

QARC-ATC Activities

ATC Steering Committee Meeting

Philadelphia, PA

Oct 26, 2009

The Quality Assurance Review Center (QARC) is a research program within the University of Massachusetts Medical School providing radiotherapy quality assurance and diagnostic imaging data management services. QARC is a nationally and internationally recognized program serving the National Cancer Institute (NCI) sponsored cooperative groups and the pharmaceutical industry for over three decades.

QARC manages/archives data and provides RT and/or Imaging reviews on over 130 active protocols for:

ACOSOG

CALGB

COG

ECOG

PBTC

SWOG and

industry studies.

QARC Archive

The QARC archive contains:

- Data from more than 350 protocols
- >45,000 protocol cases (45% pediatric) from >1,400 participating institutions
- More than 50,000 diagnostic studies encompassing >13 million image files.
- MAX, QARC's database, includes functionality that links demographic and clinical protocol patient data to the diagnostic imaging and RT objects.

QARC-ATC

- Credentialing
- Digital RT Data Acquisition and Review
 - Remote Review Tool (RRT)
 - Computational Environment for Radiotherapy Research (CERR)
- NCI Initiatives
 - cancer Biomedical Informatics Grid (CaBIG)

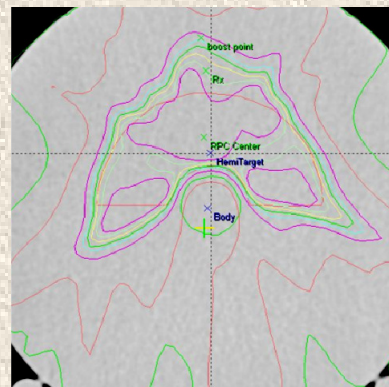
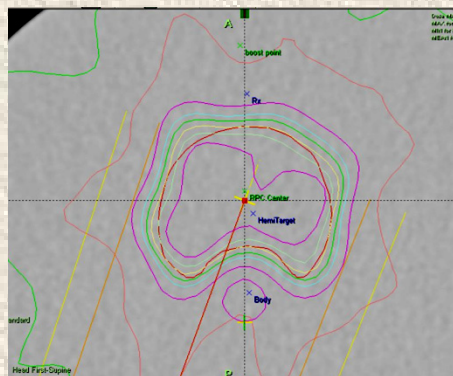
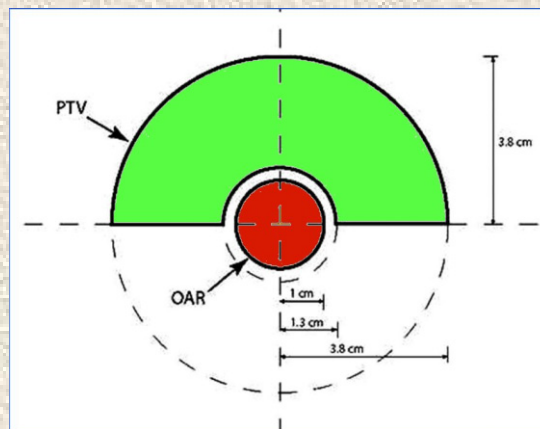
ATC Credentialing Accomplishments

Development of uniform guidelines for advanced technology treatment modalities:

- ATC Guidelines for the Use of IMRT (including Intra-Thoracic Treatments)
- Guidelines For The Use Of Proton Radiation Therapy In National Cancer Institute Sponsored Cooperative Group Clinical Trials

ATC Credentialing Accomplishments

- Reciprocity of IMRT credentialing
among cooperative groups
RPC phantoms and/or QARC benchmark

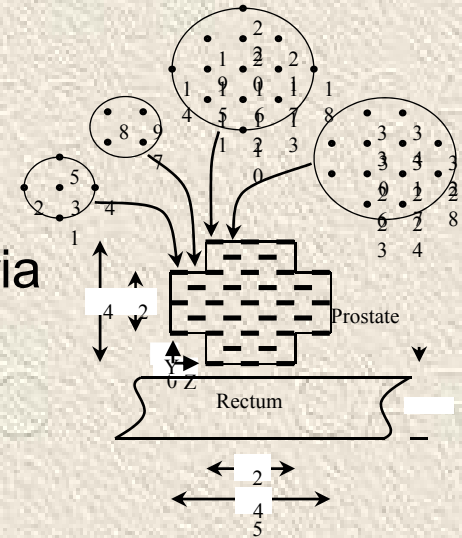


ATC Credentialing Accomplishments

- Uniform credentialing for prostate seed implants

RPC (RTOG) and QARC (ACOSOG)

