SRS BRAIN AND BEYOND….OUR JOURNEY WITH VISION RT AND ELEKTA

LEANNE MC NAMARA

CLINICAL SPECIALIST RADIATION THERAPIST

GALWAY UNIVERSITY HOSPITAL RADIOTHERAPY DEPARTMENT

HISTORY

- Department Opened in Galway in 1995
- 3 Elekta Linear Accelerators, Brachy therapy, Orthovoltage.
- MV Imaging
- Vision RT for Breasts and DIBH since 2019
- New Department with 4 Elekta Versa Linear accelerators, 2 Siemens CTs, Brachytherapy, Orthovoltage
- CBCT Imaging, MV, KV, VMAT, Hexapod, SRS
- 40+ Radiation Therapists, 5 Radiation Oncologists, Nursing, Physics and Dosimetrists

THE PAST TO THE PRESENT

GALWAY UNIVERSITY HOSPITAL IS LOCATED ON THE WEST COAST OF IRELAND.
IT HAS A VERY LARGE CATCHMENT AREA FOR ONCOLOGY PATIENTS FROM NORTH DONEGAL TO SOUTH CLARE

VISION RT

- AlignRT Installed in in 1 Linac and CT
- Used for Lt Breast Treatments for DIBH
- Moved to Pelvis and Thorax
- Aimed to have staff trained on AlignRT before moving to new department to reduce the amount of new equipment that staff had to get training on.
- Opened New Department with all patients using AlignRT apart from Head and Necks as we still used closed shells.
- 2025 Department went Tattoo less on all sites
- 2025 SRS introduced using AlignRT
- 2025 Open faced shells used with Vision RT to Treat Head and Necks Patients

RADIOTHERAPY IN THE WEST OF IRELAND.

- One Centre for Treatment in Galway. Opened in 1995
- Patients from long distances away stay at Lodge Accommodation On Site
- Bus transfers daily from towns and villages along the West Coast and inland.
- Previous to Galway setting up SRS all Patients requiring SRS Traveled to Dublin (200+ km away).
- Extra Burden on the service in Dublin
- Patients that would not travel or were unable to travel only had the option of less effective treatments that compromised their health, QOL and ultimately their life expectancy.

STATISTICS:

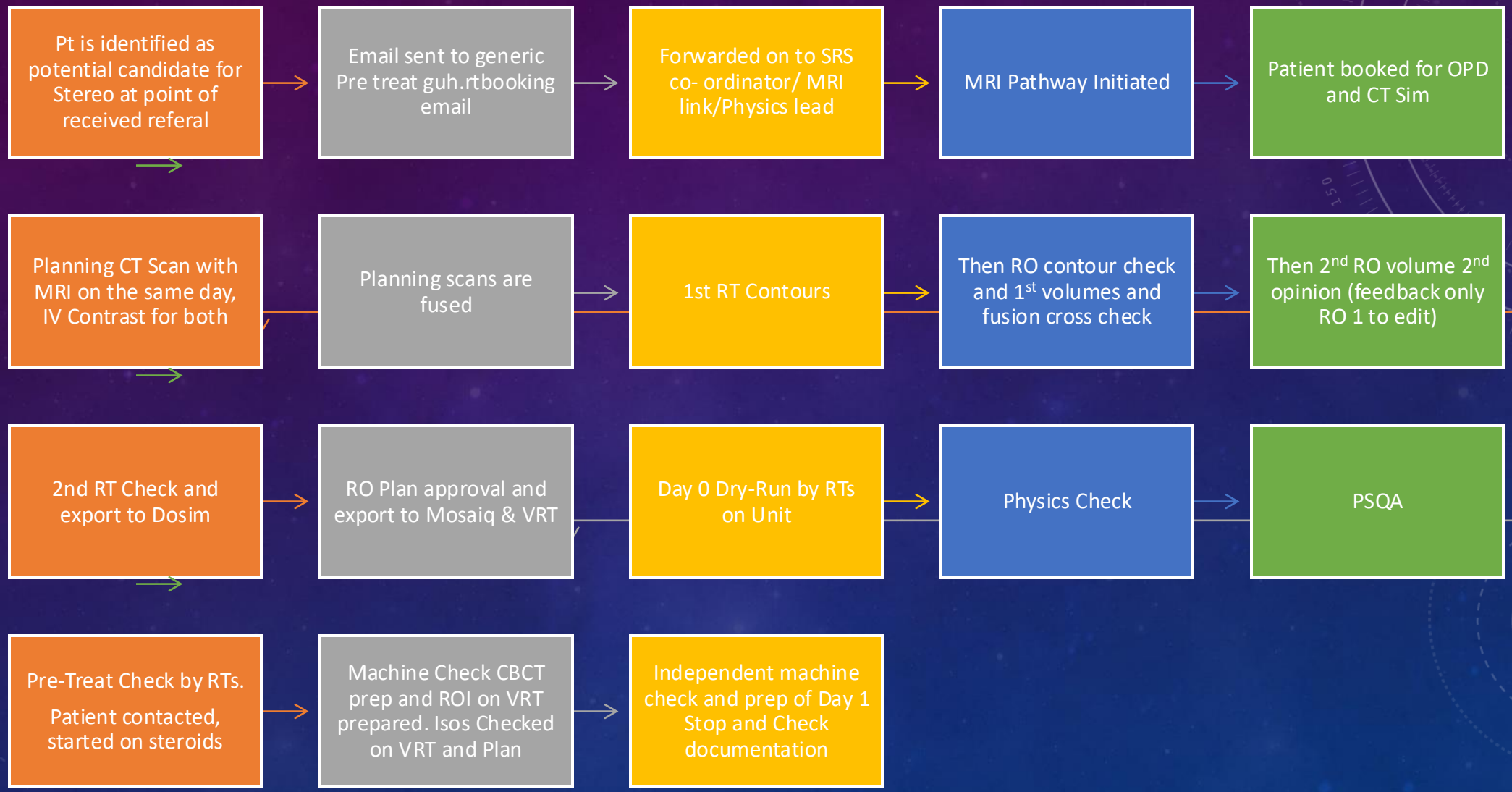
- How many Patients?
- From Where?
- Age Group?
- Expense to HSE?
- Patient Burden?

