

**SGRT** **BIG BENEFITS**  
**BETTER WORKFLOWS**



# Surface Guided Respiratory Gating with AlignRT's Respiratory Module and DIBH for SABR lung

Kyle Noyce

**University Hospitals Dorset NHS Foundation Trust**



Chloe Westlake-Allen

**University Hospitals Dorset NHS Foundation Trust**



## Respiratory Module



# Surface Guided Respiratory Gating with AlignRT's Respiratory Module

By Chloe Westlake-Allen

Kyle Noyce

# Poole Radiotherapy Department

- 2 Sites – Poole and Dorchester
- 3 Truebeams in Poole
- 1 Truebeam in Dorchester
- Began using AlignRT in 2021
- Tattooless in 2023
- Respiratory Module in 2025

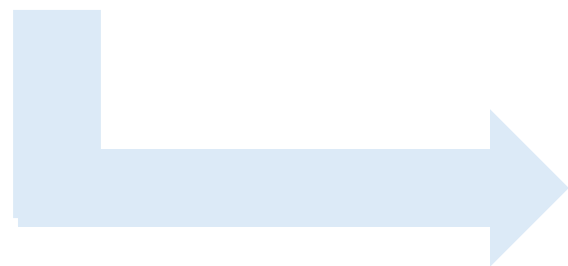




Motion  
Management



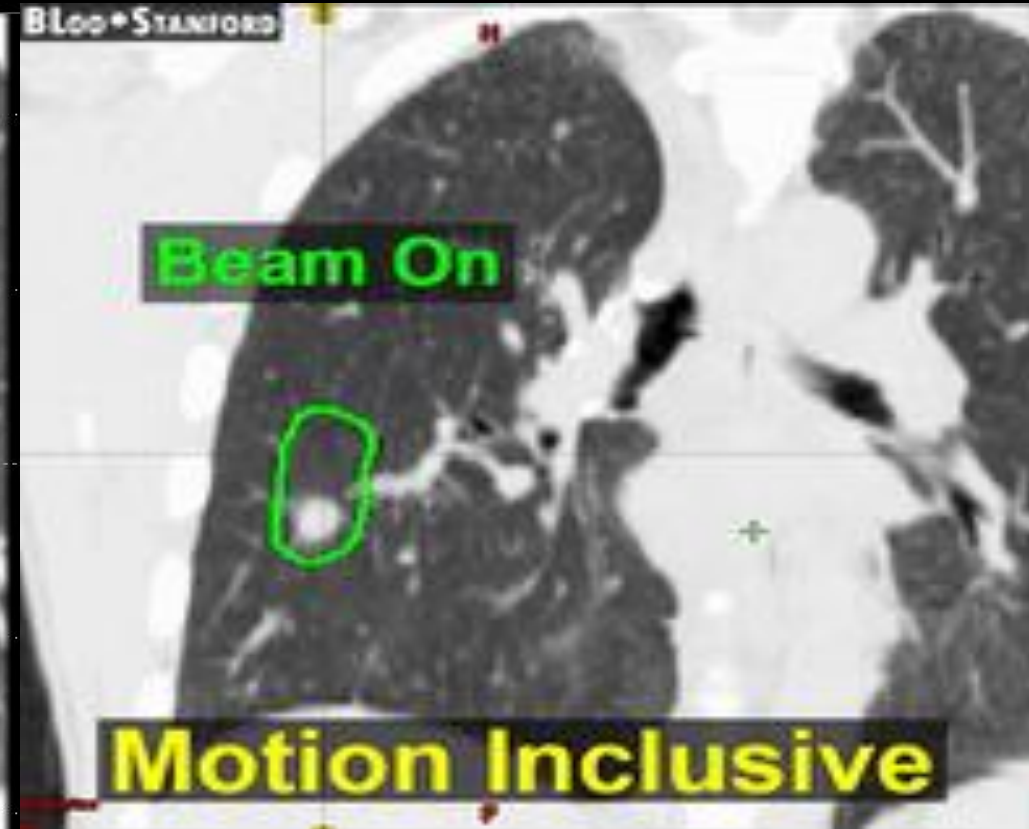
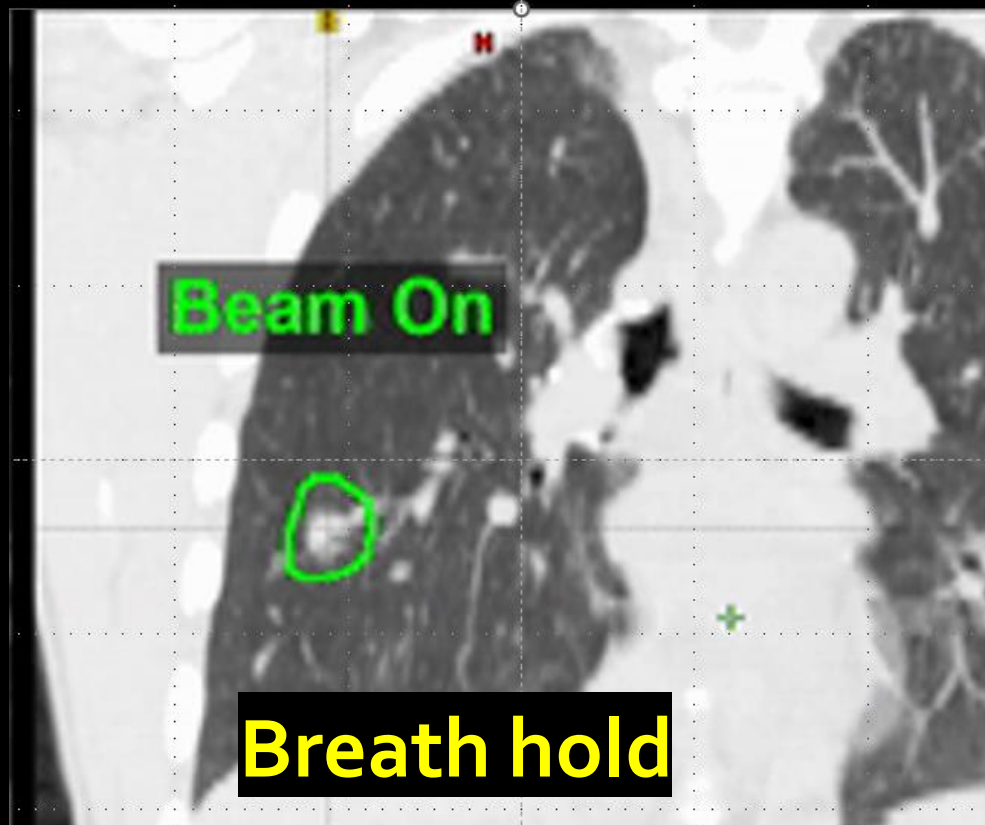
**ITV**