Developed benchmark case with acceptability criteria



- Unification of informational forms

- Prostate seed implant facility survey and questionnaire

- Questionnaire for IMRT

IMRT QUESTIONNAIRE & BENCHMARK

Institution: _____	Date: ____/____/____
Physicist: _____	e-mail: _____
Address: _____	

Telephone: _____	Fax: _____
Responsible Radiation Oncologist(s) _____	
Telephone: _____	e-mail: _____

This questionnaire and benchmark have been accepted by all of the NCI funded cooperative groups and Quality Assurance Offices as a minimum standard for an institution to be credentialed for use of IMRT in clinical trials. The benchmark is not site specific, i.e. it applies to IMRT treatment of all disease sites. The benchmark should be submitted to the appropriate Quality Assurance office, i.e. Quality Assurance Review Center (www.QARC.org), Radiation Therapy Oncology Group (www.RTOG.org), or Radiological Physics Center (<http://rpc.mdanderson.org/rpc>).

Some cooperative groups may require that a specially designed phantom be planned and irradiated using IMRT as a part of the IMRT credentialing requirement for some or all of their IMRT protocols. For such cases the RPC has developed anthropomorphic (or geometric) phantoms to meet the specific requirements of the protocol. Institutions that have satisfactorily completed IMRT credentialing with an RPC phantom will not be required to complete this benchmark. Information concerning the RPC phantoms may be obtained from the RPC.

ATC Credentialing QA Committee (ACQAC)

Mission: To help the ATC promote uniformity in credentialing and quality assurance criteria for advanced technology clinical trials across cooperative groups and QA Centers supported by the National Cancer Institute.

Members:

David Followill (Co-chair)	RPC
Marcia Urie (Co-chair)	QARC
Jim Galvin	RTOG
Bill Straube	ITC

QARC Goals for 2010-2011

ACQAC - QARC- [Credentialing](#)

- Harmonization of extra-mural independent dose verification recommendations

Importance of RPC TLD independent dose measurement

D. Followill has analyzed RPC TLD results

Consensus developing, including EORTC, on mechanism & frequency of extra-mural dose verification

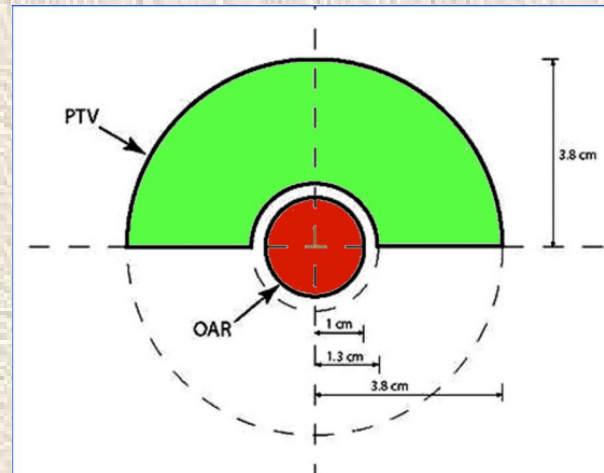
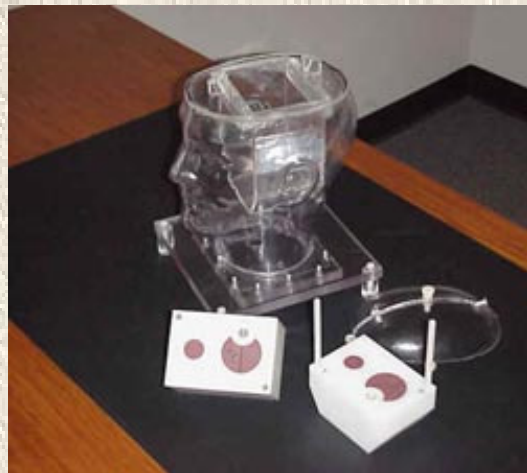
QARC will continue to rely upon RPC non-compliance reports for monitoring institutions