HOW IT STARTED…

- Dedicated SRS Team selected in Department
- MDM Team Meetings held Monthly and then Fortnightly
- Team Included RO, Radiation Therapists, Physics Dosimetry, Nursing, Pretreatment, MRI

PATHWAY CREATION

- Site Visits to CUH in Cork, University Clinic Munich, Beacon Hospital In Dublin
- Training from Elekta on using Hexapod
- Training from Vision RT on the integration of the two systems and using Vision RT for SRS and Open Face Shells.
- Training on Shell Creation to ensure consistent Face Gap for ROI on AlignRT
- Clinical Guidelines written
- Protocols Written and tested
- FMEA Conducted Issues discussed and resolved
- End to End Testing preformed
- Audits carried out on the protocols and the processes involved by External auditors.


Pt is identified as potential candidate for Stereo at point of received referal
Email sent to generic Pre treat guh.rtbooking email
Forwarded on to SRS co- ordinator/ MRI link/Physics lead
MRI Pathway Initiated
Patient booked for OPD and CT Sim
Planning CT Scan with MRI on the same day, IV Contrast for both
Planning scans are fused
1st RT Contours
Then RO contour check and 1st volumes and fusion cross check
Then 2nd RO volume 2nd opinion (feedback only RO 1 to edit)
2nd RT Check and export to Dosim
RO Plan approval and export to Mosaiq & VRT
Day 0 Dry-Run by RTs on Unit
Physics Check
PSQA
Pre-Treat Check by RTs.
Patient contacted, started on steroids
Machine Check CBCT prep and ROI on VRT prepared. Isos Checked on VRT and Plan
Independent machine check and prep of Day 1 Stop and Check documentation

EQUIPMENT FOR SRS BRAIN:

Elekta Versa Linear Accelerator with Hexapod (6 DOF)

AlignRT (Vision RT)

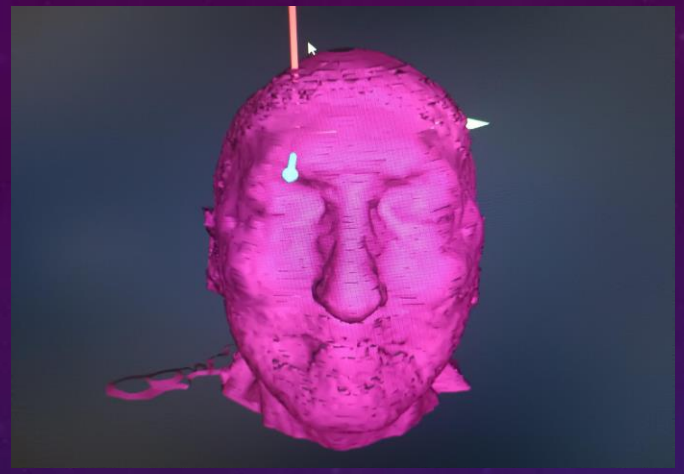
Omniboard Immobilization

Double Sided Open Faced Short Shells

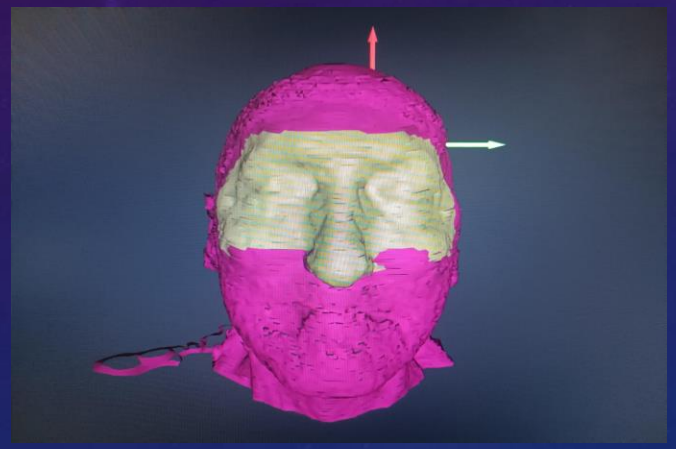
Mattress


2500213


PREPARATION
STATE
READY



VRT FOR SRS



- All Stereo treatments will be treated using AlignRT and with beam control on. This ensures that any movement during the treatment is immediately caught and stopped.
- The tolerances are tighter with only 1mm translation and 0.3-degree rotational movement tolerance window.
- You follow the same steps as a normal AlignRT prep, the selection is set with the tighter tolerances ‘Intracranial SRS ’ and from here you can draw the ROI.
- The ROI must include the forehead, the nose. The stable surface area visible using the open faced shell. Patients are scanned with Eyes closed to increase area for placing ROI
- The ROI must not include the edges of the shell.
- Strict rules for Shell Construction must be adhered to to get the correct area for ROI Creation.

SET UP IN ROOM FOR SRS

First Day Treating SRS Patients:

Day Zero Collision Check and Treatment Checks Carried out prior to Day 1 of treatment

RTs, RO, Physics and Vision RT Teams on Set. ROI reviewed prior to treatment with Vison RT Rep.

