



The Airvo NHFT system

Richard Canters, BRIC meeting 16-17 April 2026 Birmingham

 **Maastricht**

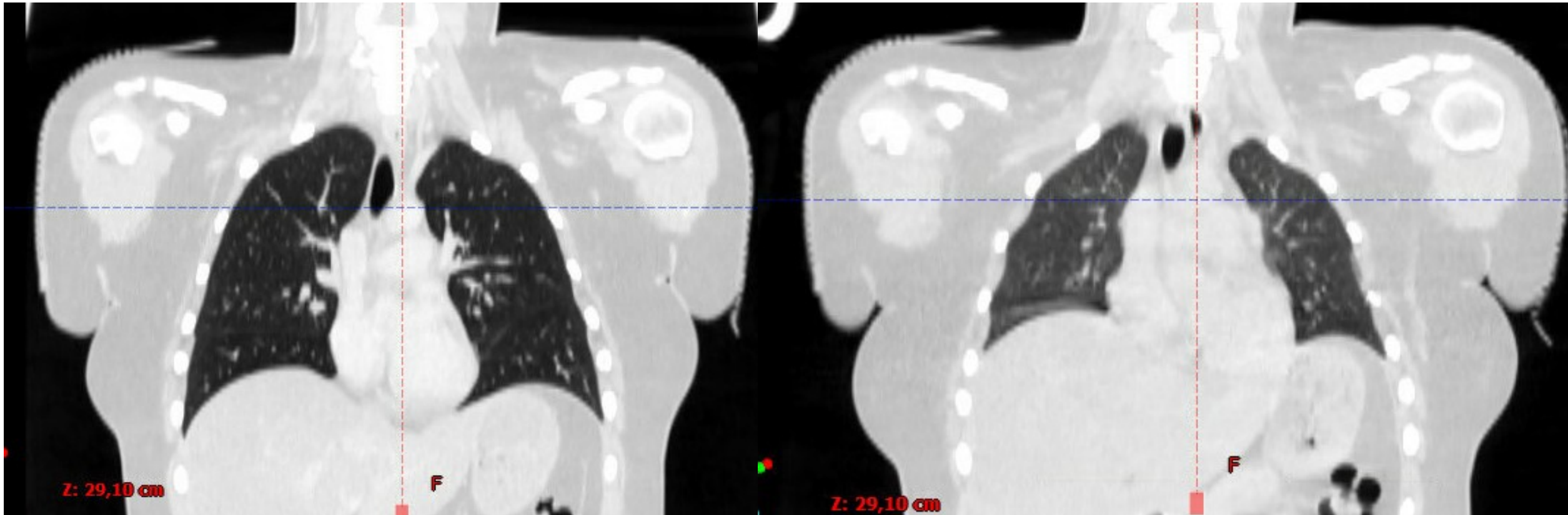