QARC Goals for 2010-2011

ACQAC - QARC- Credentiaing

- Harmonization of IMRT Credentialing Requirements

Established reciprocity of IMRT credentialing among cooperative groups for RPC phantoms and/or QARC benchmark



Update of IMRT benchmark

Harmonization report near final draft (J. Galvin)

QARC Goals for 2010-2011

ACQAC - QARC- [Credentialing](#)

- Harmonization of IGRT Credentialing Requirements

Report drafted (J. Galvin) for overall requirements

Credentialing necessary to demonstrate coincidence of imaging and treatment coordinate systems (general consensus)

Specific credentialing tests under discussion
QARC has proposals

QARC Goals for 2010-2011

ACQAC - QARC - [Credentialing](#)

- Unified facilities data repository

for all institutions and groups and QA centers

Web-based, housed at RPC

- Harmonization of Dose Prescription and Dose Uniformity

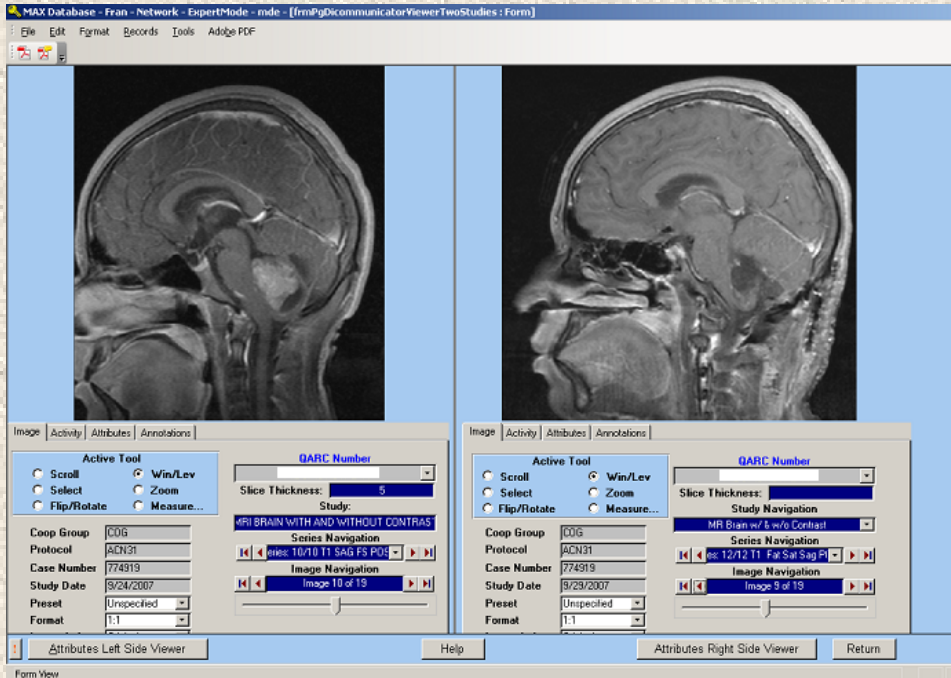
for all protocols among all groups

Representative examples from current RTOG, COG, ECOG, CALGB and SWOG protocols compiled

Initial discussions - need for consistency

QARC –ATC

Digital Data / Remote Review



- QARC implemented Dicom to handle diagnostic digital data
 - Developed by Dr. K. White and donated to COG
 - CRAs could download from local PACs and transmit scans via e-mail
 - QARC developed it to manage the diagnostic data with direct links from patient pages in database
 - Currently via CDs, sFTP, or Dicom
 - >50,000 studies in archive

