The Clatterbridge Cancer Centre NHS
NHS Foundation Trust

The benefits and limitations of using **JAW TRACKING** to plan and deliver lung SABR

Naomi Sisson

Content

- What is Jaw Tracking?
- Why could lung SABR benefit?
- Does it reduce doses to OARs?
- Does it affect treatment times?
- Does it change delivery accuracy?
- Are there any limitations?

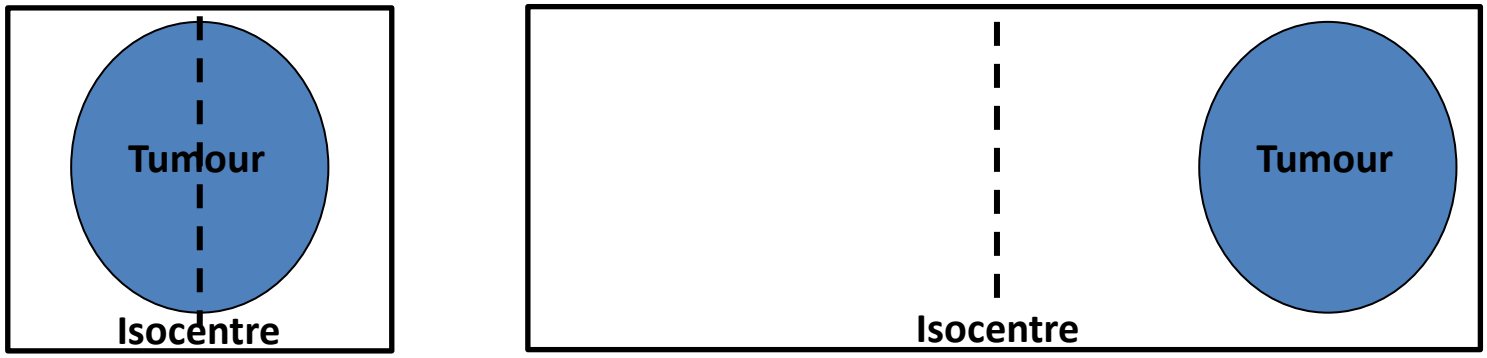
Jaw Tracking

- Available on Varian Linacs.
- A parameter in the Eclipse optimiser

- Enables the jaws to follow the outermost MLC leaf during VMAT delivery.
- Potential reduction in transmission from 1% with MLC closed to 0.02% with MLC and jaws.

Lung SABR at CCC

- Delivered using an off-axis isocentre



- Therefore the MLC leaves will move considerably to track the tumour as the gantry moves around the patient.

