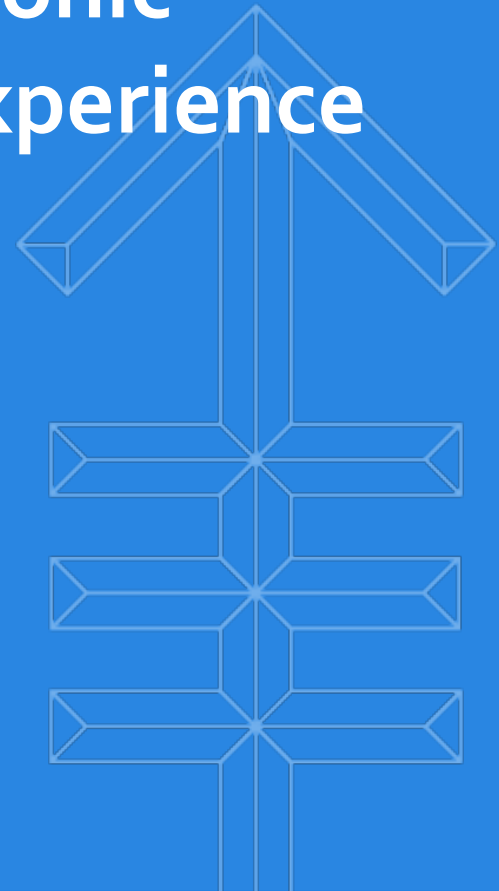




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# Overview of TG262 on Electronic Record Keeping & Clinical Experience with ARIA

March 7, 2016  
James Mechalakos  
Chair, TG-262



# Overview

- TG262 overview
- ARIA as an information repository
- ARIA as a workflow and communication manager
- ARIA connectivity and IT considerations
  - TPS integration
  - Hospital EMR integration



# Sources

- TG262 internal survey
  - 2015 educational course
- MSKCC physician survey on workflow
- MSKCC experience
- ARIA documentation
- TG201 rapid communication
- Mechalakos J. Dieterich S., “Quality and the EMR in radiation oncology” from “Quality and Safety in Radiation Oncology”, Dicker, Williams, Ford, eds., Demos Medical Publishing- *to be published*

Mechalakos, J. *MO-A-BRB-01: Review of TG-262 Internal Survey of Practices in EMR for External Beam Therapy*. 2015 10/15/2015]; Available from: <http://aapm.org/education/VL/vl.asp?id=4376>.

Siochi RA, Balter P, Bloch CD, Santanam L, Blodgett K, Curran BH, Engelsman M, Feng W, **Mechalakos J**, Pavord D, Simon T, Sutlief S, Zhu XR, A rapid communication from the AAPM Task Group 201: recommendations for the QA of external beam radiotherapy data transfer. AAPM TG-201: quality assurance of external beam radiotherapy data transfer. J Appl Clin Med Phys. 2010 Dec 4;12(1):3479



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# TG262 charges

- To provide guidance in the administration, design, and implementation of electronic charting for simulation, planning and treatment using external beam radiotherapy and brachytherapy
- To provide guidance in maintaining safe clinical processes and communication when designing an electronic charting system- both during the transition to the new system and once the system is implemented.
- To provide guidance in implementation and management of electronic charting in the context of other systems in the clinic and other programs in the hospital (billing, IT, medical records)
- To provide a list of desired features for a robust electronic charting system and potential pitfalls based on accumulated clinical experience.



# TG262 current work

- Internal survey - white paper in progress
- Groups
  - Implementation, training, and QA
  - Information repository- documents, forms, checklists
  - Workflow management and communication
  - IT considerations-connectivity
  - Brachytherapy and non-standard txt devices

Mechalakos, J. *MO-A-BRB-01: Review of TG-262 Internal Survey of Practices in EMR for External Beam Therapy*. 2015 10/15/2015]; Available from:  
<http://aapm.org/education/VL/vl.asp?id=4376>.

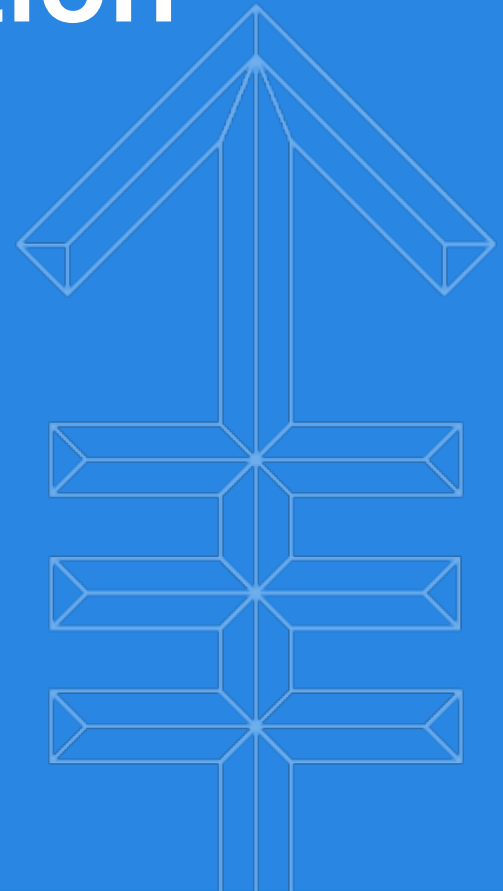


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# ARIA as an information repository



# Information in the electronic chart

*"The biggest challenge was where to document all the items that were documented in patient's treatment section of the paper chart."-TG262 internal survey*

	Pre Treatment-Simulation	Planning	On Treatment	Post-Treatment
<b>MD/Nursing</b>	<ul style="list-style-type: none"> <li>-Consents</li> <li>-Initial Consultation (Radiation Oncology)</li> <li>-Simulation order</li> <li>-Simulation note</li> <li>-Pathology reports</li> <li>-Radiology reports</li> <li>-Patient questionnaires</li> </ul>	<ul style="list-style-type: none"> <li>-Prescription/written directive</li> <li>-Special orders (not on Rx)-imaging, treatment goals, etc.</li> </ul>	<ul style="list-style-type: none"> <li>-chart rounds checklists</li> <li>-MD status check</li> <li>-Nursing status check</li> </ul>	<ul style="list-style-type: none"> <li>-MD Treatment Summary</li> <li>-Followup visits</li> </ul>
<b>Physics/Radiation Therapy</b>	<ul style="list-style-type: none"> <li>-Simulation checklists and QA forms</li> <li>-Simulation documentation (CT-PET-MRI)</li> <li>-Seed inventory and calibration</li> </ul>	<ul style="list-style-type: none"> <li>-Treatment Plan</li> <li>-Manual MU calculation forms for non-planned cases</li> <li>-Treatment planning timeout</li> <li>-Initial chart check form</li> <li>-Protocol specific dosimetry forms</li> <li>-Patient specific dosimetry report</li> <li>-Record of previous treatment/multiple concurrent txt</li> <li>-IMRT/VMAT QA</li> <li>-RTT initial chart check checklist</li> </ul>	<ul style="list-style-type: none"> <li>-Brachytherapy treatment delivery checklists/logs- pt specific and room specific</li> <li>-Weekly chart checks- RTT and physics</li> <li>-Daily treatment documentation form</li> <li>-SRS and SBRT QA (includes IGRT forms: on-board imaging, OSI, etc)</li> <li>-Procedure specific QA (craniospinal irradiation, respiratory gating, etc)</li> <li>-EKG report</li> <li>-Procedure specific dosimetry (TBI, TSEB)</li> <li>-In vivo dosimetry (OSL, TLD)</li> <li>-Setup Instructions (site/procedure specific)</li> <li>-Custom worksheets and QA forms (breast boost, clinical setup, etc)</li> <li>-Room surveys</li> </ul>	<ul style="list-style-type: none"> <li>-Post implant evaluation</li> <li>-End of treatment check</li> <li>-RTT end of treatment check</li> </ul>

# ARIA as an information repository

- Birds eye view
- The prescription
- The treatment plan
- The treatment history
- The journal
- QA functions





# Birds Eye View

ARIA - Patient Manager

File View Tools

New Patient Save Patient Refresh Print Screen Reports

Summary Registration Encounters Care Path Diagnosis Evaluation Documents Journal

Patient Information

Name: [Redacted]  
 ID1: [Redacted]  
 Birth Date: [Redacted]  
 Home Phone: (none)  
 Work Number: (none)

Patient I/O Status: Outpatient  
 Room Number: (none)  
 Admission Date: (none)  
 Last kV/MV Image: [Redacted]  
 Last kV/MV Status: Approved  
 Directives: not asked

Doctors

Primary Oncologist: [Redacted]  
 Phone: (none)  
 Ref. Physician: (none)  
 Phone: (none)

Transportation

Name: (none)  
 Phone: (none)

Contact

Name: (none)  
 Relationship: (none)  
 Phone: (none)

Payor

Payor Name: (none)  
 Plan Number: (none)  
 Policy Number: (none)  
 Account Number: (none)

Appointments Tasks

Activity Na...	Due Date	Start Date	Duration	Note	Staff/Re...	Patie
Daily Treatment		[Redacted]	15		441-6EX	PE
Daily Treatment			15		441-6EX	PE
Daily Treatment			15		441-6EX	PE
Daily Treatment			15		441-6EX	PE
Daily Treatment			15		441-6EX	PE
Daily Treatment			15		441-6EX	PE

RT Summary MedOnc Summary

Course & Diagnosis

1\_LEFT BREAST  
 QA  
 DO NOT USE  
 C50.4, Malignant neoplasm of upper-outer quadrant of breast

Prescription & Treatment

Course ID	Plan ID	RxDose (cGy)	Primary RP	Fraction	RxDose/Frac...	Plan Status
1_LEFT BREAST	LT BRST #	4240	LEFT BREAST	16/16	265	Treatment Appr...
1_LEFT BREAST	LT BRE BOOST	1000	LT BREAST BO	4/4	250	Treatment Appr...

1\_LEFT BREAST Delivered Dose (incl. dose corrections) : 5240 cGy

Reference Points

Ref. ID	Planned Dose (...)	Actual Dose (c...	Total Dose Limi...	Daily Dose Lim...	Session Dose L...
LT BREAST BOOST	1000	1000	1000	250	250
LEFT BREAST	4240	4240	4240	265	265

Patient Alert(s)

Sign Off	Display D...	Patient Alert	Created By	Signed Off By	Signed Off...
<input type="checkbox"/>	[Redacted]	4:10 PM APPROVED	[Redacted]		

Plans

Reference Points

Alerts for the therapist

Appointments and Tasks



# Dynamic Documents

ARIA - Patient Manager

Activity Worklist Quicklinks Logout

File View Tools

New Patient Save Patient Refresh Print Screen Reports

Summary Registration Encounters Care Path Diagnosis Evaluation Documents Journal

Patient Documents

Date of Service	Template Name	Document Type	Signed By	Approved By	Approved Date
					<a href="#">Click here to enter filter criteria</a>
13 PM	RIGHT BREAST	MD - Consent			
56 AM	RIGHT BREAST	RTT - Setup Doc			
10:40 AM	MD - Simulation Note	Sim Notes			
11:53 AM	MD - Prescription	MD - Prescription		MD	06 AM
11:34 AM	RT BREAST	MP - Treatment Plan		MD	23 AM
11:37 AM	RIGHT AXILLA/UPPER CW	RTT - Daily Doc (32)			
12:00 PM	Sim Order	Orders			
12:02 AM	Sim Note	Sim Notes		MD	2 PM
12:03 AM	Setup Doc - LT DIBH IMRT	Setup Docs			
12:04 AM	Pre-Simulation Timeout Checklist	QA			
12:09 AM	EBRT - RIGHT BREAST	Consents			
12:32 PM	Prescription - BREAST6 - IMRT	Prescriptions		MD	3 PM
12:45 PM	Record Prev bx-LT BREAST	Physics QA		MD	2 PM
12:12 AM	DailyDoc (32) LT CW	Delivery			
12:14 AM	LT CW	Plans			
12:15 AM	DIBH PLOT	Setup Docs			
12:15 AM	PIC LEFT BREAST	Physics QA			

New... Scan... Import... Copy... Modify... View... Print...

