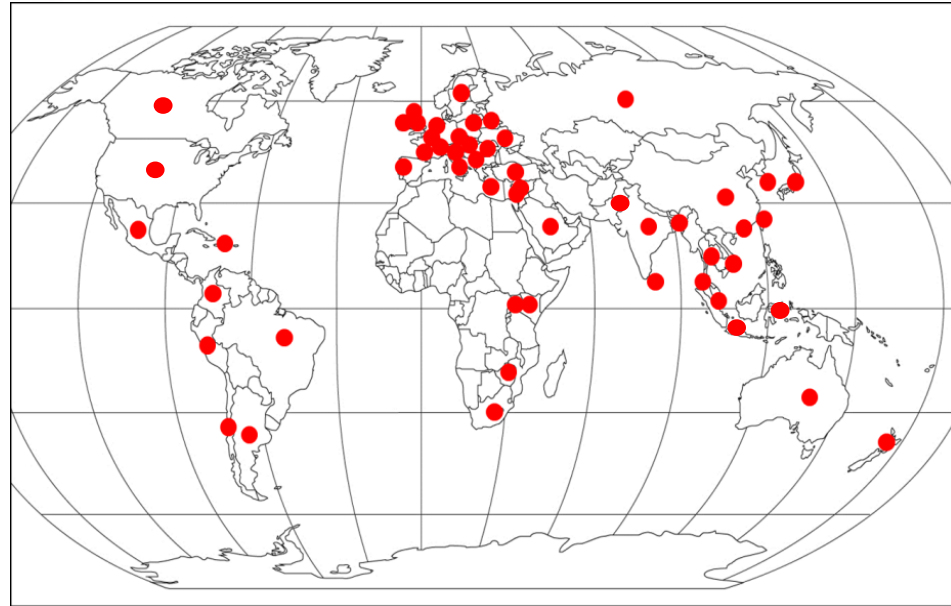


IROC Houston QA Center end-to-end QA phantom program key findings over the past 15 years



Extent of Activities

- **1,837** RT facilities participate in NCTN and monitored by IROC Houston
- **329** other sites (primarily international also audited)
- **56** countries monitoring a total of **2166** sites
- Largest QA audit program
- Shipping >700 phantoms/yr



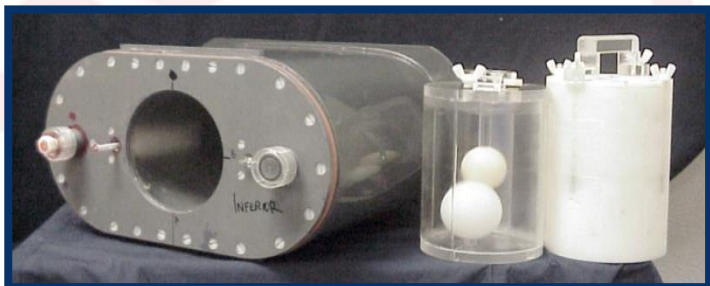
Imaging, Planning and Delivery - QA required at each step

