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Editorial

Developing Culture of Radiation Safety in Medicine

"First, Do No Harm" or "Primum non nocere" in Latin or nonmaleficence is the bedrock of the well-known Hippocratic Oath which establishes the health professionals' duty to prevent harm to patients. However, about 10% patients are harmed while receiving hospital care in high income countries and about 2.6 million deaths occur annually due to adverse events in lower- and middle-income countries (WHO Patient Safety Report 2019). In India, about 5.2 million injuries are caused due to medical errors resulting in about 3 million preventable deaths every year (BMJ Quality and Safety, September 2013). No wonder, patient safety is the key component of quality healthcare system all over the world. In India, National Health Mission has developed Patient Safety Tools which lists radiation safety of the patients under Safety and Quality: Self-Assessment Tool for Health Facilities (SaQusal). On 28th Feb 2025 the Annals of ICRP published online The Ethics in Radiological Protection for Medical Diagnosis and Treatment (ICRP Publication 157)[1] which states that "the radiation dose estimates should be recorded in a patient's medical record and patents should have access to this data and its explanations. The dose, associated risk and benefit and risk communication depends on the needs and cultural background of each patient which may be explored in shared decision-making". The publication 157 further states that "the risks should be defined explicitly which are known with certainty, those that are potential and those where there is uncertainty." It is evident that radiation safety of the patients is receiving increasing attention. International Atomic Energy Agency (IAEA) has launched a Radiation Safety: Trait Talks handbook[2] in 2021 for the field of healthcare. It identifies ten radiation safety cultures like individual responsibility, questioning attitude, effective safety communication, leadership responsibility etc. Now, last year in 2024, the World Health Organization (WHO) issued a publication entitled Enhancing Radiation Safety Culture in Healthcare: Guidance for Healthcare Providers[3] jointly with IAEA, International Organization for Medical Physics (IOMP) and International Radiation Protection Association (IRPA). This is a 80 pages booklet with seven well-elaborated chapters and with 18 actual examples of good practices which provides a framework to establish, maintain and enhance radiation safety culture in healthcare.The publication states that the radiation safety culture is effloresced when actions taken to enhance radiation safety of the patients and personnel are embedded in the organizational and individual attitude. All with safety concern must be empowered to raise awareness and resolve the issue before starting the activity. It identifies effective safety communication, respectful work environment, environment for raising concern, questioning attitude as some of the traits in addition to others. The booklet explains the tools for assessing radiation safety culture like survey of staff to gauge the attitude to radiation safety, knowledge of dose and risk, review of standard operating procedures etc. This document finally says that "the safety is not just the sum of rules, policies, procedures and processes. The real building blocks of safety are trust, communication and culture". In fact, institutional culture of patient safety is a comprehensive concept which becomes even more important in the face of a report that staff burn-out affects the safety culture negatively and better work-life balance in staff affects it positively.[4]

1. https://journals.sagepub.com/doi/10.1177/01466453231220518
2. https://www.iaea.org/sites/default/files/21/02/radiation-safety-culture-trait-talks.pdf
3. https://www.who.int/publications/i/item/9789240091115
4. https://pmc.ncbi.nlm.nih.gov/articles/PMC8953540/

Pratik Kumar

EMPOWERING THE NEXT GENERATION OF RADIOLOGICAL PROTECTION EXPERTS: A MENTEE'S JOURNEY IN ICRP MENTORSHIP PROGRAM

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ICRP Task Group 116 (TG-116):Radiological Protection Aspects of Imaging in Radiotherapy was established by the International Commission on Radiological Protection (ICRP) to address the radiological protection aspects of imaging in radiotherapy. Approved by the ICRP Main Commission on November 17, 2019, TG-116 operates under the leadership of Dr. Colin J Martin from the University of Glasgow, who serves as the chair of the task group and vice chair of ICRP Committee 3 (Radiological Protection in Medicine).The task group comprises 10 core members and 22 member-mentees from various countries, bringing together a diverse range of experts. This collaborative approach ensures that the group's recommendations are comprehensive and globally relevant. Radiotherapy is a crucial treatment modality for cancer, and imaging plays a vital role in planning and guiding treatments. However, many radiotherapy centres worldwide do not measure the dose output from their imaging system, and even fewer record patient imaging doses during radiotherapy treatments. TG-116 aims to address this critical gap by investigating methods for accurate dose measurement.Accurate dose measurement is essential for ensuring patient safety. TG-116 helps minimize unnecessary radiation exposure to patients which is achieved by establishing and advocating for standardized methods for measuring doses from cone beam CT (CBCT) and other imaging modalities. The task group will provide guidance on radiological protection aspects in the use of imaging, such as cone beam CT and fluoroscopy, in radiotherapy. Its advice will relate to the optimization of protocols for exposures during the planning stages and the frequency and level of optimization for imaging performed for treatment guidance. We will also consider the trade-off between therapeutic advantages and additional radiation doses from imaging, and the need for assessment of organ and tissue doses and inclusion in the planning process. Optimized protocols help achieve the best possible treatment outcomes while minimizing radiation exposure. The research efforts of TG-116 group is playing a key role in enhancing radiotherapy imaging practices.

