dosimetry, radiation medicine, radiation protection and associated standards made over the last decade can be disseminated and scientific knowledge exchanged. It will cover all specialties in radiation medicine and radiation protection, with a specific focus on those areas where the standardization of dosimetry has improved in recent years (advanced radiotherapy, diagnostic radiology, nuclear medicine and audits). It will also summarize the present status of, and outline future trends in, medical radiation dosimetry and identify possible areas for improvement. The conclusions and summaries from the symposium should lead to the formulation of recommendations for the scientific community.

C. Structure, Themes and Topics

The symposium will consist of 16 sessions: four sessions per day of approximately 90 minutes each, including the opening session, educational courses, a series of topical sessions with oral and poster presentations, a session for poster highlights and three round-table discussion sessions.

The **opening session** will include welcoming addresses followed by two keynote presentations on the history of dosimetry and the main developments in dosimetry since the previous IAEA symposium on the topic (IDOS 2010), which was held in Vienna in November 2010.

A series of **topical sessions** (four plenary) will then cover selected areas of medical radiation dosimetry, from standards laboratories to the medical applications in radiotherapy, diagnostic radiology and nuclear medicine. Each topical session will include one or two keynote invited presentations of 30 minutes followed by four to six oral presentations and related discussions.

Poster presentations for each topic will be an important component of the symposium, and their display will be maintained during the symposium. A plenary session will be dedicated to the highlights of the posters. The rapporteurs will summarize each of the sessions and prepare recommendations.

On days 1 to 3, a plenary session will be dedicated to a **round-table discussion**.

The symposium will include a plenary session to highlight fifty years of IAEA/World Health Organization (WHO) dosimetry audits.

Topics

The symposium will cover recent developments in the field of radiation dosimetry standards, applications and quality assurance. The IAEA welcomes both academic and practice based contributions on the following topics:

- 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

D. Target Audience

This symposium will be of interest to a broad spectrum of medical physicists and other scientists working in radiation dosimetry with responsibilities in the following fields: radiation metrology, external beam radiotherapy with photons, electrons and light ions, brachytherapy, radiology (including CT, mammography and interventional procedures), nuclear medicine (including radiopharmaceutical therapy) and radiation protection dosimetry.

The symposium will serve as an opportunity for scientists in medical institutions, research centres, universities and standards laboratories to meet for discussions covering the entire dosimetry chain.

The IAEA welcomes and encourages the participation of women, early career professionals and individuals from developing countries.

E. Participation and Registration

All persons wishing to participate in the symposium must be designated by an IAEA Member State or should be members of organizations that have been invited to attend.

To be designated by an IAEA Member State, participants are requested to send the following form(s) (as applicable) to their competent national authority (e.g., Ministry of Foreign Affairs, Permanent Mission to the IAEA or National Atomic Energy Authority):

- Participation Form (Form A): participation only; no deadline if only Form A is submitted.
- Form for Submission of a Paper (Form B): participants submitting a paper contribution through INDICO must send their completed and signed Form B together with Form A to their competent national authority for onward transmission to the IAEA (Official.Mail@iaea.org) by **15 December 2018**.
- Grant Application Form (Form C): participants requesting financial support by the IAEA have to complete Form C and send it together with Form A (and Form B, if applicable) to the competent national authority for onward transmission to the IAEA (Official.Mail@iaea.org) by **15 December 2018**. Form C should be stamped and signed by the competent national authority.

Participants who are members of an organization invited to attend are requested to send the above form(s) through their organization to the IAEA (Official.Mail@iaea.org).

In addition, participants are requested to pre-register online through the IAEA web page for the symposium (see Section O below). Participants who registered in accordance with the above procedure will receive from the IAEA further information approximately three months before the opening of the symposium.

F. Paper/Poster Presentations and Proceedings

All papers submitted — other than invited keynote papers — must present original work and should not have been published elsewhere.

Persons who wish to present a paper at the symposium — either orally or in the form of a poster — must submit a synopsis on one of the topics listed under Section C.

F.1. Submission of Synopses

Synopses must be sent **in electronic format** (no paper copies) directly to the IAEA. Instructions on how to upload the synopses to the symposium's web browser-based file submission system (IAEA-INDICO) will be available on the symposium web page (see Section O) as of **1 September 2018.** The synopses **must** be submitted through this system by **15 December 2018** No other form of submission will be accepted

The submission should indicate to which of the topics outlined in Section 0 above it relates and the abstract content should be sequenced accordingly:

- Background of the study;
- Methodology;
- Results; and
- Conclusion.

The synopses:

- should be a maximum of two pages of about 800 words in English (including title);
- should not include more than one figure, graph or table;
- should include references; and
- must be written and submitted using the synopsis template available from the symposium web page (see Section O).

