

# **Debate: Intra-operative Planning is the Gold Standard of Care in LDR Brachytherapy**

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Guy's and St Thomas'



NHS Foundation Trust

# LDR Brachytherapy at GSTT

- GSTT implemented LDR prostate brachytherapy in Dec 2003
- Currently treat approx 70 patients a year
- Have always used intra-operative planning
- Use Mick applicator to implant seeds
- Calculate number of seeds to order from TRUS volume performed in clinic
- Post implant CT one month later

# Why Intra-operative Planning?

Only one procedure  
for the patient

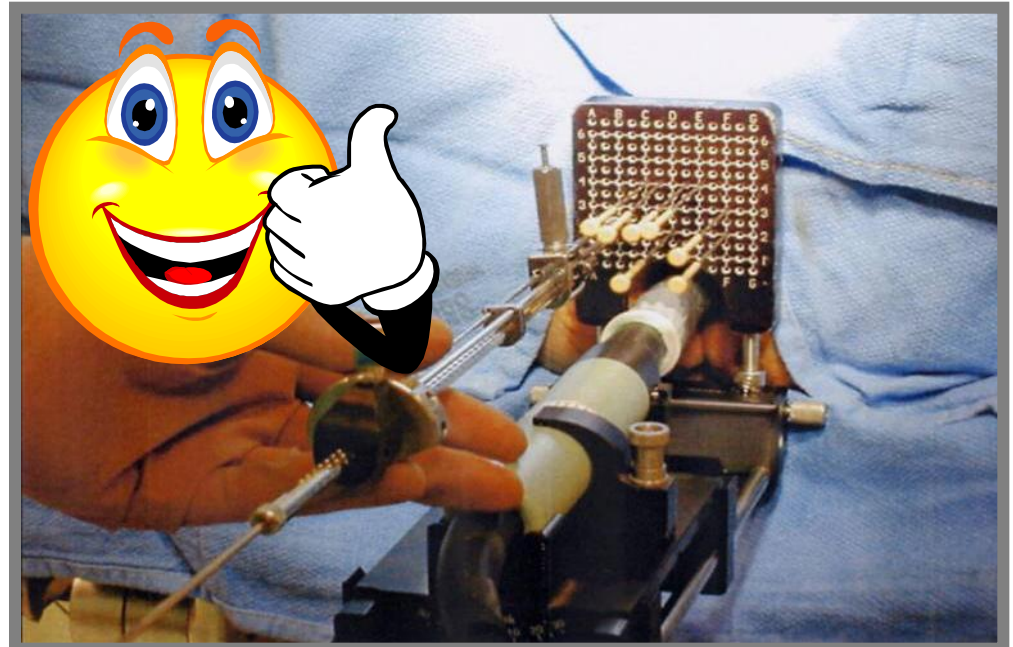
# One Procedure

Day case – no  
overnight stay

Volume study, treatment  
plan & implant seeds  
the same procedure



No procedure for  
pre-implant images



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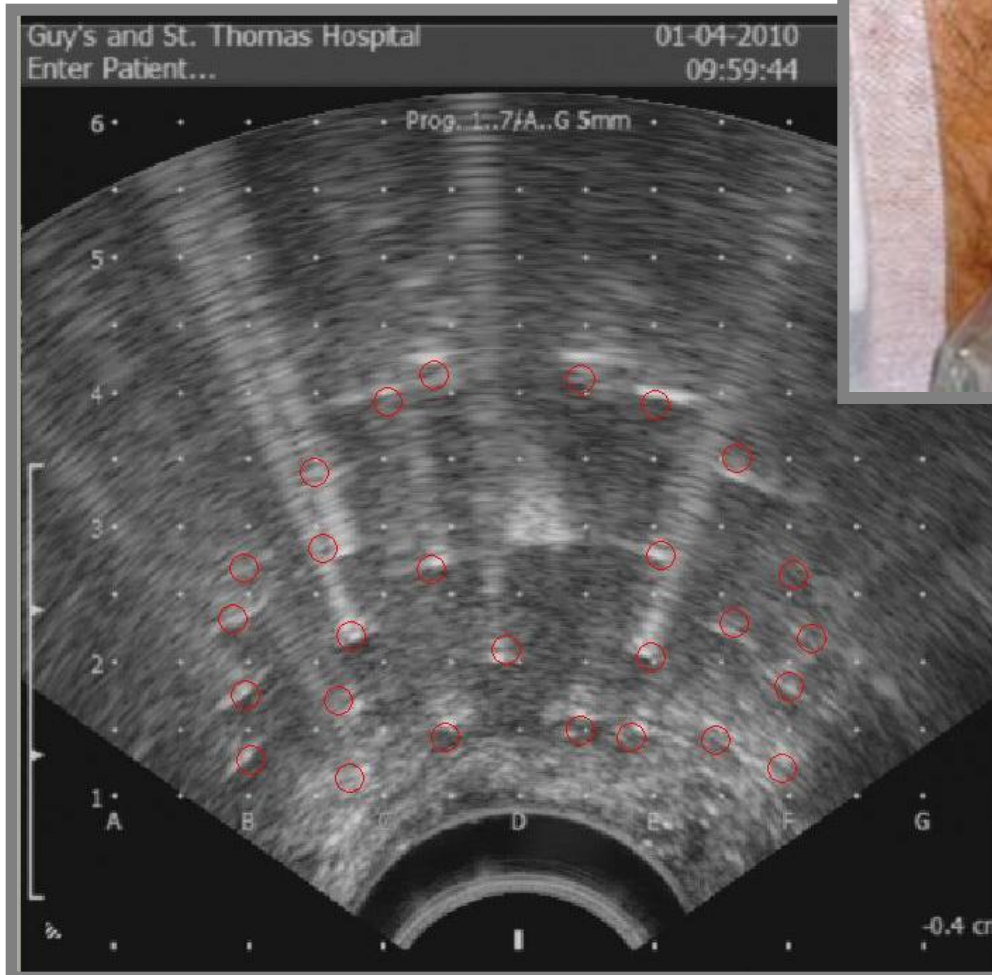