My personal journey within this esteemed group

A project for ICRP Task Group 116 Mentees started in 2022 to investigate methods for measuring doses for cone beam CT (CBCT) systems incorporated with linear accelerator treatment machines. This project is crucial as it addresses a significant gap in radiotherapy practices globally. In April 2023, I received an invitation to join the ICRP Mentorship Programme as a member of ICRP Task Group 116. Since then, I have been working under the mentorship of Dr. Colin J Martin and Dr. Tomas Kron, a member of Committee 3 at ICRP. Since then my involvement has been both challenging and rewarding.A survey conducted through the ICRP Mentorship program revealed that many radiotherapy centers worldwide do not measure the dose output from their imaging equipment, and even fewer record patient imaging doses. In India, where I conducted the survey for the ICRP, it was found that the majority of medical centers lack the necessary diagnostic equipment in the Radiotherapy department to measure CBCT doses accurately. Our current project aims to raise awareness about the doses from CBCT imaging. Even if radiotherapy centres wanted to measure these doses, many do not have the equipment to do so. We are investigating methods for CBCT dose measurement to address this issue.In the first phase of my work, involved in identifying and testing methods that might be used to make measurements in countries where equipment is less readily available. This involves comparing results from standard CT phantoms and 100 mm long chambers with measurements in other phantoms of similar dimensions but different shapes that can be acquired locally.

How as a mentee I benefited from the programme

As a mentee, I have derived substantial benefits from the mentorship program. The program was established with the primary aim of cultivating the next generation of professionals who contribute to the work of ICRP. As an ICRP member, I have had the privilege of accessing files and journals. Through active participation in research projects, I have gained invaluable hands-on experience. In the context of India, the field of medical physics in diagnostics remains largely unexplored. As a radiotherapy physicist, I am acquiring a profound understanding of the significance of imaging dose and other pertinent aspects of imaging from this team. I consider this experience vital for my professional growth.

Networking Opportunities

The mentorship program has provided me with the opportunity to collaborate closely with eminent experts in the field. This has enabled mentees to establish robust professional networks that can bolster their future careers. Additionally, quarterly mentee community meetings have been instrumental in facilitating learning about other Task Group members and interacting with members of other organizations, thus exploring diverse avenues for knowledge enhancement. For instance, these meetings encompass discussions on the work of ICRP Committees, mentee-led sessions on TG activities and day-to-day responsibilities, and presentations on the endeavors of other relevant organizations such as UNSCEAR, IAEA, WHO, among others. I have actively participated in scientific discussions, collaborated with professionals, and established networks with senior researchers.

Skill Development

By engaging in TG-116, mentees have honed a diverse array of skills, including data collection and analysis, protocol optimization, familiarity with imaging quality assurance, understanding of imaging dose and optimization for the benefit of patients, and knowledge of safe practices in the use of IGRT. Moreover, mentees have had the opportunity to conduct surveys and research studies. These proficiencies are indispensable for advancement in the realm of radiological protection. Regular interactions with mentors have involved knowledge sharing in the field of expertise. Mentees have made essential contributions to significant projects with a direct impact on global health. For instance, the work on measuring and optimizing imaging doses in radiotherapy has contributed to ensuring safer and more effective treatments for cancer patients on a global scale.

Recognition and Career Advancement

Participation in the mentorship program and contributions to TG-116 has accorded mentees recognition within the scientific community. This has led to further opportunities for career progression, including participation in conferences and career development programs. Notably, I have recently been granted the honor of participating in an ICTP-IAEA workshop in Italy, where my participation is fully sponsored. This opportunity is a direct result of the encouragement and guidance provided by my mentors.Throughout this experience, I have gained valuable insights into the medical physics culture across different countries and have acquired knowledge about various techniques and equipment used in the field across the world. Additionally, I have expanded my understanding through learning from experts in my research field, and engaging in interdisciplinary collaboration with other research areas. In conclusion, the work of ICRP Task Group 116 plays a crucial role in advancing radiological protection in radiotherapy. As a member-mentee, I take pride in contributing to this significant cause and am eager to continue our collective efforts to enhance patient safety and treatment outcomes.I would like to take this opportunity to express my gratitude to B. Viswanathan, Managing Director of PTW Dosimetry India Pvt. Ltd., and the PTW team for their invaluable support and provision of essential resources for my ICRP measurements.

Author's Note

We are commencing the next phase of our work for ICRP's TG 116. My responsibilities include investigating the feasibility of radiotherapy centers across India in measuring appropriate dose quantities to assess patient doses. On behalf of ICRP, we extend a warm invitation to medical physicists across India who are involved in handling CBCT to step forward and take part in the data collection program for ICRP's TG 116. We highly encourage all participants in the data collection with a certificate. For any further queries, please feel free to contact me at lavanive04@gmail.com.