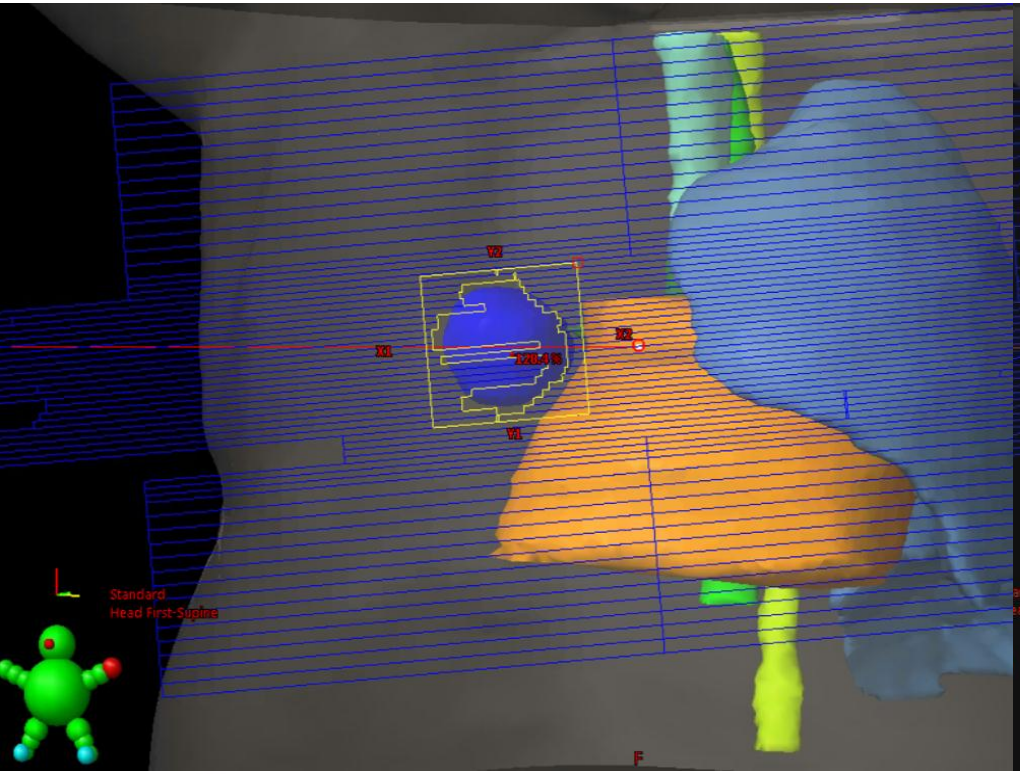
Creation of Plans

- Jaw Tracking and Static Jaw plans for 18 anonymised patients
- Identical except for the Jaw motion

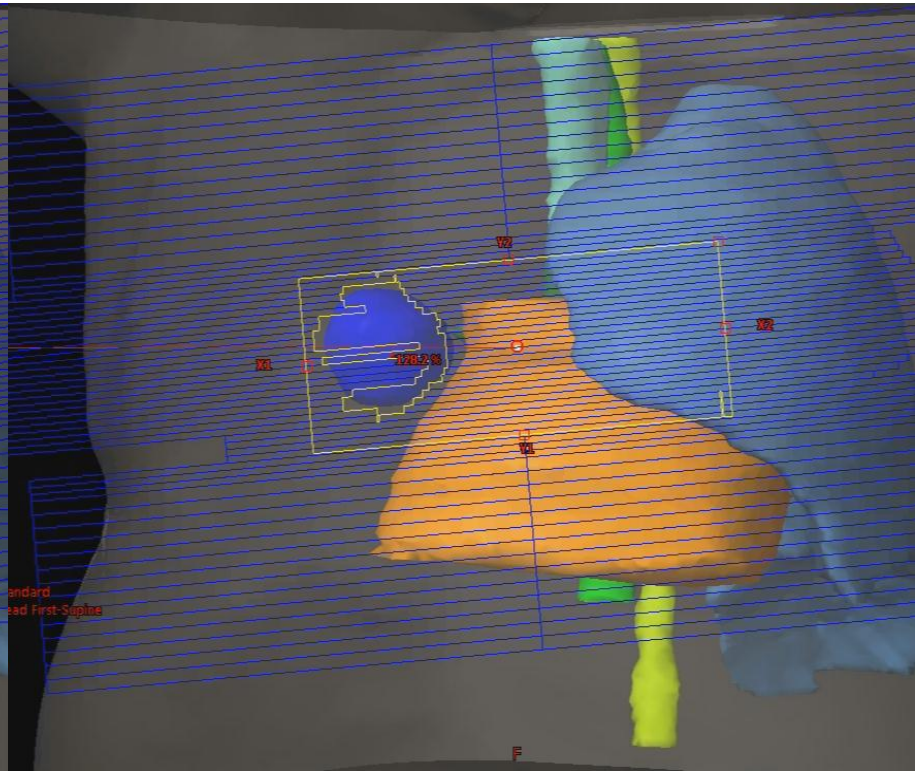
- Normalise so that 100% isodose covers 95% of the target volume