RTs carry out daily QA (Including Vision RT)

Physics Staff carry out Stereo QA (Including Vision RT)

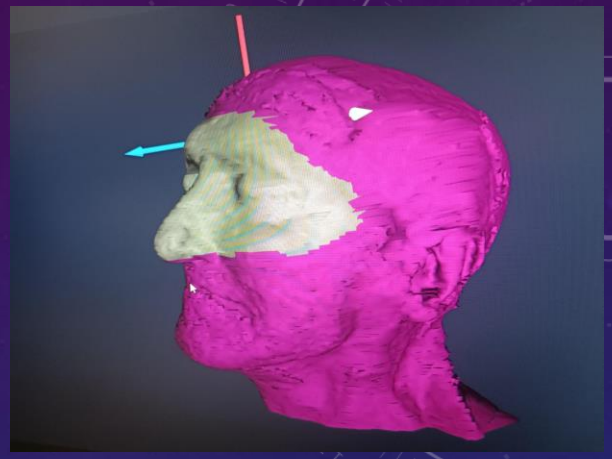
RTs Carry out Stop and Check protocol

Patient brought into Treatment room. Time taken to full explain process to patient and answer any questions.

Checks done to ensure no heavy make up, Studs, facial Hair

that may impact AlignRT

AlignRT and setting up the SRS Patient



1. Patient is set up on couch and head is placed in the posterior part of Shell. Ensure hair tucked under shell
2. Bed moved to get patient as near to iso position as possible.
3. AlignRT turned on and Head aligned Manually using Postural view, Deformation and Trans and Rotational Tolerances.
4. When ART in Tolerance in all directions apply front of shell.
5. Manually adjust for any tolerances that may be out on AlignRT due to applying the shell.
6. Bring Gantry around 360 Degrees to confirm no collisions and check for any block on AlignRT
7. Amend ROI if required

TREATMENT PROCESS.

Aquire CBCT as per SRS Protocol. RT2 matches Image while RT1 pushes in Panels.

RT1 reviews Image. Sends moves, ART Recaptured with Gantry at Zero and RT2 pulls back out panels.

CBCT2 Taken. Trans<0.1 and Rots <1 Degree RT1 Match Image. RT2 Pushes in Panels. Both RTs Checks Image. VRT Recaptured with Gantry at Zero.

Proceed to call parameters and document moves. Monitor ART throughout. ReCBCT if any movement.

Treat First Field at Zero Degrees on Floor. If ART remains in Tol Move Floor to next treatment angle and treat if VRT remains in Tolerance.

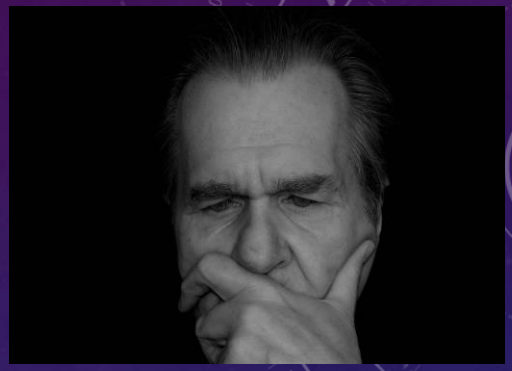
If ART goes Out of Tolerance pause treatment, check if it is block by monitoring the ART screen and then bring Gantry back to Zero and monitor. If ART remains OOT reimage at Zero to check position.

Take CBCT, apply Moves and return to treatment Angle on Floor.

Deliver remainder of Field. If more than 1 fraction document position of block if not done previously.

Continue this process for the remaining fields.

Issues that can arise and our Solutions:



AlignRT not picking up ROI Clearly – Modify ROI, Check surface (Hair,

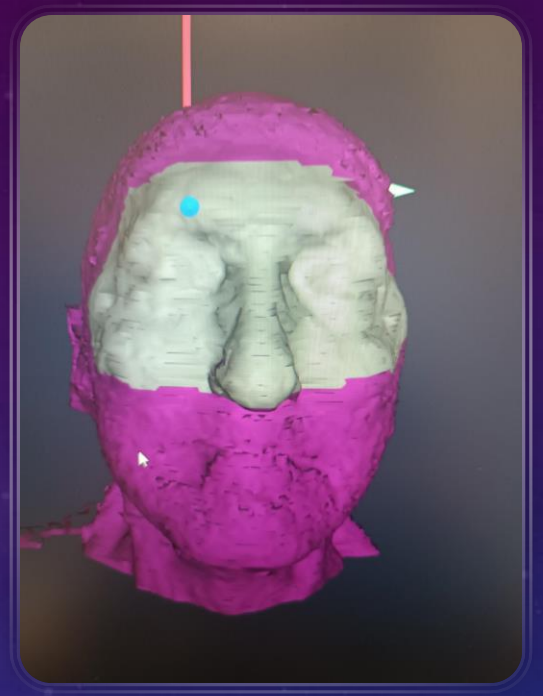
Make Up) Skin Tone, lights in the Treatment Room.

Shell allowing movement – Anchor points, Strict criteria at CT for shell construction. Treatment Staff attend first five shell constructions in CT. Patient needs to be relaxed with a neutral chin.

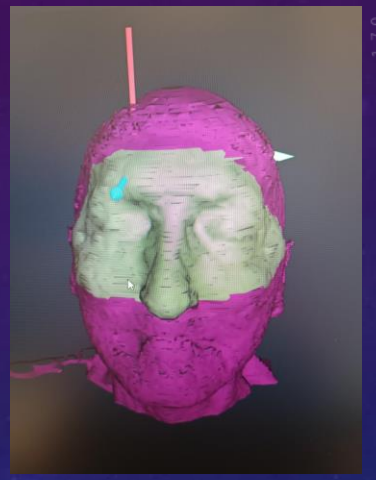
Tolerances remain OOT on returning to treatment field @ floor angle even though in Tol at Floor Zero – Expand tolerances to 0.15 on the affected translation. Return to original Tolerances after that field.