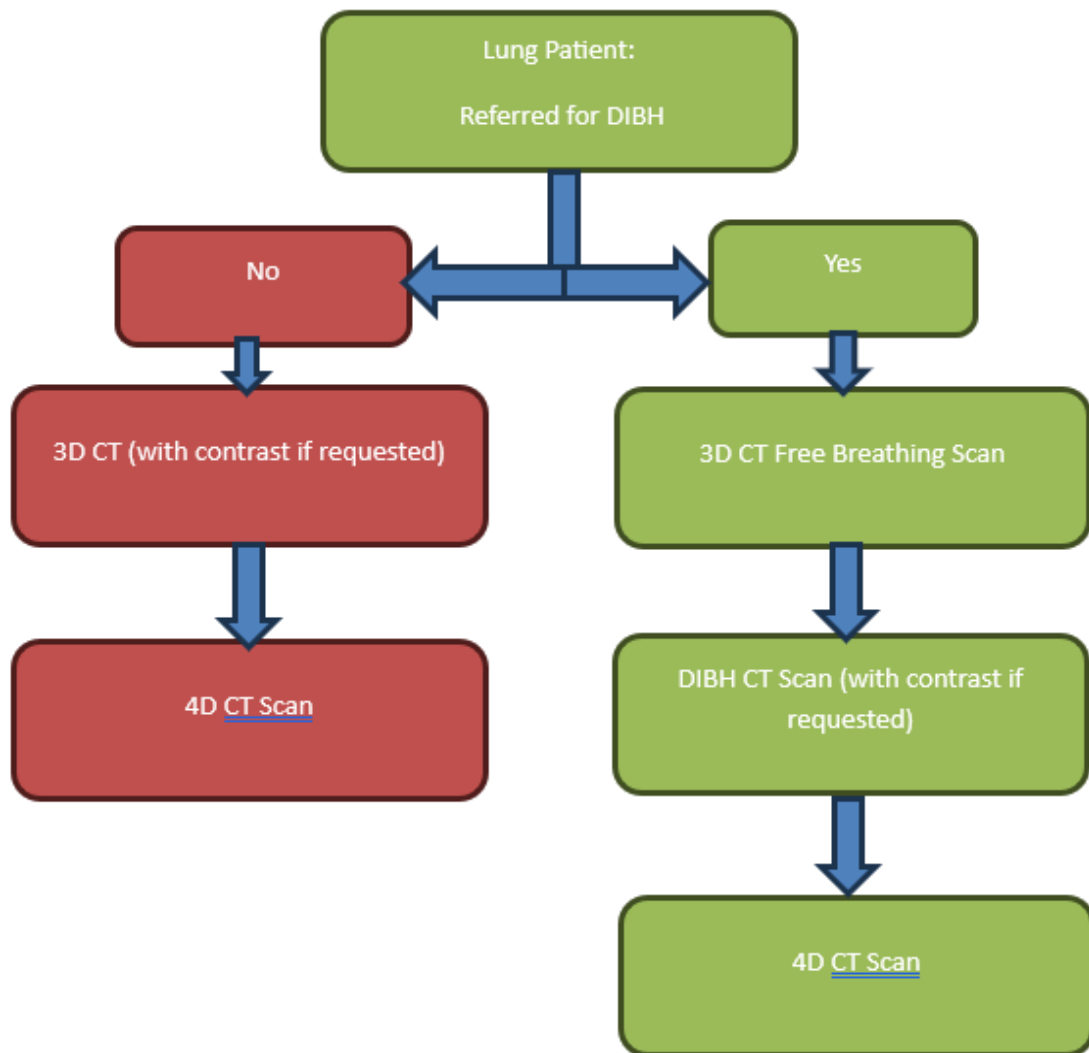


**DIBH**



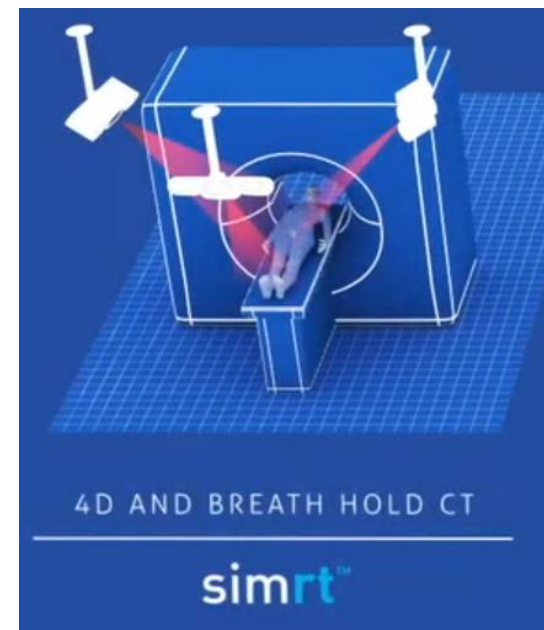
# Lung treatment breathing motion mgmt





## Pre-Treatment

SimRT



