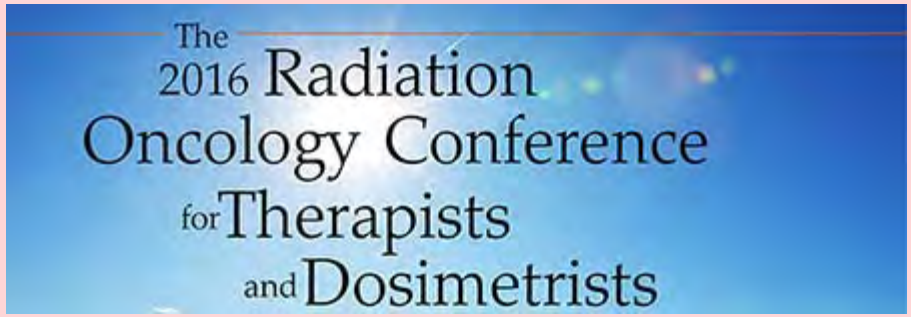

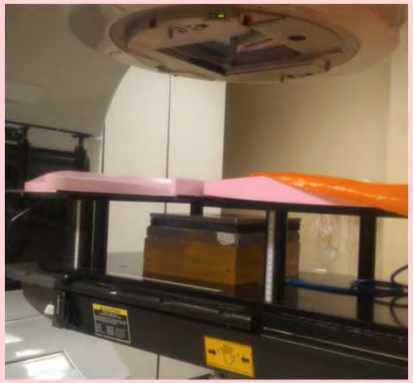

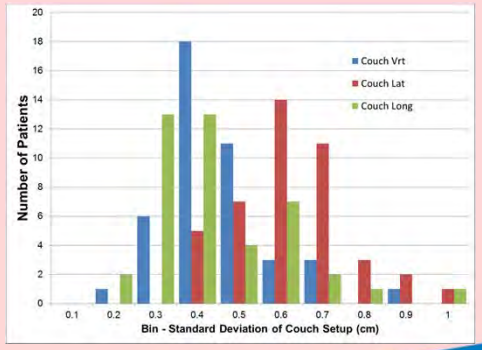

QA - Prone Breast Board and Its Dosimetric Effect

Inter-fractional Prone Breast Setup Variation

Iris Wang PhD DABR
Medical Physicist
Assistant Professor

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Prone vs Supine

Adapted from
http://www.qfix.com

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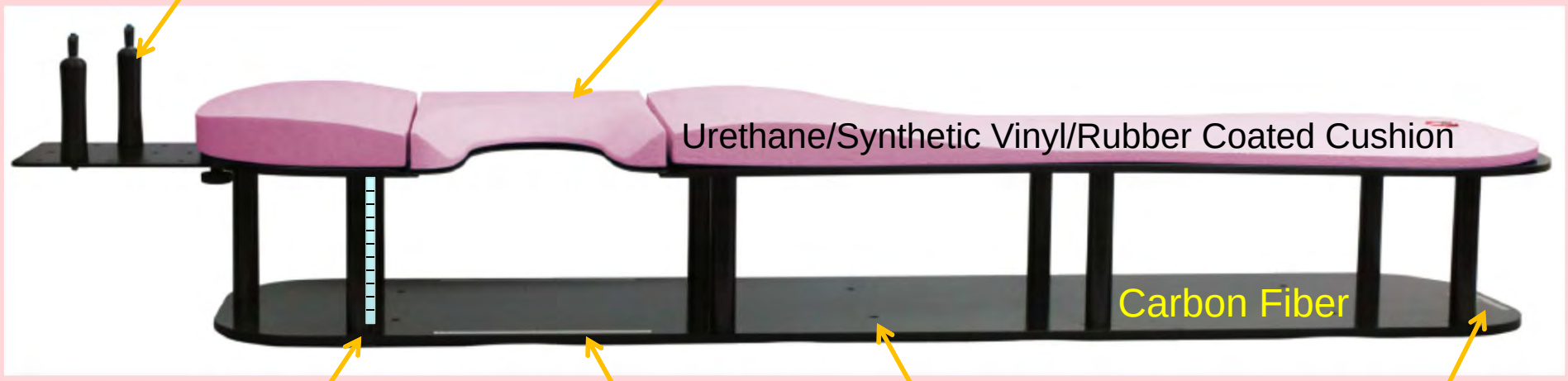
Prone Breast Board QA



**Prone breast board (ClearVue, Qfix, Avondale, PA) figure and information adapted from http://www.raditec.ch/wp-content/uploads/2014/11/M085_Sell-Sheet-Access-ClearVue.pdf*

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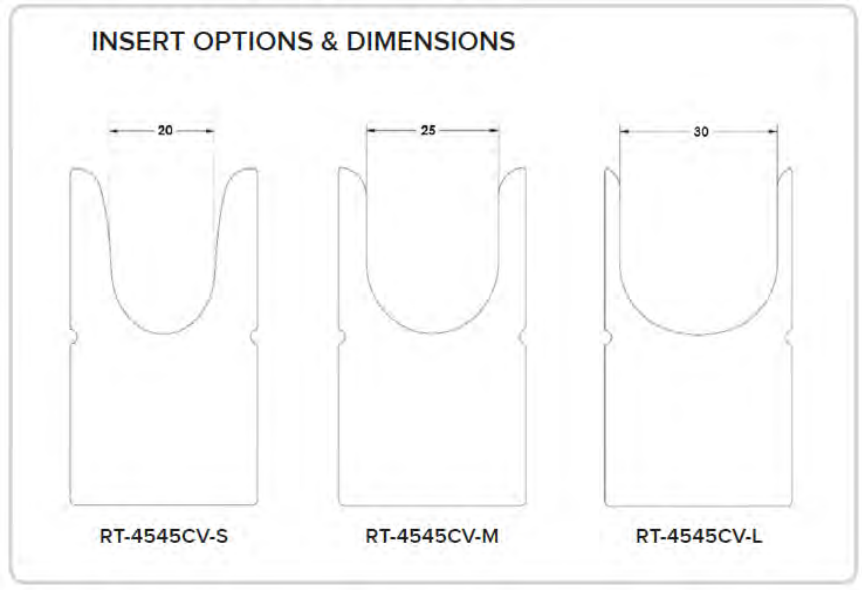
Prone Breast Board QA



**Prone breast board (ClearVue, Qfix, Avondale, PA) figure and information adapted from http://www.raditec.ch/wp-content/uploads/2014/11/M085_Sell-Sheet-Access-ClearVue.pdf*

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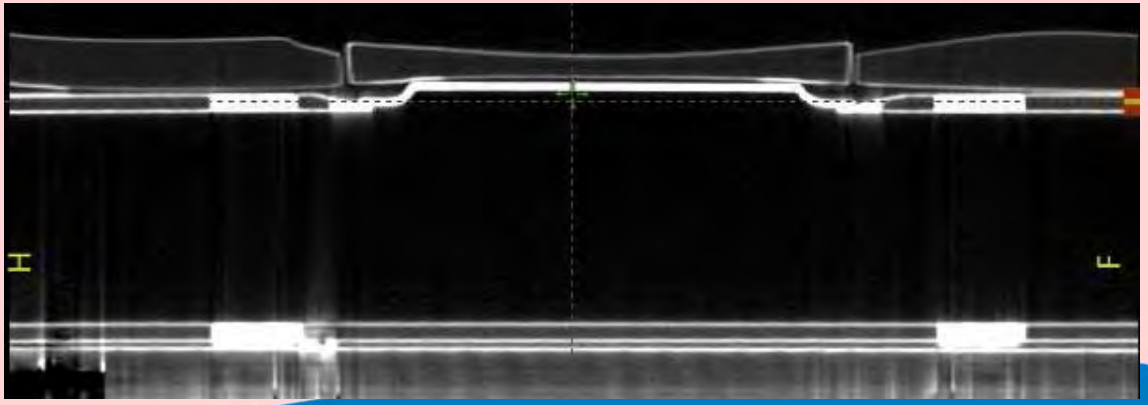
Prone Breast Board QA