QARC –ATC

Digital Data / Remote Review

Dicommunicator

Institution PACS Archive

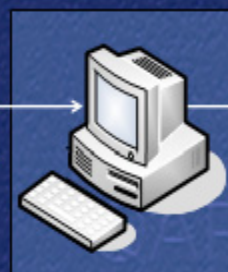


Dicommunicator can be configured to:

- "Pull" (Query/Retrieve) images directly from PACS to local system
- "Push" images from PACS to local system

Retrieve Images to Local System

CRA Desktop PC



CRA can use Dicommunicator to:

- View DICOM images
- Assign Protocol and COG Number to images
- Scrub patient demographics
- Burn imaging to a CD or Encrypt image files and email them to QARC

Relay Emails off of SMTP server

Institution SMTP Server



- Each study is sent as a number of sequential emails with corresponding image attachments
- Emails are relayed off of the institution's SMTP Server and sent out of the institution to QARC

Send Emails to QARC

QARC PACS Archive

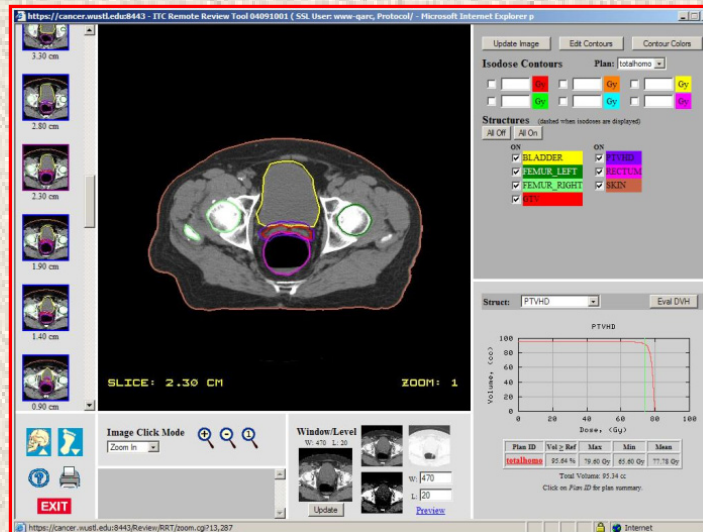


- Emails with attached images are received at QARC Mail Server
- Images are decrypted and imported into the QARC PACS Archive using Dicommunicator application
- Each study is linked with its corresponding patient record
- Physicians at QARC are able view the images directly from the patient record in the QARC database

QARC –ATC

Digital Data / Remote Review

- The ATC has been instrumental in establishing the capability to perform **digital RT data** review at QARC.
- In 2004 the **Remote Review Tool** was installed remotely at QARC by the ITC (Walter Bosch and John Matthews).
- Several changes were made to the Remote Review Tool at that time to accommodate QARC's needs.



QARC –ATC

Digital Data / Remote Review

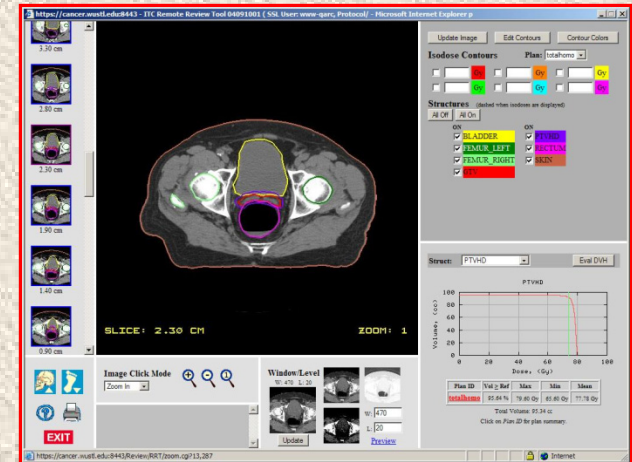
- In 2005 FTP server software and account maintenance tools were installed at QARC by the ITC (Walter Bosch).
- In 2007 the ITC converted QARC's FTP server software to secure FTP.

