

Absolute Marking using TumorLoc: *(Isodownload)* The Edinburgh Cancer Centre Experience

John Burton,
Principal Radiographer for Pre-Treatment
Edinburgh Cancer Centre

Development

- October 2001 – 1x CT Simulator installed:
 - GE HiSpeed FX/I, GE Advantage Sim, LAP 4 Lasers.
- 2002 - Isodownload process introduced to remove requirement for a plan check.
 - Anatomical placement of isocentre (initially prostate / bladder) by radiographers, treatment planned asymmetrically around this isocentre.
- Subsequently rolled out to other radical sites, and palliative treatments.

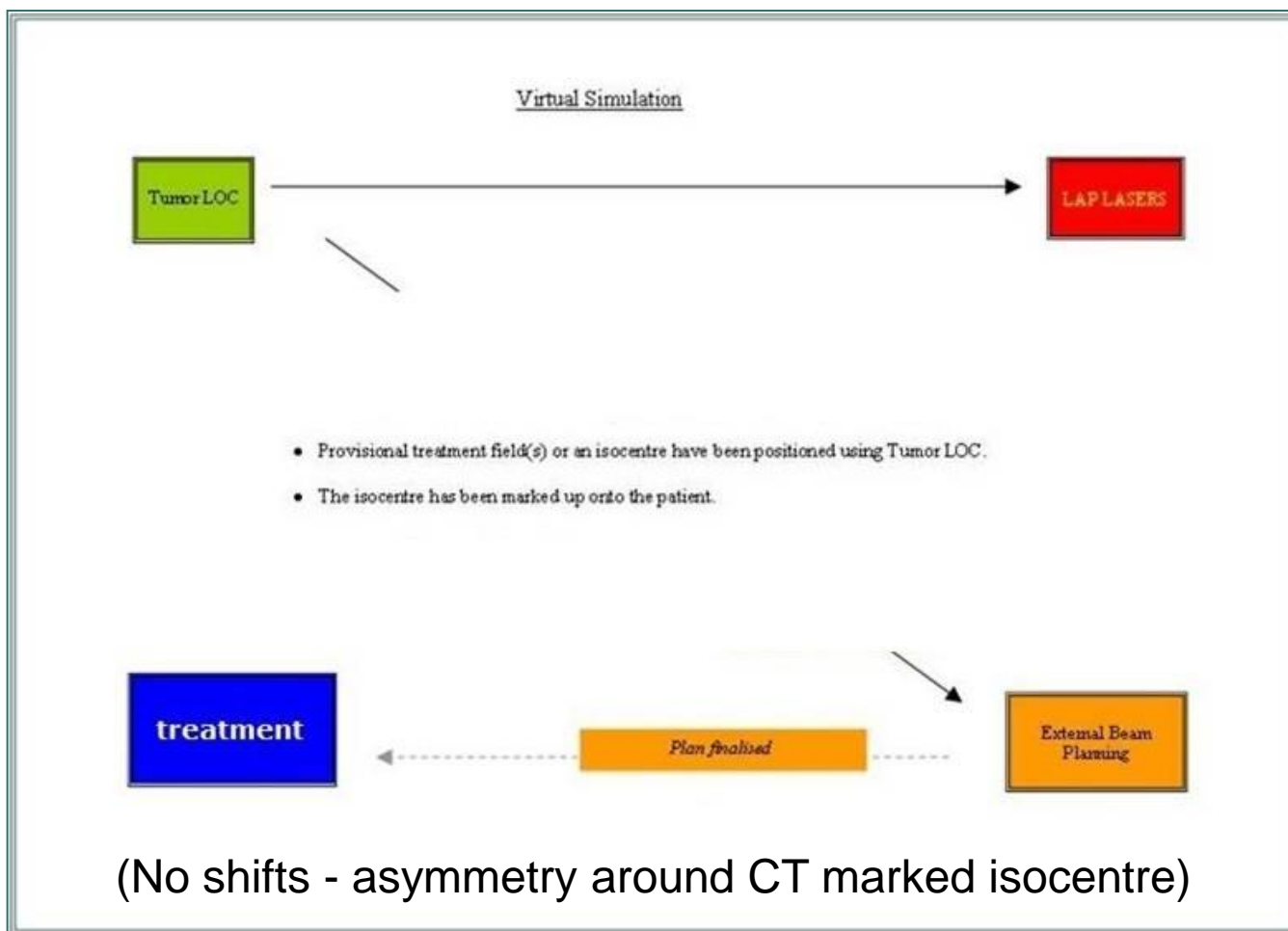


Rationale



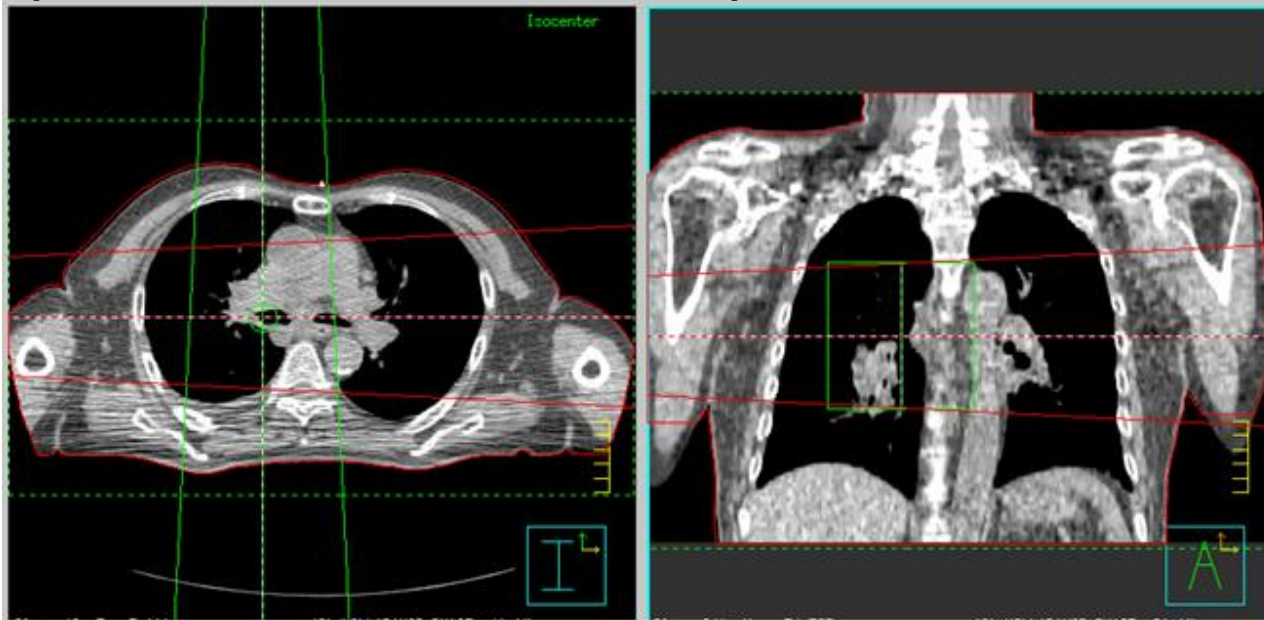
- Addressed a bottleneck in pre treatment; decreased the time between decision to treat and the first treatment fraction.
 - (Massive pressure on department to achieve waiting times targets)
- No transfer of capacity issues to treatment units (ie. for applying shifts).

Virtual Simulation Workflow

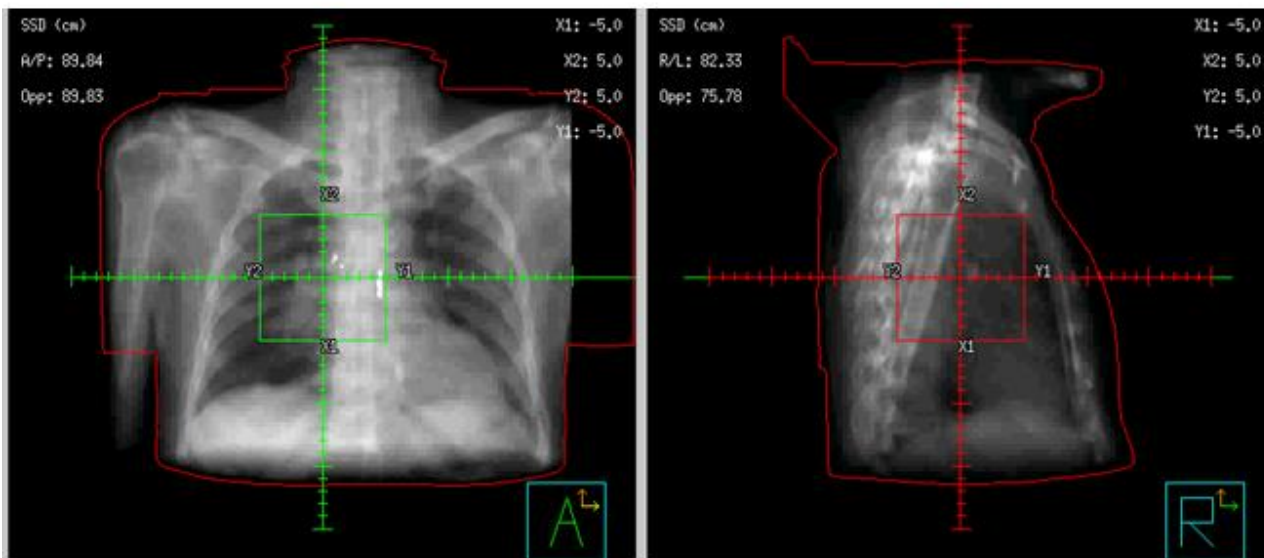


Palliative Lung example

(Virtual Simulation – On-Line)

