



WELCOME

October 10, 2025

Slides

- The slides for today's presentations will be made available to all MROQC members via our website next week

Issues

- Issues during the meeting? Please let a Coordinating Center Team member know!

MEETING
HOUSEKEEPING

SOCIAL MEDIA

Join the
conversation on by
tagging @MROQC
and using our
#MROQC25CWM
hashtag



Linked **in**



TODAY'S AGENDA



ROQCstar Report



Delivery of High-Quality Stereotactic Radiosurgery for Brain Metastases with Dr. Hunter Boggs and Dr. Richard Popple



Brain Metastases Panel



Future Planning Discussions



Who Wants to be a ROQCstar III



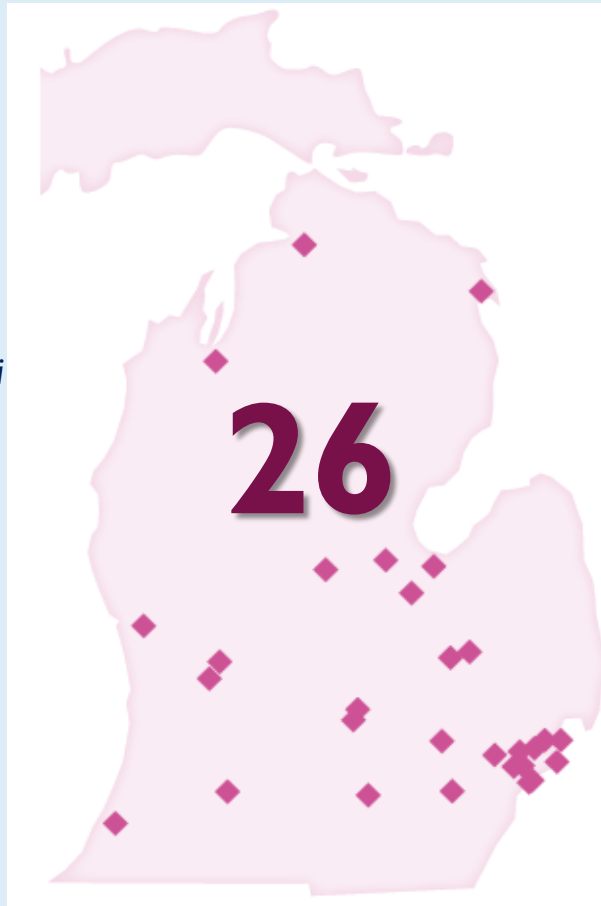
Best Practices for Preparing for a New Measurement Year



MROQC BY THE NUMBERS

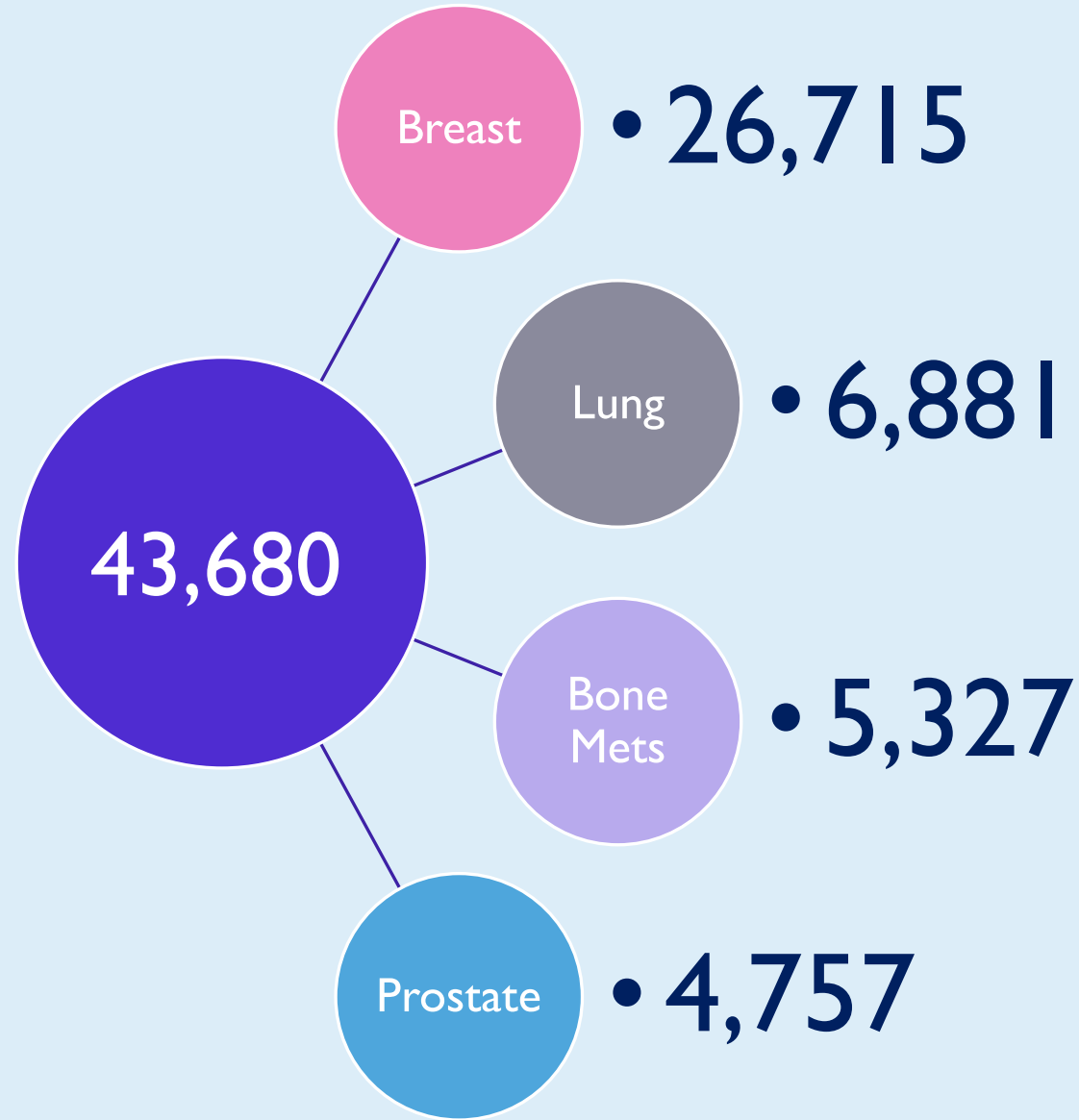
MROQC 2025

- Brighton Center for Specialty Care-*Brighton*
- Corewell Health South-*St. Joseph*
- Covenant HealthCare-*Saginaw*
- Henry Ford Health-*Jackson*
- Henry Ford Macomb Hospital-*Clinton Twp.*
- Henry Ford Providence Hospital-*Southfield & Novi*
- Henry For St. John Hospital-*Detroit*
- Henry For Warren Hospital-*Warren*
- Genesys Hurley Cancer Institute-*Flint*
- Karmanos Cancer Institute-*Detroit*
- McLaren Bay Region-*Bay City*
- McLaren Central-*Mt. Pleasant*



- McLaren Greater Lansing-*Lansing*
- McLaren Flint-*Flint & Lapeer*
- McLaren Macomb-Mount Clemens & Clarkston
- McLaren Northern Hospital-*Petoskey*
- Michigan Health Professionals(*6 locations*)
- Michigan Medicine-*Ann Arbor*
- MyMichigan Medical Center-*Midland*
- MyMichigan Medical Center-*Alpena*
- Munson Medical Center-*Traverse City*
- University of Michigan Health-Sparrow-*Lansing*
- Trinity Health Mercy Muskegon-*Muskegon*
- Trinity Health Saint Mary's-*Grand Rapids*
- University of Michigan Health West-*Grand Rapids*
- West Michigan Cancer Center-*Kalamazoo*

MROQC By The Numbers



MROQC AT ASTRO 2025



2025 Accepted Abstracts

Lung – 3 Poster Presentations

Breast – 1 Poster Presentation

Prostate – 1 Poster Presentation

TG-263 Implementation – 1 Poster Presentation



NEW THIS YEAR

MROQC was featured in a dedicated **75-minute Education Session** showcasing the collaborative's national leadership in quality improvement in radiation oncology.

Thank you to our patients, members, and partners who make this continued success possible!



EXECUTIVE COMMITTEE

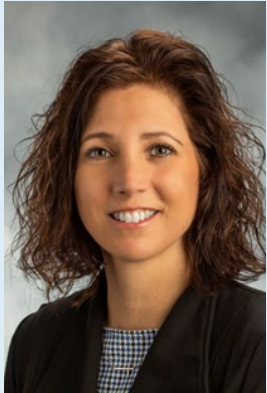
Welcome to the
newest
MROQC Executive
Committee members!



Facility Administrator Representative:
Monica Patton, MHA, RTT
Trinity Health Grand Rapids



CDA Representative:
Jen Davis, BS RTT
Munson



A huge thank you to Mark Zaki, MD,
Karen Roszczewski, BS RTT, and Kyle
Buchanan, MS for all their
contributions to the EC!!!

THANK YOU!