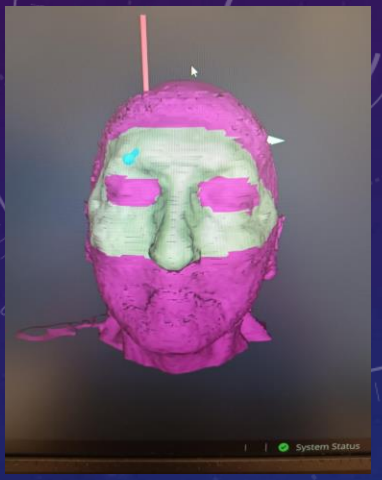
.

- Introduction of ROI2
  Removing area of Block from ROI1 while block is present.



Patient scrunching up face or blinking eyes/unable to hold eyes closed – Remove Eyes from ROI





Patient ++ Anxious and interrupting Treatment – Reset/Relaxant

Unable to get Pitch/Roll/Trans in Tol at set up – Accept up to 0.5 on Rotations and Image. Patient will hold a comfortable position and 6 Dof will apply Rotations.

Findings from Audit of first 10 Patients

Number of CBCTs started to reduce as staff confidence grew.

Ability to contact Vision RT with Issues and get quick answers was a significant benefit to the process

Time Taken to Treat was as expected <45 mins

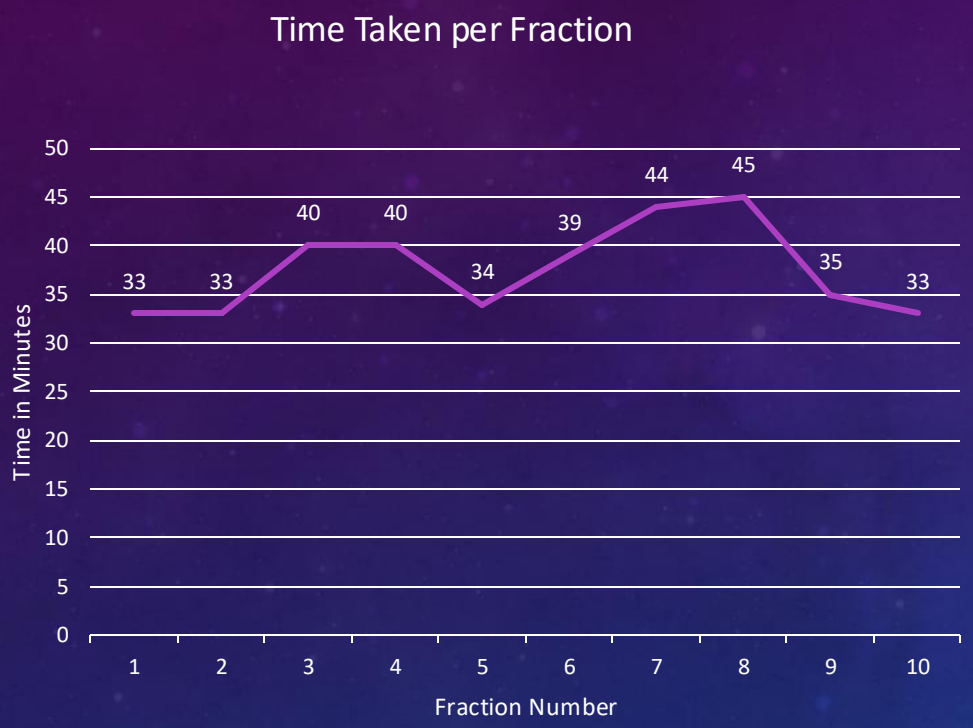
Shell Construction Changed. Mouthbite removed and Nasal septum used as an anchor

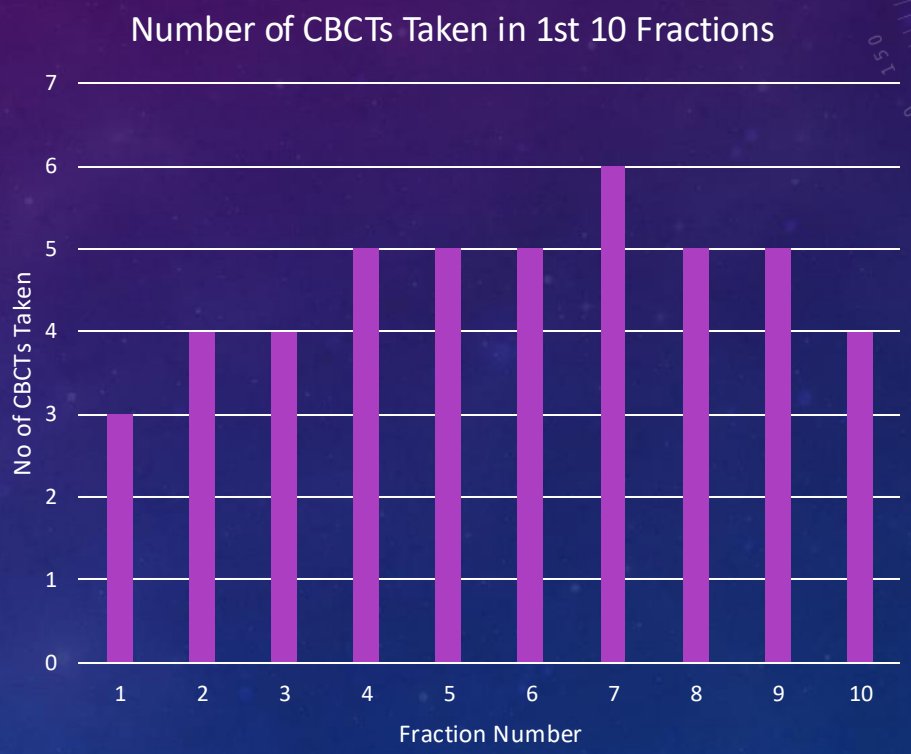
From Fraction 10 Having reviewed CBCT matching RO happy not to attend treatments unless contacted by Radiation Therapists