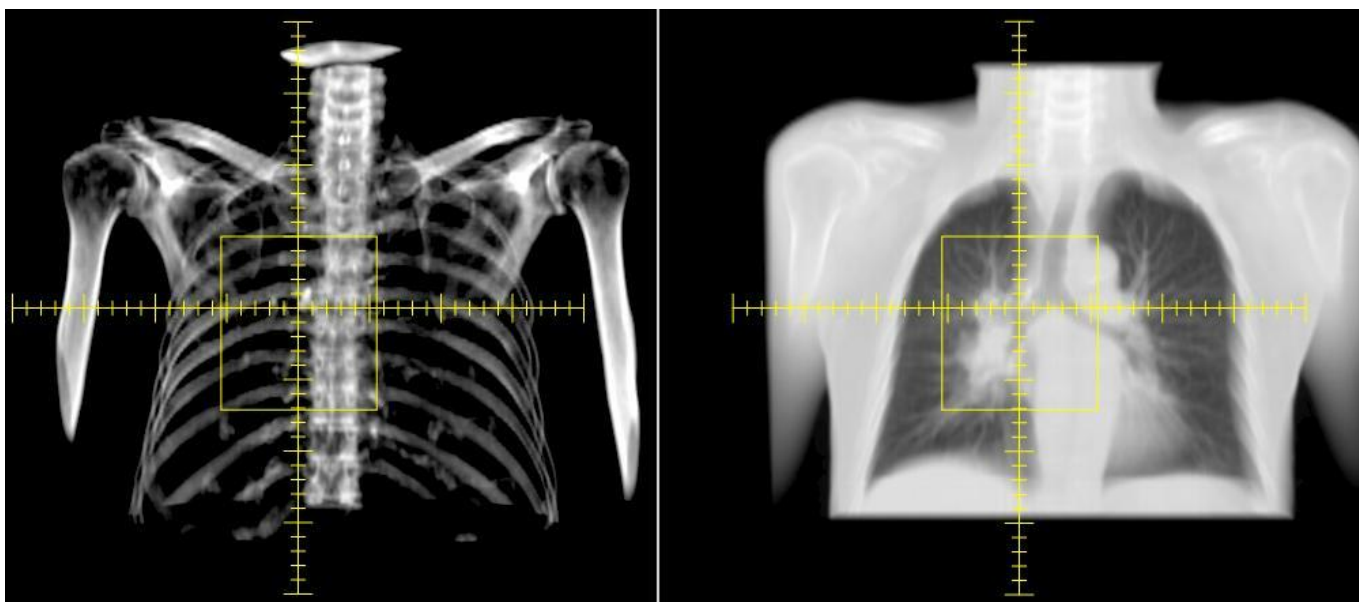


Fields positioned anatomically using TumorLoc



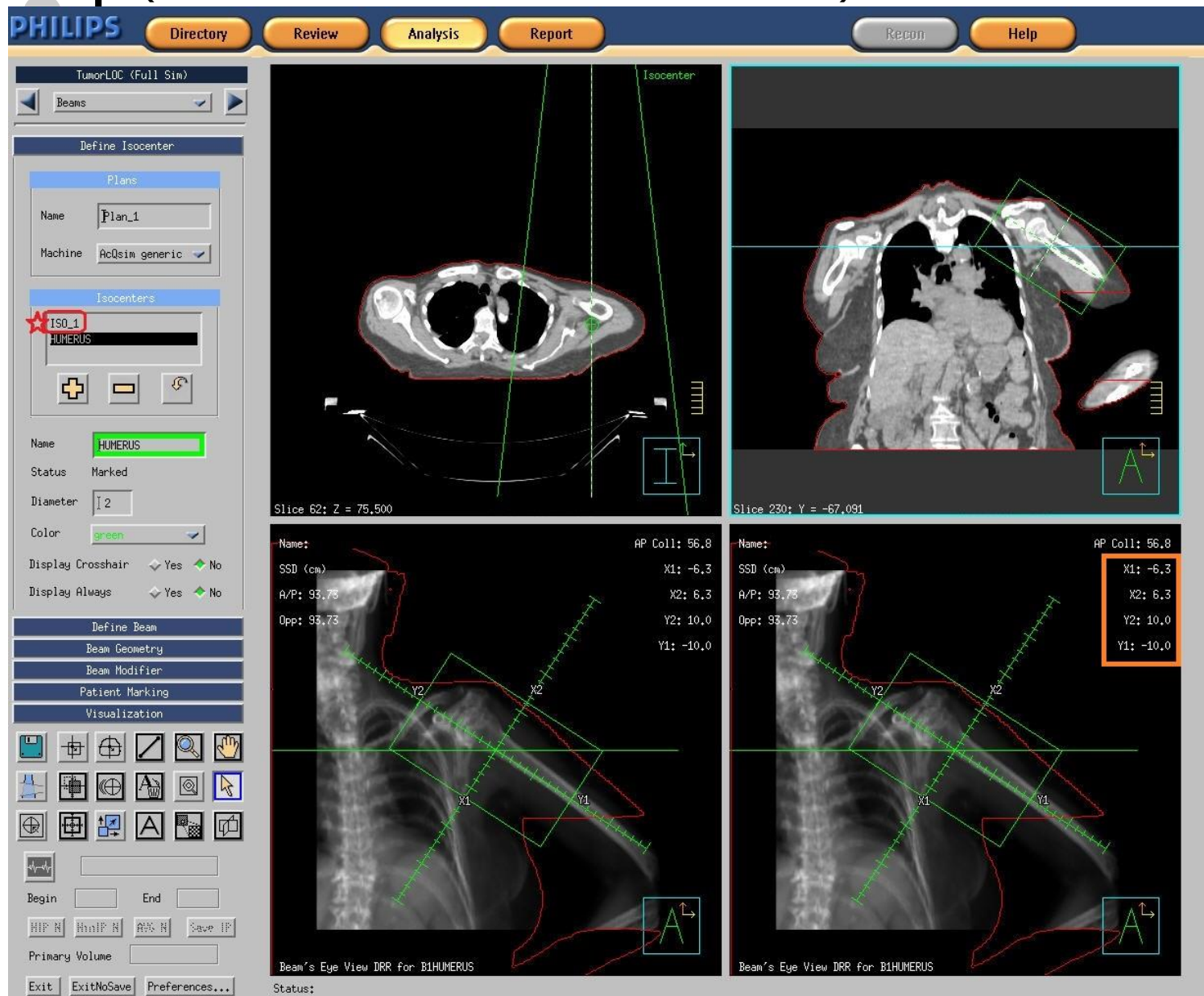
Final asymmetric fields (Virtual Simulation – Off-Line)