Black Box

**Thus the need for an end-to-end
QA audit tool to verify the
intended treatment goal.**

**Deliver the correct dose
to correct location
as planned**

Phantom Family



2 prostate phantoms



33 lung phantoms



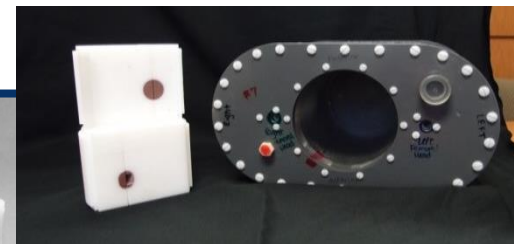
**24 H&N
phantoms**



**8 Spine
phantoms**



19 SRS phantoms

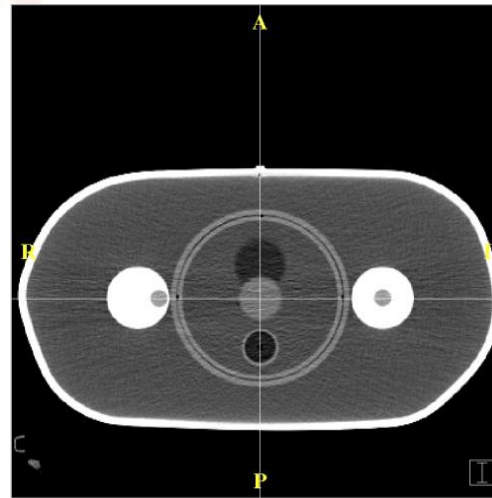


10 liver inserts

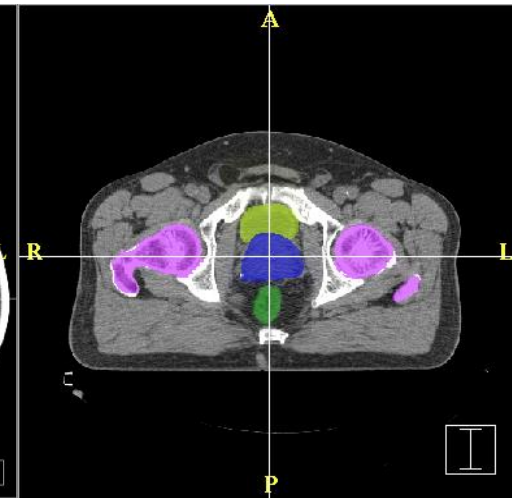
Benefits of IROC-H Phantoms

- Anthropomorphic shape with targets and OARs
- Independent “end to end” audit
 - Imaging
 - Planning/dose calculation
 - Setup
 - delivery
- Uniform phantoms and dosimeters
- Standardized analysis
- Uniform pass/fail criteria
- Allows inst. to inst. comparison
- Established infrastructure

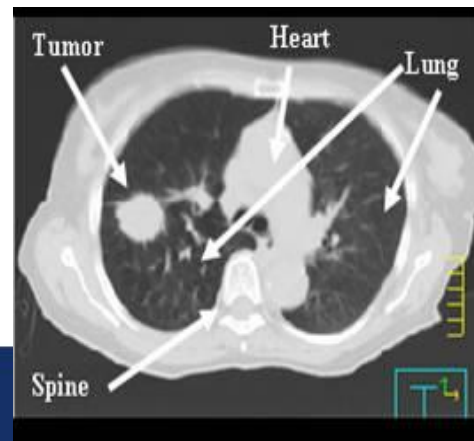
Phantom



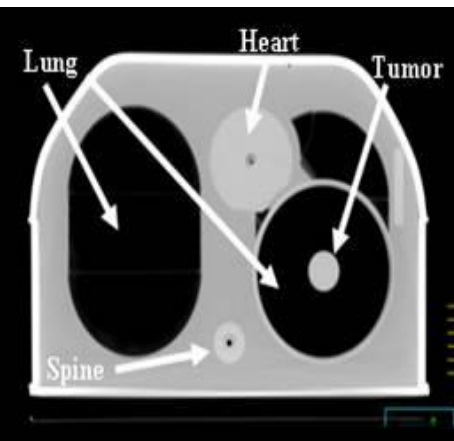
Patient



Patient



Phantom



Photon Phantom Results

Comparison between institution's plan and delivered dose.

Phantom	H&N	Liver insert	Lung	Prostate	Spine
Irradiations	2052	165	1109	566	336
Pass	1755 (86%)	120 (73%)	921 (83%)	484 (86%)	261 (78%)
Fail	297	45	188	82	75
Criteria	7%/4mm	7%/4mm	5%/5mm	7%/4mm	5%/3mm

