

AbstractID: 5796 Title: A prototype Radiation Therapy Picture Archive Communication System (RT PACS) design for clinics implementing IGRT

Purpose: To report on the development of a prototype Radiation Therapy Picture Archive Communication System (RT PACS) needed for clinics implementing image-guided radiation therapy (IGRT).

Methods and Materials: We have recently placed in clinical use (1) Elekta Synergy with kV Cone Beam CT (CBCT) and electronic portal imaging and (2) TomoTherapy HI-ART with MV CT. A third IGRT machine is scheduled for June 2006. Image series sizes of over 1 GB per study have been acquired. Responding to image storage needs, we have developed an RT PACS system using "commercial-off-the-shelf" components. System consists of a Storage Area Network (SAN) and specialized DICOM RT software. TeraMedica Evercore software is used to store and retrieve information via a DICOM query. The SAN is characterized by a three tier storage structure, allowing for fast access of the information used most often while keeping price reasonable by storing parts of data in slower areas. Access is provided via Logical Unit Numbers (LUN), each of which is associated with a quality of service, which determines position on the hardware and thereby access speed. Software is enabled to automatically move less frequently used files to slower areas, thereby allowing for seamless archiving.

Results: DICOM data sets were successfully exported to the RT PACS. Users can search the database and retrieve stored images and RT PLANS. A web-based viewer allows users to logon remotely from anywhere on the Hospital LAN, or if connected remotely thru VPN to view patient's treatment plans securely.

Conclusions: The size of patient images sets increases dramatically with the use of CBCT and tomotherapy MV CT. Daily use of these IGRT capabilities will result in our current servers filling to capacity in less than 6 months. The prototype RT PACS appears to meet our needs regarding data storage, workflow, HIPPA, EMR and connectivity.