Particle Therapy Co-Operative Group

particles

Newsletter for the Particle Therapy Co-Operative Group (PTCOG), an organization for those interested in radiotherapy with hadrons.

Newsletter #03, November 2024

Dear PTCOG Community,

I am pleased to welcome you to the third issue of the Particles Newsletter. I have received a great deal of positive feedback, and it's wonderful to see how the newsletter is helping our community stay connected beyond the annual meetings.

I am also delighted to announce that the Executive Committee has officially appointed Professor Wolfgang Sauerwein as Editor-in-Chief of the newsletter. I would like to extend my sincere gratitude to Professor Sauerwein for his outstanding work and dedication.

Looking ahead, I am excited to invite you to the 63rd PTCOG meeting, which will take place in Buenos Aires, Argentina, from June 2-7, 2025. For the first time in PTCOG's history, we will gather in South America to celebrate the milestone of the first proton therapy facility under construction in the region. This event promises to be a significant occasion, featuring the latest results from ongoing clinical trials, groundbreaking technological innovations, and new findings from both pre-clinical and clinical research.

The 63rd meeting will also mark a turning point for our association. KENES, our current organizing partner, is finalizing a contract for the association's management, which will usher in exciting new developments. Among them, we will unveil a new PTCOG website and a new PTCOG logo that will be selected by a vote of the General Assembly.

Our Steering Committee (SC) continues to expand, with more members joining every year. The SC will

be called upon to make critical decisions during PTCOG 63. Following the changes to our statutes made at PTCOG62, we will now consider implementing an institutional fee for SC membership, a decision that could greatly enhance the significance of the SC. Additionally, the SC will vote on key leadership roles within the Executive Committee, including the positions of Chair, Vice-Chairs, Biology Representative in the Scientific Program Sub-Committee, and co-chairs of the Educational Sub-Committee. I strongly encourage all SC members to attend in person or send a delegate from their facility to Buenos Aires.

The call for project funding is now open, with a submission deadline of March 1, 2025. We are excited to fund three projects—one each in medicine, physics, and biology. I encourage all interested members to apply!

Finally, I invite you to submit nominations for the Wilson Award, our most prestigious honor, recognizing outstanding contributions to the field. The nomination deadline is December 1, 2024.

These are indeed exciting times for PTCOG, and I look forward to reviewing your abstracts for PTCOG 63. The deadline for abstract submissions is December 18, 2024.

With best regards,
Marco Durante, Ph.D.

Next venue news

Letter from the Local Organizing Committee of PTCOG 63

We are delighted to welcome you all to the 63rd edition of the Particle Therapy Cooperative Group (PTCOG) congress, which will take place from 2-7 June 2025, in the lively city of Buenos Aires, Argentina. Under the theme “Bridging Borders in Particle Therapy,” the congress aims to promote science, networking, and education in particle therapies - especially for developing countries -, by bringing together leading experts in the field, interdisciplinary scientists, clinicians, and radiation therapy industry.

Being the first time that a PTCOG meeting will take place in Latin America, we hope the conference will promote the sharing of new ideas and point of views concerning the possibilities that particle therapies offer to the well-being development of the region.

The local organizing institutions, the National Atomic Energy Commission (CNEA) and the University of Buenos Aires (UBA), have been the promoters for almost 10 years of an ambitious project that has brought to life the first proton center in all of Latin America, the Argentine Proton Therapy Center (CeArP). CeArP is in the final stages of equipment assembly, and it will be a great opportunity to see how such an undertaking begins to become operational. With two PBS clinical rooms and a 3-store building with a fixed PBS beam dedicated to research, CeArP will become a world-class proton research center, ready to welcome scientists and clinicians from all over the world, especially from neighboring countries.

The venue, Hilton Buenos Aires, is situated in Puerto Madero, Buenos Aires’ premier waterfront area. Once part of the active commercial port of the city of Buenos Aires, it is now fully transformed in a very active business hub, showcasing modern sophistication as well as conserving picturesque docks and port cranes. The area easily extends to the Buenos Aires downtown district with an ample array of hotels, nightclubs, restaurants, and museums, including traditional places where tango, one of the world's most romantic dance, is performed and cultivated, through remarkable theatrical tango shows, with live orchestras and a luxury dinner and show amalgamation. Either before or after the congress, we hope you can extend your stay to explore the beautiful landscapes of Argentina, including the

overwhelming Iguazu waterfalls and the majestic Perito Moreno glacier.

Welcome to Argentina!

The Local Organizing Committee

Please follow us at the webpage: https://ptcog63.org

News

2nd World Forum on Particle Therapy

by Neil Burnet

The 2nd World Forum on Particle Therapy was held in Krems, Austria in August 2024. More than 80 international experts in particle therapy from centres in Europe, Asia, Australia, and the USA met to discuss and debate the current and future direction and challenges of particle therapy. The Forum was master-minded and developed by Prof Eugen Hug (MedAustron, Austria), Prof Anita Mahajan (Mayo Clinic, YSA), Prof Bradford Hoppe (Mayo Clinic, YSA) and Prof Steven Frank (MD Anderson Cancer Center, USA). Clinical indications for protons are expanding, yet only a small percentage of those patients that we might consider eligible are ever referred for protons. It was agreed that there is a substantial body of evidence of a value from protons. Despite this, not all radiation oncologists are convinced so some patients may be getting sub-optimal treatment. Therefore, there is an imperative to produce further evidence in order to convince our sceptical colleagues.

In considering heavier ions, further evidence will accrue from patients being treated within formal clinical studies, which is the framework already being used in treating centres. The potential for heavier ions to produce immune stimulation, and the possibility of enhancing this with immune-modulatory drugs, was considered very important to explore. Could we even cure patients with micro- or oligo-metastatic disease?

Technology development, in collaboration with industry, is needed for PT. Fundamental biological science is needed to underpin the combination of drugs with all particles but especially heavier, higher LET particles. A vital aspect of any PT centre is the financial business case, both in establishing and running the centre, and this applies in all jurisdictions.

The positive value of protons, and particle therapy more generally, needs to be promoted to our medical colleagues and service funders so that the appropriate patients can benefit from the technology.

We are pleased to share the **video report** with you.

Spain's Proton Therapy National Plan: A shoot for the Moon

by Alberto Pérez Rozos

Spain is taking a monumental step forward in cancer treatment with the launch of a National Proton Therapy Implementation Plan in the public healthcare system. In collaboration with the Amancio Ortega Foundation and Spanish Government has secured a €280 million donation to install 10 state-of-the-art proton therapy units across the country, cementing Spain's place at the forefront of this cutting-edge cancer treatment worldwide.