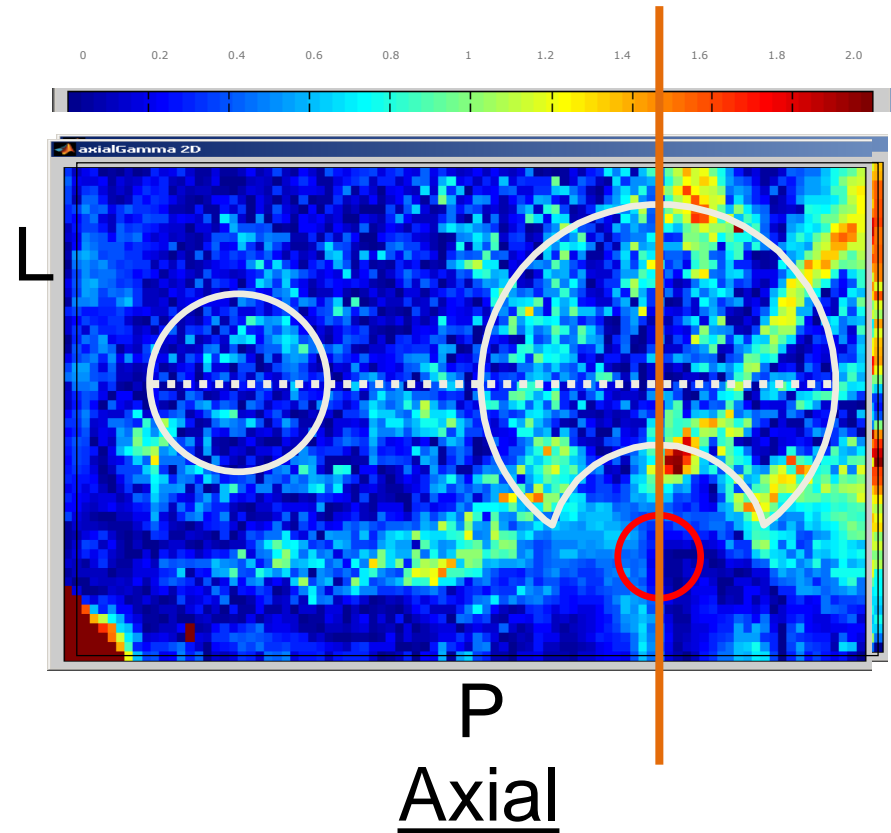
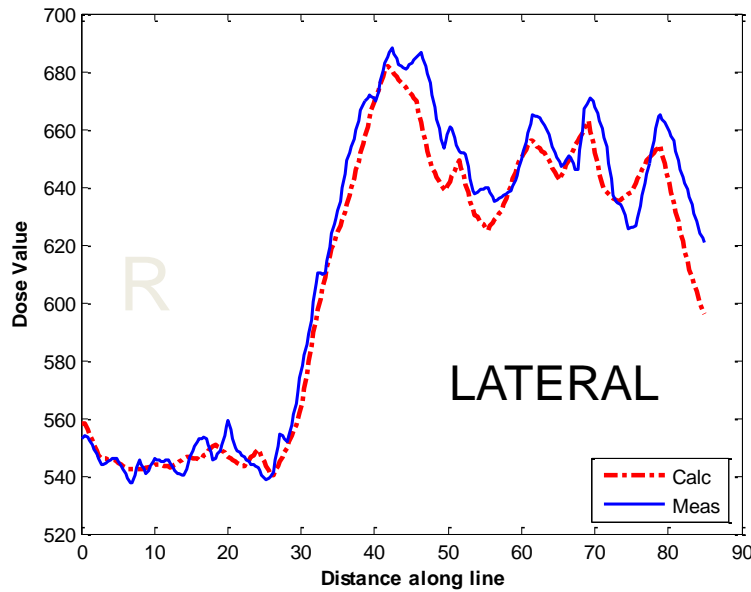


