

LEVERAGING WEB-BASED MODULAR TECHNOLOGIES TO ENHANCE MEANINGFUL USE OF EHRs

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September 9, 2010

University of Florida
Shands Cancer Center



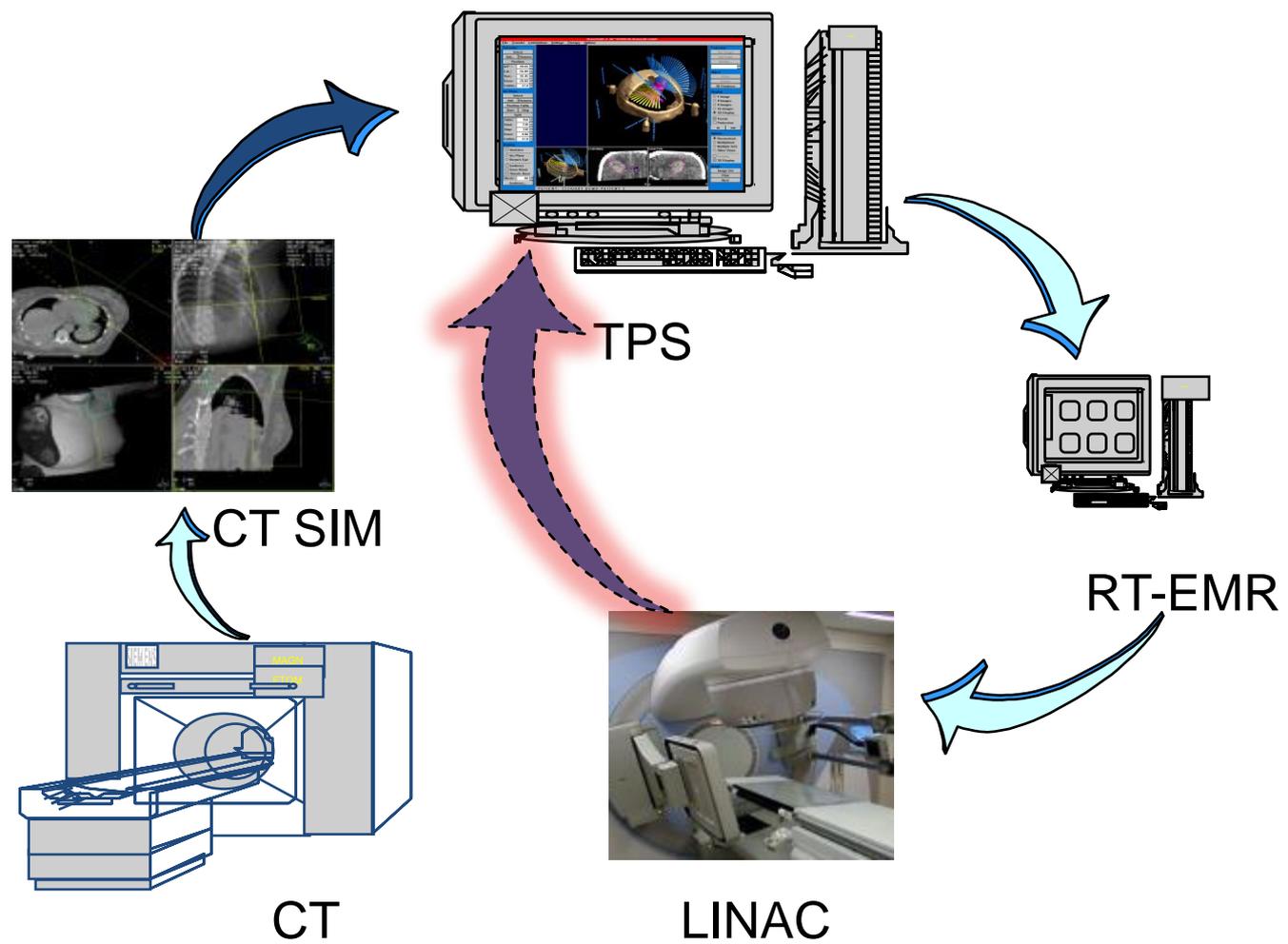
Topics for Discussion

- Applying new modular health information technology to current workflow to measure outcomes in cancer patients in an academic medical center
- The use of modular technologies in other Meaningful Use data sets
- Discuss the perceived and documented benefits and physician adoption rates associated with patient-centered data collection and communication
- Coordinating care team responses with meaningful analysis of outcomes data

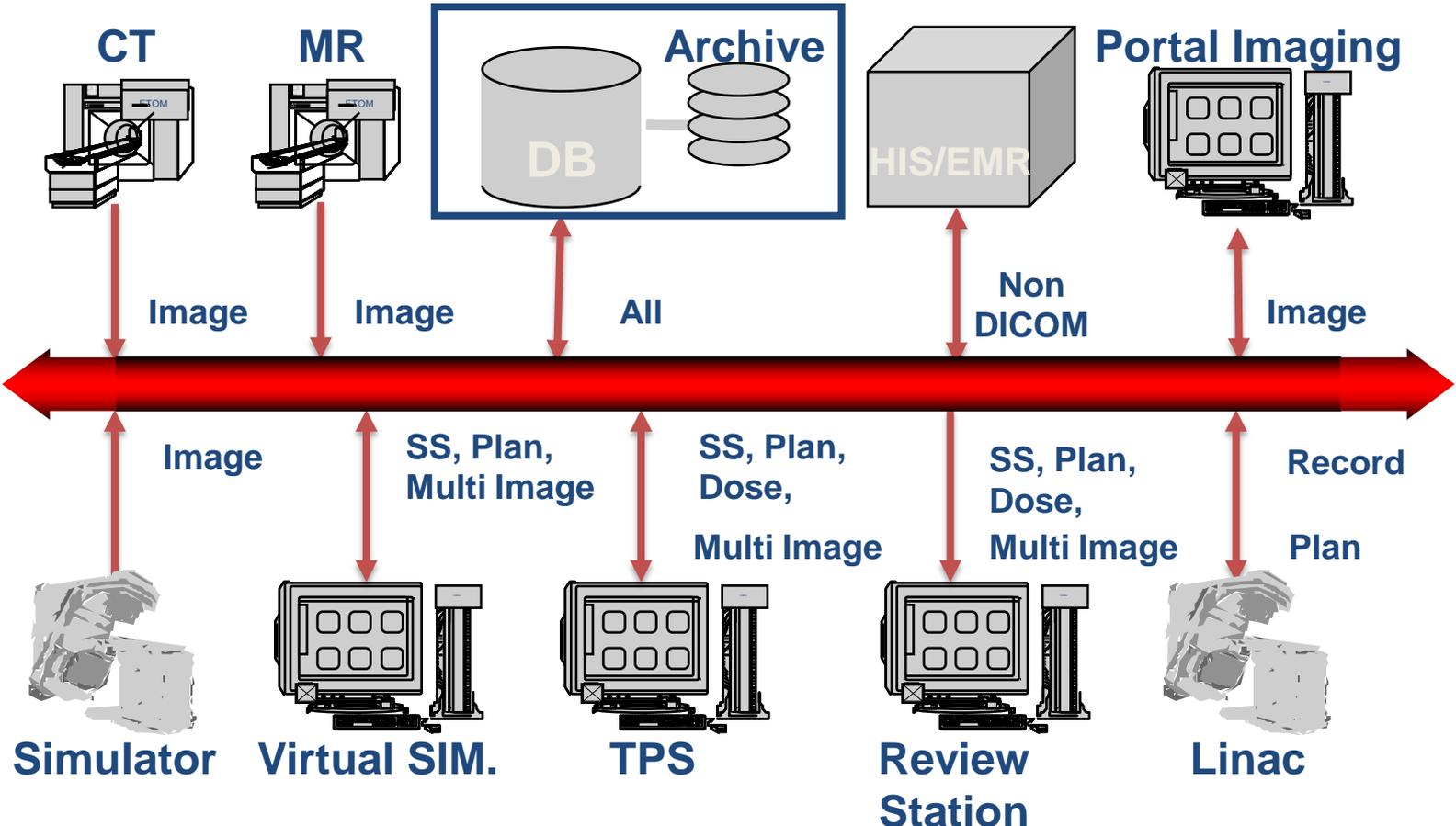
Radiotherapy Workflow / Process Overview

- Multidisciplinary review
 - Radiation oncologists, medical oncologists, surgeons, pathologists, radiologists review imaging, lab reports, and medical history
- Patient immobilization and imaging for radiation treatment planning
- Treatment target and normal tissue delineation
- Treatment planning
- Patient setup for treatment and plan verification
- Radiation treatment
- On treatment review
- Post treatment follow-up

Simplified Radiotherapy Process



Detailed Radiotherapy Process



Typical RT dataset/patient includes DICOM Images, Plan, and Dose
(300 M byte - 4 G byte)

Radiation Oncology Patient Portal: Key Use Case

The Radiation Oncology Patient Portal (ROPP) provides a patient with authenticated and authorized access to a set of patient specific reports and alerts for Meaningful Use as required by the ARRA HITECH Act.

Patient Portal Attributes:

- **Secure Patient Login** - patient can login to the portal from a computer outside the enterprise.
- **PRO Completion** - Patients can complete QoL assessments in their secure portal. Assessments can be delivered at specified time points (i.e. pre-treatment, 3 month, 6 month, 12 month, etc).
- **Reminders & Messaging** – triggers set by the provider will send email/SMS text alerts and reminders to the patient and medical team
- **Registration / Health History** - Patients can provide registration and health history information.