Fields adjusted using asymmetry, maintaining isocentre as marked

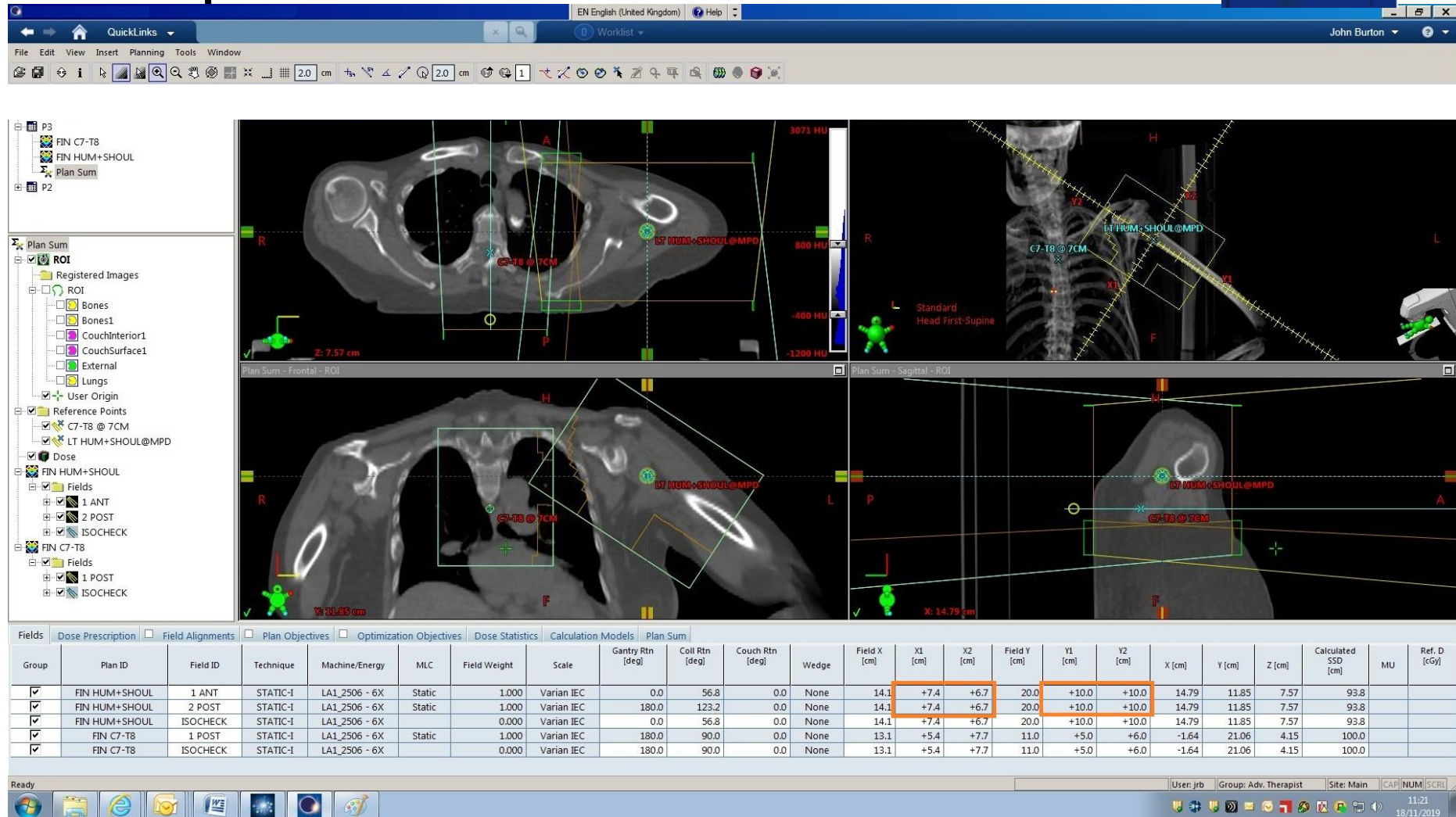