Beams Eye View

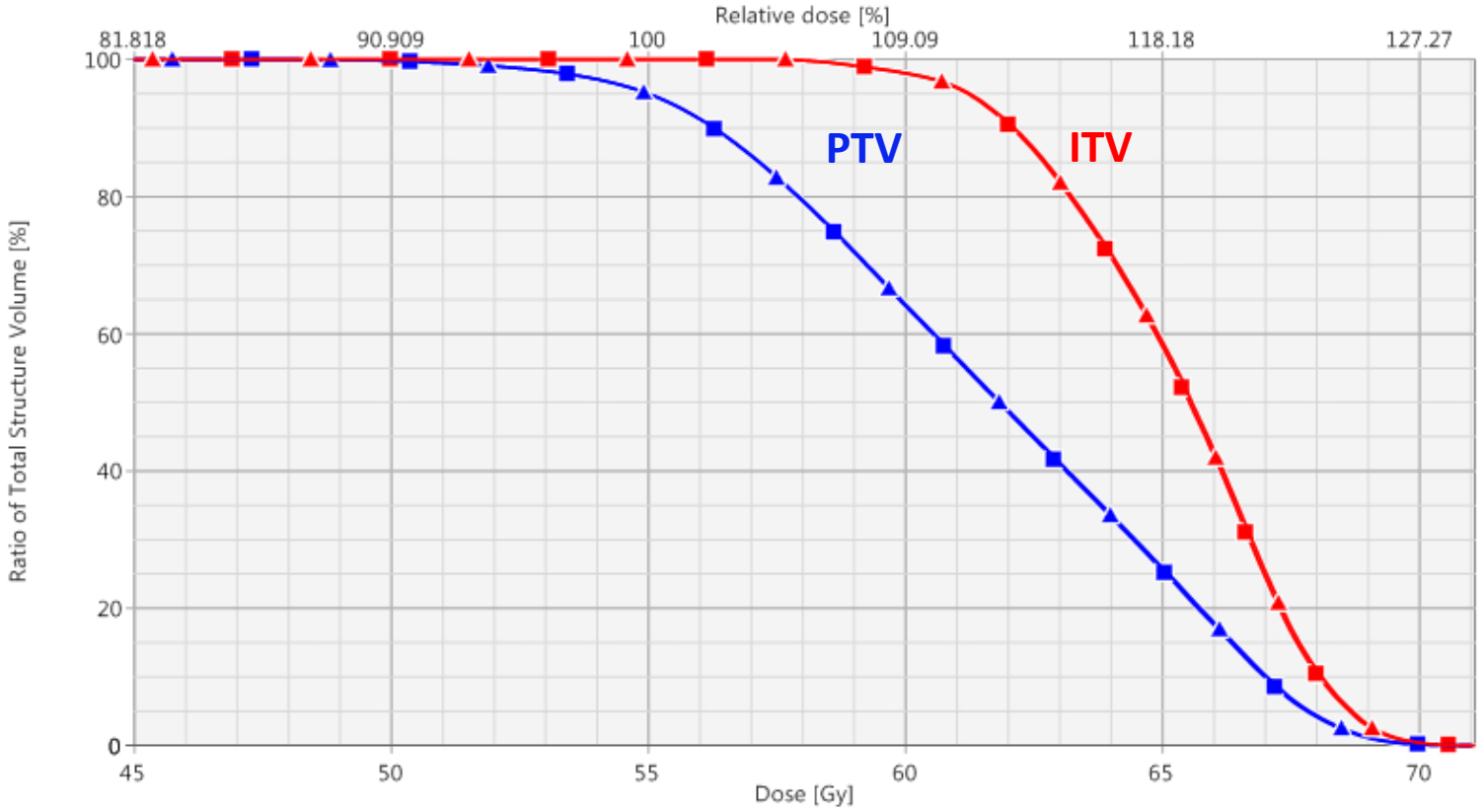
Jaw Tracking



Static Jaw



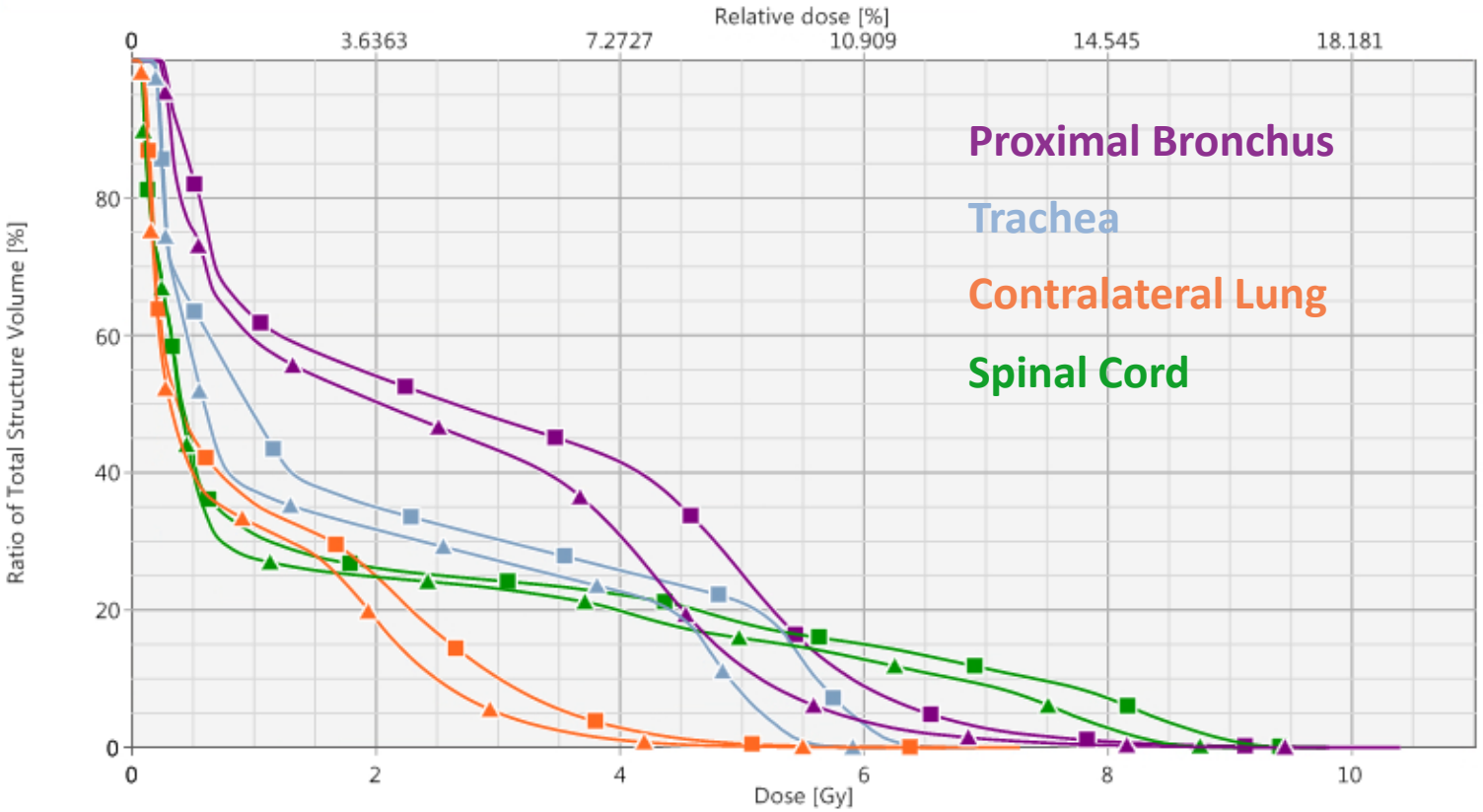
Results: Dose Volume Histograms



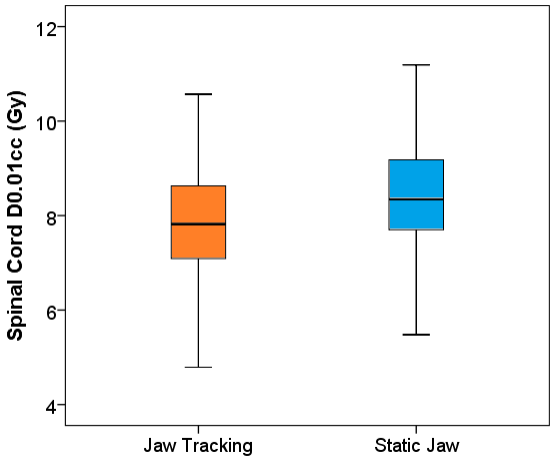
Jaw Tracking