ROQCSTAR REPORT

Melissa Mietzel, MS

October 10, 2025

News from the CC

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graph TD; A[News from the CC] --> B[Coming Soon!<br/>• Database Update<br/>• P6 Form Update]; B --> C[2026 Incentive Program Measures];
```

Coming Soon!

- Database Update
- P6 Form Update

2026 Incentive Program
Measures

TODAY'S REPORT

UPCOMING DEADLINES

November 15, 2025: Deadline for 2026 Gold Card and CQI VBR data entry

January 23, 2026: Deadline for 2025 performance measure data and case volumes



Q3 ROQCstar NEWS



In This Issue:

MROQC October Collaborative-Wide Meeting | MROQC at ASTRO! | Prostate Biannual Report | Website Updates | Join M-EQUAL | Latest MROQC Publications | Upcoming MROQC Meetings & Events

MROQC October Collaborative-Wide Meeting



MROQC OCTOBER 10TH COLLABORATIVE-WIDE MEETING

Quality Through Precision:
Advancing Radiation Oncology
Together

October 10th, 2025 10:00 am – 3:00 pm

Bavarian Inn Lodge
1 Covered Bridge Lane
Frankenmuth, MI 48734



KEYNOTE SPEAKERS



D. Hunter Boggs, MD
Associate Professor of Radiation
Oncology; Medical and Quality Director;
University of Alabama

Richard Popple, PhD
Professor and Assistant Vice Chair of
Medical Physics, Director, Medical
Physics Division; University of Alabama



mroqc.org



We look forward to seeing you at our upcoming collaborative-wide meeting!



DATABASE UPDATES |

What's Happening?

We're upgrading our survey platform to enable advanced functionality and a better user experience.

Why This Matters

- More flexible survey features
- Improved data tracking and analysis
- Streamlined user interface

 Advance notice of database downtime will be sent via email.



Update Timeline

Database	Status
Bone Metastases	 Completed (2024)
Prostate	 Completed (June 2025)
Breast and Lung	 December 2025

SURVEY SOFTWARE UPDATE

Goal: Ensure we are collecting accurate long-term data, especially as we begin collecting 3-year to 5-year follow-up data.



Major Changes

Order of questions revised for clarity

Wording refined to better reflect intent

Recurrence questions answered only if a recurrence is reported



Timeline: Form update scheduled for the week of November 17

PROSTATE PROJECT P6 FORM UPDATE

2026 INCENTIVE PROGRAM MEASURES

Mark Zaki, MD



Breast Quality Improvement Initiatives for 2026

Prone positioning

Completion of arm
measurements for
lymphedema
assessment



2026 Prone Collaborative-Wide Measure

Increase the collaborative-wide utilization of prone positioning for breast cancer radiation treatment

Full Points	$\geq 40\%$ of breast cancer patients were treated in the prone position across MROQC
Half Points	30-39% of breast cancer patients were treated in the prone position across MROQC
Zero Points	$< 30\%$ of breast cancer patients were treated in the prone position across MROQC



Lymphedema Measurements for Patients Receiving Regional RT

Increase the baseline and post-radiation treatment (RT) completion rate of standard of care arm measurements for lymphedema assessment in node positive breast cancer patients treated to regional fields.

A. $\geq 50\%$ of breast patients treated to regional fields with a baseline measurement (B7 or B9) in 2025 must have a follow-up measurement (B10 or B14) completed within Q1-Q3 of 2026.*

B. $\geq 50\%$ of breast patients treated to regional fields with a RT start date within Q1-Q3 of 2026 must have a baseline measurement (B7 or B9) reported in cm and complete nodal irradiation data (dose to irradiated nodal groups is reported and nodal contours are named according to TG263 guidelines).

Full Points

A and B were met

Half Points

Either A or B were met

Zero Points

Neither A nor B were met

*Patients who have documented arm measurements on a B10 form submitted in 2025 will be marked as meeting Part A

This measure is part of 2026 P4P|2027 Gold Card|2027 CQI VBR

Breast + M-EQUAL Quality Initiative for 2026

Cannabis Education for Breast Patients

It will be a **CQIVBR-only** measure, to allow for the additional 2% uplift provided by the tobacco cessation initiative.

This measure replaced the tobacco cessation counseling measure in 2025.



Cannabis Education for Breast Patients

At least 80% of breast cancer patients who report using cannabis in the past 30 days are offered an MROQC cannabis education document during treatment*.

***Treatment** is defined as the Baseline visit through the End of Treatment visit

The measure threshold will increase by 30% in 2026

Bone Mets Quality Improvement Initiatives for 2026

Shorter Tx

**Reirradiation
Measure**



2026 Shorter Tx. Bone Mets Quality Measure

Increase the utilization rate of bone mets treatments consisting of 5 fractions or fewer.

Full Points	$\geq 75\%$ rate achieved
Partial Points	60-74% rate achieved
Zero Points	$< 60\%$ rate achieved

This measure is scored per treatment course

This measure is part of 2026 P4P|2027 Gold Card|2027 CQIVBR



2026 Bone Mets Reirradiation Measure

Increase the rate of physics consultation for bone metastases reirradiation.*

**For cases where there is concern for toxicity due to cumulative dose (Type 1 or Type 2 reirradiation), the physics consult must occur prior to physician approval. For Type 1 reirradiation cases with no concern for toxicity, the consult must occur prior to the start of treatment.*

Full Points $\geq 50\%$ documentation rate of a physics consult achieved by facility

Zero Points $< 50\%$ documentation rate of a physics consult achieved by facility

Prostate Quality Improvement Initiatives for 2026

**ADT
Measure**

**MRI
Utilization**



2026 Recommended ADT Measure

Improve percentage of patients with intact, localized, high-risk prostate cancer patients receiving definitive radiotherapy that are recommended to receive long-term androgen deprivation therapy (ADT).

Full Points	$\geq 65\%$ of prostate cancer patients recommended to receive long-term ADT
Half Points	55-64% of prostate cancer patients recommended to receive long-term ADT
Zero Points	$< 55\%$ of prostate cancer patients recommended to receive long-term ADT

Measure thresholds will increase by 5% in 2026

