NEWSLETTER

August 2026

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ALFIM

42 Years Strengthening Medical Physics in Latin America

ALFIM celebrates its 42nd anniversary

- Friday, July 17
- 4 keynote lectures
- Time: 3:00 – 7:00 pm
- Time zone: America/Guatemala
- Join us on Google Meet

"Celebrating 42 Years Promoting the Development of Medical Physics in Latin America"

ÍNDICE

Editorial

Forty-two years ago, ALFIM was founded on the conviction that Latin American cooperation would strengthen the development of medical physics. Today, that vision not only remains relevant, but has evolved into a community spanning seventeen countries, demonstrating that borders are not an obstacle when there is a shared objective: to contribute to safer, more accurate, and higher-quality healthcare for our patients.

Each of our countries has its own distinct realities. We face different challenges, have varying levels of resources, and progress at different rates. Nevertheless, we share the same professional responsibility and the same ethical commitment. This is precisely why ALFIM exists: to bring us closer together, to learn from one another, to create educational and professional development opportunities, to promote collaborative projects, and to provide a regional voice for Latin American medical physics.

We are living through a transformative period in our profession, in which artificial intelligence, emerging treatment modalities, precision medicine, and technological innovation are changing the way we practice. These advances represent significant opportunities, but they also require us to remain current, strengthen our professional competencies, and educate new generations of medical physicists with a scientific, critical, and deeply human perspective.

We are convinced that the future of ALFIM must be built upon three pillars: integration, excellence, and innovation. Integration, to continue growing as a Latin American community; excellence, to uphold the highest professional standards; and innovation, so that our region not only adopts technological advances, but also contributes to their development.

The strength of ALFIM lies neither in its name nor in its history; it lies in the people who comprise it and in the work we undertake together, day after day, to advance medical physics throughout our region.

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ALFIM Celebrated Its 42nd Anniversary with an International Academic Program

As part of the commemoration of the 42nd anniversary of the Latin American Association of Medical Physics (ALFIM), a virtual academic program was held on July 17 to commemorate the establishment of the Association, which took place on July 18, 1984, during the 26th Annual Meeting of the *American Association of Physicists in Medicine* (AAPM).

The event brought together distinguished professionals who presented topics across various areas of medical physics. Dr. Simone Kudlulovich Renha delivered the lecture "*Photon Counting CT*: A New Era in Medical Imaging," addressing the potential of this technology to transform the acquisition and quality of medical images.

M.Sc. Marco Morales presented the topic "Glucose-Coated FeO@Fe_3O_4 Nanoparticles for ROS Generation and Safety Assessment in a 3D In Vitro Hepatic Model," highlighting advances in applied research and nanotechnology with potential biomedical impact.

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Finally, Dr. Mauro Namías delivered the lecture “Beyond Dose: What Factors Influence Response to Cancer Treatment?”, providing a comprehensive perspective on the biological and clinical determinants of therapeutic response.

The program was conducted virtually and brought together colleagues from several Latin American countries, reflecting ALFIM’s ongoing commitment to continuing education, scientific updating, and the strengthening of the regional medical physics community.

The ALFIM Executive Council extends its sincere gratitude to the speakers for sharing their expertise and knowledge, as well as to all participants whose contributions made this academic commemoration a success.

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ASOCIACIÓN LATINOAMERICANA DE FÍSICA MÉDICA
ALFIM

LIVING MEMORY OF LATIN AMERICAN MEDICAL PHYSICS

Dr. Caridad (Cari) Borrás

Pioneer, mentor and builder of the Latin American medical physics community.

> *Her legacy continues to live in every medical physicist trained, in every strengthened service, and in every patient benefited by safer and higher quality care.*

TIMELINE

1964 — She earns a degree in Sciences (Physics Section) from the University of Barcelona and begins her career as a medical physicist at the Santa Creu i Sant Pau Hospital in Barcelona.

1974 — She earns a PhD in Physics from the University of Barcelona, having completed her doctoral thesis on radiobiology at Thomas Jefferson University in Philadelphia, PA (USA), with a Fulbright scholarship.