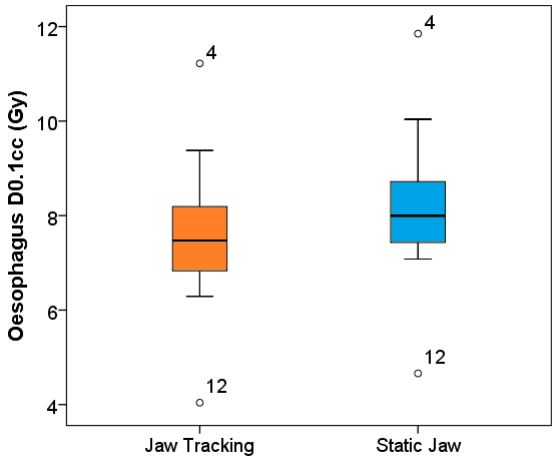
Static Jaw

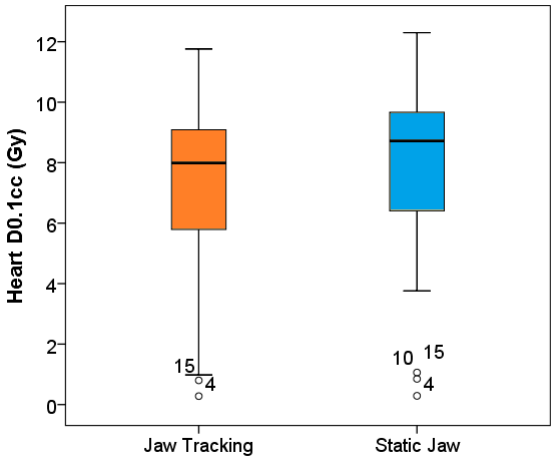
Results: Dose Volume Histograms

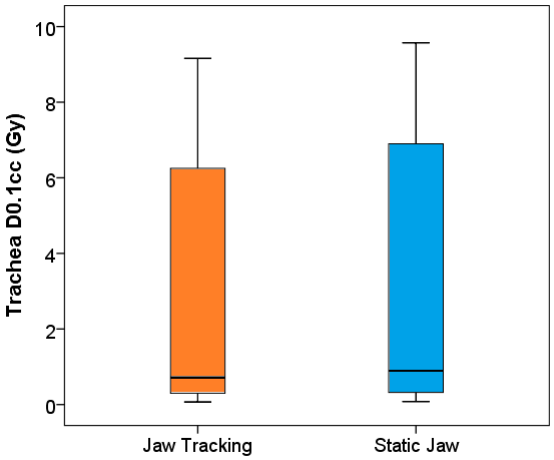


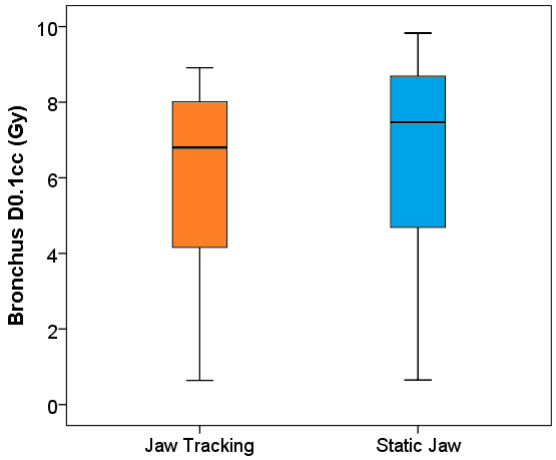
Results: Reduction in max dose to OARs