An integrated EHR and integrated Medical Team & Patient Portal system enables:

- **Pharmacy, Lab Results, Procedure Eligibility** - data access.
- **Treatment Summary and Relevant Education Materials** - meeting ARRA requirements.
- **Clinical Trials** - Visibility of appropriate ongoing clinical trials, clinical trial matching.
- **Connectivity to remote/home monitoring systems.**
- **Reminders, messages and forms** - triggered based on data values.
- **Data analysis and trends** – on medical team side, patient-level reporting.

Radiation Oncology Patient Portal: Use Cases / Meaningful Use Criteria

ARRA HITECH: Act Core Measure (15 Must Be Met)*	ROPP
1. Record Patient Demographics	X
2. Record Vital Signs & Chart Changes	
3. Maintain Up-To-Date Problem List & Active Diagnosis	
4. Maintain Active Medication List	X
5. Maintain Active Allergy Medication List	X
6. Record smoking status for patients 13+ yrs old	X
7. Provide Clinical Summary / Hosp. Discharge Instructions	X
8. On Request, Provide ePHR	X
9. Generate & Transmit ePrescriptions	
10. Computer Provided Order Entry (CPOE) for Medications	
11. Implement Drug/Allergy Interaction Check	X
12. Implement Prov./Pt. Exchange of Clinical Information	X
13. Implement & Track One Clinical Decision Support Rule	
14. Implement System to Protect Privacy & Security of PHI	X
15. Report Clinical Quality Measures to CMS / State	

ARRA HITECH: Act Menu Measure (7 of 12 Must Be Met)*	ROPP
1. Implement Drug Formulary Check	
2. Incorporate Lab Results in Structure Data Format	X
3. List Patients by Condition for Quality Improvement, Research	
4. Identify Patient-Specific Resources and Provide to Patients	X
5. Perform Medication Reconciliation Between Care Settings	X
6. Provide Summary of Care Record for Patients Referred	X
7. Submit Electronic Immunization Data to Registries	
8. Submit eSyndromic Surveillance Data to Public Health Agencies	
9. For Hospitals Record Advance Directives	
10. For Hospitals, Submit eLab Data to Public Health Registries	
11. Send Reminders to Patients for Preventive/ Follow-Up Care	X
12. Provide Patients with Timely ePHR Access	X

* Highlighted Measures represent those that can benefit from connectivity with or use of a ROPP.

**ARRA HITECH Act Meaningful Use Core and Menu Measures can be found at: <http://healthit.hhs.gov>.

Patient Portal / Interoperability for Collecting & Aggregating Outcomes Data

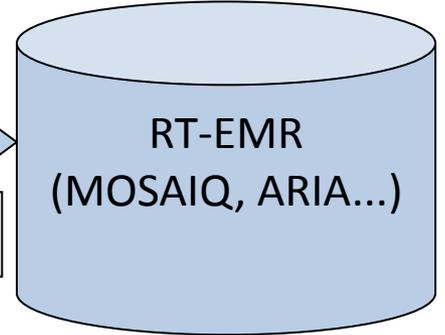
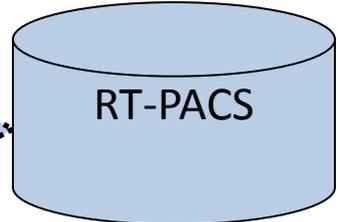
National Radiation Oncology Registry (NROR)*
(Disease Site-specific CRO and PRO Data Elements for Each Patient)
Web-based Data Entry / Reporting Template

ROPP can facilitate the development of a National Radiation Oncology Registry (NROR). ROPP use case will allow abstraction of NROR data elements from RT_EMR, patient/ clinician portal and generation of quality reports. ROPP use case is an essential step to achieve "Meaningful Use" of RT-EMR.

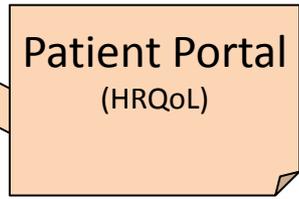
- PQI (PAAROT)
- OCER
- EHR / PHR (Health Vault, Google Health...)
- PQRI (Compliance and Quality Reports)

X	✓	X	X	X
X	*	✓	✓	✓
✓	✓	X	*	X
X	X	*	X	✓
*	✓	X	✓	✓
✓	X	✓	*	✓

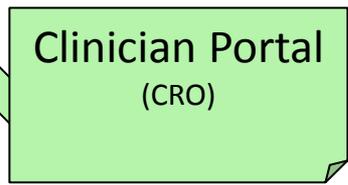
URL Redirect



Query/Retrieve Data element "X"



Data element "✓"



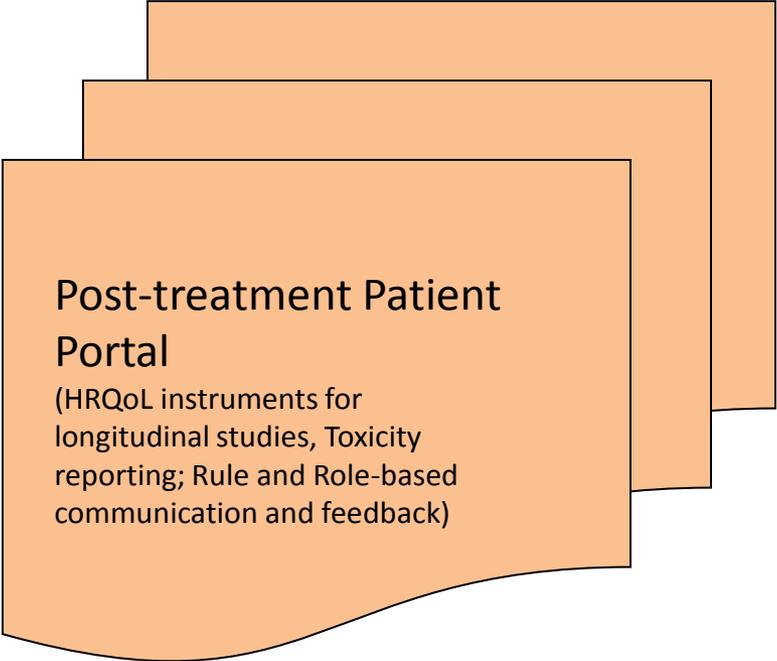
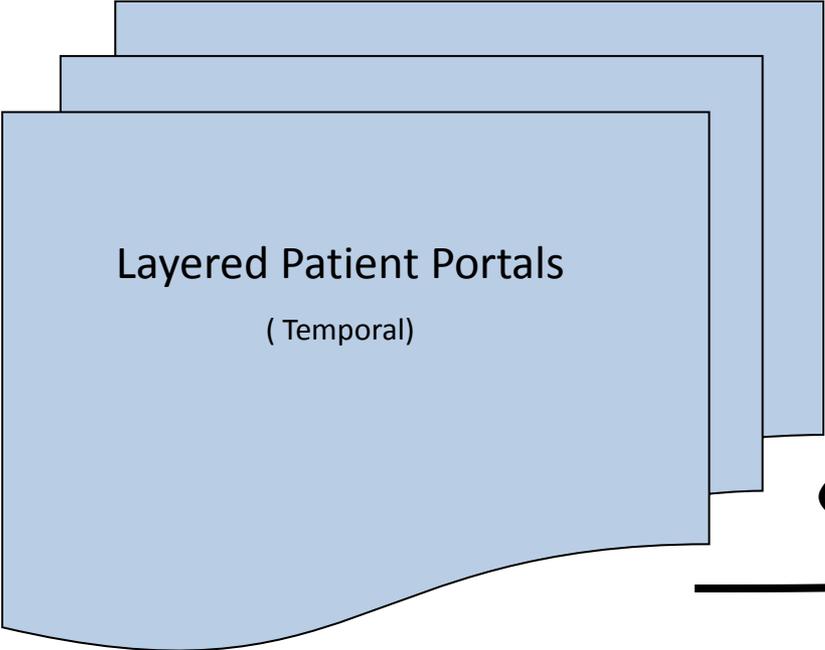
Data element "*" (with star icon)

Data elements independently validated by clinical team (with purple box icon)

*Courtesy IEEE Computer Society; August, 2010; Palta, Frouhar, Zlotecki

Layered Patient Portals in Care Continuum

Radiation Oncology Patient Portal facilitates longitudinal collection of PRO data (HRQoL data)



Patient-level data may be exchanged between patient, provided coordinated care team and PHR (e.g. HealthVault, Google Health)

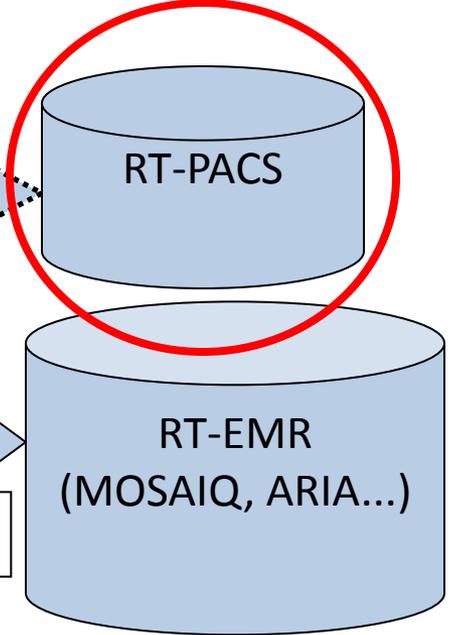
*Courtesy IEEE Computer Society; August, 2010; Palta, Frouhar, Zlotecki

Radiotherapy Data Abstraction for Outcome Studies and EHR

RT Data profile
(Disease Site-specific CRO and PRO Data Elements for Each Patient)
Web-based Data Entry / Reporting Template

- PQI (PAAROT)
- OCER
- EHR / PHR (Health Vault, Google Health...)
- PQRI (Compliance and Quality Reports)

