Peer Review File

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Reviewer Comments

Comment 1: The final section on the evolving role of the medical physicist lacks clarity, and it is hard to understand what new insights might be gained by the reader
Reply 1: Since the discovery of AI and its promising applications in radiation therapy, there have been concerns about how AI may negatively impact the works of medical physicists. The final section on the evolving role of the medical physicist points out the need of a medial physicist when AI is eventually implemented.
Changes in the test: We have not modified the text in this section, see pages 16 to 18, lines 606 - 656

Comment 2: Could clarify 49-50, what does this mean
Reply 2: AI has simplified treatment planning procedures. This means that, clinicians who have limited knowledge in treatment planning procedure can easily familiarize themselves with the use of AI and eventually become experts. This therefore could shift the works of a medical physicist from treatment planning to QA.
Changes in the test: We have not modified the text in this section

Comment 3: In line 86 and line 168, modeling of the radiation response is mentioned in both sections, maybe make some connection between these two parts. mention that during the follow-up we collected data and built a model and this model can be then used during the consultations to guide clinicians to select the best treatment options.
Reply 3: We have modified our text as advised
Changes in the test: See page 10, line 420 - 421

Comment 4: Title includes "how relevant to physicist", didn't see many discussions on this
Reply 4: how relevant to physicist is referring to the role of the physicist
Changes in the test: We have not modified out test. see pages 16 to 18, lines 606 - 656

Comment 5: Line 66: not sure why MC simulation is mentioned in this paragraph. To me, this is only a small subfield of the application of AI in RT. Commercially, many other algorithms such as superposition algorithms (e.g., AAA, collapse cone) are much more popular. MC should be added to the subsection of treatment planning
Reply 5: MC has been moved under Quality Assurance.
Changes in the test: We have modified our text in this section. See page 14 to 15, lines 507 to 536.

Comment 6: Section "simulation" is to be better organized and many sentences do not explain themself. line 105, is not clear, too vague, and needs more clarification. Line 107, didn't get it, one can easily calculate the dose based on axial planning CT,

why multiple views? What does "structural image segmentation" mean? The discussion on the applications seems to jump all over places, may need to better organize these and add a concise sentence to summarize at the very beginning, e.g., image registration, synthetic CT/MR, motion management ...
Reply 6: Simulation section has been reorganized as advised
Changes in the test: We have modified our text in this section as advise, see page 4 to 8, lines 105 to 262.

Comment 7: As mentioned, AI-aided dose calculation should be added to this section. The paragraph puts too much effort into discussing auto segmentation, this is important but not the key application of AI in treatment planning. Authors should focus on applications such as auto-planning, auto dose prediction, auto-fluence optimization etc instead. Or authors can split segmentation and planning into two separate sections.
Reply 7: Treatment panning section has been reorganized as advised.
Changes in the test: We have modified our text in this section as advise, see page 8 to 11, lines 264 to 376.

Comment 8: Treatment delivery. Line 152-154, this does not make sense to me. The gamma index is only an analysis method. For QA itself, one can use portal dosimetry, phantom measurement using film, ion chamber, diode/ion array, or even do in-vivo verification. Also, there are maybe machine QA that doesn't rely on gamma analysis at all. May need more appropriate examples of applying AI to QAs. The discussion should be centered on "gamma analysis"
Reply 8: Gamma index has been moved under Quality Assurance. More examples of AI to QAs have also been provided.
Changes in the test: We have modified our text in this section as advise, see page 12 to 15, lines 423 to 536.

Comment 9: May need more discussions on the obstacle to introducing AIs into clinics, i.e., technical issues, safety, potential to interrupt clinical workflow, ethics issues, quality assurance of AI tool, trust, credibility, interpretability, etc. I didn't see much on these
Reply 9: Obstacles to introducing AI into clinics have added as advised.
Changes in the test: See page 15 to 16, lines 538 to 603