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SSDL Newsletter

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Contents

From the Editor

It is almost the end of 2024. As a dosimetry community, we can look back and see the achievements of this year including the publication of the revised code of practice for dosimetry based on standards of absorbed dose to water (IAEA TRS 398 Rev.1) and the new code of practice for dosimetry in brachytherapy for Secondary Standards Dosimetry Laboratories (SSDLs) and Hospitals (IAEA TRS 492). The links to these publications can be found on page 17. This issue of the SSDL Newsletter (No. 80) is dedicated to the report of the 21st Scientific Committee of the IAEA/WHO Network of Secondary Standards Dosimetry Laboratories (SSC-21). The SSC-21 reviewed the achievements reported by the Dosimetry and Medical Radiation Physics (DMRP) Section for the biennium 2022 – 2023 and noted actions following the SSC-20 recommendations. In particular, the activities of the present and the future – for biennium 2024–2025 and 2026–2027 – were discussed and recommendations were made. Included in this Newsletter are the experiences of DMRP interns from the 2024 cohort.

Season's greetings and wishing you all a prosperous 2025.

Figure 1. SSC Members with the DMRP section staff

Staff of the Dosimetry and Medical Radiation Physics (DMRP) Section

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Services provided by the IAEA in DMRP Section

The IAEA's Dosimetry and Medical Radiation Physics Section focuses on services provided to Member States through the IAEA/WHO SSDL Network and on a system of dosimetry quality audits. The measurement standards of Member States are calibrated, free of charge, at the IAEA's Dosimetry Laboratory. The audits are performed through the IAEA/WHO postal dose audit service for SSDLs and radiotherapy centres by using radiophotoluminescence and optically stimulated luminescence dosimeters (RPLDs and OSLDs).

The Dosimetry Laboratory's Quality Management System has been reviewed and accepted by the Joint Committee of the Regional Metrology Organizations and the BIPM (JCRB). Some of the IAEA Calibration and Measurement Capabilities (CMCs) are published in Appendix C of the BIPM key comparison database (KCDB).

The IAEA CMCs can be found at the following web site: https://www.bipm.org/kcdb/

The range of services offered by the IAEA's DMRP Section are listed below.

Services	*Radiation quality*
**Calibration of ionization chambers (radiation therapy, brachytherapy*, radiation protection, and diagnostic radiology including mammography)	X rays and γ rays from ^{137}Cs and ^{60}Co beams ^{137}Cs, ^{60}Co, @linac photon beams* and ^{192}Ir brachytherapy sources
**Comparison of ionization chamber calibrations coefficients (radiation therapy, radiation protection, and diagnostic radiology including mammography) for SSDLs	X rays and γ rays from ^{137}Cs and ^{60}Co beams
Dosimetry audits (RPLD) for external radiation therapy beams for SSDLs and hospitals	γ rays from ^{60}Co, high energy X ray beams and electron beams
Dosimetry audits (OSLD) for radiation protection for SSDLs	γ rays from ^{137}Cs
Reference irradiations and blind dose checks for dosimetry audit networks (radiotherapy)	^{60}Co, high energy X ray and electron beams
Reference irradiations to dosimeters for radiation protection	X rays and γ rays from ^{137}Cs and ^{60}Co beams
High Dose Rate Brachytherapy audits	^{60}Co and ^{192}Ir

* Calibration services are not included in the IAEA CMCs published in the BIPM KCDB.

** Technical procedures and protocols for calibrations and comparisons are available on our website https://ssdl.iaea.org/.

@ Service available only for SSDL's that have activities in this area.

Member States interested in these services should contact the IAEA/WHO SSDL Network Secretariat, for further details, at the address provided below. Additional information is also available at the web site: *https://ssdl.iaea.org*

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Note to SSDLs using IAEA calibration and audit services:

1. To ensure continuous improvement in IAEA calibration and audit services, SSDLs are encouraged to submit suggestions for improvements to the Dosimetry Contact Point.

2. Complaints on IAEA services can be addressed to the Dosimetry Contact Point.

3. Feedback can be provided using the form on our website: https://ssdl.iaea.org/

https://iris.iaea.org/public/survey?cdoc=DOL00100

Scientific Committee of the IAEA/WHO Network of Secondary Standards Dosimetry Laboratories

Report of the Twenty-first Meeting of the SSDL Scientific Committee (SSC-21)

IAEA, Vienna, 11-15 March 2024

1 FOREWORD

The Scientific Committee of the IAEA/WHO network of Secondary Standards Dosimetry Laboratories (SSDLs) is a standing committee (SSC) within the framework of the International Atomic Energy Agency. It is tasked with conducting biennial reviews and evaluations of the Dosimetry and Medical Radiation Physics (DMRP) Sub-programme and reporting the results of the reviews to the Directors General of the IAEA and the WHO. The report of the twentieth meeting of the SSC (SSC-20), which was held from 14 to 18 March 2022, was published in the SSDL Newsletter No. 76 in December 2022.

The twenty-first meeting of the SSC (SSC-21) was held in Vienna at the Agency Headquarters from 11 to 15 March 2024. Opening remarks were made by Ms May Abdel-Wahab, Director of the Division of Human Health (NAHU), and Mr Mauro Carrara, Head of the Section of Dosimetry and Medical Radiation Physics who is Co-Secretary of the IAEA/WHO SSDL Network together with Ms Adriana Vélazquez Berumen, Diagnostic Imaging and Medical Devices, World Health Organization, Geneva, who was unfortunately unable to be present but was able to join the meeting via web-based video transmission on the first and last day of the meeting. The members of the SSC-21 are: Maria-Ester Brandan, Instituto de Física, National University of Mexico (UNAM) representing the International Commission on Radiation Units and Measurements (ICRU) and specialist in radiology medical physics; David T Burns, representing the Bureau International des Poids et Mesures (BIPM) specialist in radiation dosimetry and radiation standards; John Dickson, University College London Hospital, UK, specialist in nuclear medicine imaging physics; Stephen F. Kry, M.D. Anderson, USA, specialized in dosimetry audits (replaced in this meeting by Andrea Molineu from the MD Anderson Cancer Center, USA, specialist in dosimetry audits); Jan Seuntjens, Princess Margaret Cancer Centre and University of Toronto, Canada, specialist in reference dosimetry and radiotherapy physics, Zhang Jian, NIM, China, specialist in primary radiation dosimetry standards, and Mehenna Arib, SSDL, King Faisal Specialist Hospital and Research Centre, Saudi Arabia, specialist in dosimetry at the SSDL level, who was unable to attend the meeting in person but participated throughout using web-based audio and electronic transmission. The rapporteur was Penelope Allisy, specialized in radiation dosimetry and radiation standards, retired from BIPM.

1.1 Introduction

Ms May Abdel-Wahab, Director of NAHU, welcomed the Committee and particularly the new Chairman, Mr Jan Seuntjens. She then introduced the new Head of the DMRP, Mr Mauro Carrara. She provided some background for the Committee stating how the laboratory work review had started in 1985 and in 1988 all the activities of the DMRP were included in the reviews made by subsequent SSCs. The Committee is carefully chosen every 6 years with a balance of expertise and geographical distribution, and she welcomed the present Committee with enthusiasm. She stressed that the DMRP is one of the most active sections in the Agency, with the IAEA-WHO SSDLs now in over 66 countries and the Agency laboratory producing 157 calibration certificates for radiation instruments in 2023 alone. After presenting some other statistics Ms Abdel-Wahab explained that as cancer cases are now outpacing the available technology, the Agency has innovated the Rays of Hope project to support centres of excellence that will provide diagnostic imaging with radiotherapy to combat the rise in cancer cases in countries that would not otherwise have these facilities. The DMRP and the SSC are asked to support this concept. She recognised that the DMRP staff is its greatest asset and appreciated their dedication and scientific excellence, stating that more had been achieved in the current biennium than ever before with achievements such as the integration of the linear accelerator (linac) into the service with lots of new initiatives to support the Member States. She summarised by asking the Committee to review the extensive work of the Department and provide its recommendations for the next biennium. The report will be published in the SSDL Newsletter so that the whole community will be aware of the work undertaken and the recommendations for the future programme. Ms Abdel-Wahab said that she would join us again for the debriefing session on Friday at which she was looking forward to hearing innovative and targeted guidance for the next biennium.