Palliative example

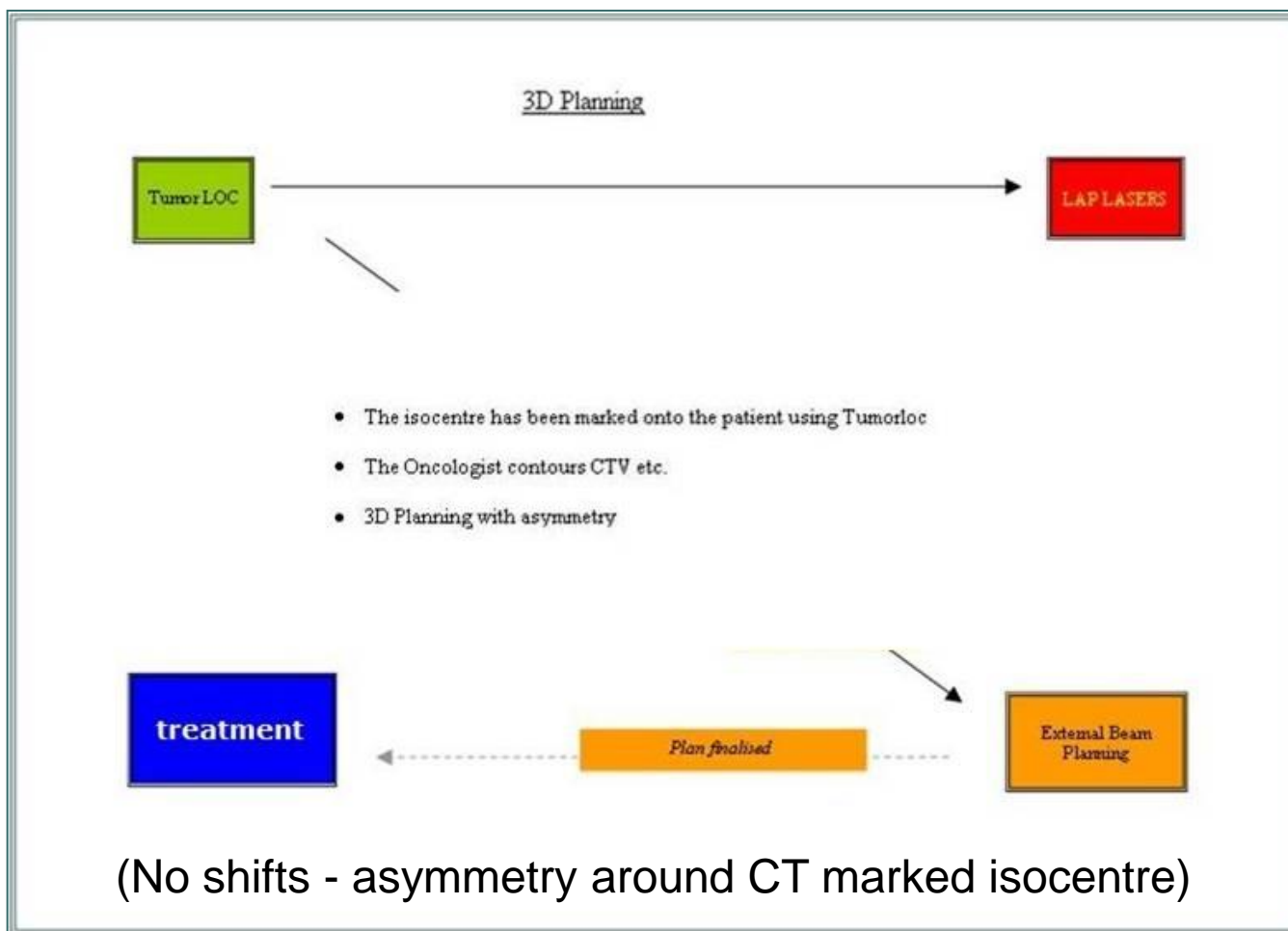
(Virtual Simulation – two isocentres)