# SABR DIBH

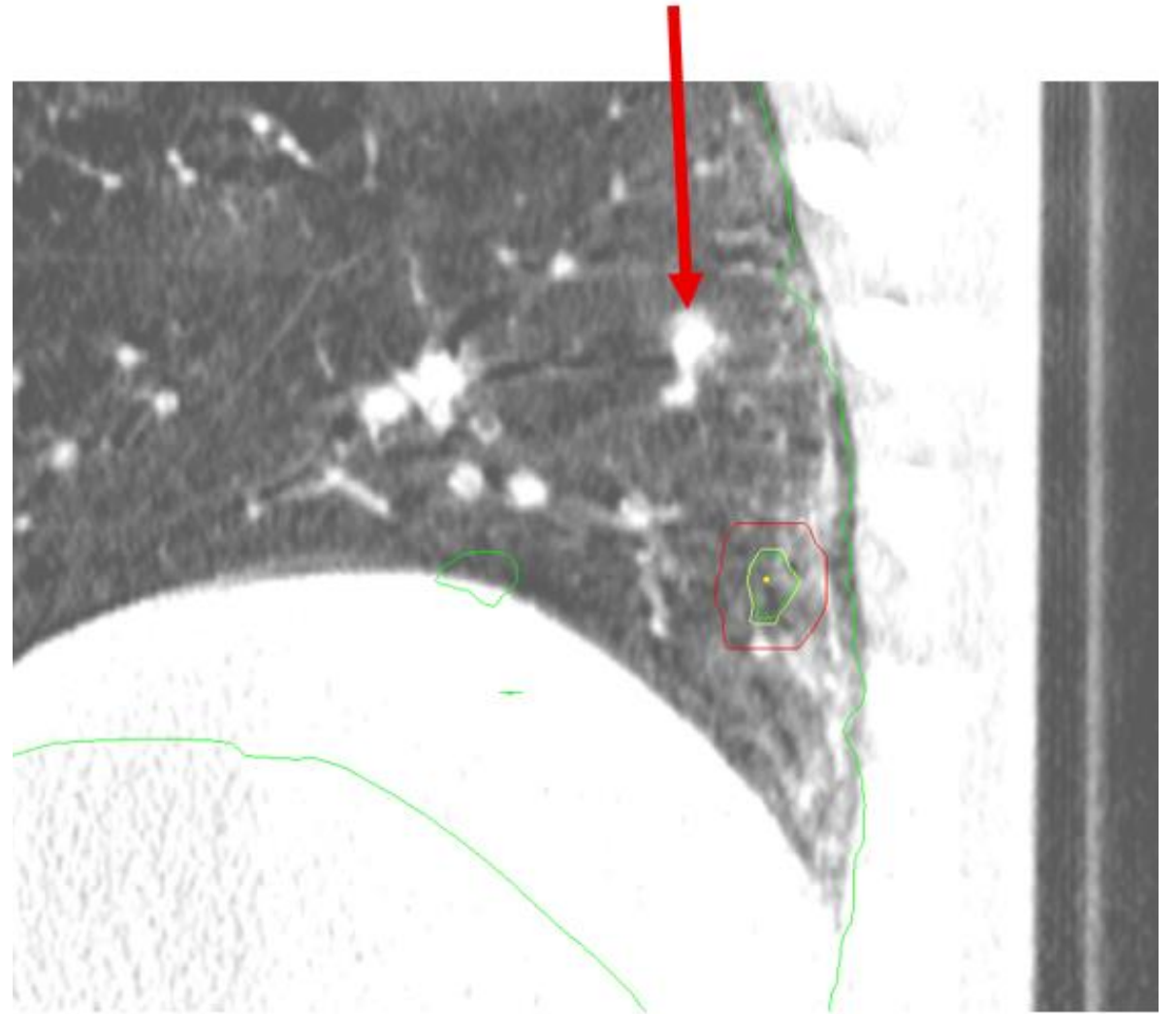
- We have scanned 8 SABR DIBH patients
- 6 successful completed treatments
- 2 patients were unsuccessful