1970s–1980s — She develops, through the West Coast Cancer Foundation, pioneering Quality Assurance programs in Diagnostic Radiology in hospitals in Northern California, promoting the role of medical physicist in this field.

1984 — She promotes the creation of the Latin American Association of Medical Physics (ALFIM), strengthening regional scientific cooperation.

KEY ACHIEVEMENTS

1988–2000 — Regional Advisor for the Radiology and Radiological Protection Program of the Pan American Health Organization / World Health Organization (PAHO/WHO). Leads initiatives in radiological protection, professional training and strengthening of radiology and radiotherapy services in Latin America and the Caribbean.

1996–1997 — She drives the publication of PAHO/WHO's reference book on organization, quality assurance and radiological protection of radiology and radiotherapy services and promotes the implementation of the International Basic Safety Standards (BSS) published by the International Atomic Energy Agency (IAEA) in 1996.

2000–2002 — Coordinator of Essential Medicines and Health Technology at PAHO/WHO.

2009–2011 — Visiting Researcher / Guest Professor at the Federal University of Pernambuco, Recife, Brazil.

Present — She continues to promote education, radiological safety and the development of Medical Physics worldwide as an international consultant and editor of books on imaging in health centers (2017) and on emerging health technologies (2024–2026).

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LIVING MEMORY OF LATIN AMERICAN MEDICAL PHYSICS

LEADERSHIP THAT TRANSFORMED REALITIES

- Promoted the recognition of the medical physicist as an essential professional for quality and safety in health services.
- Promoted the creation and strengthening of national societies and of the Latin American medical physics community.
- Led training programs in radiological protection, quality assurance and human resource development.
- Consolidated a cooperation network among PAHO, IAEA, ALFIM and scientific societies in the region, leaving a legacy of collaboration.
- Advised health ministries and professional societies in Latin America and the Caribbean on the need for greater alignment, with medical physicists and radiological protection experts to ensure quality.
- She has numerous scientific publications, including three books: among them, *Radiodiagnostics: A Primer for Medical Physicists*, published in two volumes.
- She has organized and participated in more than 300 courses and congresses, most of them in Latin America and the Caribbean.
- Actively participated in the development of the Basic Safety Standards (BSS), published in 2014 under the auspices of the European Commission, the United Nations for Agriculture and Food (FAO), the IAEA, the OECD Nuclear Energy Agency, PAHO, WHO, and the United Nations Environment Programme.
- Member of committees and working groups of prestigious professional and international organizations, including AAPM, ACR, ABR, IOMP, IUPESM and Health Physics Society.

ACADEMIC AND INTERNATIONAL ACTIVITIES

- Visiting Assistant Professor at the George Washington University, School of Medicine, in Washington D. C. (USA), and consultant for IAEA, PAHO, WHO, and other international organizations.
- Professional participation and recognition in organizations such as IUPESM, American College of Radiology (ACR), American Board of Radiology (ABR), and Health Physics Society (HPS), among others.

AWARDS AND DISTINCTIONS

- ★ Gold Medal of the Spanish Society of Medical Physics (2003).
- ★ Merit Award from IUPESM (2012).
- ★ Edith H. Quimby Lifetime Achievement Award from the AAPM (2013).
- ★ Nominated by the IOMP as one of the "50 Outstanding Medical Physicists during the Period 1963–2013".
- ★ "Fellow" Distinction from ACR, AAPM, IOMP, IUPESM and HPS (1987–2020).
- ★ Recognitions from ALFIM in Ciudad de México, Mexico (1998); Caracas, Venezuela (2002); and Cartagena de Indias, Colombia (2007).

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MEMORY OF THE LATIN AMERICAN MEDICAL PHYSICS

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OUTSTANDING NEWS

- Promote quality, safety and professional training is the cornerstone for the health of all.
- Imposed the development and application of the Basic International Safety Standards (BSS) in the region.
- Formed generations of medical physics and strengthened the Latin American community.
- Its integrative vision consolidated cooperation between institutions, scientific societies and international organizations.

ITS LEGACY

Dr. Caridad Borrás is one of the most influential figures in the consolidation of Medical Physics in Latin America and the Caribbean. Her leadership in the training of professionals, the strengthening of radiological protection, the implementation of quality assurance programs and international cooperation, leaving a scientific and human legacy that continues to inspire new generations.