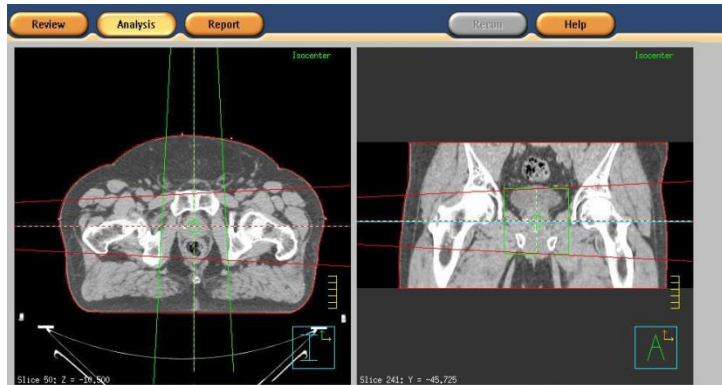
Final asymmetric fields – plan sum



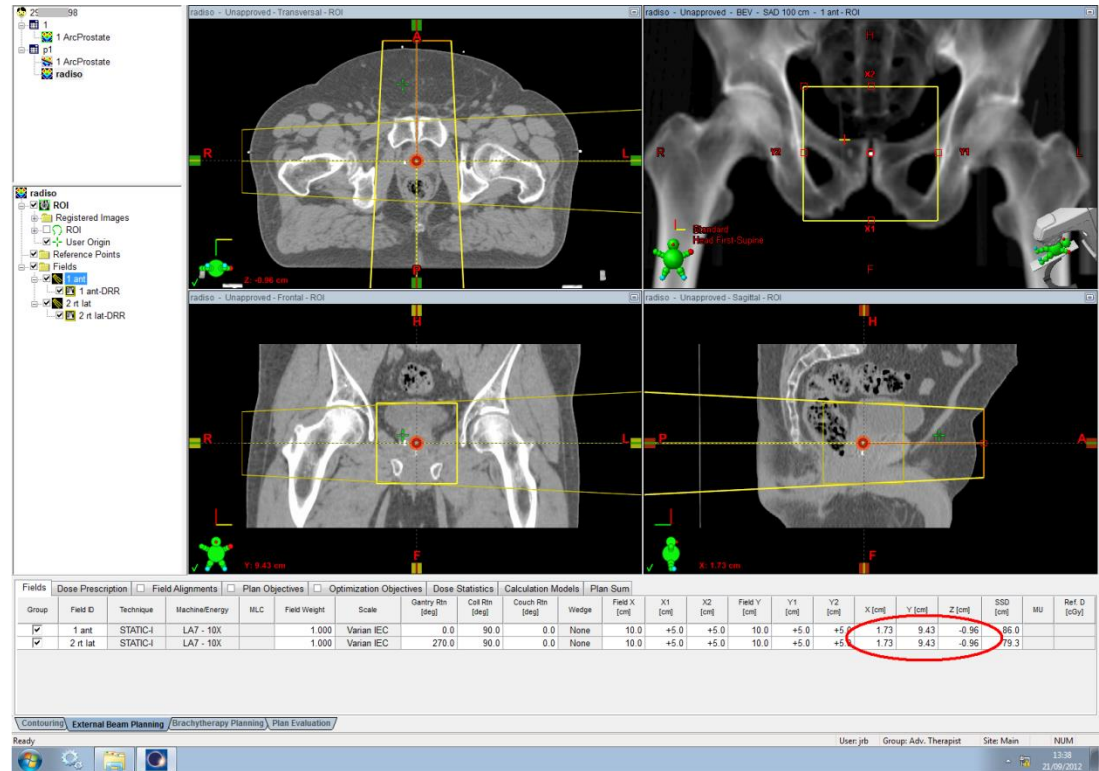
3D Planning Workflow



Radical Prostate example

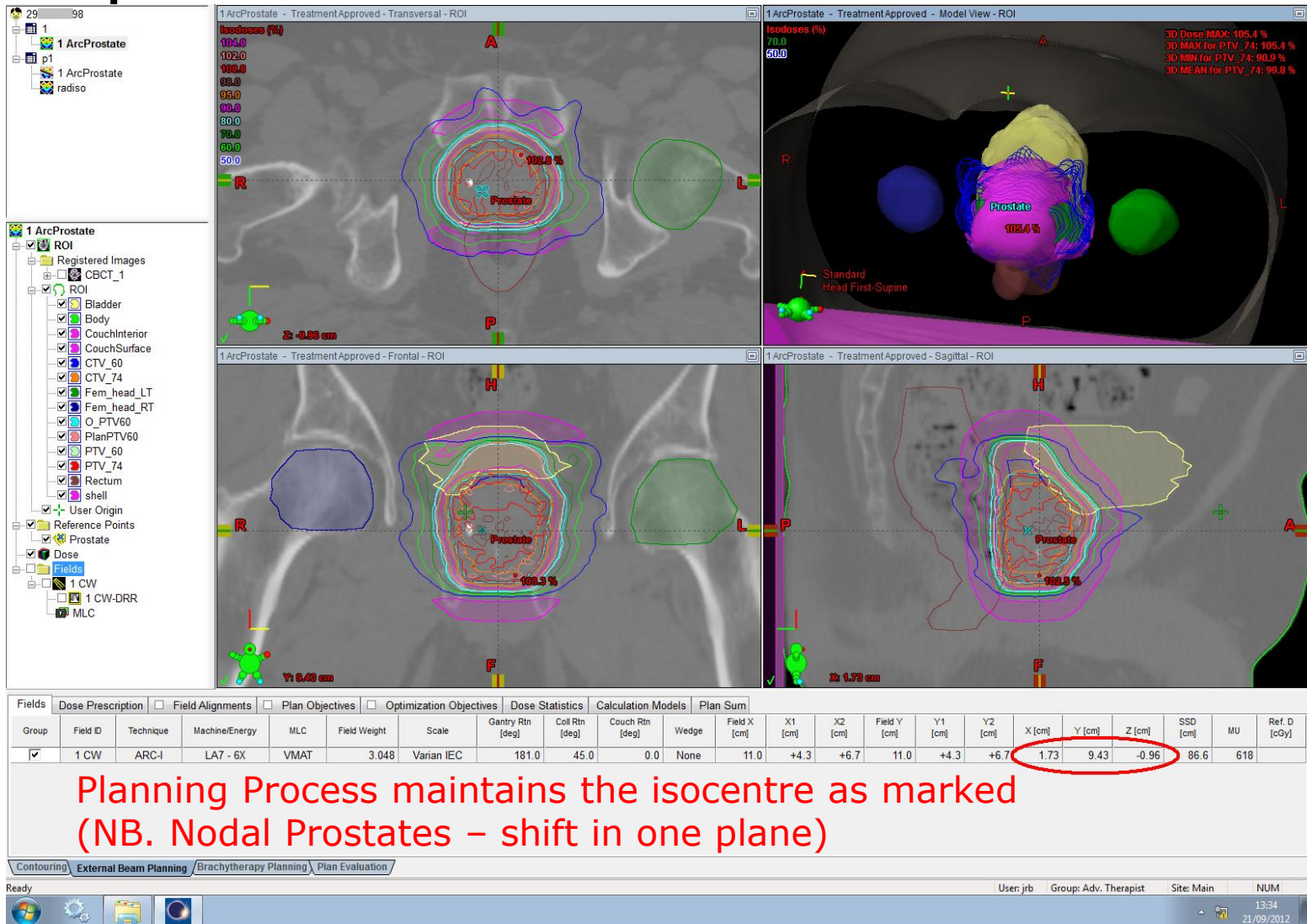


Isocentre positioned
anatomically by
radiographers (TumorLoc)



TumorLoc plan imported into RT Planning
System

IMRT Planning: Rapidarc (3D Planning – Off-Line)



Radical Processes



- Included in our CT scan protocol docs.
- (extracts)

Download Process Prostate, Prostate +SVs and Nodal Prostate	<ul style="list-style-type: none"> ○ Scroll through axial slices to identify the superior aspect of the prostate ○ Scroll down through the prostate to identify the inferior aspect. ○ On the middle slice, position the isocentre at the centre of the prostate ○ Review the axial, coronal and sagittal views to assess the isocentre placement
Download Process Prostate bed	<ul style="list-style-type: none"> ○ Place isocentre ant/post in line with mid femoral heads ○ Sup/inf is at the halfway point Sup/inf of the symphysis pubis ○ Left/right isocentre sits midline ○ Review the axial, coronal and sagittal views to assess the isocentre placement
Download Process Prostate SABR	<ul style="list-style-type: none"> ○ Scroll through axial slices to initially position isocentre at the superior tip of the RayPilot Transmitter ○ Determine shift values to reposition isocentre at approximate centre of prostate <ul style="list-style-type: none"> ○ Eg 2cm INF / 1cm POST / 0.5cm RT etc ○ Record the displacement (shift) from the tip of the Transmitter to the isocentre.
Download Process Bladder	<ul style="list-style-type: none"> ○ Review the axial, coronal and sagittal views to assess the size and shape of the bladder ○ Position the isocentre at the estimated mid point of the bladder by assessing the overall AP/LR and SI dimensions on the multi-plane reconstructions