# Not everyone is suitable for DIBH

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- Maintain
- Consistent
- Follow instructions
- Visible chest rise







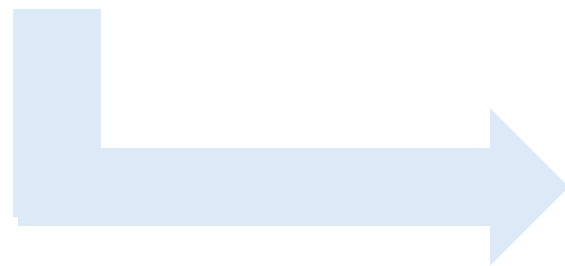
Motion  
Management



**ITV**

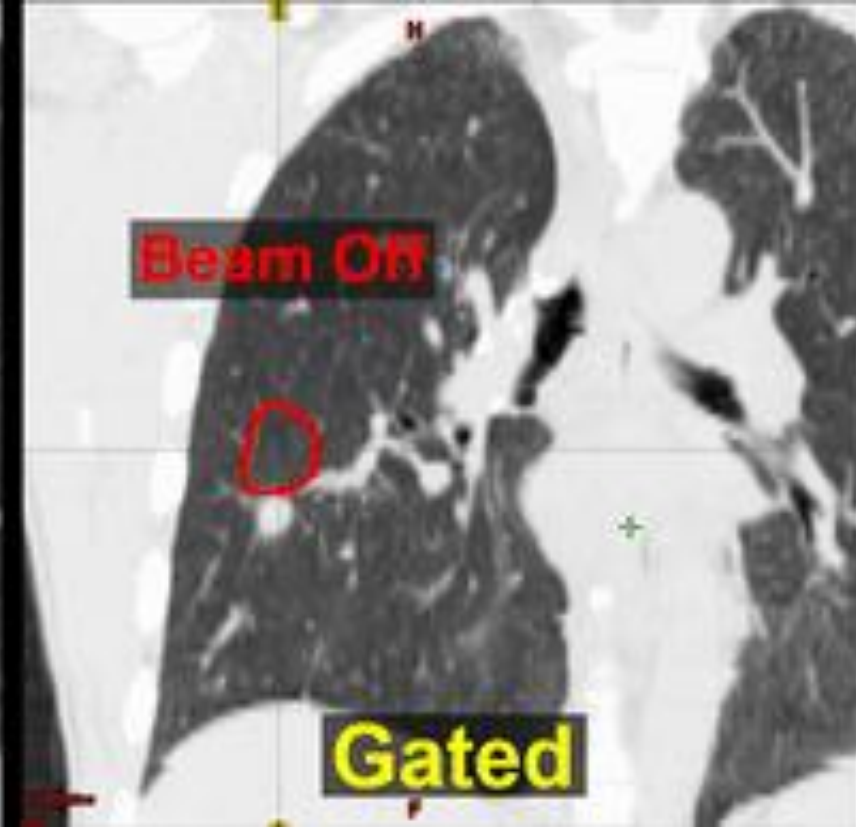
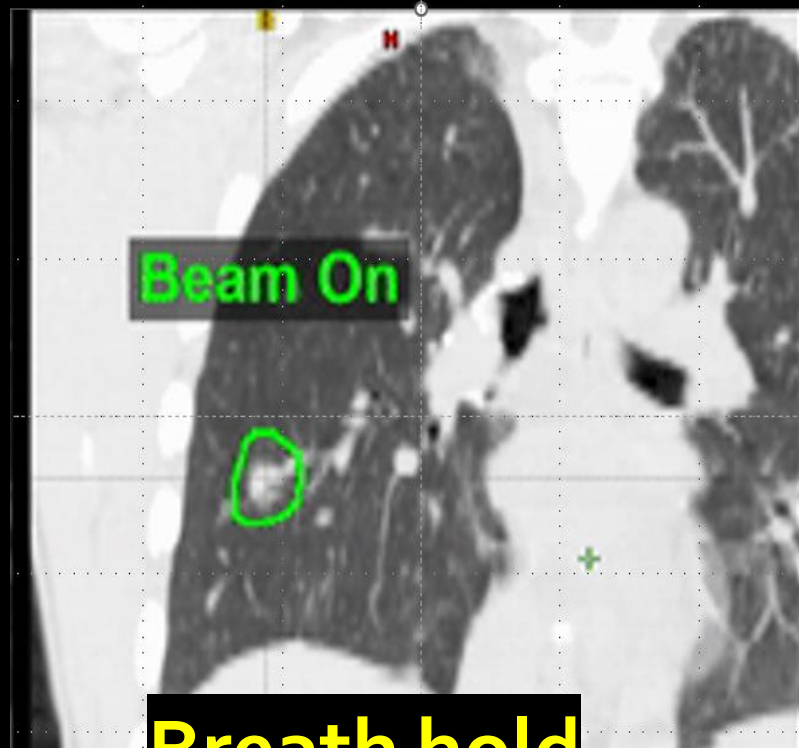