X	✓	X	X	X
X	*	✓	✓	✓
✓	✓	X	*	X
X	X	*	X	✓
*	✓	X	✓	✓
✓	X	✓	*	✓



URL Redirect

Query/Retrieve Data element "X"

Patient Portal (HRQoL)

Data element "✓"

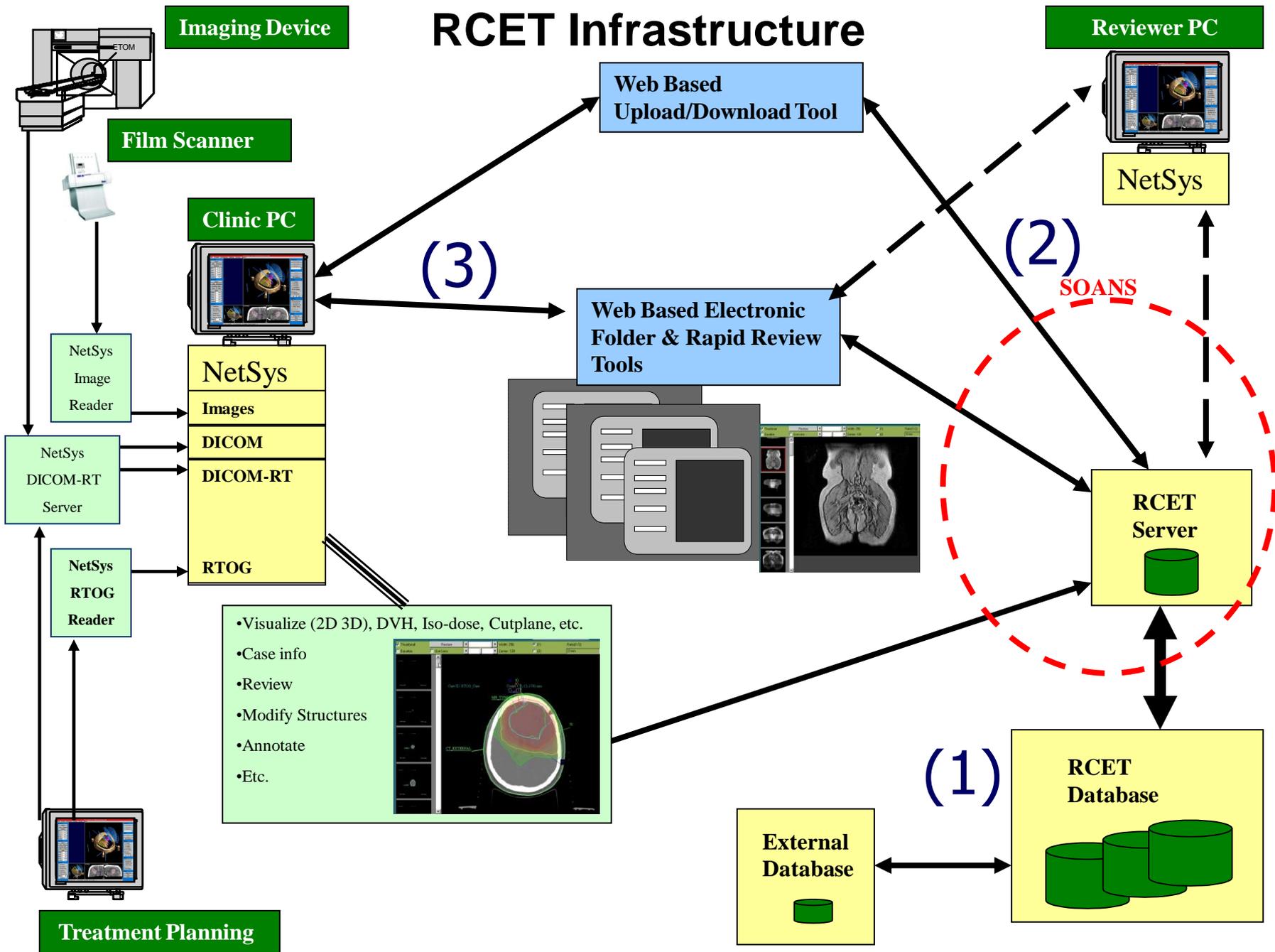
Clinician Portal (CRO)

Data element "*" (in a box)

Data elements independently validated by clinical team

*Courtesy IEEE Computer Society; August, 2010; Palta, Frouhar, Zlotecki

RCET Infrastructure



This component is best understood in analogy with Picture Archiving and Computerized Systems (PACS)

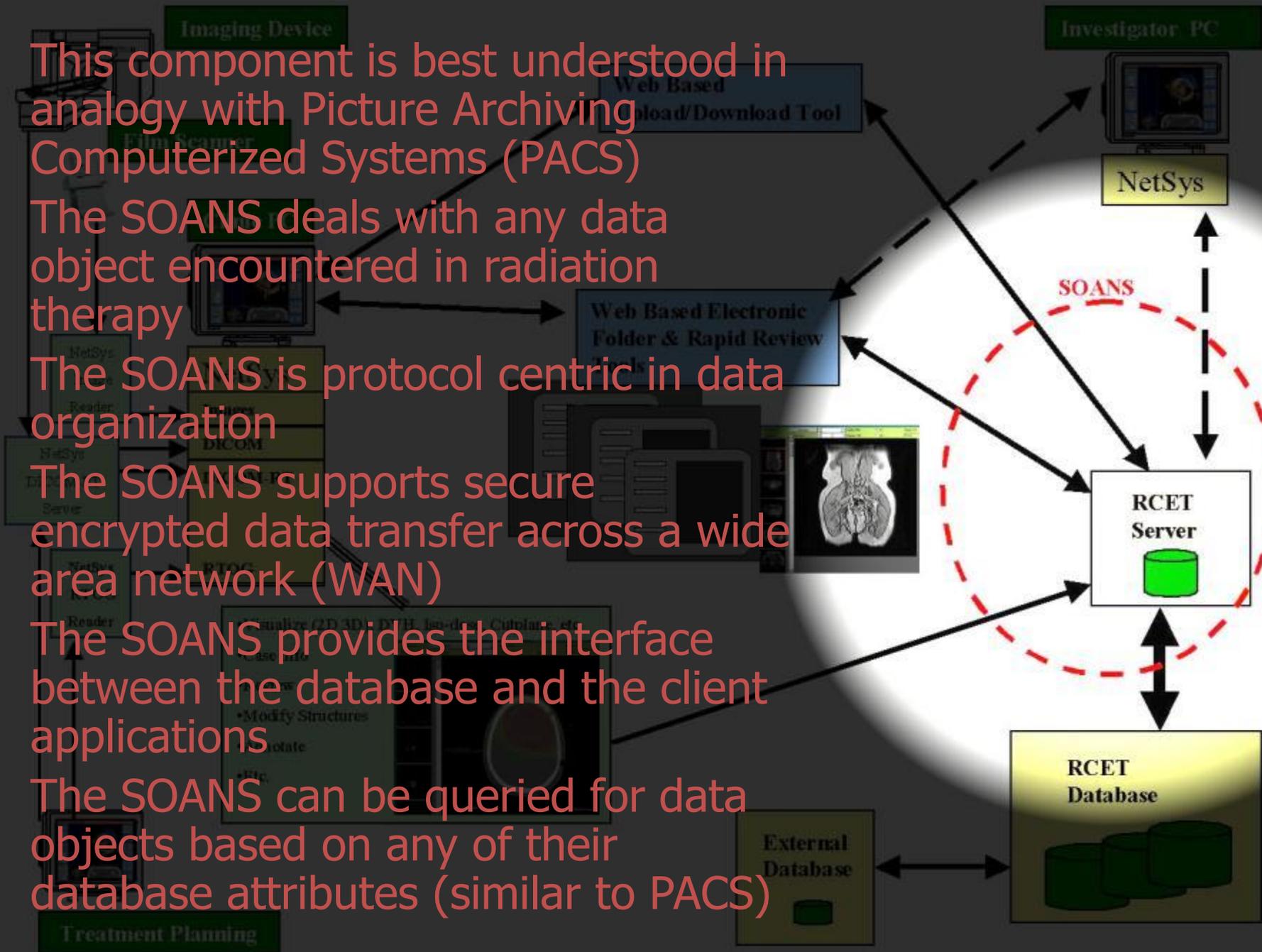
The SOANS deals with any data object encountered in radiation therapy