 Maastricht University

 Maastricht UMC+

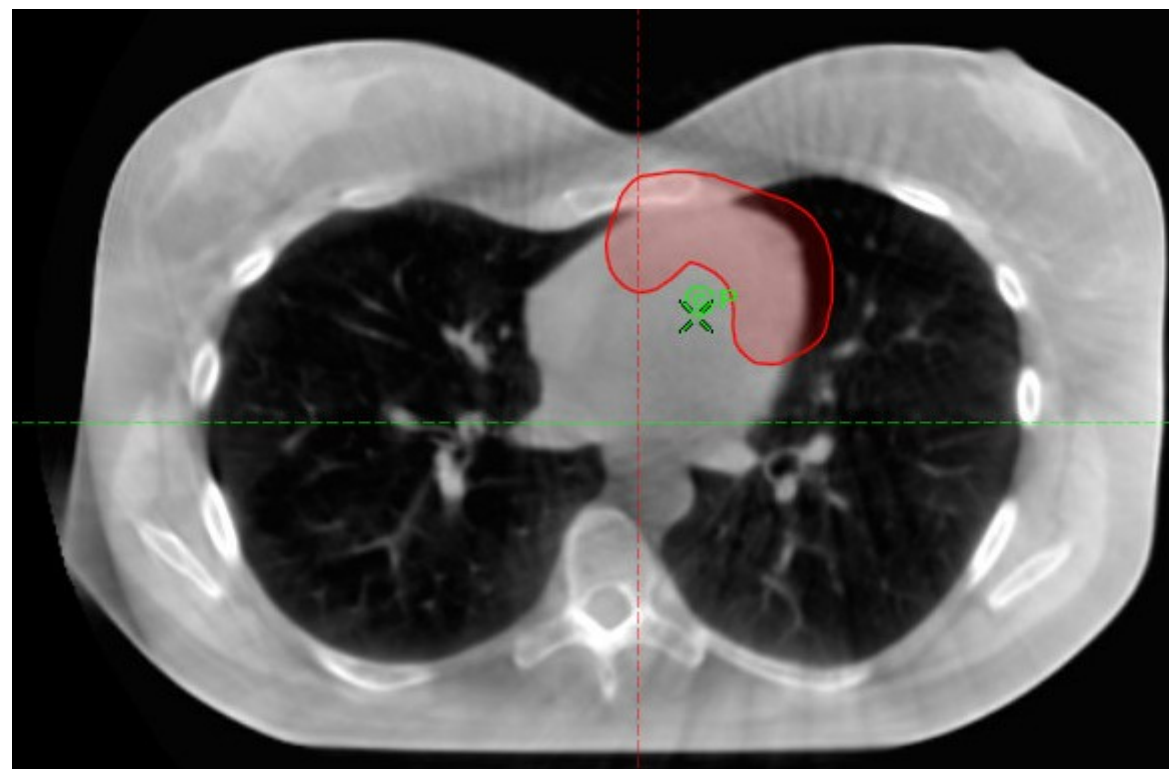
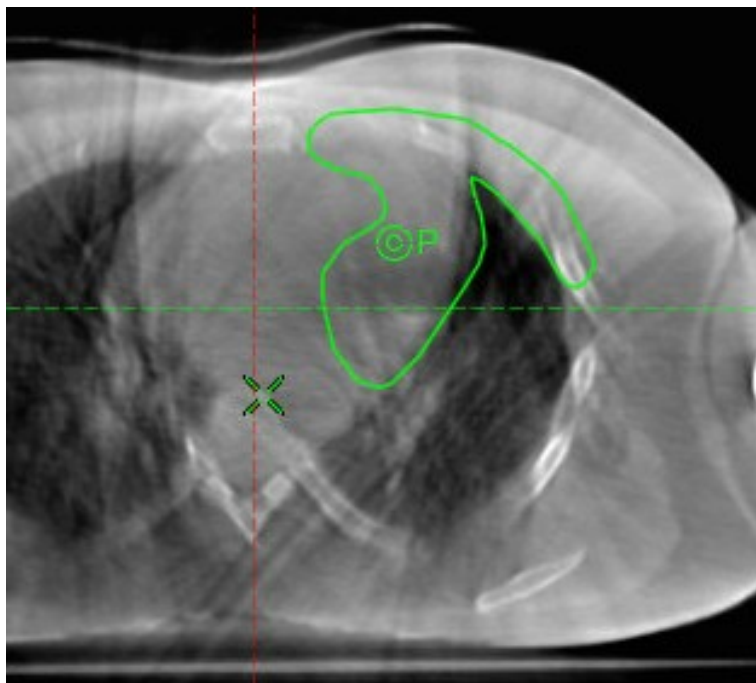
Treatment in breath hold