**GATING**



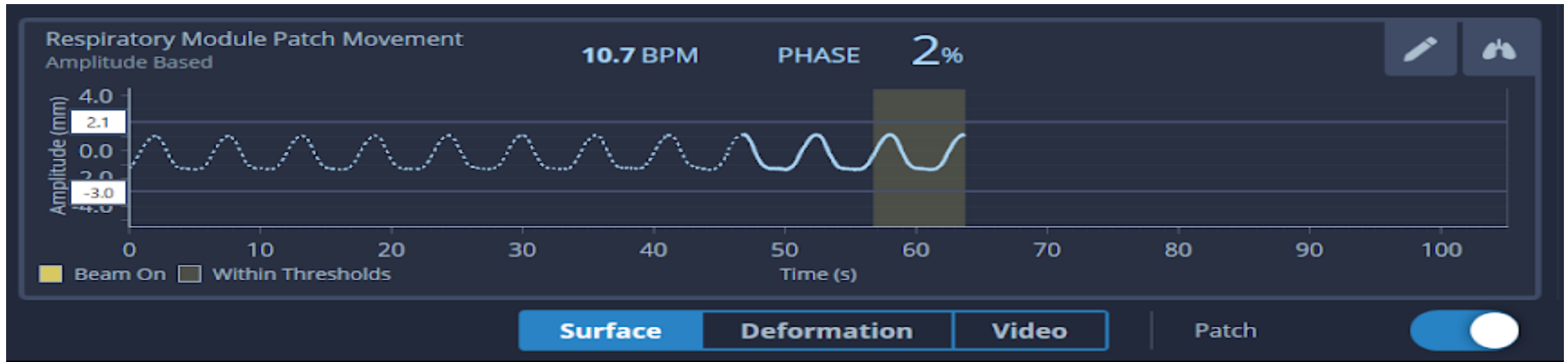
**DIBH**

# Lung treatment breathing motion mgmt



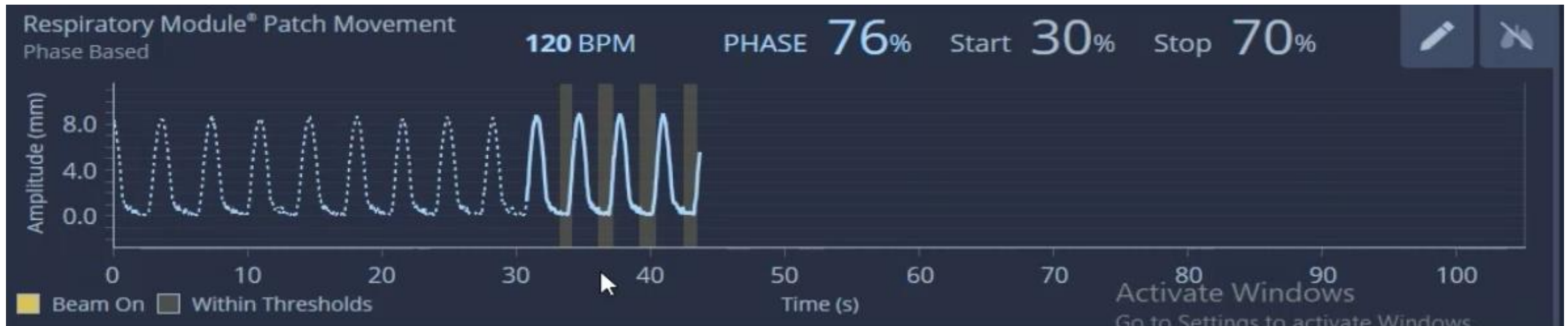
# Back Up Gating

- 3D CBCT
- Amplitude based gating
- Thresholds above the peak and below the trough