# Why Intra-operative Planning?

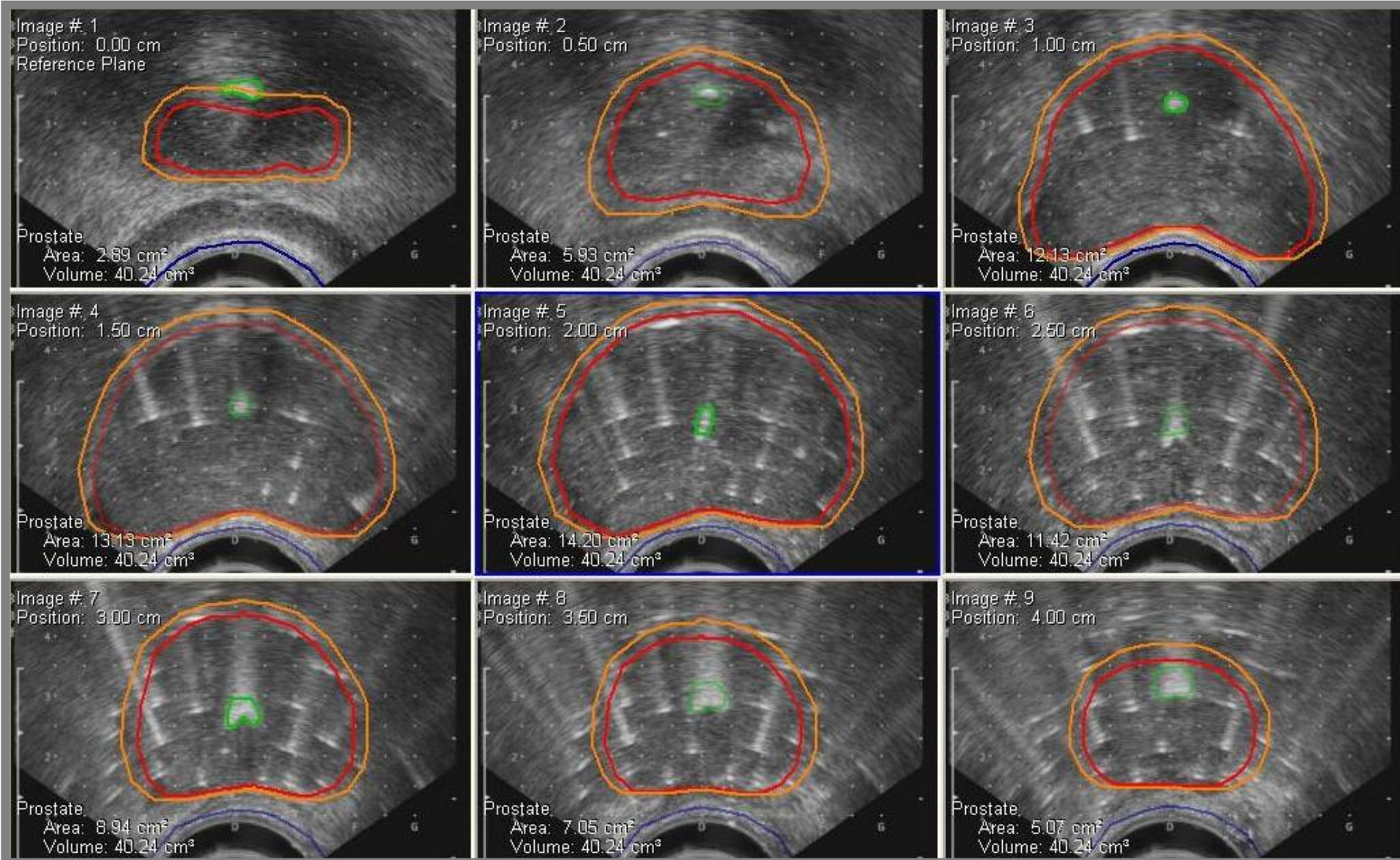
Can adapt to patient conditions presented on the day of the implant



# Intra-operative planning



Needles distributed  
around periphery of  
prostate with few  
additional central ones  
avoiding urethra



**Contours drawn by oncologist  
with needles in situ**





# Treatment Planning System - VariSeed

**Automatic Source Placement**

Placement Method | **Implant Area Rules** | Dose Rules

GSTT+margin [Save Rule Set As... Delete Rule Set]