This measure will be part of 2026 P4P|2027 Gold Card|2027 CQI VBR



2026 MRI Utilization Measure

Increasing MRI Utilization for Intact Prostate Cancer Patients
Receiving Definitive Radiotherapy

Full Points	$\geq 70\%$ of prostate cancer patients received an MRI
Partial Points	60-69% of prostate cancer patients received an MRI
Zero Points	$< 60\%$ of prostate cancer patients received an MRI

Measure thresholds will increase by 10% in 2026

This measure will be part of 2026 P4P|2027 Gold Card|2027 CQI VBR

NEW Lung Quality Improvement Initiative for 2026

Hypofractionation
Measure





2026 Lung Collaborative-Wide Measure

For treatment of lung cancer with hypofractionation (6-20 fractions), MROQC Consensus Quality Guidelines are achieved.

Full Points	≥75% of patients treated with hypofractionation (6-20 fx) for lung cancer across MROQC achieved the phase I guideline fractionation & dosimetric goals
Half Points	60-74% of patients treated with hypofractionation (6-20 fx) for lung cancer across MROQC achieved the phase I guideline fractionation & dosimetric goals
Zero Points	<60% of patients treated with hypofractionation (6-20 fx) for lung cancer across MROQC achieved the phase I guideline fractionation & dosimetric goals



QUESTIONS???

CALL FOR CLINICAL CHAMPION VOLUNTEERS

 MROQC is seeking a **Clinical Champion** from a facility with ≤ 3 **radiation oncologists** to serve on the **Executive Committee** for a **3-year term** beginning **January 2026**.

This role offers the chance to:

- Represent smaller practices
- Advance statewide quality improvement
- Shape MROQC's strategic direction

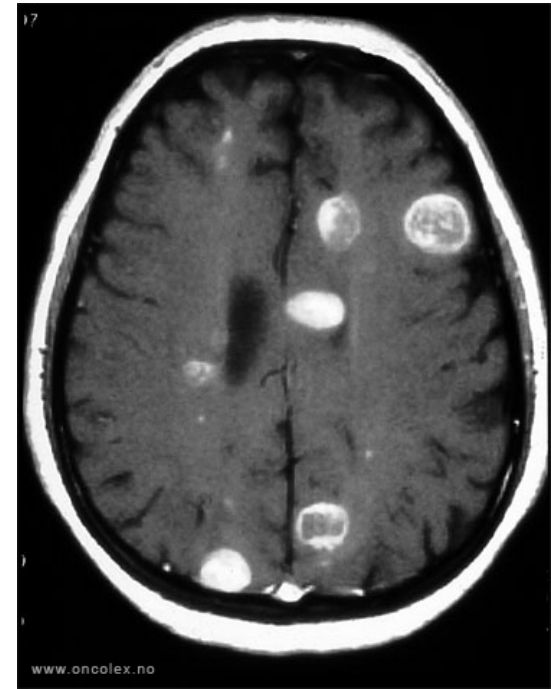
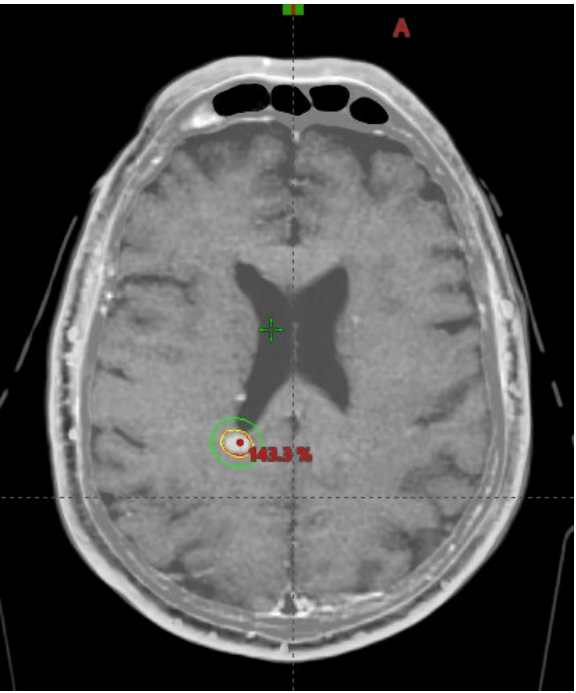
 *My term concludes December 2025.*

 **Interested?** Please connect with **Melissa** at or after today's meeting.

Delivery of High-Quality Radiosurgery for Brain Metastases

D. Hunter Boggs M.D.

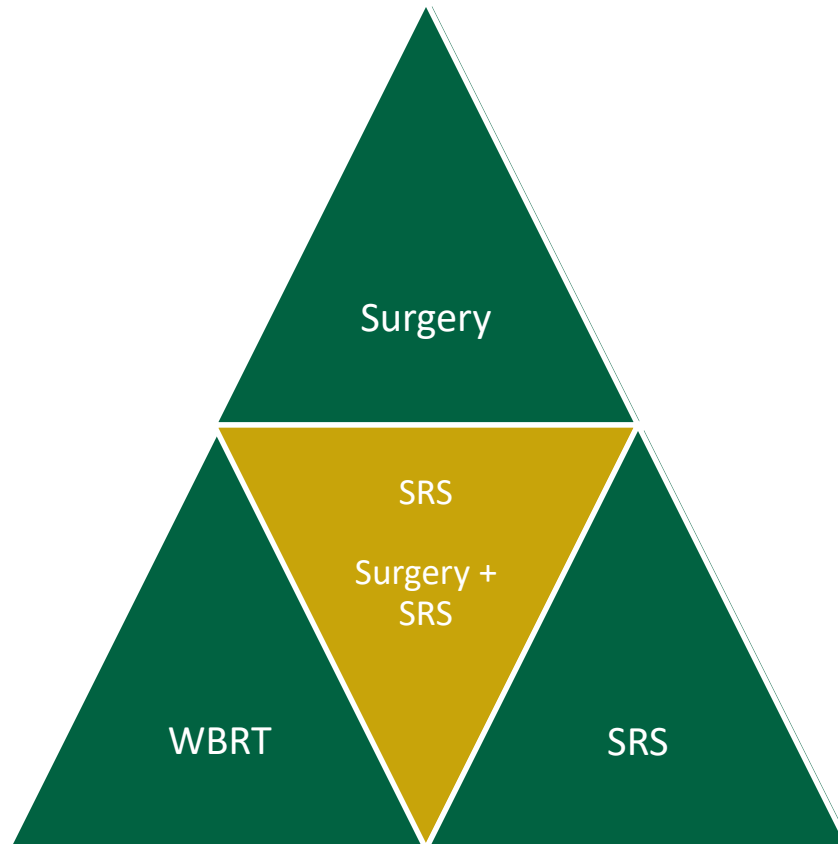
Vice Chair of Quality and Clinical Affairs
Associate Professor of Radiation Oncology
University of Alabama at Birmingham



Disclosures

Varian sponsored speaking engagements and research support.

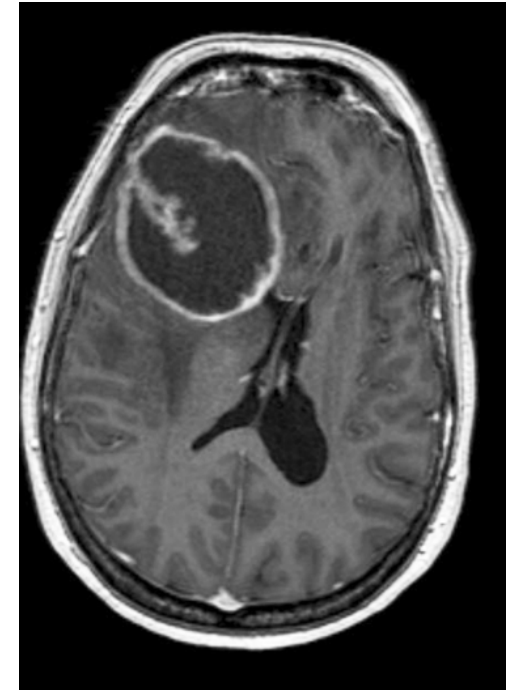
Brain Metastasis Treatment



- Factors affecting treatment choice
 - Favorable vs poor prognosis
 - Number of metastases
 - Individual and cumulative tumor volume
 - Symptomatic mass effect
 - Histology

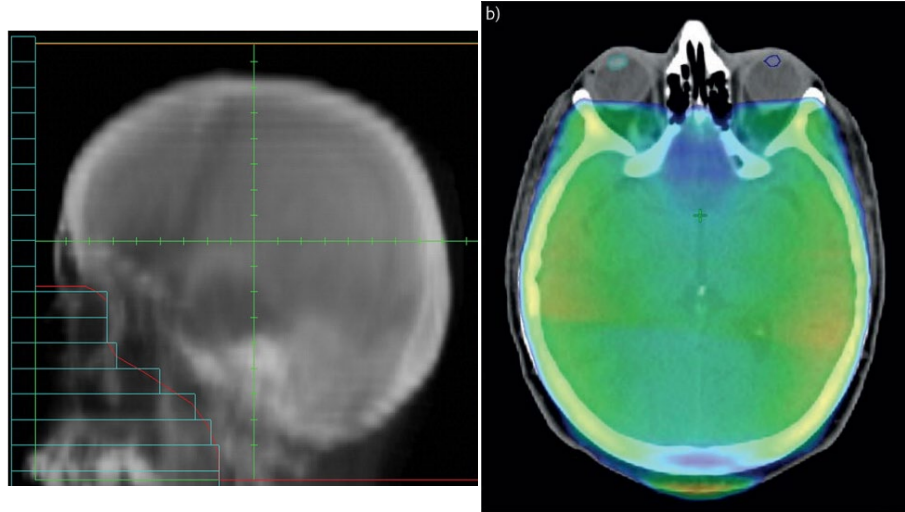
What is the role of surgery?

- Diagnosis
- Rule out recurrence vs necrosis
- Relief of mass effect and symptoms
 - Tumor >>4cm
- Lower steroid requirement (facilitates immunotherapy)



Whole Brain Radiotherapy

QUARTZ: Whole Brain RT for patients with NSCLC did not improve Overall Survival or Quality of Life compared to Dexamethasone +Supportive Care



THE LANCET

Volume 398, Issue 10055, 22–28 October 2016, Pages 2004–2014

Articles

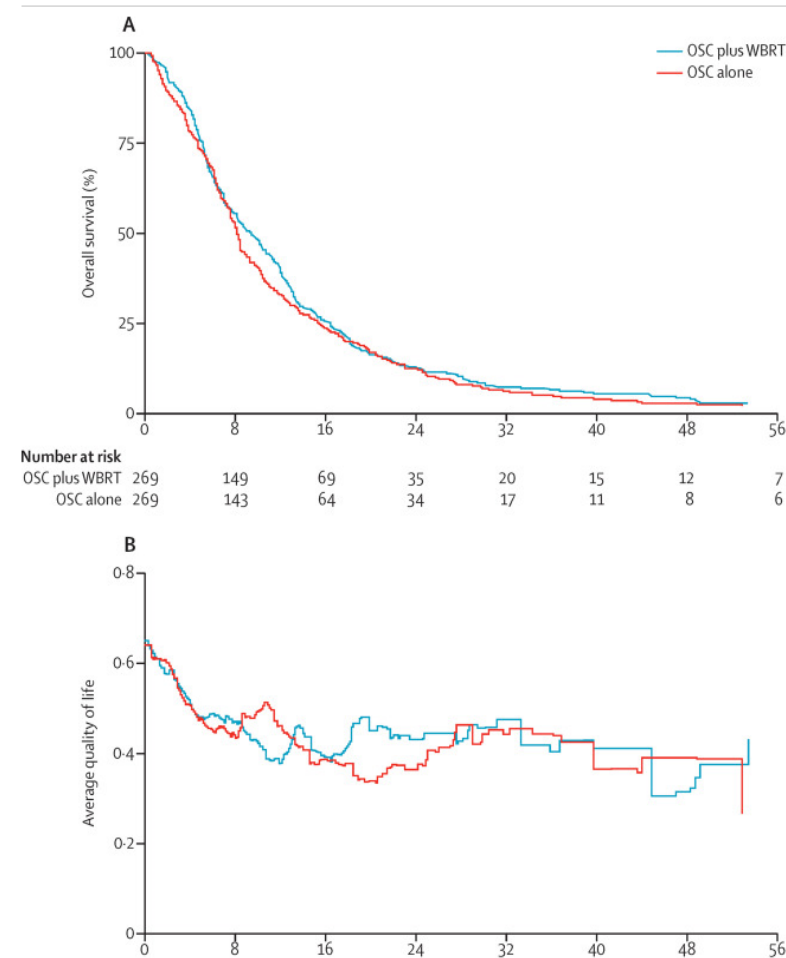
Dexamethasone and supportive care with or without whole brain radiotherapy in treating patients with non-small cell lung cancer with brain metastases unsuitable for resection or stereotactic radiotherapy (QUARTZ): results from a phase 3, non-inferiority, randomised trial

Paula Mulvenna FRCR ^a, Matthew Nankivell MSc ^b, Rachael Barton DM ^a, Prof Corinne Faivre-Finn PhD ^a, Paula Wilson FRCR ^a, Prof Elaine McColl PhD ^c, Barbara Moore MSc ^a, Iona Brisbane BSc ^a, David Andron BA ^a, Tanya Holt FRANZCR ^d, Sally Morgan FRCR ^e, Caroline Lee FRCR ^f, Kathryn Waite FRCR ^g, Neil Bayman FRCR ^h, Cheryl Pugh BSc ⁱ, Benjamin Sydes ^j, Richard Stephens ^k, Prof Mahesh K Parmar DPhil ^l, Prof Ruth E Langley PhD ^a, & ^m

Show more

[https://doi.org/10.1016/S0140-6736\(16\)30825-X](https://doi.org/10.1016/S0140-6736(16)30825-X)

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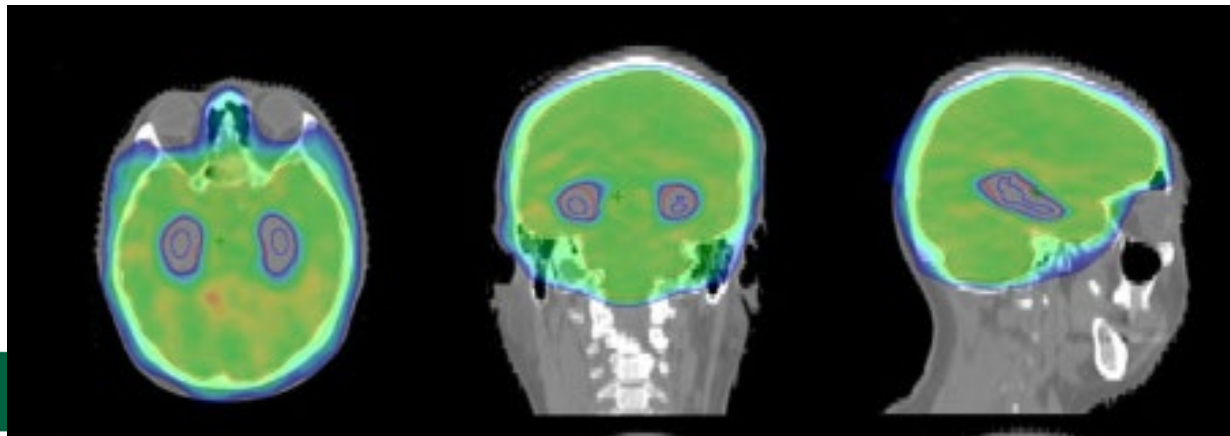


Indications for Whole Brain RT

- Small Cell Lung Cancer
 - Consider SRS for <10 mets
- Leptomeningeal Metastases
- Very large volume symptomatic bulky brain lesions with limited life expectancy

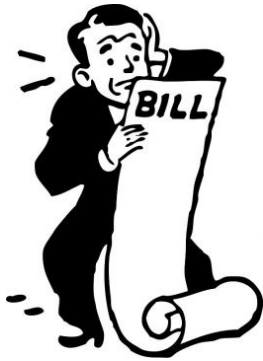
Hippocampal Avoidance Whole Brain Radiotherapy

- Reduces neurocognitive decline compared to whole brain radiotherapy
 - Contraindicated in leptomeningeal disease and perihippocampal lesions
 - Consider for other whole brain cases where cognitive preservation is desirable.



Historical Uses of Radiosurgery for Brain Metastases Were Limited to Selected Patients

- Single tumor
- Only in salvage setting
- Controlled systemic disease (few systemic options)
- Controlled primary tumor
- High KPS



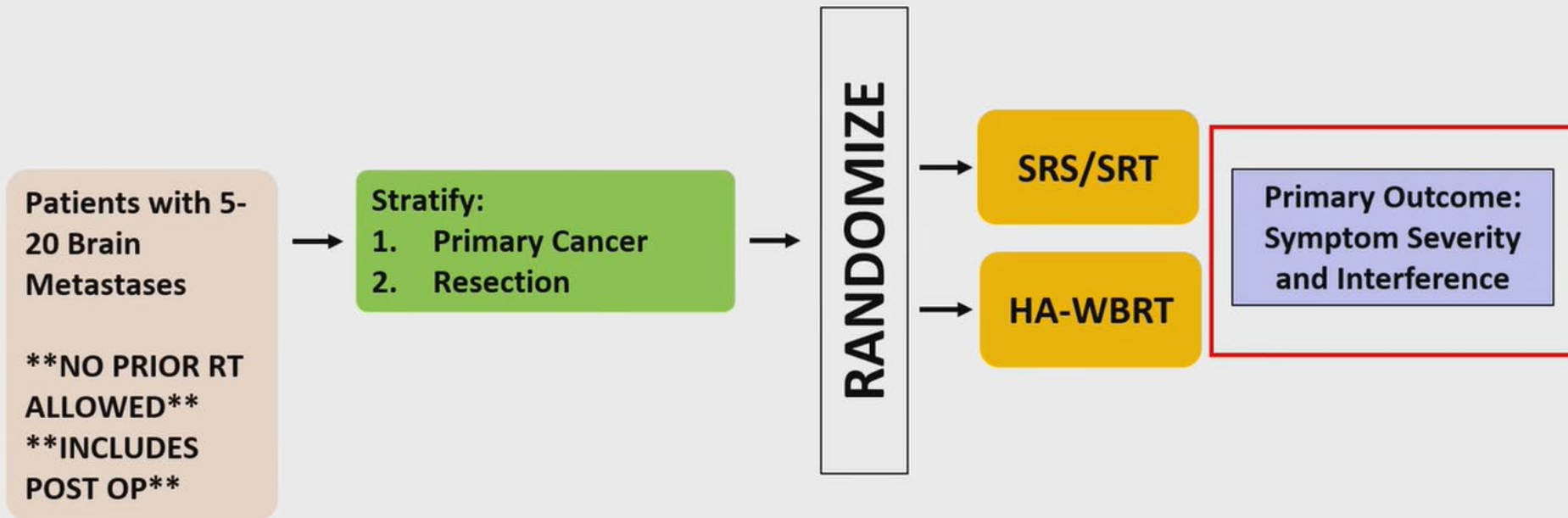
How many is too many?

When should I consider HA-WBRT?

- 1990s
 - Radiosurgery is a replacement for surgery
 - 1-3 mets is all that is technically feasible with multiple isocenters per target
- 2010s-present
 - WBRT is bad for cognition as early as 1-4 months in multiple phase III trials
 - Phase II trial of 1-10 mets (Japan)
 - Phase III trial of 4-15 mets (MD Anderson)
 - Phase III trial of 5-20 mets SRS vs HA-WBRT (ASTRO 2025)
 - Single Isocenter Multiple Target (SIMT) is clinically feasible.

ASTRO 2025

Study Design



Stereotactic radiation (SRS/SRT) versus hippocampal avoidance whole brain radiation (HA-WBRT) in patients with 5-20 brain metastases: A multicenter, phase 3 randomized trial

Ayil Alizer MD MHS, Shyam Tanguturi MD, Grant Benham, Paul Brown MD, Daniel Cagney MD, Paul Catalano ScD, Fallon Chipidza MD, Daphne Haas-Kogan MD, Jaroslaw Hopel MD, Monica Krishnan MD, Marciana Johnson BA MPH, Nayan Lamba MD, Jennifer Nosker PhD, Michael Parsons PhD, Luke Peng MD ScM, Ivy Ricca BA, Diana Shi MD, Kee-Young Shin MS, Patrick Wen MD, Rifaquat Rahman MD

Ayil Alizer MD, MHS
Director of Central Nervous System Radiation Oncology
Brigham and Women's Hospital / Dana-Farber Cancer Institute
Associate Professor, Harvard Medical School

ASTRO 2025: lower symptom burden and ADL interference with SRS/SRT

Primary Outcome

MDASI-BT Symptom Severity			
	SRS/SRT	HA-WBRT	p
Baseline (mean)	2.19	1.90	0.20
Post baseline minus baseline (weighted, mean)	-0.03	0.59	
Difference	-0.62		<0.001