The project, announced by President of the government at the end of 2021, aims to ensure equitable access to proton therapy across Spain. The proton therapy units will be distributed in key regions, including Andalusia, Catalonia, the Canary Islands, Galicia, Valencia, Madrid, and the Basque Country. The selection of these locations was based on criteria of accessibility, technical viability, and the ability to maximize the use of existing healthcare infrastructure and human resources. IBA was selected as provider and partner in this project, taking the responsibility of installing the proton therapy units, network, TPS and accessories.

Currently, the Ministry of Health and the Regional Governments are actively working on drafting their building and functional projects, and construction has begun on the installations in Galicia and Madrid-Fuenlabrada. The first patients are expected to begin treatment in 2026, and all units are projected to be fully operational before the end of 2028.

Teams of healthcare professionals, oncologists, physicists, engineers, and administrators are committed to develop functional plans, coordination of patient referrals, and consensus documents of indications for patient selection. Additionally, these teams are working on the creation of a national patient registry, aligned with European standards. Regular national meetings are being held, involving every region of Spain to ensure equity and fair and efficient access to these advanced treatments.

Also, these facilities are supported by the Spanish nuclear safety regulator, that has developed a guidance document for the authorization process that set a new standard in radiation protection for the new projects to come. Once fully operational, Spain will stand as a global leader in proton therapy, offering cutting-edge cancer treatments to its citizens while contributing to the advancement of

international radiotherapy standards. This ambitious project, though complex and long-term, promises to revolutionize cancer care in Spain, delivering world-class medical technology to patients across the nation.

Altogether, the ten new public rooms from Amancio Ortega Foundation, plus the ongoing center being developed in Santander and the two existing private centers in Madrid, add up to a total of thirteen proton therapy centers for cancer treatment in the Spanish healthcare system.

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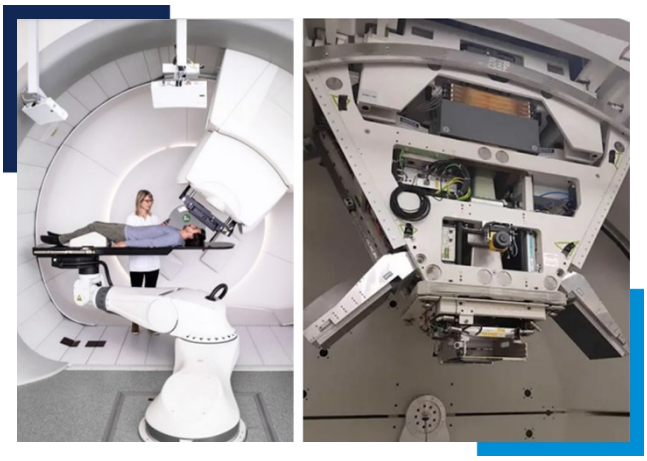
Survey of the Technology Development Subcommittee



Hello PTCOG Community,

The '***Nozzle Design and Beam Application***' Working Group, part of the **Beam Delivery (Technology Development Subcommittee)**, is excited to invite you to participate in our new survey. This effort aims to gather detailed information on nozzle design parameters and beam application methods across particle therapy centers, covering both pencil beam scanning (PBS) and scattering nozzles, including ocular nozzles.

Why Your Participation Matters?
Your input will directly impact the future of particle therapy nozzle design by enabling the working group to:

1. **Identify Best Practices:** Data from a wide range of facilities will help us understand which nozzle design features most effectively enhance treatment precision and safety. As the nozzle design is directly related to the beam application, we also intend to collect data from the scanning system or passive devices that shape the beam to the target volume.
2. This insight will allow us to recommend optimal nozzle configuration and parameters for the beam application technique in the treatment room, supporting centers looking to upgrade or standardize their technology.
3. **Drive Innovation:** Learning about the design trends and challenges you face at your center helps guide future research and development. With real-world data, we can target improvements that

enhance precision, reduce beam loss, and accommodate increasingly complex treatment protocols.

4. **Establish Standardization Guidelines:** As particle therapy continues to grow, having standard nozzle specifications is essential for consistency across facilities, improving patient outcomes, and ensuring centers can easily adopt best practices.

How to Participate

Please fill out the Survey form linked below to indicate your availability for the survey. This survey will take a closer look at design practices across facilities and help drive meaningful advancements in nozzle technology. Many questions will be optional or alternative, so participation will be streamlined for ease and relevance.

Your contributions are invaluable, and we thank you for helping shape the future of particle therapy nozzle design. Findings from this survey will be shared in the PTCOG Newsletter in November, providing insights that benefit the entire community.

Link https://vkgvi47p.forms.app/beam-delivery-nozzle-survey

Best regards,
The Nozzle Design Working Group

Growing Interest in BNCT in the USA

On May 20 and 21, a Boron Neutron Capture Therapy (BNCT) Summit was held in New York City, attended by nearly 200 people. The event brought together leading representatives from science and industry from around the world to discuss current technological advances, therapeutic developments and operational requirements for the further development of BNCT in the United States and in global healthcare.

The organizers, Deerfield Management Company, invited several vendors and representatives from various clinical BNCT centers and scientific societies to discuss important aspects that will be crucial to establishing BNCT in clinical routine, such as the need to establish clinical evidence, collaboration and knowledge sharing, training of healthcare providers and engagement with patient advocacy groups. Participants were particularly interested in issues related to investment in therapeutics and diagnostics related to BNCT.

A summary of the summit and recommendations for advancing BNCT are included in a recently

published white paper, which can be found on the Aviko Radiopharmaceuticals website here: https://avikobnct.com/white-paper/cancer-therapy-bnct-turning-point/

If you would like to share your thoughts on the white paper, please write to Dave Greenwald, CEO of Aviko Radiopharmaceuticals and Vice President of Business Development at Deerfield: dgreenwald@deerfield.com.

Reports from Subcommittees

In this section, each PTCOG subcommittee will report once throughout the year. PTCOG currently has 22 subcommittees, so the newsletter will publish 5-6 reports in each issue.

Update from the PTCOG Education Committee

The PTCOG education meeting offered in the first 2 days of the Annual PTCOG meeting, provides a platform for Basic education about the principles and basic sciences and best practice necessary for starting centers as well as a review for attendees already in practice. Meeting program is the work of The Education subcommittee to choose, prepare, and evaluate topics, experts and teacher to provide the knowledge exchange opportunity with the help of the host representative. The program has been well attended and works as mind-set preparation to the PTCOG scientific meeting.

