

The Radiological Physics Center

Report to ATC



June 22, 2006

David S. Followill, Ph.D.

Geoffrey S. Ibbott, Ph.D.

THE UNIVERSITY OF TEXAS
MD ANDERSON
CANCER CENTER
Making Cancer History®

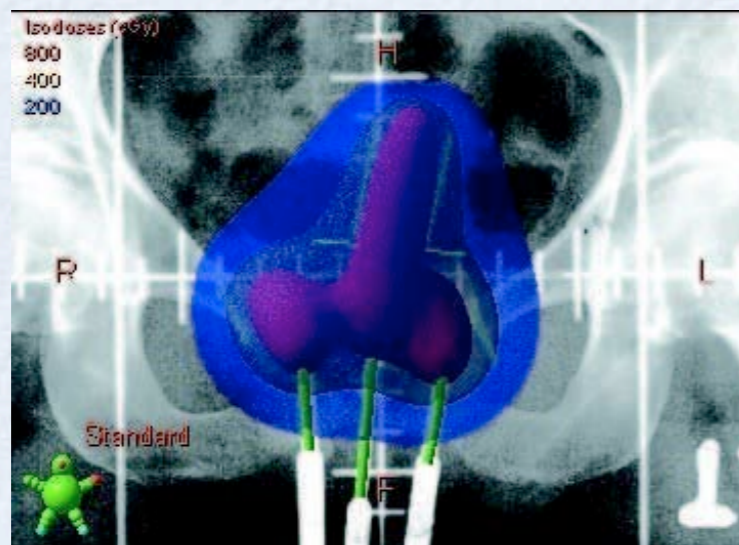
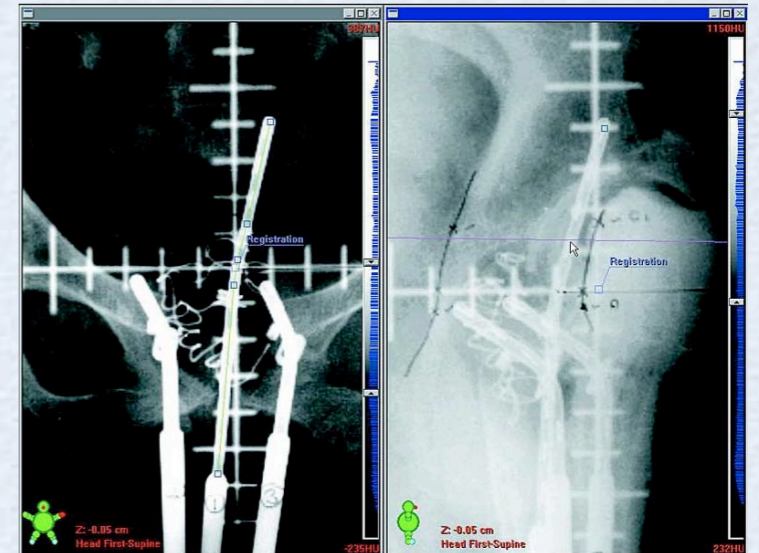
New TPS at RPC

Eclipse (with BrachyVision)