Use of CERR at QARC

RRT extremely valuable to QARC

Limitation: only axial display

CERR at QARC



CERR : A Computational Environment for Radiotherapy Research - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://radium.wustl.edu/CERR/about.php

Google

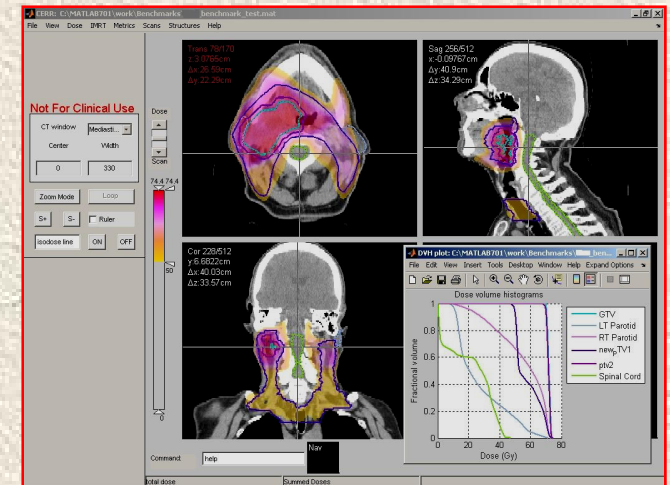
CERR

Computational Environment For Radiotherapy Research

Washington University in St. Louis

SITEMAN CANCER CENTER

SCHOOL OF MEDICINE

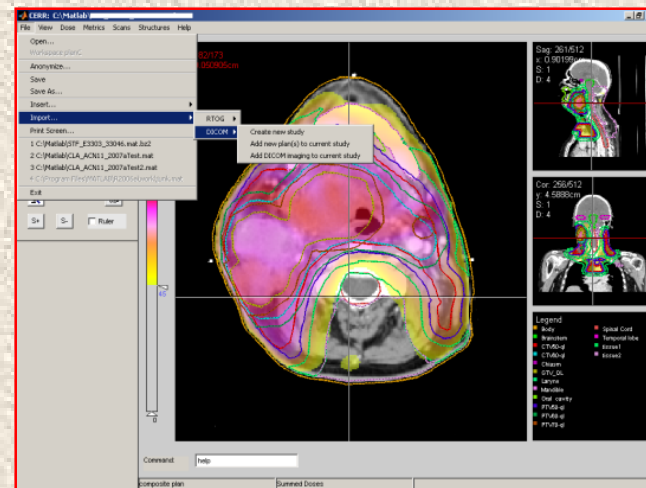
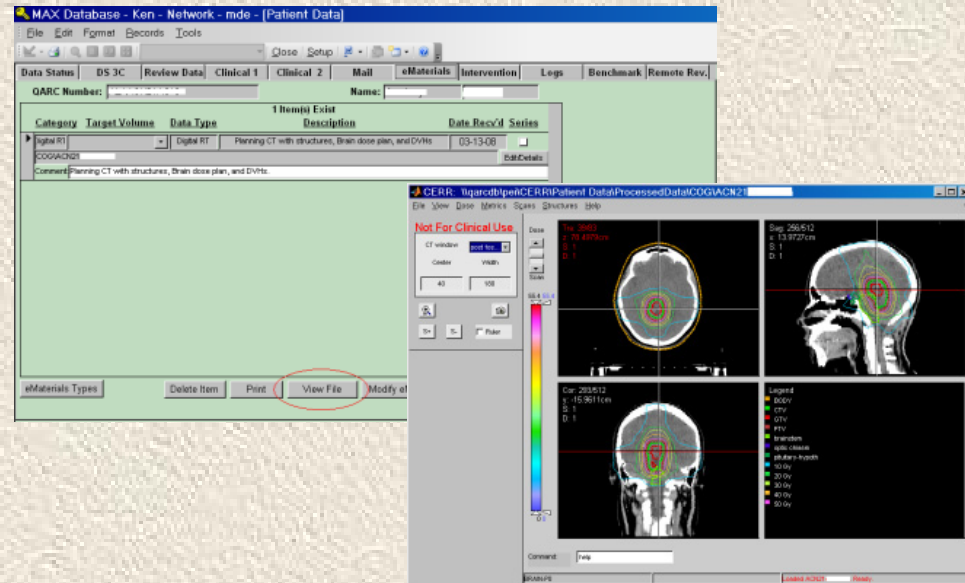