This year more than 500 participants from all over the globe had found their way to the sessions; a new record in the PTCOG history! The structure of the educational sessions is to start with combined sessions for all professionals in particle therapy to cover the fundamental aspects and provide basic knowledge. The combined sessions are followed by parallel sessions specifically directed to clinicians and medical physicists. New for this year's edition was a separate track also for the RTTs. This group of professionals is of course essential to obtain a high-quality particle therapy operation, but traditionally PTCOG has offered only limited opportunities for RTT training; a situation addressed in Singapore with more than 80 RTTs and dosimetrists participating. The RTT specific track will hopefully re-appear at PTCOG 64.

The last sessions of the educational days were devoted to prepare the participants for the scientific part of the PTCOG meeting with "primer" lectures on hot topics such as FLASH, BNTC and PT translational research and future directions in general.

The educational sub-committee, responsible for the educational program, is dedicated to continuously improve and develop the educational tools and is eager to receive any comments or suggestions you might have; don't hesitate to get in contact with us and we hope to see you at PTCOG 63. ¡Espero verlos a todos en Buenos Aires!

Hesham Gayar and Håkan Nyström

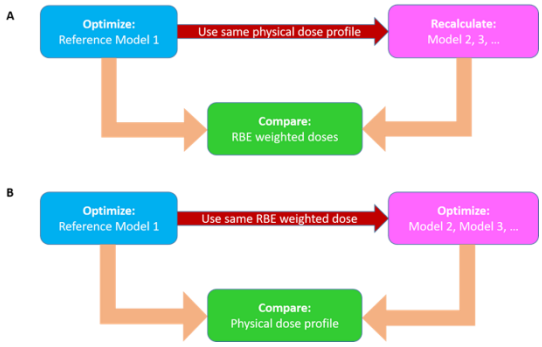
Updates from the PTCOG Breast Subcommittee, 2023-2024

The PTCOG Breast Subcommittee convened on Wednesday, June 12, 2024, at the 62nd Annual PTCOG Conference in Singapore. The meeting was well-attended by both in-person and virtual attendees, and a number of new members from existing and new particle therapy centers with a special interest in breast cancer were added to the subcommittee roster. Ongoing initiatives and future potential projects were discussed. An update on an international survey on the current state of proton therapy utilization for breast cancer was provided. In addition, plans were made to continue progress on a case-based international consensus paper, led by the PTCOG Breast Subcommittee. A new initiative was also discussed on the development of particle therapy-specific dose constraints and treatment planning parameters, including those for cardiac substructures. An update on the status of the RadComp/RTOG 3510 randomized trial of proton vs. photon therapy for breast cancer patients being treated with regional nodal irradiation was also provided, along with an announcement of opportunities for additional analyses and collaborations from the collected trial data repository.

In the past year, the PTCOG Breast Subcommittee conducted an international survey of practice patterns and utilization of proton therapy for breast cancer. This 29-question survey addressed 5 primary topics on 1) overall utilization of proton therapy for breast cancer, 2) technology, 3) patient selection criteria, 4) dose-fractionation regimens, and 5) clinical trial enrollment. The results of the survey, which included responses from 28 respondent institutions, shed light on the evolving utilization of this modality for breast cancer patients and provide a benchmark from which successor surveys can provide insight on practice pattern evolution. The manuscript from this survey initiative, entitled “PTCOG international survey of practice patterns and trends in utilization of proton therapy for breast cancer,” was recently published in Clinical and Translational Radiation Oncology (doi: 10.1016/j.ctro.2024.100847).

We look forward to another productive year of collaboration and progress on new and ongoing initiatives within the growing PTCOG Breast Subcommittee and its international membership.

Updates from the PTCOG CIRT Guideline Subcommittee



The PTCOG CIRT Guideline Subcommittee, Co-chaired by Dr. Brad Hoppe (Mayo Clinic Florida), Dr. Ishikawa Hitoshi (QST Hospital), and Thomas Friedrich (GSI), had their first meeting on September 4, 2024, to discuss its ongoing and future projects. The subcommittee, formed to develop comprehensive clinical guidelines for carbon ion radiotherapy (CIRT), focuses on global collaboration and education within the PTCOG community. It meets quarterly, with the next session scheduled for December 4, 2024.

The meeting began with an overview of the subcommittee's mission and goals, including the consolidation of existing knowledge on CIRT, the development of evidence-based guidelines, addressing clinical practice variations, promoting education, and facilitating collaborative research. The subcommittee aims to complete at least one major project per year.

Key project updates were discussed, including:

1. **Developing Practice Guidelines for CIRT:** This project, led by Dr. Hoppe and Dr. Ishikawa, will use the Delphi Methodology to create expert consensus on CIRT as a standard of care for specific malignancies. A series of surveys will refine indications and dosing guidelines, which are currently lacking outside Japan.
2. **Impact of RBE Model Selection on Treatment Planning:** Led by Thomas Friedrich, this project focuses on addressing the complexities arising from different Relative Biological Effectiveness (RBE) models used in CIRT. The project aims to compare models and evaluate their clinical implications, offering guidance on model integration for future CIRT centers.
3. **Systematic Review of OAR Dose Constraints:** Led by Fossati and Ishikawa, this project will review dose constraints for organs at risk (OARs) across different CIRT models, with the goal of harmonizing global data and improving clinical guidelines.

Caption to figure: “Strategies for comparison of RBE models in clinical settings. A: A given physical dose profile derived from a reference model optimization is used to predict and compare RBE weighted doses with models under consideration. B: Models are all optimized to the same RBE weighted dose, and corresponding physical dose profiles are compared. Notably, model conversion strategies go beyond such comparison and aim to consider model predicted RBE weighted doses which correspond to similar (isoeffective) physical dose profiles.“

Please email Brad Hoppe (hoppe.bradford@mayo.edu) or Katie Moreno (moreno.kathryn@mayo.edu) if you are interested in participating.

Updates from Patient Relations Subcommittee

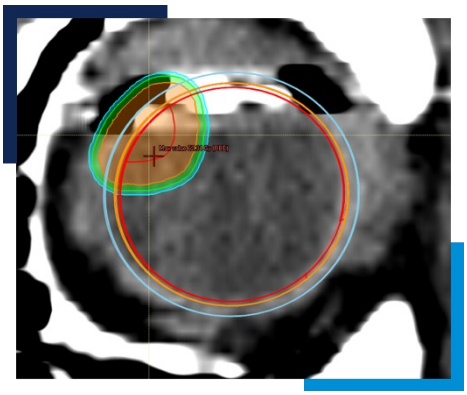
The mission of the Patient Relations Subcommittee is to serve the patient community by educating, informing, and empowering patients through various initiatives. These include:

1. Educating patients by collecting, summarizing, and sharing up-to-date indication information from other PTCOG subcommittees, providing general information about policies and procedures, and summarizing clinical trials and treatment expectations.
2. Informing patients by facilitating communication with hospitals, providing information about treatment cities, including travel and dining details, and advising on health insurance policies and funding programs.
3. Creating a peer-patient online community where patients can share real-life stories, which fosters a supportive environment and allows for the exchange of experiences.
4. Making more resources available for download, enhancing the accessibility of patient education tools and materials.
5. Developing a dedicated website or APP to serve as a platform for connecting, interacting, and empowering patients, aiming to improve patient understanding and experience with particle therapy.
6. Working on public marketing to highlight the advantages of particle therapy and making scientific evidence available to the public, as well as informing about the locations of centers providing this treatment modality.