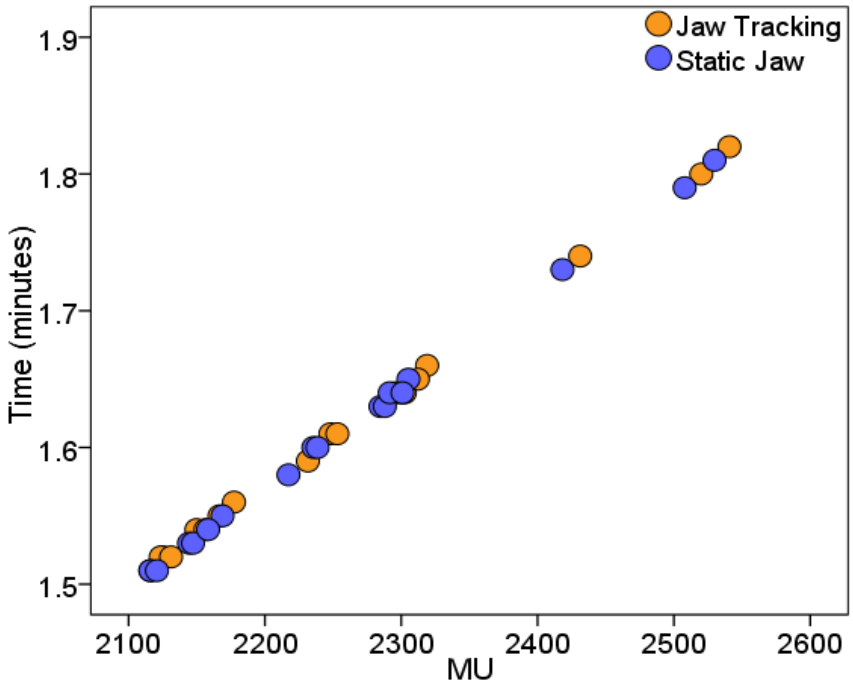


- **0.54Gy (7.1%) spinal cord D0.01cc**
- **0.59Gy (7.8%) oesophagus D0.1cc**
- **0.52Gy (7.4%) heart D0.1cc**
- **0.25Gy (8.8%) trachea D0.1cc**
- **0.51Gy (8.9%) bronchus D0.1cc**