> *"A living memory does not only record:*
> *it transmits knowledge, inspires vocations and strengthens a scientific community."*

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LIVING MEMORY OF LATIN AMERICAN MEDICAL PHYSICS

FEATURED NEWS

Promoting quality, safety and professional training means promoting health and dignity for all.

Promoted the elaboration and implementation of the International Basic Safety Standards (BSS) in the region.

Trained generations of medical physicists and strengthened the Latin American community.

Her integrative vision consolidated cooperation among institutions, scientific societies and international organizations.

HER LEGACY

Dr. Caridad Borrás is one of the most influential figures in the consolidation of Medical Physics in Latin America and the Caribbean. Her leadership promoted the **training of professionals**, the strengthening of **radiological protection**, the implementation of **quality assurance programs** and **international cooperation**, leaving a scientific and human legacy that continues to inspire new generations.

> *"A living memory is not limited to remembering: it transmits knowledge, inspires vocations and strengthens a scientific community."*

ALFIM IN FIEXPO 2026

From June 9 to 11, the President of ALFIM attended FIEXPO 2026, held in San José, Costa Rica.

FIEXPO is one of the leading gatherings of the Meetings, Incentives, Conferences, and Exhibitions (MICE) industry in Latin America, bringing together professional associations, congress organizers, tourism destinations, and specialized service providers involved in the planning and delivery of academic, scientific, and professional events at the regional and international levels.

Participation in this important forum provided an opportunity to identify new opportunities for the development of ALFIM's scientific and educational activities, as well as to establish contacts with organizations and companies involved in the events and congress industry.

He also had the opportunity to meet in person with Dr. Gustavo Sarria, a radiation oncologist and President of the Ibero-Latin American Association of Radiation Oncology (ALATRO).

Although they had previously met at various virtual meetings, this in-person meeting facilitated a broader exchange on initiatives of mutual interest and potential areas for collaboration between ALFIM and ALATRO.

In addition to providing an opportunity to connect with regional event suppliers and organizers, FIEXPO 2026 represented a valuable opportunity to strengthen institutional ties and explore joint projects that could contribute to the growth and international visibility of both associations.

From Concept to Code to Clinic: Translating Software Innovation into Radiation Oncology

At the **AAPM | COMP 2026 Annual Meeting**, Karl Otto, Chief Scientific Officer at Radformation and Adjunct Professor at the University of British Columbia, delivered the lecture **"From Concept to Code to Clinic."** Drawing on his experience with **VMAT (RapidArc)**, real-time interactive treatment planning (**HyperDrive**), and automated delineation using artificial intelligence (**Limbus AI**), he examined what transforms a promising technical concept into software that clinical professionals can use safely and routinely.

Otto's central message was clear: **software innovation does not reach clinical practice simply because the algorithm is clever**. Clinical translation is only possible when the clinical problem is real, the workflow is practical, the risks are understood, and the evidence is compelling.