The subcommittee is also focused on continuously updating and improving the information available to patients, ensuring it is relevant and beneficial for their needs, and adapting to the different requirements of patients from various parts of the world.

Want to find out more? Please contact **Xin Cheng** and **Christian Hyde**

Updates from the Ocular Subcommittee



The Ocular Subcommittee currently includes over 150 recipients to our mailing list. It is led by a core leadership volunteer group of 18 persons with an interest to further increase to have all interested institutions represented. Our subcommittee name was changed in the last year from OPTIC to Ocular Subcommittee to keep in line with the disease site led nomenclature of the other PTCOG subcommittees.

Activities in the last year:

- Second International PTCOG Ocular Proton Therapy Symposium 2024: A six-hour online meeting was held on March 26, 2024, with three educational and 16 scientific presentations. About 200 people attended. Best scientific presentation was awarded to Corné Haasjes of Leiden University Medical Center. A recording of the meeting is available on YouTube: https://www.youtube.com/watch?v=X0cWi0Cozc8&t=13743s
- A white paper “PTCOG Ocular Statement: Expert Summary of Current Practices and Future Developments in Ocular Proton Therapy” presenting a broad overview on ocular particle therapy was published as Open-Access in the Red Journal: https://doi.org/10.1016/j.ijrobp.2024.06.017
- The Ocular Subcommittee met at PTCOG 62 in Singapore with both report on the last year’s activities, current interest, and priorities on future programming.

Ongoing and future projects:

- The 2nd multicenter survey: Data collection is completed. Analyses and writing are underway with tentative expectant submission.
- Consensus paper on margins and volume definitions in treating ocular melanomas.
- The 3rd International PTCOG Ocular Proton Therapy Symposium is tentatively planned for 2026. Current consensus is to solicit educational contributions from our colleagues in Ophthalmology.

We welcome all interested persons regardless of background and experience to become involved, just contact one of the Co-chairs: Jan Hrbacek (jan.hrbacek@psi.ch); Jens Heufelder (jens.heufelder@charite.de); Helen A. Shih (hshih@mgh.harvard.edu)

Updates from the Head and Neck Subcommittee

Subcommittee Activities

Clinical Trials

- MD Anderson Consortium Trial: Phase III: IMPT vs IMRT HN OPC – 440 pts (Steven Frank (USA))
- TORPEDO Trial: Phase III IMPT vs IMRT for HN OPC -205 pts (David Thompson (UK))
- DAHNANCA Trial: Phase III IMPT vs IMRT for HN Cancer (Jeppe Friborg (Europe)) - accruing
- PROTIS Trial: Phase III: PBT vs IMRT Sinonasal Cancer Trial (UK) 276 pts – open 2024

Manuscripts/PTCOG Guidelines

- Incorporating Proton Therapy into Cooperative Group HN Trials (Mark McDonald) (USA) – 2024. DOI: 10.1097/COC.0000000000000672
- ACR-ARS Proton Therapy Practice Parameter for the Performance of Proton Beam Therapy (*IJPT 2024*) https://doi.org/10.1016/j.ijpt.2024.100021
- McCall NS, Frank SJ, Stokes WA: The Case for Allowing Proton Beam Therapy on Head and Neck Cooperative Group Studies. JAMA Oncol. 2024 Mar 1;10(3):289-290. doi: 10.1001/jamaoncol.2023.6274
- ELEKTA ProKnow Head Neck Proton Planning Survey (J.W. Snyder (USA)) - 2024
- International Proton Planning Techniques Survey (~20 International Institutions) [IP]
- MD Anderson Phase III Trial outcomes/Physics/Biology/PRO/Physics (2024/2025)
- Physics Standardization of HN Planning (Mori Shinichiro (Asia)/Xiaodong Zhang (USA)) - 2025
- Planned Meta-Analysis OPC HN Phase III Trials (Pierre Blanchard (Europe)) [TBD] – 2026/2027

Education

- Peri-orbital tumor - orbit sparing
- Mucosal sparing techniques
- Adaptive planning
- Reirradiation

HN Particle Therapy Trial Concepts

HPV Associated

- De-escalation considers dose and volumes
- Subclinical (30 vs 0 vs other)
- Primary (60 vs 70 vs. other)
- Fractionation (standard, Accelerated, Hypo)
- ctDNA directed trials

- RadTox cfDNA Test

Non-HPV associated

- Hypofractionation
- Adjuvant vs Definitive

Adenoid Cystic Cancer (ACC) – Unresectable Trial
Re-irradiation
Immunotherapy integration
LET optimization

- Reduction of toxicity
- Increase tumor control

Robust optimization (tumor control)
RBE derived dosing
Carbon Ion Therapy HN Trials

You would like to learn more? Please contact: Steven J. Frank, MD (USA) sjfrank@mdanderson.org

Updates from the Pediatric Subcommittee

Report from the Pediatric Subcommittee at the PTCOG62 Annual Meeting Singapore, June 2024

In 2024, the PTCOG Pediatric Subcommittee met at the 62nd Annual Meeting in Singapore and proposed the following project for this year.

Practice patterns for the use of particle therapy in pediatric patients varies between centers in Europe, Asia/Oceania, and the Americas. Patient selection varies widely based on proximity to and the capacities of centers and is also complicated by the special medical needs of pediatric patients, including chemotherapy and anesthesia. To facilitate the more effective treatment of children worldwide, it is important to understand the capabilities, needs, and challenges faced by particle therapy centers across the world. Comprehensive guidelines on CT simulation, patient positioning and immobilization, and treatment planning are lacking. Dr. Warissara Rongthong (Thailand) and Dr. Joo-Young Kim (South Korea) shared their work on a Pediatric Practice Patterns Survey of PTCOG-AO members, which was presented at PTCOG62. After discussion, participants at this meeting endorsed the importance of expanding this effort to compare responses between centers in Asia and the rest of the world.