SYMPOSIUM ON ADVANCES IN MEDICAL PHYSICS FOR FUTURE GENERATION: INTERNATIONAL DAY OF MEDICAL PHYSICS (IDMP) 2024

Boopalan Balaji, Chief Medical Physicist, KLE Cancer Hospital, KLES Dr. Prabhakar Kore Hosptial and MRC, Jawaharlal Nehru Medical College, Belagavi. balanmp6@gmail.com

On 23rd November 2024, a pioneering symposium on "Advances in Medical Physics for Future Generations" with the theme of "Inspiring the Next Generation of Medical Physicists" was organized by the Medical Physics Division, Deptt. of Radiation Oncology, KLE Cancer Hospital, JNMC, KLE Academy of Higher Education and Research (KAHER), Belagavi, to commemorate the International Day of Medical Physics 2024. The symposium was held at Prof. (Dr.) V.D.Patil Hall, KLE Convention Centre, JNMC. The Symposium was started with inaugural function which was graced by Chief Guest Prof.(Dr.) Nitin Gangane, Hon'ble Vice Chancellor, KAHER and Guests of Honour Prof.(Dr.)MSGanachari, Registrar, KAHER, Prof.(Dr.)VDPatil, Director, new projects, Prof.(Mrs.)NS Mahantashetti, Principal, JNMC, Prof.(Dr.)Rajesh Powar,Prof. (Dr.) VM Pattanshetti, Prof.(Dr.) ArifMaldar,Prof.(Dr.) MV Jali, Dr.(Col.) M. Dayananda, Dr. Prabhakar and other dignitaries. The inaugural program started with the prayer song. Dr. Imtiaz Ahmed, Head of Radiation Oncology and the Organizing Chairman welcomed the chief guest, guests, invited speakers, chairpersons, and delegates, followed with lighting the lamp by the chief guest and other dignitaries. Mr.E.Rajadurai,AMPI-K Chairperson, spoke about the importance of celebrating IDMP and contributions of Madam Marie Curie in the field of medical physics. Hebriefed the objectives and the theme of IDMP 2024, "Inspiring the Next Generation of Medical Physicists." Our chief guest, Hon'ble VC delivered the speech about the importance of the medical physicist and their role in radiotherapy, diagnostic radiology and nuclear medicine and the demand of medical physicists with a huge scope in academia and research. He also appreciated the radiation oncology department's effort for organizing the symposium and wished the event success for the grant success. He also encouraged the young professionals to utilize the opportunity to mingle and collaborate with the seniors. Vote of thanks was proposed by Mr. Boopalan Balaji. AMPI-Kconferred Dr. Sanjay S Supe Oration Award 2024 to Dr. S. Ramesh Babu, Senior Medical Physicist &RSO, Karnataka Medical College & Research Institute, Hubli. Dr.JerrinAmalraj, Lead Medical Physicist, Apollo Hospitals, Bangalore delivered his talk on Robotic Radiosurgery-The Relevance of Dedicated SRS Systems Versus Multimodality C-Arm Linac in Modern Radiosurgery. The first talk in session 2 was presented on "optimizing radiation oncology through robotic automation with script integration: Elekta Monaco and Varian Eclipse by Dr.Pichandi A, Director of Medical Physics, HCG, Bengaluru. He talked about the importance of AI and ML use of automation planning in RT and real-world data scripting in HCG group to enhance planning output and plan quality to improve standardization. Dr.Ravikumar, Prof.& HOD of Radiation Physics, SSCHRI, Bangalore delivered his excellent talk on Advances in Patient-Specific Quality Assurance. He spoke about the need for PSQA, methods of PSQA, AAPM TG-218 recommendations and challenges facing PSQA. The third invited talk was presented in Essence of Motion Management (MM) in Hypo fractionated Radiotherapy by Dr.N.Karthikeyan, Senior Medical Physicist & RSO, Narayana Health, Bangalore. He spoke about the impacts of respiratory motion in RT, systems for external and internal MM during RT delivery, hybrid methods, the recommended workflow for MM, and the future scope in MM.Commissioning and performance testing of the Catalyst HD+ Surface Guided Radiotherapy (SGRT) Platform was delivered by Dr.Karthikeyan S, Chief Medical Physicist, Aster Hospitals, Bangalore and spoke aboutSGRT, C-RAD workflow, commissioning, Quality Assurance, Integration of C-RAD SGRT. Mr.Ponnusamy, Senior Scientific Officer, NIMHANS, Bangalore delivered the speech about the Precision in Practice: The role of Gamma Knife ICON in SRS. He spoke about the history of GK SRS, CBCT image guidance, optical motion tracking and gating capability of GK ICON and source loading in GK, QA tests, design of GKPerfexion and ICON models, GK treatment workflow and treatment outcomes. Last invited talk was presented in External beam planning for breast cancer patients: Practical Guidelines & suggestions for an effective planning strategy by Mr.E.Rajadurai, Chief Medical Physicist, Baptist Hospital, Bangalore. He presented about the workflow of breast RT, different RT techniques of 3DCRT, IMRT & VMAT and its pros and cons of each technique. He also added the tips for OARs dose reduction and better target coverage. Also, we received abstracts to present their research work in this symposium to encourage the young medical physicists and shortlisted abstracts were presented as 1) Validation of Treatment Couch model included in Eclipse TPS by Mr. Sridhar CH, Father Muller Hospital 2) An Institutional experience of India's first Shinva Linac machines: Commissioning and clinical performance by Mr. Jagadish R,Indrayani Hospital 3) Setting the tolerance and action limit for patient specific quality assurance of CSI-VMAT based on AAPM TG-218 report by Ms. KiruthikaPrakasam, KMIO 4) An Initial Clinical experience of TSEI at State Cancer Institute(SCI)-Karnataka by Mr. Mohammad Abdul Fatha, KMIO5) Quantification and comparison of the reference dose measurements using IAEA TRS-398 protocols and its revised version by Mr.Thilakraj S, KMIO 6) Comparison of 2D,3DCRT, IMRT & VMAT planning for Oesophagus cancer in sequential method by Ms. Ankita Narvekar, KLE Cancer Hospital, JNMC, KAHER 7) Comparative study of Manual Constraint-based and template constraint-based treatment plans generated by Varian ETHOS for H&N Cancer Patients by Mr. Ram Kumar, HCG and 8) Evaluation of RED Vs HU of dedicated CT Simulator for various RT Protocols by Mr.Havin Kumar, KLE Cancer Hospital, JNMC, KAHER which was chaired by Dr.Maruthupandian, Chief Medical Physicist, Gleanegles BGS Global, Bangalore, Dr. Rohan Bhise, Prof.&HOD, Medical Oncology and Dr.Rajendra Mali, Prof.& RSO of DR, JNMC, KAHER. Mr. Mohammad Abdul Fatha and Mr. Havin Kumar received the Best Oral Presentation Award. The symposium concluded with the inspiration for the younger generation of medical physicist with fulfil the objective of the theme "Inspiring the next generation of Medical Physicist".