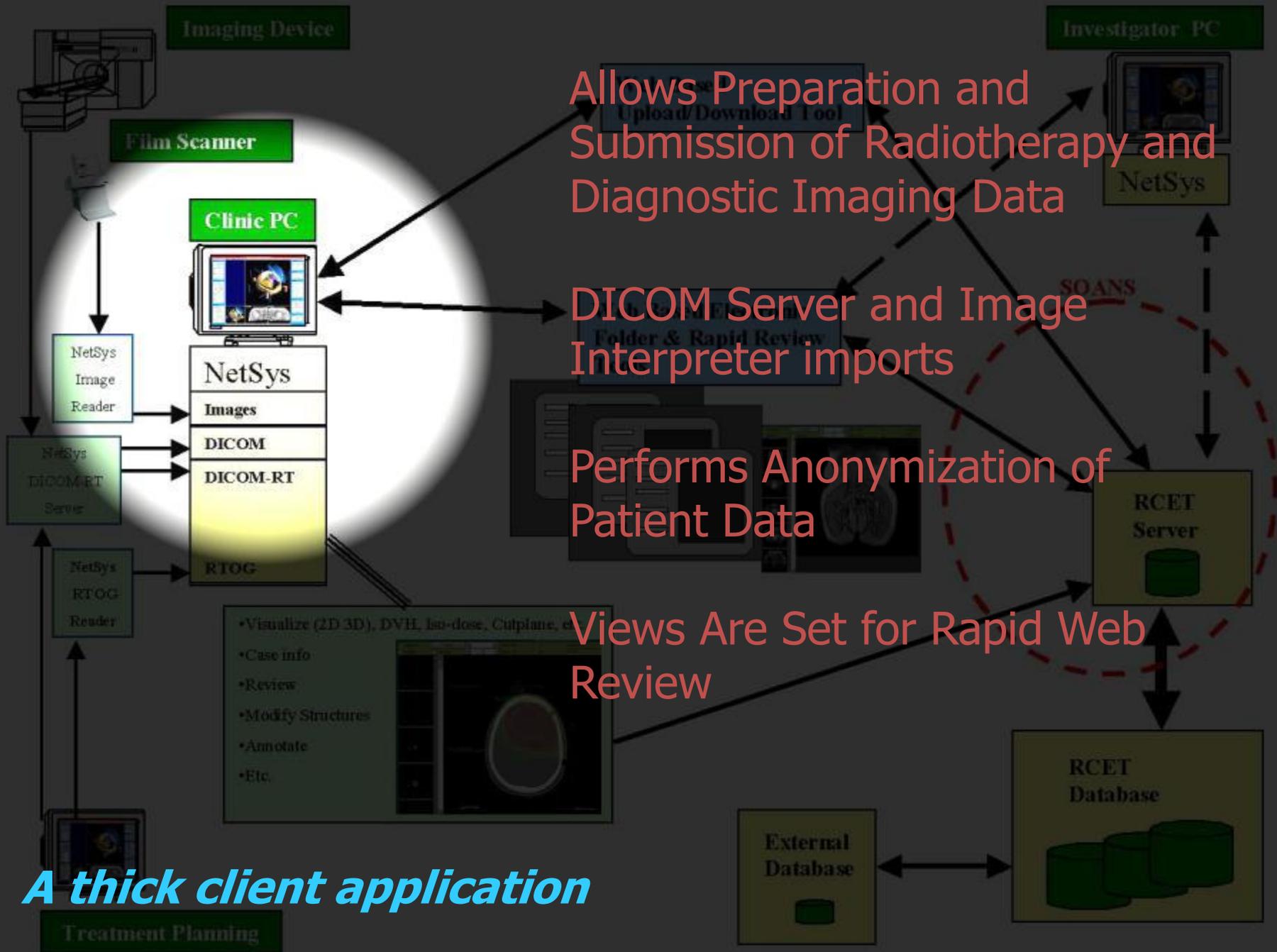
The SOANS is protocol centric in data organization

The SOANS supports secure encrypted data transfer across a wide area network (WAN)

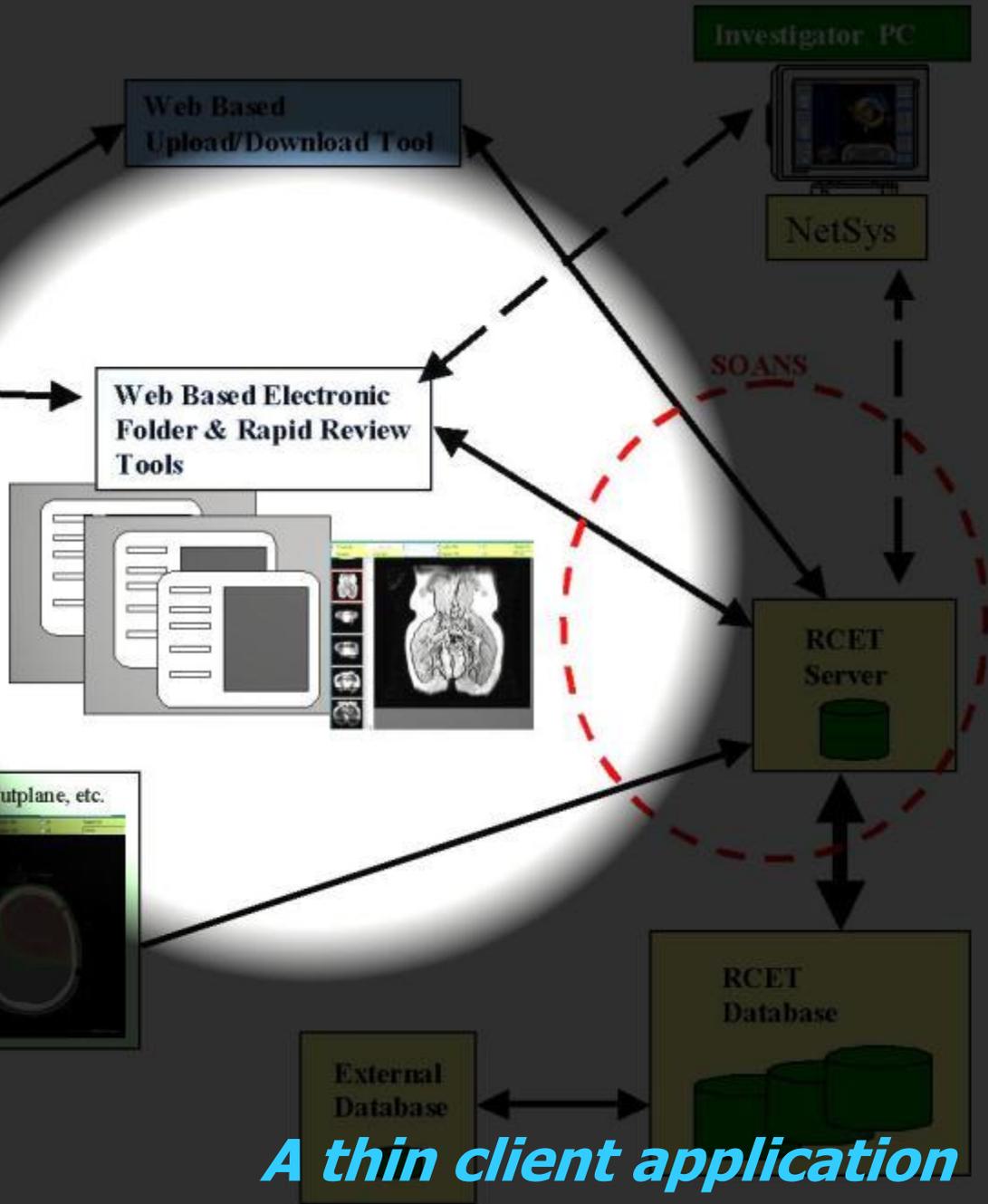
The SOANS provides the interface between the database and the client applications

The SOANS can be queried for data objects based on any of their database attributes (similar to PACS)



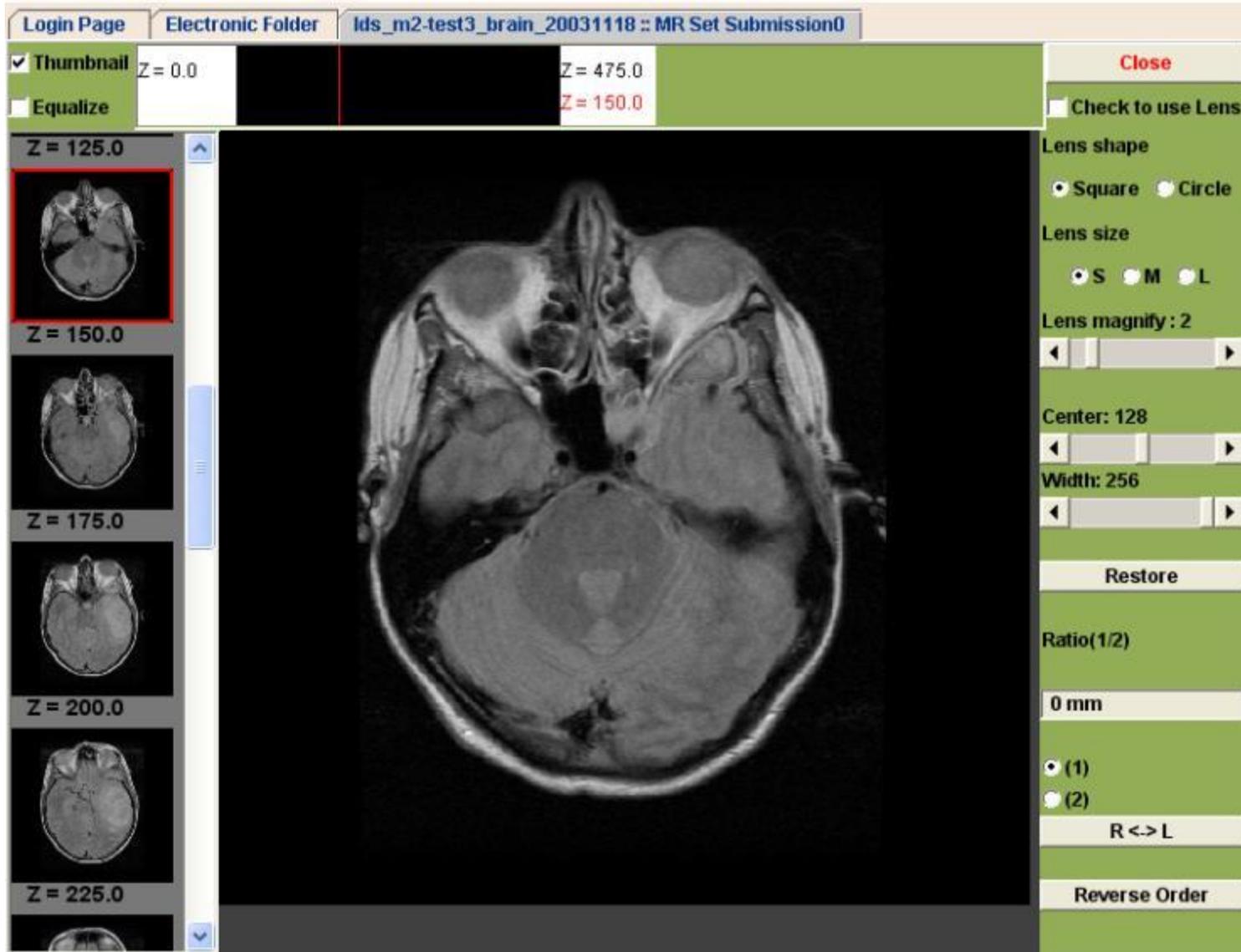


Allows review of Data Prepared with the NetSys PC Client: JPEG snapshots of the originals
Viewing of CT, MR, Port Film, DRR, DVH, scanned images, and Radiotherapy Plan
Accessible Seconds After Submission
Secure WAN Multi User Access