Training of three staff has been completed

Continuing commissioning

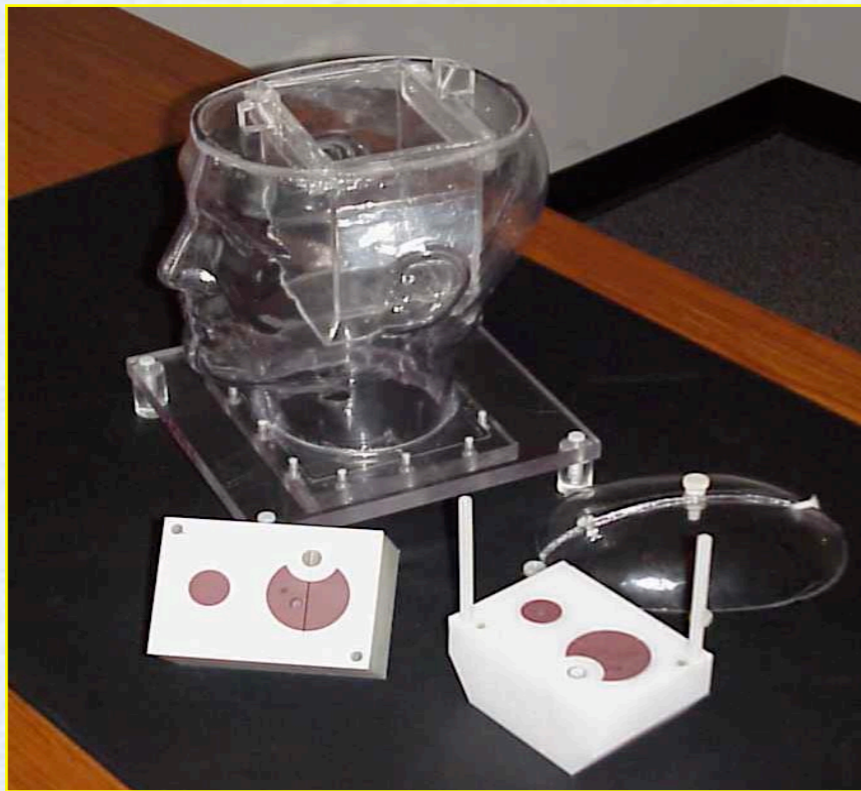
Need to receive plans and films electronically