ARTIFICIAL INTELLIGENCE (AI) - BOON OR BANE FOR MEDICAL PHYSICS PROFESSION?

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The term AI was first coined by John McCarthy in 1956 as the science of engineering and making intelligent machines. However, early works in AI had not achieved many breakthroughs due to the limited computing power. It was only in the last decade that AI research in healthcare and medicine had started to show promising results and practical applications, from facial recognition to fully automatic detection, and even finding new biomarkers for diagnosis and follow up. It has been

recognised as both a productive and disruptive force in healthcare. In particular, radiology, radiotherapy and pathology are the three medical specialties thatsaw the more prominent AI role.The integration of AI in medical physics is poised to revolutionize the field by enhancing diagnostic accuracy, streamlining treatment planning, and improving patient care where it is revolutionizing medical physicsprimarily in radiation therapy, diagnostic imaging, and nuclear medicine. As AI gains prominence, medical physicists face the dual challenge of integrating AI-driven advancements while ensuring accuracy, safety, and ethical compliance. In this article, I am trying to explore the potential of AI to transform medical physics, focusing on its applications, challenges, and future directions and whether AI is going to be boon or bane for the medical physics profession, examining its impact on clinical practices, research, professional roles, and ethical considerations.If AI is used with its full understanding with taking care of its limitations and pitfalls, AI can benefit medical physics in numerous ways, enhancing efficiency, accuracy, and patient safety. However, AI has pitfalls and limitations that must be addressed.

Radiation Therapy (RT)

In radiotherapy, AI is used to enhance the accuracy of treatment planning by reducing human intervention and improving plan quality. AI platforms can predict the radiation sensitivity of tumours before treatment starts, helping determine the optimal dose for patients. Additionally, AI can assist in image-guided radiotherapy by generating synthetic CT images from MRI data, reducing the need for additional CT scans and lowering radiation exposure.

Treatment Planning & Quality Assurance (QA)

AI can automate and optimize treatment planning for radiation therapy, especially in Intensity-Modulated Radiation Therapy (IMRT), Volumetric Modulated Arc Therapy (VMAT), and Stereotactic Body Radiation Therapy(SBRT).Machine learning models can predict optimal dose distributions, organ-at-risk (OAR) sparing, and treatment plan quality assurance. AI-based tools such as deep learning algorithms help in auto-segmentation of tumours and OARs in CT and MRI images, reducing manual workload and increasing output. AI-driven predictive analytics can help detect treatment errors before delivery of treatment giving a chance to correct. AI-enhanced gamma analysis and dose verification tools improve patient safety and treatment accuracy. Automated machine learning models can predict and correct equipment deviations before failure/breakdown/malfunction

Adaptive Radiotherapy

AI can help in daily image-guided adaptive radiotherapy(IGRT) by predicting anatomical changes during fractionated treatments and suggesting real-time plan adjustments. Deep learning models analyse imaging data to improve dose recalculations and motion management

Medical Imaging and Diagnosis

AI plays a crucial role in automating routine tasks in medical imaging, such as image processing, quality control, and data management. It can automatically segment and label structures in medical images, reducing the time and effort required by healthcare providers. AI algorithms can analyze medical images to identify patterns and abnormalities that may not be visible to the human eye, aiding in more accurate and timely diagnoses.