Current Set of Dose Rules

Require [ ] % of the ☐ Volume of the [Prostate] ☐ Surface

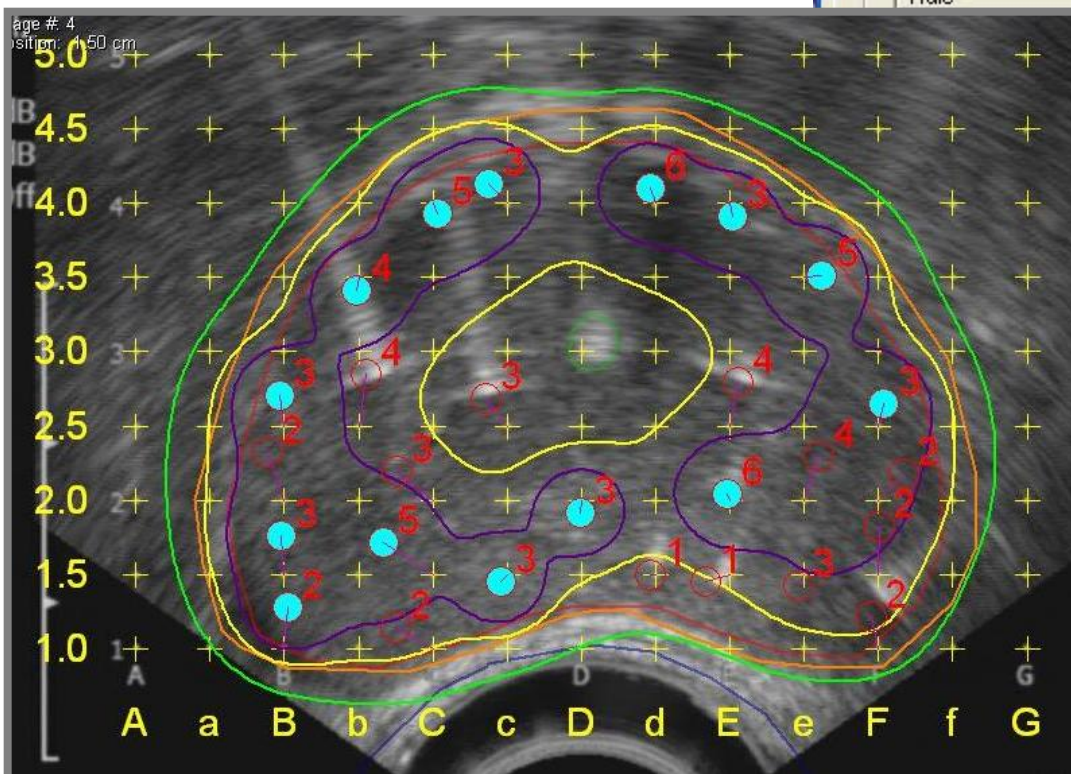
to be ☐ above ☐ below [ ] % of the Prescription Dose. [ ] Gy.

Weight this rule as a [ ] out of 10. [Add Rule to List]

Rule	Weight
of the Prostate+margin volume to be above 100.0% Rx	10
of the Prostate+margin volume to be below 200.0% Rx	8
of the Urethra volume to be below 140.0% Rx	8
of the Rectum surface to be below 200.0% Rx	6
of the Prostate+margin volume to be below 150.0% Rx	5

[Delete Unused Rules]

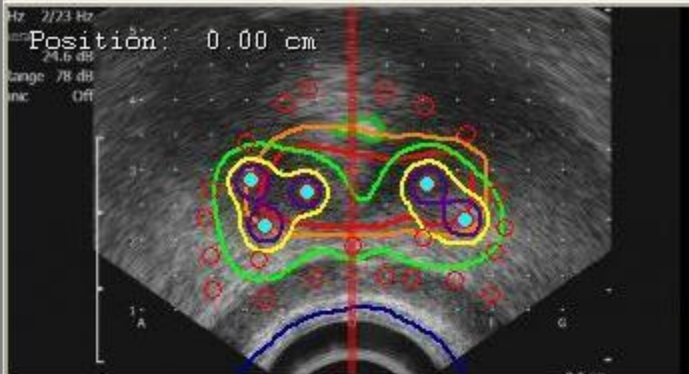
[OK] [Cancel]



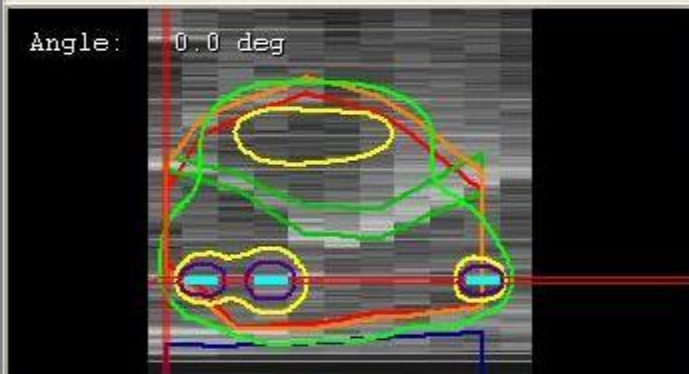
**Preloaded optimisation rules to speed creation**