Mr Mauro Carrara thanked Ms Abdel-Wahab for her introduction, welcomed the Committee and echoed some of

the areas of strength of the DMRP. He highlighted the importance of the insightful recommendations provided by SSC, which are crucial for designing the programme and budget for the upcoming cycle. Deep appreciation was extended to the current SSC Members for their substantive engagement with DMRP colleagues throughout previous SSC-19 and SSC-20 meetings. Their vision and recommendations in the field of radiation metrology, dosimetry and medical physics have helped the DMRP in meeting the challenges of the present and addressing the needs of the future.

Ms Adriana Vélazquez Berumen, greeted the SSC from WHO in Geneva and congratulated the Division for all its work. She said that in May 2023, the World Health Assembly had approved the resolution for *Increasing Diagnostics Capacity*, which gives us the mandate for our joint collaboration to support all of our Member States. In addition, the WHO-IAEA joint publication with the title *Sustainable Management of Radiotherapy Facilities and Equipment* has been welcomed by Member States. She explained that the increase in work to support cancer diagnosis and treatment with medical devices at the WHO meant they needed, more than ever, the technical support for the SSDLs provided for Member States by the Agency. The Rays of Hope programme and the Directory of Radiotherapy Centres (DIRAC) database were resources that will lead to successful outcomes for cancer treatment world-wide. She said that she looked forward to hearing the guidance from the SCC and would join the Committee again on Friday for the closing session.

The Chairman Mr Jan Seuntjens proposed that there were introductions around the table as some people present had not met previously. Each member of the Committee and each staff member present then introduced themselves, including Mehenna Arib who was unable to be present in person. The Chairman stated that the Committee would work hard during the week to make innovative and targeted recommendations for the DMRP's work within the NAHU Division and for the SSDL network. It was encouraging to learn that the previous report had assisted in planning for the current biennium and that the SSC-21 report will be welcomed to assist in the planning for the Agency programme and budget for next 2026/2027 biennium and perhaps beyond.

Turning to the agenda for the week, the Chairman highlighted some areas and accepted a proposal from a Committee member for an additional 30 minutes to be allocated for discussions around nuclear medicine and diagnostic imaging. The agenda was then duly adopted.

Mr Carrara suggested that the SSC-21 prioritize their recommendations into high and medium as previously as this was helpful. Any additional comments on the programme would also be acknowledged and implemented where appropriate. He explained that, once the SSC-21 report had been submitted and approved by the Director General (DG), the programme would be finalized, and its implementation could start as appropriate. He expressed his thanks to Jan Seuntjens for Chairing the meeting and to Penelope Allisy for acting as *Rapporteur*.

1.2 General discussion

1.2.1 Programme of the Meeting

The next item on the agenda was an overview of the DMRP sub-programme including the actions following the SSC-20 report and recommendations, which were included in the DMRP report that was sent to the SSC-21 in advance of the meeting. The overview presentation was made by Mr Carrara who outlined the successes towards implementing the recommendations of the previous SSC and the constraints that had prevented the implementation of some recommendations. He explained that the work in all three sub-programmes as well as developments in the SSDL Network would be presented by the relevant staff. Each of the staff presentations would be in three parts. Firstly, the staff would present the achievements in 2022/2023, followed by the activities planned for 2024/25 based on the SSC-20 report and finally their suggestions for what might be included in the SSC-21 report for the 2026-2027 biennium. He concluded the session by identifying the DMRP involvement in artificial intelligence (AI) as well as some overarching activities planned for the biennium. The remainder of the first day of the meeting, DMRP staff members presented reports on their activities and at the end of the day the Committee deliberated on the presentations and started to put together some recommendations. On the second day, the staff continued with presentations on the calibration and auditing services and on the DMRP cross-speciality activities. The SSC-21 then continued with their deliberations. On the third day there were presentations on the cross-sectional activities within NAHU including the comprehensive audits, and collaborative activities with other divisions including the Division of Radiation, Transport and Waste Safety (NSRW). The morning concluded with a special session on the Rays of Hope Agency initiative and the setting up of Anchor Centres. This was followed in the afternoon by presentations on the SSDL Network, and further deliberations by the Committee. In the evening there was a self-funded dinner for the Committee in which the staff also participated. This enabled general discussion and a significant interchange of ideas. The fourth day was allocated to a meeting of the Committee to consider all the work done by the DMRP and to produce a set of 27 prioritized recommendations and about the same number of good practice comments. These were then refined on the last day before being presented by the Chairman to the Director of NAHU Ms May Abdel-Wahab in the presence of the staff and Ms Adriana Velasquez Berumen. During the feedback, the Chairman of the SSC-21 thanked the DMRP staff on behalf of the whole committee, for the very full DMRP written report (submitted prior to the SSC-21 meeting), for

their carefully prepared presentations, with his emphasised approval for the new format and that he had particularly appreciated the engaging discussions about their work. Overall, he said how impressed the Committee had been with the fantastic achievements of the DMRP, the impact of which is often under-estimated. He said that one of the most important recommendations concerned the mission critical service of the dosimetry laboratory for Member States.

Ms May Abdel-Wahab responded that she appreciated the efforts of the SSC-21 in making the recommendations. She was pleased that some dynamic and positive thinking had been used to prioritise the recommendations but that these would need to be submitted to the budget programme and might require some hard negotiations. Regarding the AI recommendation she felt that having a CRP to provide more detail on the way forward for the Agency would be helpful, particularly in terms of educational guidance for Member States. She also understood that radionuclide therapy was certainly a gap that needed to be filled.

Ms Velazquez Berumen from the WHO said that she totally supported all the recommendations related to diagnostic radiology, and strongly recommended that radiotherapy support, particularly in the Anchor Centres should not go ahead without prior diagnostic imaging. She particularly supported the DMRP databases, which are much used by the WHO and stated that the WHO had links from their website to all the DMRP publications. She finished by saying that she would like to join in congratulating the DMRP for their work output and programme delivery.

Mr Carrara expressed his appreciation of the DMRP staff and for the recommendations which the staff felt had captured the essence of their forward thinking. The DMRP staff then presented David Burns with a token of their appreciation as this would be his last SSC meeting prior to his retirement from the BIPM.

Mr Seuntjens then closed the week's meeting.

1.2.2 Programme evaluation

In preparation for its report, the SSC-21 reviewed the activities reported by the DMRP for the 2022/23 biennium and noted the outcomes of some outstanding recommendations made by the SSC-17, SSC-18, SSC-19 as well as those of the SSC-20 for the current biennium. Of these recommendations, 45 had been closed or superseded and 38 were ongoing in the current programme leaving just 15 recommendations that had been paused or need further consideration to move forward. Only one recommendation was still outstanding from each of the SSC-17 and SSC-18 reports. Most importantly, during the week, the SSC heard from the DMRP staff regarding their achievements, present activities and future aspirations and then made some prioritized recommendations for the 2026/27 programme. The SSC-21 evaluation considered:

- The objectives of the sub-programme areas.
- The impact (benefit to the Member States).
- Opportunities to increase efficiency or reduce costs.
- The continuing relevance of Agency activities.