Image Processing and Enhancement

AI can improve image quality and reduce noise in MRI, CT, and PET scans. AI-based denoising algorithms help in low-dose CT (LDCT), reducing radiation exposure to patients while maintaining image quality. Super-resolution techniques using AI enhance imaging details without increasing scanning time. AI can segment tumours, organs, and lesions with high precision, reducing inter-observer variability. Deep learning-based segmentation models are widely used in brain, lung, breast, and prostate cancer imaging. AI can detect early signs of cancer, neurological diseases, and fractures from imaging scans at pixel level before it is visualised by clinicians on image without AI. Deep learning models in MRI and CT scans help identify even very minute abnormalities that radiologists might miss without AI

Radiomics and Predictive Analytics

AI can extract and analyse imaging biomarkers for tumour characterization, choose treatment options, treatment response prediction, and prognosis estimation. Radiomics, combined with machine learning, can help differentiate between benign and malignant tumours without pathological or biochemical sampling

Radiation Safety and Dosimetry

AI models can estimate radiation dose distributions in patients undergoing radiotherapy [dose painting / mapping] or diagnostic imaging. AI-based Monte Carlo simulations can improve dose calculations for complex cases more precisely. AI-enhanced sensors and wearables devices can monitor radiation exposure in real time for medical staff and opportunity to take preventive measures by modifying work practice immediately, if need be. AI-powered systems can predict radiation leakage or errors in shielding design in radiotherapy rooms so that corrective measures can be taken in timely manner

AI in Nuclear Medicine and PET Imaging

In SPECT & PET imaging, AI algorithms improve image reconstruction and reduce scan timesthere by increasing efficiency and efficacy. AI-based noise reduction allows for low-dose radio tracer imaging there by minimizing patient radiation exposure. AI can assist in optimizing radioisotope production, predicting radio pharmaceutical decay, and enhancing supply chain management efficiently

AI in Medical Physics Education and Research

AI-based simulations, e-tutorials can train medical physicists in radiotherapy planning, quality control, and safety assessments. Virtual AI tutors and decision-support systems enhance learning efficiency. AI models accelerate Monte Carlo simulations for dosimetry calculations. Machine learning aids in predicting treatment responses and improving personalized precision medicine approaches

AI in Guided Surgeries and Robotics

AI is integrated with robotic-assisted radiation therapy (Cyberknife, MR-Linac, PET-Linac) for real-time tumour tracking. AI-driven robotic systems enhance precision in biopsy procedures and brachytherapy seed placement

Benefits of AI in Medical Physics

AI significantly reduces human error in tasks such as image segmentation, treatment planning, and dose calculations. Machine learning models improve precision in detecting anomalies in imaging, leading to earlier and more accurate diagnosis. AI automates repetitive tasks, allowing medical physicists to focus more on complex decision-making and patient-specific treatments. Automated treatment planning reduces planning time, making radiation therapy more efficient.

AI-driven models analyse patient-specific characteristics, allowing personalized treatment regimens. Adaptive radiotherapy uses AI to adjust treatment in real time, enhancing efficacy and minimizing side effects. AI accelerates research by analysing large datasets, identifying patterns, and predicting patient responses to treatments. This facilitates innovation in treatment protocols, imaging techniques, and predictive analytics. AI-powered quality control ensures equipment calibration, detects anomalies, and predicts failures in medical devices. This helps medical physicists to enhances patient safety and reduces treatment-related errors.

Challenges and Future Perspectives

Over-dependence on AI may lead to skill degradation among medical physicists, reducing their ability to critically evaluate AI-generated outputs. This could be detrimental in cases where AI fails or produces