MDASI-BT Symptom Interference			
	SRS/SRT	HA-WBRT	p
Baseline (mean)	3.49	3.18	0.40
Post baseline minus baseline (weighted, mean)	-0.62	0.89	
Difference	-1.50		<0.001

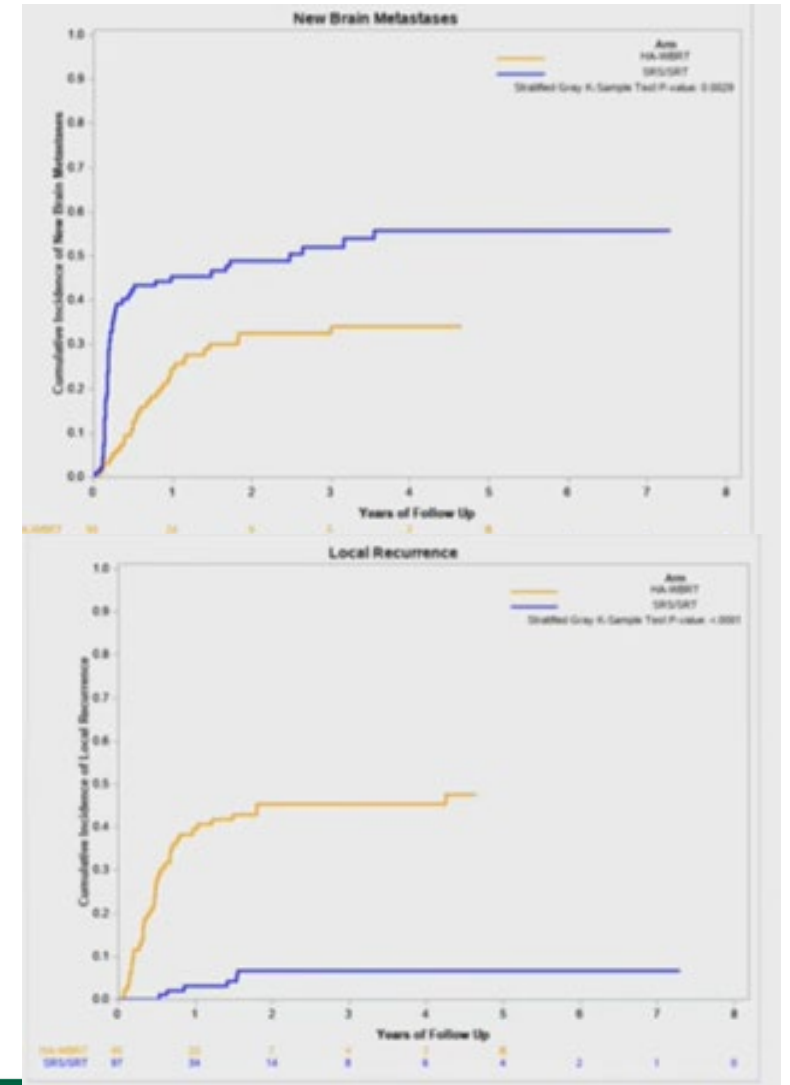
Stereotactic radiation (SRS/SRT) versus hippocampal avoidance whole brain radiation (HA-WBRT) in patients with 5-20 brain metastases: A multicenter, phase 3 randomized trial

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Ayal Aizer MD, MHS
Director of Central Nervous System Radiation Oncology
Brigham and Women's Hospital / Dana-Farber Cancer Institute
Associate Professor, Harvard Medical School

ASTRO 2025 SRS vs HA-WBRT

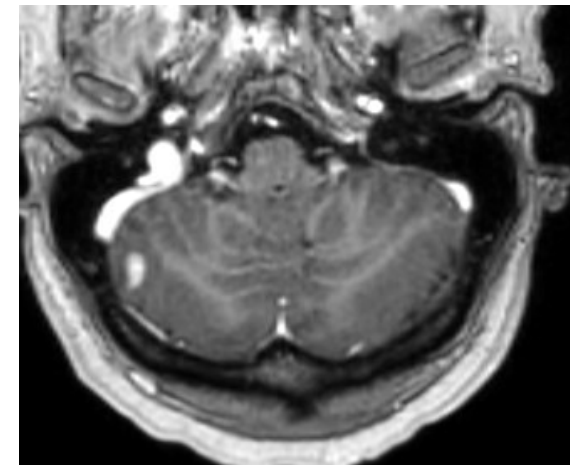
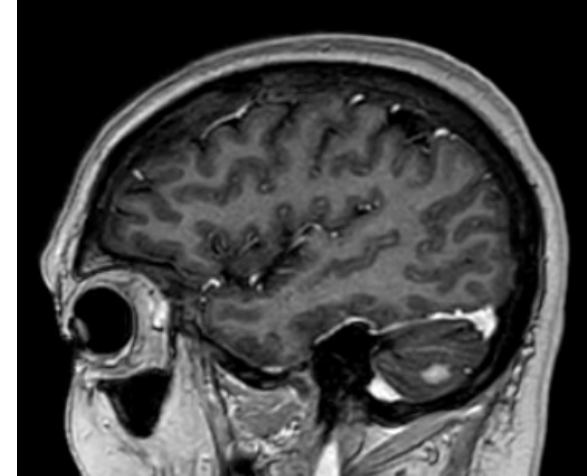
- More new brain mets with SRS/SRT
- Better local control with SRS/SRT
- Better data to support SRS for up to 20 mets



Considerations for High Quality Stereotactic Radiosurgery

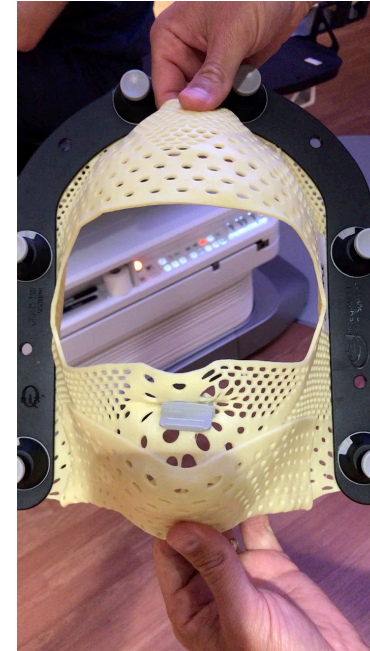
What Type of MRI is needed?

- Diagnostic (within 14 days)
 - Minimum 2mm slice thickness (1mm ideal)
 - STEALTH (surgical planning scan)
 - **3D sagittal post-contrast ~1mm**
- If insufficient quality MRI, order treatment planning MRI
 - 2 mm 3D gradient echo axial double dose contrast
 - 2.5 mm spin echo double dose contrast



How do I simulate?

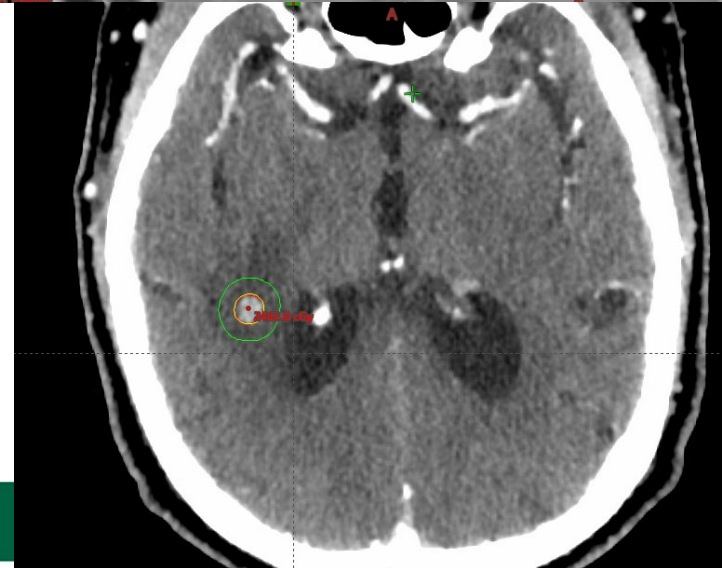
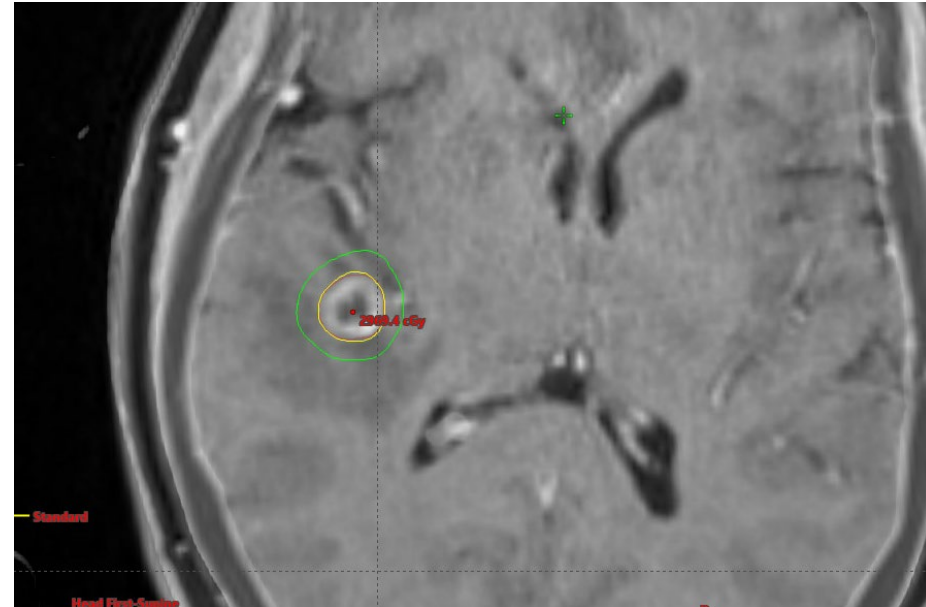
- 1mm reconstruction
- **IV contrast, especially if concern for rapid growth or long interval since MRI**
- Aquaplast Mask Immobilization



Encompass™ SRS Immobilization System by Qfix

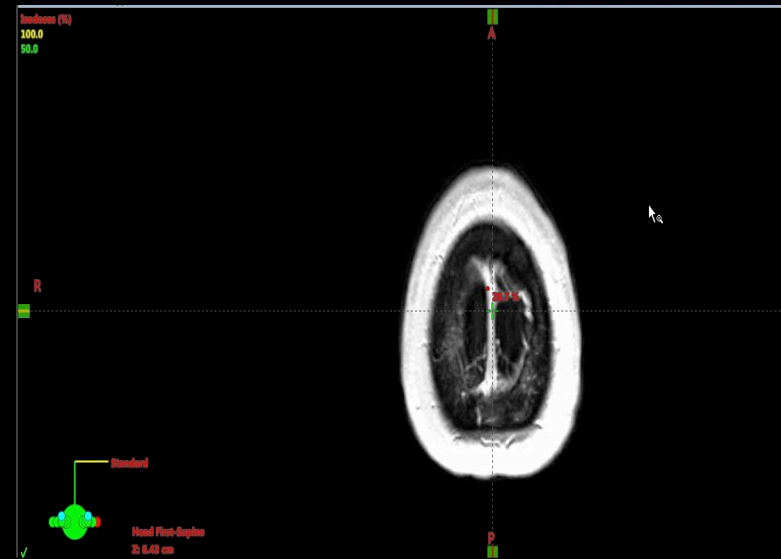
What is a good radiosurgery plan?

- Conformity Index (CI)
 - 100% isodose volume/target volume
 - Ideally <1.3-1.5
 - Will be larger for smaller tumors
- Gradient Index (GI)
 - 50% isodose/100% isodose volume
 - Ideally <3.5-4
 - Will be larger for smaller tumors
 - Worse CI makes GI look better
- Plan evaluation
 - We do not limit hot spots
 - Examine 100% and 50% IDL



What is a good Radiosurgery plan?

- Mean normal brain dose
- V12 or equivalent
- Ignore hotspot if in gross tumor
- Critical structures preserved (optics, brainstem)
- Reduce bridging of 40% isodose

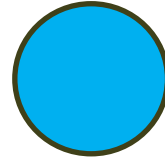


What dose should I give?

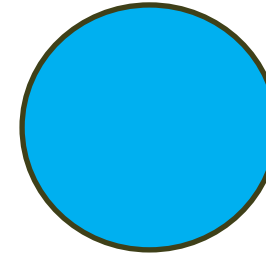
< 2cm – 20 Gy x 1
Radiosensitive – 18 Gy x 1



2-4 cm – 9 Gy x 3



4-6 cm – 6 Gy x 5 or 15 Gy preop



Brainstem – reduce dose (16Gy) or hypofractionate (8Gy x 3 or 5-6Gy x 5)

Optics – 10 Gy dmax 1fx or ~25Gy to 0.03 cc in five fractions

Bridging of high isodoses – hypofractionate

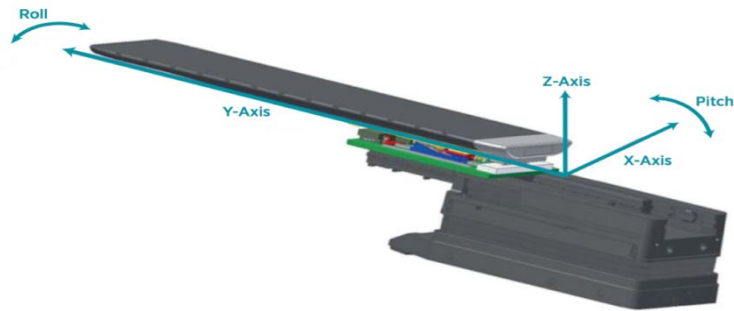
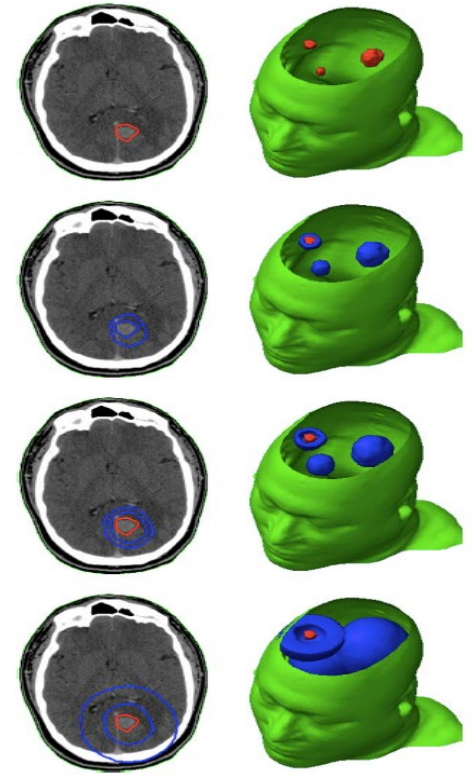
Systemic therapy increase or unknown risk –hypofractionate

Retreatment – avoid 1 fx twice, dose reduce selectively

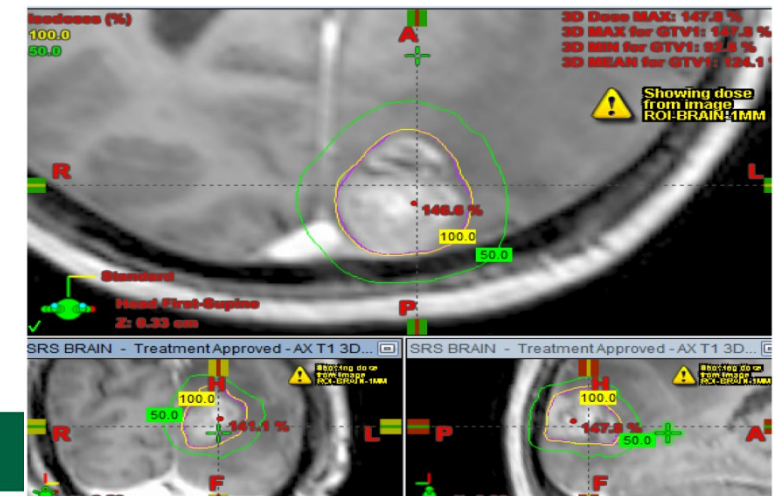
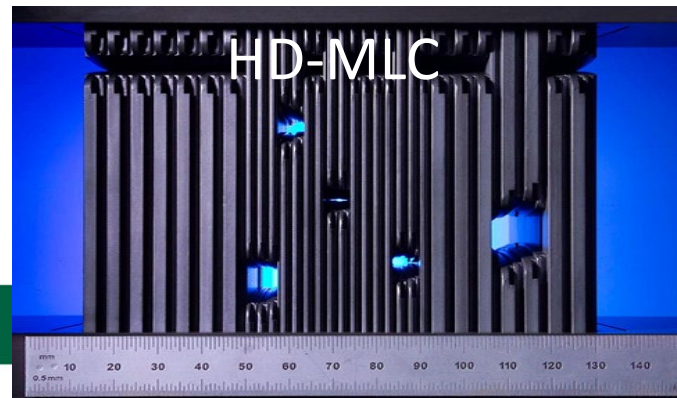
Deep or eloquent or parasagittal - ?more conservative

Linac Radiosurgery Evolution

- Cones not required due to higher resolution multi-leaf collimators
- Image Guidance allows for accurate frameless procedure
- VMAT technique evolved to produced dosimetry equivalent to GK but dramatically faster
- Flattening filter free (up to 2400 MU/min)



6 DOF Couch



RapidArc™ Radiosurgery Planning Challenges

- Many ways to get a sub-optimal plan
 - Using default Normal Tissue Optimization (NTO) to define dose falloff
 - Forced homogeneity
 - Restrictive treatment geometry (e.g. axial only)
 - Sequential optimization of multiple isocenters
- “Ring recipe” devised to place all surrogates for plan quality in the cost function
 - Conformity
 - Gradient
 - Normal brain dose
- Planning requires high level of expertise

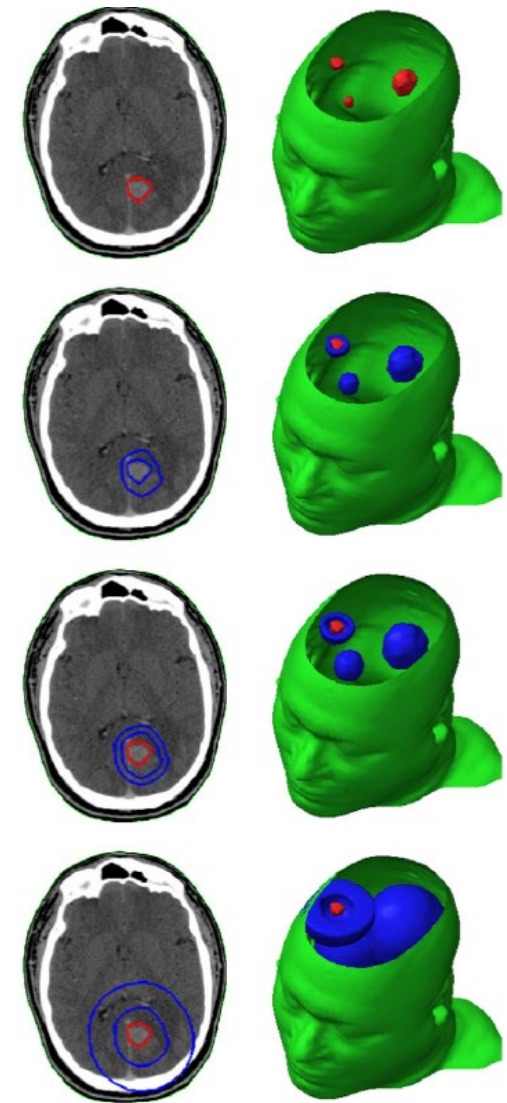
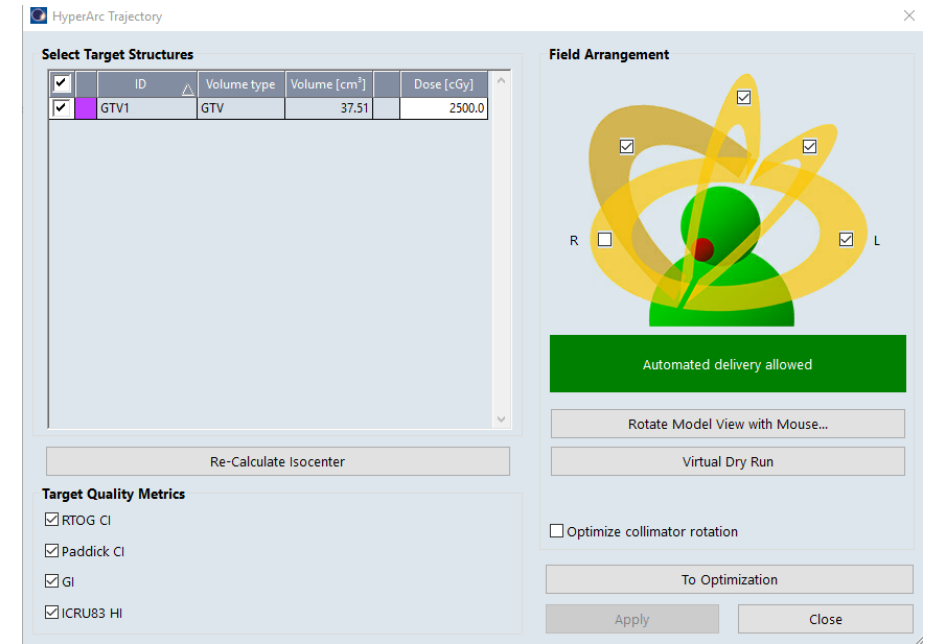


Figure 1 Dose control tuning structures utilized for dose optimization. Left side = 2-dimensional visualization for a single target patient. Right side = 3-dimensional visualization for a multitarget patient. From top to bottom (both sides): target(s) (red), inner control tuning structure (blue), middle control tuning structure (blue), and outer control tuning structure (blue).

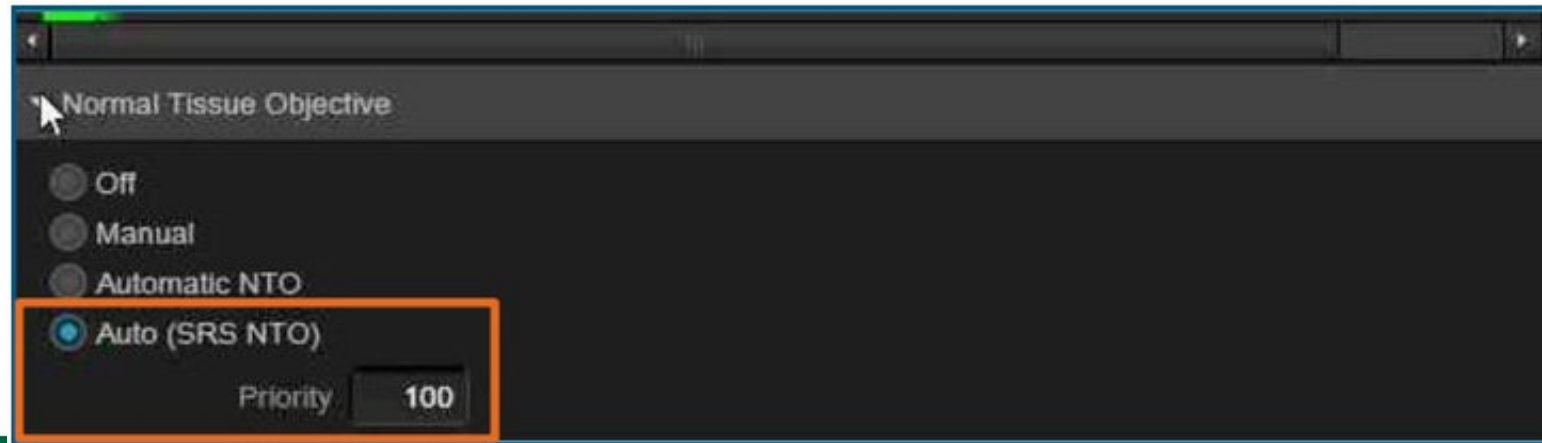
Automating Treatment Planning and Delivery (HyperArc™)



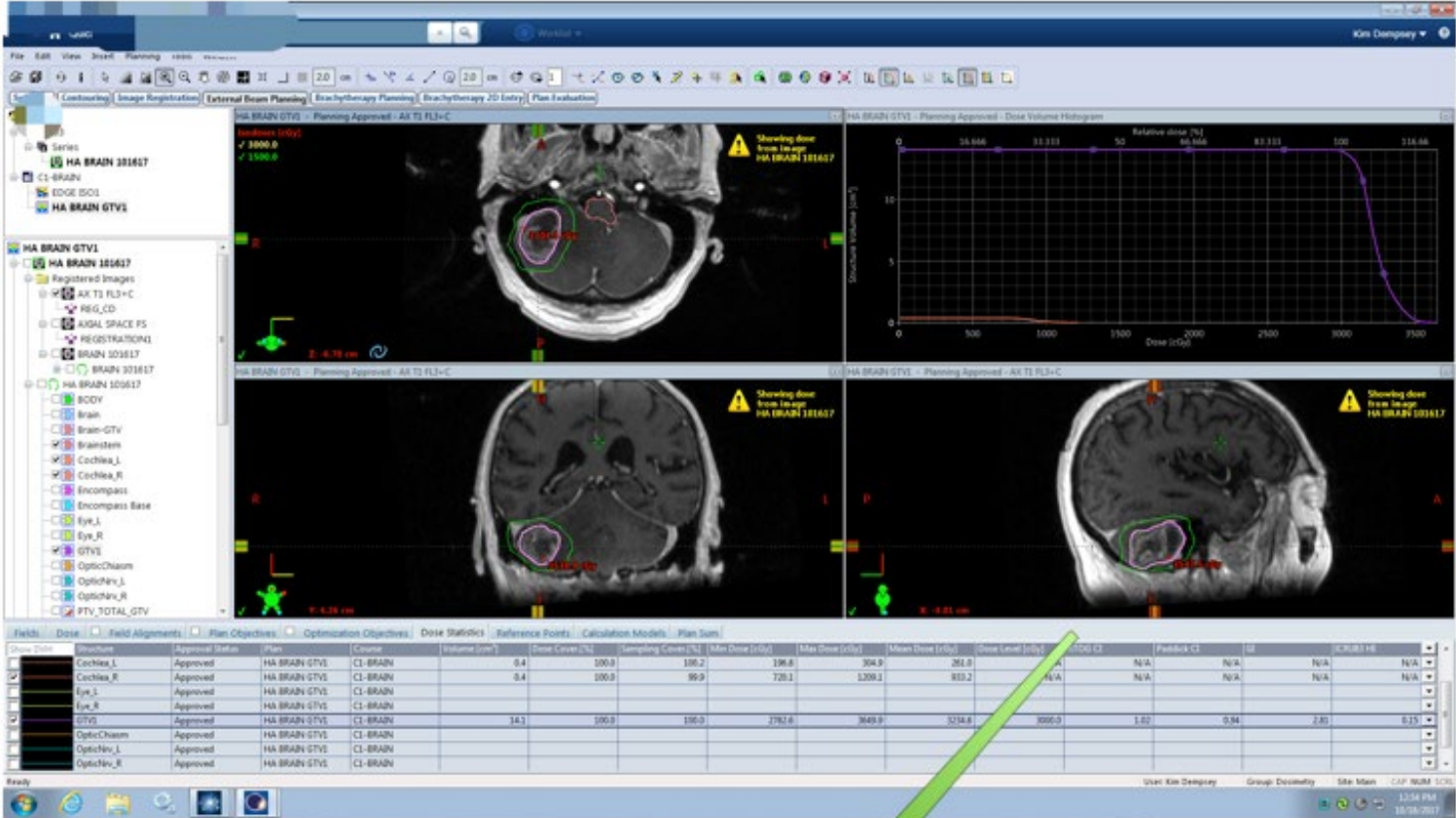
- Treatment planning software component in Eclipse
- Treatment delivery software on TrueBeam or Edge
- Process is defined and prescriptive to **ensure high quality even if planner is less experienced**

HyperArc™ Treatment Planning

- Contour targets, no rings
- New NTO (“Radiosurgery NTO”)
 - Include parameters for rapid dose falloff around targets
 - Designed for multiple targets
 - Designed for radiosurgery



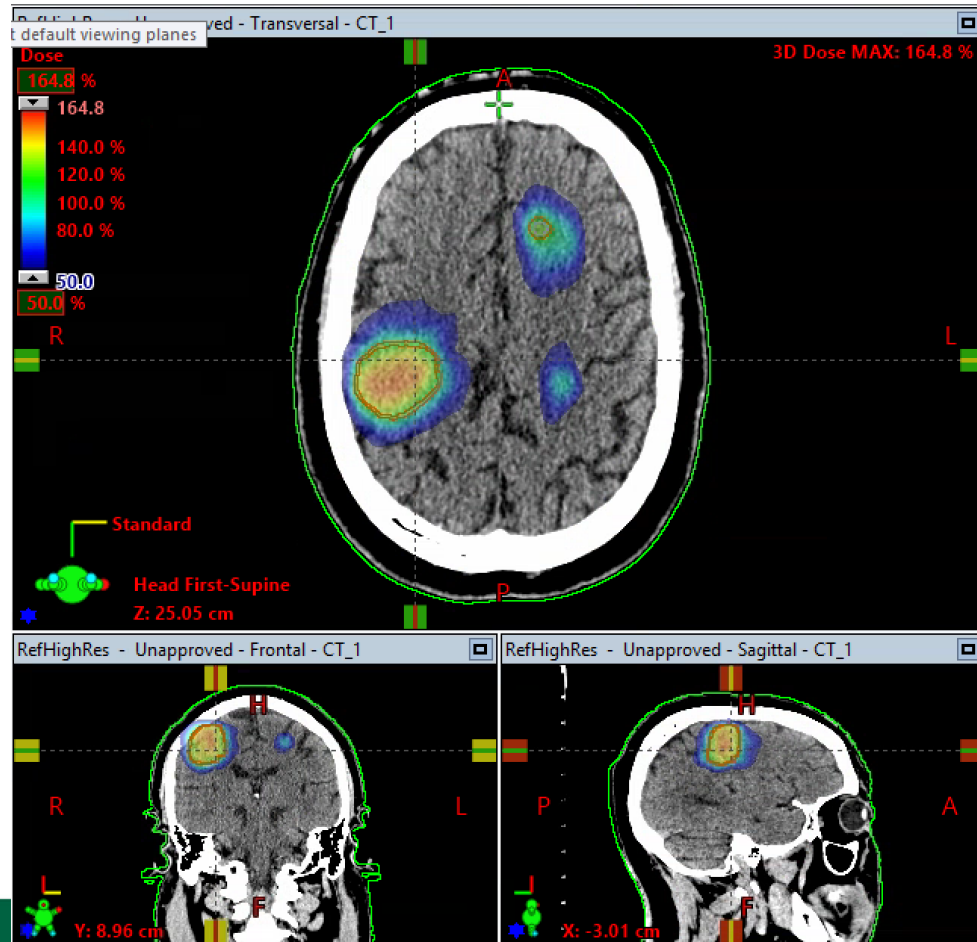
Automatic Calculation of Plan Quality Metrics



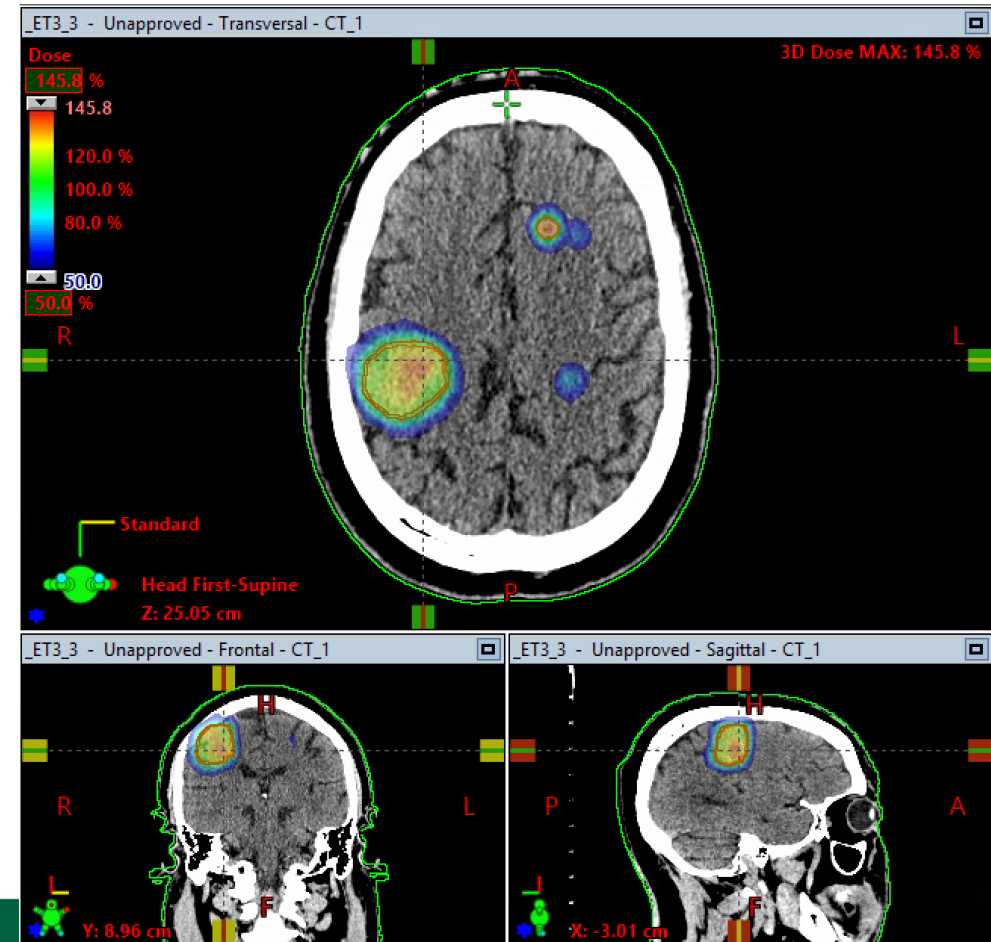
Dose Level [cGy]	RTOG CI	Paddick CI	GI	ICRU83 HI
N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A
3000.0	1.02	0.94	2.81	0.15

User: Kim Dempsey Group: Dosimetry Site: Main

UAB Clinical (RapidArc – UAB Recipe)

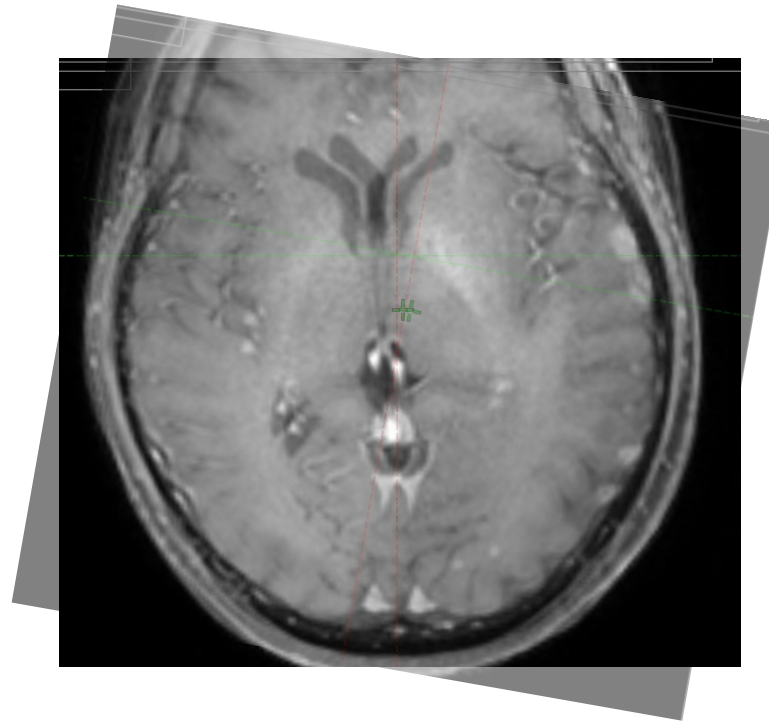


HyperArc Re-Plan



No significant differences between HyperArc and expert planner except V12, V12 < 10% different

Rotational Error About Isocenter



1 degree rotational error 6 cm from isocenter ~ 1 mm translational error

3 degree rotational error 3 cm from isocenter ~1.5 mm translational error

We Do Not Recommend Single Isocenter Multiple Target Treatments without 6 Degree of Freedom Alignment

Options to Manage Intrafraction Motion (Frameless)

	HyperArc™	CyberKnife™	BrainLab™	Gamma Knife™
Primary alignment	CBCT	KV	KV/CBCT	CBCT
Intrafraction Modality	IR Surface MV	KV	KV	IR fiducial
Timing	Continuous IR	q1-2 minutes	Prior to arcs	Continuous IR
Action Trigger	Threshold to repeat CBCT	Apply each image	Threshold Apply each image	Threshold to repeat CBCT

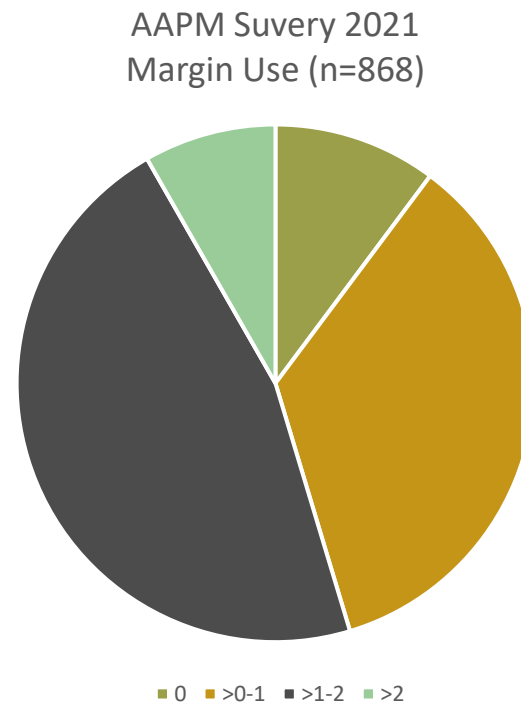


Surface imaging can continuously confirm head position even in presence of other patient motion
Goal is to monitor for motion and minimize use of margins

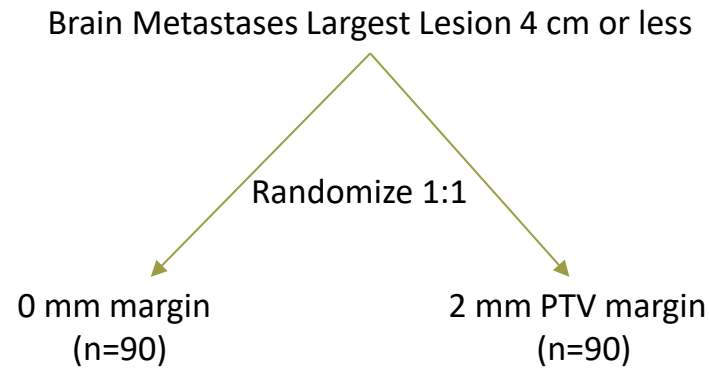
Do I use a margin?

