



RPC

Radiological Physics Center

Excellence through Quality Assurance

RPC REPORT



David Followill,
Geoffrey Ibbott
January 17, 2008

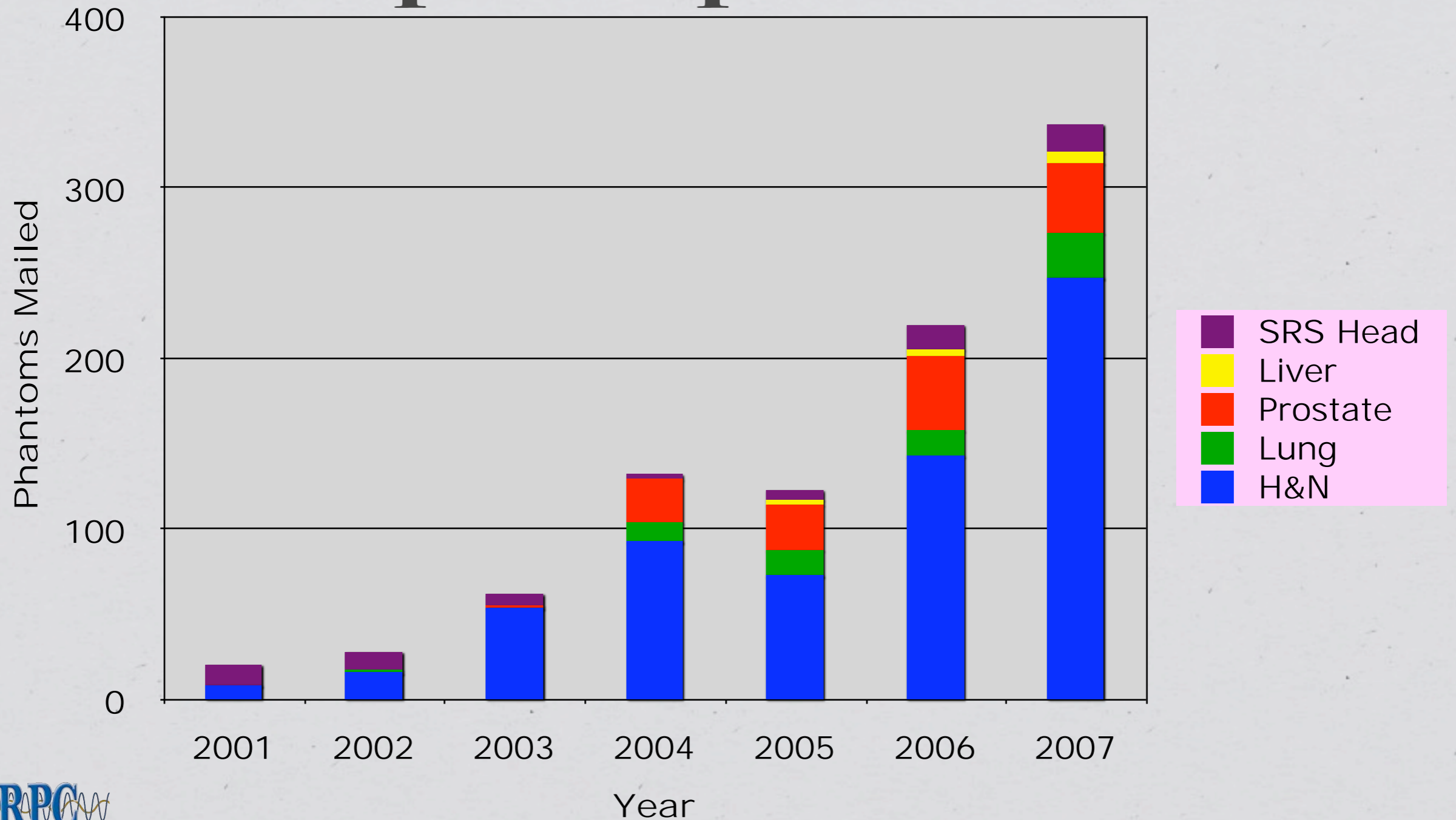


ATC-Related Projects

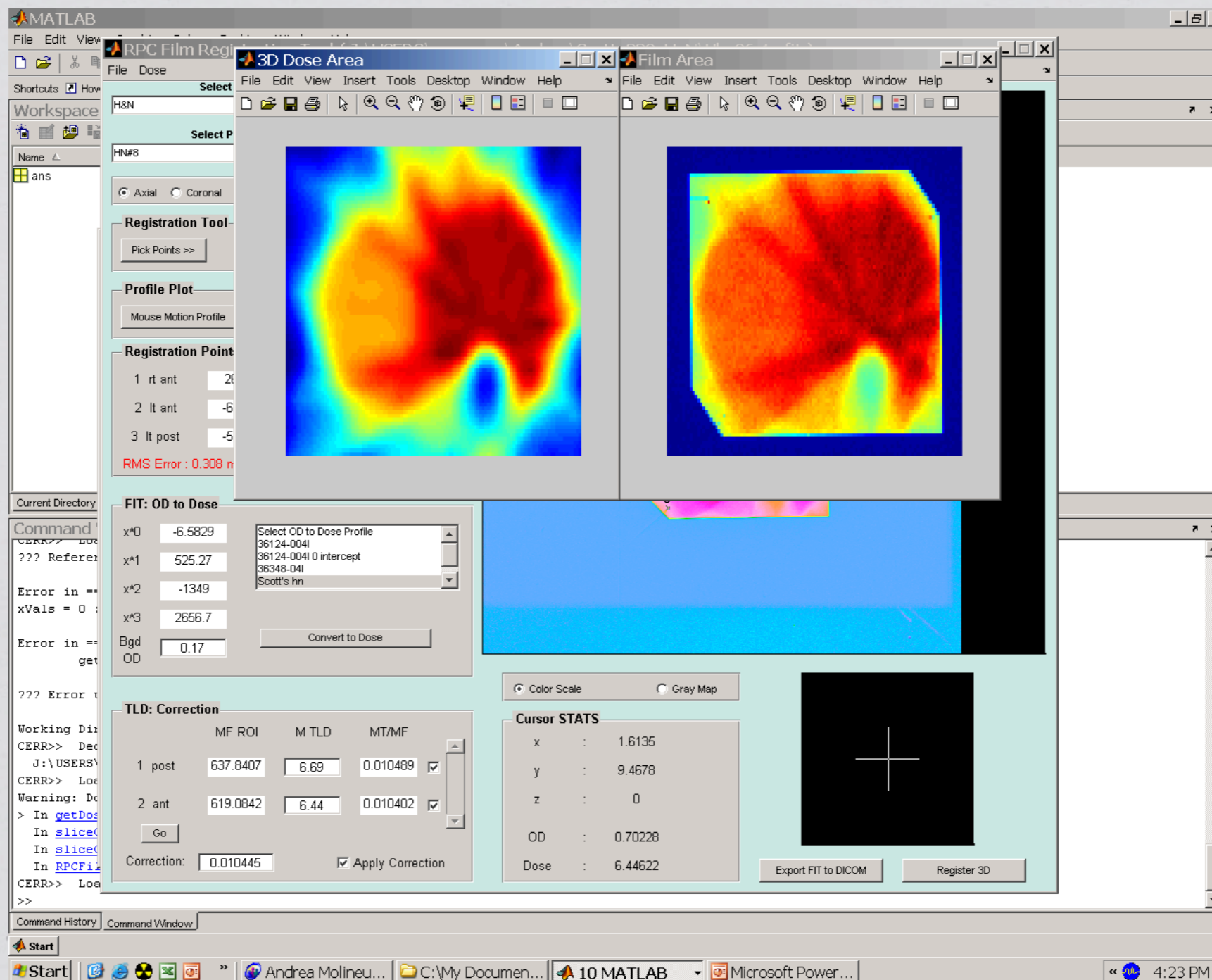
- * Credentialing with anthropomorphic phantoms
 - * Some phantom shipping costs supported with ATC funds
- * Evaluation of phantom measurements
 - * Subcontract with Joe Deasy supported with ATC funds
- * Development of Monte Carlo calculation capability
 - * Subcontract with Joe Deasy supported with ATC funds
- * Monitoring of Proton Therapy centers
 - * To be supported by ATC carryover, new NCI funds