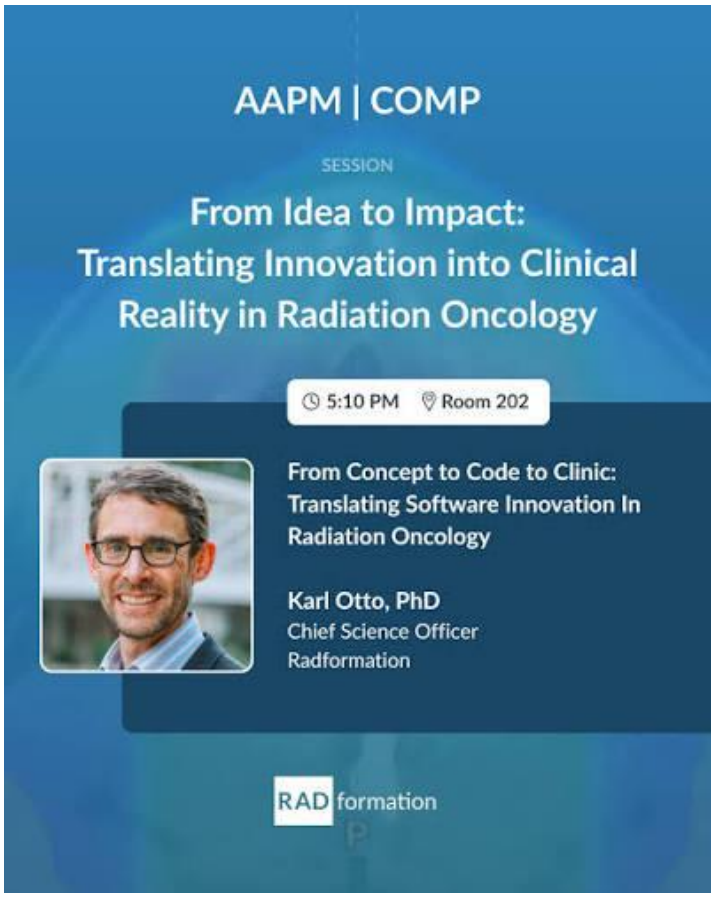
He encouraged researchers and developers to start with **the problem, not the technology**. A project should aim to improve clinical outcomes, reduce workload, increase consistency, or enhance safety. The entire workflow must then be designed: Who will use the software? What input data does it require? How will failures be handled? How will the results be verified? And how will it be integrated with clinical systems?

Validation must go beyond a single performance metric. Technical testing should assess accuracy, robustness, edge cases, speed, and reproducibility. Clinical testing should demonstrate a meaningful improvement in quality, efficiency, consistency, or safety. Ultimately, usability, regulatory strategy, implementation, and maintenance will determine whether the tool can be incorporated routinely into clinical practice.

Otto proposed a practical set of questions:

- What clinical problem does the software address?
- What clinical decision or workflow does it modify?
- Who is the intended user?
- What evidence would convince a skeptic?
- What are the failure modes and limitations of use?
- Can the results be independently reproduced by another institution?
- How will the software be reviewed and maintained?
- What is required for it to become a routine-use clinical tool?

Clinical translation is an iterative, multidisciplinary process. It requires technical creativity, clinical expertise, independent evaluation, sustained support, and perseverance from the outset.



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Did You Know That Latin America Is Strengthening Its Network of Anchor Centres in the Fight Against Cancer?

The International Atomic Energy Agency (IAEA), through its Rays of Hope initiative, is promoting a network of reference institutions aimed at strengthening cancer care in different regions of the world.

The so-called Anchor Centres are institutions with established expertise and capabilities that serve as regional reference centres. Their objective is to help ensure that progress achieved in the fight against cancer can be sustained and expanded by supporting the training of professionals through courses, fellowships, and training programmes; promoting cooperation networks; participating in research projects; and providing technical support to other institutions. Their role is particularly relevant in areas that rely on the safe and effective use of ionizing radiation, such as radiation therapy, nuclear medicine, and medical imaging.

Figure 1: Dr. Mariano Grossi, Director General of the IAEA, alongside Dr. Carolina Wiesner Ceballos of the INC. Source: INC (2026).

In our region, several institutions are part of this cooperation and capacity-building strategy. These include well-established centres in Argentina and, more recently, the Instituto Nacional de Cancerología (INC) in Bogotá, Colombia, whose inclusion in the network, as of February 2026, represents an important recognition of its expertise and leadership in cancer control.

The designation of this new Anchor Centre in Colombia strengthens its role as a regional reference centre for Latin America and the Caribbean and opens new opportunities for professional training, technical cooperation, research, and the exchange of best practices. These efforts contribute to strengthening oncology services, which require not only infrastructure and technology, but also appropriately trained professionals capable of ensuring dosimetry, quality control and quality assurance, procedure optimization, and radiation protection.

Did you know...

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For the Latin American medical physics community, this initiative represents an opportunity to strengthen professional ties, share experiences, and advance toward safer and more equitable cancer care, while also expanding knowledge, building capacity, and supporting the development and consolidation of oncology services throughout the region.

Figure 2: Multidisciplinary team of the National Cancer Institute. Source: INC (2026).