>Half Use More Than 1 mm Margin

UAB uses no PTV margin



Randomized Phase II Study of Differential Margins in Single Isocenter Radiosurgery of Brain Metastases

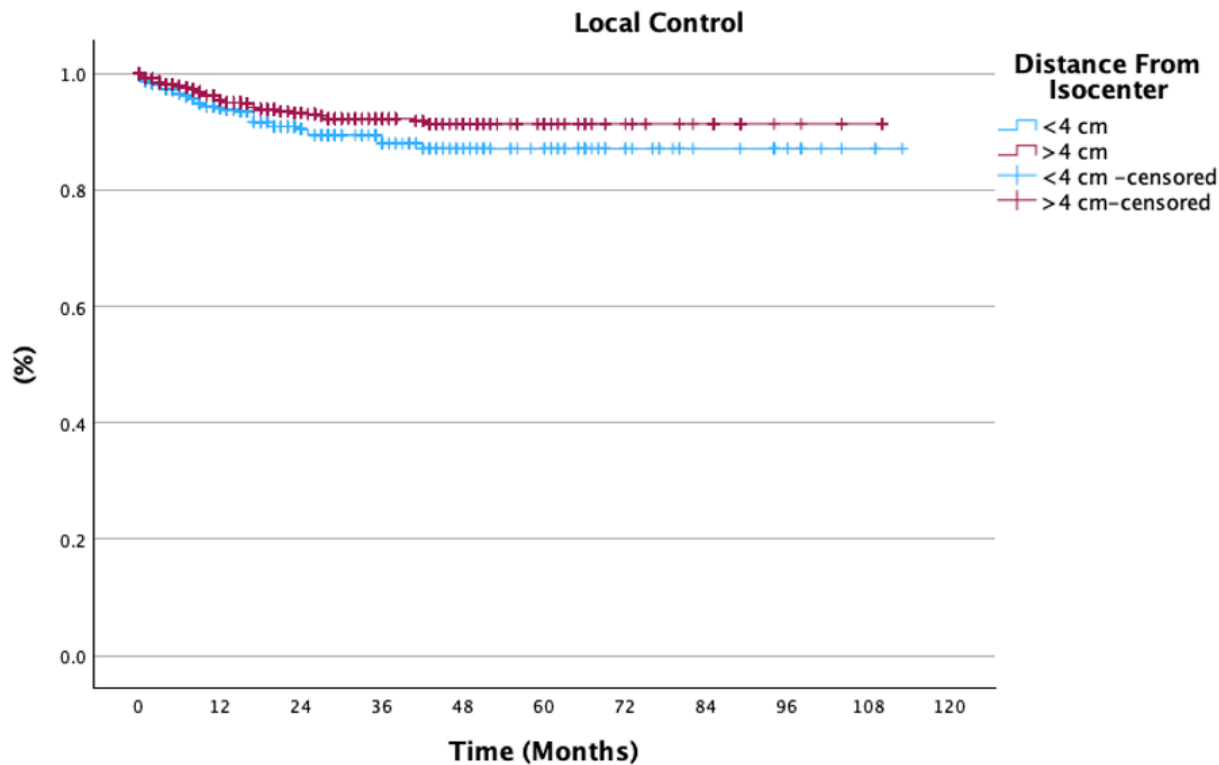


- 1-20 secondary brain metastases to be treated in single course. Lesions which are leptomeningeal or associated with a cavity can be treated but are not evaluable for local control
- Tumors that have been previously irradiated excluded

Hypothesis: A 2 mm margin will worsen uncomplicated control compared to a 0 mm PTV margin in the treatment multiple metastases in a single fraction.

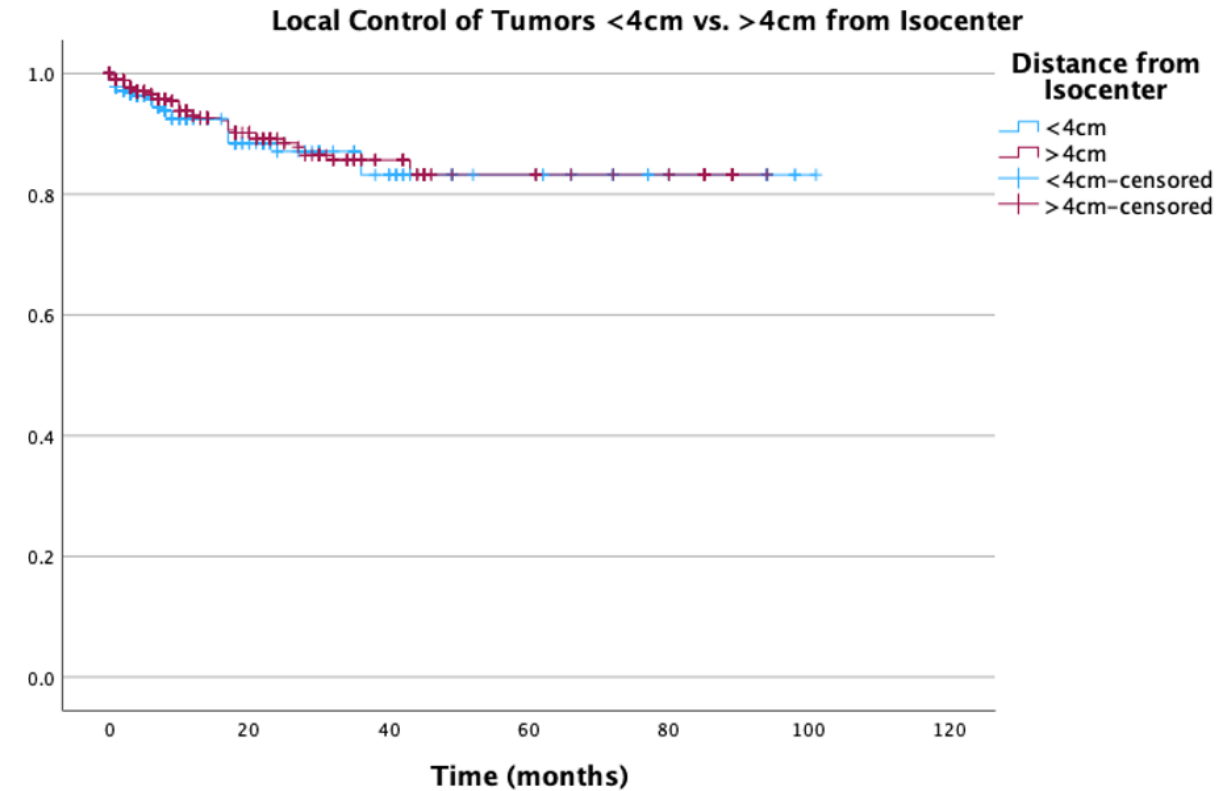
No Local Failure increase in tumors far from isocenter (no PTV)

3031 patients 1 fraction



$p=0.034$

1220 patients 3-5 fractions



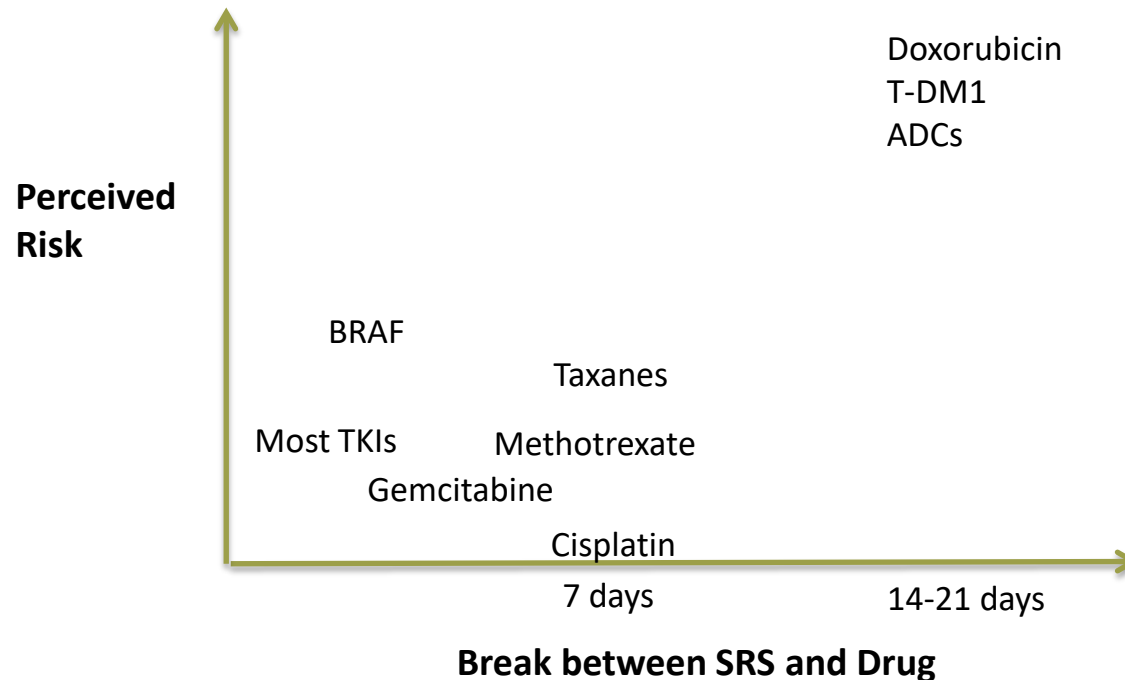
Moradi et al. 2025

When can brain mets just be treated medically?

CNS Response - Systemic Therapy

		Overall Response	
Melanoma (V600E mut)	BRAF/MEK	~40-60%	PMID: 32575838
Melanoma	Dual immune checkpoint (ipi/nivo)	56%	PMID: 30134131
Breast (HER2)	HER2 – tucatinib (HER2CLIMB) HER2-trastuzumab deruxtecan	47% 73%	PMID: 32468955 PMID: 35941372
Lung (EGFR mut)	EGFR – Osimertinib EGFR – first gen	91% 68%	PMID: 30153097
Lung (ALK/ROS)	Crizotinib Alectinib	65-85%	PMID: 30416687

How do I sequence SRS and Systemic Treatments?



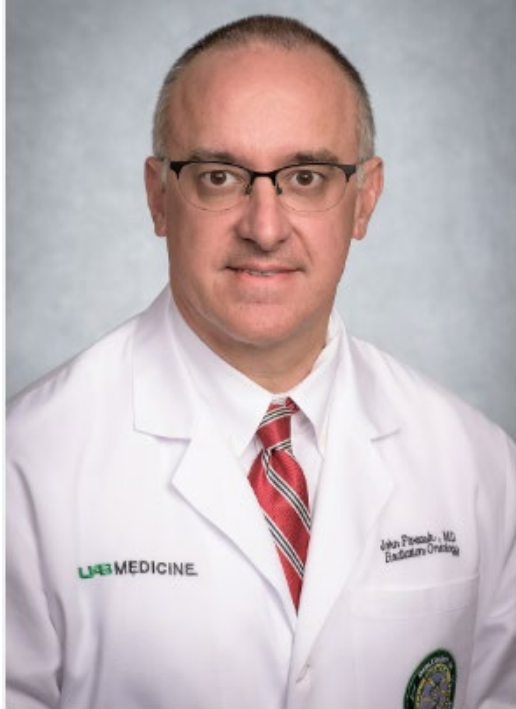
No break:

- anti-PD1
- anti-PDL1
- anti-CTLA-4
- capecitabine
- temozolomide
- etoposide
- vinorelbine
- pemetrexed
- lapatinib
- trastuzumab
- hormonal agents
- bevacizumab
- mTor

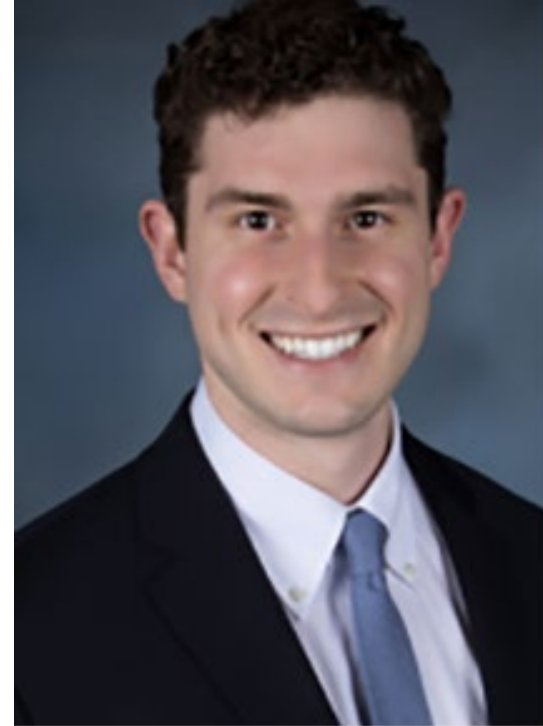
Conclusions

- The goal of therapy in brain mets
 - symptomatic burden of disease ↓
 - quality of life ↑
 - time spent at the Doctor's office ↓
- Efficiency and ease of administering radiosurgery for brain metastases ↑
- Indications for radiosurgery ↑
- Need for whole brain radiotherapy ↓

Special Thank you



John Fiveash MD



Luke Moradi MD

Delivery of High-Quality Stereotactic Radiosurgery for Brain Metastases

Richard Popple, Ph.D.

Disclosures

- Research support from Varian Medical Systems
- Intellectual property licensed to Varian Medical Systems through The University of Alabama at Birmingham



Institutional Physics Assessment Form

(To be collected annually from physics staff)

MROQC Institutional Physics Assessment Form (IPAF) Data:

- All 25* facilities have 4DCT capabilities
- 14 facilities have passed the IROC-Houston SRS Head phantom for credentialing and 21 have passed the Head and Neck phantom. All but one facility has passed at least 1 phantom.
- 23 facilities have six degrees of freedom couch control
- Online adaptive RT modalities
 - 1 facility has MRI-guided
 - 8 facilities have CBCT-guided
 - 1 facility responded “Other: Accuray (Tomotherapy) adaptive - not real-time”
 - 15 report no online adaptive capabilities
- TPS
 - 23 facilities primarily use Eclipse
 - 2 facilities primarily use RayStation
 - Secondary systems include Tomotherapy, Pinnacle, CyberKnife, BrainLab Elements SRS, Elekta, and Nucletron

Practice standards

Received: 16 August 2024 | Revised: 9 November 2024 | Accepted: 12 December 2024

DOI: 10.1002/acm2.14624

JOURNAL OF APPLIED CLINICAL
MEDICAL PHYSICS

AAPM REPORTS & DOCUMENTS

AAPM-RSS Medical Physics Practice Guideline 9.b: SRS-SBRT

Eileen Cirino¹ | Stanley H. Benedict² | Pamela J. Dupre³ | Per H. Halvorsen⁴ |
Grace Gwe-Ya Kim⁵ | Meral L. Reyhan⁶  | Christopher W. Schneider⁷ |
Lei Wang⁸  | Carl P. Weaver⁹ | Sua Yoo¹⁰ 

Practice standards

- i. Supervision of SRS-SBRT treatment sessions by a QMP with relevant SRS-SBRT training. For the first treatment session the QMP must provide personal supervision of the session.² For any subsequent treatment sessions, direct supervision should be provided by either a QMP or a medical physicist under the supervision of a QMP. The level of physicist supervision must be considered under the guidance of the QMP based on the complexity of the procedure and the experience of the team with the particular technologies utilized.



Radiosurgery of limited brain metastases from primary solid tumor: results of the randomized phase III trial (NCT02355613) comparing treatments executed with a specialized or a C-arm linac-based platform

Marta Scorsetti^{1,2}, Pierina Navarria^{1*}, Luca Cozzi^{1,2}, Elena Clerici¹, Luisa Bellu¹, Davide Franceschini¹, Antonio Marco Marzo¹, Ciro Franzese^{1,2}, Valter Torri³, Giacomo Reggiori¹, Francesca Lobefalo¹, Luca Raspagliesi⁴, Luca Attuati⁴, Federico Pessina^{1,2}, Andrea Franzini⁴, Piero Picozzi⁴ and Stefano Tomatis¹

No difference is
efficacy or toxicity
despite margins on
frameless linac

Abstract

Background Comparative prospective data regarding different radiosurgery (SRS) modalities for treating brain metastases (BMs) from solid tumors are not available. To investigate with a single institute phase III randomized trial whether SRS executed with linac (Arm-B) is superior to a dedicated multi-source gamma-ray stereotactic platform (Arm-A).

Methods Adults patients with 1–4 BMs from solid tumors up to 30 mm in maximum diameter were randomly assigned to arms A and B. The primary endpoint was cumulative incidence of symptomatic (grade 2–3) radionecrosis (CIRN). Secondary endpoints were local progression cumulative incidence (CILP), distant brain failure, disease-free survival (DFS), and overall survival (OS).

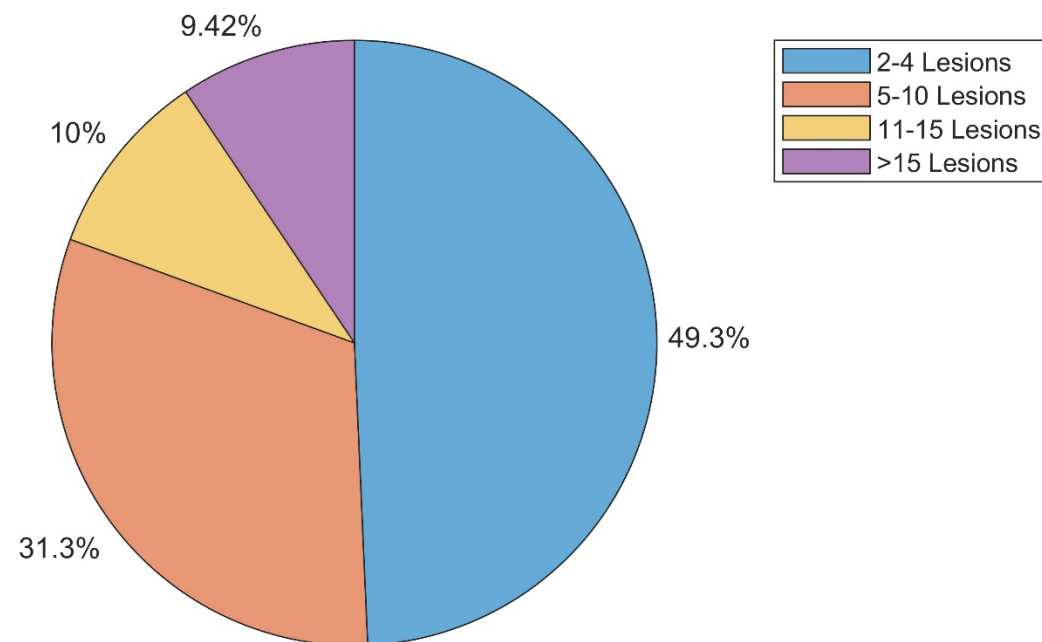
Results A total of 251 patients were randomly assigned to Arm-A (121) or Arm-B (130). The 1-year RN cumulative incidence was 6.7% in whole cohort, 3.8% (95% CI 1.9–7.4%) in Arm-B, and 9.3% (95% CI 6.2–13.8%) in the Arm-A ($p=0.43$). CIRN was influenced by target volume irradiated only for the Arm-A ($p<<0.001$; HR 1.36 [95% CI 1.25–1.48]). Symptomatic RN occurred in 56 cases at a median time of 10.3 months (range 1.15–54.8 months), 27 in the Arm-B at a median time of 15.9 months (range 4.9–54.8 months), and 29 in the Arm-A at a median time of 6.9 months (1.2–32.3 months), without statistically significant differences between the two arms. No statistically significant differences were recorded between the two arms in CILP, BDF, DFS or OS. The mean beam-on time to deliver SRS was 49.0 ± 36.2 min in Arm-A, and 3.1 ± 1.6 min in Arm-B.