***The mean dose reduction across all patients**

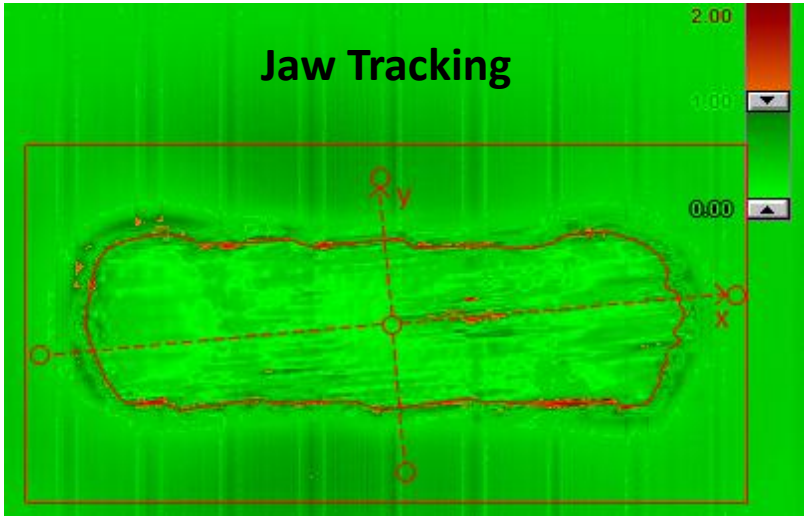
Results: Plan Delivery Time

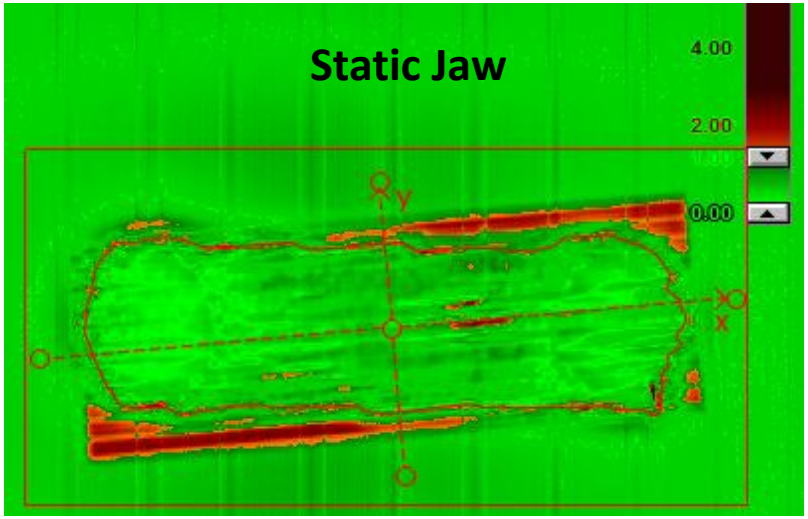
- Increase of 0.5 seconds for all Jaw Tracking plans compared to the Static Jaw plans.



Results: Plan Delivery

- Delivered to the EPID panel and analysed using Portal Dosimetry
- Gamma criteria 3% within 1mm