The 27 specific recommendations from the SSC-21 are identified throughout the text and are also listed, in just two priority categories of 14 high priority and 13 medium priority recommendations at the end of the report. Comments particularly with respect to good practice for specific aspects of the present and future DMRP sub-programme are made throughout the text and the more important comments on which action is expected are also listed at the end of the report.

2 INTRODUCTION TO THE SSC-21 REPORT

The SSC-21 expressed its thanks to the DMRP staff members for having prepared a comprehensive report covering the activities of the sub-programme on Dosimetry and Medical Radiation Physics during the biennium 2022/23. This report had been provided in advance of the meeting, in electronic format, thus enabling the Committee to develop relevant recommendations in a timely manner.

During the meeting, the SSC-21 appreciated the consistent style of the presentations made by the Section staff and found the three-slide format to be most helpful. To facilitate their subsequent use during discussions, it is suggested that the presentation file names relate to each session number according to their chronology in the agenda.

The DMRP Section objective is to support Member States in enhancing their capacity to implement radiation imaging and treatment modalities safely and effectively through optimized dosimetry and medical physics practice. To further this objective, the work of the Section is divided into three projects whose titles are:

- Project 2.2.4.1: Calibration and auditing services
- Project 2.2.4.2: Developments in radiation dosimetry
- Project 2.2.4.3: Clinical medical radiation physics for imaging and radiation therapy

This report of the SSC-21 follows the format established by previous reports and begins with a general discussion of administrative items and collaborative ventures within the Agency. The three project areas are then discussed in turn. In general, the report mentions only those activities of the DMRP Section for which the SSC-21 has comments or recommendations at present. **It should be noted that when a particular service provided by the DMRP is not mentioned specifically, the SSC-21 strongly endorses its continuation.**

The SSC-21 is particularly pleased to see the continuing support and involvement of the DMRP in

appropriate CRPs, and also the DMRP involvement in TC projects, noting that in 2022 there were some 330 projects within the TC programme that involved the use of radiation metrology and/or medical radiation physics. The SSC-21 noted that the Agency initiative to provide "cancer care for all" under the *Rays of Hope* initiative that had been introduced in 2022 is likely to need significant input from the Division.

A list of acronyms is given in the Appendix.

3 THE SSC-21 REPORT

3.1 General Organizational Items

The SSC-21 was pleased to learn about the progress made regarding previous recommendations. Only the proposed code of practice for the dosimetry of small composite fields in radiotherapy recommended by SSC-17 is still outstanding, with the other recommendations either completed or underway, some of which had been awaiting input from external bodies. The 24 recommendations from SSC-18 have either been completed or are in progress in the present biennium. It was also noted with satisfaction that the 34 recommendations of the SSC-19 are mostly completed or underway and only 6 have been paused, one of which is the CRP recommended on radiation metrology and advanced dosimetry that has not been funded. The SSC-21 was pleased to note that for the current biennium of 2024/2025, 16 of the recommendations of SSC-20 had been completed, 21 were underway in the present biennium and only 7 had been paused and needed further input from the SSC-21. The many comments provide by SSC-20 were noted by the DMRP as helpful to the programme.

The SSC-21 expressed the view that the quality and volume of work produced by the DMRP is impressive, thanks to the dedication and professionalism of the DMRP staff. The SSC-21 commends the work being undertaken in the current programme and supports all those activities that are not specifically mentioned in their recommendations and comments.

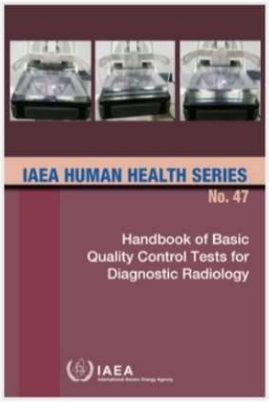
The Deputy Director General of Nuclear Applications, Ms Najat Mokhtar, and the Director of the NAHU, Ms May Abdel-Wahab, are thanked sincerely for the support they give to the DMRP programme and budget.

With regard to the organization of the SSC meeting by the Agency, the SSC-21 was pleased to have all the documents in electronic format only, noting the saving in resources. The video conferencing facilities were also used that enabled one Committee member to attend the meeting from his home country. The SSC-21 also welcomed the possibility to visit the Agency's archives on the Friday afternoon although not all the Committee members were able to profit from this interesting visit.

The SSC-21 really appreciated the consistent and more summary style of presentations by the Section staff during the meeting and endorsed this new format for future meetings as this had facilitated the understanding of the salient points for discussion. To facilitate discussion at future meetings, it is suggested that the Power Point presentation file names relate to each of the DMRP project number as well as the meeting session number, according to their chronology in the agenda.

Publications

The SSC-21 was very pleased to see all the efforts of the DMRP staff to develop and publish the work that they have completed. They noted the 12 Guidance documents, including the International Codes of Practice for brachytherapy dosimetry (TRS-492) and external beam radiotherapy (TRS-398 Rev. 1), 4 SSDL Newsletters and 9 peer-reviewed papers had been published in the last two years. These publications play a fundamental role in maintaining the safe and accurate delivery of radiation doses to patients in Member States and their timely publication is important. It was noted with pleasure that *The Handbook of Basic Quality Control Tests for Diagnostic Radiology* was the most downloaded publication of the Agency in 2023.



The SSC-21 is pleased to see that the backlog of guidance document publications seems to have been addressed and encourages the DMRP to continue liaising with the editorial system to streamline all publications.

Staffing

The SSC-21 recognizes that a great deal of DMRP staff effort is dedicated to supporting TC projects, as well as DMRP projects. We would like to acknowledge this considerable effort together with the addition of the *Rays of Hope* flagship initiative and congratulate the DMRP staff on their efforts to support all these endeavours.

The Dosimetry Laboratory is key to the DMRP programme with the services that it provides. The efficient and secure provision of calibration services by the DOL to Member States requires a continuity of expert calibration staff. A potential discontinuity in such provision would the risk of temporary removal ("greying out") of the IAEA CMCs registered in the CIPM Key Comparison Database (KCDB) and because of the consequences for the CMCs of the SSDLs, the SSC reiterates previous concerns raised over the staff rotation policy when applied to critical posts where on-site continuity of experience is essential. Consequently:

[R1] The SSC-21 **recommends** that the DMRP investigates all options to preserve the long-term continuity in dosimetry

expertise that is essential for the IAEA calibration and dosimetry audit services.

The SSC-21 welcomes the *Rays of Hope* initiative noting that its success relies partially on the contribution from DMRP, which together with an increasing number of TC projects is proving to be a non-negligible burden on the regular budget activities of the staff. The SSC-21 recognizes the efforts to bring extrabudgetary resources to support additional Medical Physicists working for DMRP. This should enable the DMRP to maintain its level of commitment to the Member States.

Databases

The DMRP databases (IDEA, DIRAC, SSDL, DOLNET, DAN) are vital to the functioning of the Section but the technology used is now over 12 years old. Consequently:

[R2] The SSC-21 reinforces its **recommendation** from SSC-20 that the DMRP develops a plan to transition its critical data repositories to a new database platform, for example a cloud-based solution, to allow these DMRP repositories (IDEA, DIRAC, SSDL, DOLNET, DAN) to be used effectively, securely and efficiently.