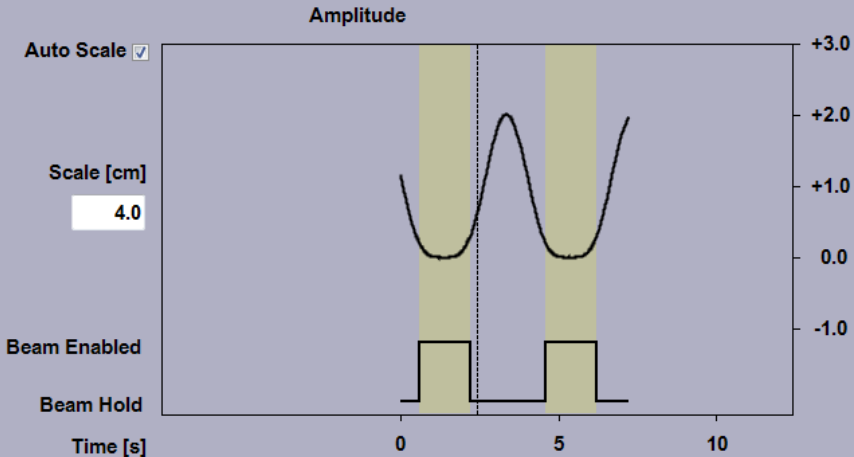
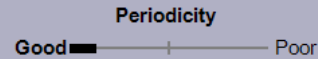
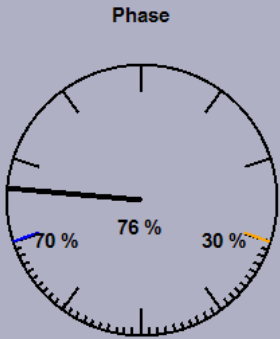


# Phase or Amplitude Based Gating

- 4D CBCT
- Amplitude or phase based prospective gating



Review of the actual reference curve



Duty Cycle [%] 40.5

Gated Motion [cm] 0.28

Inspiration [s] 2.0

Expiration [s] 2.0

Planned gating thresholds

Upper Threshold [%] 70

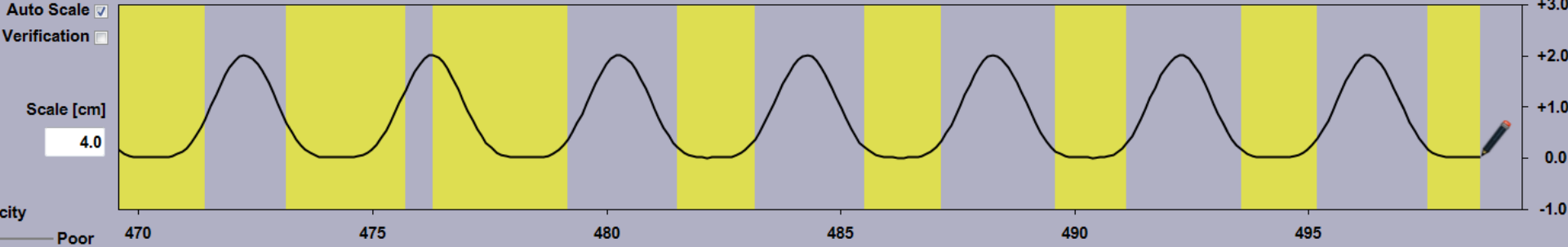
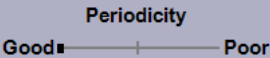
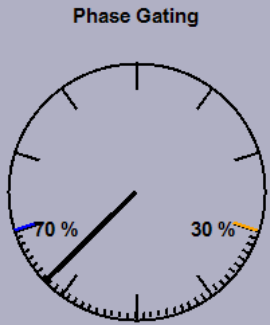
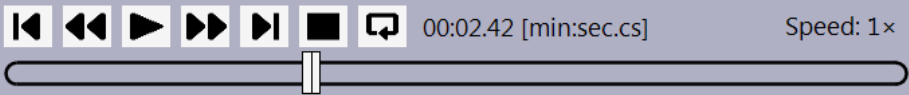
Lower Threshold [%] 30

