

Purpose: To demonstrate the efficacy of a peer review system (PRS) for remote quality assurance in radiation oncology. The PRS is a Web-based system which allows radiation oncologists to share anonymous treatment plans (imaging, structure sets, and dose distributions) with peer reviewers for their feedback.

Methods: We have developed a DICOM-RT compliant PRS that can store patient images and treatment planning data. The PRS infrastructure consisting of three components: Gateway, Web Server and Web Viewer, which is developed with current Web technology, utilizing .NET framework and Silverlight plug-in for web interface. The patient data can be visualized through a Web browser and distributed across multiple locations by the local area network and the Internet. The submitter uses the Gateway to anonymize patient data, chooses a reviewer from the master list, adds annotations and messages and submits patient data for review via the PRS Web Server. Upon receiving the data from the submitter, the reviewer is notified via email and prompted to review the submitted treatment plan from the Web Viewer simply by clicking on the embedded URL. The PRS Web Server has built-in functionality to keep track of reviewer comments communication between submitter and reviewers.

Results: The system was evaluated at two facilities with different treatment planning systems (Varian Eclipse v.8.9 and Philips Pinnacle v.9.0). The CT images and related DICOM-RT objects for several different patients from each facility were successfully submitted and reviewed using the prototype PRS.

Conclusions: The PRS has been successfully pilot-tested for remote peer-review of treatment planning data. The PRS allows radiation oncology service providers access to treatment planning data from any location and an ability to review it in an interactive and collaborative manner. The broader implementation of the PRS in clinical settings will improve the quality and safety of radiation therapy.