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Editorial

Five years, 20 volumes and 300 publications of *Physics and Imaging in Radiation Oncology*

This editorial celebrates that *Physics and Imaging in Radiation Oncology* (phiRO) has been five years in operation [1,2]. Since its launch in January 2017, phiRO has circulated 20 complete volumes containing a total of 300 publications. By now, phiRO is firmly established as a valuable publishing alternative for physicists and imaging scientists in radiation oncology. Taking advantage of its strong connection to the European Society for Radiotherapy and Oncology (ESTRO), we have strengthened the journal through linking it to ESTRO's science-focused activities such as the physics workshops and the annual conferences. These activities have resulted in dedicated thematic special issues on radiotherapy physics and imaging topics [3,4] as well as conference highlight issues reporting in paper form the very best physics and imaging research that was presented at the conference [5–8]. Also this editorial accompanies the special issue of physics and imaging highlight papers from the ESTRO 2021 conference, with important papers from across our field already published [e.g. 9,10], and several other strong papers soon to appear.

During our five years of operation, imaging has continuously increased in importance in radiation oncology in general, and this is also reflected in the development we see in phiRO (Fig. 1). So far we have published three special issues dedicated to different aspects of imaging in radiotherapy. These special issues were dedicated to computed tomography (CT) developments for treatment planning dose calculations in radiotherapy, functional imaging for prostate cancer, and magnetic resonance (MR) imaging in radiotherapy. Publications in these special issues but also other papers showed that the development of different strategies for including pre-treatment imaging information into treatment decisions and planning continue to be a major medical physics research topic. E.g., in the special issue on CT developments, a survey-based evaluation on inter-center variability of stopping-power prediction in particle therapy demonstrated the importance of appropriate use of treatment planning CT data for precise dose calculations [11]. Also on-board imaging techniques are being developed for online radiotherapy adaptation and assessment of treatment response. Overall, the increasing proportion of phiRO papers related to imaging aspects in radiotherapy is mostly due to the increasing number of studies investigating the use of imaging during the course of treatment or for online adaptation (Fig. 1). Several recent phiRO publications focused on methods to enable online adaptive radiotherapy, often exploring artificial intelligence (AI) approaches to solve the related tasks with ultra-short latency times. Maspero et al. [12] introduced a new approach to cone-beam CT (CBCT) based radiotherapy for different entities using a single neural network whereas another study focused on investigating the clinical implementation of AI-driven CBCT-guided online adaptive radiotherapy [13]. As fast automatic annotation of imaging information is crucial for online adaptive radiotherapy, methods for AI-based segmentation were presented and benchmarked by multiple groups [14,15]. Finally, a growing number of papers were published in phiRO during the last two years related to online adaptive and functional MR-guided radiotherapy using hybrid MR-Linacs [16–18].

Last year we received the most recent recognition of our journal's continued development, by being selected for inclusion in the PubMed Central database. Traditionally, science has been disseminated in peer-reviewed papers recorded in databases such as PubMed, and more recently Scopus and Web of Science, and the impact of the papers has been quantified as the number of downloads and citations. Despite being a relatively young journal, phiRO is already documenting considerable usage also in terms of citations numbers and statistics in these databases. Of the 300 publications we published the first five years, 12 papers have according to Scopus so far been cited more than 20 times, and 107 papers have 5 or more citations, while our CiteScoreTracker (for February

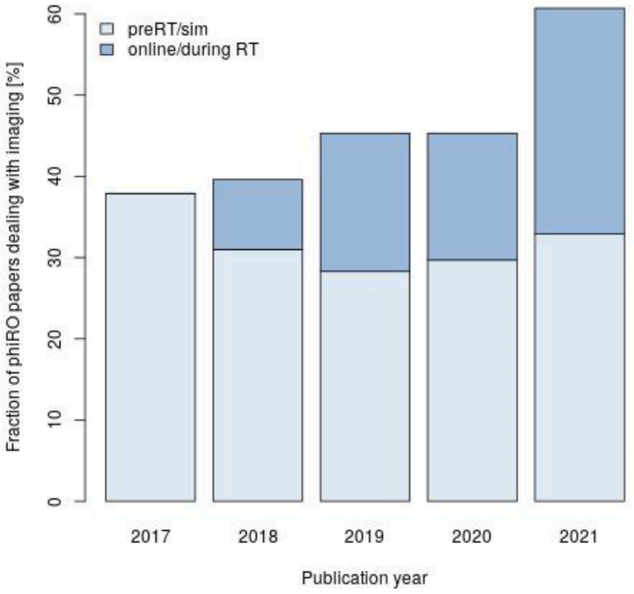

Fig. 1. Fraction of imaging related publications per year in phiRO during the period 2017 to 2021, separated into papers investigating imaging for radiotherapy simulation purposes (preRT/sim) and papers looking at the use of imaging during radiotherapy (online/during RT).