One of several steps in RPC's transition to electronic chart review

Credentiaing Techniques

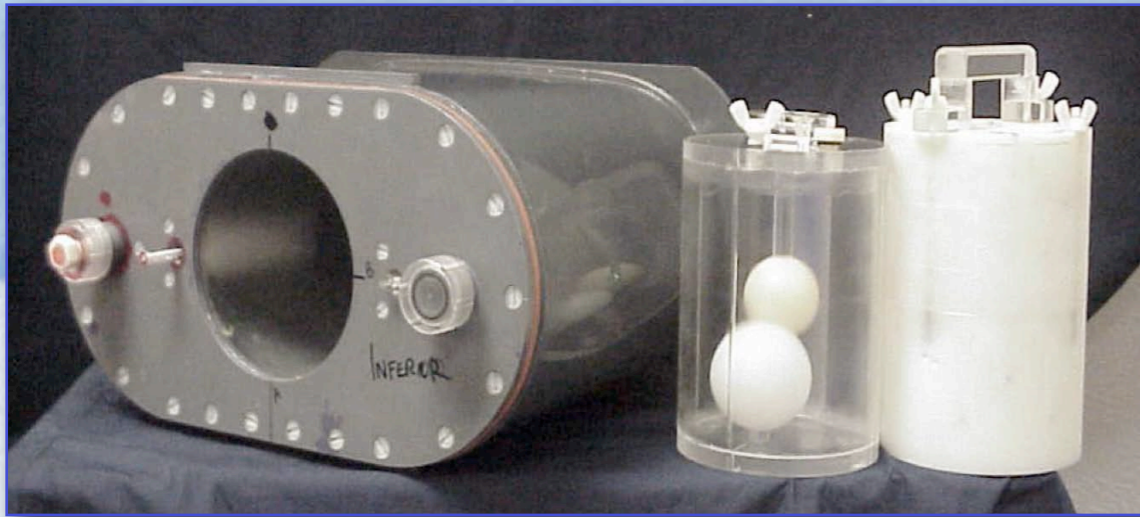
Phantoms



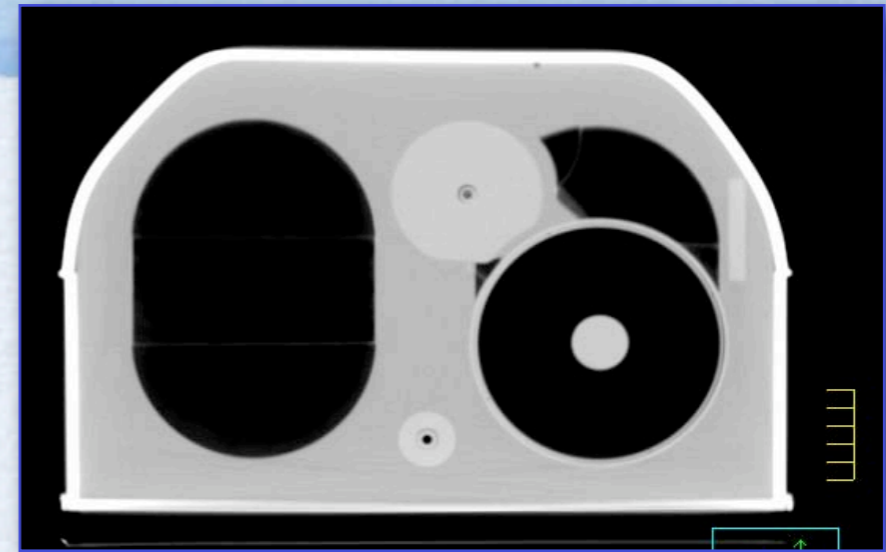
Benchmarks



RPC Phantoms



prostate IMRT: 4, incl. prosthesis



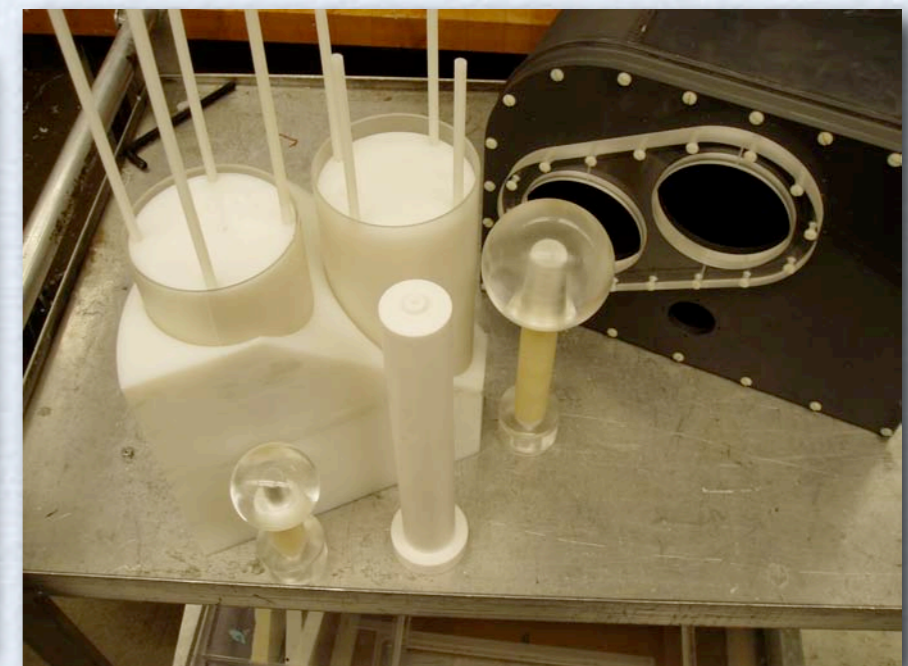
thorax SBRT: 3 phantoms



H&N IMRT: 15 in service, 10 under constr.