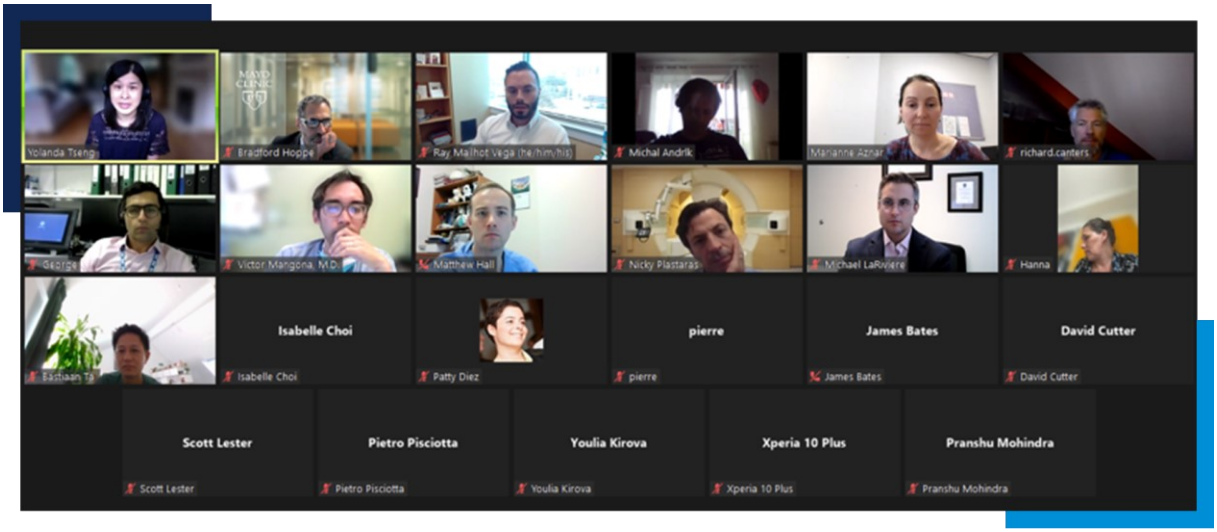
The group resolved to collaborate and develop a Pediatric Practice Patterns survey to expand on this important work and collect responses from active and developing centers in Europe, Asia/Oceania, the Americas, Africa, and the Middle East. Leaders of this working group will include Dr. Joo-Young Kim, Dr. Warissara Rongthong, Dr. Anita Mahajan, and Dr. Matthew Hall. This project will serve as a first step toward the development of a white paper on Guidelines for Pediatric Particle Therapy, including patient selection, CT simulation, patient positioning and immobilization, motion management, plan design, and delivery. This effort is important to maximize the benefits of particle therapy in this important population and guide the implementation of best practices in existing and developing particle therapy centers worldwide.

Matthew D. Hall, MD, MBA
Co-Chair, Pediatric Subcommittee, Particle Therapy Co-operative Group

Updates from the Lymphoma Subcommittee

Over several remote meetings that included US and European colleagues, the PTCOG lymphoma subcommittee discussed ongoing projects, including creation of a multi-institutional database of pediatric patients with lymphoma treated with proton therapy and the role of proton therapy for infradiaphragmatic lymphoma. The committee also contributed to educational sessions at the PTCOG meeting (Particle therapy to spare the heart). The end of the year marked a transition of co-chairs. We thank Dr. Marianne Aznar for her service and welcome Drs. George Ntentas and Stella Flampouri.

More information can be obtained by Yolanda Tseng ydt2@uw.edu



Communication from the International Journal of Proton Therapy (IJPT)

We are pleased to report that the *International Journal of Particle Therapy (IJPT)* has published three volumes and 27 articles so far this year as part of our collaboration with Elsevier. Our final publication, Volume 14, expected to be released in December, will represent an increase in average annual articles published by *IJPT*, surpassing our goal of 28 articles in 2024.

We are extremely proud of our progress: The top three downloaded *IJPT* articles are "Proceedings to the 61st Annual Conference of the Particle Therapy Cooperative Group", "PTCOG Gastrointestinal Subcommittee Lower Gastrointestinal Tract Malignancies Consensus Statement ", and the " ACR-ARS Practice Parameter for the Performance of Proton Beam Therapy". Further, the number of monthly readers of our full-text articles has reached just over 6,000 and the quality of our articles has also resulted in an increased CiteScore of 3.8*.

The *IJPT* and Elsevier editorial teams are currently working with the PTCOG AI Subcommittee to create an *AI in Particle Therapy* Special Issue, which we anticipate will be published at the close of 2025 - more details and deadlines related to this issue are forthcoming. In the meantime, we hope to see you at the PTCOG-NA 10th Annual Meeting in New York City, November 14-16, 2024!

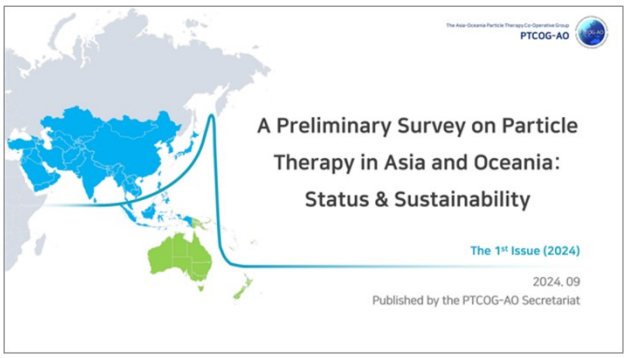
**Metrics reported as of August 2024.*

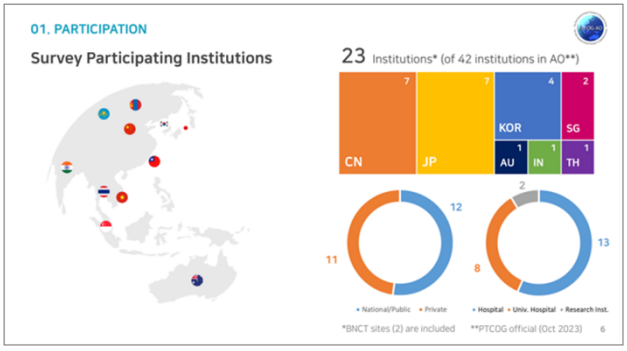
PTCOG Inside

PTCOG-NA

PTCOG-NA has been actively engaged in several key initiatives to advance proton therapy and strengthen our community in North America. In recent months, we've focused on building stronger relationships with key groups, including NRG, PCG, and NAPT. We are also excited to co-host a workshop before ASTRO, where thought-leaders will explore the barriers, strengths, and research landscape for particle therapy in the U.S. Additionally, in collaboration with NRG, we are preparing a manuscript that summarizes a survey on how proton centers manage and understand RBE.