Relaxant only used when needed. Patient asked when contacted if required.

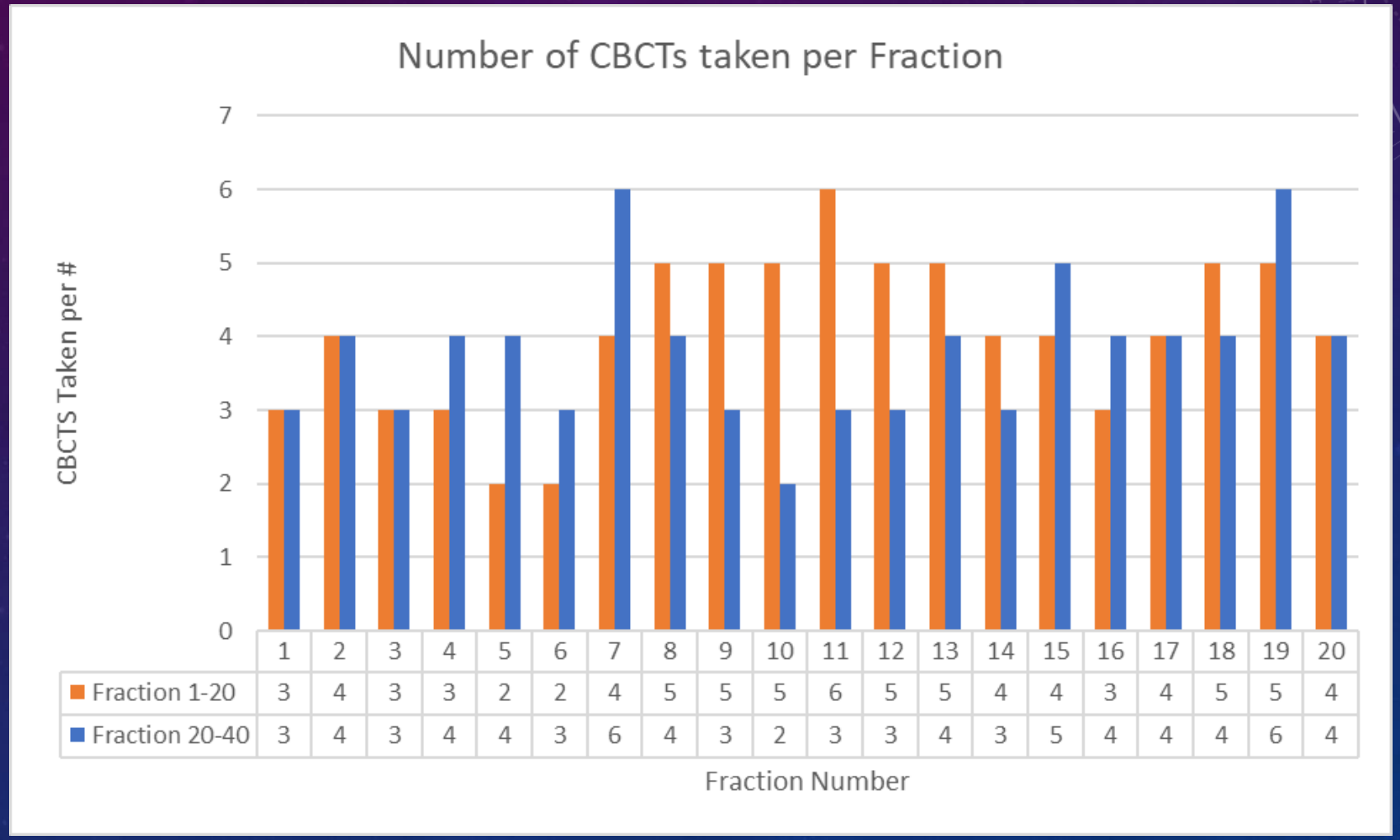
Due to the ease of use of the open shells with AlignRT for SRS the team decided to start the process of introducing Open Face Shells with AlignRT for Head and Neck Patients