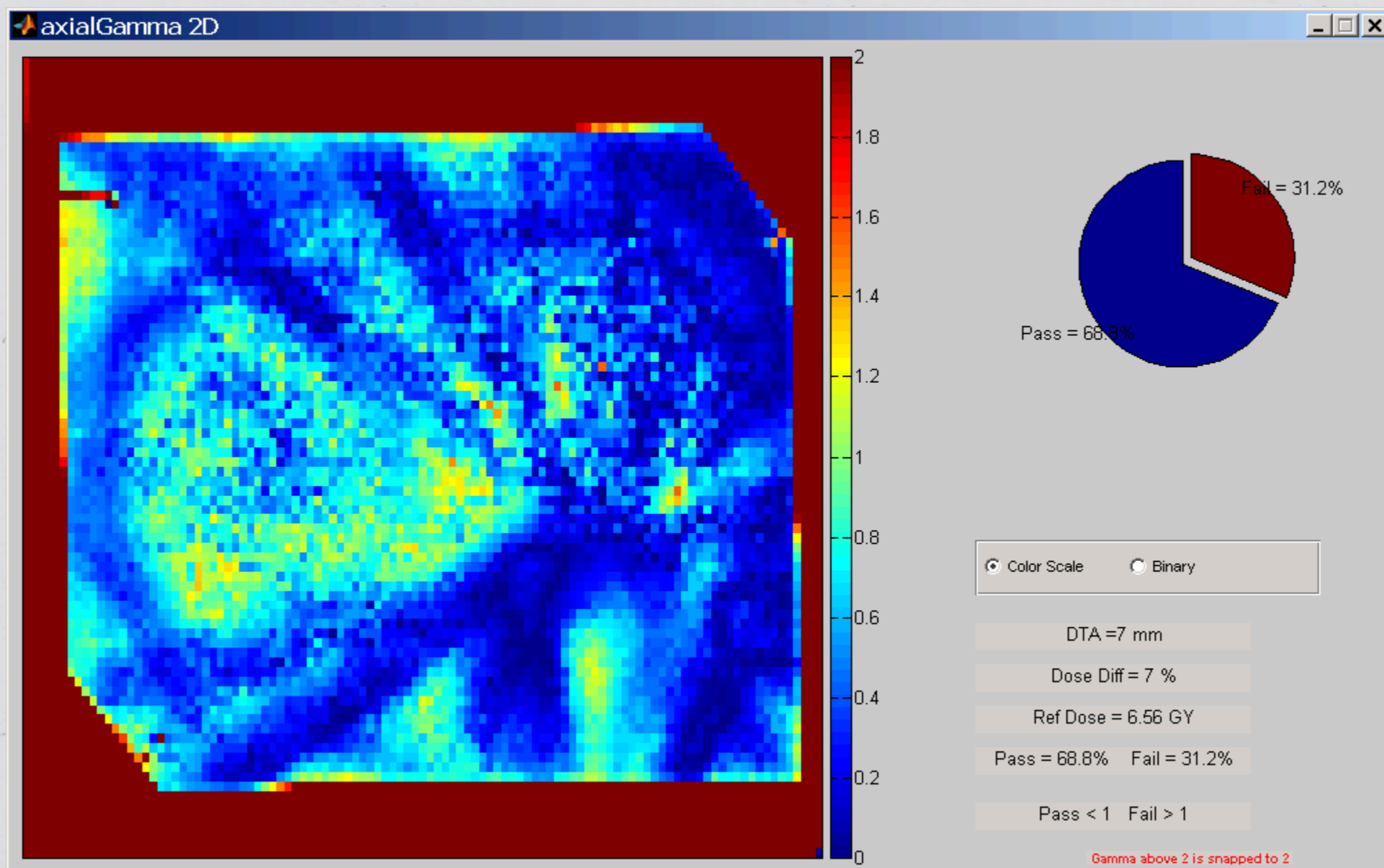
Credentialing with Anthropomorphic Phantoms