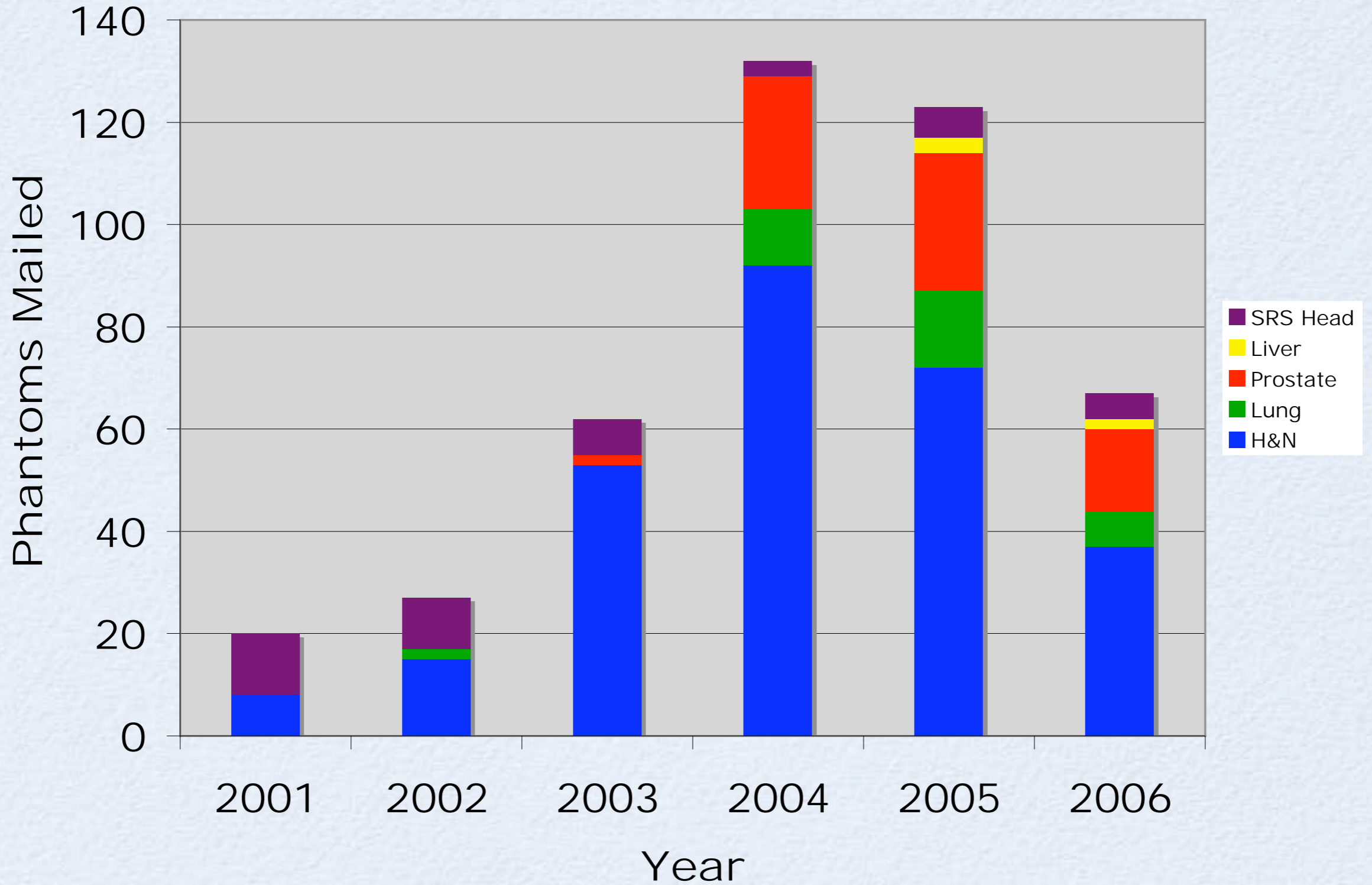


SRS: 2 in service, others sent by RDS



liver SBRT: 3, incl. motion

Phantom Mailings



Phantom Results

| Phantom | H&N | Prostate | Thorax | Liver |
|---|-------------|-------------|-------------|-------------|
| Irradiations | 217 | 58 | 28 | 4 |
| Pass | 146 | 41 | 14 | 3 |
| Fail | 57 | 13 | 5 | - |
| Under analysis or at institution | 12 | 11 | 4 | 1 |
| Unevaluable | 12 | 6 | 4 | - |
| Institutions | 154 | 42 | 21 | 4 |
| Year introduced | 2001 | 2004 | 2004 | 2005 |

*** 34% of institutions failed on
the first attempt**

Lung Phantom Irradiations

| TPS | Dose Calc. Algor correction on | Number of irradiations | $D_{\text{hetero}}/D_{\text{homo}}$ |
|------------------------------------|-----------------------------------|---------------------------|-------------------------------------|
| Precise v 2.01 | Scatter Integ. Clarkson Type | 2 | $1.19 \pm 2.6\%$ |
| BrainLab | Clarkson & Pencil Beam | 4 | $1.21 \pm 0\%$ |
| Eclipse | Pencil Beam | 2 | $1.19 \pm 4.6\%$ |
| Ergo | 3D Convolution Pencil Beam | 1 | $1.19 \pm 0.1\%$ |
| Pinnacle v 6.2, 6.4, 7.0g, 7.4f | Adaptative Convolve | 8 | $1.13 \pm 2.1\%$ |
| Render plan | Change in primary attenuation | 1 | 1.20 |
| XiO | Superposition/ Convolution | 3 | $1.12 \pm 2.4\%$ |
| Total | | 21 | 1.18 |