- Larger lung volume and better delineation

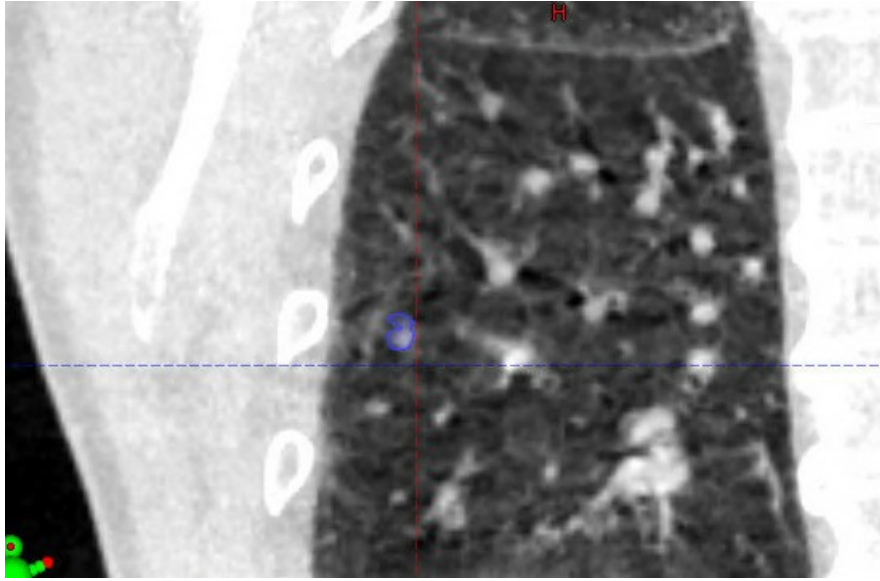


Treatment in breath hold

- Cone beam improvement: FB vs BH

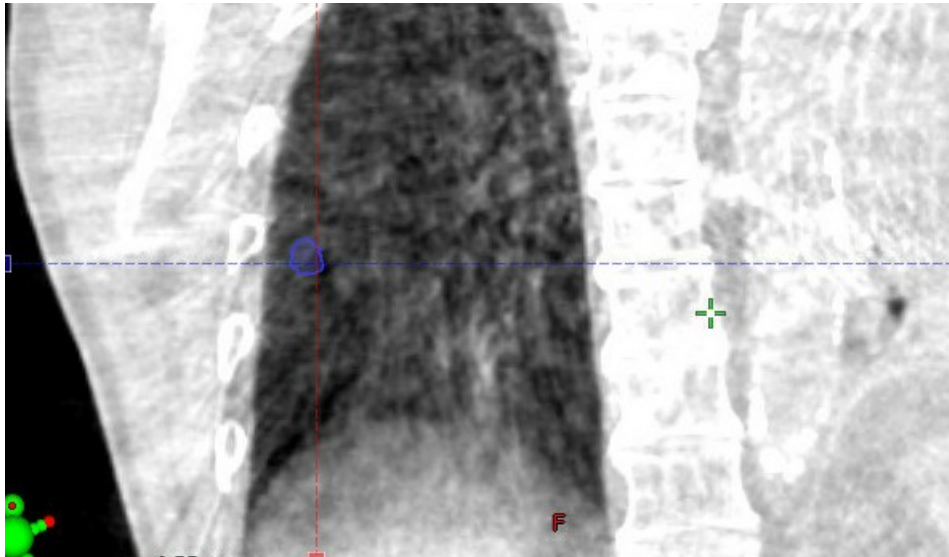
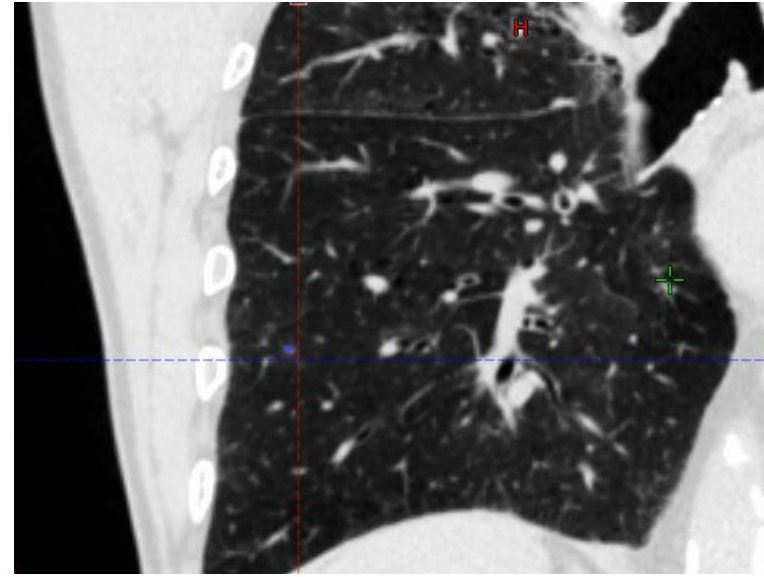