Education and Training

The SSC-21 is strongly supportive of the educational and training courses provided by the DMRP and of the publications that are such an important and visible feature of the work of the DMRP. The SSC-21 looks forward to the employment of a new Training Officer and **proposes** that a priority list of activities is prepared by the DMRP in readiness. Emphasis should be given to projects where materials are ready for deployment and the DMRP website should be promoted at every opportunity.

The SSC-21 is aware of copyright issues associated with training materials prepared by external experts. The SSC-21 **proposes** that the DMRP employs standard text requiring experts to provide copyright free materials and/or materials where copyright has already been granted, as part of good practice and that such requirements are strongly enforced.

The SSC-21 is pleased to see the DMRP activities regarding artificial intelligence (AI), e.g. the Training Course Series No.83 and the organization of the very successful ICTP course on the subject. Noting the importance of AI in medical physics, the SSC-21 **proposes** the integration of this successful AI ICTP curriculum into e-learning materials for Member States to use.

While it was noted that staff working in different areas of the DMRP do meet and discuss progress with projects, the SSC-21 **suggests** that care is taken regarding activities on cross-cutting technologies (e.g. AI, dosimetry) and also cross-cutting treatment modalities (e.g. theranostics) that involve all medical physics sub-specializations, to ensure that these are coordinated and streamlined across the DMRP.

The SSC-21 is pleased to see that IDOS is already being planned for 2026 and **proposes** that a special celebration of the 50 years of the SSDL Network is highlighted.

The SSC-21 is very supportive of DMRP hosting IAEA General Conference side-events to promote the importance of medical physicists to Member States as these events are raising awareness globally.

Collaborations

The SSC-21 strongly supports the DMRP in its collaborations with other sections within the Division, with other Divisions of the Agency as well as with appropriate external organizations. The provision of expert consultation and all these collaborations are seen to be an important part of the DMRP programme. The dedication of the staff in supporting TC projects is well recognized and the SSC-21 acknowledges this considerable input to the work of the Agency for its Member States.

The use of Big Data in radiation oncology calls into question the need for structured data initiatives for future AI applications using real-world data. In this context, it was previously recommended that a CM be organized between DMRP and ARBR with a group of experts to discuss possible Agency action on the definition and use of operational ontologies and Big Data in radiation oncology. Standardized, domain-specific ontology for oncology should integrate with existing databases or data systems and support the implementation of AI-driven analytics. Such effort should engage with international stakeholders, including clinicians, data scientists, and regulatory bodies, to ensure the ontology is comprehensive, clinically relevant, and compliant with global health data standards. The end goal is to enhance treatment personalization, improve patient outcomes, and facilitate knowledge sharing across the international community. The SSC-21 notes that a CM is planned in April 2024 on AI and big data that will shed light on the relevance of operational ontologies in oncology. The SSC-21 **suggests** that further action on this matter be planned after the outcome of the CM is known.

The SSC-21 welcomes the establishment of Anchor Centres under the *Rays of Hope* Agency initiative. In this context, the SSC-21 **proposes** that some Regional Designated SSDLs are associated with Anchor Centres to ensure that radiation metrology is included within the programme to provide a holistic approach for quality. Selection of the Regional Designated SSDLs to be associated with Anchor Centres should be based on criteria that need to be established.

The SSC-21 is pleased to note that the Rays of Hope initiative requires that Anchor Centres include all aspects of

multi-modal medical imaging as a pre-requisite before they are accepted as an Anchor Centre.

The SSC-21 supports the collection at the NAHU level of metrics and key performance indicators from Member States that will provide the Agency with quantified information on the cost-effectiveness of the various interventions on radiation medicine and nutrition.

The SSC-21 **proposes** that the DMRP works with the WHO to promote the use of the guidance document HHS 46 *Worldwide Implementation of Digital Mammography Imaging*. It would be useful to make a survey of the current situation in mammography imaging, thus obtaining information to support future decisions aimed at attaining the WHO Global Breast Cancer Initiative goals.

3.2 DMRP Projects

The SSC-21 reviewed the outcome of the previous biennium 2022/23, was pleased with the progress in the present biennium 2024/25 and has made a number of recommendations and comments for the biennium of 2026/27 as described here.

Project 2.2.4.1: Calibration and Auditing Services

This project is to enhance the capability of Member States in achieving quality and consistency in radiation measurements linked to the international measurement system and ultimately to the safe use of radiation for cancer patients. The project provides dosimetry audits of radiation beams at cancer centres and SSDLs, as well as calibrations of national reference dosimetry systems and inter-laboratory dosimetry comparisons. The Dosimetry Laboratory runs under a Quality Management System (QMS) supported by databases. Together with technical support for research, this project and its output thus ensures a traceable chain of measurements to the end-user in hospitals and cancer centres.

In the interests of efficiency, the effective use of resources and a reduction in duplication of effort:

[R3] the SSC-21 **recommends** that the DMRP collaborates with each appropriate RMO when planning a technical review of an SSDL to enable its QMS to be accepted in the framework of the CIPM MRA.

The SSC-21 strongly endorses the concept of arranging comparisons for field instruments to support SSDLs and **suggests** this is carried out at a national level for countries having more than one SSDL. This could be coordinated within regions maybe including RMOs. This would ensure a more frequent and structured organization of such comparisons,

[R4] Under the SSDL Charter that is being revised, the SSC-21 **recommends** that those SSDL Members who have undertaken a successful peer review, using competent independent technical reviewers, within the previous 5 years be identified as Peer-reviewed Members.

This will enable their CMCs to be included in the KCDB. The categories of Provisional Member (for an SSDL) and of Affiliated Member (for a PSDL) should be retained. This recommendation and the system to implement it needs to be incorporated in the revised SSDL Charter.

The SSC-21 strongly supports the concept of a Regionally Designated Centre for an SSDL that can then act as a focal point in updating the DMRP databases, in organizing training courses, hosting trainees and offering calibration services for the countries in the region that do not have an SSDL and is pleased to see that several such centres have already been established.

The SSC-21 endorses the proposal to incorporate electrometer calibration and comparisons into the new DMRP Database.

In view of the added dangers to patients if electron doses are inaccurate, the SSC-21 **encourages** the DOL to assess the feasibility of characterizing a small series of electron beam qualities, in collaboration with a PSDL, to fulfil requests from SSDLs to offer megavoltage electron beam dose verifications.

The SSC-21 **suggests** that members of the SSDL Network are notified e.g. by an SSDL Newsletter, that they are allowed to challenge the appointment of assessors who are not specialists in the field of radiation metrology.

[R5] The SSC-21 **recommends** establishing a system similar to the SSDL Charter for the DANs. This will enable formal recognition of the DANs. Once this system is in place, advocacy requiring the use of DANs may be considered but care should be taken so it does not become counter-productive.

[R6] Following the Consultants Meeting on radiotherapy audits the SSC-21 **recommends** that a new CRP be started using the virtual audit tools that were recommended, once the current CRP on brachytherapy audits is completed.

The SSC-21 **suggests** that the DMRP produce new QMS procedures for film dosimetry to support the QUATRO and IMRT processes that involve the DOL to ensure the credibility of these services.

The SSC-21 **proposes** that the diagnostic radiology multi-meters used for the QUAADRIL audits be calibrated at the DOL.

The SSC-21 **supports** the adaption of the remote IMRT audit methodology to use RPLDs in place of TLD.

[R7] The SSC-21 **recommends** that DMRP performs a sampling theory analysis to study the risk of reducing the frequency of Level 1 audits (Reference beam output) for historically successful institutions with the intention of creating bandwidth to perform a limited number of Level 3 audits (End-to-End) that are requested from the DMRP. At

the same time, the DMRP should conduct a *pilot study* where a limited number of Level 3 audits are performed over a two-year period *without* reducing the number of Level 1 audits. Based on the findings, a future SSC committee may recommend a suitable forward plan on the conduct of Level 3 audits.