Correspondence

Print... Fax...

☐ Show Errors

Date Range

12 / 8 / 2011

2 / 12 / 2016

☒ All Dates

☐ Show document preview (if available)

Show Documents in Group: (All)

Refresh

Screen Right: All Rights

2/12/2016 11:24



# Prescription

Patient Document - [Patient Name]

Patient Document Details

Home Insert Page Layout References Mailings Review View Design Layout

Cut Copy Paste Format Painter Clipboard

Font Paragraph Styles Editing

Memorial Hospital for Cancer and Allied Diseases  
LOCATION: Hamilton - 687 St.  
Department of Radiation Oncology  
Prescription

Previous RT: ☐ No ☒ Yes  
Brachy Component: ☐ No ☒ Yes  
Protocol: ☐ Pacemaker ☒ Defibrillator  
Diagnosis: C79.3 - Secondary malignant neoplasm of brain and cerebral meninges.  
151.5 - Malignant neoplasm of lesser curvature of stomach, unspecified.

Date: [Date]  
Site: L FRONTAL MET  
Energy / Modality: 6MV  
Field Arrangement: PLAN  
Reference Point / Isodose: SEE PLAN  
Dose / Fraction: TARGET DOSE TARGET DOSE TARGET DOSE TARGET DOSE  
Number of fractions: 5  
Fractions / Day: 1  
Reevaluation Dose: cGy  
Planned Dose: TARGET DOSE TARGET DOSE TARGET DOSE TARGET DOSE  
Total Dose (cGy): 3000

Beam Modifiers  
Statement of Complexity  
Imaging Details

NOTES: (e.g. TLD, gating to [Date])

Document

Customizable

Integrated

Prescription List New Prescription Reload

Course: 1 Intent: Unknown Diagnosis: Template:

Treatment Prescription

Prescription Name: L FRONTAL MET [Approved] [History]

Site: Brain

Fractions: 6

Prescribe To: Volume Add

Volume Total Dose (cGy) Dose/Frac (cGy/Frac)

PTV 3000.0 500.0

Primary/Boost: Primary

Mode: Photon

Technique: IMRT

Energy: 6X

Frequency: Once Daily

Start: 0 Days [None] [ ]

Other: AlignRT

Notes: AlignRT

Prescription Coverage Constraints

Min Dose: Max Dose: At least: % of at: No more than: % of at:

Organ at Risk Constraints

Mean: cGy Max: cGy Add Constrain

Treatment Management

Imaging: CBCT: Pre Tx, Every Treatment Add

Gating: None

Bolus: None None

Breakpoint: None

Labs: Add

Simulation: Yes No

Linked Plans:

Approve Review Prescription ErrorOut Save as Template Edit

ARIA Rx

# Prescription workflow

- The tyranny of electronic approval
  - Move non-essential information
  - Use templates
- What if the prescription is changed?
  - Communication is vital between attending, machine, and physics but compliance isn't 100%

Document Template Select	
Template Name	Template Type
Prescription	Prescriptions
Prescription - BREAST 1 - Hfx Tangents	Prescriptions
Prescription - BREAST 1B - Hfx Tang + Boost	Prescriptions
Prescription - BREAST 2 - SFx Tang + Boost	Prescriptions
Prescription - BREAST 3 - Recr Br + Sclav	Prescriptions
Prescription - BREAST 4 - 3F Unrec CW (e)	Prescriptions
Prescription - BREAST 5 - Breast + Sclav + IMN	Prescriptions
Prescription - BREAST 6 - IMRT	Prescriptions
Prescription - SRS Cranial	Prescriptions
Prescription - SUPERFICIAL	Prescriptions
Prescription - Z11 Standard Tangents	Prescriptions
Prescription (Post-Op Prostate Fossa Only)	Prescriptions
Prescription (Post-Op Prostate Fossa Plus Nodes)	Prescriptions
Prescription (Prostate + Pelvis Conventional)	Prescriptions
Prescription (Prostate Only Conventional)	Prescriptions
Prescription (Prostate Plus Nodes Conventional)	Prescriptions
Prescription (Prostate SBRT Post-Brachy)	Prescriptions
Prescription (Prostate SBRT)	Prescriptions

Patient Alert(s)		
Sign Off	Display D...	Patient Alert
<input checked="" type="checkbox"/>		
<input checked="" type="checkbox"/>		
<input type="checkbox"/>		/16 12:33pm approved

Require concordance between timestamp reported in alert and Rx document timestamp

Prescription		Prescriptions		2016 12:33 PM
--------------	--	---------------	--	---------------



# TG262 survey:

- How are modifications to the prescription managed?
  - A modification to the prescription automatically triggers a treatment hold until it is reapproved-**4** (all MOSAIQ)
  - A modification to the prescription triggers a warning message but not a treatment hold- **0**
  - A modification to the prescription does not trigger a treatment hold. -**7** (6 ARIA, 1 MOSAIQ)



# Hard stop for prescription revisions- ARIA

The screenshot displays the ARIA software interface for managing prescriptions. The top navigation bar includes tabs for 'Prescribe Treatment', 'Plan Parameters', 'Reference Points', 'Treatment Preparation', 'Plan Scheduling', 'Appointment Scheduling', and 'RT Summary'. The 'Manage Prescription' tab is active, showing a calendar view for December 2014 and January 2015. Below the calendar, the 'Prescription List' and 'New Prescription' buttons are visible. The 'lung [R1] [Approved:Primary]' and 'Right Chestwall [Draft:Primary]' tabs are selected. The 'Treatment Prescription' section shows details for the 'lung' prescription, including 'Site: Chest', 'Fractions: 20', 'Prescribe To: Isocenter', 'Total Dose: 3600.0 cGy', 'Dose/Frac: 180.0 cGy / Frac', 'Primary/Boost: Primary', 'Mode: Photon', 'Technique: 4 Field Box', 'Energy: 6X', 'Frequency: 5 Times a week', and 'Start: 0 Day(s)'. The 'Prescription Coverage Constraints' and 'Organ at Risk Constraints' sections are also visible. The 'Treatment Management' section shows 'Imaging: Add', 'Gating: None', 'Bolus: None', 'Breakpoint: None', 'Labs: Add', and 'Simulation: Yes'. A 'Linked Plans' warning is highlighted with a blue circle, stating: 'There are Plan(s) linked to a previous revision of this Prescription. These changes will not automatically be applied to the plans. Please ensure plans are valid before proceeding.' The bottom of the interface features buttons for 'Approve', 'Review Prescription', 'ErrorOut', 'Save as Template', and 'Edit'.

*"If a prescription which has been linked to a plan is edited, the treatment plan automatically reverts to a planing approved status so that the plan linked to the original prescription is not able to be treated without a revision."*

"ARIA 13.6 Prescribe Treatment Video", available via myVarian website- document  
AI 13.6-VID-04-A

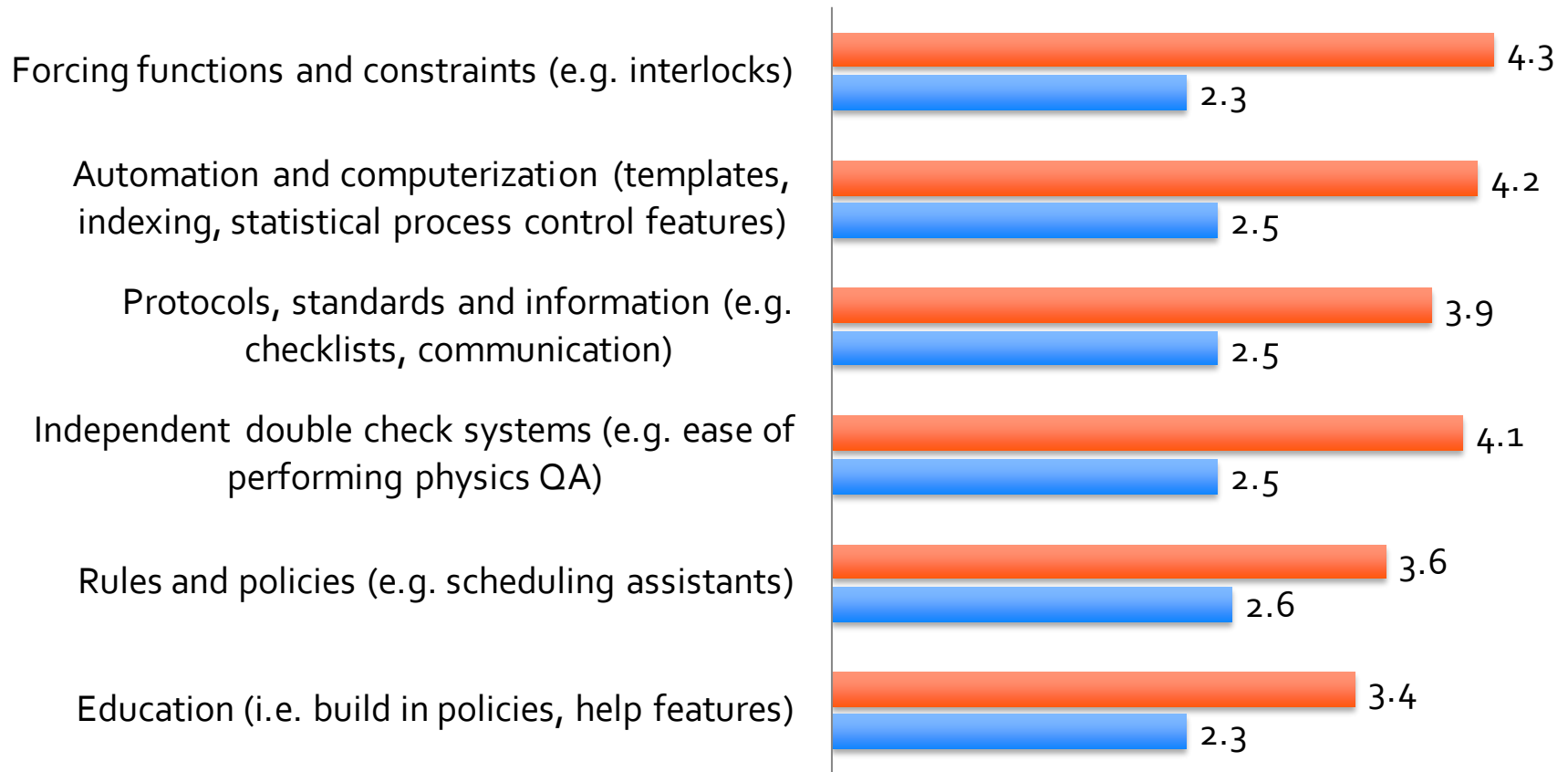


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# How effective is the OIS for QA?