incorrect results. Medical Physicists needs to alert and avoid becoming slaves of machine/ AI but to remain the master of it. Automation of routine tasks might reduce the demand for traditional roles in medical physics, leading to concerns about job displacement. However, AI also creates opportunities for new roles focused on AI oversight and algorithm development. AI will not completely replace medical physicists but medical physicists who fail to embrace and acquire skills in AI will definitely be replaced. Models trained on datasets lacking diversity may not generalize well across different populations. AI models are only as good as the data they are trained on. Bias in training datasets can lead to inaccuracies in treatment recommendations, potentially compromising patient outcomes. Therefore, generating own data and updating/validating the software tuned to country/region is necessary. It's like garbage in, garbage out. Ensuring the accuracy and reliability of AI algorithms is crucial. AI integration in medical physics requires stringent validation, regulatory approvals, and continuous monitoring. Standardizing AI practices across institutions remains a complex challenge. Patient privacy and safety are paramount. AI systems must be developed and used responsibly to maintain trust in healthcare and must comply with data privacy regulations of the country. AI-driven medical decisions need to be explainable to clinicians and clinicians needs to be trained and acquainted with the system. AI tools must seamlessly fit into ongoing clinical practice and adaption to future issues. Patients must be informed about the use of AI in their care, including how their data is used and the potential risks and benefits of AI-driven decisions. This ensures that patients have autonomy over their healthcare choices. AI models can be complex and difficult to interpret, making it challenging to hold anyone accountable for their decisions. Ensuring transparency in AI decision-making processes is essential to build trust and ensure accountability. Medical physicists need updated education and training to effectively integrate AI into their practice.

Future Directions

Rather than replacing medical physicists, AI should be viewed as a collaborative tool that enhances their capabilities. The future of AI in medical physics is promising for medical physics and lies in integrating AI responsibly, ensuring on going research aimed at addressing current challenges. Combining AI with other technologies like big data analytics and machine learning will further enhance its capabilities in medical physics. Establishing clear guidelines for the use of AI in medical physics is essential to ensure safe and effective implementation. Medical physicists must acquire AI literacy to understand, validate, and oversee AI-driven systems. Regular updates in education and training programs will be necessary to keep medical physicists proficient in AI technologies. AI should assist, not replace, expert judgment, with physicists providing oversight for AI recommendations. AI algorithms must be explainable, unbiased, and continuously refined based on real-world data. Policies should evolve to ensure AI's safe and effective use in medical physics.

Conclusion

AI presents both opportunities and challenges for the medical physics profession. While it enhances accuracy, efficiency, and innovation, concerns regarding expertise retention, ethics, and job displacement must be addressed. The future lies in collaboration, ensuring AI serves as an augmentation rather than a replacement for human expertise in medical physics and ongoing research and development are poised to address these issues, paving the way for a future where AI is integral to medical physics. Now, almost every one of you will agrees with me that AI is essential and will only continue to play increasing roles in medical physics.

REPORT ON CONFERENCE ON RADIATION APPLICATIONS IN MEDICINE: INTERNATIONAL DAY OF MEDICAL PHYSICS & INTERNATIONAL DAY OF RADIOLOGY

Dr Mary Joan, Professor and RSO, Department of Radiation Oncology, Christian Medical College and Hospital, Ludhiana, Punjab

On 30th November 2024, a conference on Radiation Applications in Medicine with the theme 'Inspiring the future generations of radiation professionals' was organized by the Departments of Radiation Oncology and Radio Diagnosis Christian Medical College & Hospital, Ludhiana to commemorate the International Day of Medical Physics (IDMP) and the International Day of Radiology (IDoR) 2024. This conference was accredited with 4 credit hours by the Punjab Medical Council. The conference was held in the Lady Willingdon Assembly Hall, Christian Medical College and Hospital, Ludhiana.Contribution of Medical Physics in healthcare is multi-dimensional and it has improved the healthcare tremendously. The recent advancements in Medical Physics may it be in Radio diagnosis, Radiotherapy, Nuclear Medicine and various fields specially using ionizing radiation has made monumental sprints. To recognize the contribution of Medical Physics to healthcare, International Organization for Medical Physics (IOMP) has started to celebrate 7th November, the birthday of Madam Marie Curie as International Day of Medical Physics (IDMP) since 2013. Discovery of X-rays on 8 November 1895 by German physicist Prof Wilhelm Roentgen has revolutionized the medical diagnosis and treatment. The anniversary of this discovery is celebrated around the world as IDoR in recognition of the remarkable contributions made by radiological imaging and radiological treatment to health care, and the role of radiation professionals in providing quality care to patients.The departments of Radiation Oncology and Radio Diagnosis collectively decided to commemorate the IDMP and IDoR 2024 and more than 450 healthcare professionals and trainees attended the conference.Honourable Sub Divisional Magistrate, Moga, Ms Swati Tiwana inaugurated the conference and addressed the gathering. She highlighted the importance of creating awareness among general public