- Check board structure integrity

- CT scan of the board



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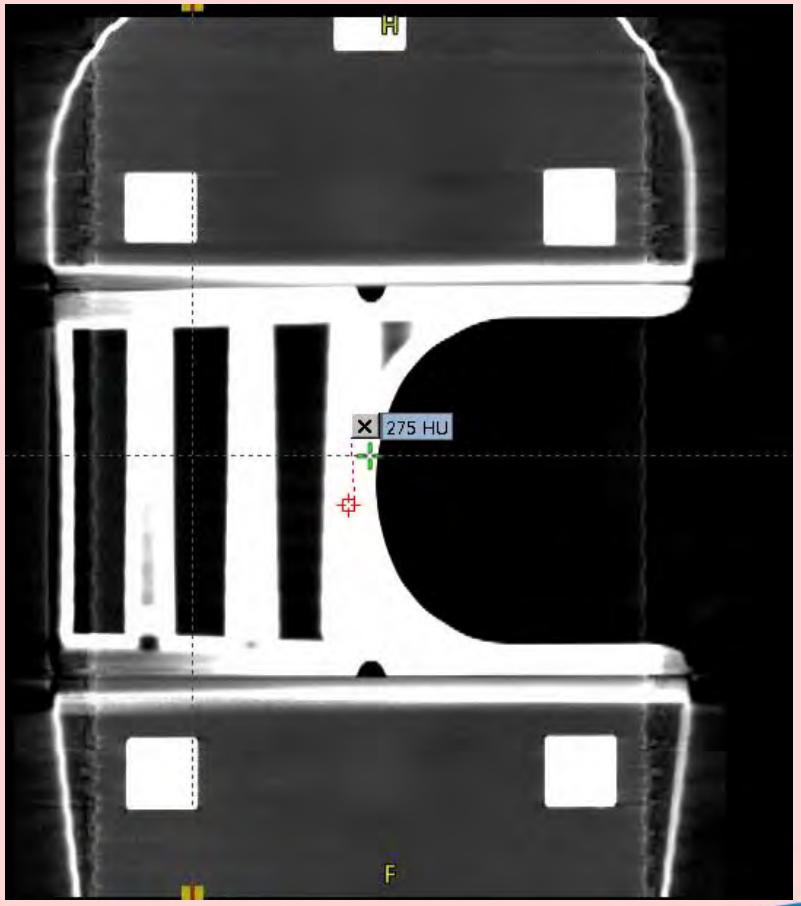
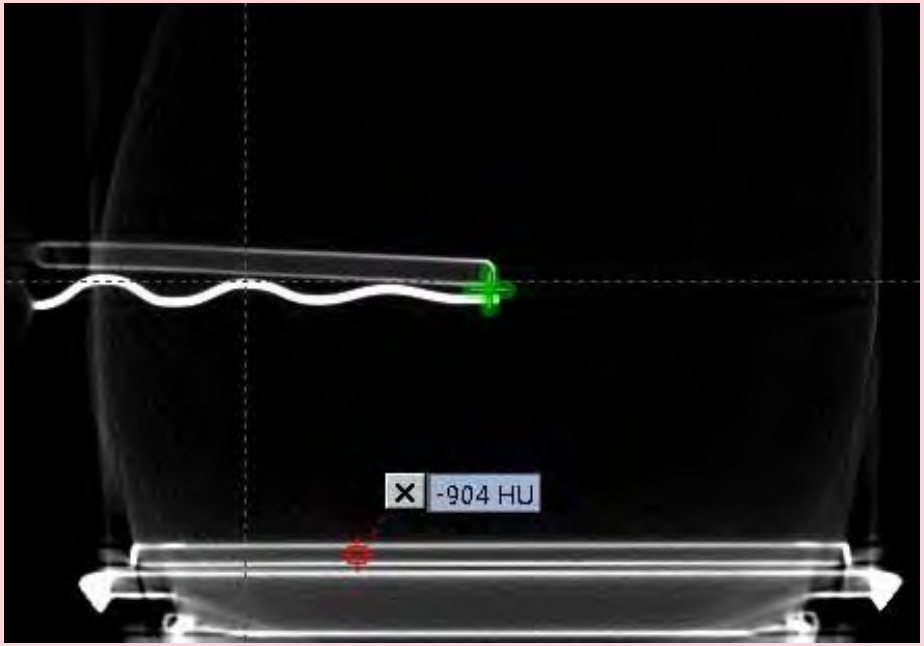
Prone Breast Board QA





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Prone Breast Board QA

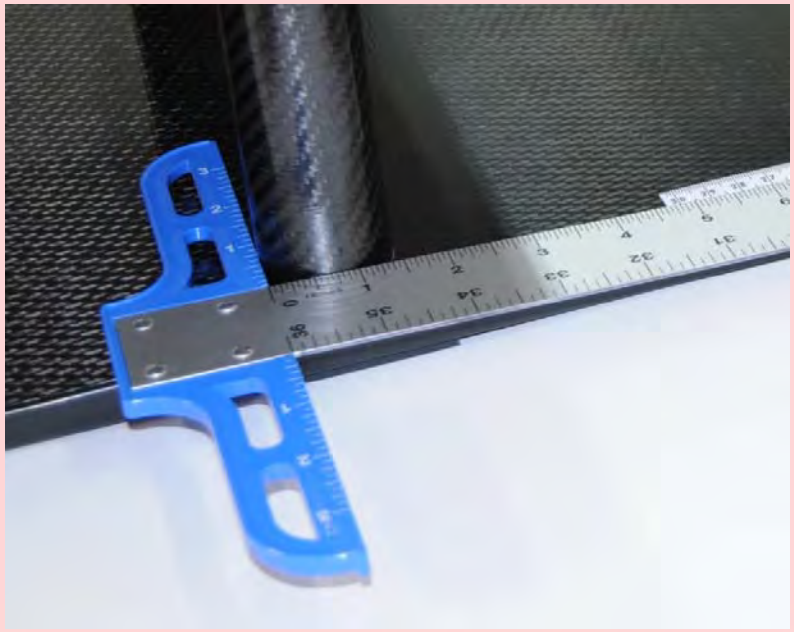
- Scale Ruler QA
  - Following vendor provided procedure*

From the foot of the table, Place ruler on the right side of bottom plate of ClearVue. Align the ruler so that the 0 mark is aligned with the edge of the inferior post on the cutout

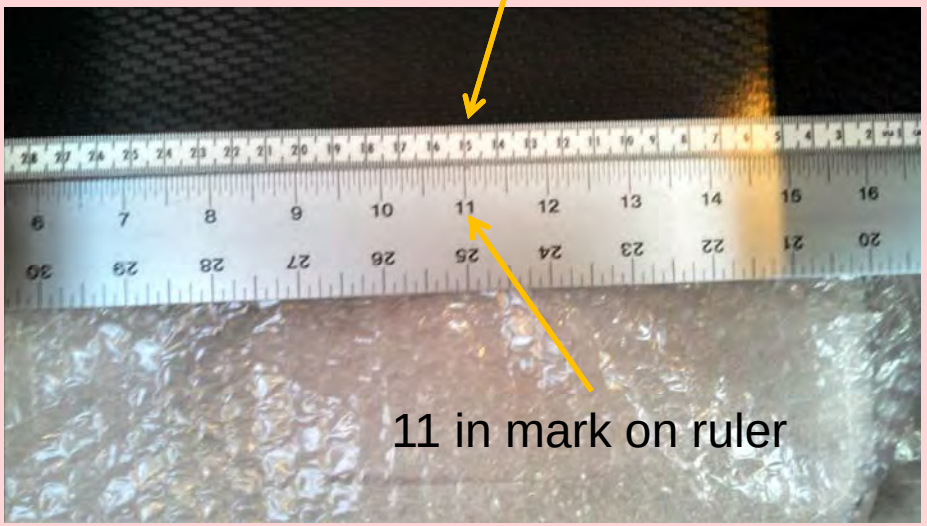
**Adapted from instruction provided by ClearVue, Qfix, Avondale, PA*