Calibration data received by the DOL from an Affiliated laboratory show a degree of statistical variation that is problematic for the subsequent calibration of SSDL instruments at the DOL. The SSC-21 **proposes** that a methodology be adopted, analogous to the fitting method adopted for megavoltage photon beams, to reduce the impact of the observed statistical variations. While this might result in a small increase in the stated uncertainty of the calibration coefficients provided to the SSDLs, there will be a consequent gain in robustness and long-term reproducibility.

The SSC-21 recognises that the Agency supports the installation of linear accelerators for radiotherapy and stresses that 6 MV energies should not be prevented from being used while neutron dose reports for the higher photon energies are awaited. Consequently, the SSC-21 **proposes** that DMRP work jointly with NSRW to assist local regulators and medical physicists by providing e-learning materials on neutron dosimetry, detectors and measurement uncertainties.

Project 2.2.4.2 Developments in Radiation Dosimetry

This project contributes to international harmonization and consistency in radiation dosimetry while enhancing Member States' capabilities in the effective, efficient and safe use of current and future advanced radiation medicine technologies.

The SSC-21 is a strong advocate for the CRPs that support the DMRP's radiation dosimetry programme. Suggestions for doctoral topics include:

- Determining field size limits for irregular fields where TRS483 may not be valid.
- Studying the spectra of kV X-rays to determine if the beam quality index (HVL and kV) can be more accurately modelled than measured.
- Studying alpha-emitter dosimetry in radiopharmaceutical therapy applications.
- Testing dosimetry codes of practice in clinics.

[R8] Consequently, the SSC-21 **recommends** a new doctoral CRP in advanced radiation dosimetry/metrology research once the current doctoral CRP is completed.

Many modern, diagnostic radiology systems, e.g., for CT systems and mammography, provide dose indices to users without any independent verification.

[R9] The SSC-21 therefore **recommends** that guidelines for the verification and uncertainties associated with on-line dose indices from diagnostic radiology systems are produced together with supporting educational media where appropriate.

The SSC-21 **suggests** that once the CRP on dosimetry in diagnostic radiology is completed, the results and findings of the CRP should be used to support the update of Code of Practice TRS 457.

[R10] The SSC-21 **recommends** that DMRP work with professional societies (e.g. AAPM) to develop a dosimetry registry of factors for new ionization chambers not found in TRS 398 Rev.1. This can be achieved similarly to the AAPM's brachytherapy source registry, where prerequisites for sources are well-defined. A joint paper detailing the requirements for inclusion of chambers in the registry should be published.

The SSC-21 is **pleased** to see that a consultants' meeting will be convened to give guidance on calibration coefficients for well-type ionization chambers used in brachytherapy, such as 'high altitude' (low air pressure) corrections and source geometry corrections, as soon as the brachytherapy CRP is complete.

The Committee welcomes the publication of the revision of the Code of Practice TRS-398 for absorbed-dose determination in external-beam radiotherapy. Regarding the methods used in practice to evaluate the ion recombination correction in proton and light ion beam facilities, the SSC-21 **proposes** that the DMRP holds a Consultants' Meeting to review the relevant uncertainties. This would be with a view to a treatment of the ion recombination correction that is fully harmonized over the range of beam modalities covered by the Code of Practice.

The recently completed Revision 1 of the TRS-398 does not include recommendations for reference dosimetry in MRI-guided accelerator beams. Consequently,

[R11] The SSC-21 **recommends** that DMRP establishes a CM to produce a supplement to TRS-398 Rev 1 in collaboration with the AAPM TG-351 to address this absence of guidance.

The SSC-21 appreciates that the blue paper on plan-class specific reference field dosimetry (PCSR) will be published imminently. SSC-21 **suggests** that DMRP actively monitors the scientific activity following the publication of the PCSR blue paper and plans follow-up action with regards to future recommendations accordingly.

The accurate measurement of activity using radionuclide calibrators is essential to ensure the patient does not receive excessive dose and to ensure that sufficient activity is used to achieve the desired clinical outcome. This has become more critical with the growth of radiopharmaceutical therapies where the consequences of inaccurate activity measurements have more significance. Therefore:

[R12] The SSC-21 **strongly recommends** that DMRP set up a Consultants' Meeting to define a structure to enable

traceable activity measurements with radionuclide calibrators for Member States in accordance with Report TRS 454, using the SSDL Network where appropriate.

The existing IAEA publication TRS 454 Advancing QA in Nuclear Medicine Radioactivity Measurement is now almost 20 years old, but still covers topics relevant to Member States. Therefore:

[R13] The SSC-21 **recommends** that the DMRP updates IAEA publication TRS 454.

The SSC-21 is pleased with the ongoing publication of the revised SRS16 Calibration of Radiation Protection

Monitoring Instruments and **suggests** exploring mechanisms for testing the new version, once published, such as through CRPs, Doctoral CRPs, or research agreements with selected SSDLs.

The SSC-21 **suggests** that DMRP formulate consensus guidelines for clinical reference dosimetry and traceability for the calibration and clinical dosimetry of electronic brachytherapy sources, beta-emitting eye plaques and source model correction factors.

Project 2.2.4.3: Clinical Medical Radiation Physics and Quality Assurance

This project aims to achieve international harmonization in quality assurance in radiation medicine by enhancing the quality in the clinical practice of diagnosis and treatment using radiation in Member States.

The creation and implementation of new artificial intelligence (AI) tools in clinical practice will affect all sub-specializations of medical physics. With the completion of the document "Clinical implementation of medical imaging-based artificial intelligence tools – Guidelines for medical physicists" the roles and responsibilities of medical physicists are outlined. These AI tools are now entering clinical practice, therefore:

[R14] The SSC-21 **recommends** that a CRP be set up to evaluate and test the recommendations of the report on "Clinical implementation of medical imaging-based artificial intelligence tools – Guidelines for medical physicists".

The SSC-21 celebrates the ongoing success of QUATRO and QUAADRIL audits, particularly the significant growth of QUAADRIL audit requests.

The SSC-21 commends the ongoing success of the QUANUM audit process and proposes that the DMRP is actively involved in this process.

The SSC-21 strongly **encourages** the DMRP to digitise the processes for the QUATRO, QUAADRIL and QUANUM audits and to harmonize the format of the reports to facilitate the analysis of the results.

[R15] The SSC-21 **recommends** the ongoing promotion of these audit activities, particularly through inter-regional TC projects, which are key to the safe and effective use of ionizing radiation in Member States.

[R16] To facilitate the implementation of audits, particularly in Latin-America, the SSC-21 **recommends** that the Second Edition of QUATRO be translated into Spanish.

[R17] The SSC-21 strongly **recommends** that SHANE IMRT be offered as a standard option in QUATRO audits.

The SSC-21 strongly **supports** continuing the revision of the Radiation Oncology Physics Handbook and the preparation of a handbook on Foundations of Radiation Physics. Once the draft of the handbook on foundations is ready, the revision of the Diagnostic Radiology Physics and Nuclear Medicine Physics Handbooks should be completed. To facilitate the transfer of knowledge from these publications to medical physicists working in the Member States:

[R18] The SSC-21 **recommends** that presentation materials be updated and prepared together with the publication of all four radiation Physics Handbooks.

The SSC-21 **proposes** that the DMRP continues to work closely with ICTP and Trieste University to provide a post-graduate framework that results in the recognition of the role and work of radiation metrologists in assuring traceability of radiation measurements for the safety of patients. This could be based on the Medical Physics Masters course supplemented by specialised lectures on radiation metrology provided by the DMRP appointed lecturers (and potentially endorsed by BIPM/CCRI and RMOs) and include formally evaluated competency training at the DOL, the ENEA, or another PSDL/SSDL.