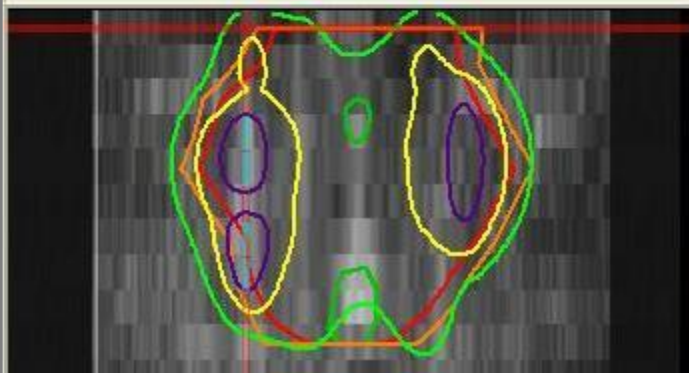
Transverse



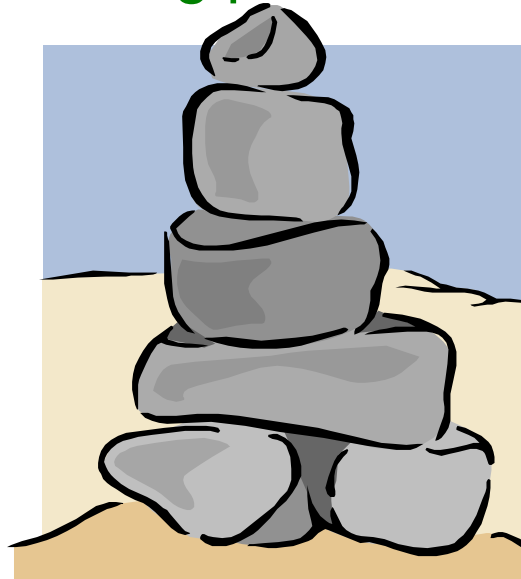
Longitudinal



Coronal



Register actual  
positions of  
implanted seeds  
during procedure



Plan not set in **stone**  
can still adapt

Adjust the plan to  
the patient not the  
patient to the plan!

Prescription Dose/Isodose Levels

145.0 Gy

Modify...

Dose (Gy)	Dose (%)	Color
<input type="checkbox"/> 362.5	250 %	
<input checked="" type="checkbox"/> 290.0	200 %	
<input checked="" type="checkbox"/> 217.5	150 %	
<input checked="" type="checkbox"/> 145.0	100 %	
<input type="checkbox"/> 107.3	74 %	

Activity: 0.490 U

Longitudinal

Transverse

0.00 cm

Set Probe Depth

Overlay Controls

- ☒ Sources
- ☒ Anatomy
- ☐ Landmarks
- ☒ Isodose Contours
- ☒ Needle Paths

Dosimetric Quality Alerts

Prostate+margin - V200:	26.73 %
Prostate+margin - D90:	118.80 %
Urethra - V140:	0.00 %
Rectum - V100:	0.09 cc

Set...

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# Why Intra-operative Planning?