Prone Breast Board QA

Zero of Ruler aligned
with edge of post



15 cm mark
on board side scale label



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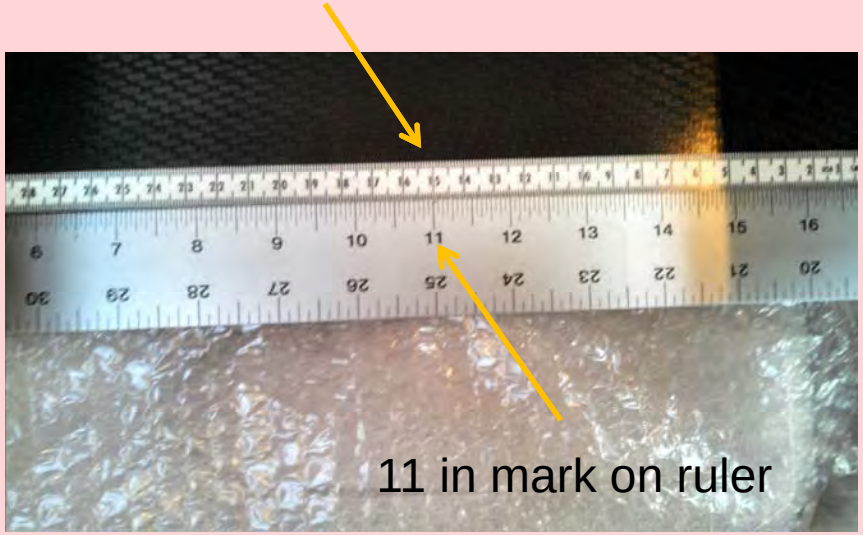
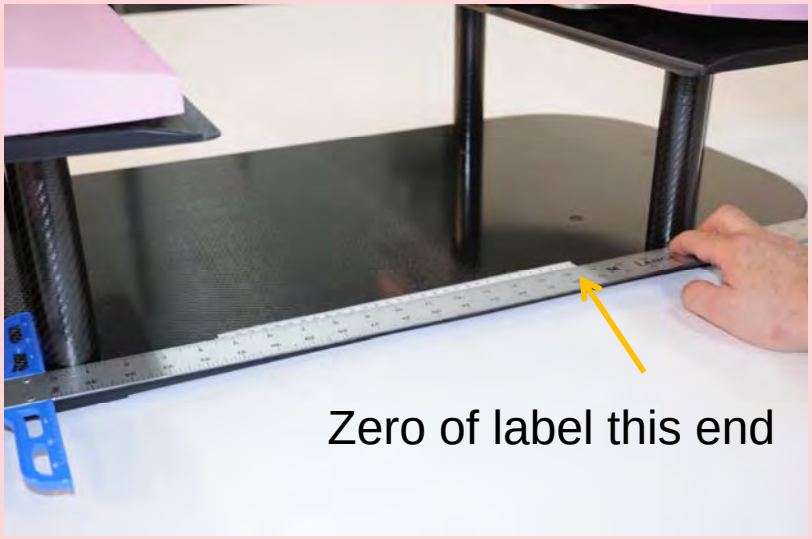
Prone Breast Board QA

15 cm mark
on board side scale label



Side scale: 0 cm to 30 cm
running superior to inferior



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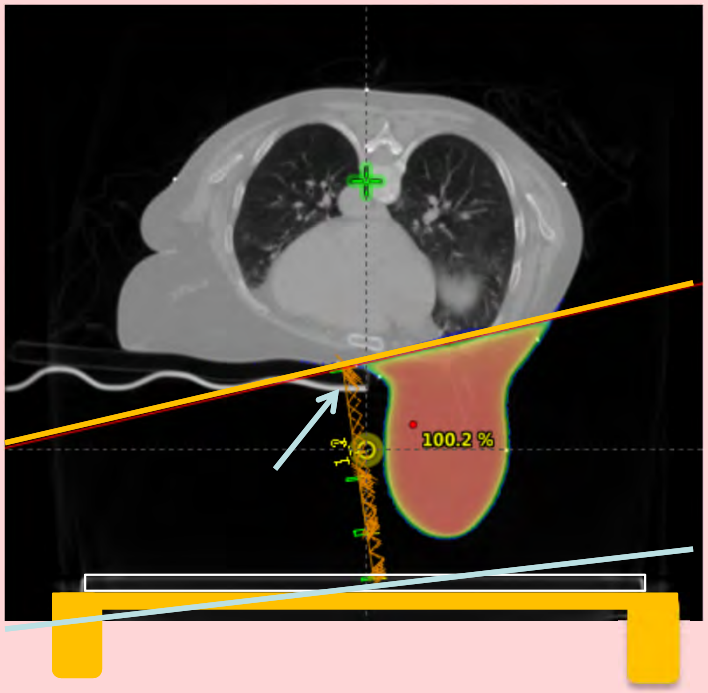
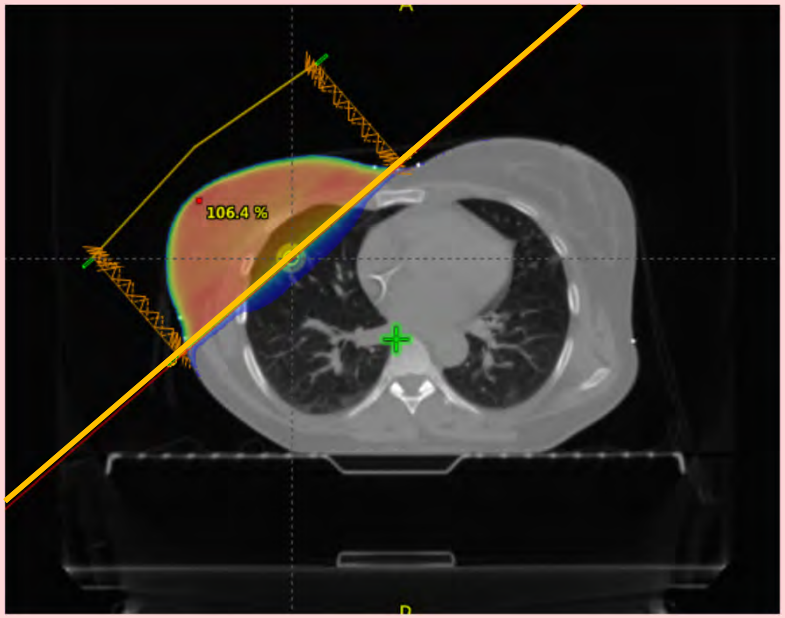
Prone vs Supine