Use of CERR at QARC

Extensive modifications and enhancements made to CERR by **K. Ulin** for QARC use include:

- A command line to launch a CERR study from the patient's record in the QARC database

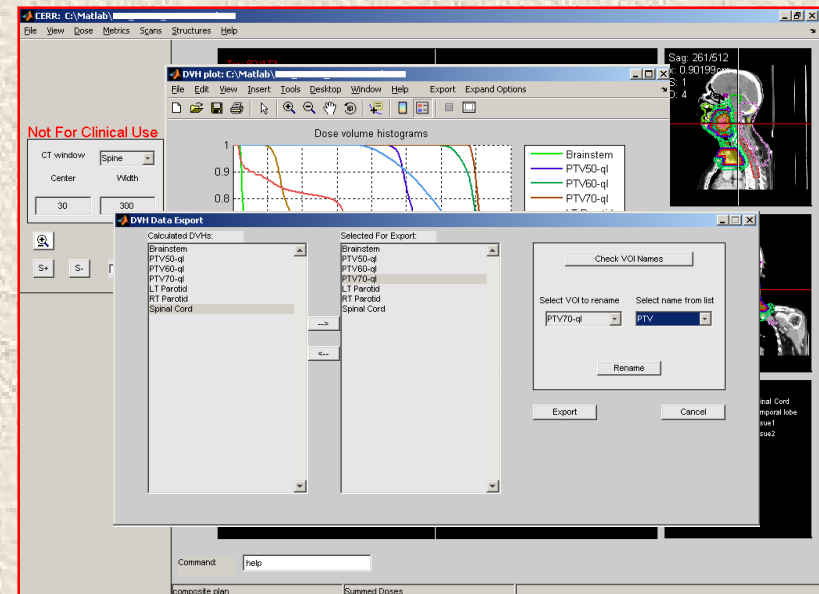
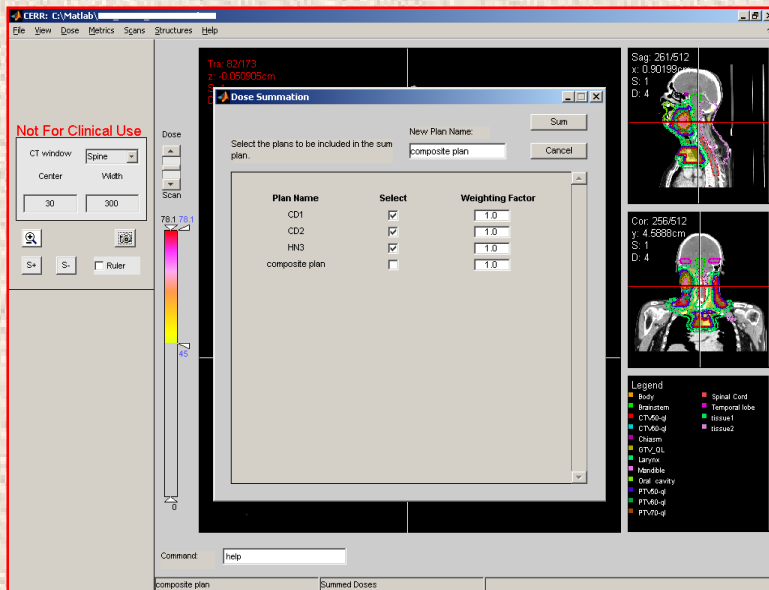
- Import of additional plans to an existing study (subsequent phases of treatment and/or modified plans)



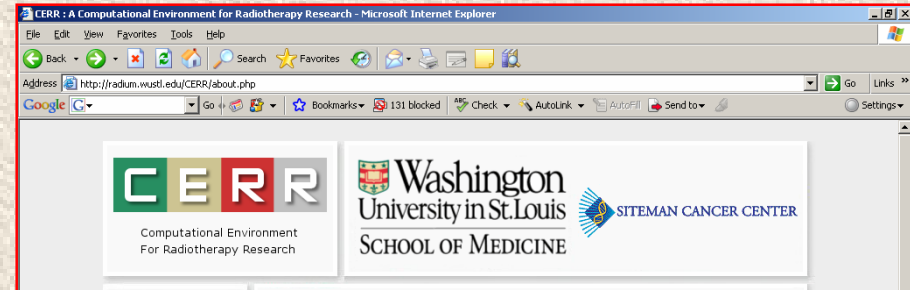
Use of CERR at QARC

Extensive modifications and enhancements made to CERR by **K. Ulin** for QARC use include:

- Improvement in import speed for DICOM RT
- Multiple consistency checks applied during the import process and when changes are made within the viewer
- Dose summation of multiple (>2) dose distributions
- An export function to export DVH data to a delimited text file for further analysis

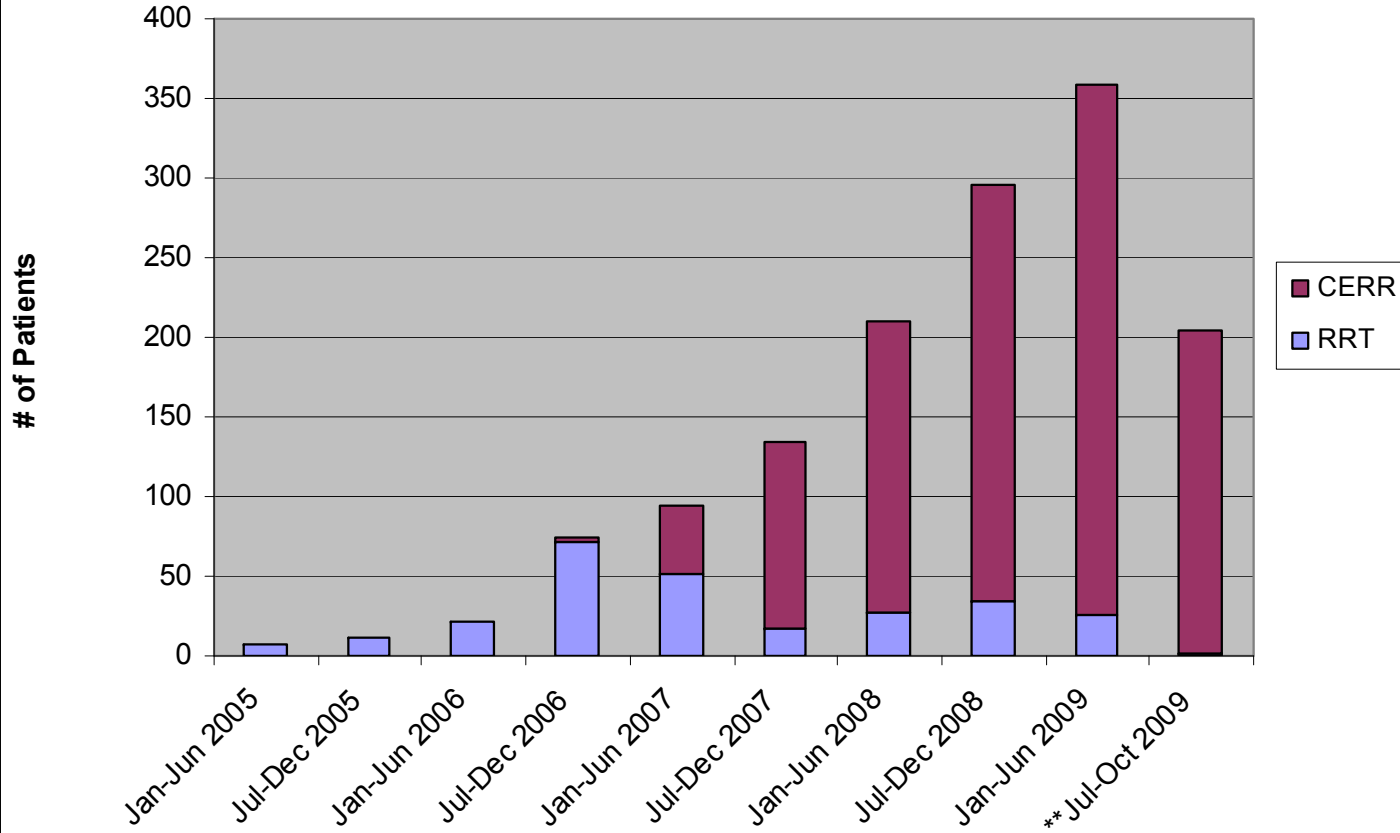


Use of CERR at QARC



- QARC began using CERR for digital RT reviews in 2007 for visualization of anatomy in sagittal and coronal views.
- A network concurrent license for Matlab enables use of CERR by all users on the local network.
- Use of CERR is enabled remotely by connection to a terminal server through a web browser.
- All the modifications for QA center use have been made available to other ATC members.
- Some of the modifications have been incorporated into the downloadable version of CERR, which continues to be under development.

QARC Digital RT Data



>1400 total (Oct 09)

Use of CERR at QARC

Full data sets from 14 planning systems have been successfully imported into CERR

DICOM RT	RTOG
Eclipse	Pinnacle
Variseed	XiO
Plato	Theraplan Plus
XiO	Corvus
Oncentra Masterplan	UMPlan
Pinnacle	
TomoTherapy Hi-ART	
Helax	
IsoGray	
Konrad	
MSKCC Planning System	

QARC Digital RT Data

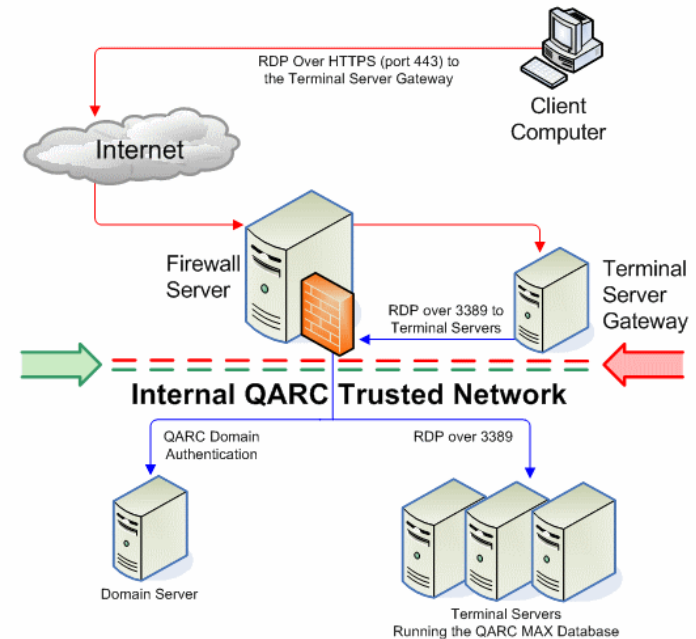
Acquisition/Review

- QARC is now using primarily CERR for digital RT data review.
- Submission of data by either sFTP or CD is supported.
291 institutions have sFTP sites set up at QARC.
- Digital plans for over 1200 patients have been received.
- ITC has worked diligently so that nearly all treatment planning vendors now export plans in DICOM RT (or RTOG) format.
- Submission of all RT data in digital format is becoming a requirement for new protocols.

QARC Digital RT Data

Acquisition/Remote Review

- Remote access is accomplished with terminal server and remote desktop technologies
- Remote users are authenticated and granted access via their web browser to a QARC terminal server
- QARC employees have full remote access to the QARC database and network.
- Remote Reviewers have limited access.
- Terminal server approach may have potential for data acquisition as well as remote review.
- This approach may be applicable to other ATC members.



QARC Network Access Diagram – Remote Internet Desktop Users access QARC MAX Database using standard HTTPS to the Terminal Server Gateway (TSG). TSG communicates with Internal Terminal Servers via RDP 3389.

caBIG

cancer Biomedical Informatics Grid

- QARC continues to work with caBIG to adopt tools as they become available on the caBIG grid.
- It is recognized that the QARC database has unique functionality and can easily be adapted to display digital pathology objects as well as imaging.
- QARC continues to support J. Purdy's effort to implement a use test case