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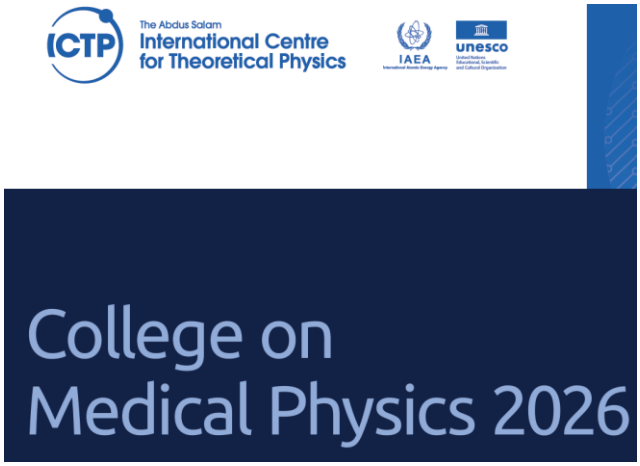
6th ECMP 2026 – 23-26 September 2026, Valentia, Spain

The 6th European Congress of Medical Physics (ECMP 2026) will take place from September 23 to 26, 2026, in Valencia, Spain. The programme will cover artificial intelligence, medical imaging, radiation therapy, nuclear medicine, radiation protection, and professional education. ECMP 2026 promises an inspiring combination of cutting-edge science, professional exchange, and cultural experience. For more information: https://ecmp2026.efomp.org/



The International School of Medical Physics will be held from August 24 to September 19, 2026, in Trieste, Italy. The 2026 ICTP College of Medical Physics is designed to strengthen medical physics in high- and middle-income countries, promoting excellence in medical physics through outreach, workshops, education, and research, thereby directly contributing to the overall quality of healthcare. For more information: College on Medical Physics 2026 | (smr 4232) (24 August 2026 - 12 September 2026)

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The 15th Argentine Congress of Medical Physics and the 1st National Dosimetry Conference will be held from September 2 to 4, 2026, in La Plata, Argentina. The event is organized by the Argentine Society of Medical Physics (SAFIM). Precongress courses will be held on September 2, followed by the congress on September 3 and 4. The programme will address technological innovation, professional education, and the role of medical physics within the healthcare system. The inclusion of the 1st National Dosimetry Conference makes this one of the most relevant events of the year for medical physicists in the region.

The 30th Brazilian Congress of Medical Physics will be held from October 7 to 10, 2026, in São Paulo, Brazil. It is one of the leading medical physics meetings in Latin America. Organized by the Brazilian Association of Medical Physics (ABFM), the congress will cover topics related to radiation therapy, diagnostic radiology, nuclear medicine, radiation protection, and non-ionizing radiation, as well as emerging technologies and artificial intelligence. Its theme is “Integrating technology and people with purpose in healthcare.”

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Did you know ...

The 13th Regional Congress on Radiological and Nuclear Safety, the 11th Latin American IRPA Congress, and the Ibero-American Meeting on Radiation Protection will be held from October 18 to 22, 2026. It is one of the most important regional events of 2026 in radiation protection and nuclear safety. The event will bring together professionals and specialists to address topics including radiation protection, nuclear safety, environmental monitoring, medical applications of radiation, regulatory frameworks, the transport of radioactive material, and emerging challenges in radiation protection.

From November 5 to 7, 2026, the 10th ALATRO Congress of the Ibero-Latin American Association of Radiation Oncology will be held in Montevideo, Uruguay. This regional meeting is of particular interest to medical physicists working in radiation therapy. It will bring together Latin American and international specialists to review scientific and technological advances in radiation oncology, with an emphasis on innovation and clinical implementation. It is particularly relevant to medical physics in radiation therapy, dosimetry, and emerging treatment technologies.

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Did you know...