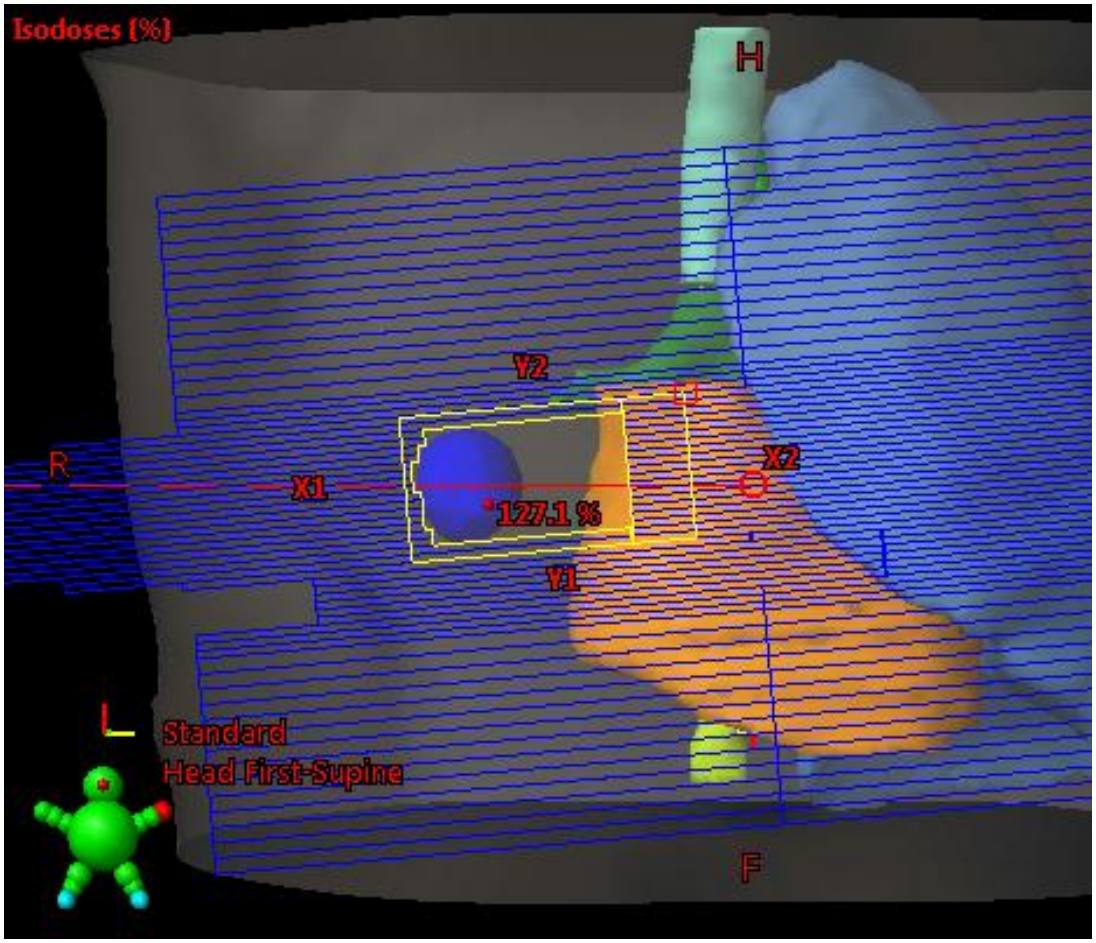




- Delivered Dose is more accurate with Jaw Tracking

Limitations Of Jaw Tracking

Maximum field size limited to 15cm in X.



Conclusions

- What is Jaw Tracking? A feature in Eclipse which enables the jaws to follow the outermost MLC leaf during delivery of VMAT.
- Why could lung SABR benefit? Off-axis isocentre
- Does it reduce doses to OARs? Yes
- Does it affect treatment times? No
- Does it change delivery accuracy? Improved accuracy