https://doi.org/10.1016/j.phro.2022.02.018

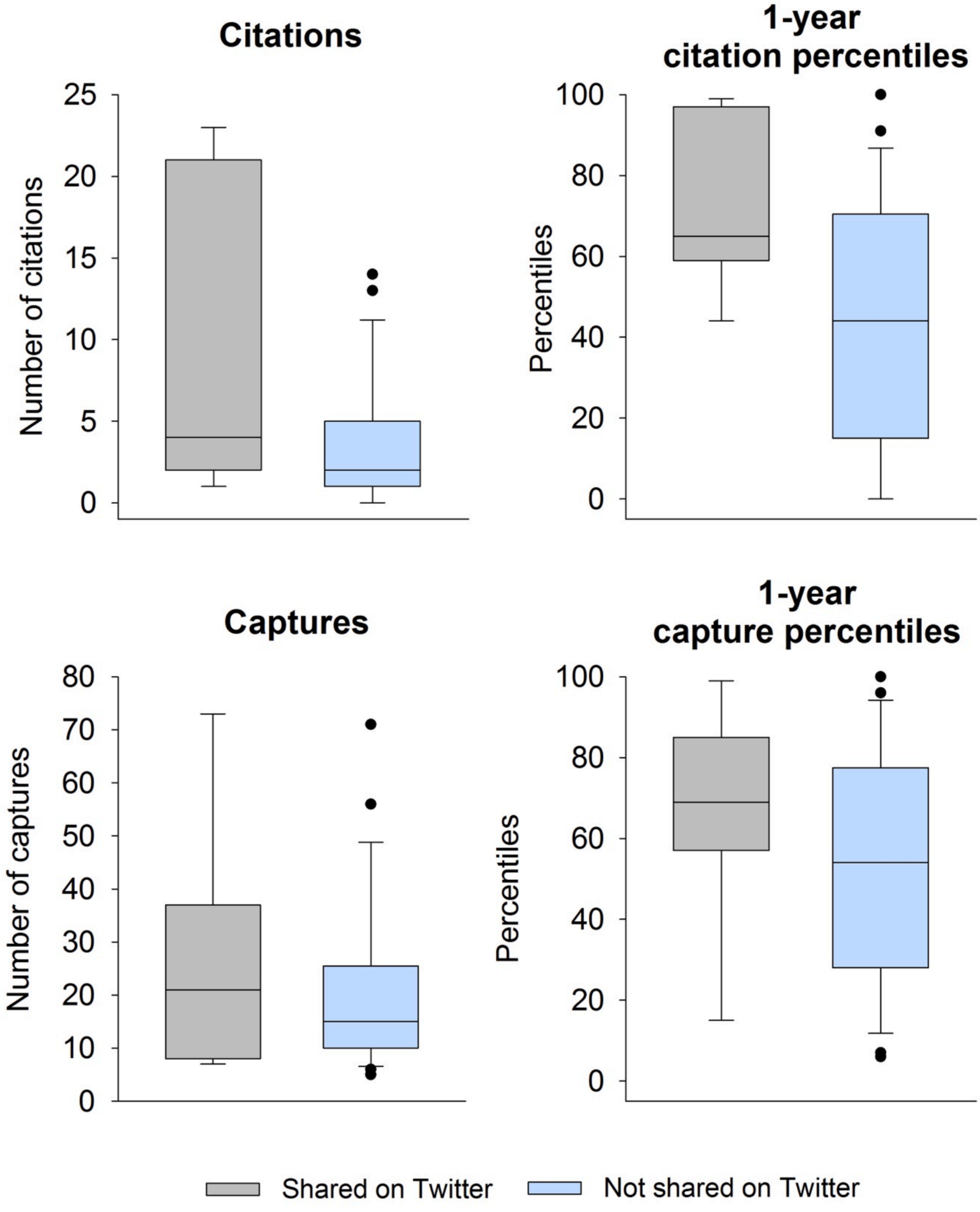

Fig. 2. PlumX Metrics of citations and captures for ESTRO 2020 highlight issue papers in phiRO that we shared on Twitter (n = 7; grey) vs. those from the same highlight issue that we did not share (n = 25; light blue), with each box plot showing the median (horizontal line), 25%-75% quartile and the range of the presented metric. The number of citations and captures 12–15 months after publication is shown in the left panels, while the 1-year percentiles of the citations and captures are shown in the right panels. Statistics collected February 20, 2022.