Evaluation of Phantom Data



Gamma Index



Evaluation of Lung Phantoms

- * Asked to re-evaluate data at July RTOG meeting
- * Promised to complete by 30 Sept.
- * Functioning software delivered late December
- * Analysis is under way



Lung Phantoms - Status

Algorithm	Number of Institutions	Number Evaluated	Average Percentage of Pixels Passing 5% / 5 mm*		
			Axial	Coronal	Sagittal
Pencil Beam	9	1	66	79	55
Super-position	15	7	97	90	85



* Percentage of TLD dose measurement

Lung Benchmarks - Status

TPS	Algorithm	Ratios hetero/homo		
		Iso	AP	PA
XiO 4.33.02	Superposition	1.17	1.24	1.10
Pinnacle v7.4f	CC Convolution	1.17	1.24	1.10
Pinnacle v 7.4f	CC Convolution	1.18	1.26	1.10
Eclipse 7.5.51	AAA	1.18	1.27	1.10
Eclipse 7.3.10	AAA	1.19	1.28	1.11
XiO 4.33.02	Superposition	1.17	1.24	1.10
Pinnacle v 8.0	Adaptive convolve	1.17	1.26	1.09
Pinnacle v8.0d	Adaptive convolve	1.15	1.22	1.08
Eclipse v 7.5.51	AAA	1.19	1.27	1.11
Eclipse 7.3.10	AAA	1.17	1.24	1.10
XiO 4.33.02	Fast Superposition	1.18	1.26	1.10
Pinnacle v8.0d	CC Convolution	1.18	1.25	1.10
XiO 4.33.02	Superposition	1.17	1.25	1.09
XiO 4.33.02	Superposition	1.17	1.25	1.10
Pinnacle v7.6c	Adaptive convolve	1.17	1.25	1.10
XiO 4.33.02	Superposition	1.19	1.26	1.11
XiO 4.33.02	Superposition	1.18	1.25	1.10
XiO 4.33.02	Superposition	1.17	1.25	1.10
Pinnacle v 7.4	Adaptive convolve	1.19	1.27	1.11
	Mean	1.19±0.01	1.25±0.01	1.10±0.01