- Are there any limitations? There are limits to the maximum jaw size

Question?

Acknowledgements:

- Andy Willett
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- Carl Rowbottom
- Helen Mayles

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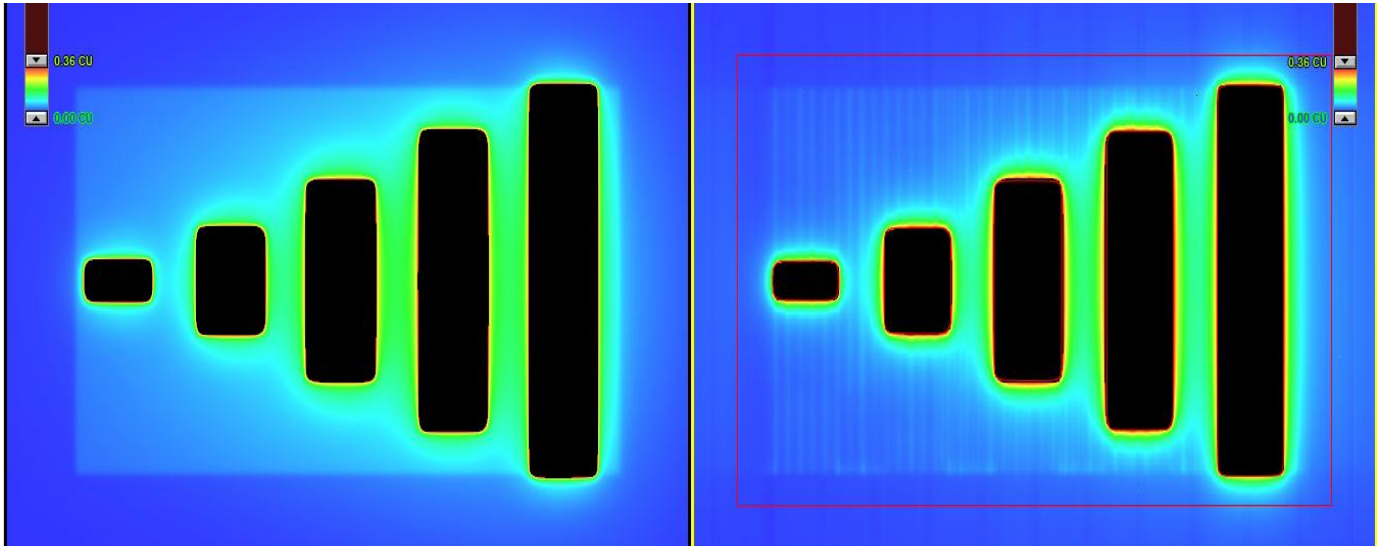
Tongue-and-groove effect and Eclipse



Predicted Dose **Measured Portal Dose**

The change in the leaf transmission due to the attenuation by the tongue-and-groove affecting is not included in Acuros or other Eclipse planning algorithms.