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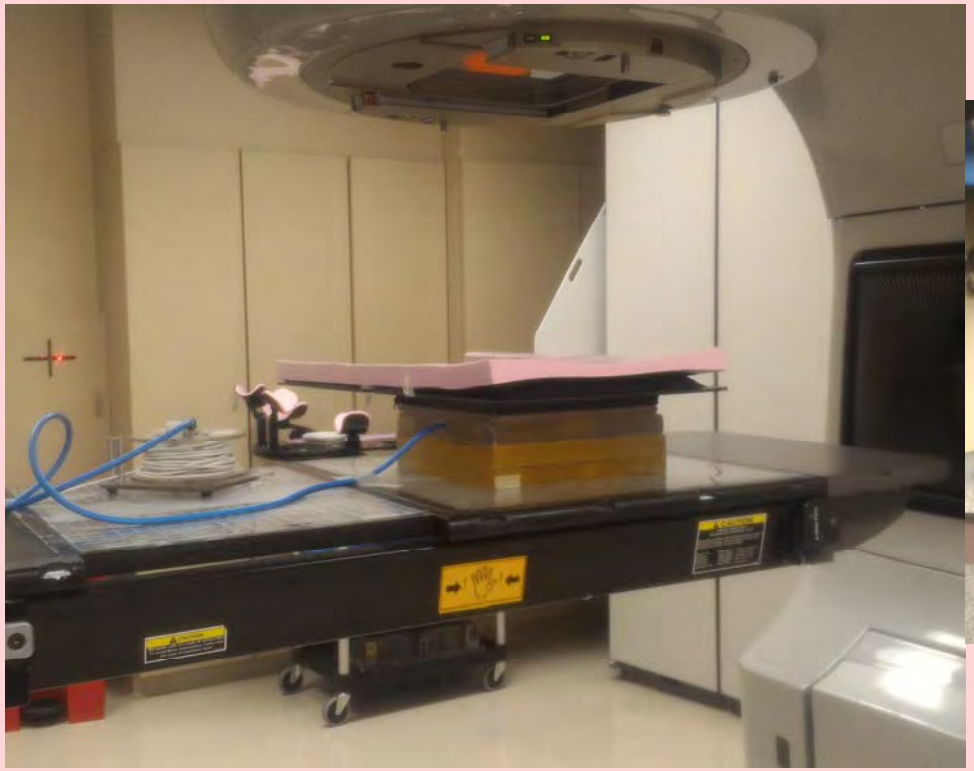
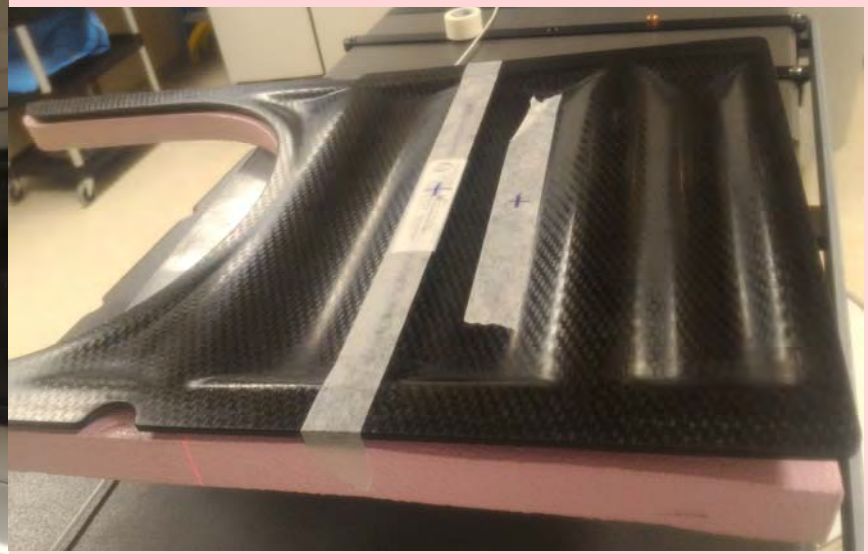
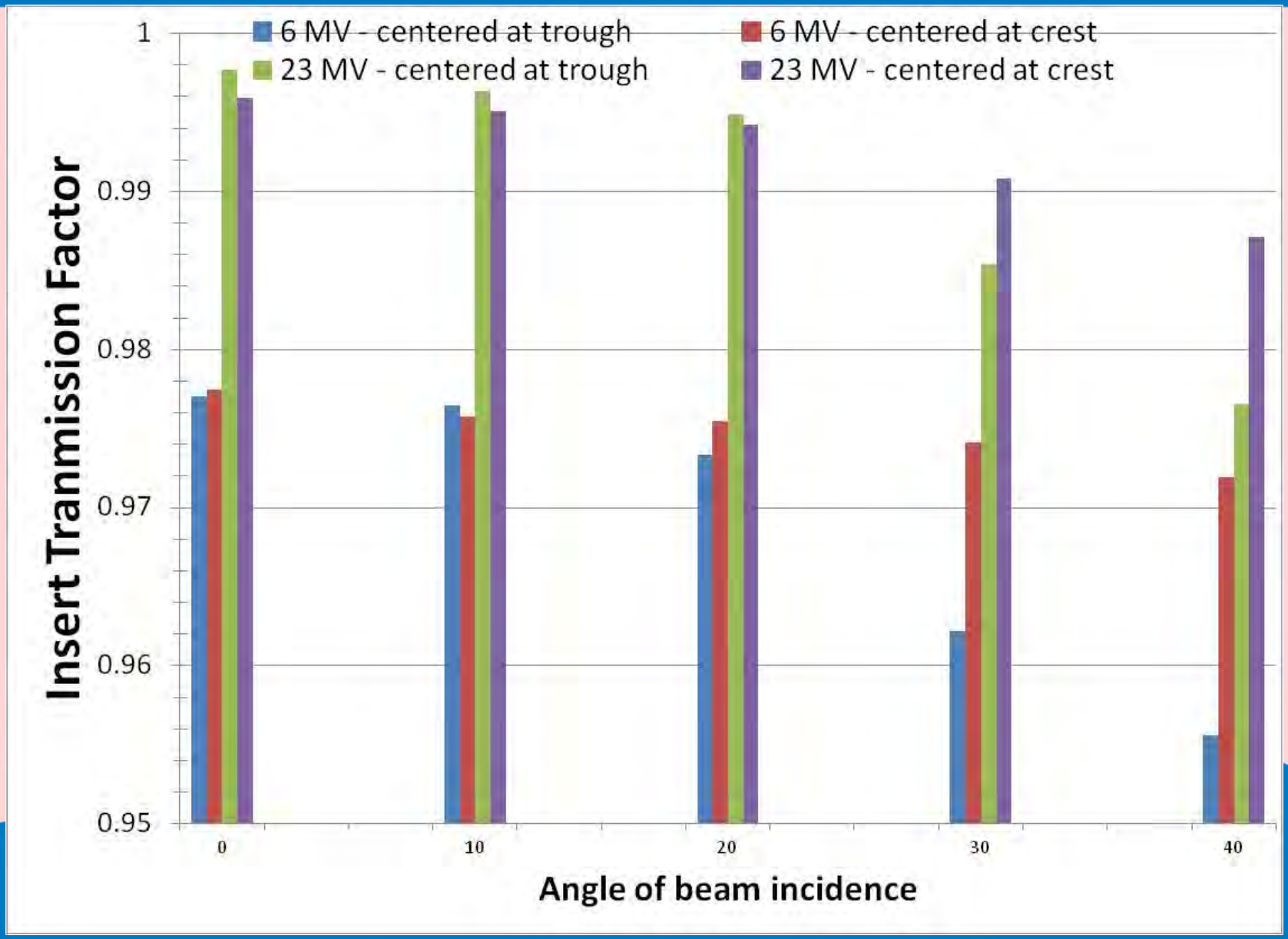
Board and Couch Structure - Transmission Factors