and emphasized the immense contribution of Madam Marie Curie to the health sector. Professor Dr MK Mahajan, guest of honour, a senior radiation oncologist from CMC Ludhiana illuminated the contributions of Sir Wilhelm Roentgen with the discovery of X-Rays. Professor Karamveer Goel Member Punjab Medical Council congratulated the organizing team and announce four credit hours. Prof Dr William Bhati, Director CMC Ludhiana congratulated the organizing team. Prof Dinesh Badyal, Vice Principal encouraged the conduct of academic programs and conveyed the wishes of Dr Jeyaraj Pandian Principal CMCH. Prof Dr Pamela Jeyaraj, Head, Department of Radiation Oncology and Organizing Chairperson mentioned about the contributions made by the founder Dame Edith Mary Brown and the services rendered to cancer patients and Prof Dr Mary Joan, Organizing Secretary extended the vote of thanks to the entire invited faculty, delegates and the team of support persons.The key note talk was delivered by former Professor and Head, Deptt. of Radiation Oncology, CMC Ludhiana. He has emphasized not only the contributions of scientists and clinical medical physicists to the field of radiation oncology, but also reiterated the importance of the role of medical physicists in routine clinical activities of radiation oncology, academic and research work. Dr RajeshwarSahonta, Associate Professor, Neurology and Interventional Neurology spoke about the 'Mechanical Thrombectomy: CMC Experience. A talk on radiation accidents causes, consequences and preparedness by Dr PreetyNegi, Radiation Oncologist, Capitol Hospital, Jalandhar was followed by the talk on 'Liver SBRT by ExacTrac Gating' by Mr Rakesh Kaul, Senior Radiotherapy Technologist, Max Hospital, New Delhi. The next talk was on 'Theragnostics: Present and Future', by Dr Dhananjay Kumar, Medical Physicist, Dept of Nuclear Medicine, Yashoda Hospital, New Delhi. The 'Safe Practice in Radiotherapy' was discussed by Dr KamleshPassi, Senior Consultant Medical Physicist, Dept of Radiation Oncology, Mohan Dai Oswal Cancer Hospital Ludhiana. Next Talk was 'Advancing Imaging and Diagnostics with ultra-sound' by Dr DrChithraKrishnamoorthy, Medical Physicist, AMITY University, Noida. Dr Parneet Singh, Radiation Oncologist, Panchkula deliberated on 'Building a culture of Radiation Safety'. Dr Reena Sharma, Senior Medical Physicist, Dept of Radiation Oncology, PGI Chandigarh spoke on 'Small Field Dosimetry'. Dr GouravGoyal, Radiation Oncologist, Advanced Cancer Institute, Bhatinda spoke about 'Radiation Protection in a Changing World'. Following that Mr Ramesh Chandra Sharma, Senior Technologist, SMS Medical College, Jaipur presented 'Transportation of Radioactive Material'. The morning session concluded with a talk on 'MR Linac- Early clinical experience in India' by Dr Vivek Immanuel, Radiation Oncologist, Fortis Hospital New Delhi. e-Poster presentations were followed after lunch on the theme 'Radiation Applications in Medicine' for the graduate and post graduate students to promote awareness and to nurture all round development.42 e-posters were presented by medical physicists, radiology MD residents and BSc technology trainees, radiation oncology MD residents and BSc radiotherapy technology trainees from various medical colleges and teaching institutions across Punjab. A major attraction was the 5 models prepared and presented by graduate students upholding the spirit of the IDMP celebrations. Ms.Nimmi Mathew, Homi Bhabha Cancer Hospital Sangrur won the 1st Prize from medical Physicists. Dr HarshitChouhan, MD RT, Dr Guntas, MD RD and Dr BenhurJojan MD RD won the 1st, 2nd and 3rd prizes respectively from PG residents. Ms. Sejal Sharma, Ms.Kiran and Mr.Bhupendra Kothotiya won the 1st, 2nd and 3rd prizes respectively from radiotherapy technology students. From Radiology technology students MsTanvi, Ms Anumeetand Ms Rukhsahwon the 1st, 2nd and 3rd prizes. In the model session, Mr Sahil (RD), MsHarshpreet (RD) and MsVaishnavi (RT)won the 1st, 2nd and 3rd prizes. Dr Maria Thomas, Associate Director, CMCH Ludhiana presented the awards.

INTERNATIONAL DAY OF MEDICAL PHYSICS 2024 CELEBRATED IN THE HIMALAYAN STATE SIKKIM

Arun Adhikari, Medical Physicist, Department of Radiation Oncology,Sir Thutob Namgyal Memorial, Hospital,Gangtok, Government. of Sikkim

The International Day of Medical Physics (IDMP) 2024 was celebrated for the first time in the Himalayan state Sikkim. The state's sole Radiation Oncology Department, which began its operations in 2020, has since provided essential services to over 800 patients, including those from neighboring states. The Government offers free treatment to its residents, ensuring that medical care is accessible to all. The IDMP celebration commenced with a traditional offering of Sikkimese khada (a cloth scarf) to Madame Curie, followed by a cake-cutting ceremony. The department staff then honored two state physicists, Arun Adhikari, and Bindiya Dhakal, by offering them khada in recognition of their contributions. During the event, Arun Adhikari addressed the gathering and explained the significance of IDMP and its global observance. He highlighted the theme for this year's celebration: "Inspiring the Next Generation of Medical Physicists." This theme emphasizes the

importance of nurturing and motivating future professionals in the field of Medical Physics. The event was attended by Radiation Oncologists, Nursing Staff, General duty attendants, and other hospital personnel. Physicist Bindiya Dhakal expressed her gratitude to everyone present, thanking them for making the day memorable and special.