The possibility of enhanced educational provision via video and other media offers the DMRP the opportunity to provide educational material for Member States in ways not previously possible.

[R19] The SSC-21 **recommends** that videos and other educational materials on quality control techniques for both SPECT and CT continue to be created. This should include techniques involved with radiopharmaceutical therapy such as quantitative SPECT calibration and set-up.

The SSC-21 appreciates the rapid developments in the field of radiopharmaceutical therapy and sees excellent guidance available in the literature. However, some new guidance from the Agency is now required to better serve the needs of Member States and complement already published guidance. Consequently:

[R20] The SSC-21 **recommends** that R21 of SSC-20 be refocussed into providing guidance on the minimum requirements to implement a radiopharmaceutical therapy service successfully, with a roadmap towards improved tiers of service provision.

Monte Carlo simulation for gamma camera and SPECT imaging is a valuable tool for optimization, harmonization, and quality assurance of imaging processes. Therefore:

[R21] The SSC-21 **recommends** that E-learning materials be created on how to use Monte Carlo simulations for gamma cameras and SPECT.

Comprehensive quality management in radiation oncology involves all professions that form part of the radiation oncology service delivery, including therapists, physicists, and radiation oncologists to come together around a comprehensive quality and safety management programme. To provide the best support to Member States:

[R22] The SSC-21 **recommends** that DMRP collaborates with ARBR to organize a CM with the goal of producing a document providing guidance to the radiation oncology community on comprehensive quality management systems.

[R23] The SSC-21 **recommends** that DMRP and ARBR collaborate to update and extend the IAEA Human Health Report 7, "Record and Verify Systems for Radiation Treatment of Cancer: Acceptance Testing, Commissioning and Quality Control" to cover functionality, acceptance, commissioning, and quality control of a radiation oncology information system.

Considering the possible introduction of advanced technologies in Member State radiotherapy facilities, the SSC-21 **encourages** the DMRP to work with ARBR in providing comprehensive guidance documents on the relevance of advanced technology implementation. These guidance documents should include but are not limited to particle radiotherapy, SBRT/SRS radiotherapy, and MRI- or CT-guided adaptive radiotherapy including ring-based linacs.

The SSC-21 recognizes that there is limited understanding of diagnostic radiology patient dosimetry and dosimetry computational tools in Member States. Therefore: [R24] The SSC-21 **recommends** that the DMRP composes a guidance document on dosimetric computational tools in diagnostic radiology together with the appropriate applications and use for these tools.

With all the advances in X-ray imaging modalities, there is a need to develop quality assurance practices, including methods for image quality characterization, aligned with the more recent imaging technologies. After completion of the CRP E24025 "Advanced Tools for Quality and Dosimetry of Digital Imaging in Radiology":

[R25] the SSC-21 **recommends** setting up a CRP that will address advanced performance assessment methods and tools, image quality metrics and performance indicators in X-ray imaging modalities.

Dental and maxillofacial radiology is an important specialism in Member States. Recognising this:

[R26] The SSC-21 **recommends** that a guidance document on QA in X ray imaging modalities in dental and maxillofacial radiology is produced, to include dental cone beam CT.

Cone beam CT outside dental applications, and dual energy and spectral CT are growing in reach in Member States. To support the member States:

[R27] The SSC-21 **recommends** that a guidance document on the quality control of all new CT technologies should be written within the biennium.

4 Summary of SSC-21 Recommendations

4.1 High Priority Recommendations

[R1] The SSC-21 **recommends** that the DMRP investigates all options to preserve the long-term continuity in dosimetry expertise that is essential for the IAEA calibration and dosimetry audit services.

[R2] The SSC-21 reinforces its **recommendation** from SSC-20 that the DMRP develops a plan to transition its critical data repositories to a new database platform, for example a cloud-based solution, to allow these DMRP repositories (IDEA, DIRAC, SSDL, DOLNET, DAN) to be used effectively, securely and efficiently.

[R3] In the interests of efficiency, the effective use of resources and the reduction in duplication of effort, the SSC-21 **recommends** that the DMRP collaborates with each appropriate RMO when planning a technical review of an SSDL to enable its QMS to be accepted in the framework of the CIPM MRA.

[R4] Under the SSDL Charter that is being revised, the SSC-21 **recommends** that those SSDL Members who have undertaken a successful peer review, using competent independent technical reviewers, within the previous 5 years be identified as Peer-reviewed Members, which will enable their CMCs to be included in the KCDB.

[R7] The SSC-21 **recommends** that DMRP performs a sampling theory analysis to study the risk of reducing the frequency of Level 1 audits (Reference beam output) for historically successful institutions with the intention of creating bandwidth to perform a limited number of Level 3 audits (End-to-End) that are requested from the DMRP.

[R8] The SSC-21 strongly **recommends** a new doctoral CRP in advanced radiation dosimetry/metrology research once the current doctoral CRP is completed.

[R12] The SSC-21 **strongly recommends** that DMRP set up a Consultants Meeting to define a structure to enable traceable activity measurements with radionuclide calibrators for Member States in accordance with Report TRS 454[R13], using the SSDL Network where appropriate.

[R13] The SSC-21 **recommends** that the DMRP updates IAEA publication TRS 454.

[R14] The SSC-21 **recommends** that a CRP be set up to evaluate and test the recommendations of the report on

"Clinical implementation of medical imaging-based artificial intelligence tools – Guidelines for medical physicists".

[R15] The SSC-21 **recommends** the ongoing promotion of the Quality Assurance audit activities, particularly through inter-regional TC projects, which are key to the safe and effective use of ionizing radiation in Member States.

[R17] The SSC-21 strongly **recommends** that SHANE IMRT be offered as a standard option in QUATRO audits.

[R18] The SSC-21 **recommends** that presentation materials be updated and prepared together with the publication of all four radiation Physics Handbooks.

[R20] The SSC-21 **recommends** that R21 of SSC-20 be refocussed into providing guidance on the minimum requirements to implement a radiopharmaceutical therapy service successfully, with a roadmap towards improved tiers of service provision.

[R25] the SSC-21 **recommends** setting up a CRP that will address advanced performance assessment methods and tools, image quality metrics and performance indicators in X-ray imaging modalities.

4.2 Medium Priority Recommendations

[R5] The SSC-21 **recommends** establishing a system similar to the SSDL Charter for the DANs. This will enable formal recognition of the DANs. Once this system is in place, advocacy requiring the use of DANs may be considered but care should be taken so it does not become counter-productive.

[R6] Following the Consultants Meeting on radiotherapy audits the SSC-21 **recommends** that a new CRP be started using the virtual audit tools that were recommended, once the current CRP on brachytherapy audits is completed.

[R9] The SSC-21 **recommends** that guidelines for the verification and uncertainties associated with on-line dose indices from diagnostic radiology systems are produced together with supporting educational media where appropriate.

[R10] The SSC-21 **recommends** that DMRP work with professional societies to develop a dosimetry registry of factors for new ionization chambers not found in TRS 398.

[R11] The SSC-21 **recommends** that DMRP establishes a CM to produce a supplement to TRS-398 Revision 1 in collaboration with the AAPM TG-351 to address the absence of guidance for reference dosimetry in MRI-guided accelerator beams.

[R16] To facilitate the implementation of audits, particularly in Latin-America, the SSC-21 **recommends** that the Second Edition of QUATRO be translated into Spanish.