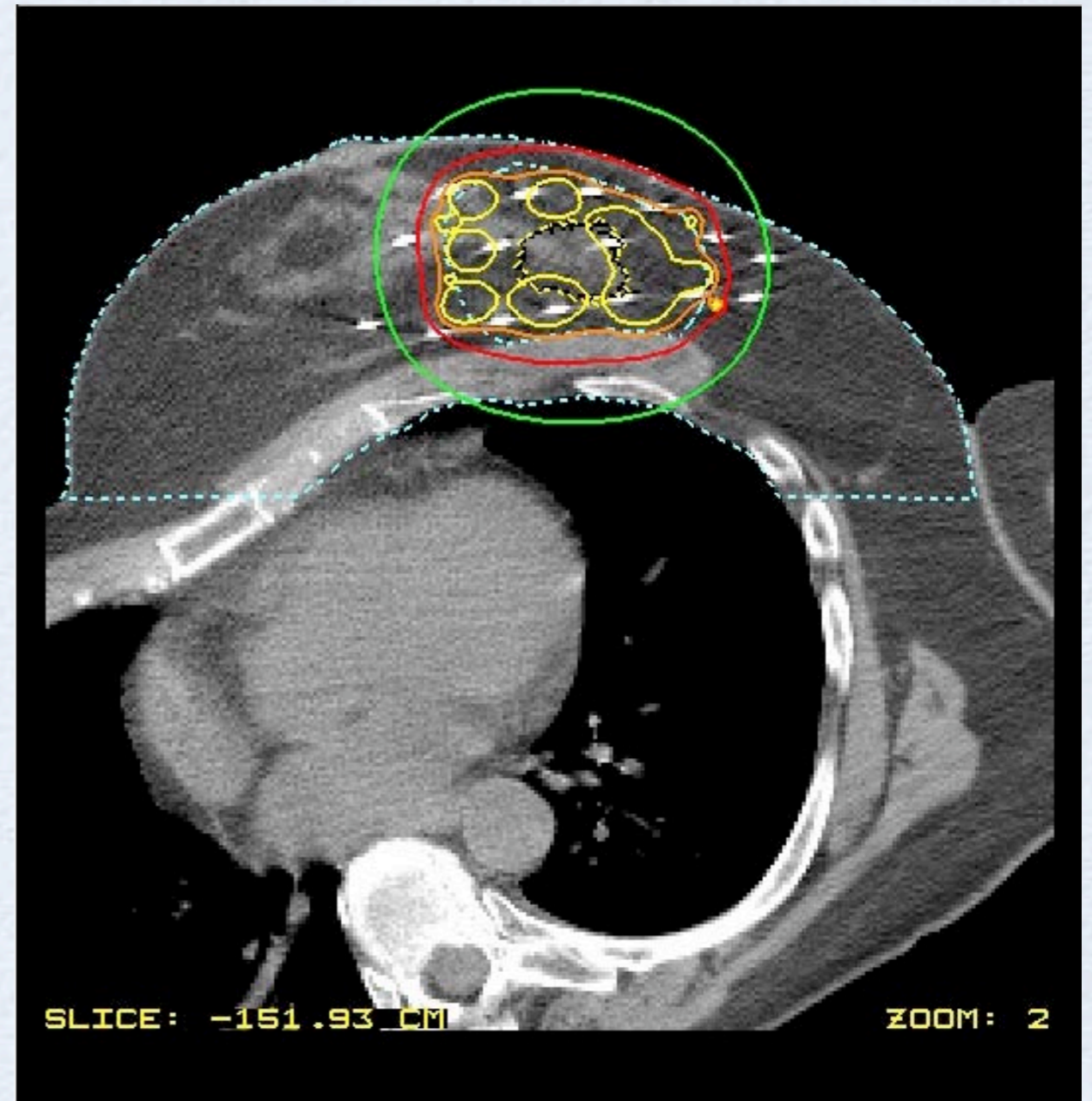
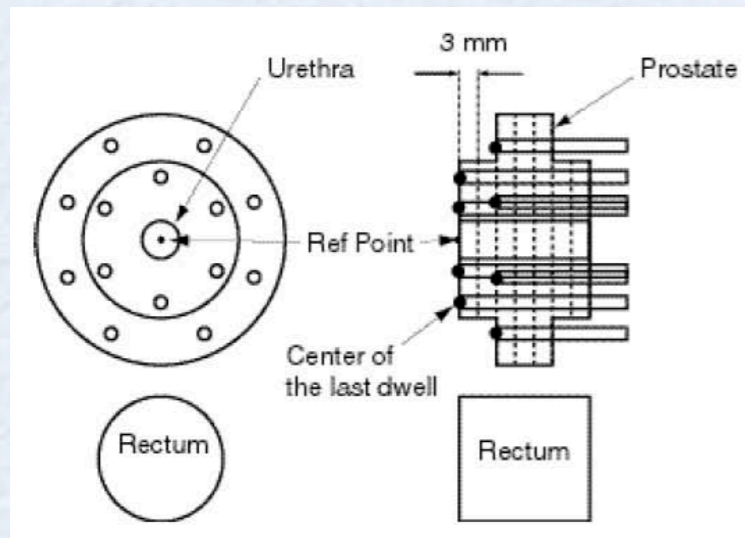
TLD Dose vs. Hetero Corrected Plan