Looking ahead, the 10th PTCOG-NA annual meeting will be held in New York, hosted by the New York Proton Center. Expect cutting-edge research presentations, invited speakers, a thrilling debate, and ample networking opportunities. Save the date for our 2025 meeting in Shreveport, Louisiana—more details to come!



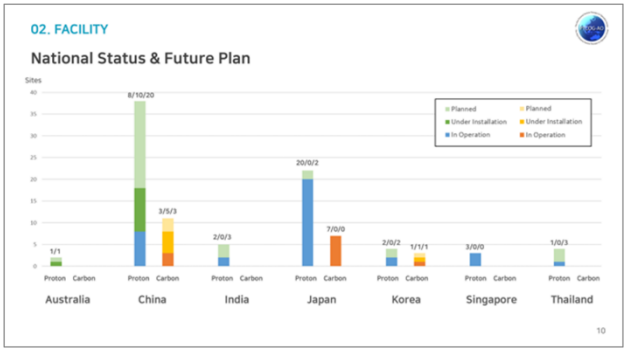


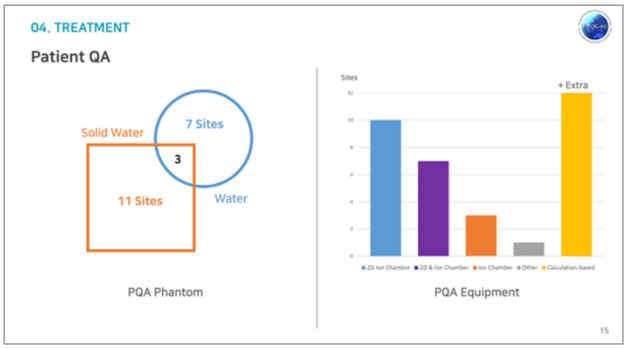
PTCOG-AO

A Preliminary Survey on Particle Therapy in Asia and Oceania]

The Asia-Oceania Particle Therapy Co-Operative Group (PTCOG-AO) recently completed its first project, a preliminary survey titled "*A Preliminary Survey on Particle Therapy in Asia and Oceania: Status and Sustainability.*" The survey aimed to assess and share the treatment capabilities, operational practices, and research activities of particle therapy institutions affiliated with PTCOG-AO, while also establishing a database to support the expansion of particle therapy throughout the Asia-Oceania region.

The survey was conducted online via email between June and August 2024, with 23 institutions from seven countries participating. These institutions included proton therapy centers, carbon ion therapy centers, institutions





offering both proton and carbon ion therapies, and boron neutron capture therapy (BNCT) centers. The participating institutions ranged from long-established providers of particle therapy to those in the process of installing new treatment equipment.
The survey was structured into six key sections: Basic Information, Treatment Facility, Personnel, Planning & Treatment, Cost, and Clinical Research. Below is an overview of the main survey topics:

Main Survey Items:

1. Treatment Facility
2. Personnel
3. Planning & Treatment
4. Treatment Cost & Insurance
5. Clinical Research Projects

This survey provided valuable insights into the current landscape and future direction of particle therapy in the Asia and Oceania regions. It has also laid the groundwork for future collaboration and dialogue among member institutions. The data collected will serve as a crucial foundation for shaping particle therapy policies, guiding the establishment of new treatment centers, and fostering enhanced cooperation among institutions. We anticipate that these findings will help inform future discussions and partnerships among PTCOG-AO member countries.

The preliminary results were first presented at the recent joint PTCOG conference, co-hosted by PTCOG and PTCOG-AO in Singapore. The full results, including additional data to be collected by August 2025, will be published in an international journal and shared with participating member institutions.

Finally, it is worth noting that the Asia and Oceania region is home to approximately 60% of the world's population. Given the current availability of radiation therapy and the growth potential across these countries, particle therapy is expected to expand significantly in the near future. This survey marks the beginning of an ongoing effort; we plan to conduct it annually, with updates and enhanced content, to track developments over time. We appreciate your patience and look forward to sharing the findings soon.

News from the Industry

Comic-books readers listen up. IBA announced the launch of their Proton Pro-Team comic book! Curious readers can find it here: https://www.iba-protontherapy.com/comicbook?mtm_campaign=ComicBook&mtm_source=Fall_Newsletter . And this is not all from IBA. Just as the Proteus User meeting 2024 took place, presenting clinical advancements, updates on the IBA roadmap and emphasising the importance of collaborations, IBA secured a deal with Penn Medicine for two ProteusONE proton therapy solutions.

RaySearch has embarked on a journey to facilitate BNCT dose computation independently of the accelerator technology used to generate the neutrons. With the idea of establishing a harmonised standard format for the phase-space files, including an adequate description of anything relevant for the dose computation, they are very interested in discussing their project with expert of the fields and interested parties. If interested, contact Elias Coniavitis elias.coniavitis@raysearchlabs.com

Leo Cancer Care Ltd. announces new collaborations with LinearBeam, ProTom and ProNova, in addition to its collaboration with Mevion Medical Systems, to promote upright patient positioning instead of expensive gantry systems in proton therapy.

Publications of Interest

Evolution of Proton Radiation Therapy Brainstem Constraints on the Pediatric Proton/Photon Consortium Registry

Dora Correia et al.

https://doi.org/10.1016/j.prro.2024.05.013

The article examines the progression of brainstem dose constraints in proton radiation therapy (PRT) for pediatric patients, utilizing data from the Pediatric Proton/Photon Consortium Registry. Initially, treatment protocols were designed with conservative dose limits to protect the brainstem due to its critical role in neurological function. As clinical experience with PRT has expanded, there has been a notable evolution in these constraints, allowing for more aggressive dosing strategies while still prioritizing patient safety.

The registry has played a crucial role in this evolution by collecting extensive data on treatment outcomes and side effects, enabling clinicians to refine their approaches based on real-world evidence. The article highlights that advancements in imaging techniques and treatment planning have facilitated better targeting of tumors while sparing surrounding healthy tissue.

In conclusion, the ongoing refinement of brainstem constraints reflects a commitment to

Boron Neutron Capture Therapy Delays the Decline in Neurological Function in a Mouse Model of Metastatic Spinal Tumors

Yoshiki Fujikawa et al.

https://doi.org/10.1111/cas.16245

This study investigates the effects of boron neutron capture therapy (BNCT) on neurological function in a mouse model with metastatic spinal tumors. Metastatic spinal tumors often lead to significant neurological decline due to their invasive nature and the resulting pressure on spinal structures. The research aims to evaluate whether BNCT can effectively mitigate this decline.