Conclusions Given the technical differences between the treatment platforms investigated in this single-institution study, linac-based SRS (Arm-B) did not lead to significantly lower grade 2–3 RN rates versus the multi-source

IROC survey

- Task Group 362 (Multi-lesion Stereotactic Radiosurgery) conducted a survey of multi-lesion SRS practice administered in conjunction with the IROC-Houston's annual facility questionnaire.
- 91% (n=789) of institutions reported that they treated multiple lesions in a single course
- Of respondents having equipment capable of treating multiple lesions with a single isocenter (n=605), 83% (n=504) treated multiple lesions with a single isocenter.

Maximum Number of Lesions Treated in Single Isocenter



Multileaf collimator

The effect of MLC leaf width in single-isocenter multi-target radiosurgery with volumetric modulated arc therapy

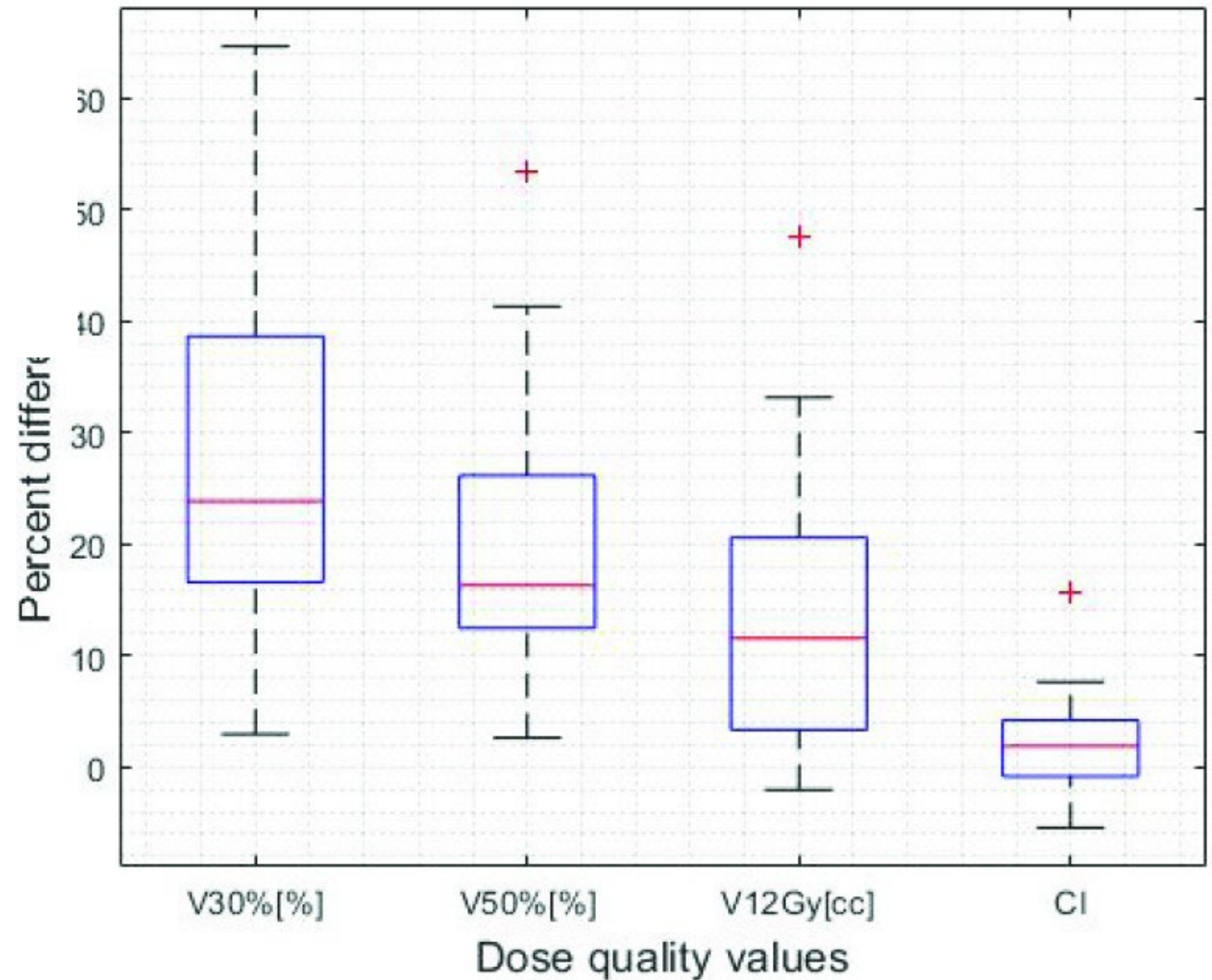
Zhanerke Abisheva¹, Scott R. Floyd, MD, PhD², Joseph K. Salama, MD², John Kirkpatrick, MD, PhD², Fang-Fang Yin, PhD², Michael J. Moravan, MD, PhD², William Giles, PhD² and Justus Adamson, PhD²

¹Medical Physics Graduate Program, Duke University, 2424 Erwin Rd, Durham, NC 27705, USA

²Department of Radiation Oncology, Duke University Medical Center, 20 Duke Medicine Circle, Durham, NC 27710, USA

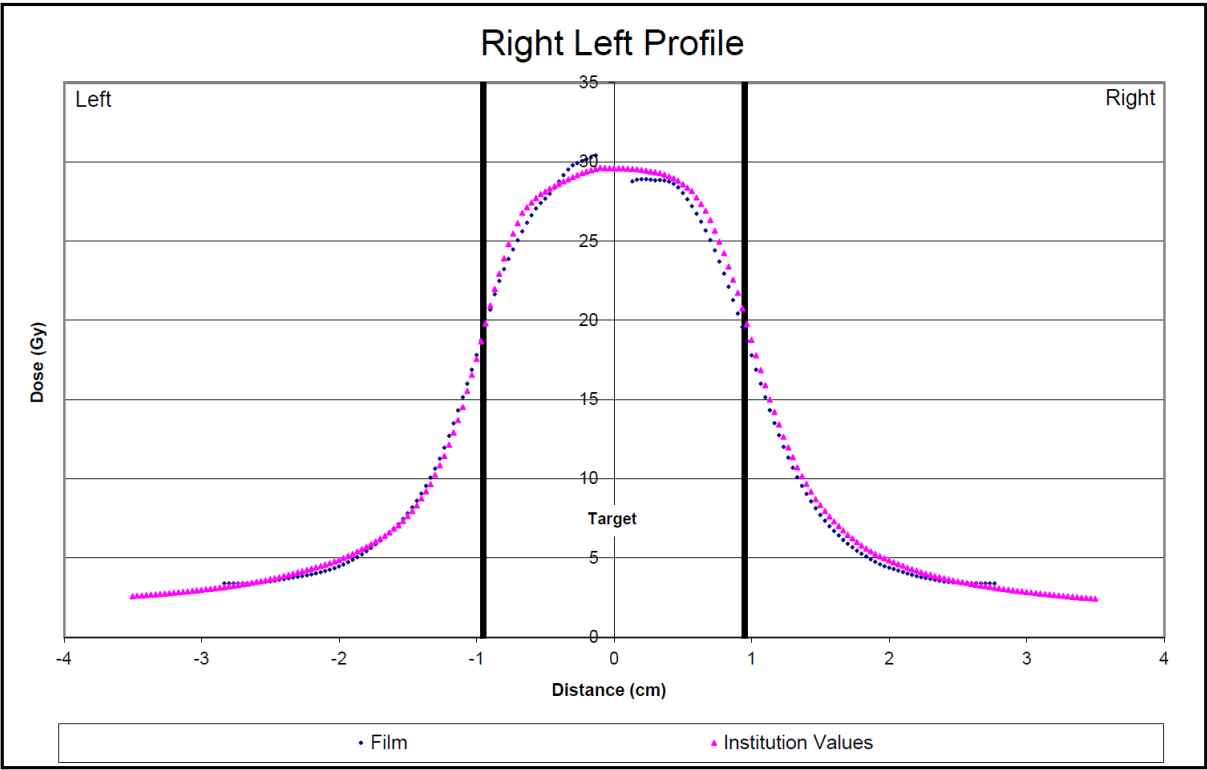
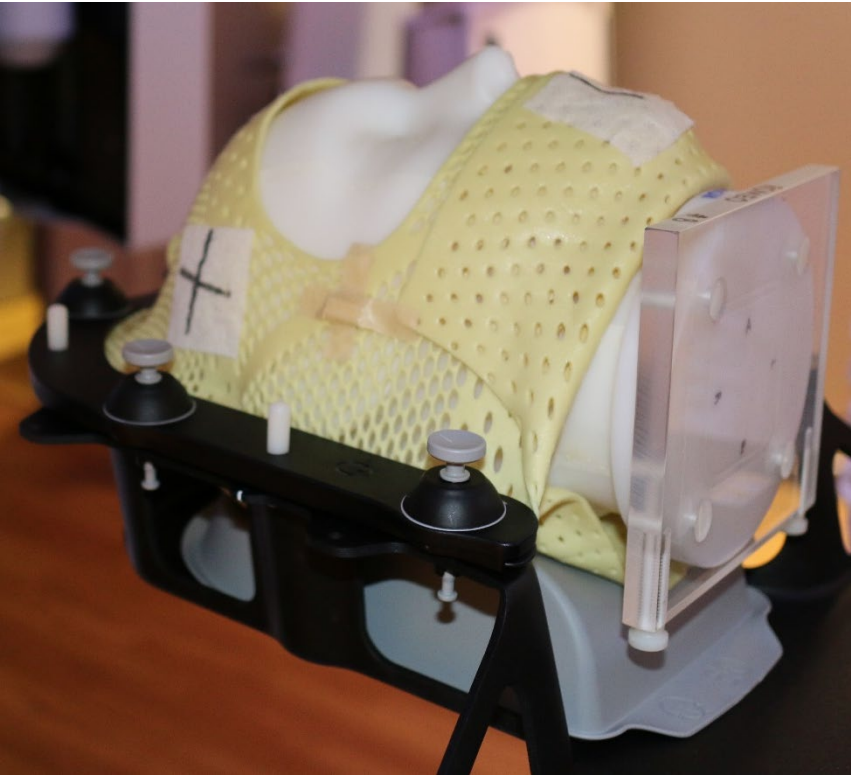
Percent differences of dose quality values between 2.5 and 5 mm leaf width MLC plans.

Positive values indicate an increase in the dose index when the larger MLCs are utilized.



Abisheva Z, et al. J Radiosurg SBRT. 2019;6(2):131-138. PMID: 31641549; PMCID: PMC6774495.

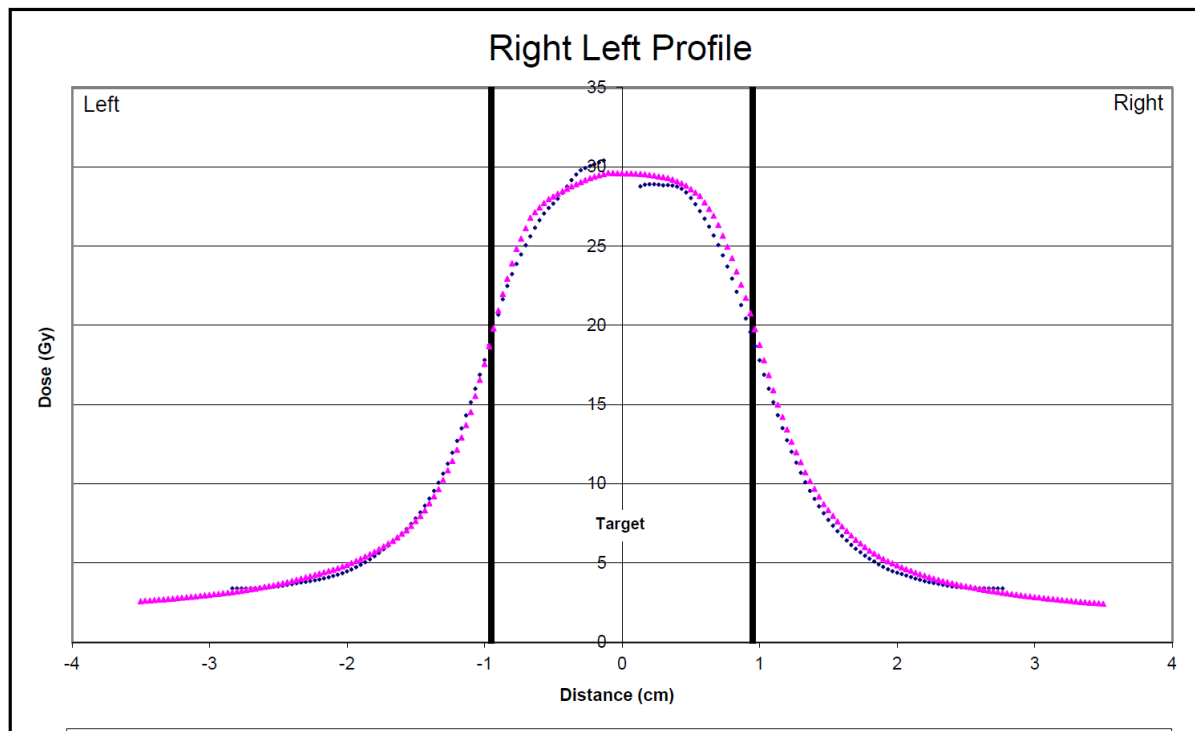
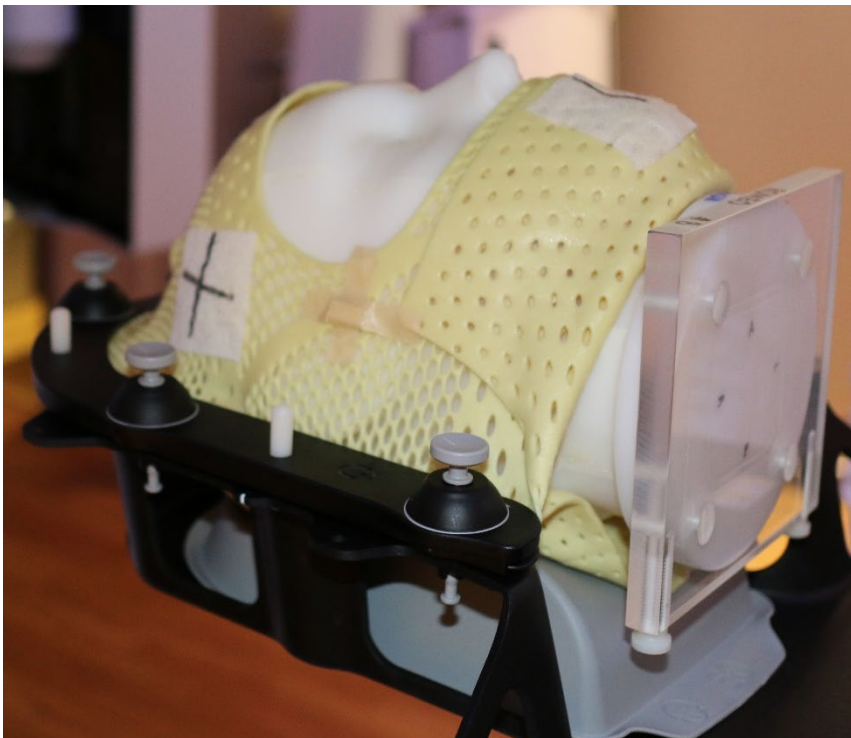
MDADL SRS Head Phantom



TLD Results:

Dose to TLD Capsules (cGy)		Institution Dose (cGy)		Average Ratio Measured/Institution
Upper	Lower	Upper	Lower	
2810	2911	2727	2832	1.03

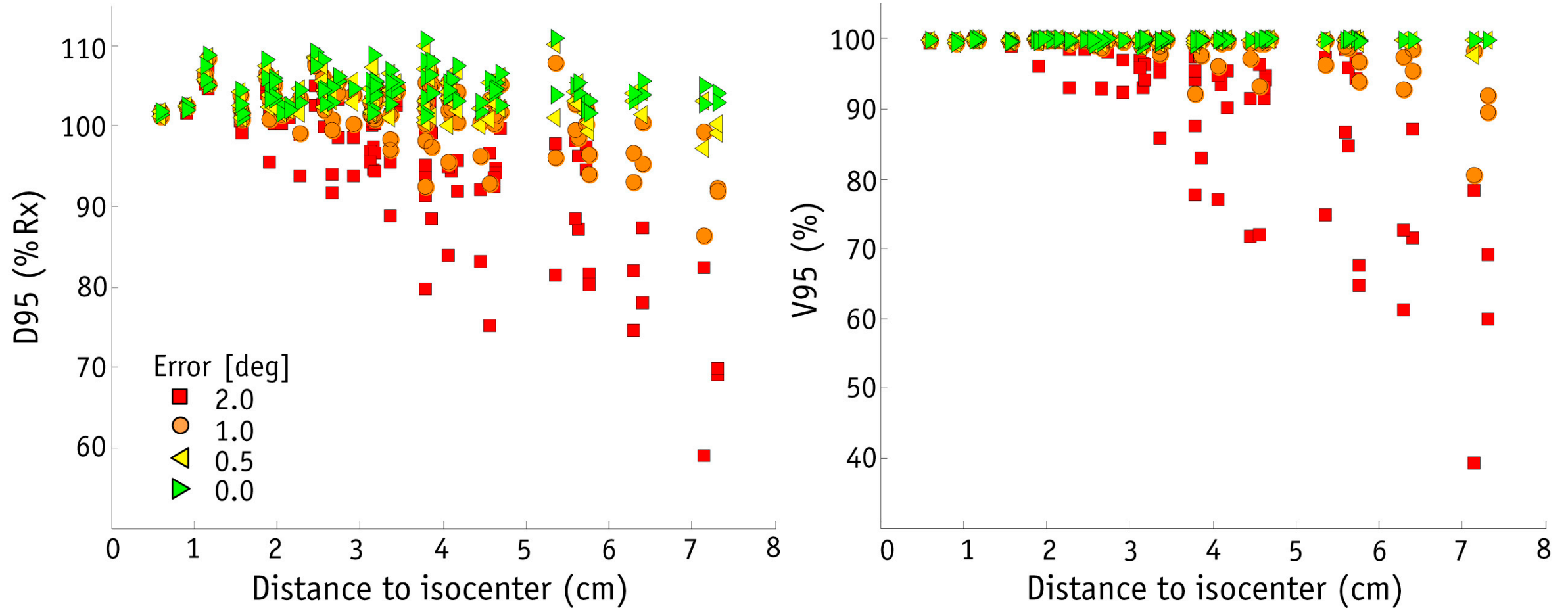
MDADL SRS Head Phantom



MROQC Institutional Physics Assessment Form (IPAF) Data:

- All 25* facilities have 4DCT capabilities
- 14 facilities have passed the IROC-Houston SRS Head phantom for credentialing and 21 have passed the Head and Neck phantom. All but one facility has passed at least 1 phantom.

Patient setup - rotation



Roper et al, IJROBP 2015;93(3):540-6 <https://doi.org/10.1016/j.ijrobp.2015.07.2262>

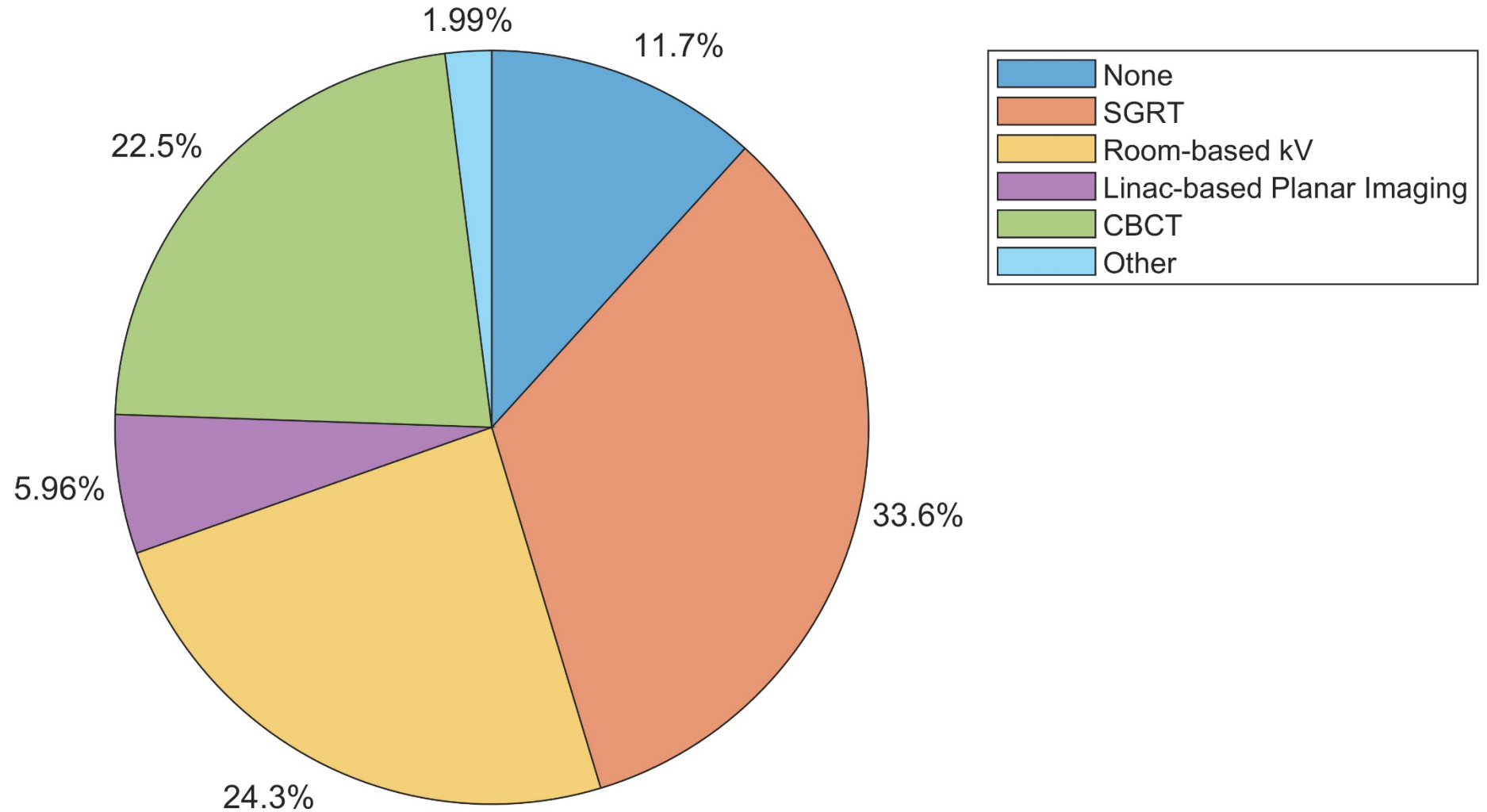
Patient setup - rotation

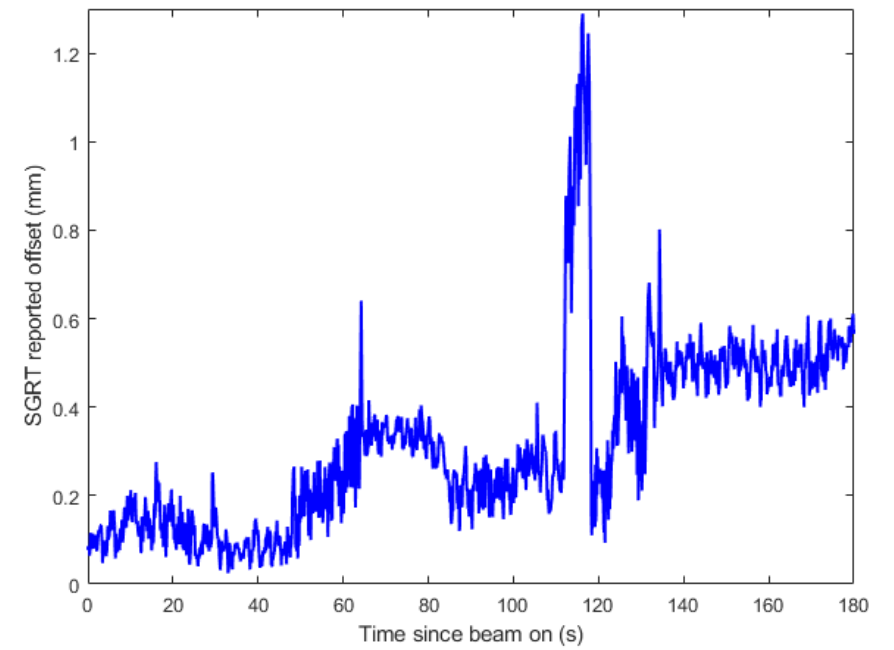
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- 23 facilities have six degrees of freedom couch control

TG-362 IROC-H survey – intrafraction imaging

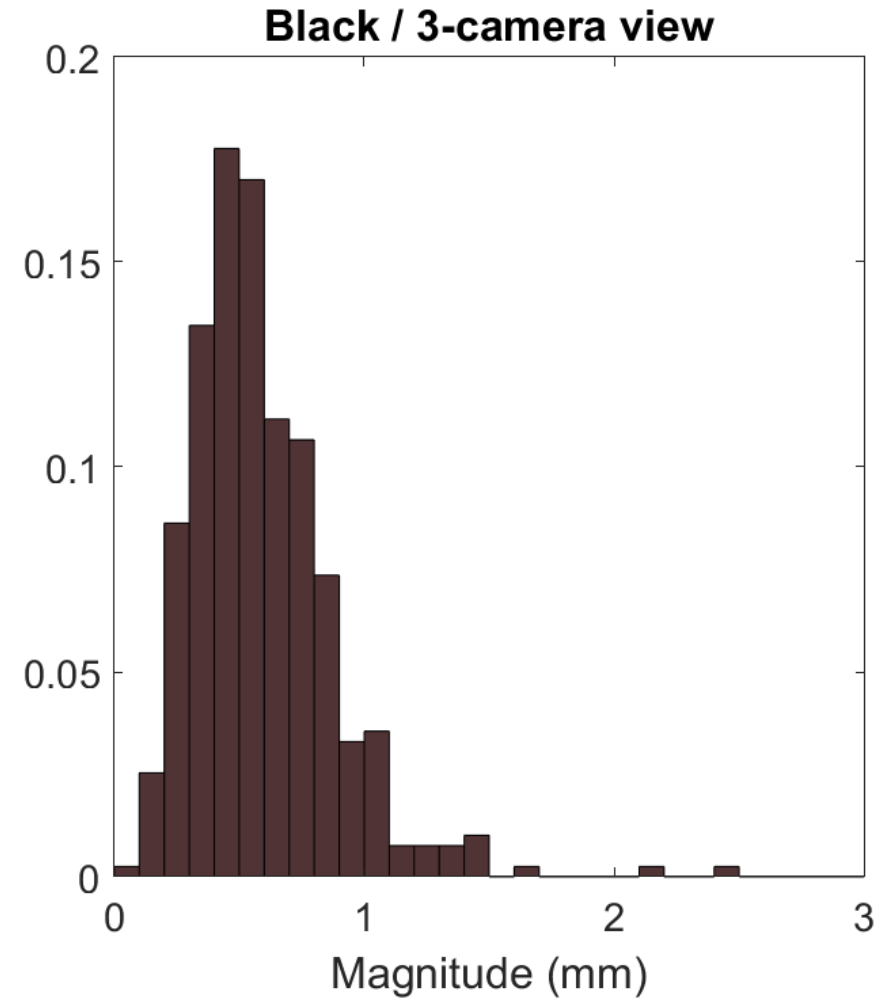
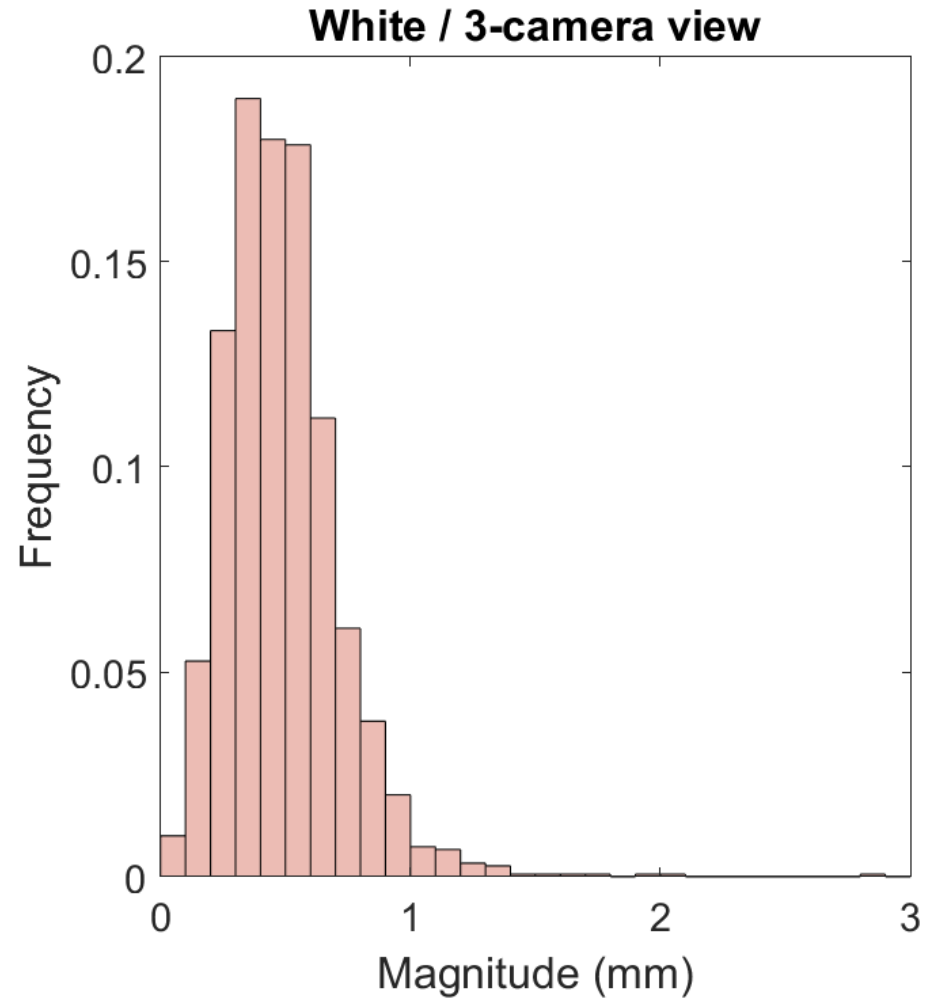
Intrafraction Imaging Techniques for Single Isocenter Multiple Lesion Treatments



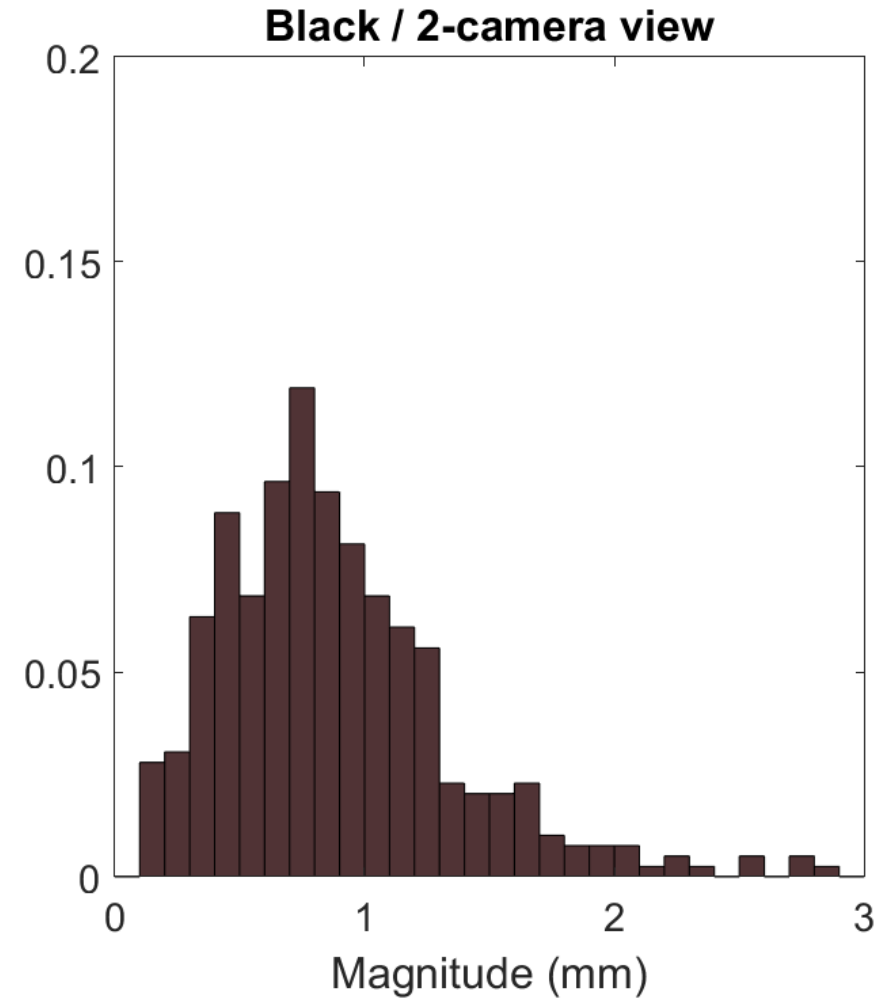
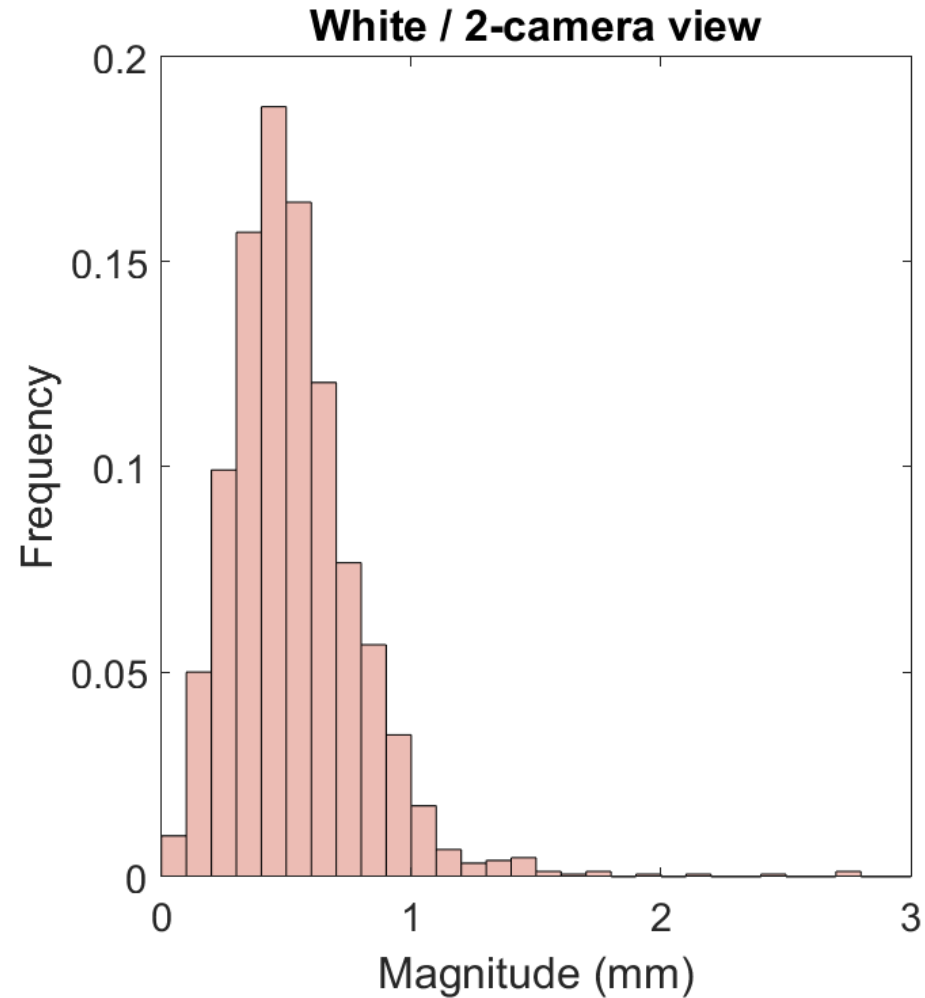


Surface imaging can continuously confirm head position even in presence of other patient motion

Clinical experience at non-zero table angles

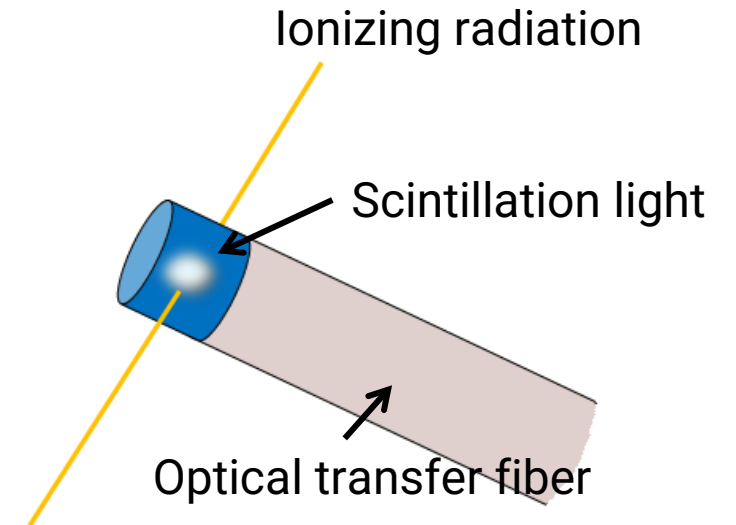
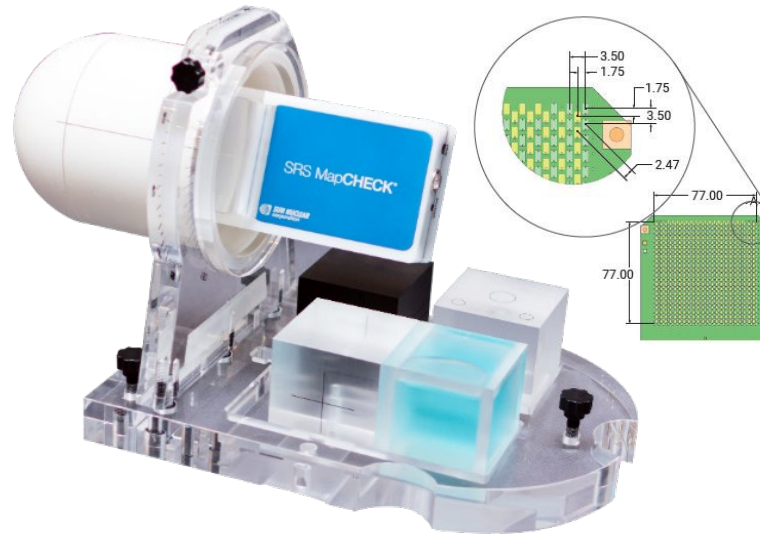
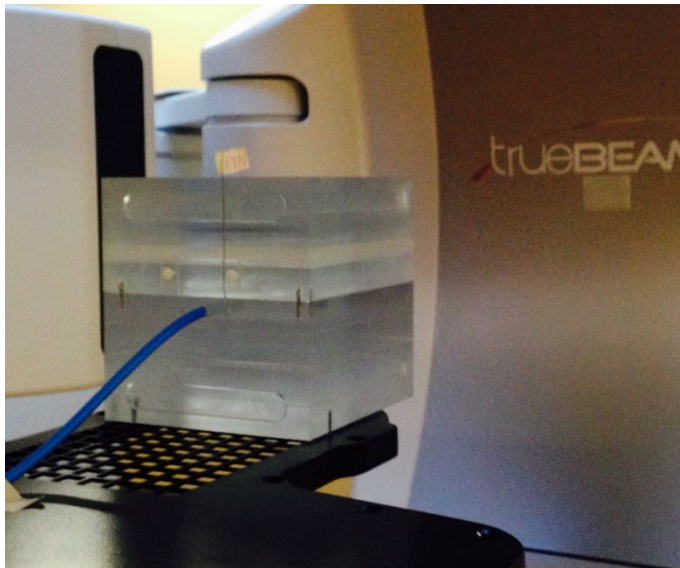


Clinical experience at non-zero table angles

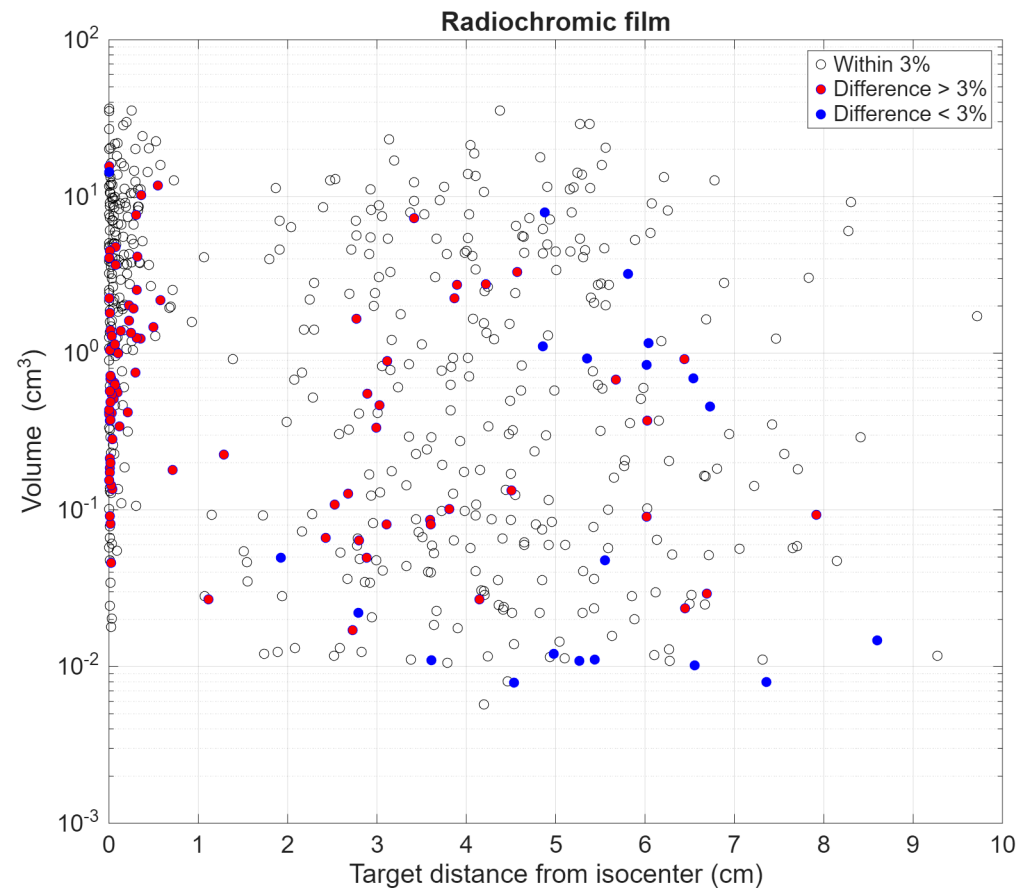
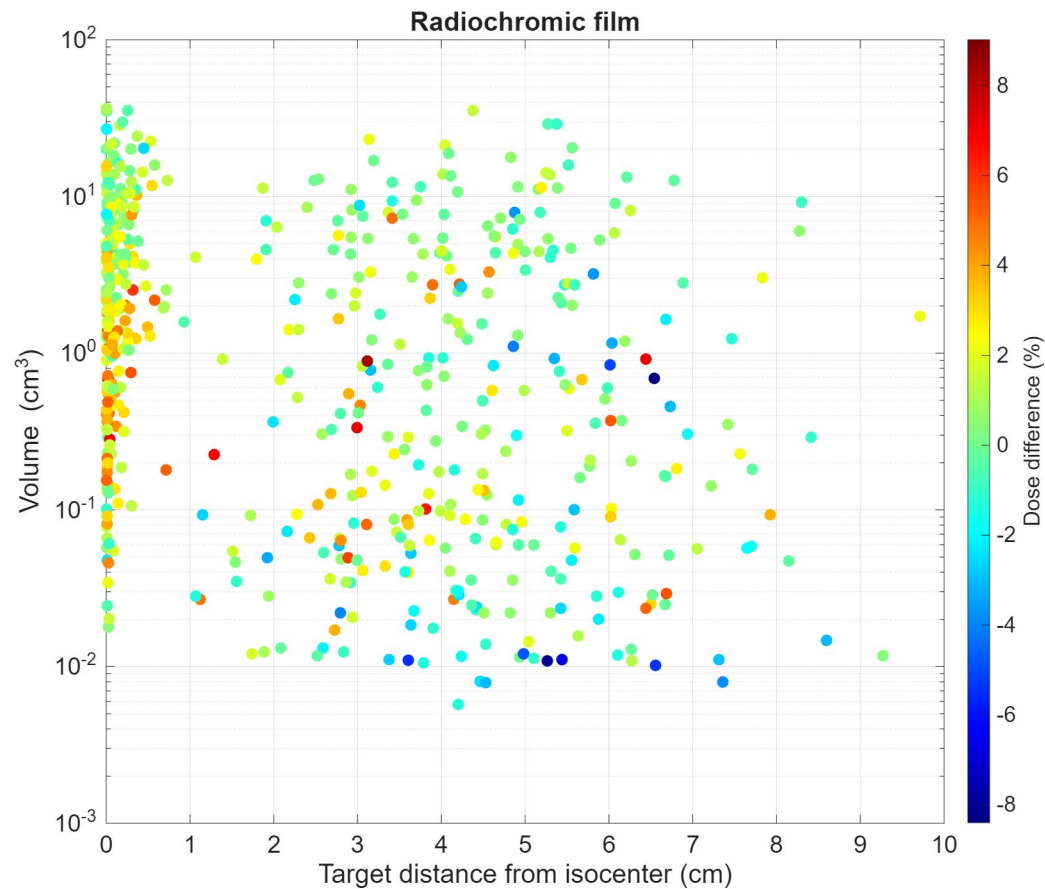


Dosimetry – patient specific QA

- Radiochromic film (EBT XD, Ashland Chemical)
- Diode Array (SRS MapCHECK, Sun Nuclear)
- Scintillator detector (W2, Standard Imaging)



UAB radiochromic film



Recommendations

- Follow national guidelines for SRS (MPPG 9b, etc)
- Credential centers for SRS
 - One isocenter per target
 - Multiple targets per isocenter (e.g. require 6DOF positioning)
- Standardize clinical guidelines
- Standardize nomenclature (TG-263, TG-263U, TG-362)
- Standardize quality assurance
 - Standardize equipment and analysis techniques as much as possible to permit comparison between centers
 - Collect data, including patient specific QA results, longitudinally

Recommendations tl;dr;

Standardize...

Standardize...

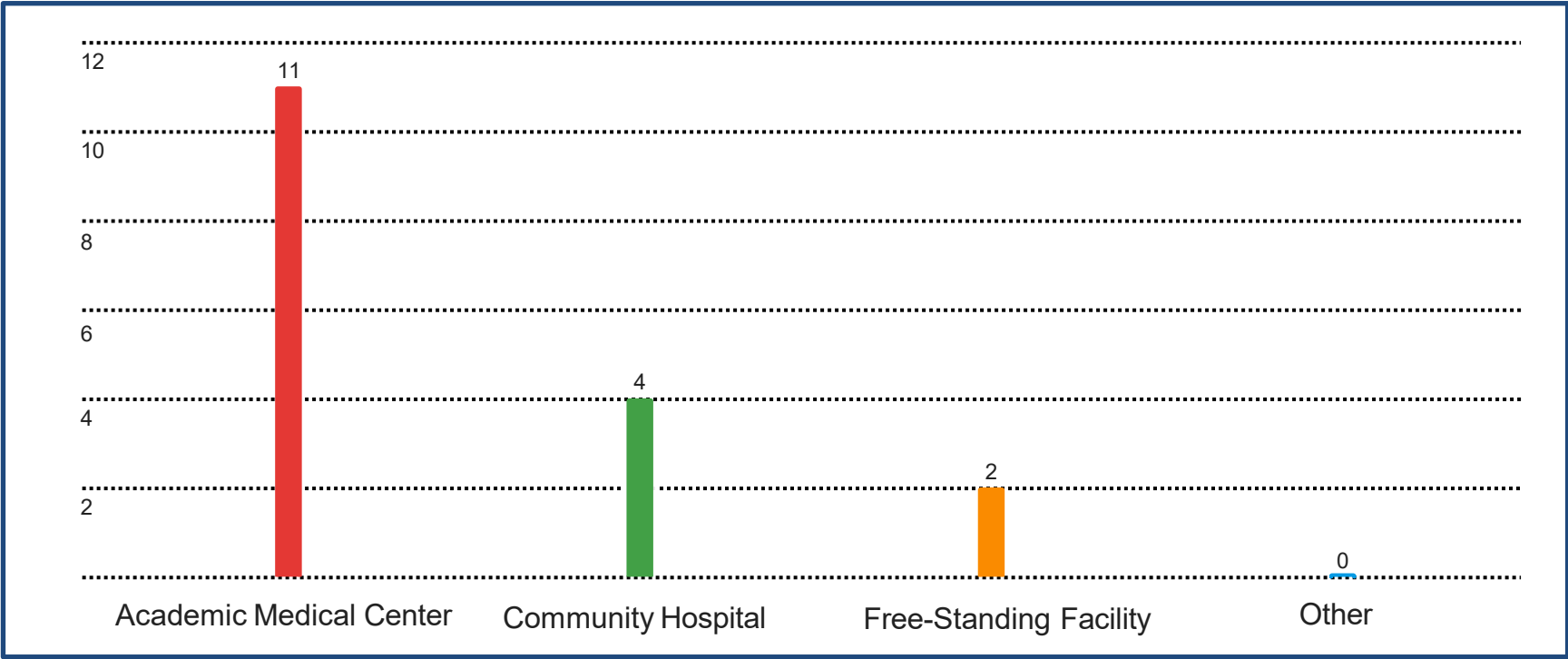
Standardize

**FUTURE
PLANNING
DISCUSSIONS:
BRAIN METS**

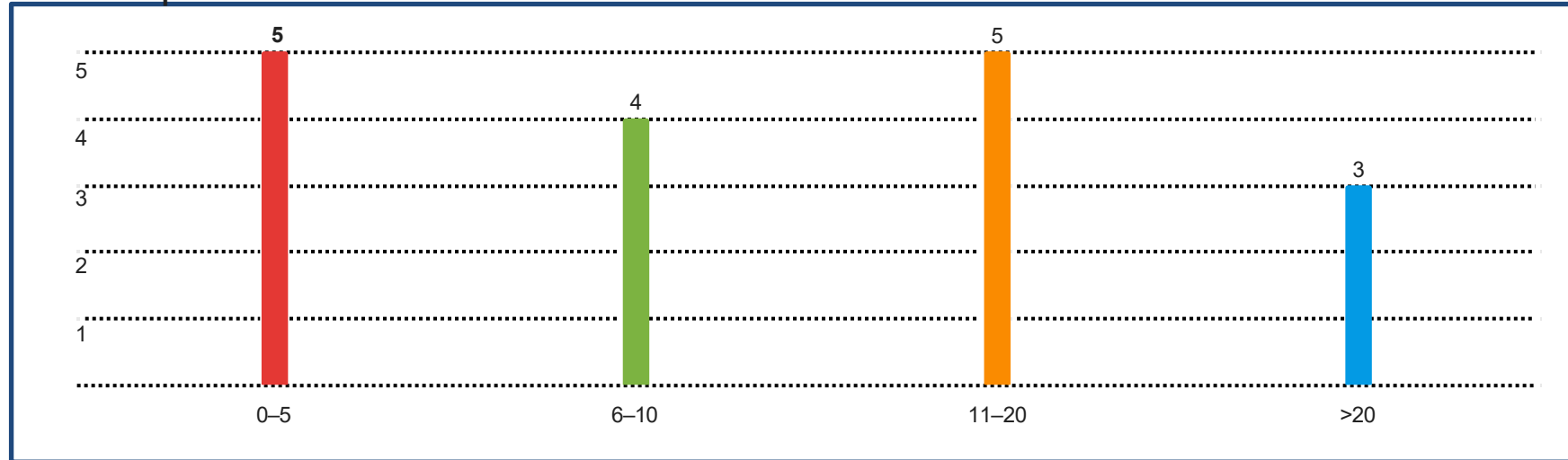
Eyad Abu-Isa, MD
Lana Critchfield, PhD

MROQC Patterns, Barriers, and Opportunities in the Radiation Management of Brain Metastases

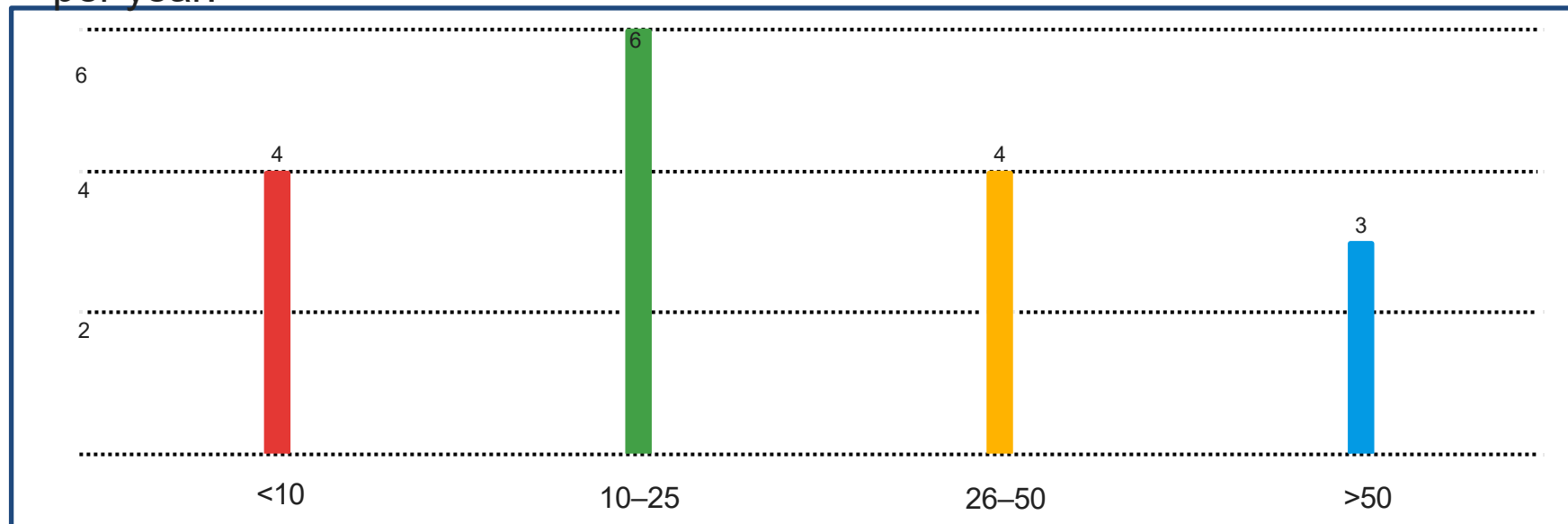
Practice setting:



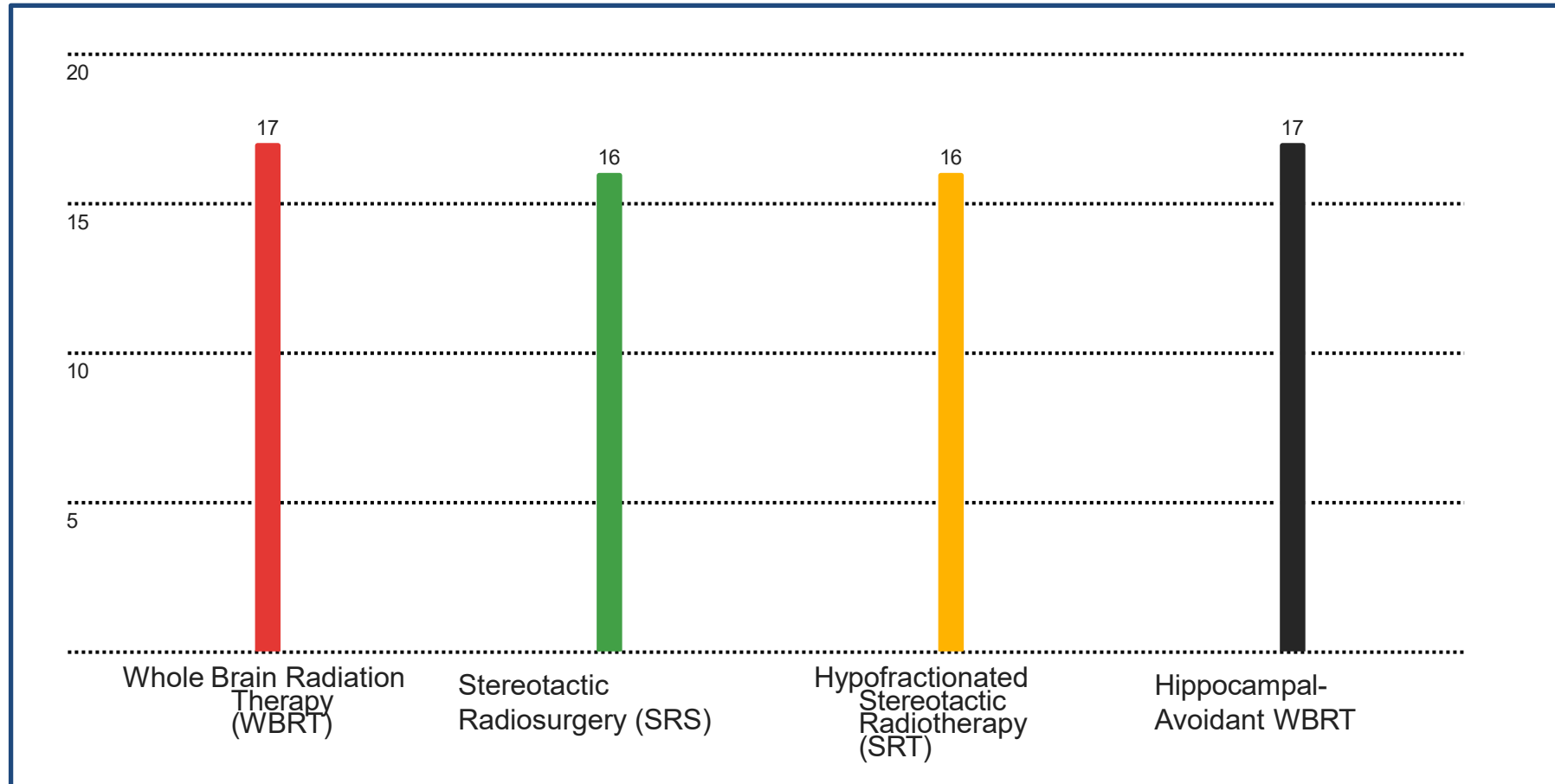
Years in practice:



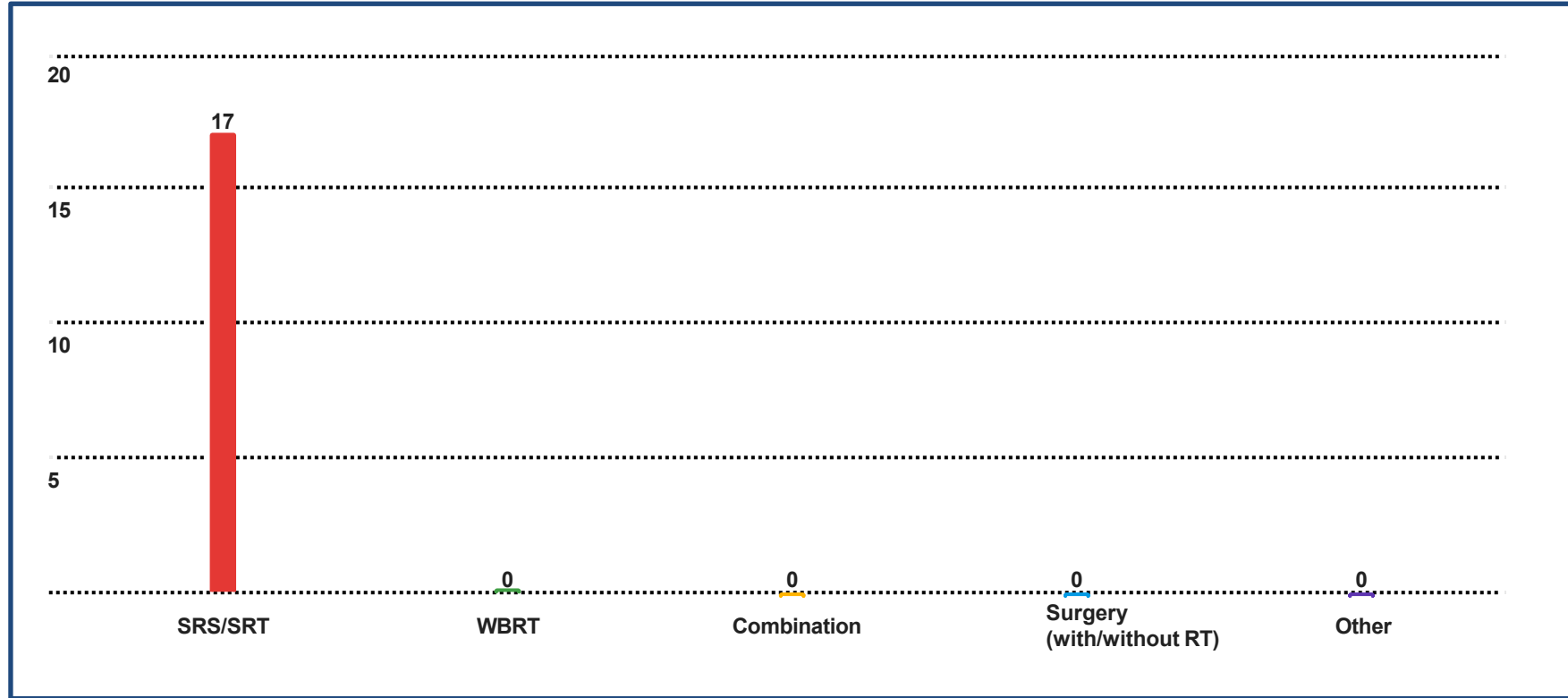
Average number of new brain metastasis radiation patients you personally treat per year:



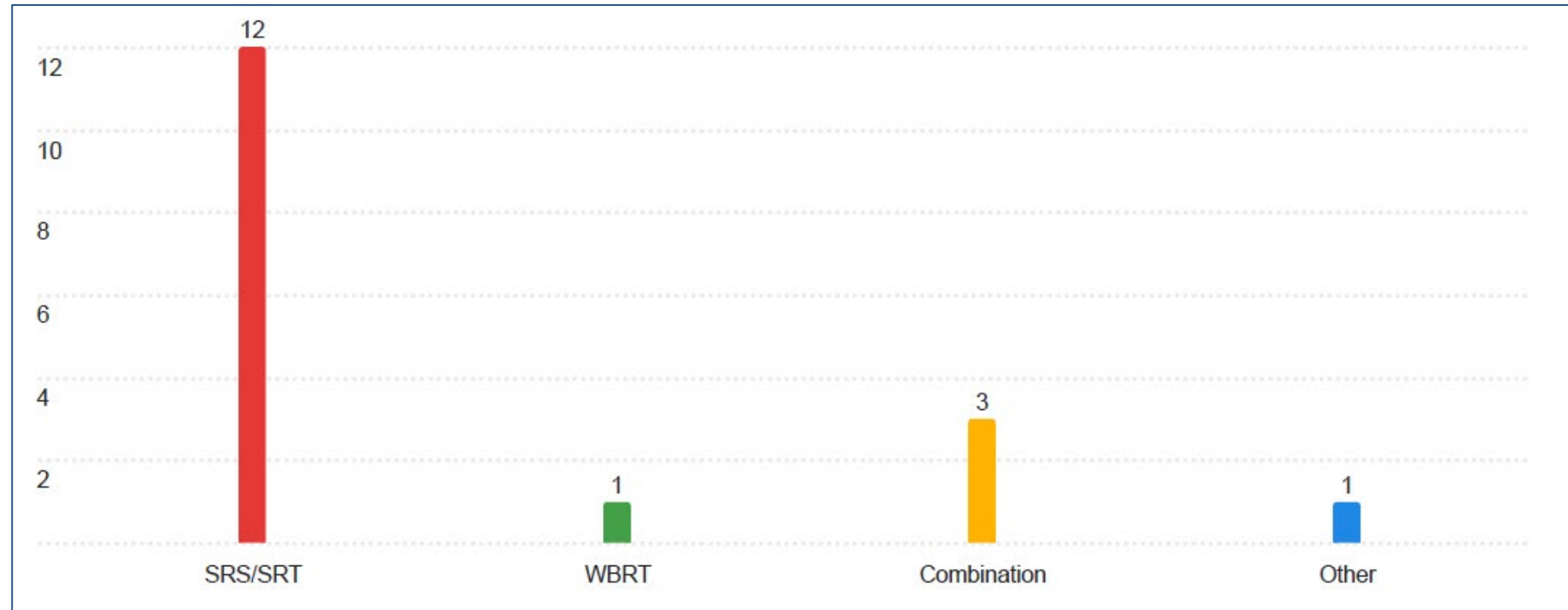
Which modalities are available at your facility? (Select all that apply)



Q What is your *typical* management for: Patients with 1–4 brain metastases:



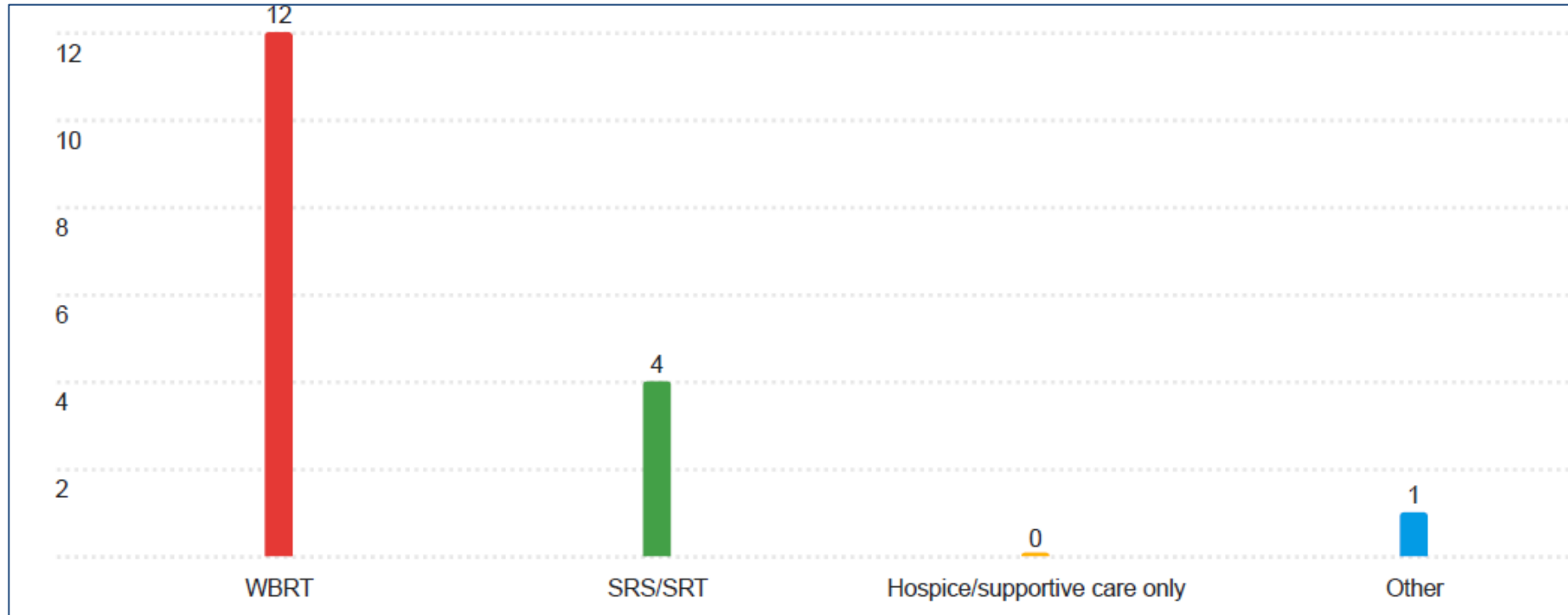
Q What is your *typical* management for: Patients with 5–10 brain metastases:



Other, please specify:

- SBRT; versus whole brain HA

Q What is your *typical* management for: Patients with >10 brain metastases:



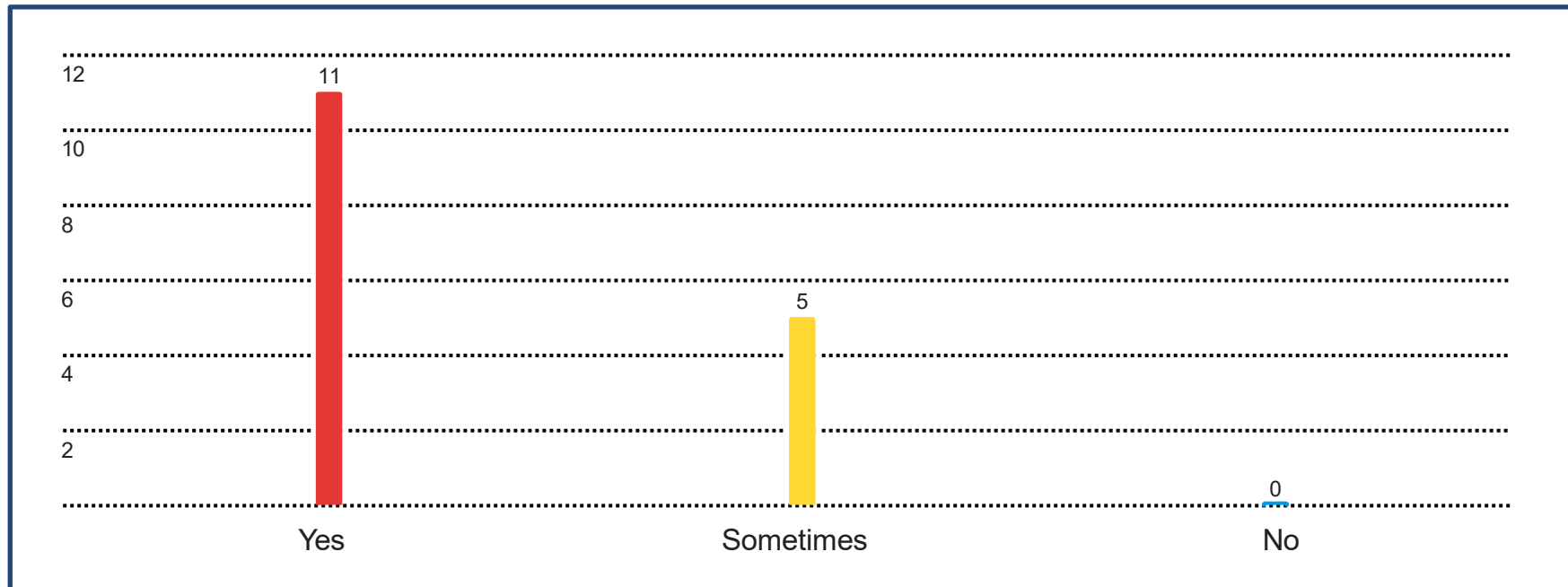
Q Other, please specify:

- Hippocampus ART

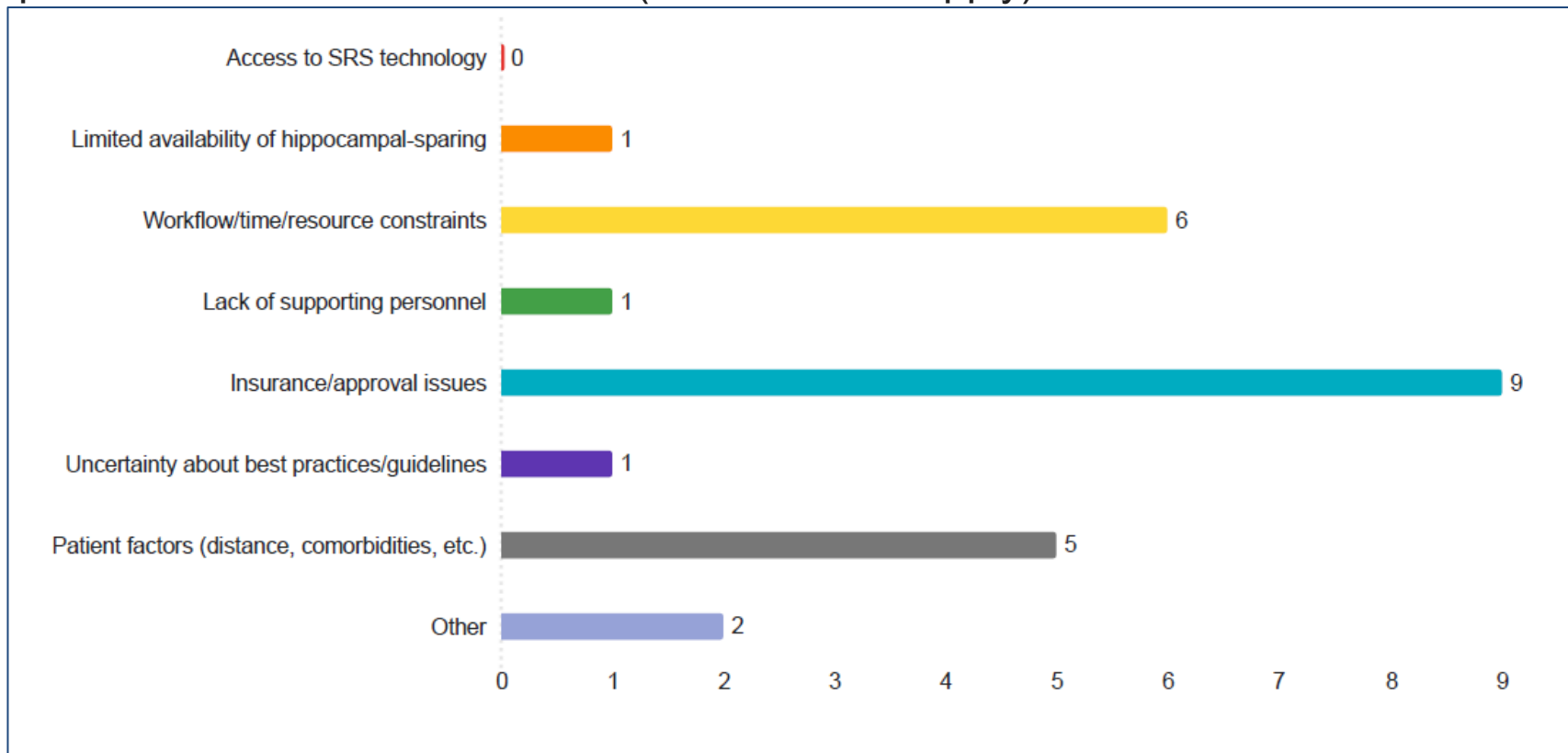
Q Do you routinely offer hippocampal-avoidant WBRT to eligible patients?



Q Do you routinely prescribe memantine for patients receiving WBRT?



Q What are the greatest barriers at your facility to delivering optimal radiation care to patients with brain metastases? (Select all that apply)



Q8 Other - Other, please specify:

- Treating within 2 weeks of most recent MRI (clinic constraints) or delays in obtaining new MRI
- MRI on the same day of SRS

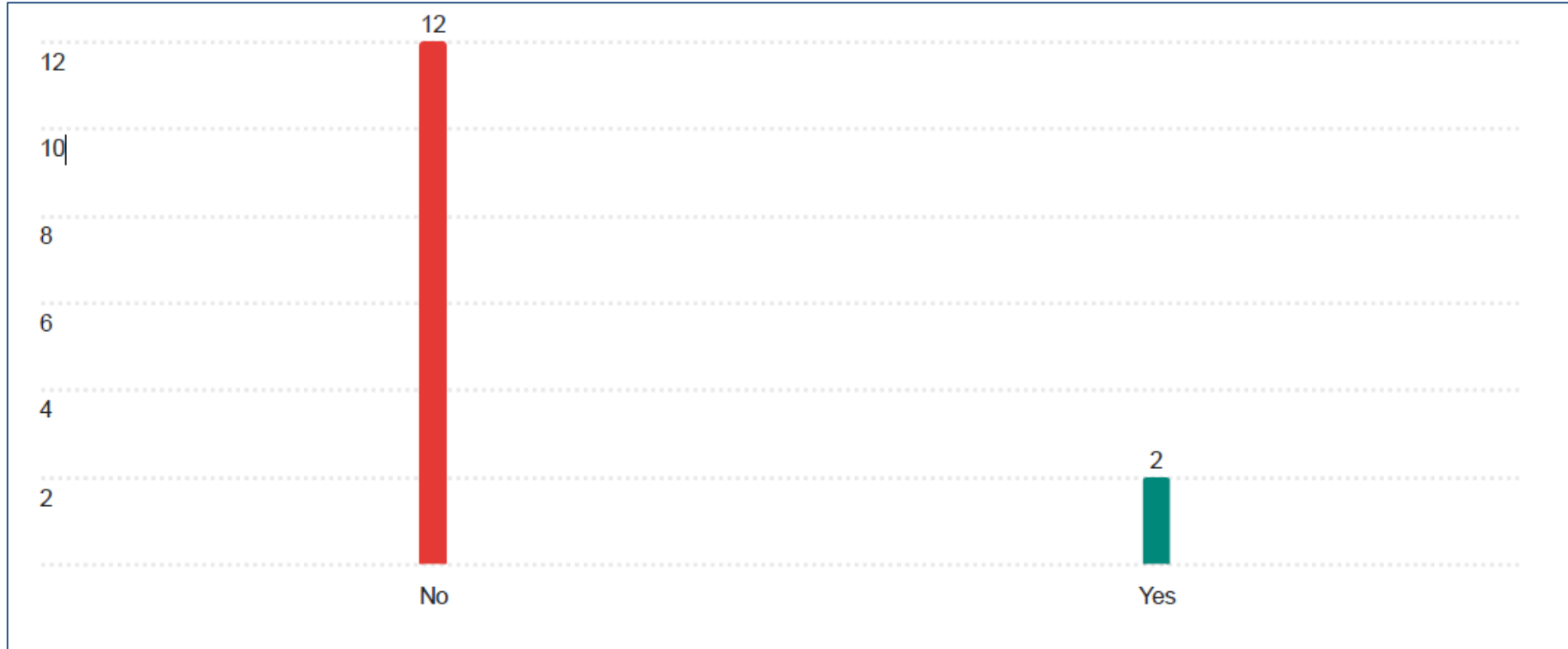
Q Are there practice guidelines you currently follow?



Q Yes (please specify):

- NCCN and ASTRO guidelines
- ASTRO, NCCN. Several brain metastasis papers for contouring postop or definitive.
- NCCN practice guidelines
- ASTRO/SNO brain mets consensus guidelines
- NCCN and other professional society guidelines
- NCCN, IRSS