Problems that have been detected

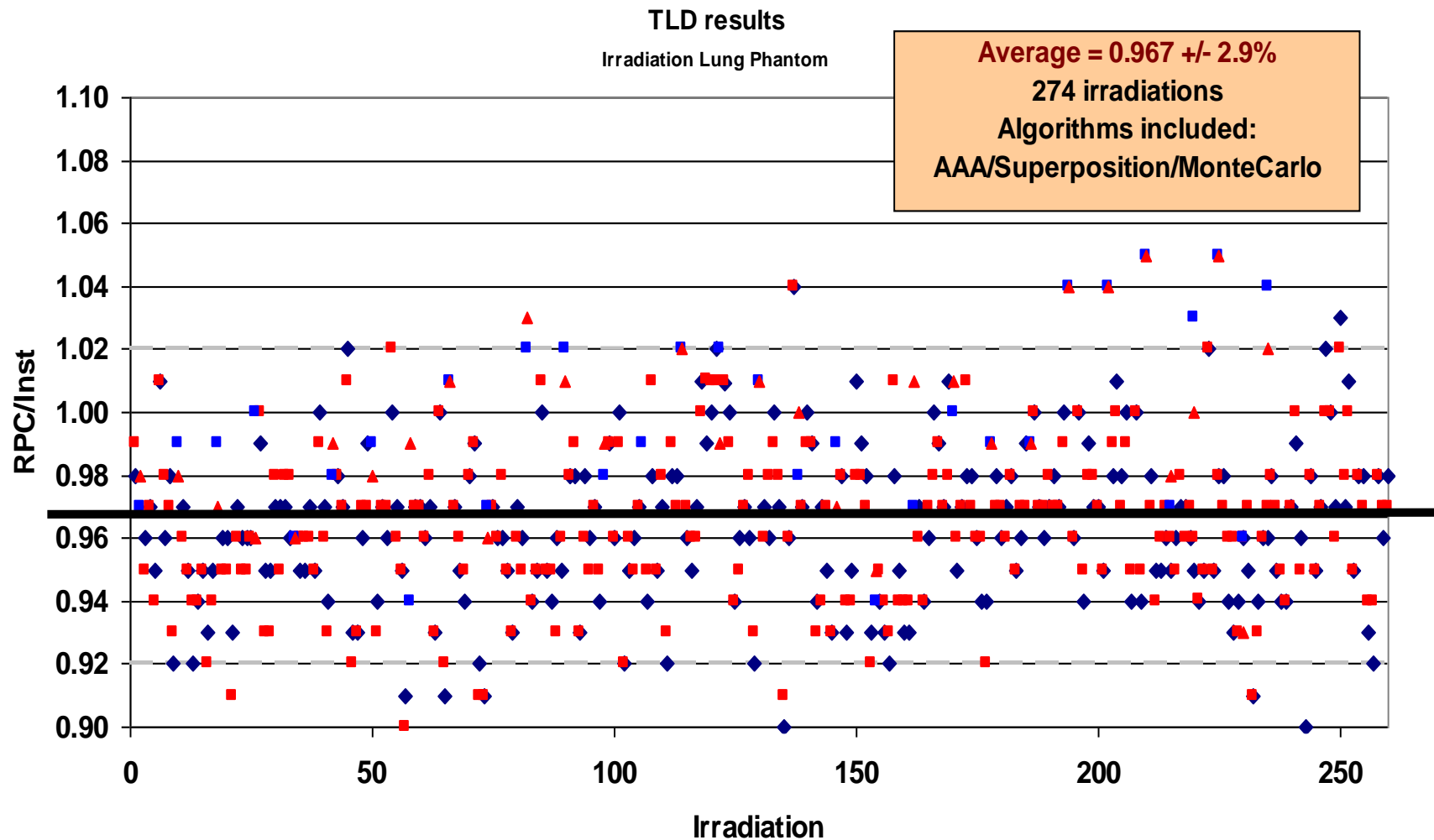
Varian 6 MV IMRT H&N

Measurement vs. Monte Carlo

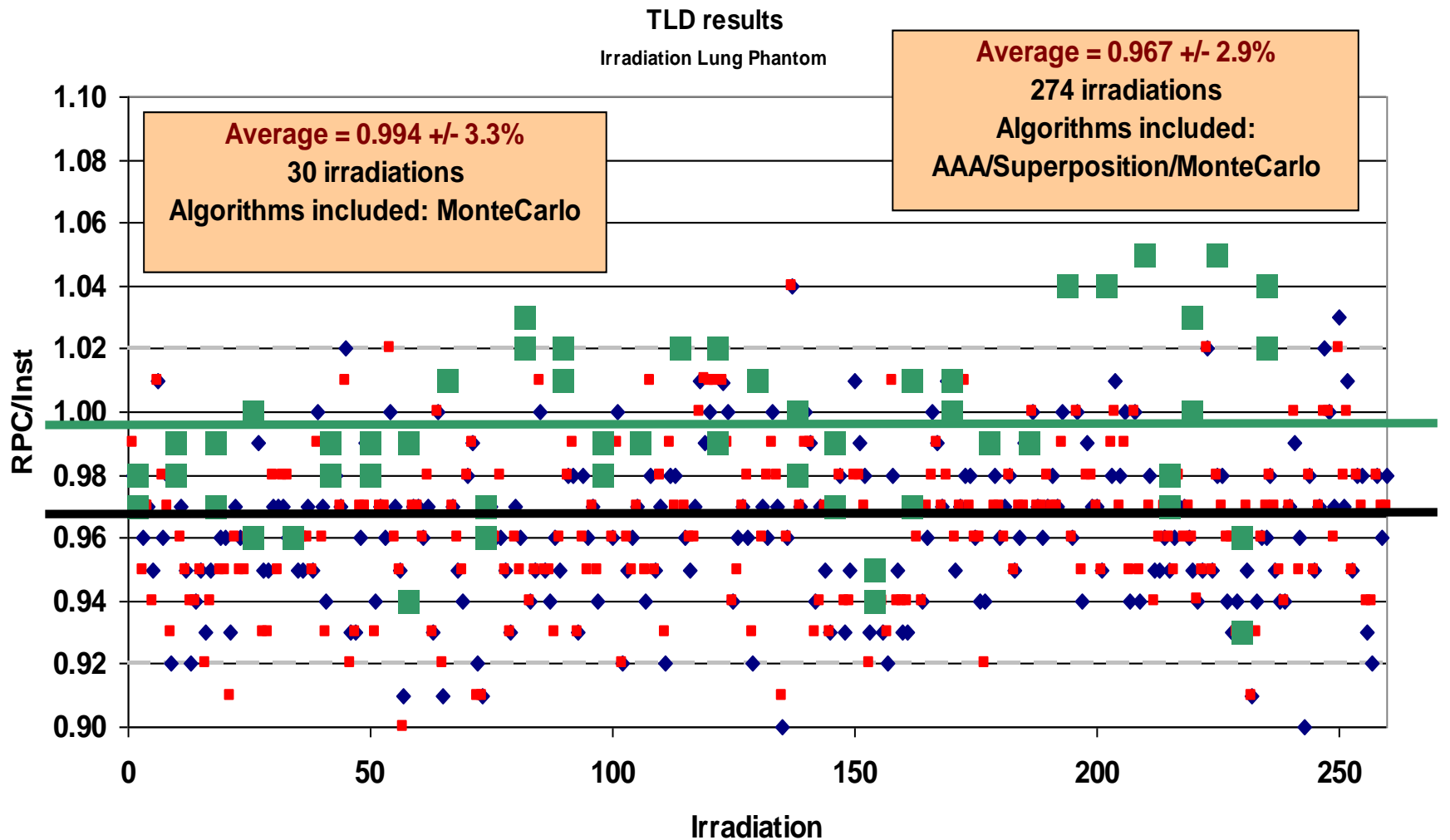