Download Process Rectum	<ul style="list-style-type: none"> ○ Review the PA and the Lat beams eye views ○ On the PA view, position the isocentre in line with the symphysis pubis (SP), 1cm superior to the top of the SP. ○ On the lat view, position the isocentre 4.5cm Ant to the anterior surface of the sacrum on the central axis as positioned above
Download Process <u>Ph1 Cervix only:</u> NB, for VMAT - On Full Bladder scan	<ul style="list-style-type: none"> ○ Review the AP and the Lat beams eye views ○ On the AP view: <ul style="list-style-type: none"> ○ Position the superior border at the junction of L4-L5 if pelvis only ○ NODAL: Position the superior border at the junction of T12-L1 ○ Position the inferior border below the obturator foramen (unless extending to vagina) ○ Position the lateral borders to give 1cm clearance over the pelvic rim ○ Make the field symmetrical ○ On the Lat View <ul style="list-style-type: none"> ○ Set the length to match the AP view ○ Position the Ant border 0.5cm Post to the anterior aspect of the symphysis pubis ○ Make the field symmetrical <p>Position the Post border at the anterior surface of the sacrum</p>
Download Process <u>Ph1 Vagina only:</u> NB VMAT - On Full Bladder scan	<ul style="list-style-type: none"> ○ Review the AP and the Lat beams eye views ○ On the AP view: <ul style="list-style-type: none"> ○ Position the superior border at the junction of L4-L5 if pelvis only ○ NODAL: Position the superior border at the junction of T12-L1 ○ Position the inferior border below the obturator foramen (unless extending to vagina) ○ Position the lateral borders to give 1cm clearance over the pelvic rim ○ Make the field symmetrical ○ On the Lat View <ul style="list-style-type: none"> ○ Set the length to match the AP view ○ Position the Ant border 0.5cm Post to the anterior aspect of the symphysis pubis ○ Make the field symmetrical <p>Position the Post border at the anterior surface of the sacrum</p>