If yes, do you feel the practice guidelines were difficult to implement at your facility





Describe one change that would allow you to improve the care of patients with brain metastases at your facility:

- Better understanding of when to prescribe memantine and its side effects
- Increased availability and faster scheduling of diagnostic MR imaging and CT simulation, especially expedited MRI access (including same-day MRI for SRS)
- Streamlining and accelerating insurance authorization and review processes, particularly for standard cases
- Clearer clinical guidelines on the maximum number of lesions suitable for specific treatments
- More high-quality randomized studies comparing HA-WBRT plus memantine vs. SRS for patients with more than four brain metastases
- Earlier identification of eligible patients for clinical trials to improve access and equity in trial enrollment

Q Standardizing criteria for SRS vs. WBRT - (1=highest importance, 5=lowest)

Ranking:

Standardizing criteria for SRS vs. WBRT	Increasing use of hippocampal-sparing WBRT	Neurocognitive preservation (e.g., greater use of memantine)	Improving multidisciplinary care/tumor board utilization	Enhancing transitions to supportive/palliative care
1	2	3	4	5

Q Other - MROQC quality improvement focus areas: Other, please specify:

SRS use in 1-4 brain metastasis category

Standardized imaging utilized for SRS planning

Enhancing coordination with medical oncology through multidisciplinary tumor boards and clinics for patients receiving CNS active systemic therapies and radiotherapy. Key areas of unmet need are outlined in this NCI Consensus White Paper: <https://pubmed.ncbi.nlm.nih.gov/37541280/> .

Gap area is also outlined in ASTRO Brain Metastases Guideline we contributed to, specifically KQ1 #7-8, for which there is very little data: [https://www.practicalradonc.org/article/S1879-8500\(22\)00054-6/fulltext](https://www.practicalradonc.org/article/S1879-8500(22)00054-6/fulltext)

Q What MROQC initiative, resource, or educational offering would help you address gaps in brain metastasis care at your facility?

- Guidelines, educational session
- Guidelines in appropriateness of HA whole brain
- Data collection from community practices about implementation of best practice guidelines and understanding patterns of care around coordination with med onc and rad onc and other multi-D providers in rapidly changing landscape of radiation and other therapies. Also, educational initiatives around Importance of multi-D care, awareness of clinical trials, and early detection of brain mets for high risk patients



KEY GAPS IN THE MANAGEMENT OF BRAIN METASTASES

INTEGRATION WITH NEW THERAPIES:



Limited understanding of how radiotherapy is timed and integrated with newer CNS-active systemic therapies (e.g., for HER2+ breast cancer, melanoma, NSCLC).



Need for more data on real-world multidisciplinary coordination, especially in community practice.

ENHANCING MULTIDISCIPLINARY COORDINATION:



Importance of improving collaboration with medical oncology via multidisciplinary tumor boards and clinics for patients receiving both CNS-active therapies and radiotherapy.



Key unmet needs for coordination and integration are outlined in:

NCI Consensus White Paper

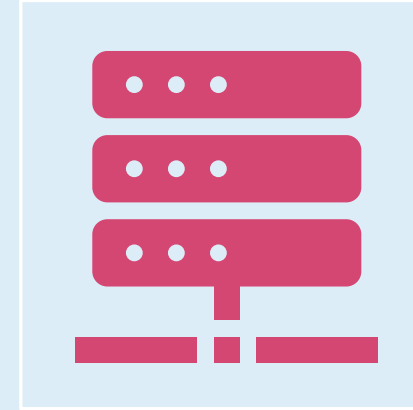
ASTRO Brain Metastases Guideline (KQI #7-8)

These documents highlight significant gaps and outline research questions where little data currently exists.

PRACTICE PATTERNS AND OUTCOMES:

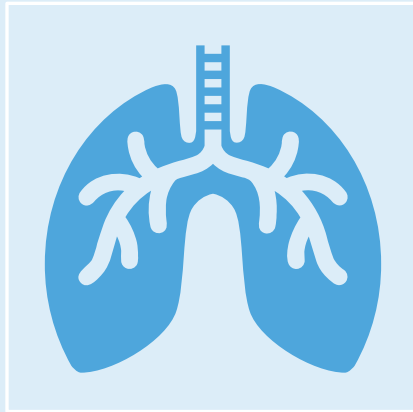


Importance of evaluating current practice patterns and their impact on management and outcomes as new drugs emerge.



No existing multi-site, community-based data registry to capture these patterns and outcomes.

SRS AND WBRT IN SMALL CELL LUNG CANCER:



Increasing community interest in the use of SRS for small cell lung cancer brain metastases, with some new prospective data available.



Potential for further research on how practitioners choose between SRS and WBRT based on the number of lesions (e.g., 1-4, 5-10, >10).

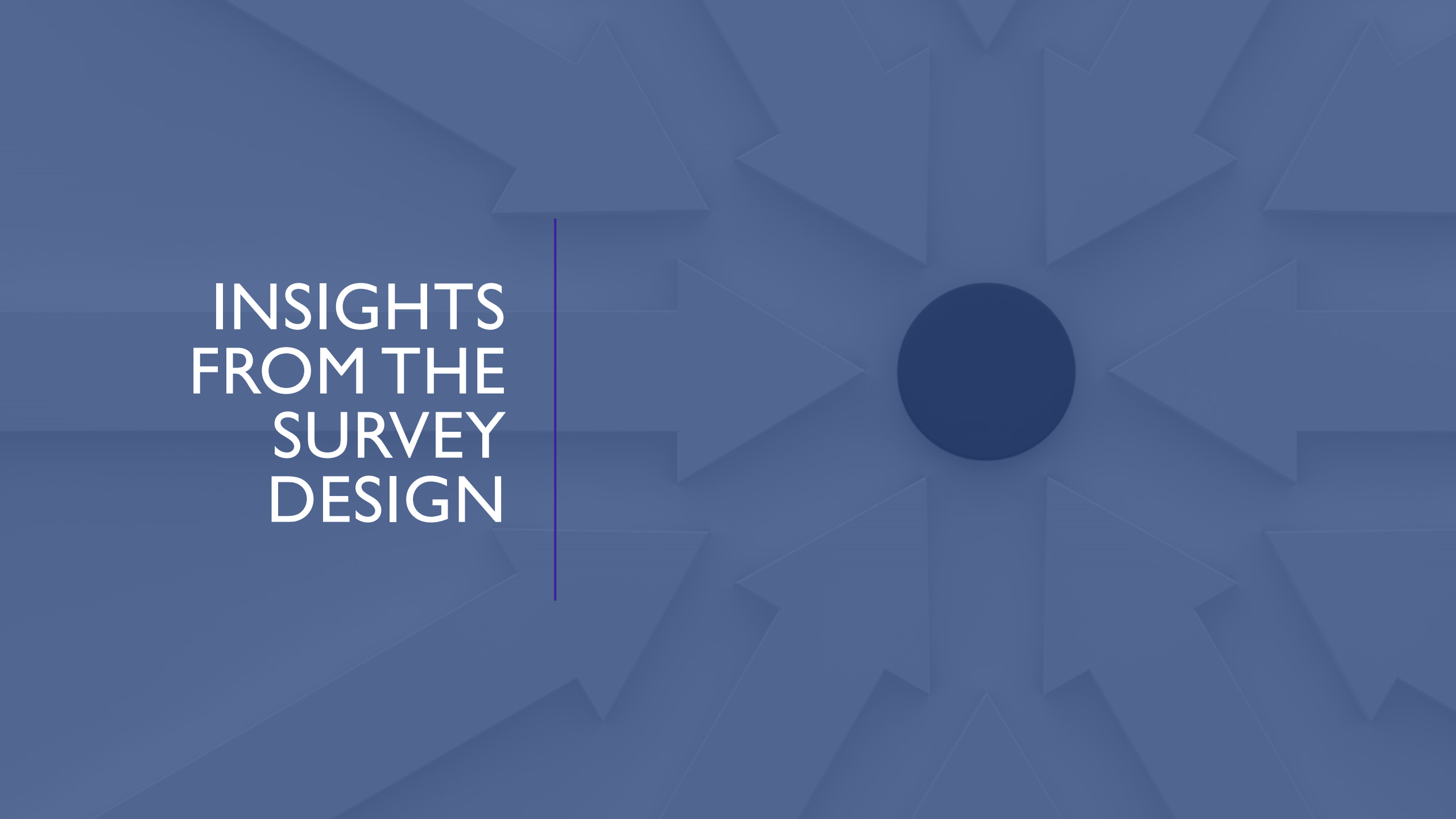
CNS METASTASES AND LEPTOMENINGEAL DISEASE:

New evidence supports comprehensive radiotherapy (e.g., craniospinal irradiation) for select patients with leptomeningeal disease.

Uncertainty about generalizability and adoption of advanced planning and treatment approaches in community settings.

Opportunity to address unmet needs and improve care, including with advanced techniques such as VMAT.

INSIGHTS FROM THE SURVEY DESIGN



The background features a central dark blue circle surrounded by a radial pattern of light blue triangles pointing outwards. A thin vertical line is positioned to the right of the text.

Decision-Making Beyond Lesion Number

- Treatment decisions aren't based solely on the number of brain metastases (1-4); size, edema, and surgical operability are all critical factors.
- These factors may influence decision-making even more than the lesion count.

Technical Considerations

- The age of the MRI used for treatment planning is a crucial consideration for optimal patient care.

BRAIN METS PANEL

Moderator: Bob Dess

Panelists:

Hunter Boggs

Richard Popple

Eyad Abu-Isa

Lana Critchfield

Mike Dominello

Vrinda Narayana



FUTURE DIRECTIONS

Breast Post-Mastectomy Radiation Therapy
(PMRT)



**WHO WANTS
TO BE A**

**ROOC
Star**

Game Instructions and Rules

Define the following roles in your group:

- Buzzer Person
- Answer Presenter
- Phone a Friend (1 MROQC Leadership Representative per team)

1. Be the fastest to buzz in! Buzzer Person, that's you!
2. Display the answer via the answer sheets provided (A, B, C, D). Answer Presenter, that's you!
3. The team with the fastest buzzer and correct answer collect the points!

The team with the MOST points, WINS!



WARM UP

WHO WANTS
TO BE A

ROOC
Star

WARM UP

What is the title of Taylor Swift's new Album?

A: The Life of a Girl

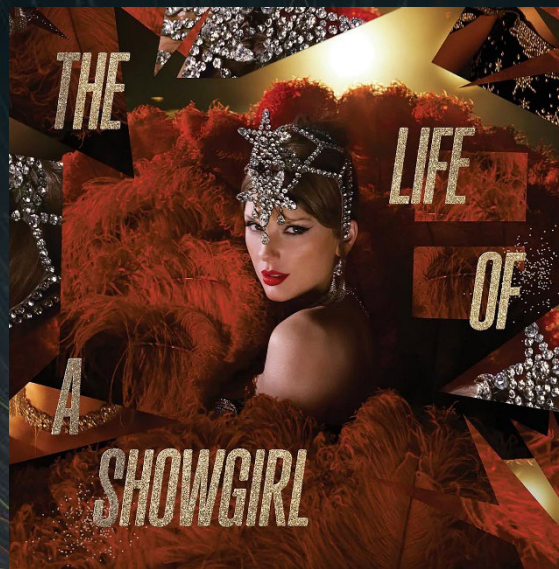
B: The Life of a Physicist

C: The Life of a Showgirl

D: The Life of Taylor

WHO WANTS
TO BE A

ROOC
Star



WARM UP

What is the title of Taylor Swift's new Album?