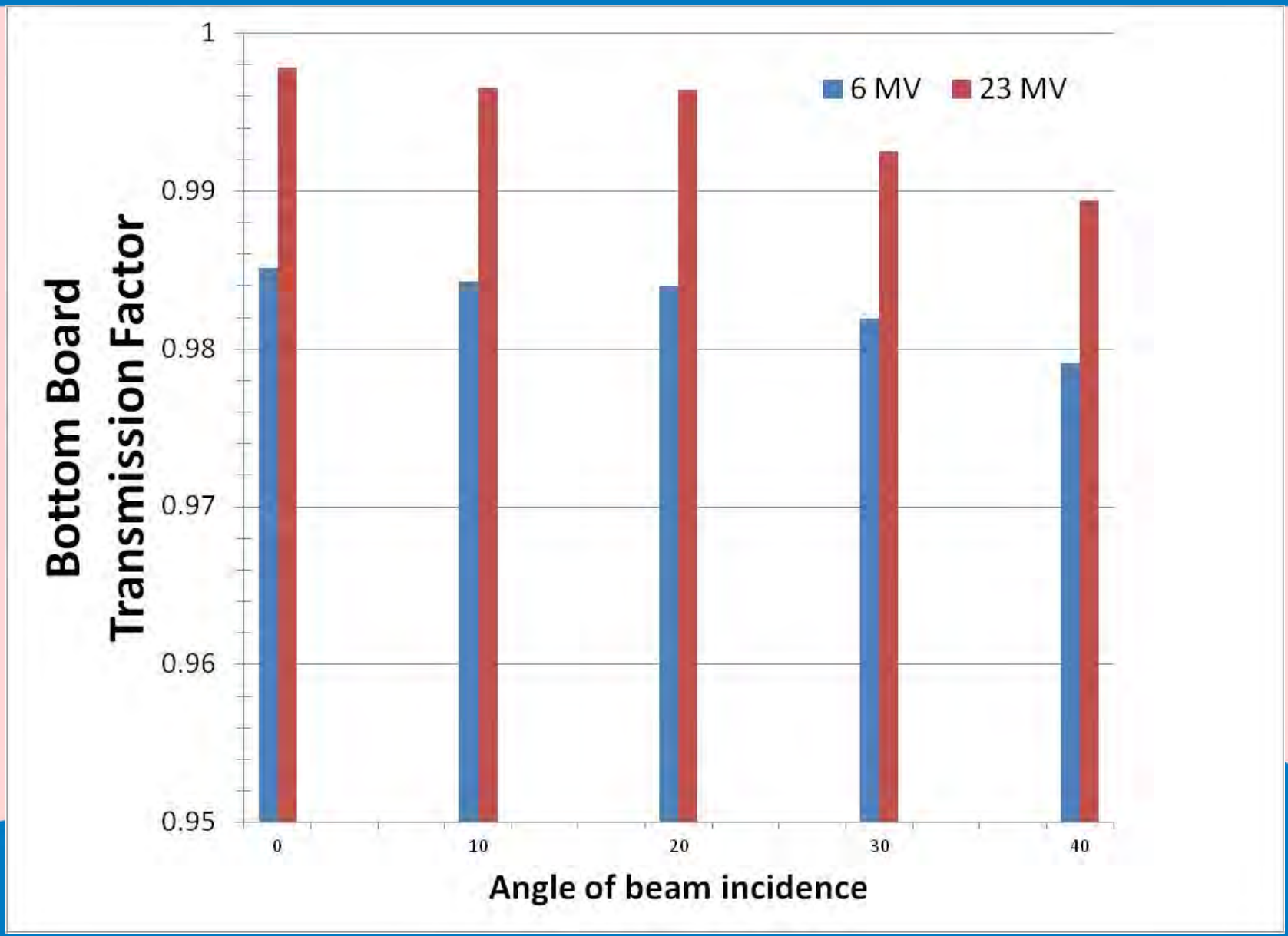


Dosimetor: Cylindrical Farmer Chamber
(PTW, Germany)

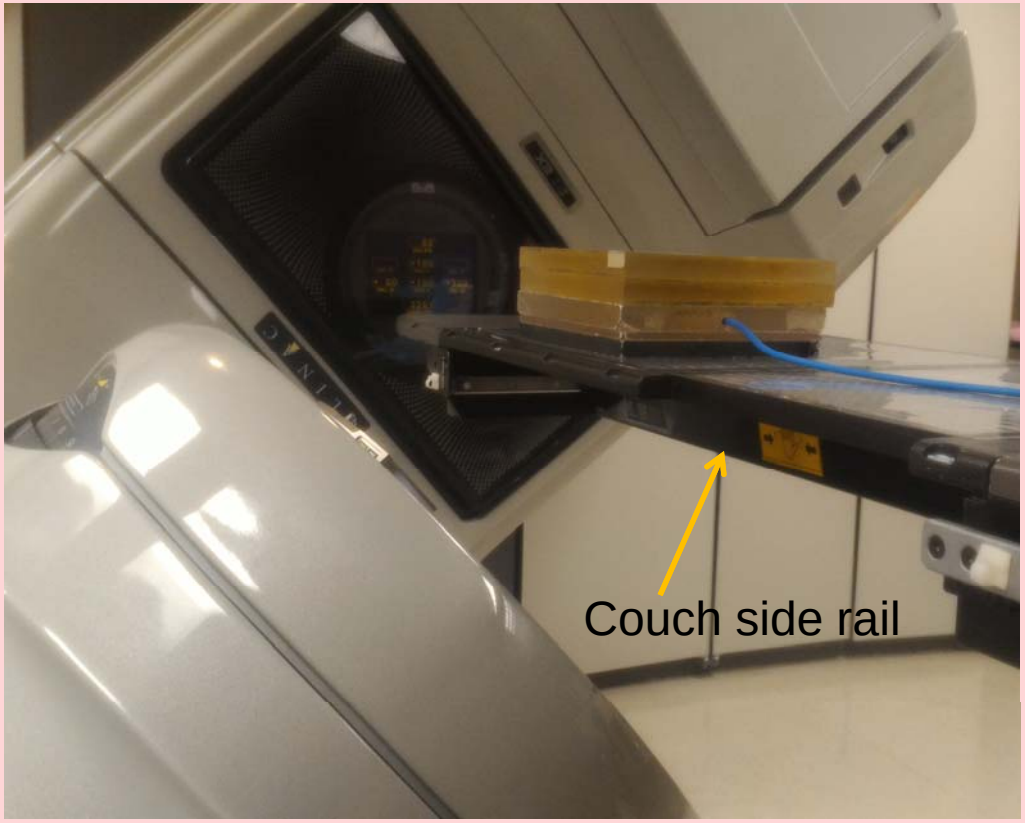
Board and Couch Structure - Transmission Factors



Board and Couch Structure - Transmission Factors



Board and Couch Structure - Transmission Factors

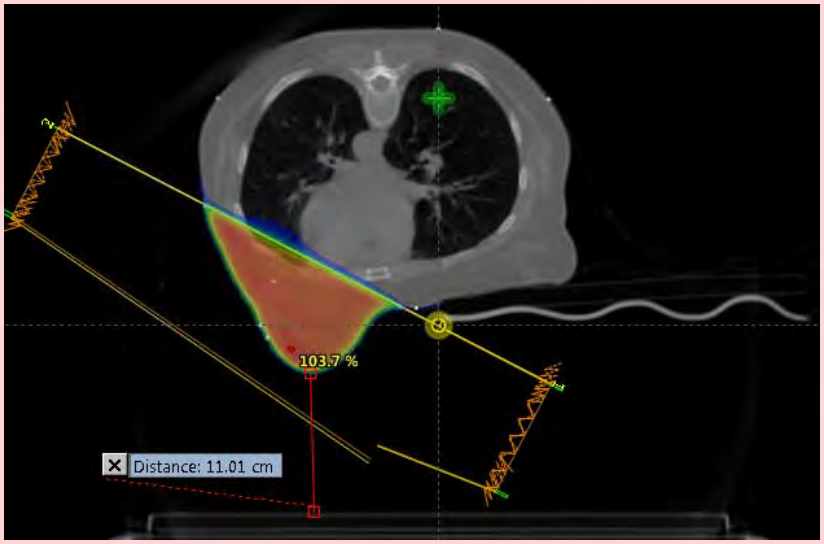


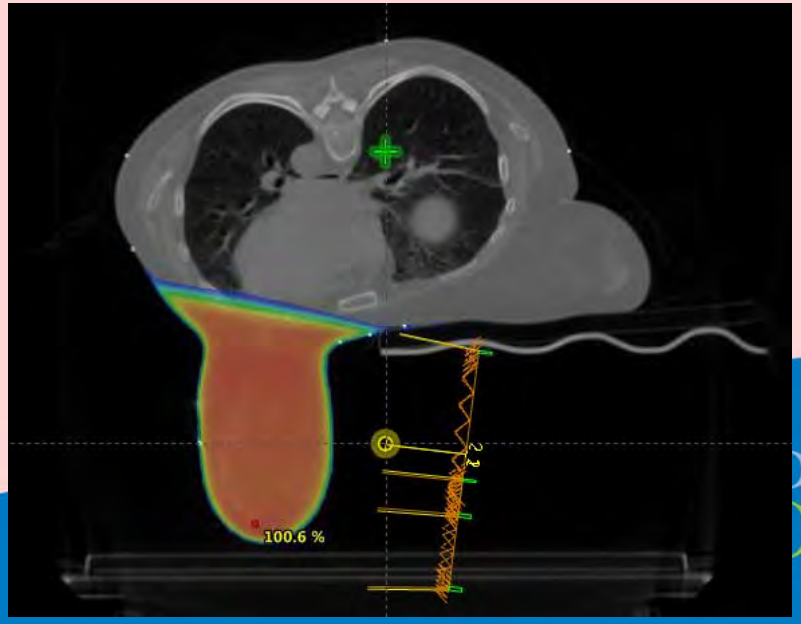
Transmission Factor (TF)
Measured @ Gantry 245°