Criteria: 3%/2 mm



Lung Phantom TLD results

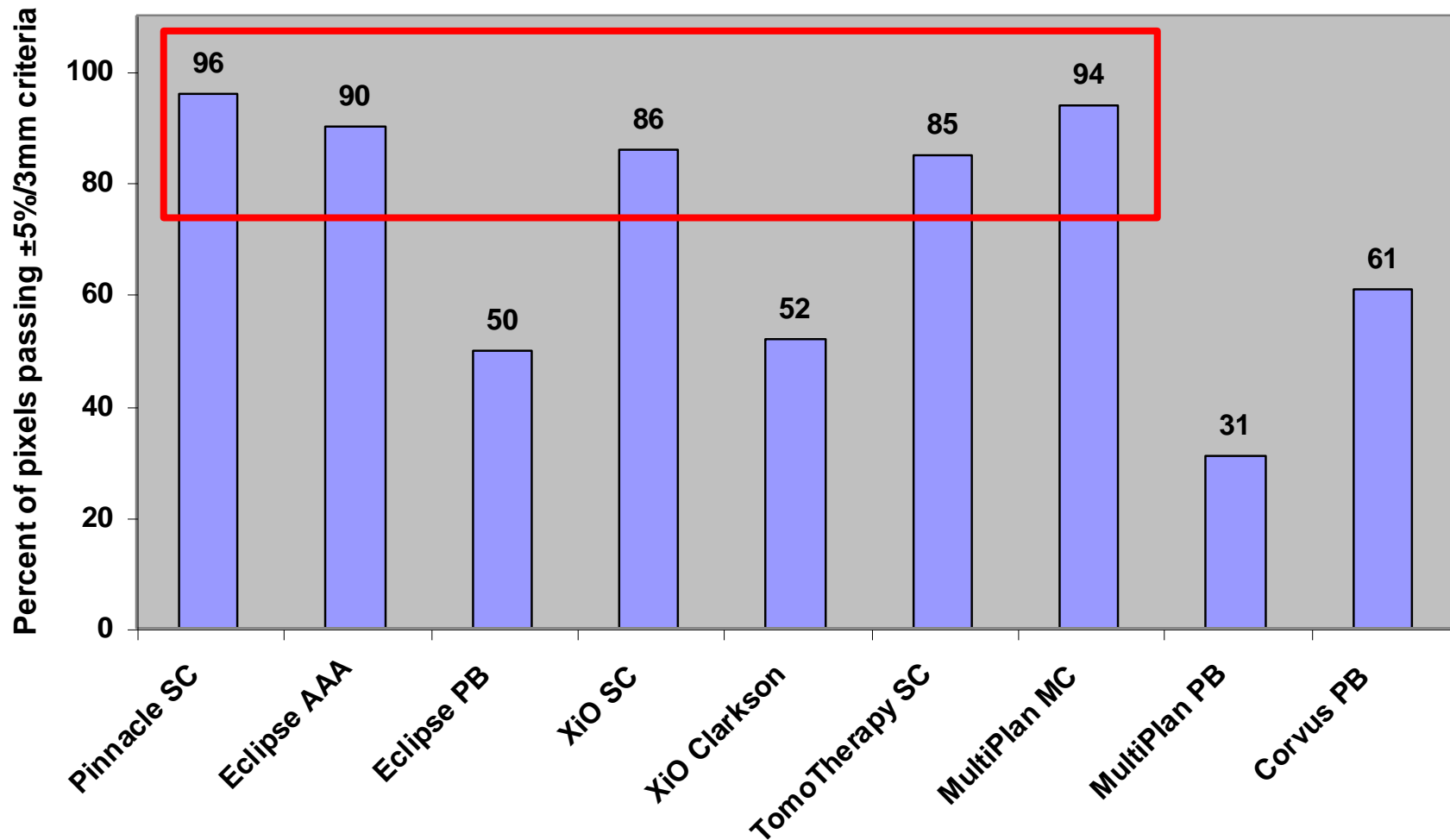


Lung Phantom TLD results



Lung Phantom Results

Percent of pixels passing $\pm 5\%/3\text{mm}$ gamma criteria

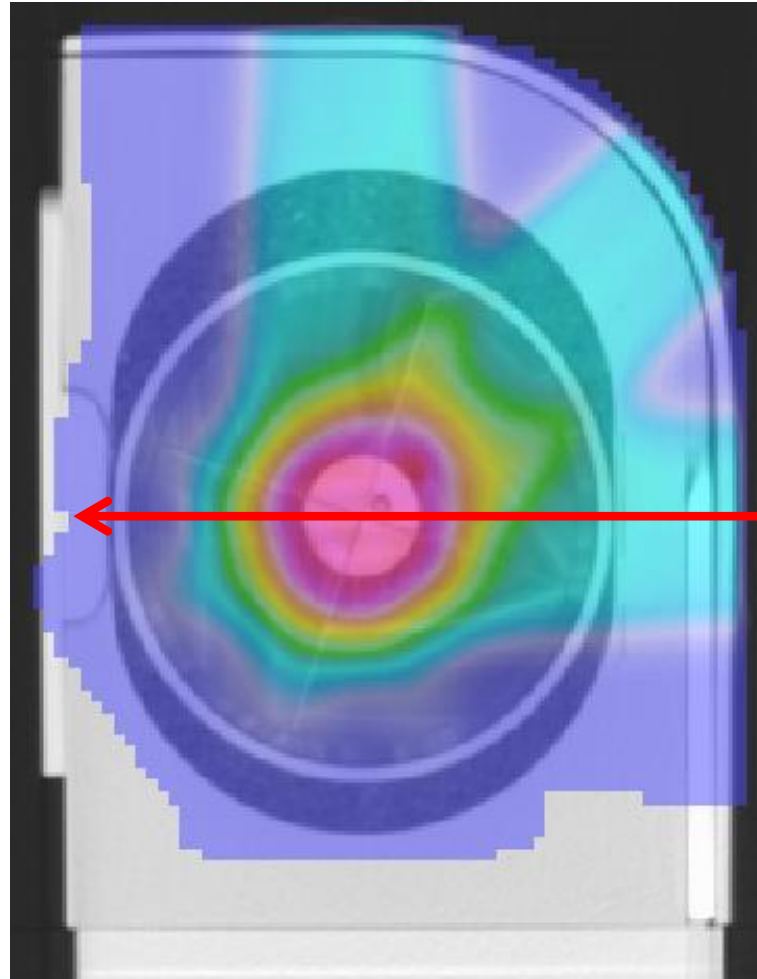


Proton Phantom Audits

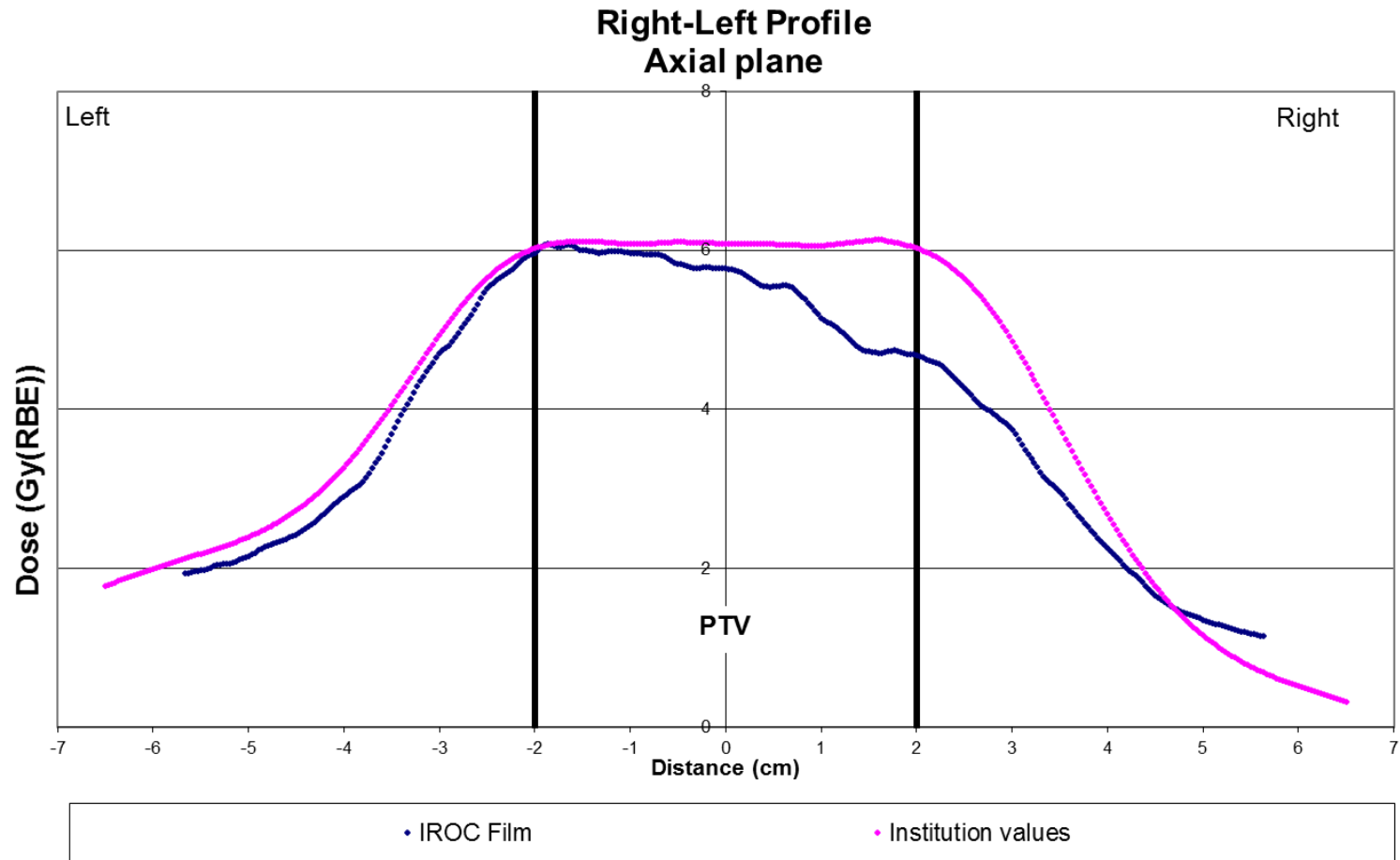
- 136 proton phantoms irradiated, analyzed

	Brain	Liver	Lung	Prostate	Spine	TOTAL
Total Irradiations	25	14	38	38	21	136
# Passed	24	7	24	30	17	102
Pass Rate [%]	96%	50%	63%	79%	81%	75%