[R19] The SSC-21 **recommends** that videos and other educational materials on quality control techniques for both SPECT and CT continue to be created. This should include techniques involved with radiopharmaceutical therapy such as quantitative SPECT calibration and set-up.

[R21] The SSC-21 **recommends** that E-learning materials be created on how to use Monte Carlo simulations for gamma cameras and SPECT.

[R22] The SSC-21 **recommends** that DMRP collaborates with ARBR to organize a CM with the goal of producing a document providing guidance to the radiation oncology community on comprehensive quality management systems.

[R23] The SSC-21 **recommends** that DMRP and ARBR collaborate to update and extend the IAEA Human Health Report 7, "Record and Verify Systems for Radiation Treatment of Cancer: Acceptance Testing, Commissioning and Quality Control" to cover functionality, acceptance, commissioning, and quality control of a radiation oncology information system (ROIS).

[R24] The SSC-21 **recommends** that the DMRP composes a guidance document on dosimetric computational tools in diagnostic radiology together with the appropriate applications and use for these tools.

[R26] the SSC-21 **recommends** that a guidance document on QA in X ray imaging modalities in dental and maxillofacial radiology is produced, to include dental cone beam CT.

[R27] The SSC-21 **recommends** that a guidance document on the quality control of all new CT technologies should be written within the biennium.

4.3 Good Practice Comments

- The SSC-21 is pleased to see the DMRP activities regarding artificial intelligence (AI), e.g. the Training Course Series No.83 and the organization of the very successful ICTP course on the subject. Noting the importance of AI in medical physics, the SSC-21 **proposes** the integration of this successful AI ICTP curriculum into e-learning materials for Member States to use.
- The SSC-21 is pleased to see that IDOS is already being planned for 2026 and **proposes** that a special celebration of the 50 years of the SSDL Network is highlighted.
- The SSC-21 welcomes the establishment of Anchor Centres under the *Rays of Hope* Agency initiative. In this context, the SSC-21 **proposes** that some Regional Designated SSDLs are associated with Anchor Centres to ensure that radiation metrology is included within the programme to provide a holistic approach for quality.
- The SSC-21 **proposes** that the DMRP works with the WHO to promote the use of the guidance document HHS 46 *Worldwide Implementation of Digital Mammography Imaging*. It would be useful to make a

survey of the current situation in mammography imaging, thus obtaining information to support future decisions aimed at attaining the WHO Global Breast Cancer Initiative goals.

- In view of the added dangers to patients if electron doses are inaccurate, the SSC-20 **encourages** the DOL to assess the feasibility of characterizing a small series of electron beam qualities, in collaboration with a PSDL, to fulfil requests from SSDLs to offer megavoltage electron beam dose verifications.
- The SSC-21 **proposes** that the diagnostic radiology multi-meters used for the QUAADRIL audits be calibrated at the DOL.
- Calibration data received by the DOL from an Affiliated laboratory show a degree of statistical variation that is problematic for the subsequent calibration of SSDL instruments at the DOL. The SSC-21 **proposes** that a methodology be adopted, analogous to the fitting method adopted for megavoltage photon beams, to reduce the impact of the observed statistical variations.
- The SSC-21 recognises that the Agency supports the installation of linear accelerators for radiotherapy and stresses that 6 MV energies should not be prevented from being used while neutron dose reports for the higher photon energies are awaited. Consequently, the SSC-21 **proposes** that DMRP work jointly with NSRW to assist local regulators and medical physicists by providing e-learning materials on neutron dosimetry, detectors and measurement uncertainties.
- Regarding the methods used in practice to evaluate the ion recombination correction in proton and light ion beam facilities, the SSC-21 **proposes** that the DMRP holds a Consultants' Meeting to review the relevant uncertainties. This would be with a view to a treatment of the ion recombination correction that is fully harmonized over the range of beam modalities covered by the Code of Practice.
- The SSC-21 strongly **encourages** the DMRP to digitise the processes for the QUATRO, QUAADRIL and QUANUM audits and to harmonize the format of the reports to facilitate the analysis of the results.
- The SSC-21 strongly **supports** continuing the revision of the Radiation Oncology Physics Handbook and the preparation of a handbook on Foundations of Radiation Physics.
- The SSC-21 **proposes** that the DMRP continues to work closely with ICTP and Trieste University to provide a post-graduate framework that results in the recognition of the role and work of radiation metrologists in assuring traceability of radiation measurements for the safety of patients.

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Appendix of Acronyms

AI	Artificial Intelligence
ARBR	Applied Radiation Biology and Radiotherapy
BIPM	Bureau international des poids et mesures (International Bureau of Weights and Measures)
CIPM	Comité international des poids et mesures (International Committee for Weights and Measures)
CM	Consultancy Meeting
CMC	Calibration and Measurement Capability
CRP	Coordinated Research Project
CT	Computed Tomography
DMRP	Dosimetry and Medical Radiation Physics
DAN	Dosimetry Audit Network
DOL	Dosimetry Laboratory
ENEA	Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile (Italian National Agency for New Technologies, Energy and Sustainable Economic Development)
HVL	Half-Value Layer
ICRU	International Commission on Radiation Units and Measurements
ICTP	International Centre for Theoretical Physics
IMRT	Intensity modulated Radiation Therapy
KCDB	Key Comparison Database
MRA	Mutual Recognition Agreement
NAHU	Division of Human Health
NSRW	Division of Radiation, Transport and Waste Safety
PSDL	Primary Standards Dosimetry Laboratory
QA	Quality Assurance
QMS	Quality Management System
QUAADRIL	Quality Improvement Quality Assurance Audit for Diagnostic Radiology Improvement and Learning
QUANUM	Quality Management Audits in Nuclear Medicine Practices
QUATRO	Quality Improvement Quality Assurance Team for Radiation Oncology
RMO	Regional Metrology Organization
RPLD	Radiophotoluminescent Dosimeter
SPECT	Single-Photon Emission Computed Tomography
SSDL	Secondary Standards Dosimetry Laboratory
TC	Technical Cooperation
TLD	Thermoluminescent dosimeter

Interns of the DMRP 2024

Hajir Al Siyabi (Oman): During my internship at the IAEA Dosimetry Laboratory within the DMRP section, I contributed to the development and workflow of the IAEA-supported End-to-End audit program for dose delivery checks in IMRT/VMAT, particularly for head and neck cancer patients. Additionally, I worked extensively with film dosimetry. This experience significantly enhanced my skills in dosimetry audits, data management, and quality assurance, which I look forward to applying in my future career in medical physics.

Sana Khalid (Pakistan): During my internship at the IAEA Dosimetry Laboratory within the DMRP section, I gained valuable experience in the field of medical physics. I had the opportunity to enhance my knowledge and technical skills. My role allowed me to engage in various projects, from updating database to supporting audit services to participating in the testing of new audit techniques. This experience deepened my understanding of medical physics applications and provided insights into how international organizations contribute to healthcare development. Overall, my internship was a rewarding learning experience, helping me grow professionally while preparing me for future challenges in the field.

Weiguang Li (China): I am delighted to have joined the DMRP section for this internship. As part of the IAEA's Directory of Radiotherapy Centre (DIRAC) team, I contributed to the database's development by assisting with data collection and organization, ensuring the database was refreshed with the latest information on institutions and treatment units. I also collaborated with related groups in radiation therapy within the IAEA. These experiences have deepened my understandings of cutting-edge radiation therapy technologies, enriched my medical physics knowledge, and enhanced my expertise through working with renowned experts in the field.

