

Subcommittee Name: **Treatment Efficiency**

Co-chairs

Name	Country	Term started	Term ends*
Chin-Cheng Chen	United States	07/01/2026	06/30/2029
Frank Emert	Switzerland	07/01/2020	06/30/2027
Sung Yong Park	Singapore	07/01/2020	06/30/2027
Hong-Qi Tan	Singapore	07/01/2027	06/30/2030

*The term of office is 3 years and may be renewed once, for a maximum total service of 6 years. It is recommended that the 3 co-chairs come from 3 different continents (America, Asia, Europe). To ensure continuity, it is recommended that the co-chairs step down on a staggered basis following their first three-year term.

Subcommittee Achievements (e.g. white papers, publications, workshops, ...) – max 2,000 characters including spaces

The Treatment Efficiency Subcommittee aims to advance particle therapy modalities and associated workflows to improve treatment efficiency while maintaining the highest standards of quality and safety. To support this mission, the subcommittee conducted two in-person workshops on machine-specific and patient-specific QA, which proved highly valuable in clinical practice, particularly during the rapid global expansion of particle therapy centers from 2010 to 2020. In addition, two white papers were published to provide guidance for particle therapy centers in establishing and refining QA programs, with the goal of improving treatment efficiency.

White Papers (<https://ptcog.online/ptcog-publications/>):

- Emert, F, Dahlgren, CV, Chen, CC, Li, H, Flanz J, and, Robertson, D, PTCOG Treatment Efficiency Subcommittee Risk Assessment Report on Patient-Specific Quality Assurance, PTCOG Report No. 1, June 2026, 130 p.
- Flanz, J, Litzenberg, D, and Chen, H, White Paper on Particle Therapy Efficiency: Aspect of Quality Assurance, ver. 1, PTCOG Report No. 2, May 2016, 13 p.

Workshops:

- 2nd Particle Therapy Efficiency Quality Assurance Workshop, Knoxville, Tennessee, United States, December 2017.
- 1st Particle Therapy Efficiency Quality Assurance Workshop, Knoxville, Tennessee, United States, November 2015.

Do you maintain a mailing list of subcommittee members (Yes/No)?

Yes.

The current mailing list comprises almost 100 participants. We have also identified the active members who are engaged in initiating, leading, and contributing to ongoing and newly established workgroup projects.

Should the subcommittee continue its work (Yes/No)?

Yes.

Over the past decade, particle therapy has entered a new phase driven by advances in beam delivery, including upright positioning, FLASH, and SFPT, as well as the growing use of artificial intelligence (AI). These developments require updated quality assurance (QA) programs for both machine- and patient-specific processes, incorporating new QA equipment and clinical procedures. AI-enabled QA and more efficient workflows are also expected to become widely adopted. To better reflect this broader scope and mission, we propose renaming the subcommittee the ***Treatment Efficiency and QA Subcommittee***. The new name recognizes the subcommittee's achievements and future direction while ensuring that QA, an essential component of clinical practice, is formally represented within the PTCOG subcommittee structure.

If yes, please describe the planned activities and goals for the next 3 years – max 2,000 characters including spaces

The planned activities and goals are:

1. AI in workflow (Workgroup Chair: Frank Emert):

- Establish a vendor- and method-neutral, risk-based framework to identify where automation and AI can improve clinical workflow efficiency and QA in particle therapy, initially focusing on PBS proton therapy.
- Analyze key bottlenecks, including protocol retrieval, data transfer and review, treatment planning, (Patient-specific) QA, and documentation.
- Match each task to the least complex suitable approach: deterministic automation, machine learning, grounded generative AI/LLMs, or hybrid tool-based systems.
- Require each intervention to undergo risk assessment, independent validation, lifecycle monitoring, and human oversight, with predefined fallback and rollback.
- Deliver a joint charter, task-to-method matrix, two pilot projects, and a common validation and reporting framework for future multicenter evaluation, with success defined by reduced avoidable workload while maintaining safety, accuracy, consistency, traceability, and error-detection capability.

2. Computer-assisted QA and data management (Workgroup Chair: Chin-Cheng Chen):

- Review plan-check script/software compatible with different Oncology Information Systems (OIS), Treatment Planning Systems (TPS), and Particle Therapy Systems (PTS), including both in-house and commercially available solutions.
 - Review machine QA and data management tools that integrate with particle therapy system and QA equipment to enable real-time data acquisition, trend analysis, machine performance monitoring, and downtime logging.
 - Reach consensus on appropriate usage and development, and draft corresponding guidelines and recommendations.
 - This workgroup was formed at the 63rd PTCOG Annual Meeting.
 - The survey results were presented at the 64th PTCOG Annual Meeting.
3. Collaborate with other PTCOG subcommittees (e.g., AI, ECR, Beam Delivery, and Imaging) and international professional organizations (e.g., AAPM, IOMP, and ESTRO) to exchange guidelines and recommendations on particle therapy QA programs.

Please circulate this form to all subcommittee members and once agreed upon by the subcommittee submit it to: secretariat@ptcog.online (cc: m.durante@gsi.de) within:

August 30, 2026

Please attach the list of subcommittee members (name and country).

The information contained in this form and the list of members will be uploaded on the webpage of your subcommittee (see: <https://ptcog.online/subcommittee/>).

Subcommittee Members

The listed subcommittee members reviewed and agreed on the information in the survey form.

Name	Country
Abdallah Qubala	Germany
Alessandra Bolsi	Switzerland
Chang Chang	United States
Chia-Jung Wu	Taiwan
Chin-Cheng Chen	United States
Daniel Robertson	United States
Dennis Mah	United States
Dongho Shin	Korea
Edgar Gelover Reyes	United States
Estelle Batin	United States
Francis Yu	United States
Frank Emert	Switzerland
Haibo Lin	United States
Hong-Qi Tan	Singapore
Isabella Colizzi	United States
Jinsung Kim	Korea
Joseph Bateman	United Kingdom
Julian Horn	Germany
Kwangzoo Chung	Korea
Lei Hu	United States
Lew Kah Seng	Singapore
Mark Ka Heng Chan	United States
Mark Pankuch	United States
Nicholas Lynch	United States
Niek Schreuder	United States
Sara St. James	United States
Simon Jolly	United Kingdom
Sung Yong Park	Singapore
Thomas J. Whitaker	United States
Tom Hrinivich	United States
Wen Chien Hsi	China
Yao Hao	United States
Yuting Li	United States