RESULTS OF AUDIT





RESULTS OF AUDIT AFTER 40 PATIENTS

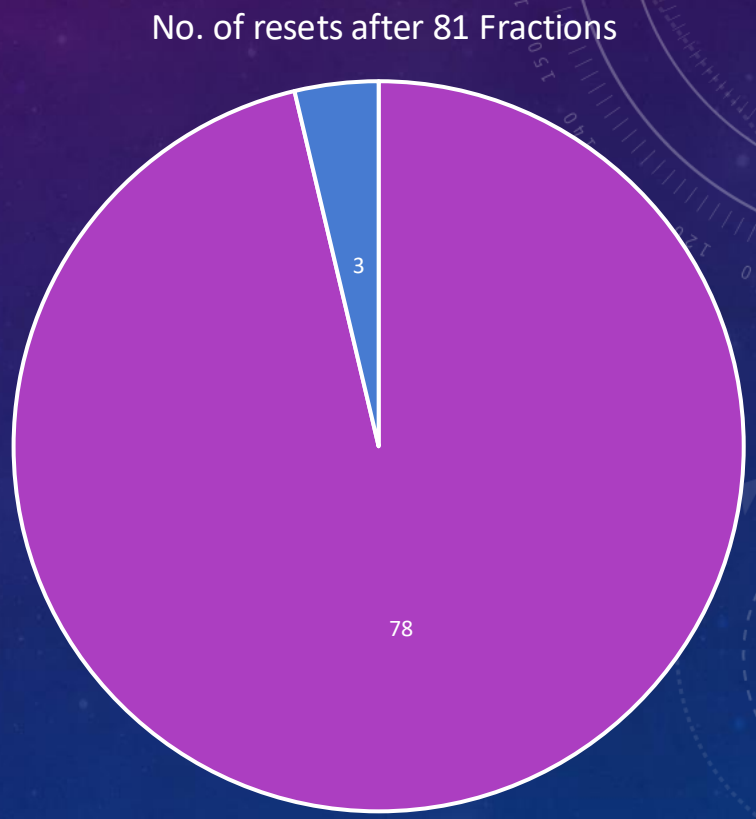


	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Fraction 1-20	3	4	3	3	2	2	4	5	5	5	6	5	5	4	4	3	4	5	5	4
Fraction 20-40	3	4	3	4	4	3	6	4	3	2	3	3	4	3	5	4	4	4	6	4

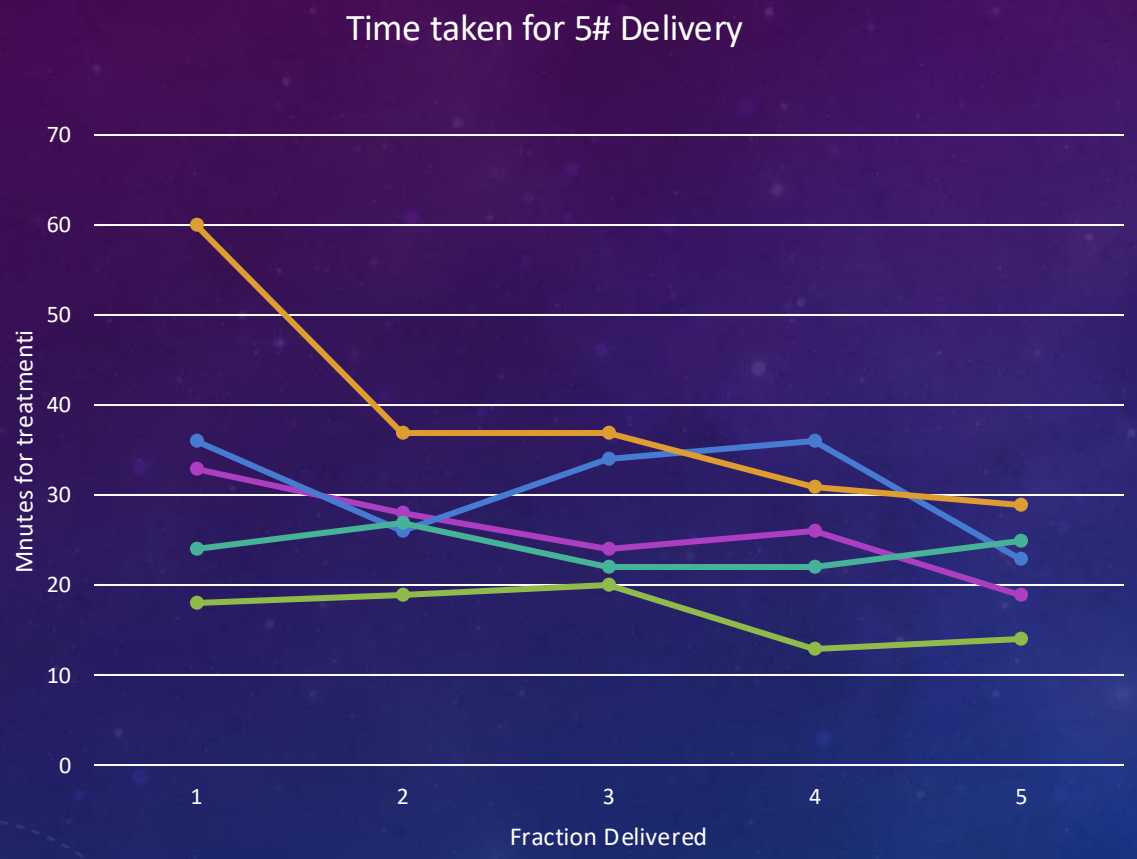
Reasons for Extra CBCTs:

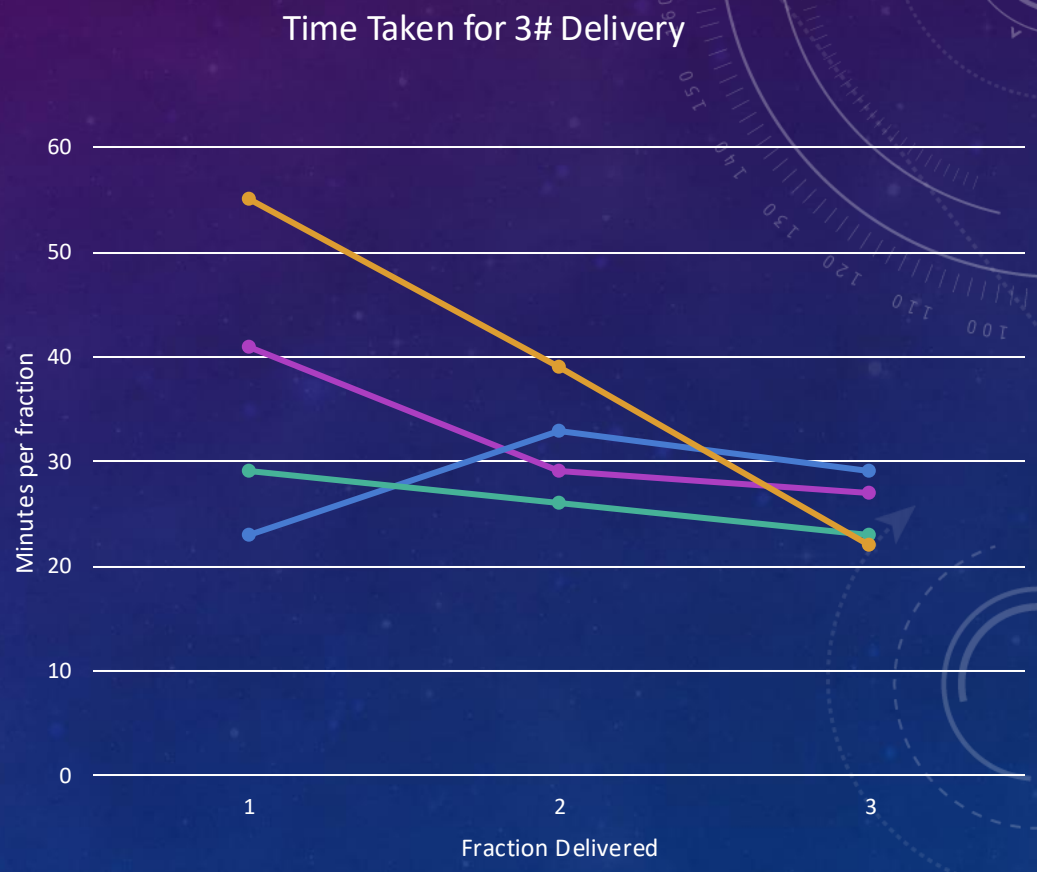
- Patient not Compliant with Treatment.
- Rotations OOT for Hexapod (>2.9 and full reset required)

- Software Issues

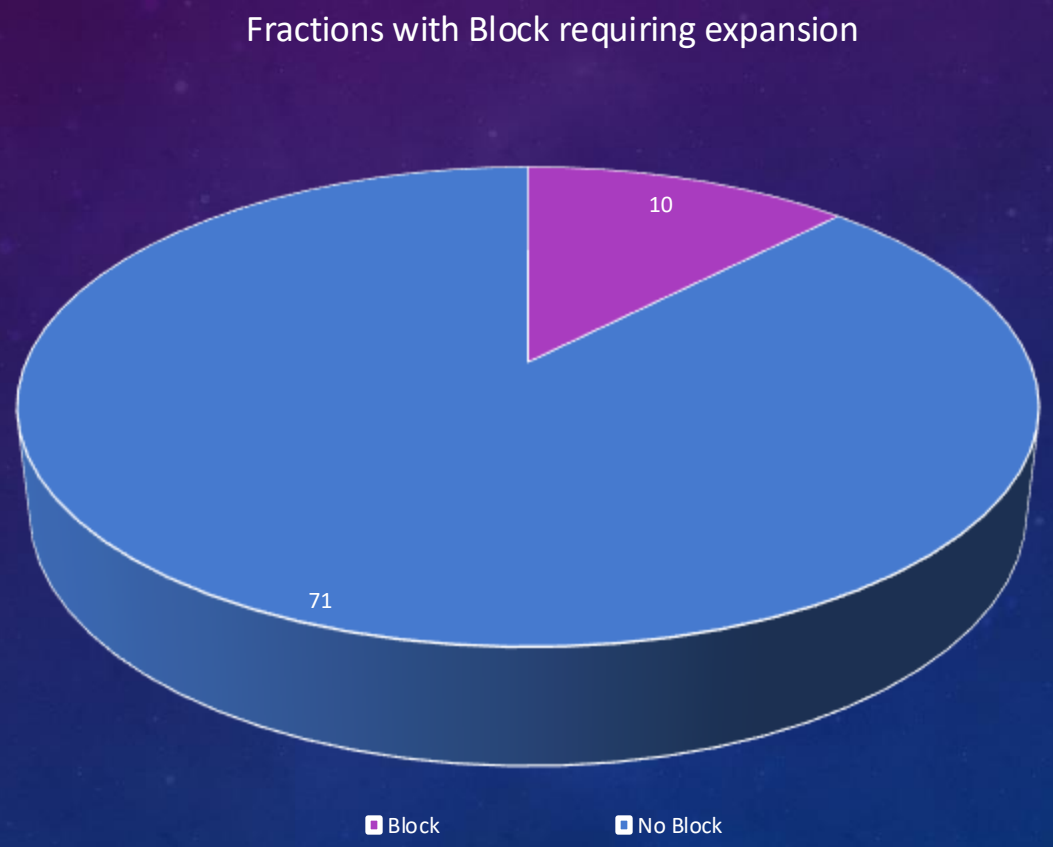


TIME PER FRACTION





NUMBER OF FRACTIONS THAT NEEDED THE TOLERANCE INCREASED FOR AT LEAST 1 FIELD. (0.1-0.15)



Other findings from the Audit.

Largest Move on Translations : 0.3cm

Only 3 Patients had to be reset fully due to Rotations over 2.9 Degrees (Limit of Hexapod).