Yasmine Joy Labagnoy (Philippines): As an SSDL Intern at the IAEA's Headquarters, it was interesting to view dosimetry from an international and diplomatic perspective. This helped me appreciate just how globally impactful the work of a medical physicist is. Among my tasks were daily database maintenance, collaboration with SSDL professionals across the globe, and assistance in reviewing important IAEA publications. Throughout the course of the year, I've gained essential organizational skills that will prove useful in my career moving forward, as well as lifelong friends! I'm happy to have contributed to cancer alleviation in my own way through this internship.

Dina Moseti (Kenya): Working at the IAEA under the DMRP section, I have gained first-hand experience in how data can significantly enhance global access to radiotherapy infrastructure, particularly in low- and middle-income countries. My role while working with the DIRAC team involved database management and assisting in reviewing IAEA publications adopted in radiotherapy. I was also tasked with the review and management of publications referring to DIRAC focusing on health economics, quality assurance, dosimetry audits, and radiotherapy delivery outcomes. Through expert and consultancy meetings, I have also had the opportunity to engage with international experts in the field of medical physics broadening my knowledge and scope to implement in my future career as a clinical medical physicist.

Figure 2. Interns from the DMRP section in 2024

IAEA Publications in the Field of Dosimetry and Medical Physics (2023–2024)

Education of Radiation Metrologists for Secondary Standards Dosimetry Laboratories (**Training Course Series No. 76**), February 2023
Education of Radiation Metrologists for Secondary Standards Dosimetry Laboratories | IAEA

Handbook of Basic Quality Control Tests for Diagnostic Radiology, (**IAEA Human Health Series No. 47**), February 2023
Handbook of Basic Quality Control Tests for Diagnostic Radiology | IAEA

Establishing a Secondary Standards Dosimetry Laboratory, (**IAEA Human Health Series No. 44**), March 2023
Establishing a Secondary Standards Dosimetry Laboratory | IAEA

SSDL Newsletter Issue No. 77, May 2023
SSDL Newsletter Issue No. 77, May 2023 | IAEA

National Networks for Radiotherapy Dosimetry Audits IAEA (**Human Health Reports No. 18**), June 2023
National Networks for Radiotherapy Dosimetry Audits | IAEA

Guidelines on Professional Ethics for Medical Physicists, (**Training Course Series No. 78**), June 2023
Guidelines on Professional Ethics for Medical Physicists | IAEA

Worldwide Implementation of Digital Mammography Imaging (**IAEA Human Health Series No. 46**), October 2023
Worldwide Implementation of Digital Mammography Imaging | IAEA

Artificial Intelligence in Medical Physics: Roles, Responsibilities, Education and Training of Clinically Qualified Medical Physicists (**Training Course Series No. 83**), November 2023
Artificial Intelligence in Medical Physics | IAEA

SSDL Newsletter Issue No. 78 December 2023
SSDL Newsletter Issue No. 78, December 2023 | IAEA

Dosimetry in Brachytherapy – An International Code of Practice for Secondary Standards Dosimetry Laboratories and Hospitals (**Technical Reports Series No.492**), December 2023
Dosimetry in Brachytherapy – An International Code of Practice for Secondary Standards Dosimetry Laboratories and Hospitals | IAEA

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 (Rev. 1)**), February 2024
Absorbed Dose Determination in External Beam Radiotherapy | IAEA

Dosimetry for Radiopharmaceutical Therapy, April 2024
Dosimetry for Radiopharmaceutical Therapy | IAEA

SSDL Newsletter Issue No. 79, May 2024
SSDL Newsletter Issue No. 79, May 2024 | IAEA

Courses, Meetings and Consultancies in **2025**

TC Courses and Workshops related to DMRP activities

- RAS6101: Regional Training Course on Medical Physics Clinical Training Programmes, Hanoi, Vietnam, 6 – 10 January 2025
- LEB0010: LEB TC Programme Review and Coordination Meeting, Vienna, Austria, 13 – 17 January 2025
- ANG6011: National Training Course on HDR Brachytherapy, Luanda, Angola, 13 – 17 January 2025
- RLA9093: Regional Meeting on the Thematic Safety Area: Occupational Radiation Protection and Secondary Standards Dosimetry Laboratories (SSDLs), Recife, Brazil, 20 – 24 January 2025
- RAS6109: Regional Workshop on the Role of the Medical Physicist in Quality Management of Radiology Departments, Chiang Rai, Thailand, 27 – 31 January 2025
- RAF6060: Regional Training Course on Nuclear Medicine Therapy including Advanced Techniques, Pretoria, South Africa, 20 – 24 January 2025
- ANG6011: National Training Course on Quality Control and Dosimetry, Luanda, Angola, 24 – 28 February 2025
- RLA6091: Regional Training Course on Good Practices in Clinical Nuclear Medicine Physics, Guatemala City, Guatemala, 3 – 7 March 2025
- RAF6060: Regional Training Course on Women Cancers from Diagnosis to Treatment, Tunis, Tunisia 14 – 18 April 2025
- RLA6091: Regional Training Course on Good Practices in Diagnostic Radiology, Guatemala City, Guatemala, 3 – 7 March 2025
- RAF6060: Regional Training Course on Multidisciplinary Approach of Diagnosis and Treatment of women cancers, Tunis, Tunisia, May 2025
- RAS6099, Regional Training Course on quality and safety in diagnostic radiology, Auckland, New Zealand, Q2 2025
- MEX6014, National Training Course on Monte Carlo Programming and Simulation of medical applications for medical physicists, Mexico City, Mexico, Q1 2025
- RLA6088: TC Regional Training Course on quality control for medical physicists, biomedical engineers and radiographers, Georgetown, Guyana, TBD
- MAR6017: National Training Course on Radiopharmaceutical Therapies, Port Louis, Mauritius, TBD

Training courses and ESTRO Courses

- RER6040: TC Training Course on Advanced TPS algorithm commissioning and validation, Seibersdorf, Austria, 3 – 7 March 2025
- Joint ICTP–IAEA Workshop on Quality Assurance and Dosimetry in X-ray Breast Imaging, Trieste, Italy, 26 – 30 May 2025
- Joint IAEA and Argonne National Laboratory Course on Internal Dosimetry in Radiopharmaceutical Therapy, Houston, TX, United States of America, Q2 2025
- Joint ICTP–IAEA Workshop on Reference Dosimetry for External Beam Radiotherapy and Brachytherapy, Trieste, Italy, 3 – 7 November 2025
- Joint IAEA and Argonne National Laboratory Course on Quality Assurance and Dosimetry in Fluoroscopically Guided Procedures, 1 – 5 December 2025

DMRP Meetings and Consultancies

- Consultancy Meeting on Update of the Diagnostic Radiology Physics: A Handbook for Teachers and Students, Vienna, Austria, 17 – 21 February 2025
- First Research Coordination Meeting on Doctoral CRP in Advanced Dosimetry and Radiation Metrology, Vienna, Austria, 7 – 11 April 2025
- First Research Coordination Meeting on Advanced Tools for Education, Audit and Quality Assurance in Radiopharmaceutical Therapy Dosimetry, Vienna, Austria, Q2
- Second Technical Meeting of Dosimetry Audit Networks, Vienna, Austria, 9 – 12 June 2025
- Third Research Coordination Meeting on Evaluation of the Dosimetry Needs and Practices for the Update of the Code of Practice for Dosimetry in Diagnostic Radiology (TRS-457), Vienna, Austria, Q3/4
- Third Research Coordination Meeting on Development of Methodology for Dosimetry Audits in Brachytherapy, Vienna, Austria, TBD
- First Research Coordination Meeting on Establishing a Sustainable Network for Data Collection in Radiation Medicine, Vienna, Austria, TBD

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