Purpose:
To demonstrate a Web-based electronic peer review system that has the potential to improve quality of care for radiation therapy patients. The system provides tools that allow radiation oncologists to seek peer review of target and critical structure delineation, treatment plans, and share clinical data with peers to optimize radiation therapy treatments.

Material and Methods:
Peer review of radiation therapy treatment planning data prior to its initiation improves the quality of radiation therapy and clinical outcomes. Web-based access to radiation therapy treatment planning data and medical records mitigate existing geographical and temporal constraints. With internet access, the healthcare provider can access the data from any location and review it in an interactive and collaborative manner. Interoperability standard like DICOM-RT and IHE-RO compliant RT Systems have facilitated the design and implementation of PRS with Silverlight Web technology, .net Framework and SQL Server. Local DICOM-RT archive and cloud based services are deployed to facilitate remote peer reviews.

Results:
To validate the PRS system, we tested the system for 100 patients with Philips Pinnacle v 9.0 and Varian Eclipse v 8.9 treatment planning system (TPS). We transmitted the DICOM RT data from the TPS to the cloud based services via the PRS local DICOM RT Archive. Various CT simulation based parameters such as orientation of CT, properties of RT structures etc. were compared between the TPS and PRS system. Data integrity of other parameters such as patient demographics (patient name, ID, attending physician etc.) and dose volume related parameters were also evaluated. Such rigorous testing allowed us to optimize the functionalities and clinical implementation of the PRS.

Conclusions:
We believe that the PRS will improve the quality and safety of a broad spectrum of radiation therapy patients treated in underserved areas while discouraging the overutilization of expensive radiation treatment modalities.

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