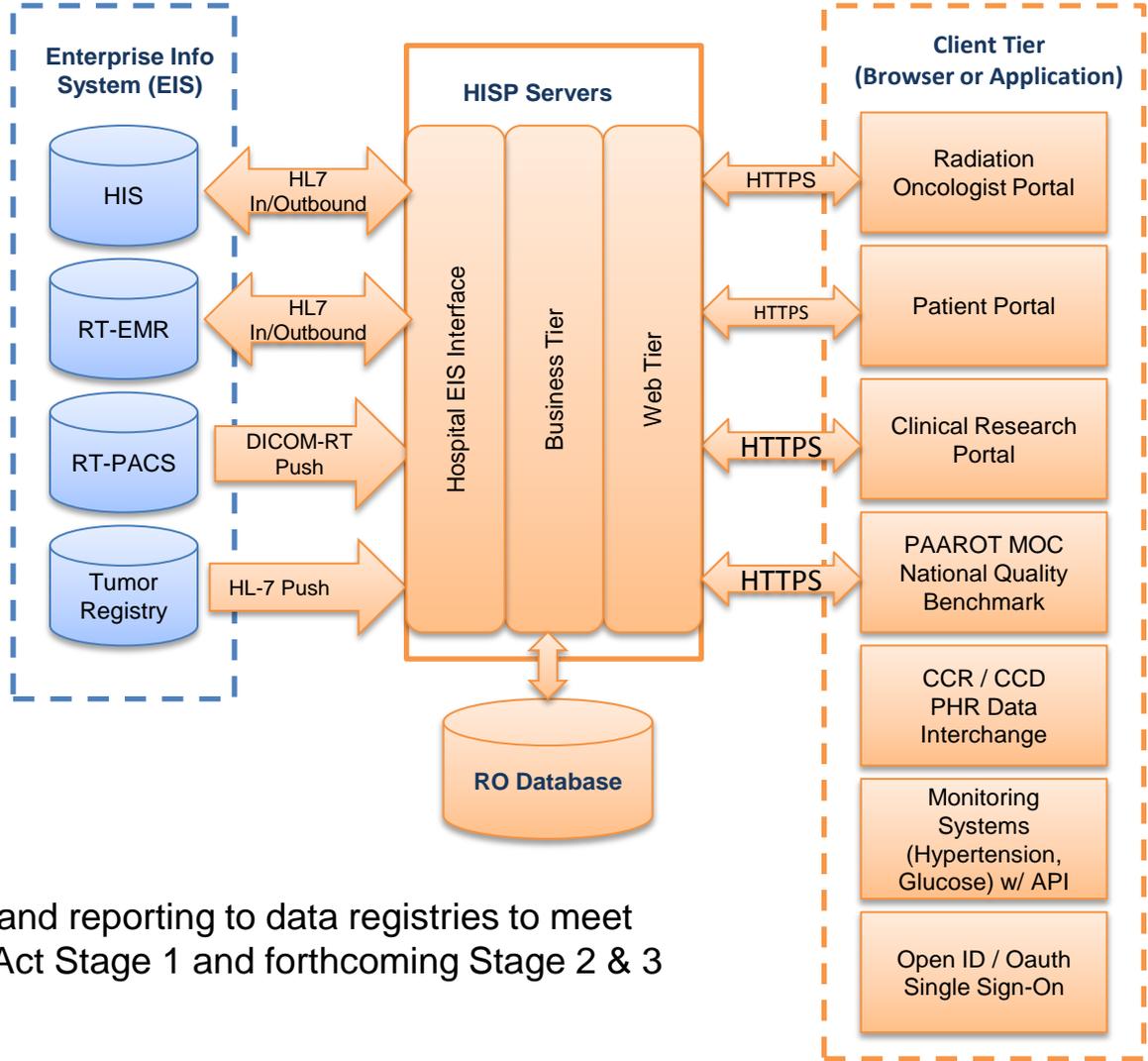


Rapid Image Viewer

- Displays diagnostic and treatment verification images
- Images are organized in an electronic folder



Patient Portal Data Interchange Standards & Systems



- Data exchange and reporting to data registries to meet ARRA HITECH Act Stage 1 and forthcoming Stage 2 & 3 Requirements.

ROPP: Roles & Quality Alerts

Based on a user's role (i.e. physician, researcher, nurse, or other medical team member will be able to:

- **Patient Account & Consent Management** - create, access, update, send/receive messages.
- **Update Patient Portal Data** - schedule modifications, medications / refills based on patient request.
- **Set patient specific alerts**
- **Read / Respond to patient specific alerts**
- **Send / Receive Quality Alerts** - triggered by roles, metrics, tasks and form completion & outcomes data collection, toxicity grades, lab results & related adverse events and messaging are necessary for quality care and treatment.
- **Generate Quality Metrics Reports** - including identifying QA performed on behalf of patient, e.g. IMRT QA or lack thereof and real-time national quality benchmark data.

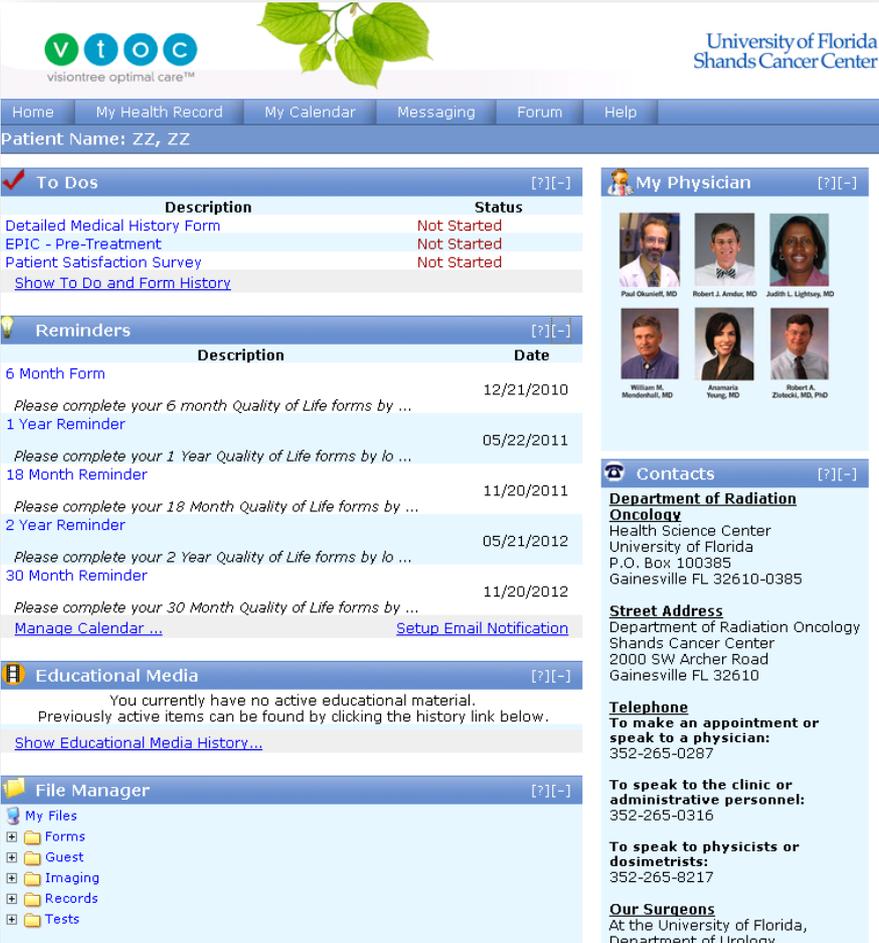
Radiation Oncology & Coordinated Care Team Patient Workflow

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Shands Cancer Center



Patient Portal Features & Data Exchange

- 1) Patient logs on to their secure, web portal.
- 2) Completes CCR, outcomes assessments and forms at specific time points.
- 3) Receives reminders for forms completion, appointments.
- 4) Secure 2-way messaging for appt / refill requests & needs.
- 5) Ability to view/store labs, imaging.
- 6) Receive Treatment Summary (CCR/CCD) and Treatment Pathway follow-up reminders / educational material.



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Home My Health Record My Calendar Messaging Forum Help

Patient Name: ZZ, ZZ

To Dos [?][-]

Description	Status
Detailed Medical History Form	Not Started
EPIC - Pre-Treatment	Not Started
Patient Satisfaction Survey	Not Started
Show To Do and Form History	

Reminders [?][-]

Description	Date
6 Month Form	12/21/2010
Please complete your 6 month Quality of Life forms by ...	
1 Year Reminder	05/22/2011
Please complete your 1 Year Quality of Life forms by lo ...	
18 Month Reminder	11/20/2011
Please complete your 18 Month Quality of Life forms by ...	
2 Year Reminder	05/21/2012
Please complete your 2 Year Quality of Life forms by lo ...	
30 Month Reminder	11/20/2012
Please complete your 30 Month Quality of Life forms by ...	
Manage Calendar ...	Setup Email Notification

Educational Media [?][-]

You currently have no active educational material. Previously active items can be found by clicking the history link below.