Treatment in breath hold

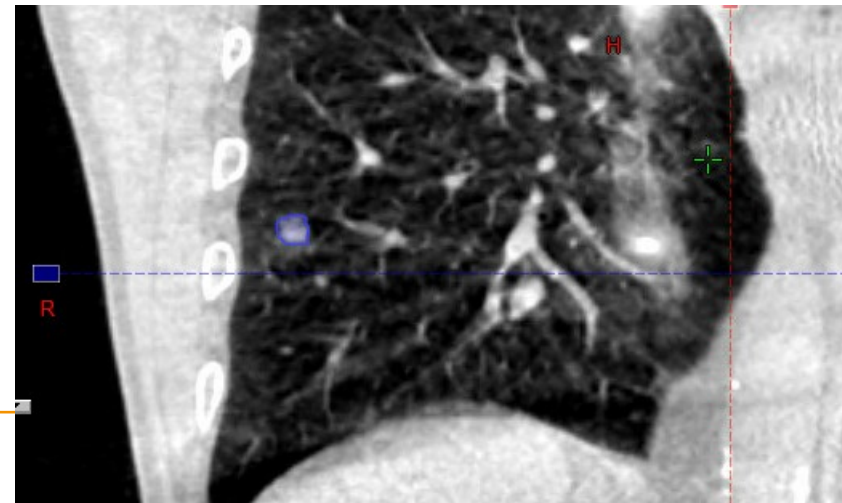


tumor
visibility

Planning CT



Halcyon
hypersight



Treatment in breath hold

- Less artifacts



Treatment in breath hold

- Dosimetric gains

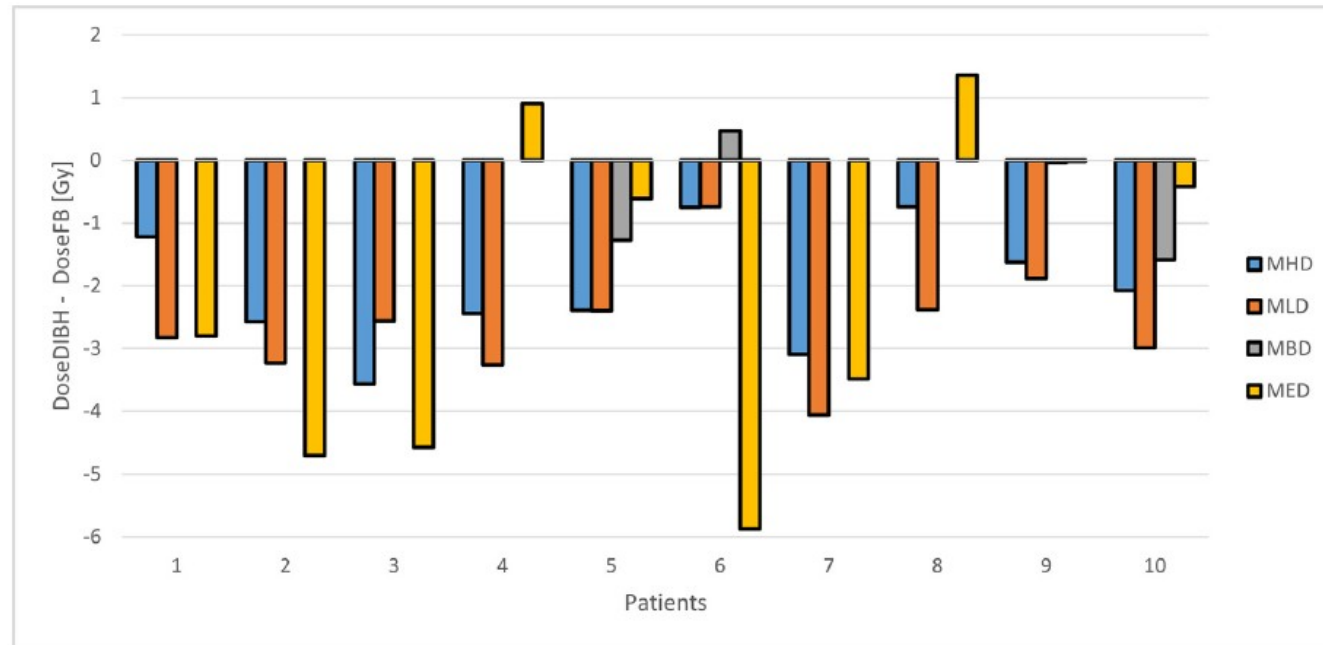


Fig. 4. Dose in breath hold plan minus dose in free breathing plan for mean dose in heart (MHD), lung (MLD), breast (MBD), and esophagus (MED).