Record a new reference curve

Start Stop

- ☐ Original gating thresholds from reference curve
- ☒ Planned gating thresholds

# RPM / RGSC



Coaching

Settings

Restart

Total kV Dose [mGy] 0.00 Timer [min] 0.0 Reset HU%: Anode 5 Housing 0

<< Previous Next >> OK Cancel

kV CBCT Reference CT



# Respiratory Module

II lung ISO 1



SGRT External



ROI1

VRT <sub>cm</sub>	-0.10	<div><div></div></div>
LNG <sub>cm</sub>	0.16	<div><div></div></div>
LAT <sub>cm</sub>	-0.06	<div><div></div></div>
MAG <sub>cm</sub>	0.20	<div><div></div></div>
YAW <sup>°</sup>	-0.1	<div><div></div></div>
ROLL <sup>°</sup>	0.5	<div><div></div></div>
PITCH <sup>°</sup>	1.6	<div><div></div></div>

Reference

Treatment

Couch 0.0°

Beam Control ☐

01/12/2022 11:05:00

Gated Capture



Respiratory Module® Patch Movement

Phase Based

120 BPM

PHASE 91%

Start 30%

Stop 70%



Amplitude (mm)

Time (s)

Beam On Within Thresholds

Activate Windows  
Go to Settings to activate Windows.

Surface Deformation Video Patch ☐

# Respiratory Module



VKT<sub>cm</sub> 0.01

LNG<sub>cm</sub> 0.02

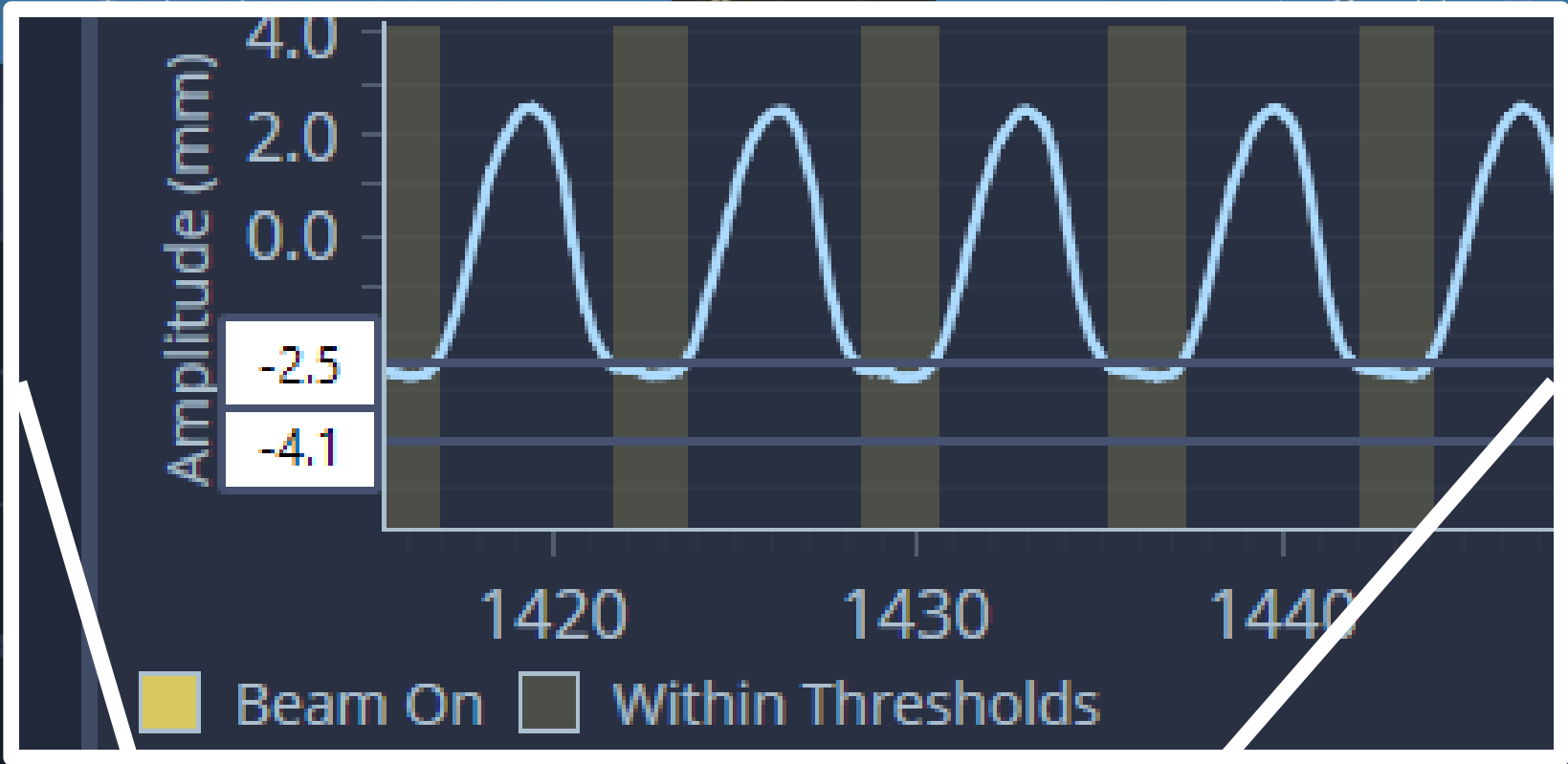
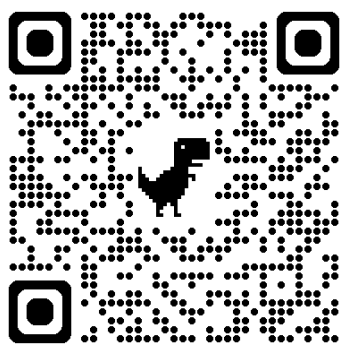
LAT<sub>cm</sub> -0.02