Development of Monte Carlo Calculations

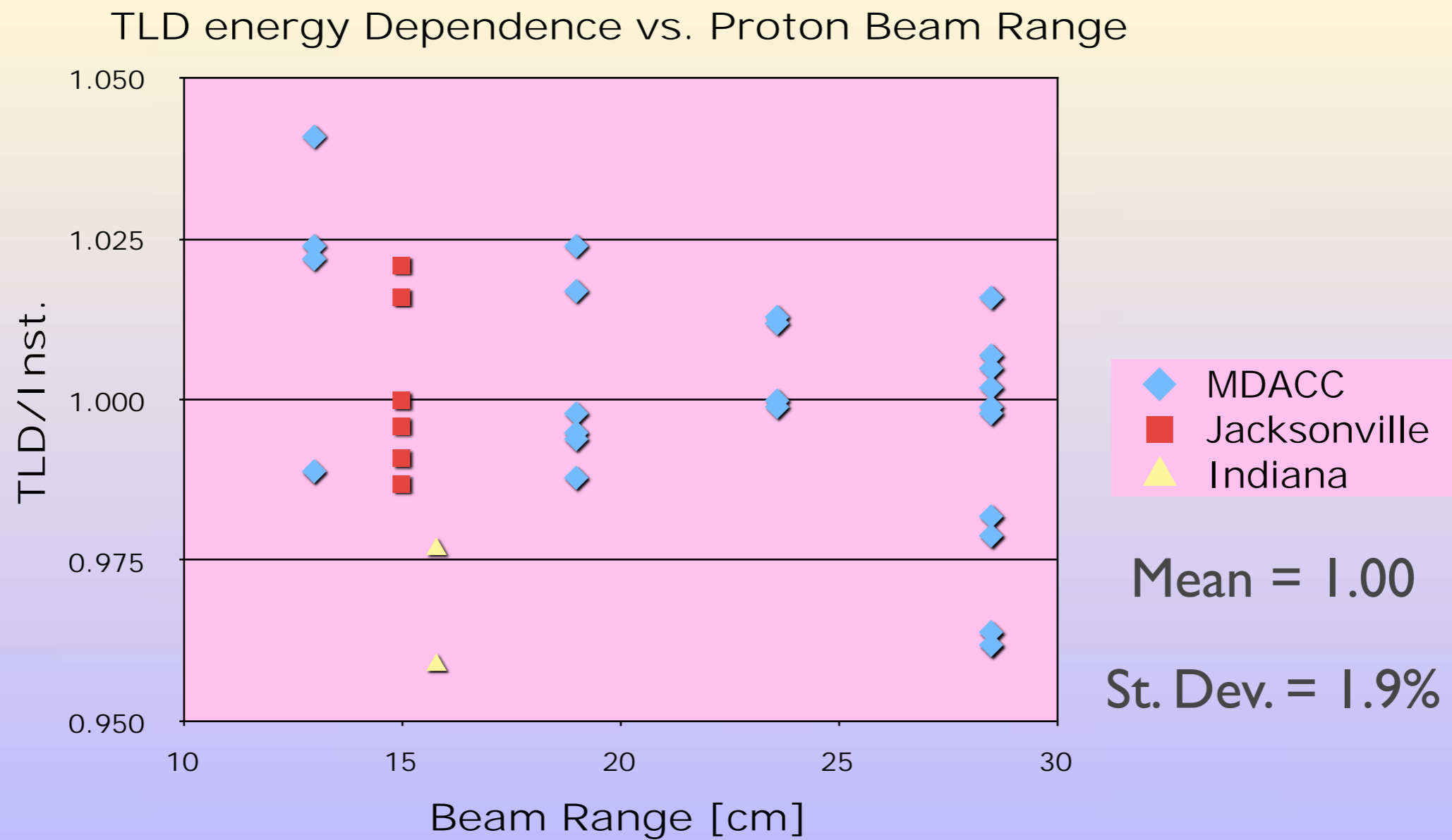
- * Collaboration with Joe Deasy to develop MC code
 - * General source model
- * Evaluated Varian 6X
 - * IMRT with H&N phantom
 - * IMRT with lung phantom
- * RPC intends to use to evaluate IMRT plans

Proton Beam Monitoring

- * Year 1:
 - * Institute routine monitoring of proton beams
 - * Institute program of dosimetry review visits to proton facilities
 - * Complete evaluation of BANG® gels, Presage™ dosimeters
- * Year 2:
 - * Undertake redesign of H&N, thorax and pelvis phantoms for proton beams
 - * Through AAPM, pursue adoption of uniform calibration protocol, traceability to NIST
- * Years 3-5:
 - * Accumulate database of representative beam data
 - * Develop capabilities to independently recalculate patient plans



Proton Beam Monitoring with TLD



Treatment Record Reviews for ATC-Supported Trials

Protocol	Cases Reviewed	Per Protocol (by volume)	Variation Acceptable	Deviation Unacceptable
413	1210	859	145	3
418	83	61	57	0
529	45	114	34	5

ACRIN QA Committee

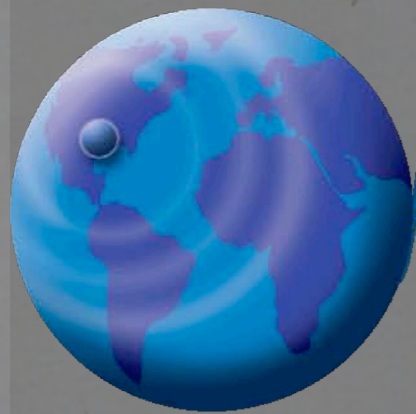
- * Function is similar to RTOG QC Committee
- * Committee reviews quality of data, timeliness of submissions
- * Also reviews individual member institutions
- * Discusses monitoring and auditing, and adverse events



AAPM Proposal for an Imaging Physics Center

- * Per John Boone:
- * No concrete efforts to form an IPC
- * Boone has written a grant through AAPM to focus on quantitative imaging physics.
- * Subcontractors: 5 universities including MDACC
- * A “virtual” center, not envisioning on-going NCI funding





RPC

Radiological Physics Center

Excellence through Quality Assurance