The International Atomic Energy Agency (IAEA) is organizing the International Symposium on Standards, Applications and Quality Assurance in Medical Radiation Dosimetry (IDOS 2026), which will provide an international forum to discuss and disseminate the latest advances in radiation dosimetry for the medical application of ionizing radiation, radiation protection, and associated standards. For more information: Simposio Internacional sobre Normas, Aplicaciones y Aseguramiento de la Calidad en la Dosimetría de Radiación Médica (IDOS 2026) | OIEA

From October 18 to 22, 2026, Medellín will host the 13th Regional Congress on Radiological and Nuclear Safety, the 11th Latin American IRPA Congress, and the Ibero-American Meeting on Radiation Protection. For more information: IRPA 2026 - XIII Congreso Regional de Seguridad Radiológica y Nuclear | Medellín

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Did you know…

Approximately 250 days remain until the opening of the 5th International Symposium on Radiation Protection in Medicine and the 9th Peruvian Congress on Radiation Protection, to be held in Cusco, Peru, from April 12 to 15, 2027.

The meeting aims to strengthen the ALFIM–FRALC partnership by establishing joint initiatives to advance radiation protection in medicine across our region, with the active participation of medical physics and radiation protection professionals.

The scientific program will feature technical sessions with a preference for oral presentations of submitted works, encouraging active discussion among participants and fostering the development of proposals for future collaborative actions. In addition, the symposium will include round-table discussions on specific topics and invited lectures delivered by recognized experts. Technical sessions will cover the major fields of radiation oncology, nuclear medicine, diagnostic radiology, and interventional procedures, as well as other related disciplines.

Further information on **abstract submission, scientific topics, venue, accommodation, and registration** is available at: https://sites.google.com/view/siprame-cusco/inicio/

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Did you know...

The Medical Physics Group of the National University of Colombia, together with IEEE and NPSS, invites you to the School on Nuclear Instrumentation and Applications for Society.

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Did you know...

https://sefm.es/eventos/microcredencial-universitaria-en-fundamentos-fisicos-de-la-protonterapia/

The Spanish Society of Medical Physics invites applications for the University Microcredential Course on the Fundamentals of Proton Therapy.

The course is intended for specialists in hospital medical physics, medical physics professionals, residents, and other university graduates with a scientific or technical background.

The sessions will be delivered online, with 50 minutes of instruction followed by 10 minutes for questions and discussion. Practical assignments will be included in some topics. The course will be conducted in Spanish and English. Tutoring sessions will be held remotely at times scheduled outside the regular course hours.

Did you know...

From June 22 to 26, 2026, the 40-hour course “Medical Physics in Nuclear Medicine: Key Areas” was held at the facilities of the National Cancer Institute of Mexico.

The activity aimed to strengthen the training and continuing education of medical physicists with a focus on Nuclear Medicine and Molecular Imaging, emphasizing quality control, optimization of diagnostic and therapeutic procedures using radiotracers, internal dosimetry, and the participation of medical physicists in internal audits at each centre to promote comprehensive service quality through safety and radiation protection, as well as through optimization and the provision of tools to support clinical decision-making by medical specialists in the field. The course also promoted group-based and multidisciplinary work.

The course director was Dr. Leonel Alberto Torres, a specialist with extensive experience in quality assurance, internal dosimetry, and human resource development in Latin America. His participation was complemented by faculty members from the institute and the Metropolitan Autonomous University, who are familiar with national regulations and provided an important complementary perspective. Together, they provided participants with tools to support clinical processes and contribute to the continuous improvement of Nuclear Medicine services in the country.

Foto de los participantes, a la derecha el Dr. Leonel Torres

From Latin America and Around the World: Articles, Books, and Documents of Interest

IAEA TECDOC No 2132. Implications of ICRU Report 95: Operational Quantities for External Radiation Exposure

https://www.iaea.org/publications/16070/implications-of-icru-report-95-operational-quantities-for-external-radiation-exposure

The document examines the scientific, technical, and regulatory implications of adopting the new operational quantities proposed in **ICRU Report 95** for external radiation protection. The document aims to support Member States and stakeholders in evaluating the transition from the current operational quantities to a revised system that is more closely aligned with protection quantities, thereby improving the accuracy and consistency of radiation monitoring.

The report reviews the scientific basis of the proposed quantities, identifies the limitations of the current system, and discusses the expected effects on individual and workplace monitoring, calibration procedures, reference radiation fields, metrology, instrumentation, and international standards. It also evaluates the implications for regulatory frameworks, radiation protection programmes, education and training, and the costs associated with implementing the new quantities.