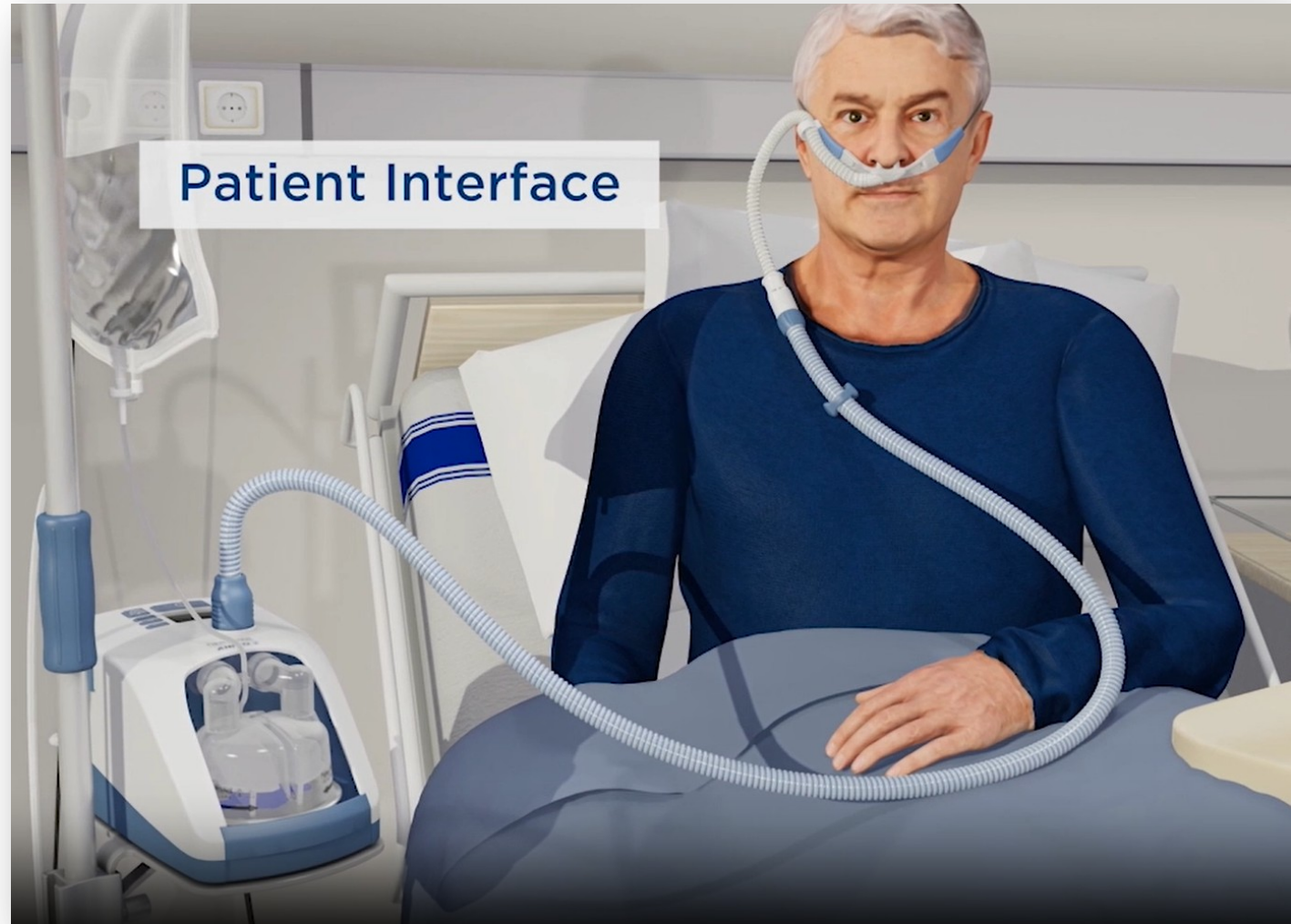
Canters et al. Radiother Oncol 2023

The Airvo Optiflow system

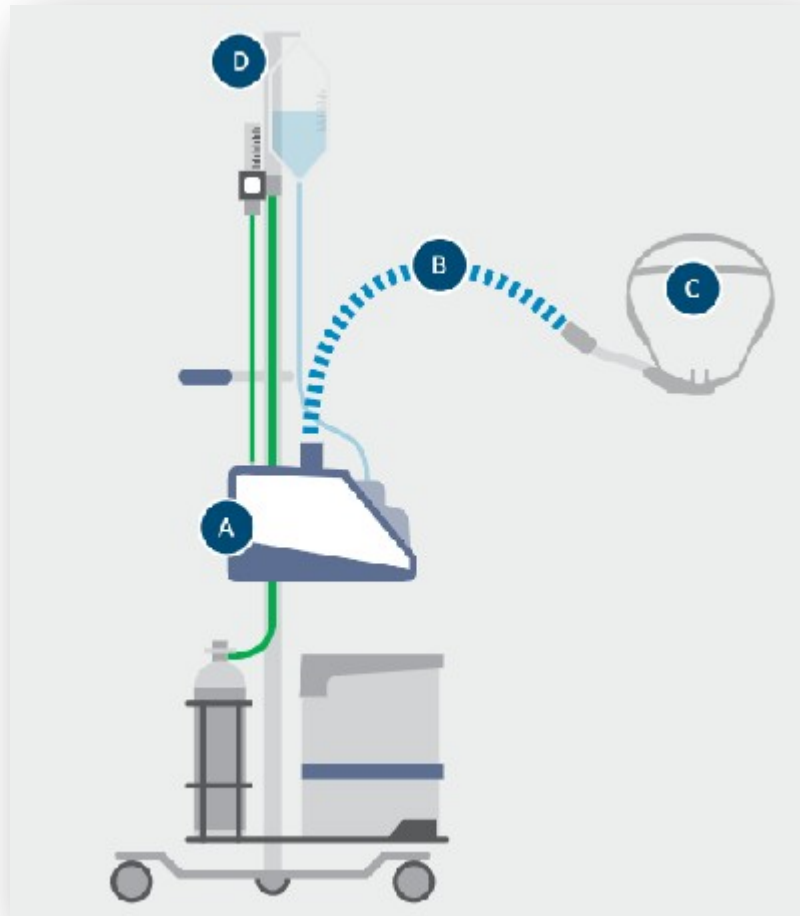
- Oxygen
- Humidification
- Heating
- Nasal flow