2022) is at 3.9. However, recently we have seen new directions in scientific dissemination patterns, partly attributed to the increasing focus on open science. This has led to the expansion of preprint servers such as arXiv, sharing of data, application of the FAIR (Findable Accessible Interoperable Reusable) principles [19], as well as data analytics and the use of social media. Paradis et al. [20] reported that sharing information about radiation oncology papers on the social media platform Twitter resulted in increased interest in the papers, and consequently more citations. This was demonstrated through a correlation between number of tweets and number of citations in Scopus. In addition, the 11% of papers with a pre-publication Twitter "buzz" (defined as a paper with ≥10 tweets before publication) had almost four times more citations in Scopus when compared to papers with no "buzz." Recognizing that Twitter could represent a potential new arena for post-publication review and scientific discussions, we performed an initial study of the possible impact of sharing and discussing new papers in our journal on Twitter. Seven papers published as part of the ESTRO 2020 highlights special issue were tweeted about from our journal's Twitter account

(@PhiroTweets). The other 25 papers in the same highlights special issue were selected as a suitable control group. In February 2022, 15 months later, the impact of all papers was evaluated by the PlumX Metrics [21]. The results revealed a trend of increased number of citations and captures for the papers shared on Twitter, compared to those not shared (Fig. 2). Hence, both the results reported by Paradis et al. [20] and our early assessment indicate that Twitter is becoming an important platform for discussions of scientific papers. Whether the association between Twitter attention and increased citation numbers of phiRO papers will translate into a stronger scientific impact requires further studies.

The new trends toward open access also stimulate more modular science dissemination, as proposed by Fuller et al. [22]. This concept refers to a system where one can dynamically link modules of a larger research project, such as the research plan, a clinical trial protocol, a pre-print, an open-access publication, the sharing of data, the sharing of software, and a software publication. This may for example be done by linking digital object identifiers (DOIs) of each module. Such a system would be attractive in cases of retraction, errata, correction, data updates and further developments, as the relevant information would be embedded not only in later references but also in previously submitted modules. Such transparent dissemination of science would require the leadership of scientific societies, journals and publishers to act as mediators of the modular infrastructure. Although new preprint platforms allow increased speed and transferability of science, the peer-review process provided by high-quality scientific journals, such as phiRO, is still essential to maintain the credibility of science. With open science finding its way through open-access peer-review journals, increased availability and equity of science can be provided while preserving quality. This combination of open access and high-quality, rigorous peer-review continues to be a characteristic feature of phiRO.

During the coming years, *Physics and Imaging in Radiation Oncology* and its associated team of editors, editorial board members and reviewers will continue our committed work for the benefit of physicists and imaging scientists in our field. While the achievement of an Impact Factor would be a welcome – and expected – next step, we believe that phiRO has already delivered far more and better than expected. However, to stay on this road of growth and improvement, we need the withstanding support and input from all in our field: authors to submit your strongest papers to us, active scientists to critically review submissions for us, and readers to continue using, discussing, tweeting about and also citing our publications. Indeed, we need your help so that we in return can help you by making phiRO a first-choice publishing alternative for the physicists and imaging scientists in radiation oncology.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Ludvig P. Muren[a,b,*], Kathrine R. Redalen[c], Daniela Thorwarth[d]

[a] *Danish Centre for Particle Therapy, Aarhus University Hospital, Aarhus, Denmark*

[b] *Department of Clinical Medicine, Aarhus University, Aarhus, Denmark*

[c] *Department of Physics, Norwegian University of Science and Technology, Trondheim, Norway*

[d] *Section for Biomedical Physics, Department of Radiation Oncology, University of Tübingen, Tübingen, Germany*

[*] Corresponding author.

E-mail address: ludvmure@rm.dk (L.P. Muren).