In addition, the document outlines the responsibilities of key stakeholders—including monitoring services, instrument manufacturers, metrology laboratories, regulators, licensees, and qualified experts—and proposes a phased implementation timeline. Rather than recommending immediate adoption, the TECDOC provides a technical framework for informed decision-making, emphasizing the need to balance scientific improvements with practical feasibility, economic considerations, and the maintenance of a stable and effective international radiation protection system.

Training Course Series No. 90. Syllabus for the Training of Radiation Protection Officers Diagnostic Radiology and Image Guided Interventional Procedures

https://www.iaea.org/publications/16022/syllabus-for-the-training-of-radiation-protection-officers

The document provides a standardized training syllabus for Radiation Protection Officers (RPOs) working in diagnostic radiology and image-guided interventional procedures. Its objective is to provide Member States with a framework for designing and implementing training courses that develop the competencies required to oversee compliance with occupational and public radiation protection requirements, in accordance with the International Basic Safety Standards (GSR Part 3) and Safety Guide GSG-7.

The syllabus is organized into 11 topics, covering the fundamentals of ionizing radiation, dosimetric quantities and units, radiation sources and diagnostic imaging equipment, biological effects of radiation, principles of radiation protection, control measures, the regulatory framework, responsibilities of employers and authorized parties, radiation protection programmes, and the management of anomalies and incidents. The curriculum follows an outcome-based educational approach aligned with Bloom's Taxonomy and incorporates practical exercises to reinforce the application of theoretical knowledge.

The TCS-90 emphasizes that the RPO is responsible for overseeing the radiation protection of workers and the public but does **not** replace the medical physicist in matters related to patient exposure. Overall, the document serves as an international reference for harmonizing RPO training and strengthening the radiation safety culture in diagnostic radiology and image-guided interventional facilities.

AAPM Task Group No. 249.B—Essentials and guidelines for clinical medical physics residency training programs.
Nye JA, Dugas JP, Erwin WD, et al. *J Appl Clin Med Phys*. 2025; 26:e70111. https://doi.org/10.1002/acm2.70111

The AAPM report updates the guidelines for Clinical Medical Physics residency programs, replacing the 2013 version. Its objective is to establish a reference standard for residency training in imaging physics, nuclear medicine physics, and radiation oncology physics, incorporating technological advances, the evolution of clinical practice, and updated requirements for professional certification.

The guidelines define the minimum requirements for program organization, residency duration (at least 24 months), qualifications of the program director and faculty, institutional resources, evaluation policies, and mechanisms to ensure high-quality clinical training. They also emphasize the development of technical competence, critical thinking, leadership, professionalism, ethics, communication skills, diversity and inclusion, a strong culture of safety, and lifelong learning.

The document provides detailed curricula and expected competencies for each specialty, including knowledge of medical imaging and therapy equipment, quality assurance, dosimetry, radiation protection, medical informatics, artificial intelligence, clinical optimization, and regulatory compliance. It also recommends structured methods for assessing resident progress through workplace-based assessments, written and oral examinations, Entrustable Professional Activities (EPAs), and competency-based evaluations. Overall, these guidelines provide a comprehensive framework for harmonizing the education of clinical medical physicists and ensuring safe, competent, and high-quality professional practice.

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- Assessment of 6MV flattening filter free (FFF) beam commissioning parameters for Versa HD and TrueBeam: A comparison study. I-Aseebee MK, Mraity H, Esposito M. *J Appl Clin Med Phys*. 2026; 27:e70723. https://doi.org/10.1002/acm2.70723

- Obese patient imaging: Potential dose reduction with photon-counting CT. Liu LP, Mei K, Sharma S, et al. *J Appl Clin Med Phys*. 2026; 27:e70720. https://doi.org/10.1002/acm2.70720

- A survey of dosimetry capabilities and trends in Latin America and the Caribbean region: Implications for occupational dosimetry. Juan C. Mora, Mariella Terán, Helen Khoury et al. Radiation Measurements, 2026 (193). https://www.sciencedirect.com/science/article/pii/S1350448726000338?via%3Dihub

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