One session for  
multi-disciplinary team  
of staff to attend





# Why Intra-operative Planning?

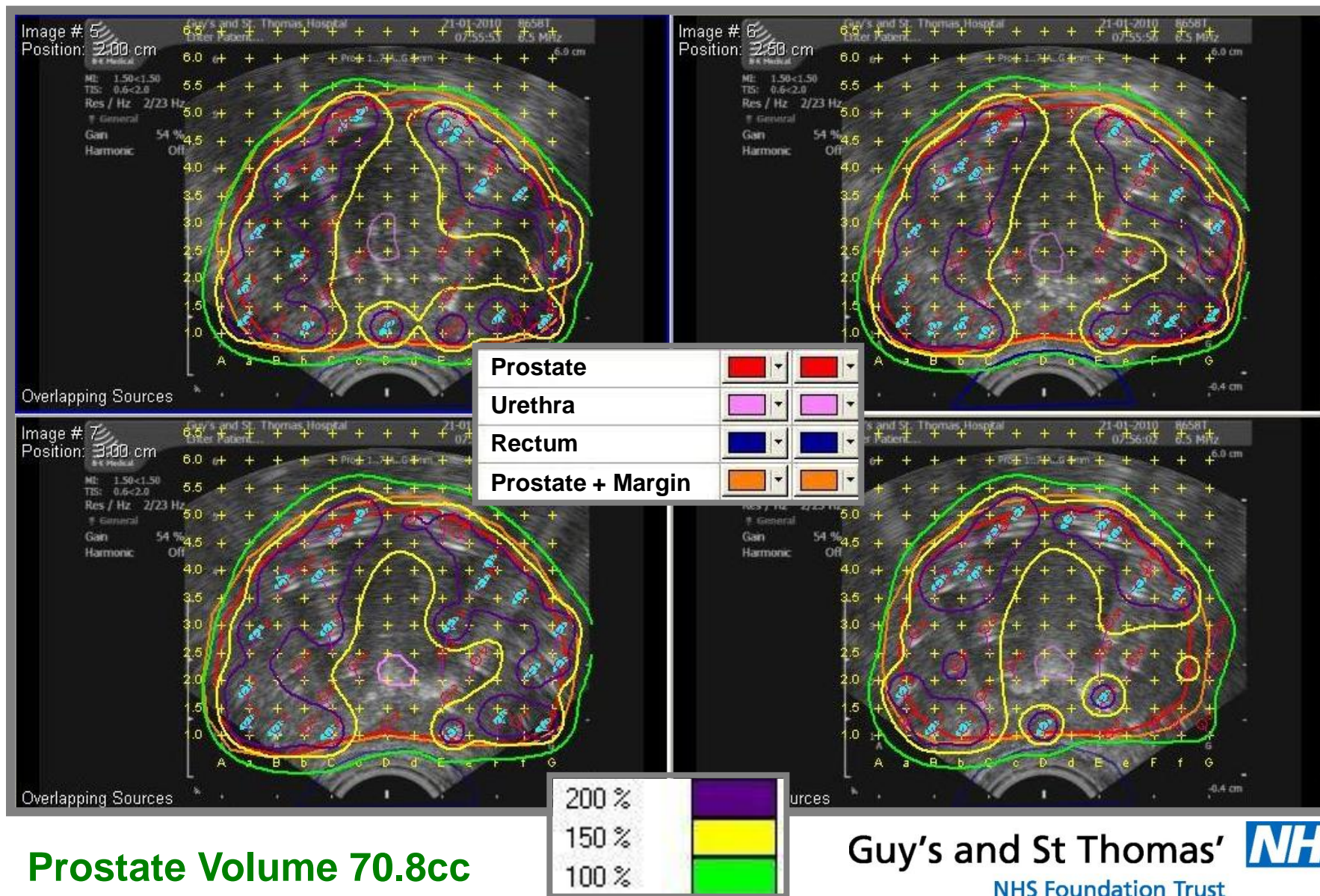
Ideal for special cases:

- Large prostates >50cc
- TURP

# Case Study – Large Prostate

- Since Dec 2003 implanted 350 patients
- Median size – 39cc
- Largest prostate implanted 91cc
- 70 patients implanted prostate volume >50cc