In addition, authors must submit the following two forms to their appropriate governmental authority (see Section E) for transmission to the IAEA. These forms must be received by the IAEA no later than **15 December 2018**.

- Participation Form (Form A); and
- Form for Submission of a Paper (Form B).

IMPORTANT: The electronically received abstracts will be considered by the Programme Committee only if these two forms have been received by the IAEA through the established official channels (see Section E).

Authors should state to which of the topics outlined in Section 0 their contribution relates.

F.2. Acceptance of Papers for Oral or Poster Presentation

Given the number of synopses anticipated and the need to provide ample time for discussion, the number of papers that can be accepted for oral presentation is limited. Authors who prefer to present their papers as posters are requested to indicate this preference on Form A and through INDICO.

The Secretariat reserves the right to exclude papers that do not comply with its quality standards and/or that do not apply to one of the topics in Section C above.

Authors will be informed **by the end of January 2019** as to whether their papers have been accepted by the Programme Committee for oral or poster presentation. Following the acceptance of their paper they will be informed of the session of presentation. All the accepted synopses will be reproduced in unedited form in the *Book of Extended Synopses*, which will be available free of charge to all participants upon registration at the symposium.

F.4. Symposium Proceedings

A summary of the proceedings, highlights and recommendations will be published in an appropriate journal as soon as possible after the symposium.

G. Expenditures and Grants

No registration fee will be charged to participants.

The IAEA is generally not able to bear the travel and other costs of participants in the symposium. The IAEA has, however, limited funds at its disposal to help meet the cost of attendance of certain participants. Upon specific request, such assistance may be offered to normally one participant per country, provided that, in the IAEA's view, the participant will make an important contribution to the symposium.

If participants wish to apply for a grant, they should submit applications to the IAEA to this effect through their competent national authority. Participants should ensure that applications for grants are:

1. Submitted through the competent national authority by **15 December 2018**;
2. Accompanied by a completed and signed Grant Application Form (Form C); and
3. Accompanied by a completed Participation Form (Form A).

Applications that do not comply with the above conditions cannot be considered.

Approved grants will be issued in the form of a lump sum payment that usually **covers only part of the cost of attendance**.

H. Distribution of Documents

A preliminary programme will be posted on the IAEA web page for the symposium (see Section O) as soon as possible. The final programme and the *Book of Extended Synopses* will be made available on the symposium web page and the IAEA Conferences and Meetings app.

I. Exhibitions

A limited amount of space will be available for displays/exhibits during the symposium. Interested parties should contact the Scientific Secretary (see Section N) by email at IDOS2019@iaea.org by **16 November 2018**.

J. Working Language

The working language of the symposium will be English. All communications, including the synopses and papers submitted, must be in English. No interpretation will be provided.

K. Symposium Venue and Accommodation

The symposium will be held at the IAEA's Headquarters in Vienna, Austria. Participants must make their own travel and accommodation arrangements. Hotels which are offering a reduced rate for symposium participants will be listed on the symposium web page (see Section O). Please note that the IAEA is not able to assist participants with hotel bookings, nor can the IAEA assume responsibility for paying cancellation fees or for re-bookings and no shows.

L. Visas

Designated participants who require a visa to enter Austria should submit the necessary application to the nearest diplomatic or consular representative of Austria at least eight weeks before they travel to Austria. Since Austria is a Schengen State, persons requiring a visa will have to apply for a Schengen visa. In States where Austria has no diplomatic mission, visas can be obtained from the consular authority of a Schengen Partner State representing Austria in the country in question.

M. Key Dates and Deadlines

Opening of synopsis submission through IAEA-INDICO	**1 September 2018**
Deadline for submission of synopses through IAEA-INDICO	**15 December 2018**
Deadline for submission of Form for Submission of a Paper (Form B) (together with Form A) through the competent national authority or through InTouch+	**15 December 2018**
Deadline for submission of Grant Application Form (Form C) (together with Form A) through the competent national authority or through InTouch+	**15 December 2018**
Notification of acceptance of synopsis	**End of January 2019**
Registration only (no paper submission, no grant request)	**No deadline**

N. Symposium Secretariat

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Subsequent correspondence on scientific matters should be sent to the Scientific Secretary of the symposium and correspondence on administrative matters to the IAEA Conference Services Section.

O. Symposium Web Page

Please visit the following web page regularly for new information regarding this symposium: https://www.iaea.org/events/idos2019

P. Greening

To demonstrate its commitment to sustainability, the IAEA will organize this symposium as a 'green meeting' according to the guidelines of the Austrian Ecolabel.

There will be a focus on the areas of paper smart documentation, waste reduction and recycling, and environmentally friendly catering.