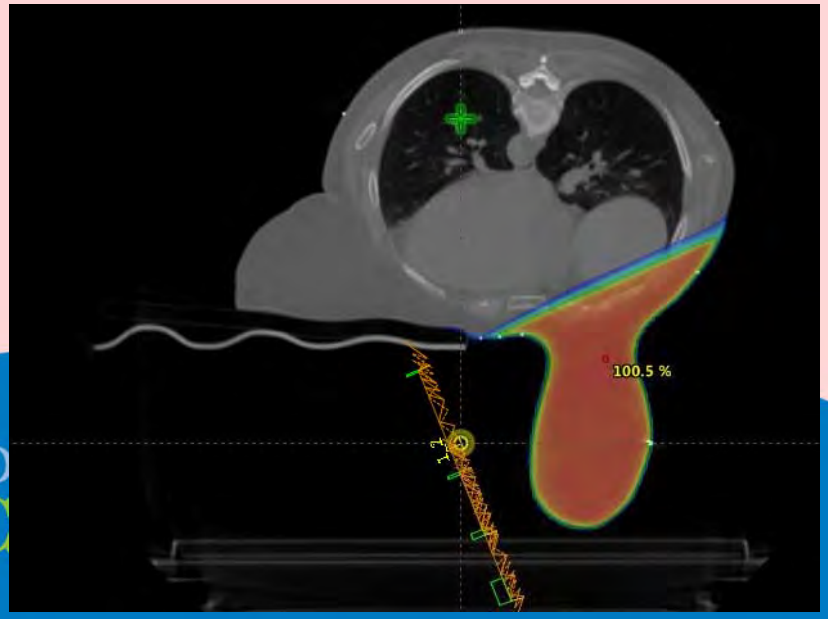
6MV: TF = 0.962

23MV: TF = 0.979

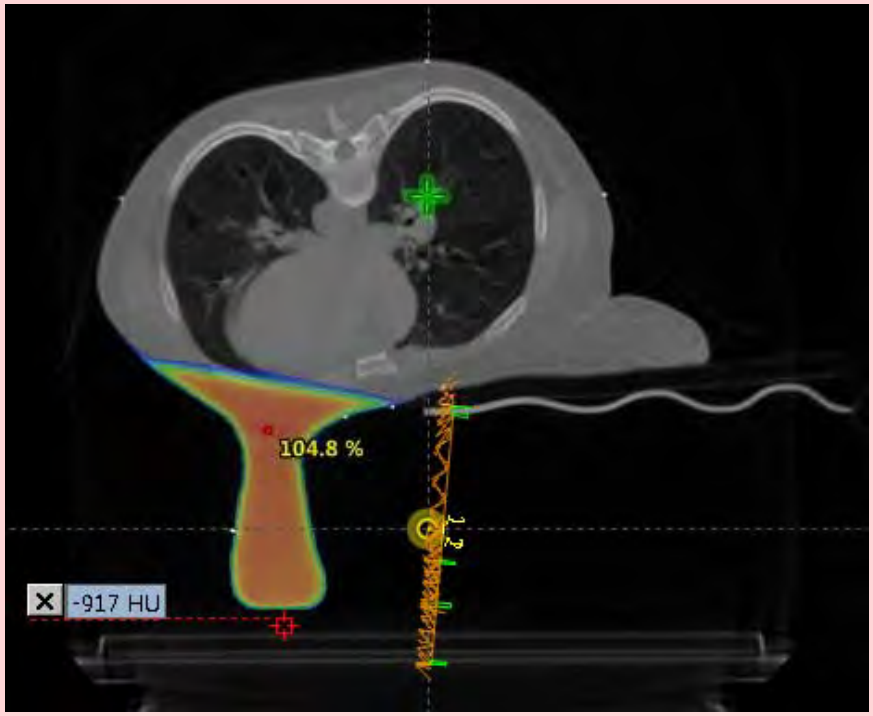
Breast Size vs Air Gap







Large Pendulous Breast – w. 19 mm Styrofoam



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Increased Skin Dose from the Breast Board

Measurement used
Parallel Plate
Markus Chamber
(PTW, Germany)
w. 1 mm build up cap