## QA Functions

■ Importance ■ Performance



Mechalacos, J. *MO-A-BRB-01: Review of TG-262 Internal Survey of Practices in EMR for External Beam Therapy*. 2015 10/15/2015]; Available from: <http://aapm.org/education/VL/vl.asp?id=4376>.

<https://www.ismp.org/newsletters/acutecare/articles/19990602.asp>



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## PLAN SUMMARY REPORT

### PATIENT

Name:   
IDs:   
Radiation Oncologist:

Cover sheet

### PLAN

General  
Course Id: 2\_SRS BRAIN  
Plan Id: L FRONT BRAIN  
Plan Name: L FRONTAL MET  
Plan Comment:  
Dose Prescription  
Number of Fractions: 1  
Fractionation: F1  
Prescribed Dose: Prescribe 600.0 cGy / 1x to 100.0 %  
Number of Fractions: 5  
Prescribed Dose: 3000.0 cGy

### Approvals

Planning Approval

Planned By:

Plan Summary  
Memorial Sloan Kettering Cancer Center  
Department of Radiation Oncology

Plan Summary  
Memorial Sloan Kettering Cancer Center  
Department of Radiation Oncology

Plan, algorithm, ref pt info

Independent MU check summary sheet  
This document is printed on

Patient Name:   
Treatment course: 2  
Plan's Study ID/Series number:   
Plan ID: L FRONT BRAIN  
Plan time:   
Plan export:   
Plan export:   
Patient group: L FRONT BRAIN

Prescription:   
Dose calculated in Eclipse by: AAA  
Couch model used: None

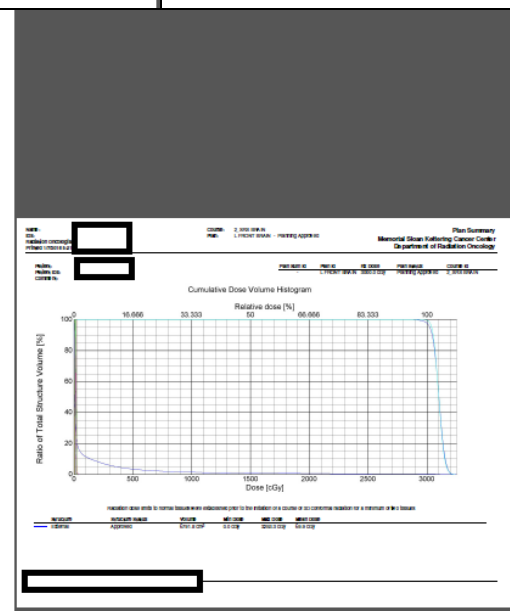
Beam Id	D6	D7
Jaws	X1(cm) 2.6 2.0	X2(cm) 2.1 2.0
	Y1(cm) 2.0 2.0	Y2(cm) 2.0 2.5
Isocenter(cm)	0.0/0.1/0.0	0.0/0.1/0.0
MU	613	571
Penumbra	6FFP_TL_HD_1-12-15	6FFP_TL_HD_1-12-15
Check point	Check in 10% 10% 10% 10% 10%	Check in 10% 10% 10% 10% 10%
	Drop coordinates (cm) 0.0, 0.0, 1.0, 0.0, 0.1, 0.0	0.0, 1.0, 1.0, 0.0, 0.0
	BEV x, y (cm) 287.1 269.5	287.2 261.9
	Eclipse dose (cGy) 287.1 269.5	287.2 261.9
	Check dose (cGy) 287.1 269.5	287.2 261.9
	Check dose difference (%) 0.0 -0.9	0.0 -0.9
	Closest match (%) 0.02 0.31	0.02 0.31
	Check Sp 0.974 0.973	0.974 0.973
	Check Sc 0.984 0.984	0.984 0.984
Plane dose	Gamma calculation depth (cm) 7.5 5.0	7.5 5.0
	Plane calculation resolution (cm) 0.13 0.13	0.13 0.13
	Average dose inside rectangle (cGy) 195.52 137.28	195.52 137.28
	Gamma pass rate(%) 99.73 100.00	99.73 100.00
Machine/Energy	4FFB3-Flx 4FFB3-Flx	4FFB3-Flx 4FFB3-Flx
Gantry angles	130-0 0-130	130-0 0-130
Rotation direction	CC C	CC C
Collimator angle	0 90	0 90

The average gamma pass rate is 99.87

Ind. MU

5 Fx Brain (No Prior RT)					
Patient MRN	Plan: L FRONT BRAIN	Export Date: 5:01:52 PM	Exported by:		
Rx Structures	PTV				
# Fx	5				
Dose/Fx (cGy)	600				
Total Dose (cGy)	3000				
*This sheet is for summary purposes only - it is important to evaluate the entire DVH. It is possible that some structures requiring dose evaluation may be missing from the template below. There are instances where it is necessary, and even preferable, to exceed these general constraints based on individual patient's clinical scenario and the physician's discretion.					
Structure	Guideline/Limit (cGy)	Plan Dose (cGy)	Volume Goal/ Guideline	Volume Analysis	Comments
PTV	D_95% DMAX	3023 3253		97.69% of Vol. > 3000	
External	DMAX	3253			
Cord	max = 3000 4.38% Vol > 2300	5	0.35 cc, Guideline	0% of Vol. > 2300	
Brainstem	max = 3120 5% Vol > 3000	26	Guideline, PTV overlap	0% of Vol. > 3000	
Chiasm	max = 2300	28	Guideline		
OptNrv_L	max = 2300	23	Guideline		
OptNrv_R	max = 2300	23	Guideline		

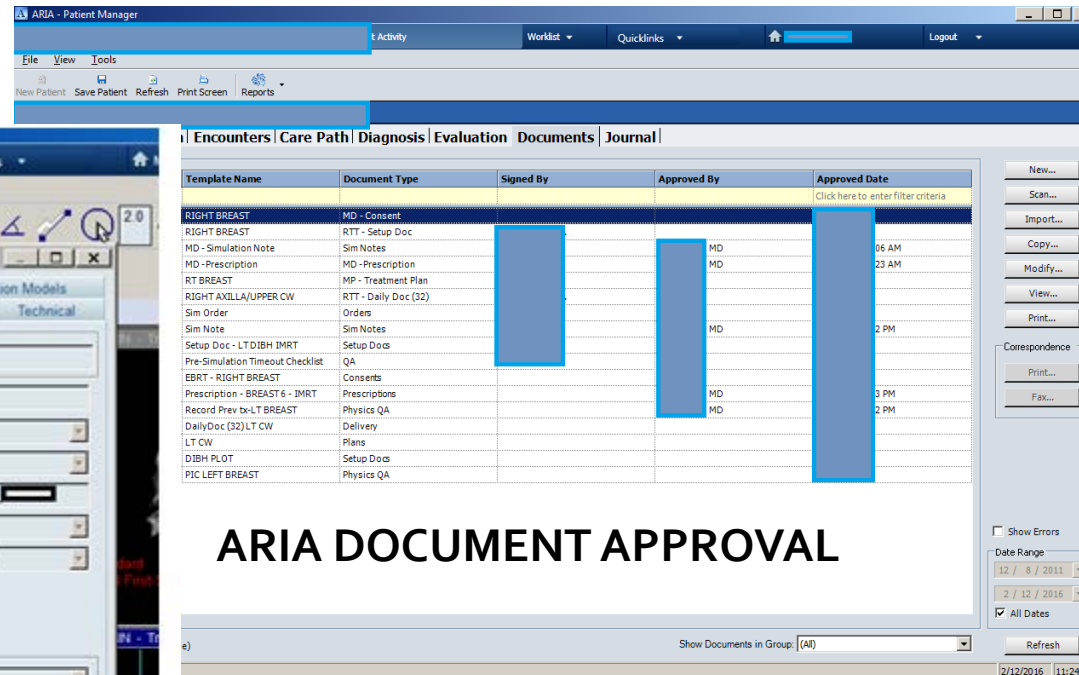
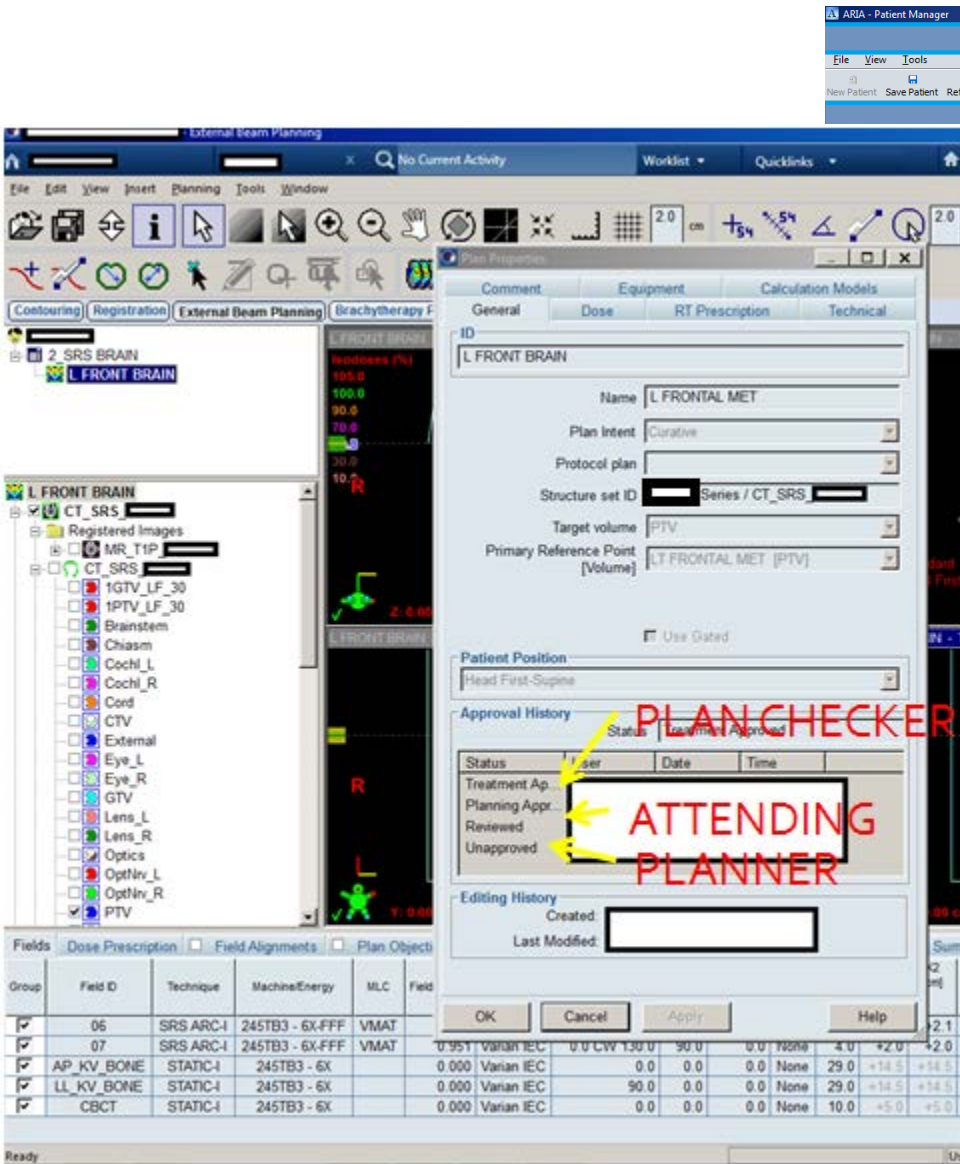
DVH info



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# Plan approval



## ARIA DOCUMENT APPROVAL

Electronic systems introduce electronic approval which should fit the institutional workflow.