[Show Educational Media History...](#)

File Manager [?][-]

- My Files
 - Forms
 - Guest
 - Imaging
 - Records
 - Tests

My Physician [?][-]

Paul Okunieff, MD
 Robert J. Andur, MD
 Judith L. Lightsey, MD
 William M. Mendenhall, MD
 Anamaria Young, MD
 Robert A. Zureicki, MD, PhD

Contacts [?][-]

Department of Radiation Oncology
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 University of Florida
 P.O. Box 100385
 Gainesville FL 32610-0385

Street Address
 Department of Radiation Oncology
 Shands Cancer Center
 2000 SW Archer Road
 Gainesville FL 32610

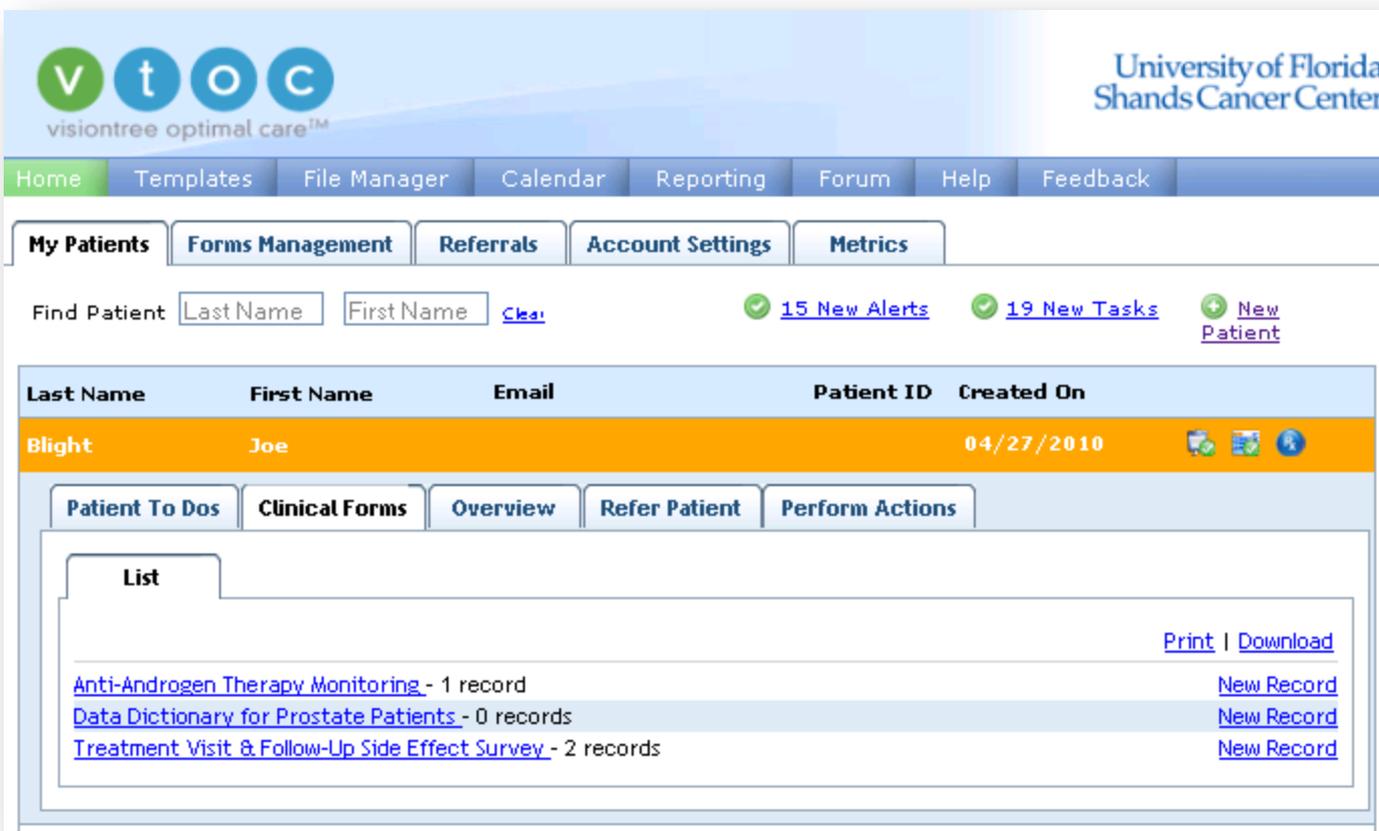
Telephone
To make an appointment or speak to a physician:
 352-265-0287

To speak to the clinic or administrative personnel:
 352-265-0316

To speak to physicists or dosimetrists:
 352-265-8217

Our Surgeons
 At the University of Florida,
 Department of Urology,

Data Cascades Between EMR / VTOC Forms



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Home | Templates | File Manager | Calendar | Reporting | Forum | Help | Feedback

My Patients | Forms Management | Referrals | Account Settings | Metrics

Find Patient: [Clear](#)
✓ [15 New Alerts](#)
✓ [19 New Tasks](#)
+ [New Patient](#)

Last Name	First Name	Email	Patient ID	Created On
Blight	Joe			04/27/2010

Patient To Dos | **Clinical Forms** | Overview | Refer Patient | Perform Actions

List

[Print](#) | [Download](#)

Anti-Androgen Therapy Monitoring - 1 record	New Record
Data Dictionary for Prostate Patients - 0 records	New Record
Treatment Visit & Follow-Up Side Effect Survey - 2 records	New Record

Roles & Rules-Based Alerts

Home | Templates | File Manager | Calendar | Reporting | Forum | Help | Feedback

My Patients | Forms Management | Forms Alerts | Account Settings | Metrics | Messages

Set the parameters for medical team alerts and notifications by form and question by clicking open the  sign and selecting the link next to each question you would like to setup, and click on the  icon to set the notification and parameters

Expanded Prostate Cancer Index Composite (EPIC) Pre-Treatment

- Over the past 4 weeks, how often have you leaked urine? 
- Over the past 4 weeks, how often have you urinated blood? 
- Over the past 4 weeks, how often have you had pain or burning with ... 
- Which of the following best describes your urinary control over the past 4 ... 
- How many pads or adult diapers per day did you usually use to control ... 
- How big a problem, if any, has dripping or leaking urine been for you ... 
- How big a problem, if any, has pain or burning on urination been for ... 

Expanded Prostate Cancer Index Composite (EPIC) Post-Treatment
 Expanded Prostate Cancer Index Composite (EPIC) 6 Month
 Expanded Prostate Cancer Index Composite (EPIC) 1 Year
 EQ-5D
 SF-36 Pre-Treatment
 SF-36 Post Treatment
 SF-36 6 Week
 SF-36 6 Months
 SF-36 1 Year
 SF-36 5 Year
 Desailles Health History

Home | Templates | File Manager | Calendar | Reporting | Forum | Help | Feedback

My Patients | Forms Management | Forms Alerts | Account Settings | Metrics | Messages

Set the parameters for medical team alerts and notifications by form and question by clicking open the  sign and selecting the link next to each question you would like to setup, and click on the  icon to set the notification and parameters

Expanded Prostate Cancer Index Composite (EPIC) Pre-Treatment

- Over the past 4 weeks, how often have you leaked urine? 

Notification & Parameters

ROLE	NOTIFICATION TYPE
<input type="text" value="Physician"/> <input type="text" value="Nurse"/> <input checked="" type="text" value="Radiologist"/> <input type="text" value="Scheduler"/> <input type="text" value="Researcher"/> <input type="text" value="Yes/Answer"/>	<input type="text" value="Alert (High Importance)"/>
SYNC WITH:	
<input type="text" value="Outlook"/>	
<input type="button" value="Cancel"/> <input type="button" value="Ok"/> <input type="button" value="Apply"/>	

Set / Send Alerts & Triggers from Discreet Form Data

Radiation Oncology Clinical / Disease Specific Templates



Home Templates File Manager Calendar Reporting Forum Help Feedback

Patient Portal Templates

Choose a template to edit from the template name list or click Create New Template

Template Name: 0828 Template [Delete Template](#) | [Create New Template](#)

Assign as Default Template for Patient Self Registration (Currently: Default Template Not Set)

Show all templates for Patient Self Registration

To Dos (Forms/Surveys) | **Calendar Templates (Reminders)** | Educational Media (Docs/Files)

Title	Active Start Interval	Duration	List Position
1 Year - FA/EPIC	10 mons	4 mons	14
1 Year - HP/HSCL-25	10 mons	4 mons	18
1 Year - QF/EQ-5D	10 mons	4 mons	7
1 Year - SA/Utilization of Sexual Medications/Devices	10 mons	4 mons	11
2 Years - FA/EPIC	1 year 10 mons	4 mons	15
2 Years - HP/HSCL-25	1 year 10 mons	4 mons	19
2 Years - QF/EQ-5D	1 year 10 mons	4 mons	8
2 Years - SA/Utilization of Sexual Medications/Devices	1 year 10 mons	4 mons	12
5 Years - FA/EPIC	4 years 10 mons	4 mons	16
5 Years - HP/HSCL-25	4 years 10 mons	4 mons	20
5 Years - QF/EQ-5D	4 years 10 mons	4 mons	9
5 Years - SA/Utilization of Sexual Medications/Devices	4 years 10 mons	4 mons	13
6 Months - FA/EPIC	5 mons	2 mons	5
6 Months - HP/HSCL-25	5 mons	2 mons	17
6 Months - QF/EQ-5D	5 mons		
6 Months - SA/Utilization of Sexual Medications/Devices	5 mons		
Baseline - FA/EPIC	-15 day		
Baseline - HP/HSCL-25	-15 day		
Baseline - QF/EQ-5D	-15 day		
Baseline - SA/Utilization of Sexual Medications/Devices	-15 day		