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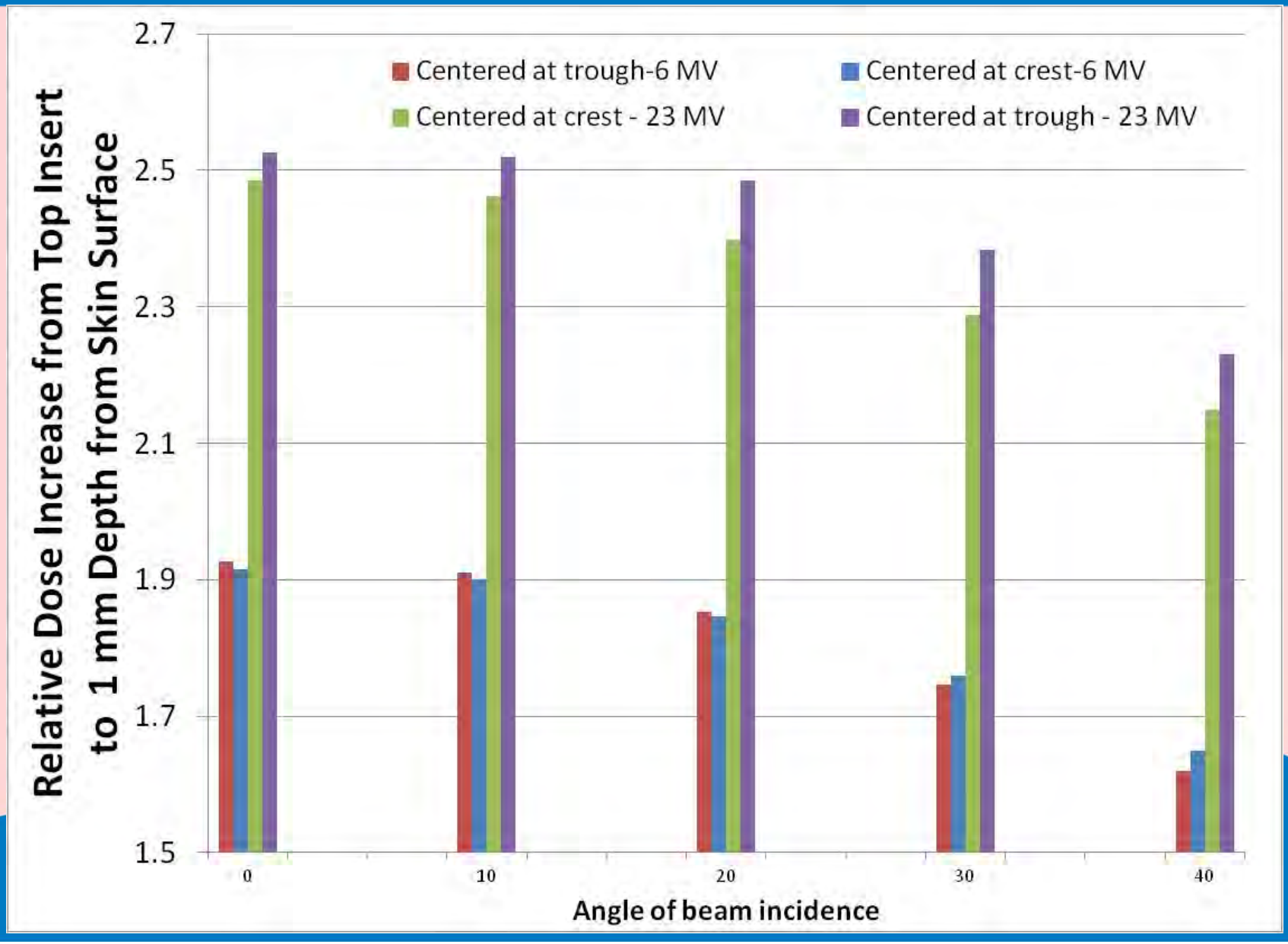
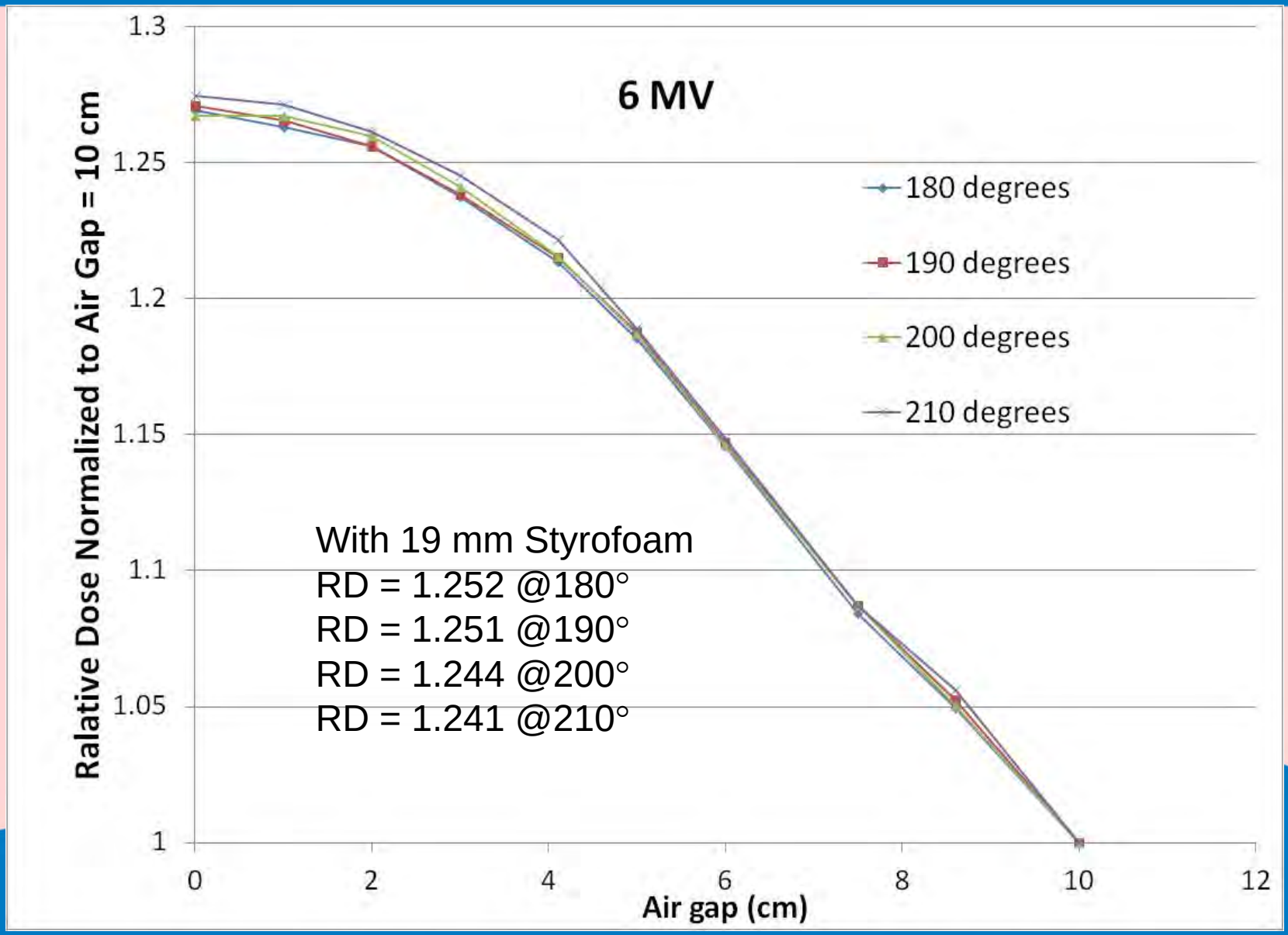
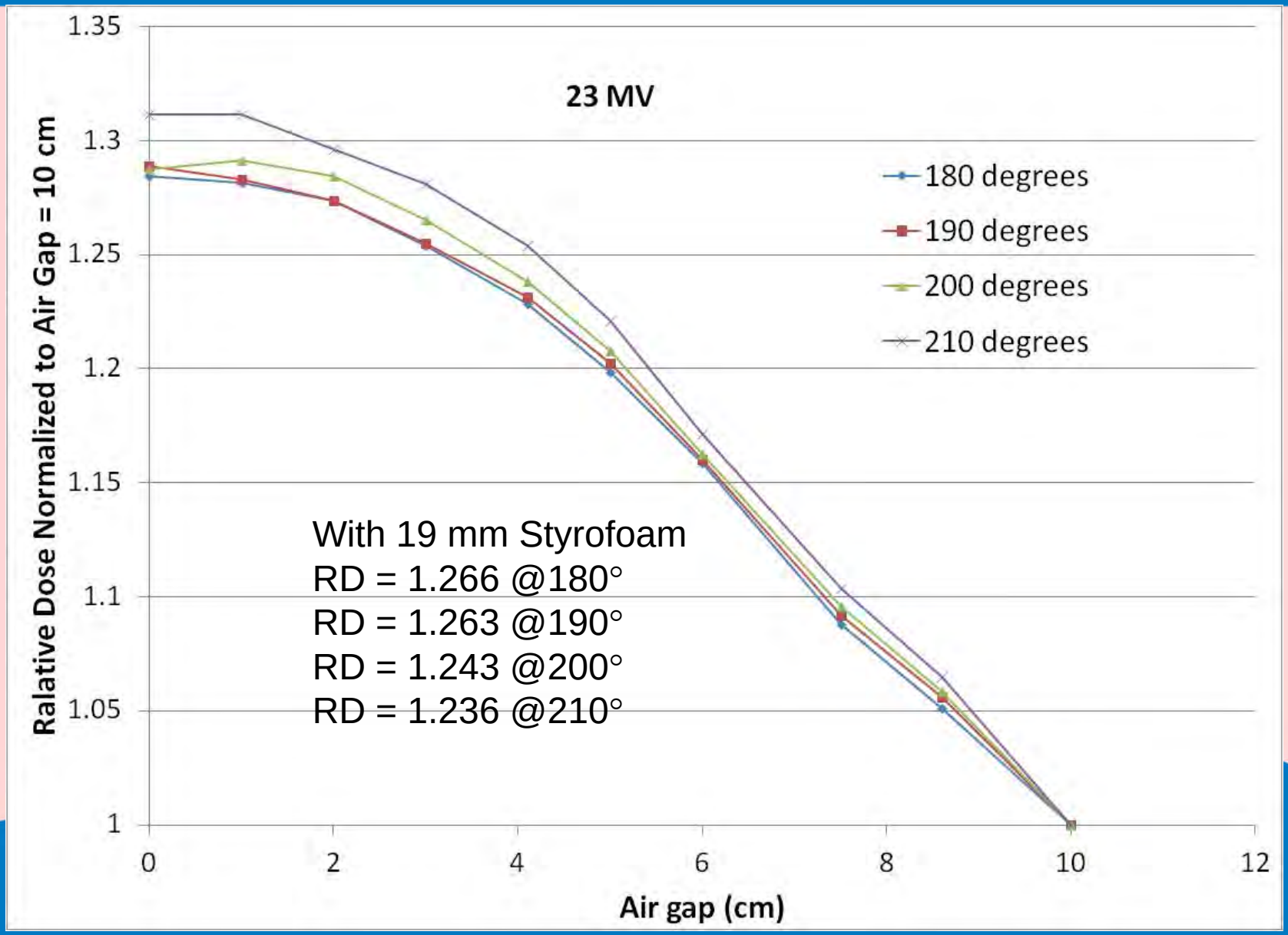
Increased Skin Dose from the Top Insert