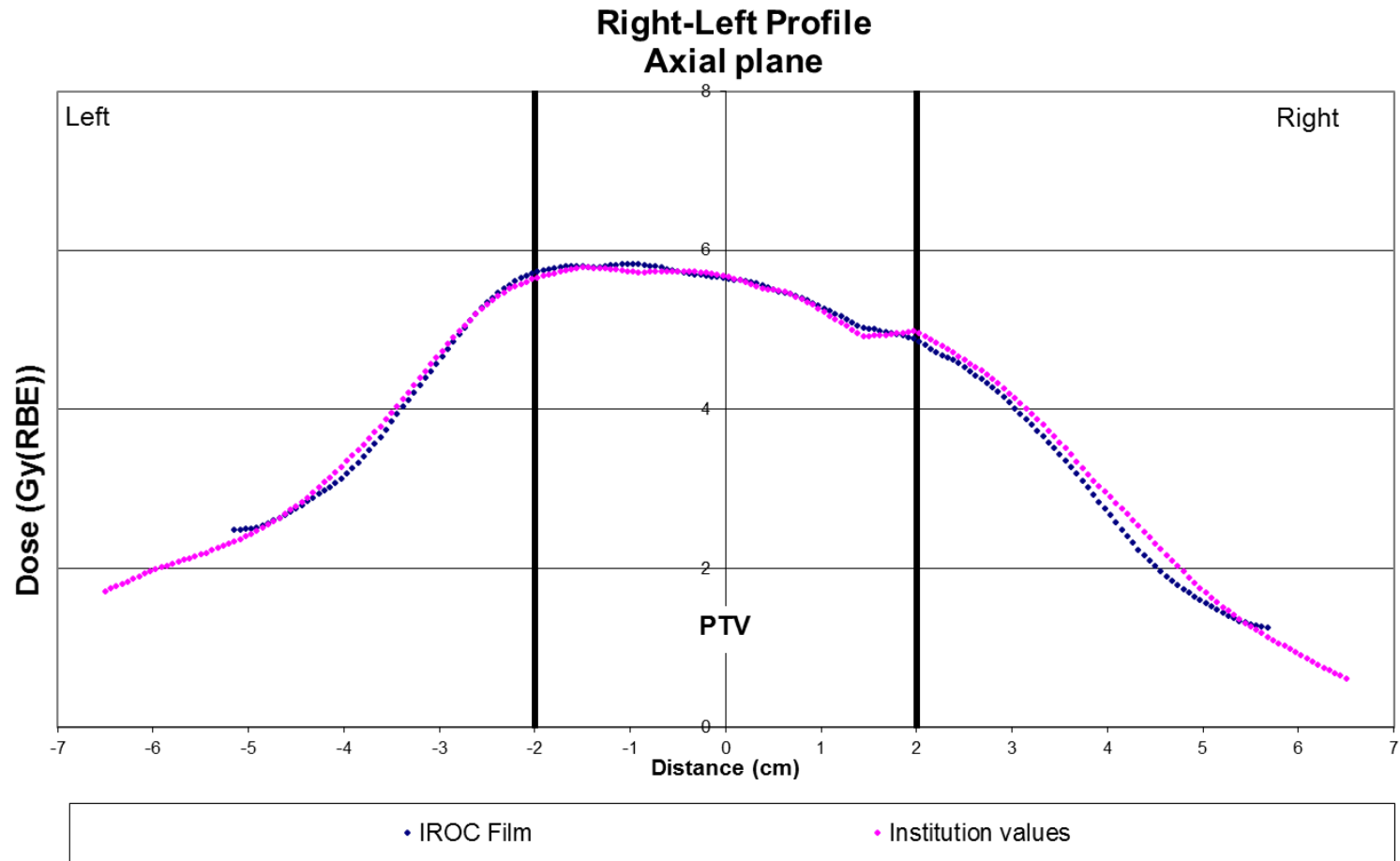
Lung Phantom Results



Lung Phantom Results



Lung Phantom Results



Summary

- Introduction of new technologies present challenges that need to be verified prior to treating patients
- End-to-end QA phantoms detect errors, improve dose delivery accuracy and provide confidence
- Improved compliance with protocol prescription specifications and reduced deviation rate

Questions?