The methodology involved implanting tumor cells into the spinal region of mice, followed by treatment with BNCT, which utilizes boron-10 and thermal neutrons to selectively target and destroy cancer cells while sparing surrounding healthy tissue. The results demonstrated that mice receiving BNCT exhibited a significant delay in the deterioration of neurological function compared to control groups. Behavioral assessments and neurological scoring indicated improved motor function and reduced symptoms associated with spinal cord compression.

In conclusion, the findings suggest that BNCT

improving therapeutic efficacy without compromising safety. The findings emphasize the importance of collaborative research efforts within the consortium to continuously update and optimize treatment guidelines. Ultimately, this evolution aims to enhance long-term outcomes for pediatric patients undergoing proton therapy, ensuring that they receive the most effective care tailored to their unique needs.

Selection for Proton Radiotherapy of Grade 1–3 Glioma Patients

C.S. Byskov et al.

https://doi.org/10.1016/j.ctro.2024.100836

The article explores the criteria and considerations for selecting patients with grade 1 to 3 gliomas for proton radiotherapy (PRT). Gliomas, which are among the most common types of brain tumors, present unique challenges in treatment due to their location and the need to minimize damage to surrounding healthy tissue. The authors discuss the advantages of PRT, including its ability to deliver high doses of radiation precisely to tumor sites while sparing adjacent critical structures.

Key factors influencing patient selection include tumor histology, size, location, and the patient's overall health status. The article emphasizes the importance of multidisciplinary evaluation involving neurosurgeons, radiation oncologists, and medical physicists to determine the appropriateness of PRT for individual cases. Additionally, it highlights the role of advanced imaging techniques in treatment planning and monitoring.

may offer a promising therapeutic approach for managing metastatic spinal tumors, potentially preserving neurological function and enhancing quality of life. Further research is warranted to explore the long-term effects and clinical applicability of BNCT in human patients with similar conditions, as well as its integration into existing treatment protocols.

Thoracic Proton Minibeam Radiation Therapy: Tissue Preservation and Survival Advantage Over Conventional Proton Therapy

Annaïg Bertho et al.

https://doi.org/10.1016/j.ijrobp.2024.04.011

The article explores the innovative approach of thoracic proton minibeam radiation therapy (PBRT) and its advantages over conventional proton therapy in treating thoracic tumors. PBRT utilizes a unique delivery method that involves administering narrow beams of protons, which allows for precise targeting of tumor tissues while significantly sparing surrounding healthy structures. This technique is particularly beneficial in the thoracic region, where critical organs such as the heart and lungs are at risk during radiation treatment.
The study presents experimental data demonstrating that PBRT not only preserves healthy tissue but also enhances overall survival rates in animal models compared to traditional proton therapy. The authors highlight that the minibeam configuration minimizes the dose delivered to normal tissues, reducing side effects and improving patients' quality of life post-treatment. Additionally, the research indicates

In conclusion, the article underscores that careful selection is crucial for optimizing outcomes in glioma patients undergoing PRT. By tailoring treatment plans based on specific tumor characteristics and patient needs, clinicians can enhance therapeutic efficacy while minimizing potential side effects. Ongoing research and clinical trials are essential to further refine selection criteria and improve long-term outcomes for this patient population.

Reduced Risk of Severe Radiation-Induced Lymphopenia in Carbon Ion Radiation Therapy for Locally Advanced Pancreatic Cancer: A Comparative Analysis of Carbon Versus Photon Therapy

Gowoon Yang et al.

https://doi.org/10.1016/j.ijrobp.2024.04.003

The article investigates the effects of carbon ion radiation therapy (CIRT) on radiation-induced lymphopenia in patients with locally advanced pancreatic cancer, comparing it to conventional photon therapy. Lymphopenia, characterized by a decrease in lymphocyte counts, is a common and detrimental side effect of radiation treatment that can compromise immune function and negatively impact patient outcomes.

The study highlights the unique physical properties of carbon ions, which allow for more precise targeting of tumor tissues while sparing surrounding healthy tissues. This precision is particularly crucial in treating pancreatic cancer, where critical structures are often adjacent to the

that PBRT may stimulate a biological response that further aids in tumor control. In conclusion, the findings suggest that thoracic proton minibeam radiation therapy represents a promising advancement in cancer treatment, offering significant benefits in terms of tissue preservation and survival outcomes. The article calls for further clinical trials to validate these results in human patients and to explore the potential integration of PBRT into standard treatment protocols for thoracic malignancies. This innovative approach could redefine therapeutic strategies and improve patient care in oncology.

Impact of Intensity-modulated Proton Therapy in Reducing Radiation-induced Lymphopenia in Glioma Patients

Anindita Das et al.

https://doi.org/10.1093/noajnl/vdae088

The article investigates the impact of intensity-modulated proton therapy (IMPT) on radiation-induced lymphopenia in patients diagnosed with gliomas. Lymphopenia, characterized by a reduction in lymphocyte counts, is a common side effect of conventional radiation therapies and can lead to compromised immune function, increased susceptibility to infections, and potentially poorer treatment outcomes. Given the critical role of the immune system in cancer treatment and recovery, addressing this issue is paramount.

The study highlights how IMPT utilizes advanced technology to deliver high doses of radiation precisely to tumor tissues while minimizing

tumor. The authors present clinical data indicating that patients undergoing CIRT experience significantly lower rates of severe lymphopenia compared to those receiving photon therapy. This reduction is attributed to the ability of CIRT to deliver higher doses of radiation directly to the tumor while minimizing exposure to lymphoid organs.

Furthermore, the article discusses the implications of preserved lymphocyte levels on patient health. Maintaining a healthier immune system may enhance treatment tolerance and potentially improve overall survival rates. The findings suggest that CIRT not only provides effective tumor control but also mitigates one of the significant side effects associated with conventional radiation therapies.

In conclusion, the research indicates that carbon ion radiation therapy offers a promising alternative for patients with locally advanced pancreatic cancer by reducing the risk of severe radiation-induced lymphopenia. The authors advocate for further studies to validate these findings and explore long-term outcomes associated with CIRT. By integrating this advanced therapeutic approach into clinical practice, there is potential for improved patient care and enhanced quality of life for those battling this challenging disease.