MAG<sub>cm</sub> 0.04

YAW<sup>°</sup> -0.1

0.2

0.2




# Respiratory Module



Gated Capture

▼



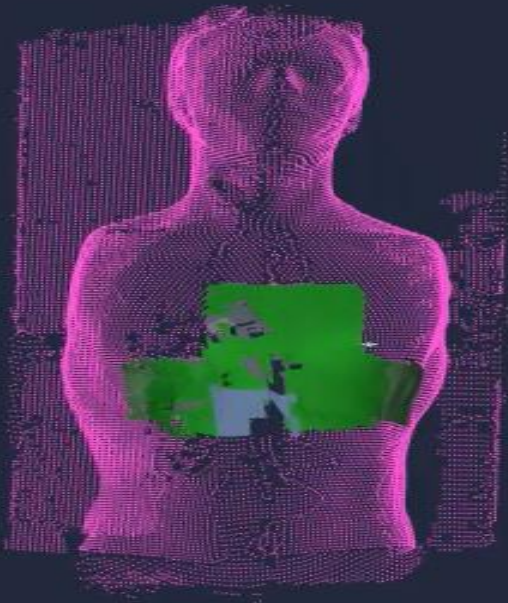
ROI1

▼

Touch 0.0° ▼

Beam Control

☐



Respiratory Module® Patch Movement  
Amplitude Based

120 BPM

PHASE 88%







■ Beam On    ■ Within Thresholds

Surface

Deformation

Video

Patch

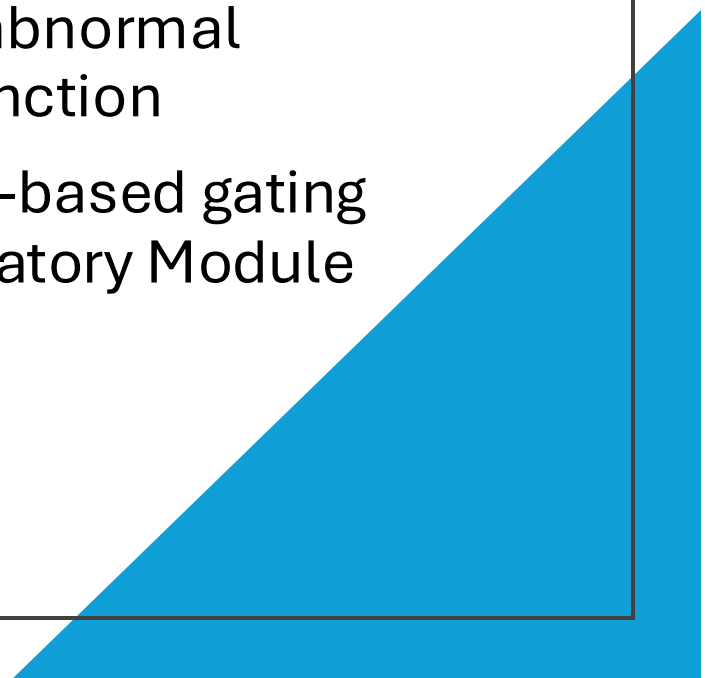
☐

Activate Windows  
Go to Settings to activate Windows.

# Considerations

- SGRT does not interlock the CBCT on Truebeam
- SGRT is not compatible with 4D CBCT on Truebeam
- Relearn the trace each day
- Patch position variability.
- Camera visibility

# What's Next?

- Starting imaging using 4D CBCT
  - Begin exploring further uses of the abnormal breathing function
  - Begin phase-based gating using Respiratory Module
- 
- A large blue right-angled triangle is positioned in the bottom right corner of the slide, pointing towards the top-left.





ANY  
questions?

c.westlake-allen@nhs.net  
kyle.noyce1@nhs.net