## ELECTRONIC PLAN APPROVAL



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# Treatment History

The screenshot shows the ARRA - Chart QA software interface. The top menu bar includes File, View, Tools, and a search bar. Below the menu is a toolbar with buttons for Create Worklist, Add to Worklist, Save, Refresh, Print Screen, and Reports. The main window is divided into two panes. The left pane, titled 'Patient Worklist', shows a list of patients with columns for ID, Last Name, and First Name. The right pane, titled 'Treatment History', shows a detailed table of treatment sessions. The table has columns for DateTime, Plan ID, Fraction Number, Field ID, Field Type, Resource, Energy, MU, Accessory IDs, Tolerance Table, and Dose Rate. The table lists various treatment sessions for a patient, including LT\_BREAST #, LT\_SCVPAB, and LT\_SCVPAB, with details on the fraction number, field ID, field type, resource, energy, MU, accessory IDs, tolerance table, and dose rate.

DateTime	Plan ID	Fraction Number	Field ID	Field Type	Resource	Energy	MU	Accessory IDs	Tolerance Table	Dose Rate
	LT_BREAST #	01_1	01_1	Planned	443-2300DX1	6X	217	Millenium 120	0-INTER...	6
	LT_BREAST #	01_2	01_2	Planned	443-2300DX1	6X	152	Millenium 120	0-INTER...	6
	LT_BREAST #	02_1	02_1	Planned	443-2300DX1	6X	145	Millenium 120	0-INTER...	6
	LT_BREAST #	02_2	02_2	Planned	443-2300DX1	6X	219	Millenium 120	0-INTER...	6
	LT_SCVPAB	03	03	Planned	443-2300DX1	15X	237	Millenium 120	0-INTER...	6
	LT_SCVPAB	04	04	Planned	443-2300DX1	15X	24	Millenium 120	0-INTER...	6
	LT_SCVPAB	1	03	PIMG	443-2300DX1	6X	1		0-INTER...	1
	LT_SCVPAB	1	03	PIMG	443-2300DX1	6X	1		0-INTER...	1
	LT_SCVPAB	1	03	PIMG	443-2300DX1	6X	1	Millenium 120	0-INTER...	1
	LT_SCVPAB	1	04	PIMG	443-2300DX1	6X	1	Millenium 120	0-INTER...	1
	LT_SCVPAB	1	04	PIMG	443-2300DX1	6X	1	Millenium 120	0-INTER...	1
	LT_BREAST #	1	02_2	PIMG	443-2300DX1	6X	1	Millenium 120	0-INTER...	1
	LT_BREAST #	1	02_1	PIMG	443-2300DX1	6X	1		0-INTER...	1
	LT_BREAST #	1	02_1	PIMG	443-2300DX1	6X	1		0-INTER...	1
	LT_BREAST #	1	01_1	PIMG	443-2300DX1	6X	1	Millenium 120	0-INTER...	1
	LT_BREAST #	1	01_2	PIMG	443-2300DX1	6X	1	Millenium 120	0-INTER...	1
	LT_BREAST #	1	01_2	PIMG	443-2300DX1	6X	1		0-INTER...	1
	LT_BREAST #	1	01_2	PIMG	443-2300DX1	6X	1	Millenium 120	0-INTER...	1
	LT_BREAST #	1	01_1	TRT	443-2300DX1	6X	217	Millenium 120	0-INTER...	6
	LT_BREAST #	1	01_2	TRT	443-2300DX1	6X	152	Millenium 120	0-INTER...	6
	LT_BREAST #	1	02_1	TRT	443-2300DX1	6X	145	Millenium 120	0-INTER...	6
	LT_BREAST #	1	02_2	TRT	443-2300DX1	6X	219	Millenium 120	0-INTER...	6
	LT_SCVPAB	1	04	TRT	443-2300DX1	15X	24	Millenium 120	0-INTER...	6
	LT_SCVPAB	1	03	TDT	443-2300DX1	15X	237	Millenium 120	0-INTER...	6

*"There are some infrequent instances where the communication is dropped between the delivery system and the RO e-chart system. If this is not discovered on time, there is the potential to treat the patient for another fraction. We have processes in place to avoid this issue." – TG262 survey*

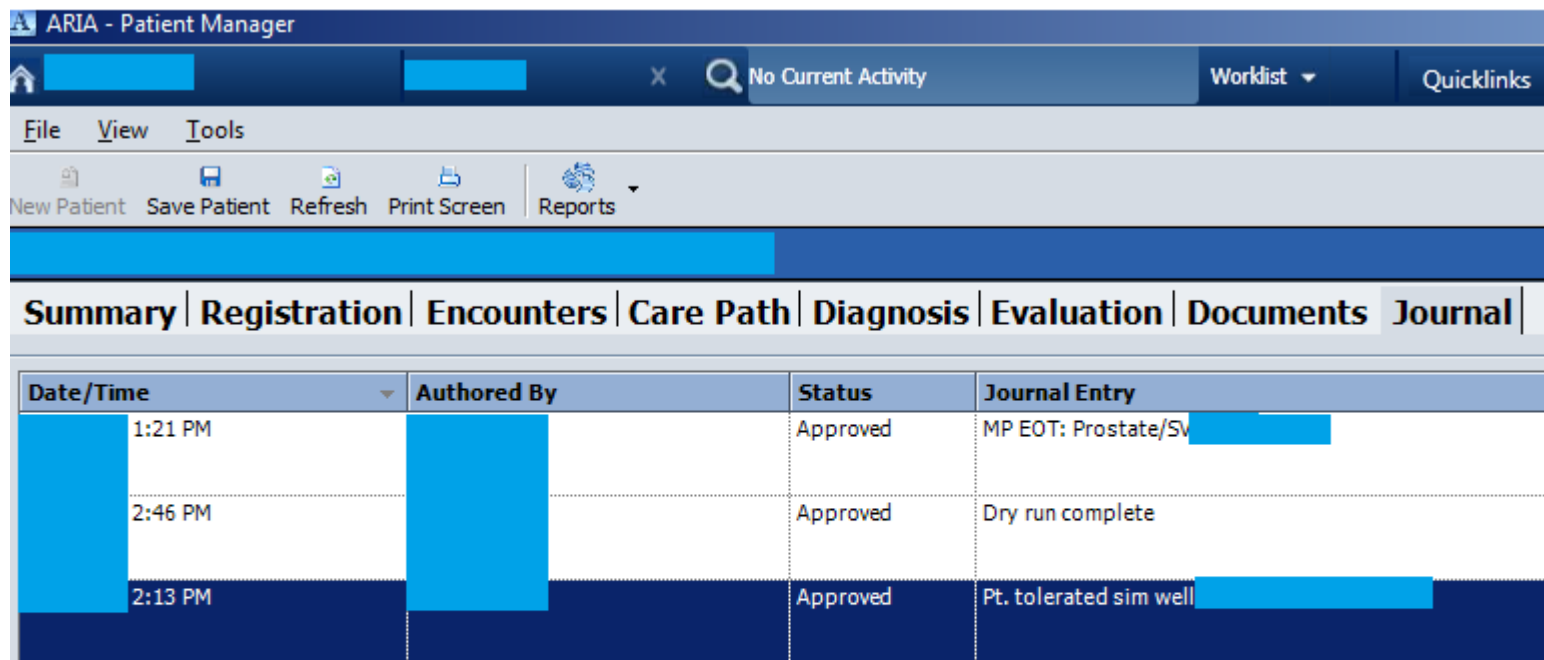
*"Clinics should have policies and procedures in place to handle treatments that are interrupted by network or software problems" – TG201 rapid communication*

Siochi RA, Balter P, Bloch CD, Santanam L, Blodgett K, Curran BH, Engelsman M, Feng W, **Mechalakos J**, Pavord D, Simon T, Sutlief S, Zhu XR, A rapid communication from the AAPM Task Group 201: recommendations for the QA of external beam radiotherapy data transfer. AAPM TG-201: quality assurance of external beam radiotherapy data transfer. J Appl Clin Med Phys. 2010 Dec 4;12(1):3479



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# The journal



The screenshot shows the ARIA - Patient Manager interface. At the top, there's a header bar with 'ARIA - Patient Manager', a search bar with 'No Current Activity', and buttons for 'Worklist' and 'Quicklinks'. Below this is a menu bar with 'File', 'View', and 'Tools'. A toolbar contains icons for 'New Patient', 'Save Patient', 'Refresh', 'Print Screen', and 'Reports'. The main content area has a tabbed interface with 'Summary', 'Registration', 'Encounters', 'Care Path', 'Diagnosis', 'Evaluation', 'Documents', and 'Journal'. The 'Journal' tab is selected, displaying a table with the following data:

Date/Time	Authored By	Status	Journal Entry
1:21 PM		Approved	MP EOT: Prostate/Sv
2:46 PM		Approved	Dry run complete
2:13 PM		Approved	Pt. tolerated sim well

- *It is an easy way to document planning, QA or treatment related items or notes*
- Anything that would have been written as a note in the paper chart- for example setup checks, early txt completion, etc
- For everything that we have not found a good place for
- Admin. or nursing use as a communication note section



# QA documents

- Dynamic document
- Questionnaire
- ARIA checklist\*

The 'Questionnaires' window displays a table with columns 'Date/TL...', 'Status', and 'Title'. It lists two entries: 'Optional: MP Initial Chart Check...' and 'Approved: MP Initial Chart Check...'. To the right, a form titled 'MP Initial Chart Check Planned Site: 1' is shown. The form includes fields for 'Title', 'Type' (set to 'Clinical'), and 'Date'. The main content area contains a checklist of 8 items related to treatment plan verification, such as 'Course-plan name(s)', 'Patient history', 'Plan verified against approved prescription', and 'Isocenter verified'. At the bottom, there are buttons for 'Amend', 'New', 'Approve', 'OK', and 'Cancel'.

Plan check questionnaire

Continued...

The 'Treatment Approve Plan' window shows details for a plan owned by 'John Conner' with a due date of '6/12/2012 5:00 PM'. It includes a 'Checklist' tab with a table of items and their status.

Item	Status
2 Plan QA: Verify that treatment plan QA has been performed, completed, reviewed and signed.	InComplete
3 Setup fields, DRRs: Verify that setup fields, DRRs and other reference images are relative to the proper isocenter.	Complete
4 Correct patient: Verify that the patient being treated matches the patient in the treatment plan.	Complete
5 Correct treatment plan: Verify that the treatment plan and procedure matches the treatment site and physician's intent.	Complete
6 Machine motions: Verify that the planned treatment machine motions do not cause collisions between the	Complete

Facilitate staff compliance to your department protocols by linking customizable checklists to any activity.

\* From  
[https://www.varian.com/sites/default/files/resource\\_attachments/ARIARadOncProductBrief\\_.pdf](https://www.varian.com/sites/default/files/resource_attachments/ARIARadOncProductBrief_.pdf)



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# Questionnaires

- ARIA users- do you use questionnaires?
  - Yes(Please explain how) 5
    - document initial chart check
    - for time out before tx, sbrt rounds, pacemakers, hdr audits, theraspheres, eyeplaque for second checks, sim check list, srs pre treatment qa and weekly physics checks.
    - tried to, only one that stuck was resident chart round tasks
    - EOT
    - It is useful to standardize the input of information and also since it is structured data, this information can be queried and used for future data gathering and analysis for outcomes.