[Save](#)



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Network
connecting healthcare

UF Shands Cancer Center

[Main](#) [News](#) [Contacts](#) [Members](#) [Forum](#) [Photo](#) [Files](#) [Edit Group](#)

Upload Files

Upload File [Browse...](#)

[Info](#) [Catalogue](#) [Learn Group](#)

File Name	Created	Delete
uf_radonc_blu_sheet.pdf	August 25, 2009 10:04	X
uf_radonc_epic.pdf	August 25, 2009 10:03	X

University of Florida Shands Cancer Center

Includes Form Sharing Library &
Best Practice Templates

Data Cascades Between EMR / VTOC Forms

List **New Prostate History & Physical Form** X

INSTRUCTIONS TO PATIENTS: IF YOU ARE NOT SURE OF THE ANSWER TO ANY OF THESE QUESTIONS, PLEASE LEAVE IT BLANK AND OUR MEDICAL STAFF WILL REVIEW IT WITH YOU DURING YOUR CONSULT.

Date of Service:
Type of Prostate Cancer:

BASIC INFORMATION

- + Patient Demographics
- + Person Responsible for your Care
- + Emergency Contact
- + Medical Contacts

HISTORY OF PRESENT ILLNESS

Are there pre-existing conditions which could affect RT? Yes No

Please mark which of the following apply:

Prior prostate surgeries or procedures Yes No
Date:

Prostatectomy Yes No

Hyperthermia Yes No

Cryosurgery Yes No

Any previous pelvic radiation Yes No

Procedures to improve urinary flow such as:
TURP, TUNA, TUMT Yes No
Date:

Prior cancers Yes No

Prior abdominal conditions or surgeries Yes No

Active rectal diverticulitis Yes No

Crohn's Disease Yes No

Ulcerative Colitis Yes No

Is there a family history of prostate cancer in 1st degree relatives?
(father, brother(s), son(s)) Yes No

Data 'cascades' between EMR and VTOC portal system for form for auto-completion and reporting, including:

- VTOC forms data from Registration, H&P, Toxicity QoL forms
- Roles-based forms completion.
- Rules-based notification

Scheduled Data Export to EMR

Test, Medonc - 04-0008 - 9/19/2009 - Interface, Document - Consult Report - Pending

ProCure Bloomington
Prostate QTV

Completion Date: 09-18-09

5 Current RT Dose: _____

Weight: 185 Pretreatment Weight 09-04-09
Date: _____

Height: 178 lbs Height 5 feet 8 Inches HR: _____ RR: _____

1 2 3 4 5 6 7 8 9 10

Location: _____

Has patient receive Taxotere therapy? Yes No

Has patient receive or currently receive LHRH therapy? Yes No

Has patient receive or currently receiving anti-androgen? Yes No

Is patient being treated on protocol? Yes No Trial #: _____

Instructions: the NCI Common Terminology Criteria for Adverse Events (CTCAE) is used to score all adverse events. Please refer to the CTCAE carefully (see tab above) and follow its instructions. Score the most severe grade observed since the last clinical visit. (Grade 1-5). **Note a semicolon indicates "or" within the description of the grade.**

Symptoms

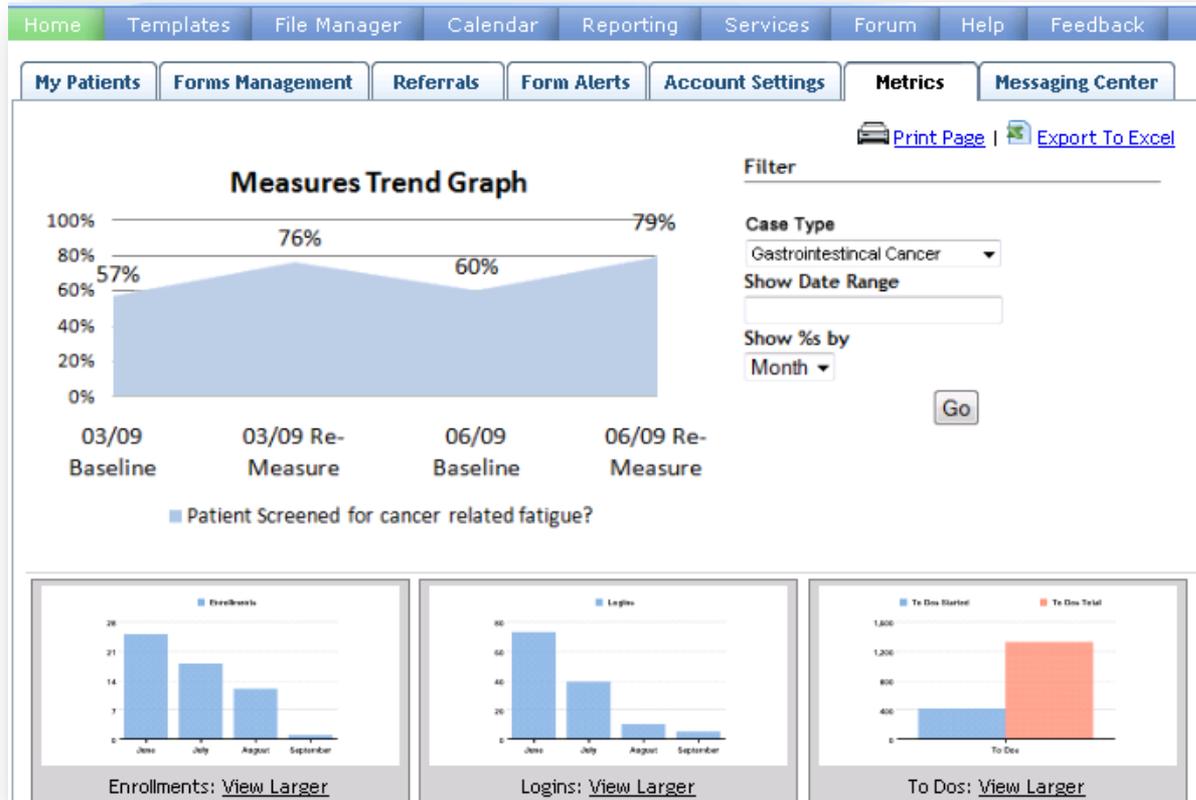
Performance Status (Zubrod)
active, no restrictions.
limited in physically strenuous activity but still able to carry out work of a light or moderate nature, e.g. light housework, office work.
unable to carry out work of a light or moderate nature and capable of self-care but unable to carry out any work activities. Up and about more than 50% of time.

Radiation Dermatitis (Rash: dermatitis assoc w/ radiation (specify chemoradiation or radiation below))
0 - None
1 - Faint erythema or dry desquamation
2 - Moderate to brisk erythema; patchy moist desquamation, mostly confined to skin folds and creases; moderate edema

VTOC Form/File	Mosaic Document Type	Mosaic Document Folder
1 Patient Registration		
2 Self Reported History (SRH)	PC Self Rep Hx	RADONC RCD
3 WBP	PC WP	RADONC RCD
4 QTV	PC QTV	RADONC RCD
5 Completion of Treatment	PC End of Tx Summary	RADONC RCD
6 Follow-Up	PC F/Up Note	RADONC RCD
7 QOL	PC QOL	RADONC RCD
8 Compliance form	Does not get transferred to Mosaic	
9 WRAA Form	PC WRAA form	PC ADMIN
10 Patient Rights & Responsibilities Form	PC Bill of Rights-pt	PC ADMIN
11 Chemotherapy	CHEMO RECORD	O/S CHEMO RCD
12 Labs	LAB	LAB
13 Other	PC Intake Other	PC INTAKE
14 Pathology	PATHOLOGY	PATH
15 Patient Records	MISC RECORDS	O/S RCD
16 Physician Notes	OUTSIDE Consult	O/S RCD
17 Previous RT	O/S RAD TX RCD	O/S RAD-ONC RCD
18 Radiology		RADIOLOGY
19 Surgery	O/S Surg Ref	O/S RCD

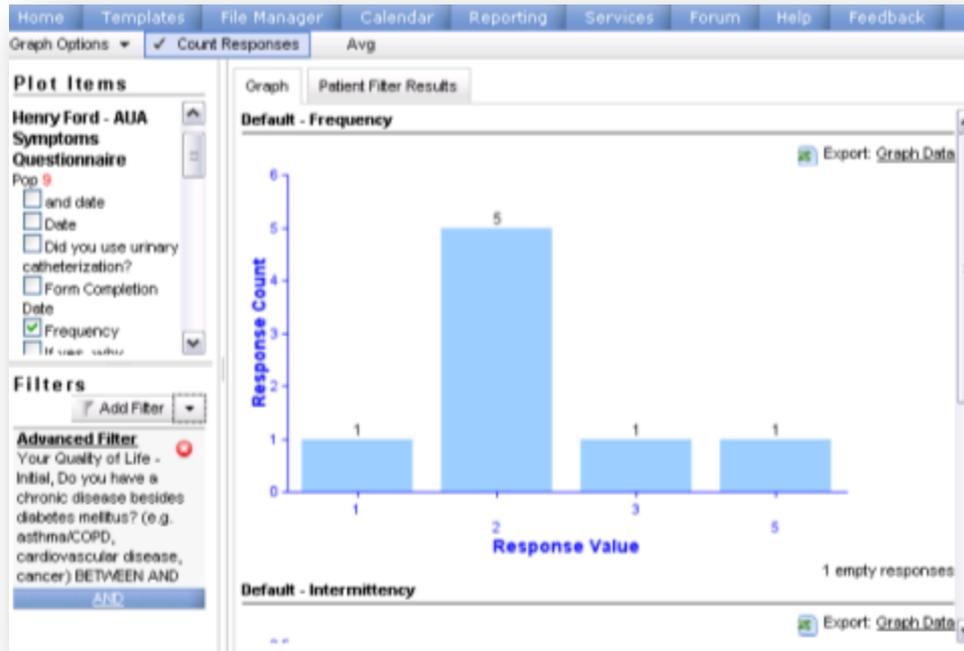
- Mapping / Crosswalk of VTOC forms & files
- Auto-export to EMR via HL7 message w/ Document Type