Only 3 Patients needed a relaxant for treatment. Open face shells reduce the need for this

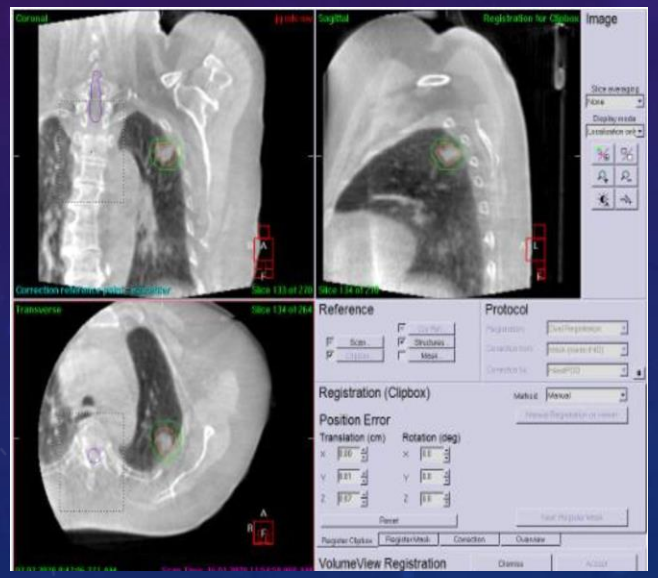
The average Treatment Time per fraction over the 40 patients is 35 Minutes. This ranged from 19 minutes to 70 Minutes

Using AlignRT the set up is quick and consistent. Any movement is quickly clear and can be accounted for.

Patients tolerate the treatment significantly better for fraction 2-5.

Following SRS…..

- Moving on to start Treating Lung SABR this month .. same team different Treatment area!!
- Have treated 20+ Patients with Open Face Shells using AlignRT already following on from our experience with SRS.
- Hope to start Treating Bone and Spinal SABR in the New Year



EUnetCCC
ONEFORALL
Co-funded by the European Union

Annual meeting
Shaping the future of cancer care, research and education in Europe
CNIT Forest, Paris La Défense
6-7 NOVEMBER 2025

Galway University Hospitals

An institutional experience of Open-Faced Immobilisation Masks in Head and Neck Radiotherapy at Galway University Hospital

J.Trousdell, A.Al-Khunaizi, P. Sharma, L.Kennedy, L.McNamara, A.Smyth, A.O'Hara, S.Coyne, J.Martin, S.Carr, J. Gaffney

Introduction

Head and Neck Cancers (HNC) has a prevalence of approximately 800 cases per year in Ireland, accounting for 3.3% of all invasive cancers(excluding non-melanomatous skin cancers). Approximately half of these patients receive radiotherapy treatment[1].

Open-faced radiotherapy masks were introduced in Galway University Hospital in April 2025. This study aims to survey the patients' experience of closed versus open faced masks during and following radiotherapy treatment.

Materials and methods

A seventeen-question survey was created in both paper and online formats, and included questions related to mask comfort, anxiety and mask stability. Surveys were completed either during or within three months of completion of treatment.

Data regarding inter-fraction translational moves, number of rescans, and number of reset-ups were collected by treating radiation therapists.

Results

Thirty-two patients were surveyed; sixteen from the closed-faced mask group and sixteen from the open-faced group.

Seventy-four percent of patients reported some degree of anxiety related to the mask.

Two-thirds of patients with increased mask-related anxiety had a closed face mask (8 closed vs. 4 open).

Sixty-two percent of patients who reported trouble breathing had a closed-face mask (8 closed vs. 5open).

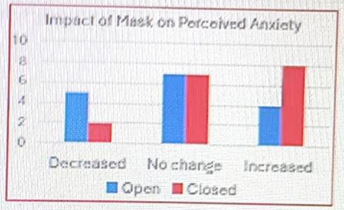
Most patients (78%) would prefer to use an open-faced mask if they were to undergo radiotherapy again.

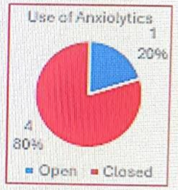
The number of re-scans and re-sets are shown in table 1.

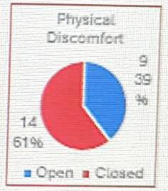
Conclusions

This patient survey has shown that radiotherapy face-masks remain a source of anxiety for patients undergoing HNC radiotherapy. The results suggest that this effect is greatest in patients with pre-existing anxiety.

Overall, our survey demonstrated that open-faced masks were the preferred immobilisation method for head and neck radiotherapy, reflecting greater patient acceptability and comfort without compromising treatment setup

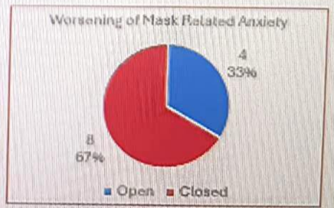






	Re-scans	Re-sets/ No. of fractions (%)
Open	0	14 / 417 (3%)
Closed	3	42 / 463 (9%)

Table 1. The number of re-scans and re-sets



Co-funded by the European Union

Most significant result of this Project:

For the Patients who said

- *“ I am not able to face going to the other of the side of the country for treatment”*
- *“ I have nobody to bring me. What will happen to me now”*
- *“How would I manage to travel all the way over there”*

These are the people and their families that we do this for and we can see it and hear it every day the difference we are making and hope to continue to do so.

ACKNOWLEDGEMENTS

- To all the staff of the Radiation Therapy Department in Galway for your help and support
- To Kate at Vision RT who answered our many questions and may you continue to do so as we head into Lung SABR!!
- Most of all to the SRS team without who this would never have come together.