# Weekly checks

ARIA - Chart QA

File View Tools

Create Worklist Add to Worklist Save Refresh Print Screen Reports

Pending Completed

Patient Worklist

ID Les... First...

Summary Treatment History Encounters Documents In Vivo Measurements Questionnaires Journal

Personal Information

Name: [REDACTED]  
 ID1: [REDACTED]  
 Birth Date: [REDACTED]  
 Home/Cellular Phone: (none)  
 Work Number: (none)  
 Primary Oncologist: [REDACTED]  
 Phone: (none)

Last kV/MV Image: [REDACTED]  
 Last kV/MV Status: [REDACTED]  
 Last Chart QA: [REDACTED]

Chart QA History

Date/Time	Approved...	Chart QA Note
[REDACTED]	#3 Initial	[REDACTED]
[REDACTED]	#6	[REDACTED]
[REDACTED]	FX12	[REDACTED]

Prescription & Treatment

Course ID	Plan ID	Energy	RxDo...	Primary RP	Fr...	RxDose...	Last...
1_LT BREAST	LT_SCLVPAB	15X	5000	LT_SCLVPAB	12/25	200	[REDACTED]
1_LT BREAST	LT_BREAST # 6X	6X	5000	LT_BREAST	12/25	200	[REDACTED]
1_LT BREAST	LT_BREAST...	20E	1000	LT_BREAST	0/5	200	[REDACTED]

1\_LT BREAST Delivered Dose (incl. dose corrections): 4800 cGy

Reference Points

Ref. ID	Planned D...	Actual D...	Total Dose Lim...	Daily Dose Lim...	Session Dose Li...
LT_BREAST	5000	2400	5000	200	200
LT_BREAST_BST	1000		1000	200	200
LT_SCLVPAB	5000	2400	5000	200	200

Patient Alert(s)

Sign Off	Display...	Patient Alert	Created By	Signed...	Signed...
<input type="checkbox"/>		[REDACTED]			
<input checked="" type="checkbox"/>		[REDACTED]			

Appts/Tasks

Activity Name	Start D...	Duration	Staff/Resour...	Priority	Patient Name	Patient ID1	Created By	Questionnaire
Initial Simulation	[REDACTED]	60	CT Sim 4...	Medium	[REDACTED]	[REDACTED]		
New Start	[REDACTED]	45	443-2300DK1		[REDACTED]	[REDACTED]		
Daily Treatment	[REDACTED]	20	443-2300DK1		[REDACTED]	[REDACTED]		
Daily Treatment	[REDACTED]	20	443-2300DK1		[REDACTED]	[REDACTED]		

Show QA Eligible Patients

Can use a checklist (ARIA checklist, ARIA questionnaire or document)



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# Treatment History

ARIA - Chart QA

File View Tools

Create Worklist Add to Worklist Save Refresh Print Screen Reports

Pending | Completed

Patient Worklist

Summary Treatment History Encounters Documents In Vivo Measurements Questionnaires Journal

☐ Show All Treatments ☐ Hide Completed Plans ☐ Hide Retired Plans

Chart QA Note Graph QA'd

DateTime	Plan ID	Fraction Nu...	Field ID	Field Type	Resource	Energy	MU	Accessory Ids	Tolerance Table	Dose Rate	MLC Plan	Gantry Rtn	Coll Rtn	Couch Vrt	Couch Lng	Couch Lat	Pitch Angle	Roll Angle	Couch Rtn
3:10:28 PM	Lung		01	Planned	245TB3	6X	983	HD 120	2-SRS	600	4	178	0	11.6	104	998.5			0
3:10:28 PM	Lung		02	Planned	245TB3	6X	951	HD 120	2-SRS	600	4	181	90	11.6	104	998.5			0
4:59:57 PM	Rt Brain		08	Planned	245TB3	6X	347	HD 120	2A-SRS...	600	4	75	0	9.5	32.2	3.4			60
4:59:57 PM	Rt Brain		05	Planned	245TB3	6X	219	HD 120	2-SRS	600	4	315	0	9.5	32.2	3.4			0
4:59:57 PM	Rt Brain		04	Planned	245TB3	6X	238	HD 120	2-SRS	600	4	280	0	9.5	32.2	3.4			0
4:59:57 PM	Rt Brain		03	Planned	245TB3	6X	256	HD 120	2-SRS	600	4	240	0	9.5	32.2	3.4			0
4:59:57 PM	Rt Brain		07	Planned	245TB3	6X	258	HD 120	2A-SRS...	600	4	110	0	9.5	32.2	3.4			60
4:59:57 PM	Rt Brain		06	Planned	245TB3	6X	322	HD 120	2A-SRS...	600	4	305	0	9.5	32.2	3.4			270
1:09:49 PM	Rt Brain	4	03	TRT	245TB3	6X	256	HD 120	2-SRS	600	4	240	0	9.9	32	3.4	358.786499023438	359.156402587891	359.5
1:10:23 PM	Rt Brain	4	04	TRT	245TB3	6X	238	HD 120	2-SRS	600	4	280	0	9.9	32	3.4	358.786499023438	359.156402587891	359.5
1:10:53 PM	Rt Brain	4	05	TRT	245TB3	6X	219	HD 120	2-SRS	600	4	315	0	9.9	32	3.4	358.786499023438	359.156402587891	359.5
1:13:06 PM	Rt Brain	4	06	TRT	245TB3	6X	322	HD 120	2A-SRS-Co...	600	4	305	0	9.9	32	3.4	358.786499023438	359.156494140625	269.5
1:16:27 PM	Rt Brain	4	07	TRT	245TB3	6X	258	HD 120	2A-SRS-Co...	600	4	110	0	9.9	32	3.4	358.786499023438	359.156005859375	59.5
1:18:13 PM	Rt Brain	4	08	TRT	245TB3	6X	347	HD 120	2A-SRS-Co...	600	4	75	0	9.9	32	3.4	358.786285400391	359.156005859375	59.5
9:02:54 AM	Rt Brain	5	03	TRT	245TB3	6X	256	HD 120	2-SRS	600	4	240	0	8.3	32.4	3	1.41709995269775	359.637603759766	358.3
9:03:28 AM	Rt Brain	5	04	TRT	245TB3	6X	238	HD 120	2-SRS	600	4	280	0	8.3	32.4	3	1.41719996929169	359.6376953125	358.3
9:03:59 AM	Rt Brain	5	05	TRT	245TB3	6X	219	HD 120	2-SRS	600	4	315	0	8.3	32.4	3	1.41740000247955	359.6376953125	358.3
9:06:54 AM	Rt Brain	5	06	TRT	245TB3	6X	322	HD 120	2A-SRS-Co...	600	4	305	0	8.3	32.4	3	1.41709995269775	359.637786865234	268.3
9:10:21 AM	Rt Brain	5	07	TRT	245TB3	6X	258	HD 120	2A-SRS-Co...	600	4	110	0	8.3	32.4	3	1.41729998588562	359.637084960938	58.3
9:11:38 AM	Rt Brain	5	08	TRT	245TB3	6X	347	HD 120	2A-SRS-Co...	600	4	75	0	8.3	32.4	3	1.41729998588562	359.637084960938	58.3
5:03:01 PM	R_VENTRICLE		09	Planned	245TB3	6X	284	HD 120	2-SRS	600	4	320	0	8.5	31.8	1.9			0
5:03:01 PM	R_VENTRICLE		10	Planned	245TB3	6X	294	HD 120	2-SRS	600	4	40	0	8.5	31.8	1.9			90
5:03:01 PM	R_VENTRICLE		11	Planned	245TB3	6X	330	HD 120	2-SRS	600	4	150	90	8.5	31.8	1.9			45
5:03:01 PM	R_VENTRICLE		12	Planned	245TB3	6X	252	HD 120	2-SRS	600	4	210	0	8.5	31.8	1.9			315
6:11:30 PM	R_VENTRICLE	1	09	TRT	245TB3	6X	284	HD 120	2-SRS	599	4	320	0	9.2	32	2	359.480895996094	0.2432000041008	359
6:14:26 PM	R_VENTRICLE	1	10	TRT	245TB3	6X	294	HD 120	2-SRS	600	4	40	0	9.2	32	2	359.480499267578	0.243699997663	89
6:16:07 PM	R_VENTRICLE	1	11	TRT	245TB3	6X	330	HD 120	2-SRS	599	4	150	90	9.2	32	2	359.480590820313	0.24379999935627	44
6:18:44 PM	R_VENTRICLE	1	12	TRT	245TB3	6X	252	HD 120	2-SRS	600	4	210	360	9.2	32	2	359.480804443359	0.24379999935627	314
6:03:42 PM	R_VENTRICLE	2	09	TRT	245TB3	6X	284	HD 120	2-SRS	599	4	320	0	8.8	31.6	2.1	359.181213378906	359.074310302734	358.9
6:07:01 PM	R_VENTRICLE	2	10	TRT	245TB3	6X	294	HD 120	2-SRS	600	4	40	0	8.8	31.6	2.1	359.181213378906	359.074310302734	88.9
6:09:10 PM	R_VENTRICLE	2	11	TRT	245TB3	6X	330	HD 120	2-SRS	599	4	150	90	8.8	31.6	2.1	359.181091308594	359.074401855469	43.9
6:13:09 PM	R_VENTRICLE	2	12	TRT	245TB3	6X	252	HD 120	2-SRS	600	4	210	0	8.8	31.6	2.1	359.181091308594	359.074584960938	313.9

- **White** — Identifies treatments received by the selected patient.
- **Gray** — Describes plans for treatments to be received by the selected patient.
- **Red** — Shown on plans, giving a cell-by-cell identification of variances between a plan and actual treatments received by the selected patient.
- **Yellow** — Identifies overrides performed at a treatment machine.