Radiation Oncology Quality Reporting by Disease Type



EMR Connectivity for Aggregate Quality Measures Dashboard with National Benchmark Data & Reporting/Filters on a Department Level

Patient-Level & Aggregate Reporting



The screenshot shows a Microsoft Excel spreadsheet with the following data:

Interval	Total AUA	Intermittency	Frequency	Intermittency Agency	Week 10e	Starting	Intermittency	Call per
6/20/10	30	5	5	5	5	5	5	5
7/24/2011	2.7	1	1	1	1	1	1	1
7/20/2011	3	1	1	1	1	1	1	1



- Patient Lists by Diagnosis / Self-Generated Reporting Queries for Clinical & QoL data.
- Demographic, Procedure & Diagnosis Data Filters w/ Excel® export.

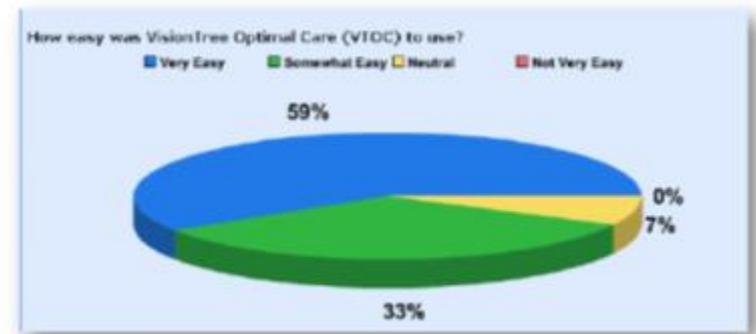
UF Shands & UFPTI VTOC Results & Other Experiences

- **5,000+ Patients** - with OTV and long-term QoL data including: IPSS, EPIC, IIEF

- **1,000+** patients actively using patient portal
 - **80% online participation**
 - **90%+ want to keep using it long-term**
 - **Average age: 60+ yrs old**

- VTOC Cancer Center sites nationally include:
 - UF Shands / UFPTI
 - UPENN
 - ProCure Treatment Centers
 - Henry Ford
 - UCSF
 - UCLA / Athena Breast Cancer Registry
 - ASTRO PAAROT National MOC Quality Reporting Program

- Other Results Include:
 - 6 Peer Reviewed Abstracts
 - 30% post-treatment quality of life
 - 30% missed canceled
 - RTOG 0828 (20 Sites) Measuring: Form Completion/Quality, Patient Compliance & Alerts



92% found VTOC Somewhat to Very Easy to Use

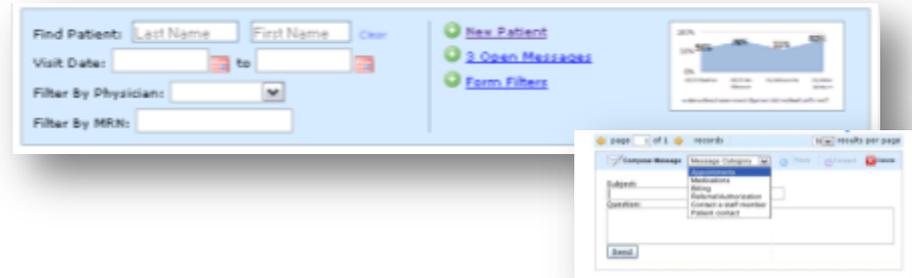
Patient Portal for Meaningful Use

- Clinical Team / Patient Paperless Workflow**
 - Registration, H&P, PROs, eCRFs, CCR/CCD delivered to patient for Treatment Summary
- Alerting & Reporting**
 - Layer on top of EMR & Practice Management Systems for collecting QoL and toxicity data sent via email/SMS text as actionable triggers
- Integration**
 - Data Extraction & Mapping
 - HL7, XML, CSV Connectivity
- Web & Mobile Access**
 - Providers, Patients, Registry Admin
- Messaging, Compliance & Education**
 - Clinical templates deliver and collect information
- Large Scale Data Capture & Analytics**
 - Community connectivity

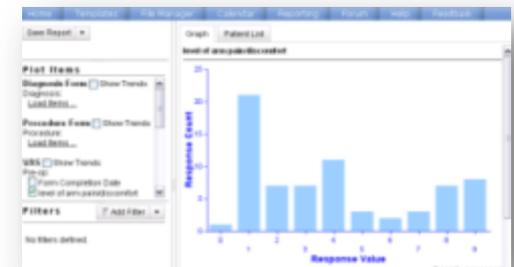
PRO/QoLs, OTV, H&P,
 CCR/CCD
 Treatment Summary



Quality, A/E Alerts,
 Msg, Case Conferencing

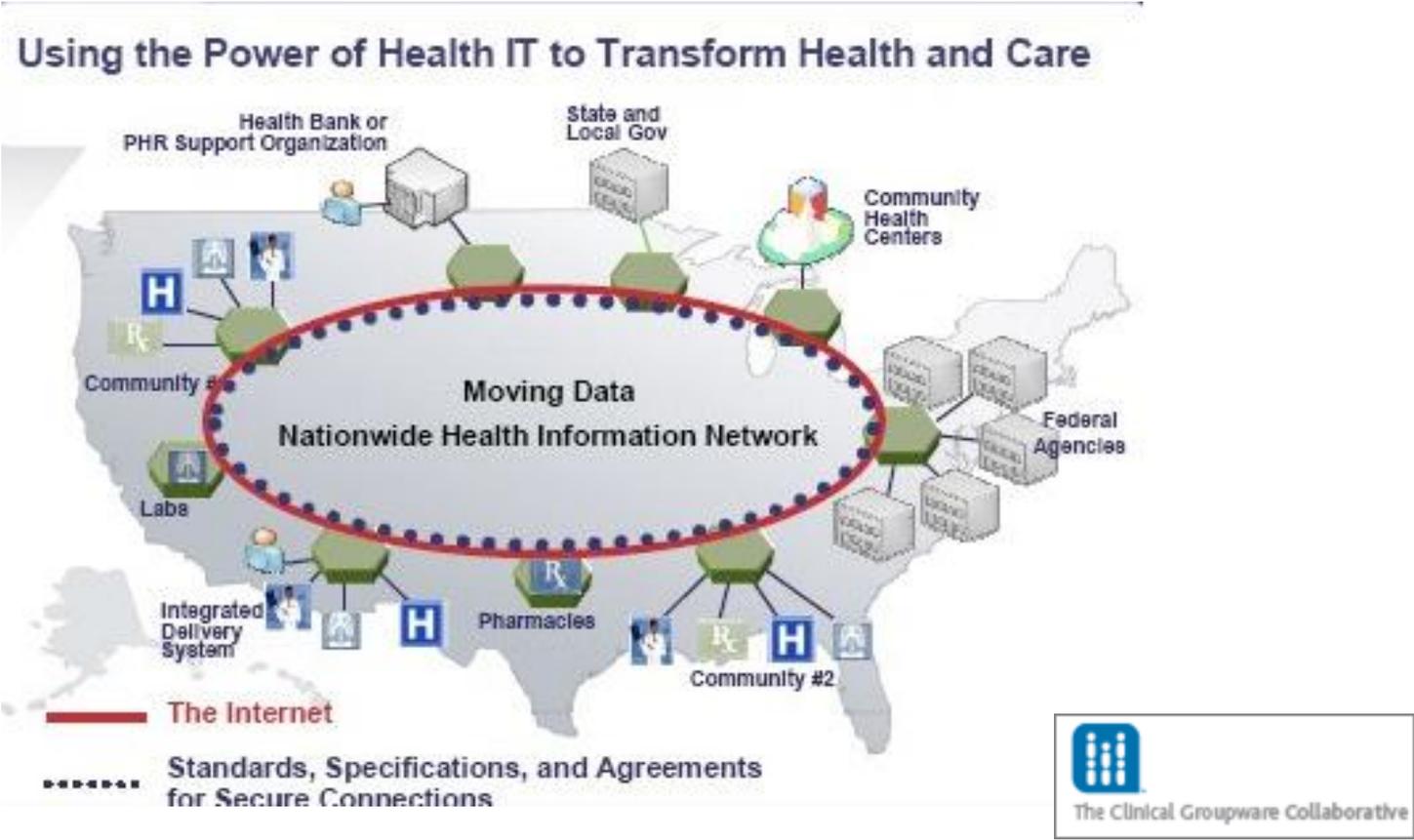


Reporting, Real-Time Metrics



ROPP: Overarching Data Exchange

NHIN Direct: Point-to-Point Patient-Level Data Exchange Model That may be used for the ROPP



* Courtesy of Office of the National Coordinator for HIT (ONC): <http://healthit.hhs.gov>