THREE CHEERS

Dr S. Senthilkumar, Sr. Asstt. Professor of Radiology Physics, Madurai Medical College, Tamilnadu received the first prize at AROCON-2024 at Mangaluru for his oral presentation "Innovative 3D Printing and Artificial Intelligence Solutions for Enhanced Radiotherapy". He also received second prize at ISO-MVR CANCON2024 at Kozhikode for his oral presentation "Exploring a pressure sensor-driven deep breath hold device for left-side breast cancer patients: An innovative development and investigation". Congrats!

THREE CHEERS

Dr Mukesh Kumar Jope, Assoc. Professor, Medical Physics, IGIMS, Patna has been awarded Meritorious Radiation Safety Officer Award - 2025 by the Indian Association for Radiation Protection (IARP). In addition, he has been made the In-Charge, Deptt. of Medical Physics, State Cancer Institute, IGIMS, Patna in January 2025. Congrats!

THREE CHEERS

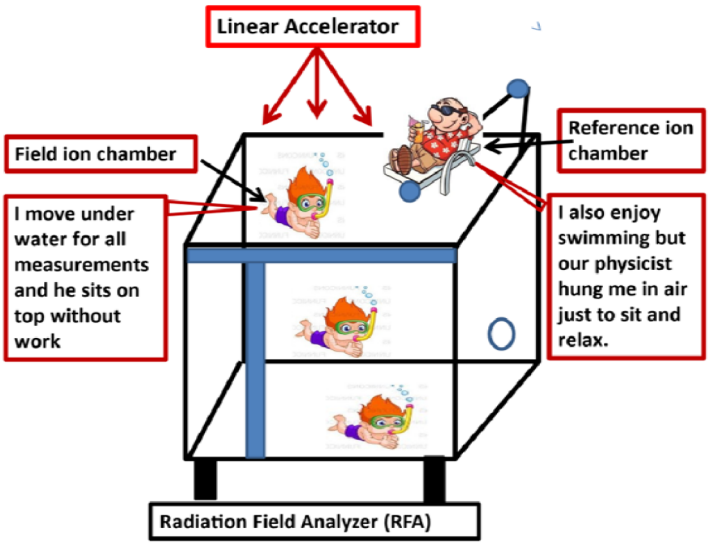
Dr. Gurpreet Kaur, Medical Physicist, Deptt. of Radiation Oncology, Guru Gobind Singh Medical College & Hospital, Faridkot, Punjab was awarded Ph.D. by Baba Farid University of Health Sciences, Faridkot in September 2024. The title of her thesis was **"Radiobiological and Dosimetric evaluation of various Fractionation regimens in HDR Brachytherapy Using Ir-192 source for carcinoma uterine Cervix".** She was also awarded with First Prize for the poster during "Workshop of Fundamentals of Brachytherapy - A Practical Approach" organized by department of Radiation Oncology, PGIMER, Chandigarh during 5-6October, 2024. In addition, on the occasion of 76th Republic Day 2025, she was awarded with letter of honor by the Govt. of Punjab for her commendable accomplishment in the field of health services. Congrats!

SHORT VIDEO CONTEST

Medical Physics Gazelle (MPG) invites Indian medical physicists to participate in a short video contest. The theme of the contest is **"Future of Medical Physics"**.

- Entry may be sent by individual contestant or a group of contestants. However, first contestant must be a medical physicist. Co-contestant(s) in an entry is permitted to be from other professions. Name of the contestant and co-contestants (if any) of the winning entry will be published but the prize will be sent to the first or only contestant. Only one entry from one contestant (or the first contestant) will be accepted.
- Contest is free and open for all Indian medical physicists.
- The duration of video must be maximum 60 seconds or less.
- Submit your entry via YouTube (unlisted link), Google Drive link, Drop Box link etc. and ensure that the link is accessible for the extended period of time. Kindly write your name, affiliation, mobile etc. in the covering mail.
- The video (or link) must not contain any identifier like name of the contestant, affiliation etc.
- The entry must not contain provocative, objectionable, inappropriate content. MPG reserves the right to reject any entry without assigning any reason.
- MPG reserves the right to modify, suspend or cancel all or any part of the contest or prize distribution any time. Result of the competition will be binding on the participants.
- The entry must not infringe on any intellectual property right or copyrights of any third party.
- Language used in the entry must be English.
- The is no strict format for the style or the structure of the video. Video may be made attractive, creative and engaging by incorporating various styles of presentations like animation, interview, narration, interesting visuals etc.
- The entry may be sent to **drpratikkumar@gmail.com** by **31st July 2025**.
- **FIRST PRIZE of Rs. 4,000/- and SECOND PRIZE of Rs. 3,000/- is sponsored by M/S Smart Medical Solutions, Chennai.**

MEDICAL PHYSICS FUN TIME



Ranjna Agarwal, Surat