

Purpose:

To implement a web-based DICOM-RT PACS for peer review, quality assurance and clinical outcome studies in proton therapy

Method and Materials:

We have designed and deployed a web-based clinical data submission and retrieval system to implement a successful peer review and clinical QA paradigm for proton therapy treatment plans. Our proprietary local DICOM server automates the communication between the TPS and our web-based secure client application. The TPS outputs the clinical treatment plan as DICOM-RT objects, which are then uploaded to the central server via a secure web-based link. The data sets are automatically anonymized based on one-to-one mapping that is known only to the submitter of a patient plan. It is often necessary to supplement this data set with additional information in order to appraise the plan reviewers of clinical rationale used in the plan evaluation and selection. The information that is not part of the DICOM ion-plan includes; proximal and distal margins used to account for range uncertainty, smearing and smoothing margins for compensator design, distal blocking to spare OAR, etc. The submitter may generate screen captured views of a plan and add comments, instructions, and provide planning criteria by adding multi-media data. This information is converted to DICOM objects and is submitted to the server as a part of a plan. The reviewers can use our web-based client application to retrieve part or all of the submitted data set and use their own TPS for more comprehensive plan evaluation.

Results and Conclusion:

The treatment plans for several prostate patients have been successfully submitted to and retrieved from the prototype system at UFPTI. In all cases, the restored plans maintained the integrity of all clinical information as submitted. We found that the supplemental information uploaded with each plan was extremely important and useful for the plan reviewers.