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# ARIA as a workflow and communication manager



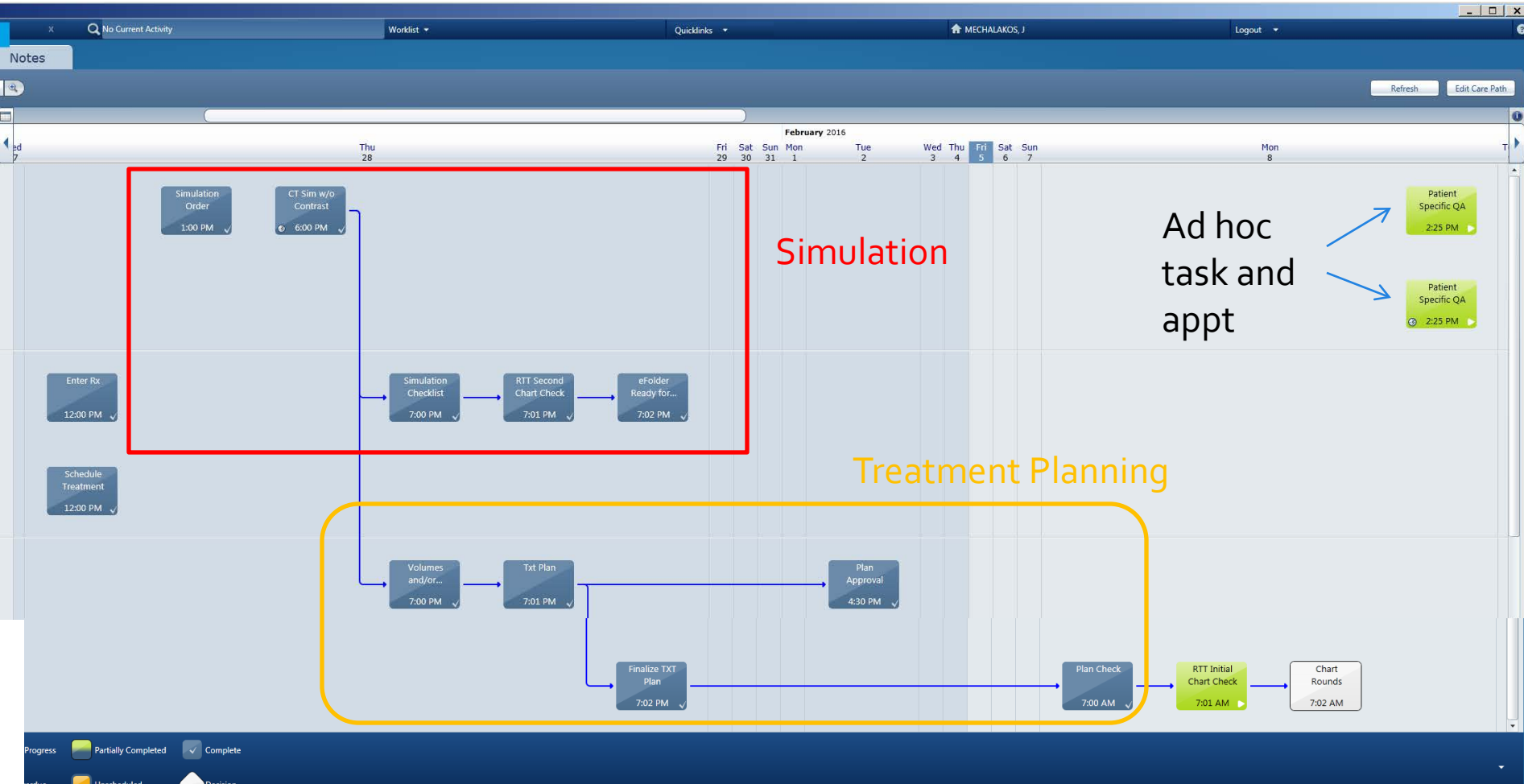


# ARIA as a workflow and communication manager

- Bird's eye view
- TG-262 workflow comments
- Physician workflow comments
- TG262 communication comments
- Physician communication comments



# Care path, activities specific to patient



# User homepage- activities specific to user

Tasks and Appointments 3 Overdue Adam Michael...

Available Pending In Progress Completed Cancelled Jan 07 - Jan 09

Group By None Sort By Due Date

Volumes and/or Fields Approval  
Status: Available 1 Day(s) Overdue Details

Enter Rx  
Status: Completed Details

Enter Rx  
Status: Available 1 Day(s) Overdue Details

Plan Approval  
Status: Completed Details

Approve Prev Txt Form  
Status: Completed Details

Volumes and/or Fields Approval  
Status: Completed Details

Approve Prev Txt Form  
Status: Completed Details

Plan Approval  
Status: Completed Details

Plan Approval  
Status: Completed Details

Launch Task (0) Same Window Separate Window

**Pending**- It's not time yet, all the tasks before have not been completed or cancelled

**Available**- I'm ready when you are

**In progress** - being worked on

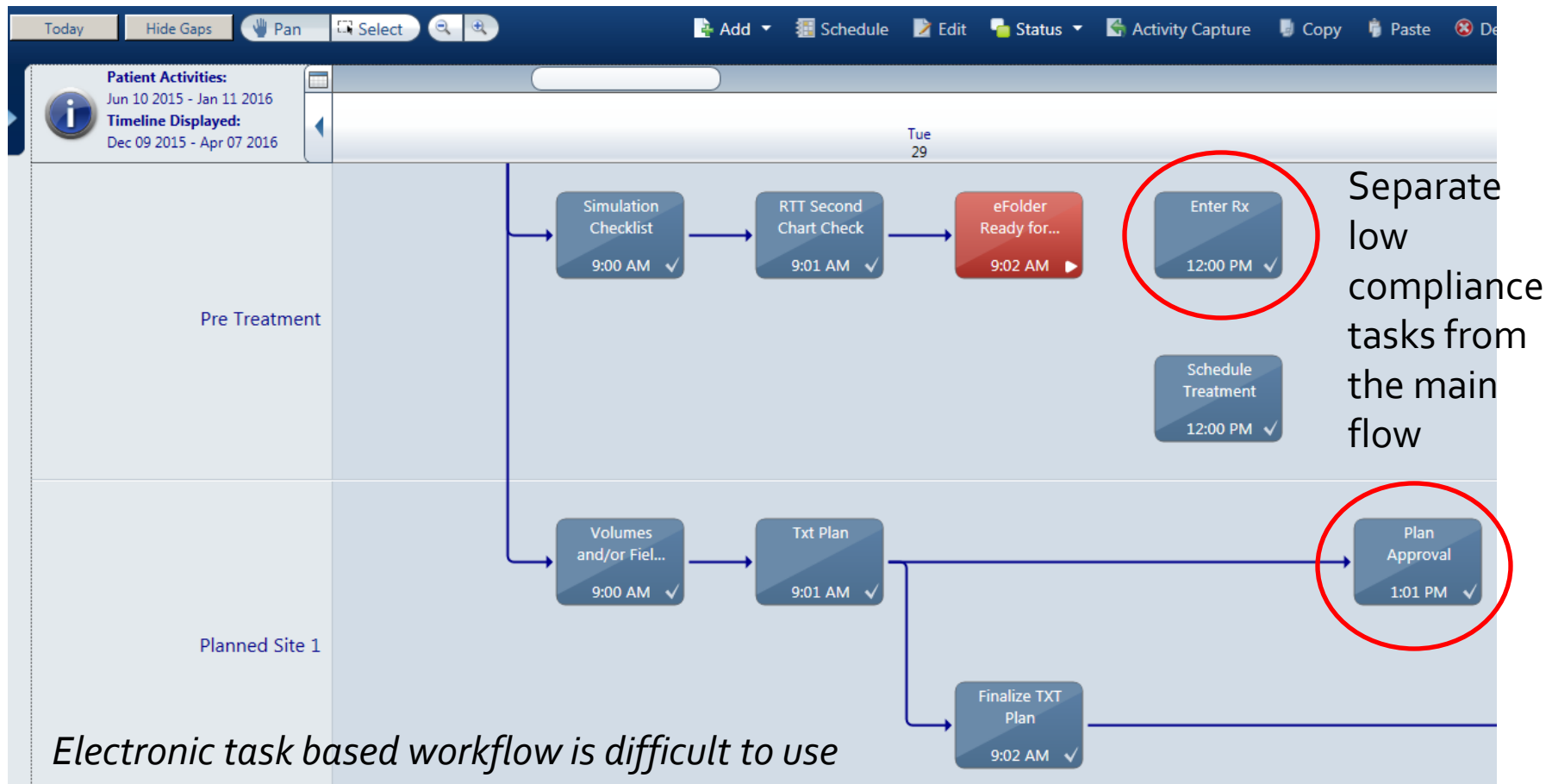
**Completed**- done

**Cancelled**- self explanatory



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# Design linked care paths with workflow and compliance in mind

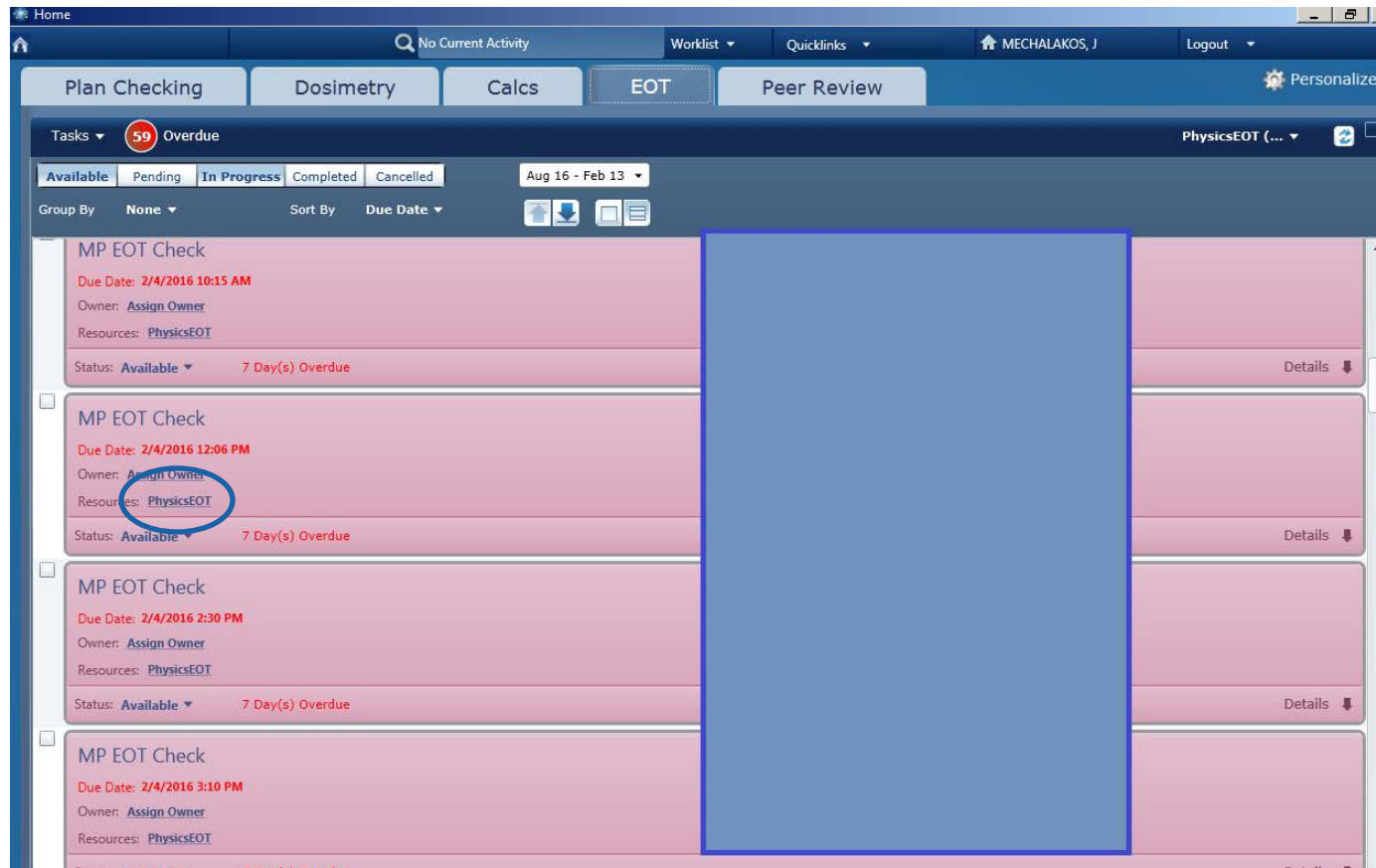


*Electronic task based workflow is difficult to use and often ignored by physicians- simplification and ongoing education needed- TG262 survey*