A: The Life of a Girl

B: The Life of a Physicist

C: The Life of a Showgirl

D: The Life of Taylor

**WHO WANTS
TO BE A**

**ROOC
Star**

WHO WANTS
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BOOC
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10 POINTS

How many times are P5 follow-up forms completed after treatment?

A: Once only

B: 2 times

C: 3 times

D: 4 times

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Which of these is **NOT** a Gold Card measure?

A: Breast Prone Measure

B: Bone Mets Physics
Consult

C: Lung Paddick CI

D: Prostate ADT
Recommendation

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10 POINTS

MROQC's Highest enrolling Facility in 2025 is...

A: Munson Medical
Center

B: Michigan Medicine
(Ann Arbor)

C: West Michigan Cancer
Center

D: MHP

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10 POINTS

Which of these is **NOT** a valid exclusion reason for the prostate MRI Measure?

A: Patient Declined

B: Physician Preference

C: Implanted Medical
Device

D: Post-Op Patient

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10 POINTS

Which of the following is **NOT** a clinical metric for P4P...

A: Clinical audit accuracy
of 100%

B: $\geq 60\%$ submission of
P6, 24month form

C: $\geq 75\%$ submission of
L11, 1 year form

D: $\geq 90\%$ submission of baseline,
on-treatment, and end-of-
treatment clinical forms

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10 POINTS

If your facility scored $>99\%$ on this year's physics data audit, will you have an audit next year?

A Yes, all facilities will be audited

B: No, you have earned an audit exemption

C: It depends. If you were exempt this year, you will have an audit next year

D: Next year YOU are the auditor

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10 POINTS

What platform is used for MROQC's new, highly-customizable reports?

A: Business Objects

B: Javascript

C: Tableau

D: Power BI

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10 POINTS

MROQC facilities are consistently delivering high-quality care and meeting performance goals. How many quality measures are going into maintenance next year as a result?

A: 0

B: 1

C: 2

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10 POINTS

Where could you find MROQC at this year's ASTRO national meeting?

A: Presenting in 3 poster sessions

B: Hosting an in-depth education session

C: In posts on LinkedIn and Bluesky

D: All of the above

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10 POINTS

Which of the following is **NOT** a core benefit of MROQC participation?

A: Benchmarking performance against statewide peers

B: Access to data for quality improvement initiatives

C: Opportunities to share best practices across sites

D: Guaranteed funding for new radiation equipment

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BONUS ROUND

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10 POINTS

True or False: MROQC stands for Michigan Radiologists
Optimizing Quick Care

A: TRUE

B: FALSE

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10 POINTS

True or False: MROQC stands for Michigan Radiologists
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BONUS QUESTION

15 POINTS

Which is **NOT** a common method for gathering feedback in radiation oncology?

A: Anonymous suggestion box

B: Patient satisfaction surveys

C: Interpretive dance by the dosimetry team

D: Focus groups

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BONUS QUESTION

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BONUS QUESTION

15 POINTS

If your team says “Let’s run a PDSA cycle,” what should you probably **NOT** do next?

A: Plan

B: Do

C: Adjust

D: Panic

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BONUS QUESTION

15 POINTS

Approximately what percentage of bone mets patients enrolled in MROQC receive type 1 and type 2 re-irradiation?

A: 10% Type 1, 10% Type 2

B: 5% Type 1, 5% Type 2

C: 5% Type 1, 10% Type 2

D: 10% Type 1, 5% Type 2

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BONUS QUESTION

15 POINTS

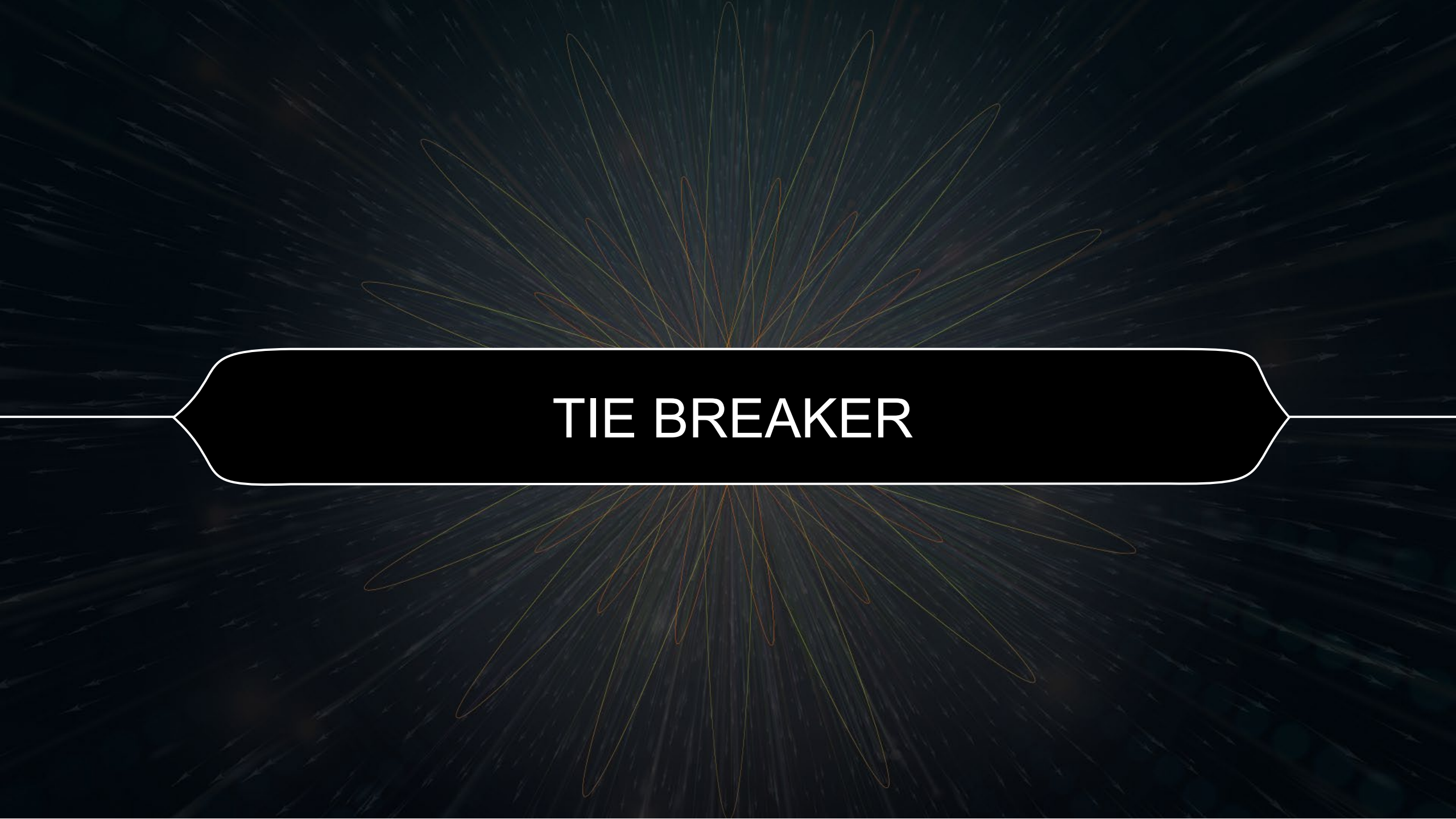
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TIE BREAKER

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TIE BREAKER

20 POINTS

If you are requesting data for a publication with a submission deadline, we recommend submitting your data request at least:

A: 2 months before your deadline

B: 3 months before your deadline

C: 4 months before your deadline

D: 1.5 months before your deadline

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TIE BREAKER

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TIE BREAKER

20 POINTS

Which form is **NOT** a Physician Form:

A: B7

B: L3

C: M4

D: P3

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TIE BREAKER

20 POINTS

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BEST PRACTICES FOR A NEW PERFORMANCE YEAR

Let's share what's worked well across facilities-
how you're setting up teams, streamlining
workflows, and engaging staff to start strong!





CLOSE

October 10, 2025



**THANK
YOU!**

**THANK YOU
FOR
ATTENDING
TODAY'S
MEETING!**



SPECIAL THANKS!



REMINDER FOR PHYSICIST CAMPEP CREDIT



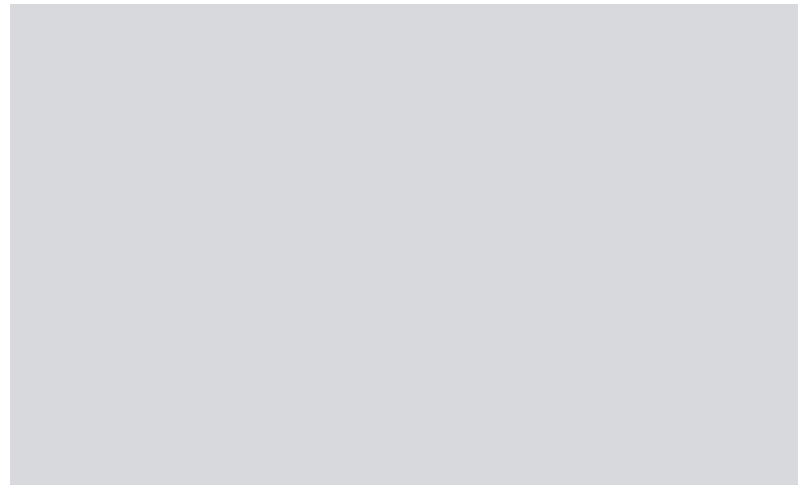
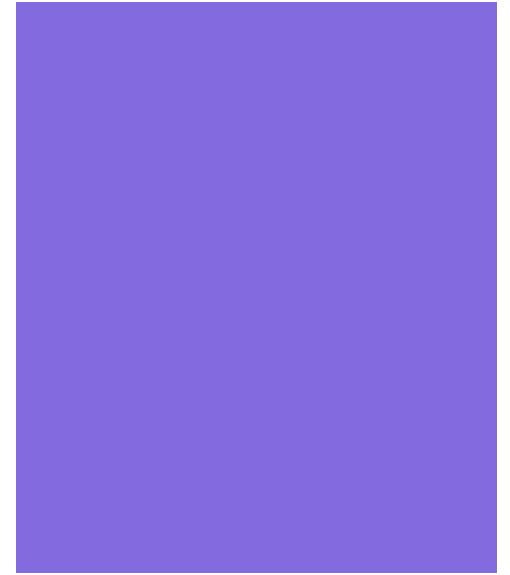
If you plan to claim CAMPEP credit, please be sure to submit the Program Evaluation and Speaker Evaluation before leaving today's meeting.



Documentation must be submitted **today** to receive credit.

POST-MEETING SURVEY

Please take the
MROQC Post-
Meeting
Feedback
Survey



PLEASE RETURN
YOUR BADGE
AS YOU EXIT
THE MEETING

Lori Pierce
MROQC Coordinating Center



FEBRUARY 13TH, 2026
COLLABORATIVE-WIDE MEETING

Join us via Zoom webinar for
the 1st collaborative-wide
meeting of 2026



THANK YOU!!!

MROQC ROQCstars:

- Patients
- Clinical Champions
- Facility Administrators
- Physicists & Dosimetrists
- Clinical Data Abstractors
- Participating Physicians
- Coordinating Center

Blue Cross
Blue Shield of
Michigan Value
Partnerships
Program

For more information: www.mroqc.org

Contact us: support@mroqc.org