# Case Study – Large Prostate

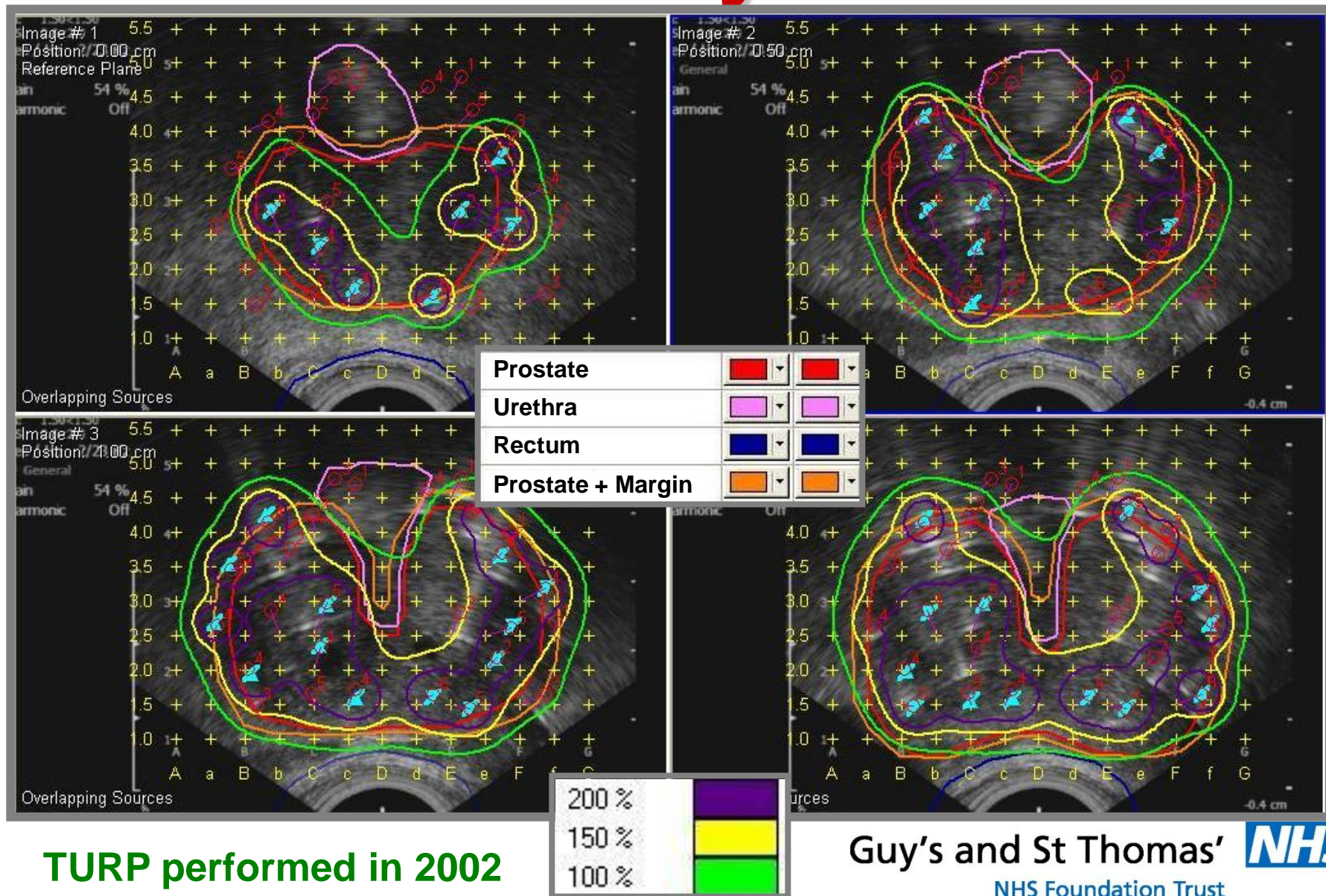




# Case Study - TURP

- Since Dec 2003 implanted 350 patients
- First patient with TURP implanted 2004
- 52 patients with TURP have been implanted
- 32 of these patients have had at least 18months follow-up post implant

# Case Study- TURP



# Summary

- One day only procedure for the patient
- Can adapt to conditions presented on the day of the implant
- One session for a multi-disciplinary team of staff to attend
- Ideal for patients with large prostates and patients who previously had a TURP



# Conclusion

Intra-operative planning is the  
**gold** standard of care in LDR  
brachytherapy



**Thank you  
for your  
attention**