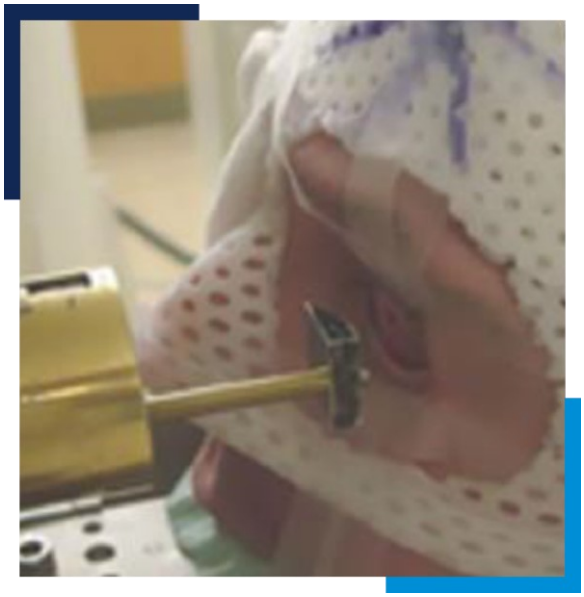
exposure to surrounding healthy tissues, including lymphoid organs such as the spleen and bone marrow. This targeted approach is particularly beneficial for glioma patients, who often require aggressive treatment regimens that can exacerbate lymphopenia when using traditional photon-based therapies.

Clinical data presented in the article demonstrate that glioma patients treated with IMPT experience significantly less reduction in lymphocyte counts compared to those receiving conventional radiation therapy. The preservation of lymphocyte levels not only supports better immune function but may also enhance the overall tolerance to treatment and improve patient quality of life.

In conclusion, the findings suggest that intensity-modulated proton therapy represents a significant advancement in the management of gliomas by effectively reducing radiation-induced lymphopenia. The authors advocate for further research to explore the long-term effects of preserved lymphocyte levels on patient survival rates and overall health outcomes. By integrating IMPT into standard treatment protocols for glioma patients, there is potential for improved therapeutic efficacy and enhanced patient care, ultimately leading to better clinical outcomes in this challenging patient population.

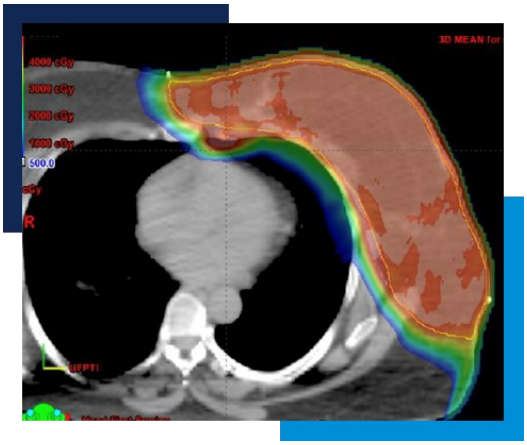
White Papers and Guidelines

White Paper Written by the Ocular Subcommittee



Published as Open-Access in the Red Journal:
https://doi.org/10.1016/j.ijrobp.2024.06.017

Jan Hrbacek, Andrzej Kacperek, Jan-Willem M. Beenakker Linda Mortimer, Andrea Denker, Alejandro Mazal, Helen A. Shih, Remi Dendale, Roelf Slopsema, Jens Heufelder Kavita K. Mishra: “PTCOG Ocular Statement: Expert Summary of Current Practices and Future Developments in Ocular Proton Therapy”



White Paper Published by the Breast Subcommittee

https://doi.org/10.1016/j.ctro.2024.100847

J. Isabelle Choi, Camille Hardy-Abeloos, Alicia Lozano, Alexandra Hanlon, Carlos Vargas, John H. Maduro, Julie Bradley, Birgitte Offerseh, Bruce Haffty, Mark Pankuch, Richard Amos, Nalee Kim, Shannon M. MacDonald, Youlia Kirova, Robert W. Mutter:
“PTCOG international survey of practice patterns and trends in utilization of proton therapy for breast cancer”.
Clinical and Translational Radiation Oncology 48 (2024) 100847

Upcoming Conferences

- November 6-9: 9th Meeting of the Latin America Society of Radiation Oncology (ALATRO), Rio de Janeiro, Brazil. https://www.alatro.org/es/23-Congresos
- November 14 - 16,2024: the 10th annual Meeting of PTCOG-NA in New York Home | PTCOG-NA 10th Annual Meeting
- December 4-6, 2024: FLASH Radiotherapy and Particle therapy Conference, Rome, Italy https://frpt-conference.org/
- February 18-22, 2025: Mini Micro Nano Dosimetry (MMND)+Innovative Technologies in Radiation Oncology (ITRO), Sydney, Australia https://www.uow.edu.au/engineering-information-sciences/mmnd-itro-2025/
- March 6-7, 2025: 5th BIR Annual Radiotherapy and Oncology Meeting, London, UK.https://www.mybir.org.uk/l/s/community-event?language=en_GB&id=a17QC00001iD2cAYAS
- March 11-12, 2025: Protons to heavy ion conference, Caen, France (no website yet)
- Mar 17 – 19, 2025: 3rd Int'l Workshop on Particle Minibeam Therapy, National Physical Laboratory, Teddington, UK. https://www.pmbt-group.org/workshop2025/overview
- March 18-21, 2025: 7th Proton Physics Research and Implementation Group meeting, National Physical Laboratory, Hampton Road, Teddington, Greater London (no website yet)
- Mar 20 – 21, 2025: 7th Proton Physics Research and Implementation Group (PPRIG) Workshop, National Physical Laboratory, Teddington, UK http://www.pprig.co.uk/pprig/meetings/
- May 2 – 6, 2025: ESTRO 2025 in Vienna. https://www.estro.org/Congresses/ESTRO-2025
- June 2 – 7, 2025: PTCOG 63 in Buenos Aires. https://ptcog63.org
- June 19-21, 2025: 31. Kongress der Deutschen Gesellschaft für Radioonkologie DEGRO, Dresden https://www.degro-kongress.org/
- September 17-19, 2025: ImmunoRad 2025, Paris, France (no website yet)
- September 28 - October 1, 2025: ASTRO's 67th Annual Meeting
- November 7 - 9, 2025: 5th annual conference of PTCOG-AO in Hong Kong “Advancing Particle Therapy with Greater Precision and Image-Guidance.”

Findings

Particle Therapy Co-Operative Group

The Particles Newsletter is an electronic publication focusing on PTCOG activities and topics for those interested in radiotherapy with hadrons. It's a platform for PTCOG members to share worldwide achievements and trends in the fields of clinical treatment, medical physics, radiobiology and technology in particle therapy. It highlights actual important research and reports about important activities in PTCOG Subcommittees and working groups as well as news about developments in the particle therapy industry.
PTCOG Members are invited to submit suggestions of topics which could be of broad interest to the particle therapy community worldwide (email to: w.sauerwein@uni-due.de).

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