WP2: Dose assessment, quality assurance, dummy runs, technology inventory

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As of October 2023, 50 participants were contributing to WP2, from 32 centres based in 13 countries.

The 6th yearly meeting of WP2 took place in December 2022, conducted in an online format. In addition to managing organizational aspects, the workshop covered five primary topics, with four of them laying the groundwork for activities in 2022/2023:

New key data for reference dosimetry in proton therapy

Hugo Palmans gave a presentation about the recent publication titled "Current best estimates of beam quality correction factors for reference dosimetry of clinical proton beams" (Palmans et al. 2022, Phys. Med. Biol. 67, 195012). In his presentation, he discussed the revisions made to the tabulated beam quality correction factors that are expected to be included in the forthcoming TRS-398 update. He also clarified the reference conditions for reference dosimetry of quasi-monoenergetic proton beams in pencil beam scanning (PBS). We believed it was crucial to engage in this discussion due to the unclear publication date of the TRS-398 update and the urgent requirement for the proton PBS community to establish a common understanding of reference dosimetry.

Follow up from the 3rd WP2 thematic workshop on TRS-398 update

As highlighted in the previous ESTRO newsletter regarding WP2 and the Aarhus workshop (DCPT), an intriguing discovery emerged when comparing monitor calibrations across different centres. This finding revealed a significant variation in energy dependence, even among machines from the same vendor. Consequently, it was determined that further exploration of this issue should be pursued as a collective effort. In February 2023, an online meeting was organized to seek a consensus on standardizing monitor calibration for the purpose of facilitating institutional comparisons. While a consensus was not reached, a smaller core group was established to address the matter, and several institutions expressed their interest in participating in an experimental campaign. The first feasibility test is scheduled for November 2023 at PSI. The challenge in reaching a consensus stemmed from the varying interpretations of existing guidelines by different centres. These discrepancies were particularly evident in areas such as the positioning of plane-parallel ionization chambers in water for reference dosimetry. This underscores the deficiencies in the current code of practice, resulting in ambiguities and emphasizing the need, as mentioned earlier, for clear and specific clarifications.

LET measurements for TPS validation of LET calculations

In late 2022, a new endeavor was launched by the Danish Center for Particle Therapy (DCPT) in collaboration with EURADOS WG9. This initiative is focused on exploring the feasibility of measuring Linear Energy Transfer (LET) in particle beams. The inaugural workshop and experimental campaign occurred from December 8th to December 10th, 2022, at DCPT and drew participation from more than 45 individuals. During this event, various techniques and detectors for LET measurements were compared. The motivation for such measurements arises from the potential scenario where LET reporting becomes a standard practice in clinical settings. Indeed, LET reporting was a central theme

in a dedicated workshop held in Manchester under the title "Beyond Physical Dose" (see dedicated report).

ESTRO-EPTN radiation dosimetry guidelines for the acquisition of proton pencil beam modelling data

The proposal, initiated by Carles Gomà, to create a guideline on the acquisition of proton pencil beam modelling data received approval from the ESTRO Guidelines committee in March 2023. Both the writing panel and the external reviewing panel have been established. However, the request to publish in the green journal was denied, and the editors suggested phiRO instead. The assigned word limit of 3,000 words has proven to be quite challenging. The manuscript is now in an advanced stage and is currently undergoing its final internal review.

ESTRO Physics Workshop 2023 on patient specific quality assurance (PSQA)

In 2022 the suggestion was made to have the 4th WP2 thematic workshop as a collaborative event with WP5. It was decided to seek approval for a dedicated ESTRO Physics Workshop with the title "Towards a consensus on pre-treatment verification in particle therapy", which was granted. This 2day workshop occurred in Torino on October 13-14, 2023. The chairs and main organizers were Marie Vidal (WP2) and Liliana Stolarczyk (WP2). The workshop had 33 participants, predominantly from Europe, with attendees from North America and Australia. Representatives from more than 20 centres and four vendors were present. Before the workshop, an online pre-meeting was held in September 2023, featuring a survey on Patient-Specific Quality Assurance (PSQA). During the 2-day workshop, participants displayed high motivation and engaged in lively discussions. It was clear to everyone that the consensus was to progress towards measurement-less PSQA, relying instead on Monte Carlo simulations and possibly log-file-based quality assurance. Additionally, it was emphasized that the decision to reduce the number of measurements at a centre should be based on a rationalized risk assessment, which would include also the centre's experience. As a follow-up, it was agreed to continue the discussion and collaboration within EPTN (with WP2 having a dedicated subgroup on PSQA). A post-workshop meeting will also be organized. A comprehensive report will be included in a dedicated ESTRO Newsletter for all ESTRO Physics Workshop of 2023.

The yearly meeting of the WP2 on updates regarding the current activities and on organizational aspects will be held online in December 2023. In that occasion proposals for the next thematic workshop of the work package will be collected.