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# Generic Users



Used to keep track of tasks associated with rotating responsibilities such as EOT- rather than assigning to a specific person, it is assigned to a generic ID and users on that rotation monitor for that generic ID



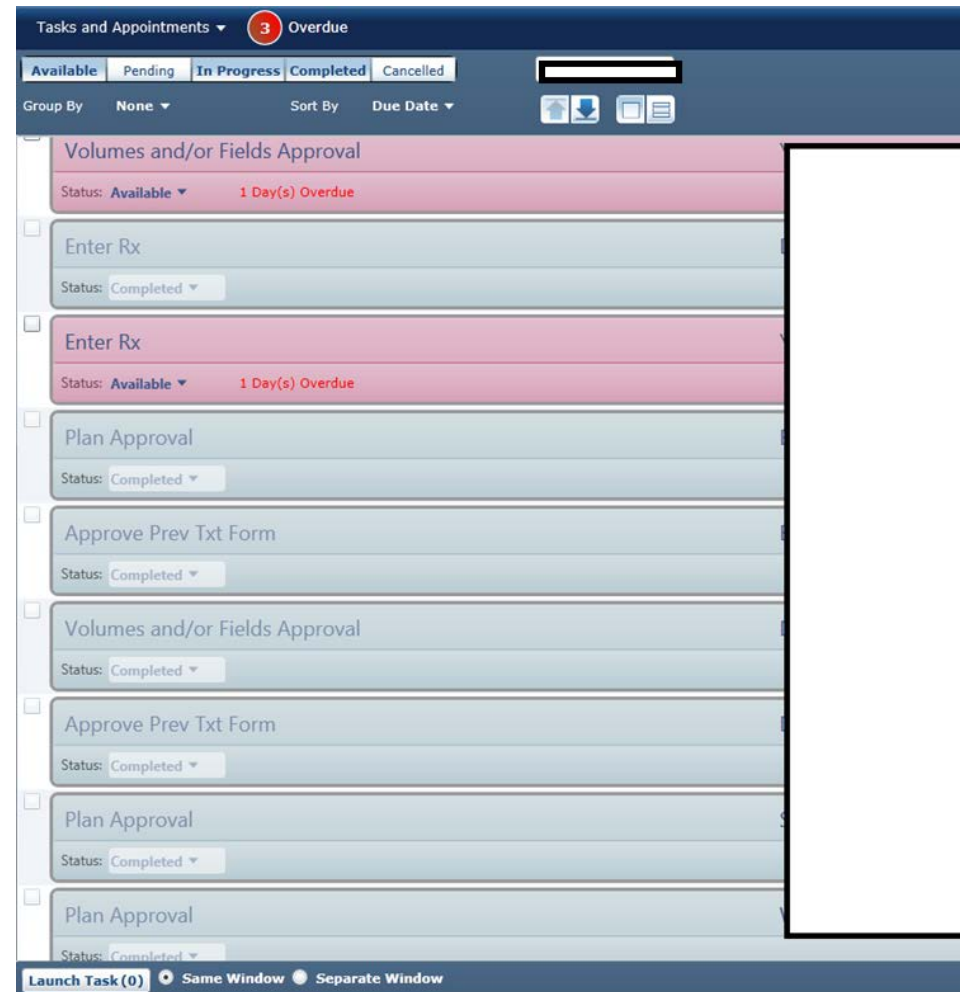
# Ad Hoc tasks

<input type="checkbox"/>	Approve Prev Txt Form Status: Available ▾ 3 Minutes (s) Overdue	<u>MD approval tasks</u> Sends the message Hyperlinks for navigation
<input type="checkbox"/>	Amend/Approve Prescription Status: Available ▾ 2 Minutes (s) Overdue	
<input type="checkbox"/>	Approve Pt Dosimetry Form Status: Available ▾ 2 Minutes (s) Overdue	
<input type="checkbox"/>	Approve Transfer w/ Journal Entry Status: Available ▾ 2 Minutes (s) Overdue	
<input type="checkbox"/>	Chart Hold Status: Available ▾ 2 Minutes (s) Overdue	For documentation issues
<input type="checkbox"/>	Chart in Physics Status: Available ▾ 2 Minutes (s) Overdue	For on-call cases
<input type="checkbox"/>	Expedited Plan Status: Available ▾ 2 Minutes (s) Overdue	For emergent planned cases
<input type="checkbox"/>	Fusion needed Status: Available ▾ 2 Minutes (s) Overdue	Alerts planning teams
<input type="checkbox"/>	Gating needed Status: Available ▾ 2 Minutes (s) Overdue	
<input type="checkbox"/>	Modify Plan Status: Available ▾ 2 Minutes (s) Overdue	For replans due to chart rounds
<input type="checkbox"/>	Patient Specific QA Status: Available ▾ 2 Minutes (s) Overdue	Alerts therapist/physics to acquire/review pt specific QA
<input type="checkbox"/>	Peer Review Status: Available ▾ 2 Minutes (s) Overdue	For cases exceeding standard dose constraints
<input type="checkbox"/>	Plan Delay Status: Available ▾ 2 Minutes (s) Overdue	For late volumes, issues causing loss of planning time



# Physician carepath comments

- Filters not set properly- miss tasks
- Task completion is manual
  - Seen by many as redundant- completing the activity should complete the task
  - Sometimes causes confusion, for example plan approval task appears after plan has been approved (“carepath should be updated instantly”)
  - Volumes, plan approval, prescription task not autocompleted, either an issue completing or forgot
  - More tasks like physics weekly which can autogenerate a task via data administration
- More annotation requested in task note
  - Multiple sites/multiple tasks- use the note more
- Due dates must be managed if they are to be respected (tasks without due dates are like “looking at the sky and waiting for a comet”)
- System does not work well for covering attendings- “when someone is covering for me, I get the task and the covering gets the email”



# TG262 and MD comments on communication

- Are there common failure/near-missed events relating to communication using the electronic chart? If so please specify.
  - A task based workflow has holes, email vs task an ongoing issue
    - Email vs task
      - People split 50/50
      - Email group visits ARIA less frequently
      - Task group gets too many emails
  - multiple forms of communication lead to message not reaching RTTs-consistency in communication
    - 80% email creates expectation of 100% email
    - Covering attendings sometimes get mixed messages
  - Not enough communication/human interaction since we went electronic.
    - One TG262 site has a planner/physician plan review checklist that must be reviewed together

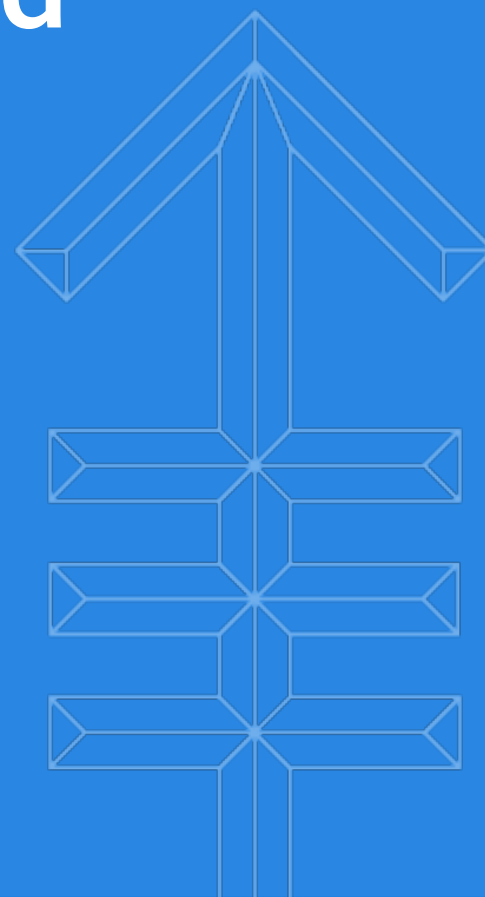




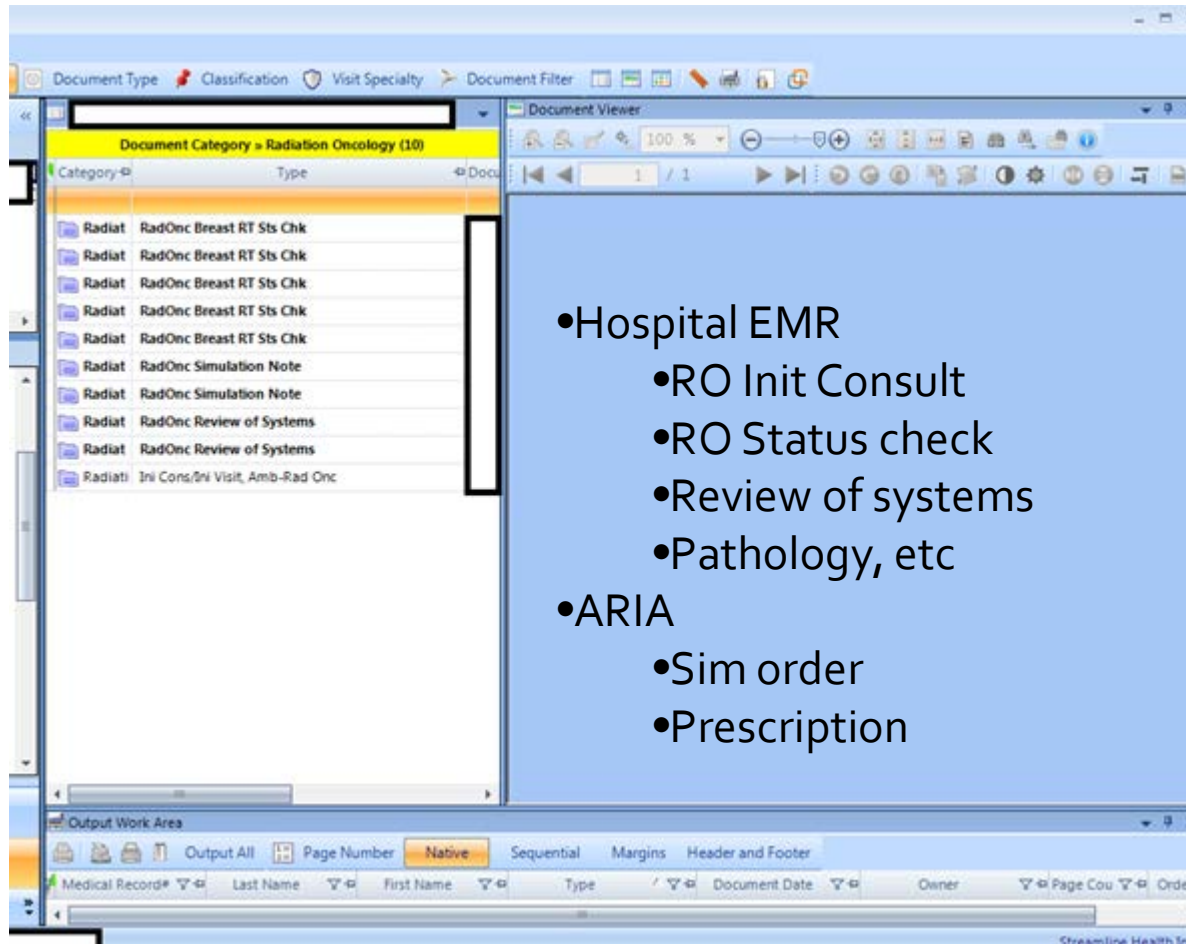


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# ARIA Integration and Connectivity



# Hospital EMR Integration



The screenshot displays a hospital EMR interface. On the left, a document viewer shows a list of documents under the category 'Radiation Oncology (10)'. The documents are listed in a table with columns for 'Category' and 'Type'. The right pane shows a document viewer with a toolbar and a large blue area for the document content. The bottom pane shows an 'Output Work Area' with a toolbar and a table of medical records.