Reducing shifts - minimising errors

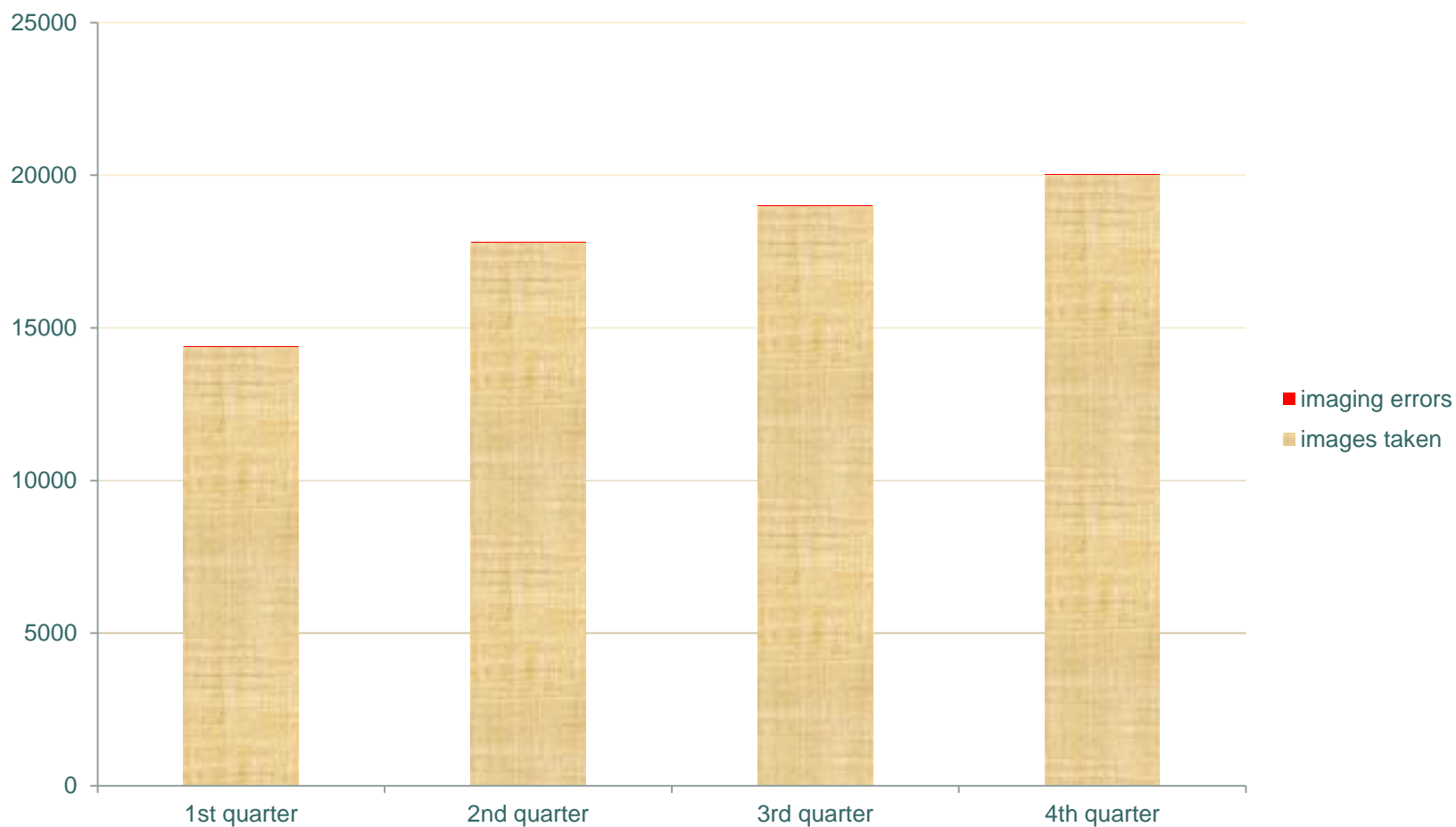


Imaging errors

- Most reported code in departmental analysis - 13i (7) use of onset imaging.
- Also 13aa (6) on set imaging: approval process & 13bb on set imaging: recording process (2).
- 5,000 images on an average month - equates to 0.02% error rate.
- Consistent with data from PHE on most reported errors.

13l – movements from reference marks not an issue (even with nodal prostates!)

Context - imaging errors



A decorative graphic consisting of three colored circles (dark teal, light teal, and grey) followed by a vertical line.

Conclusion

- Both radical and palliative isocentre downloads can be managed easily with TumorLoc
- No requirement for specialist pre-treatment teams for on call.
- The removal of verification for shifts from pathways has released capacity.



Our Philips



John Burton

John.Burton@nhslothian.scot.nhs.uk

Edinburgh
Cancer Centre



Another Philips - in Africa



LUV+ (Leprosy at Utale Village PLUS) <http://luvcharity.org>