| TPS | Dose Calc. Algor correction on | Number of irradiations | D_{TLD}/D_{hetero} |
|------------------------------------|-----------------------------------|---------------------------|----------------------|
| Precise v 2.01 | Scatter Integ. Clarkson Type | 2 | $0.99 \pm 3.1\%$ |
| BrainLab | Clarkson & Pencil Beam | 4 | $0.96 \pm 2.7\%$ |
| Eclipse | Pencil Beam | 2 | $0.97 \pm 1.6\%$ |
| Ergo | 3D Convolution Pencil Beam | 1 | $0.98 \pm 3.2\%$ |
| Pinnacle v 6.2, 6.4, 7.0g, 7.4f | Adaptative Convolve | 8 | $0.99 \pm 2.3\%$ |
| Render plan | Change in primary attenuation | 1 | 0.92 |
| XiO | Superposition/ Convolution | 3 | 0.96* |
| Total | | 21 | 0.97 |

Credentialing

IMRT, 3D CRT and Brachytherapy

- Evaluate
 - Implant technique
 - Dosimetry
 - Documentation
 - Protocol compliance



0413 PBI Credentialing

| Modality | Rad Oncs Credentialed | Institutions Credentialed | Patients Enrolled |
|---------------------------------|--------------------------|------------------------------|----------------------|
| 3D Conformal | 701 | 318 | 387 |
| Mammosite | 425 | 212 | 93 |
| Multi catheter | 108 | 41 | 40 |
| WBI | | | 520 |
| Total Institutions Credentialed | | | 416 |

As of June 15

PBI Patient Reviews

- * RTOG reviews 3D cases
 - * RPC reviews brachytherapy cases:
 - ☀ Mammosite: 144
 - ☀ Multicatheter: 49
- 193

Reviews are done in one business day

As of June 15

Credentialing for RTOG Protocols

RPC Requirements

| Protocol | H&N Phantom | Pelvis Phantom | IMRT Benchmark | Lung/Liver Phantom | Brachy Benchmark | Credentialed by RTOG |
|----------|-------------|----------------|----------------|--------------------|------------------|----------------------|
| 0126 | 146 | 41 | | | | 53 (187) |
| 0232 | 146 | 41 | 58 | | 176 | 69 (176) |
| 0234 | 146 | 41 | 58 | | | 52 (245) |
| 0236 | | | | 14 | | 14 |
| 0321 | | | | | 25 | 17 (25) |
| 0418 | 146 | 41 | | | | 55 (187) |
| 0421 | 146 | | | | | 40 (146) |
| 0435 | 146 | | | | | 36 (146) |
| 0438 | | | | 2 | | 2 |
| 0521 | 146 | 41 | 58 | | | 73 (245) |
| 0522 | 146 | | | | | 48 (146) |

Protons

- Completed evaluation:
 - MD-55 film
 - EBT film
- Conducting evaluation:
 - TLD
 - Presage 3D dosimeter
 - Normoxic gel dosimeter