Category	Type
Radiat	RadOnc Breast RT Sts Chk
Radiat	RadOnc Breast RT Sts Chk
Radiat	RadOnc Breast RT Sts Chk
Radiat	RadOnc Breast RT Sts Chk
Radiat	RadOnc Breast RT Sts Chk
Radiat	RadOnc Simulation Note
Radiat	RadOnc Simulation Note
Radiat	RadOnc Review of Systems
Radiat	RadOnc Review of Systems
Radiat	Ini Cons/Ini Visit, Amb-Rad Onc

- Hospital EMR
  - RO Init Consult
  - RO Status check
  - Review of systems
  - Pathology, etc
- ARIA
  - Sim order
  - Prescription



# ARIA integration with planning systems

- Eclipse/ARIA integration
  - Pros- no data transfers
  - Cons-
    - minor non-dosimetric changes affect the signed plan
    - Concurrent users
- There may still be manual entry of some items such as bolus thickness- it is advised to make these manual entry items part of a checklist

MSKCC Department of Medical Physics: Eclipse Smart Checklist [ver 3.6]

Patient Name: TEST Patient MRN: xxxxx Plan Site: TEST

Instructions:

- One form for each site/phase submitted, including conedowns
- Redo if plan/calc is changed due to plan check, 2nd check, etc.
- Sr. and Jr. planners must fill out separate forms
- **Fill out all demographic info carefully - this guides the checklist item display**

**Treatment Category:** ☒ Initial Plan ☐ CD Plan ☐ Re-Plan ☐ Calc ☐ Standing TBI

**Treatment Machine:** 442 **Modality:** 6X

**Fractionation:** ☐ Single ☒ Multiple

**Pacemaker/Defib\*:** ☒ Yes ☐ No \*Verify in both HIS and Prescription

**Planning Technique:** ☐ EDW ☐ VMAT ☒ IMRT / FIF

**Beam Modifiers:** ☒ Bolus ☐ Blocks

**IGRT/Motion Monitoring:** ☒ 2D OBI ☐ 3D OBI ☐ IMR

**Respiratory Monitoring:** ☐ Gating ☐ DIBH

**Plan Specific:** ☐ Prev Treatment ☐ Re-eval Dose ☐ Couch Kicks ☐ Iso-Shift

**Site:** ☐ Breast tangents ☐ PAB ☐ H&N w/ LAN ☐ GI ☐ Prostate

☐ Paraspinal ☐ Lung SBRT

**Patient Specific QA:** ☐ Film ☐ Mapcheck ☐ EPID

**Immobilization Type:** Misc (unusual)

Review each item:

- ☐ 1. **Prescription First: Confirm All Elements of Rx agrees with plan/calc before proceeding**
- ☐ 2. **Isocenter:** Confirm DICOM Offset b/w Sim Docs and Eclipse, and original Sim marked iso = (0,0,0)
- ☐ 3. **Transmission Factors:** Considered if necessary and if so, are for correct energy
  - Verify that the couch structure is included in the structure set and visible on printout
  - Consider whether this misc immobilization device needs a factor
- ☐ 4. **Aria:**
  - Verify that all dose tracking reference points equal their respective Rx doses.
  - Confirm MLC motion efficiency (max MU x lost MU factor)
  - Verify Bolus has been linked to the correct fields in Eclipse and enter alert in Patient Manager (Example: "BOLUS ON FIELDS x-y FOR PLAN zzz", where x-y are the fields and zzz is the ARIA plan name)
  - Use coded block tray
- ☐ 5. **Imaging/QA:**
  - Confirm OBI ortho pairs are ordered correctly and gantry/imager clearance at machine
  - DRR's have Field Aperture and Graticule converted to contour

Planner: \_\_\_\_\_ Covering Planner: \_\_\_\_\_

Click to Print Form Click to Reset Form

Siochi RA, Balter P, Bloch CD, Santanam L, Blodgett K, Curran BH, Engelsman M, Feng W, Mechalakos J, Pavord D, Simon T, Sutlief S, Zhu XR, A rapid communication from the AAPM Task Group 201: recommendations for the QA of external beam radiotherapy data transfer. AAPM TG-201: quality assurance of external beam radiotherapy data transfer. J Appl Clin Med Phys. 2010 Dec 4;12(1):3479

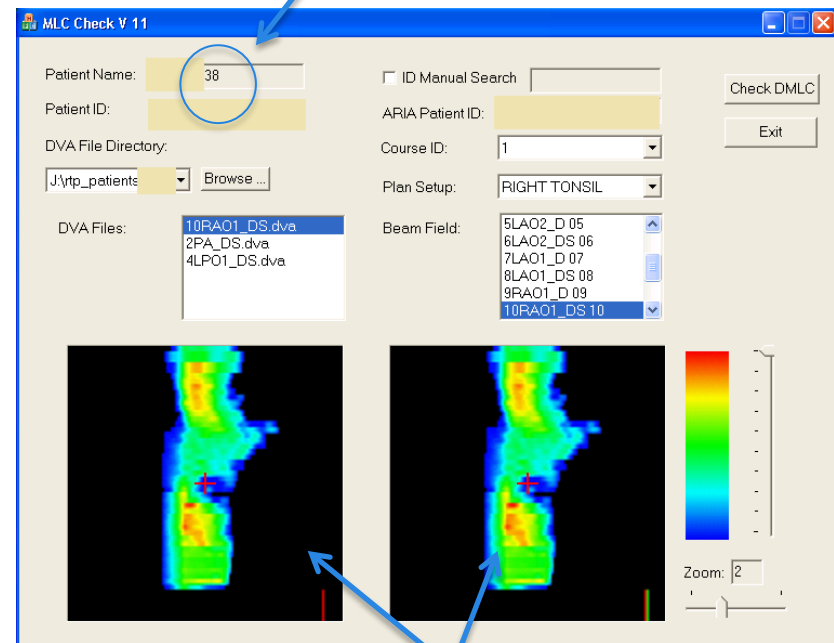


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# ARIA integration with planning systems

- External planning system integration- some recommendations from TG201:
  - Workflow should include checkpoints at all data exchange interfaces.
  - Perform pt specific verification of treatment parameters in the txt database prior to approval. This ideally includes all control points.
    - CIAO doesn't chk all control points
  - Manually entered items should be in a checklist
  - Data transfer should be checked after software upgrades using benchmark cases
  - An independent review is required when the prescription is changed after the plan is entered into the system

*Unique run number is checked against signed plan*



*MLC control points compared both visually and numerically*

# ARIA upgrades- preparation

- Provide directed training on the changes in workflow
- Confirm availability of representatives for all vendors involved, especially those connecting to the RO-EMR.
- Confirm connectivity of 3<sup>rd</sup> party systems with the new version.
- Confirm availability of clinical staff for the upgrade which typically happens on off hours or weekends.
- Plan out carefully the events of the upgrade weekend since a large amount of validation/verification is done in a short time and with minimal clinical disruption.
- If there is a database migration, this can take time therefore it may be necessary to manually transfer patient data to the new system for any changes that occur after the database snapshot is obtained.
- Plan for emergency treatments that may be necessary during the upgrade period.
- Create test patients for spot checks of basic clinical functionality such as IMRT delivery, imaging, etc.
- QA and acceptance of the upgraded planning system and management system.

Mechalacos J. Dieterich S., "Quality and the EMR in radiation oncology" from "Quality and Safety in Radiation Oncology", Dicker, Williams, Ford, eds., Demos Medical Publishing- *to be published*



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# ARIA upgrades- upgrade weekend

- Verify basic clinical functionality on the machines using previously created test patients
- Mode up existing patients and investigate any errors or warnings.
- If there is a database migration,
  - Accept the new database- this can be done by choosing a subset of existing patients across the clinical range and checking that information has been transferred correctly to the new database. This includes all documents, treatment parameters, and images.
  - Once the new database is accepted, verify transfer of patient information to the new database for all patients on treatment. Some clinics have software which can query and compare the old and new databases on a patient specific basis. This greatly accelerates the validation process\*.
  - Enter information on changes that occurred after the database snapshot was obtained and check independently. It is important to check these manual entries carefully.
  - It may be helpful to take advantage of workflow tools in the system, such as using tasks to alert the therapists that physics has finished checking the data transfer for patient A so the therapist can proceed with the test mode-up.
- Check synchronization of software from 3<sup>rd</sup> party vendors touching the system using test patients.

Mechalakos J. Dieterich S., "Quality and the EMR in radiation oncology" from "Quality and Safety in Radiation Oncology", Dicker, Williams, Ford, eds., Demos Medical Publishing- *to be published*

\*Hadley, S.W., et al., *Migration check tool: automatic plan verification following treatment management systems upgrade and database migration*. J Appl Clin Med Phys, 2013. **14**(6): p. 4394.



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# Changes that can be made to a txt approved plan- v13

Non-Dosimetric Data change for Treatment Approved plan with Advanced Feature Set OFF	
Treatment Preparation Workspace	Parameters Workspace
Couch Vrt, Lat, and Lng can be edited	No edits possible
Setup Notes can be edited or deleted; and added	No edits possible
Dosimetrically Equivalent Machine can be added	
Reschedule Treatment Session or Imaging	

Non-Dosimetric Data change for Treatment Approved plan with Advanced Feature Set ON	
Treatment Preparation Workspace	Parameters Workspace
Couch Vrt, Lat, and Lng can be edited	Couch Vrt, Lat, Lng can be edited
Setup Notes can be edited or deleted; and added	Setup Notes & photos can be added, edited, deleted
Dosimetrically Equivalent Machine can be added	
Reschedule Treatment Session or Imaging	

From "ARIA 13.0 Treatment Preparation Workbook", p110-112, available at [my.varian.com](http://my.varian.com)



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# Txt approved → Planning approved, no dose

Non-Dosimetric Data change for Planning Approved plan; No History; Advanced Feature Set OFF	
Treatment Preparation Workspace	Parameters Workspace
Tolerance Table can be edited	Treatment time can be edited
Couch Vrt, Lat, Lng can be edited	Field IDs and names
Couch Imager Position can be edited	Planned SSDs can be edited
Delta Couch Shifts can be edited or added	
Setup Notes & photos can be added, edited, deleted	
Setup Fields can be added or edited	Set up Fields can be added, and those without history may be edited
Gating Flag can be selected	

Non-Dosimetric Data changes for Planning Approved Plan; No History; Advanced Feature Set ON	
Treatment Preparation Workspace	Parameters Workspace
Tolerance Table can be edited	Tolerance Table can be edited
Couch Vrt, Lat, Lng can be edited	Couch Vrt, Lat, Lng can be edited
Couch Imager Position can be edited	Couch Imager Position can be edited
Delta Couch Shifts can be edited or added	Planned SSDs
Setup Notes & photos can be added, edited, deleted	Setup Notes & photos can be added, edited, deleted
Setup Fields can be added or edited	Set up Fields can be added or edited
Gating Flag can be selected	Field IDs and names
	Treatment times

From "ARIA 13.0 Treatment Preparation Workbook", p110-112, available at [my.varian.com](http://my.varian.com)



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Thank you!



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