Increased Skin Dose (1 mm depth) from the Bottom Board



Increased Skin Dose (1 mm depth) from the Bottom Board



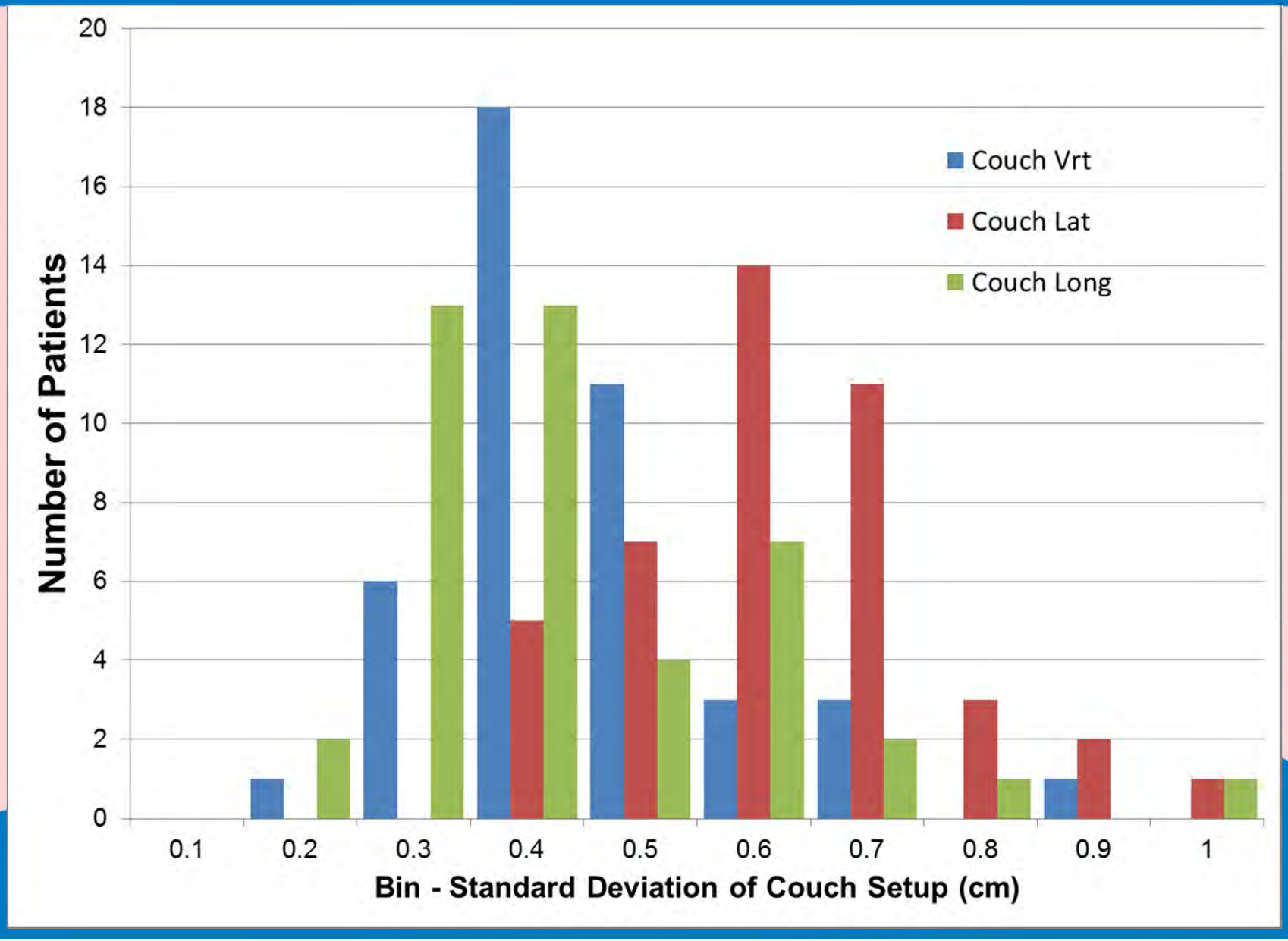
Summary I

- Quality Assurance for Prone Breast Board is crucial to ensure accurate patient setup and dose delivery
- It is necessary to evaluate and understand the potential dosimetric effects from the Prone Breast Board
  - Attenuator: reduces dose to target
  - Bolus effect: increases dose to skin

Inter-fractional Setup Variation

- Prone breast board is indexed to the treatment couch
- Lasers aligns to indexed rulers scale
- Lateral tatoo (CT mark) on breast
- Day-to-day table position variation represents the potential inter-fractional setup variation
- Analyzed 43 patients

Distribution of Inter-fractional Table Position Standard Deviation



Inter-fractional Table Position Variation – Patient Pool (45 patients)

- Small size (Air gap > or = 9 cm) :

  11 patients

- Medium size (Air gap < 9 cm; and > or = 6 cm):

  15 patients

- Large size (Air gap < 6 cm; and > or = 2 cm):

  11 patients

- Very Large Size (Air gap < 2 cm):

  4 patients

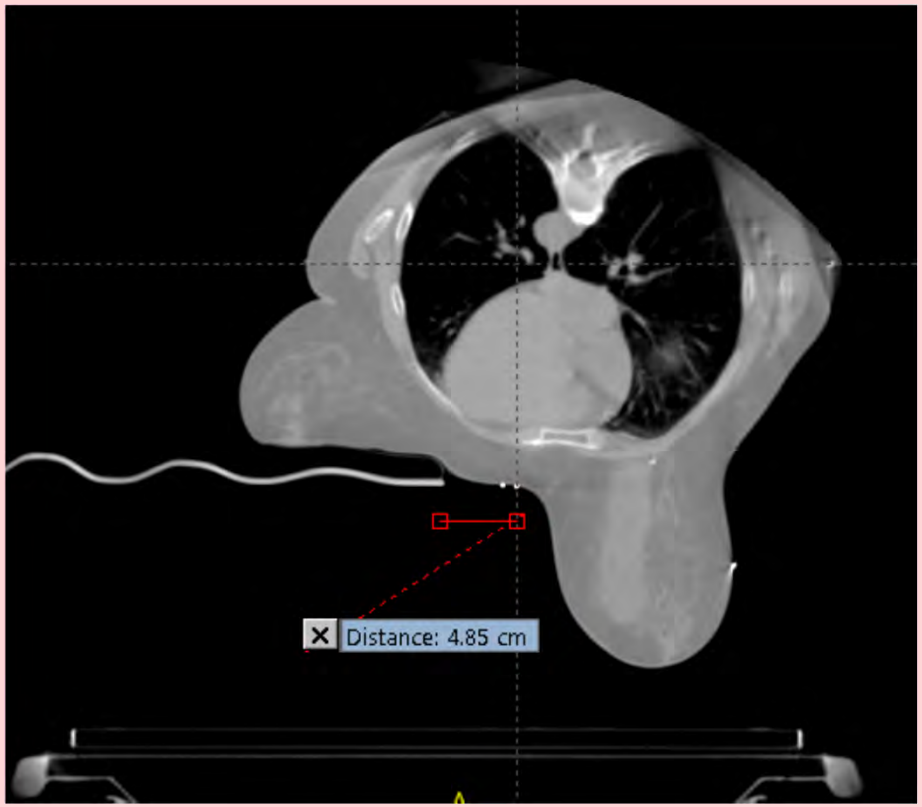
- Very Large Pendulous landing on Styrofoam:

  2 patients

Inter-fractional Table Position Variation

Dimension	# patients	Vrt	Lat	Long
S	11	**0.37 ± 0.09**	**0.54 ± 0.15**	**0.29 ± 0.11**
M	17	0.40 ± 0.10	0.56 ± 0.13	0.42 ± 0.21
L	11	0.39 ± 0.16	0.57 ± 0.14	0.45 ± 0.15
VL	4	0.48 ± 0.22	0.61 ± 0.18	0.37 ± 0.07
VLP	2	0.34 ± 0.13	0.62 ± 0.02	0.42 ± 0.16
Total	45	0.39 ± 0.13	0.56 ± 0.14	0.39 ± 0.17

Example - Possible Instability and/or Discomfort



- Patient 10

2.67 Gy x 15 fx = 40 Gy:

SD_{Vrt} = 6.9 mm

SD_{Lat} = 8.0 mm

SD_{Long} = 5.6 mm

Summary II

- Inter-fractional setup variation is largest at the lateral direction (with mean standard deviation ~6 mm at couch lateral)
- Little difference among different size groups for table setup variation (smallest breast size group had slightly smaller variation)
- Patient's comfort and stability is important for setup reproducibility
- Proper couch tolerance should be implemented in order to reduce chances of setup error

Acknowledgement

- Conference Organizing Committee
- RPCI prone breast team
- RPCI physics team and QA associates
- Amy Jessica Lau – data collecting/analysis

  (Medical Physics Program, University at Buffalo)

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Symposium: Prone Breast -- Rationale, Simulation, Planning and Treatment