Fisher & Paykel
HEALTHCARE

Courtesy Fisher & Paykel

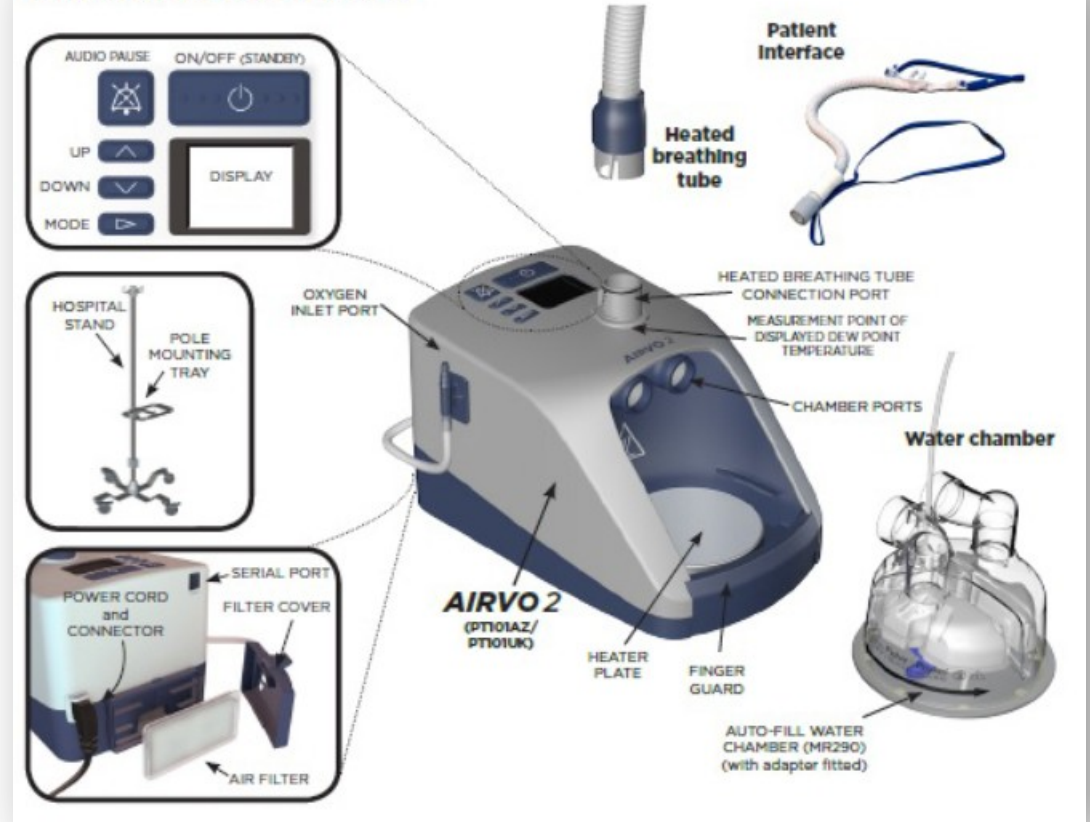


The Airvo Optiflow system



Courtesy Fisher & Paykel

AIRVO 2 AND ACCESSORIES



The Airvo Optiflow system

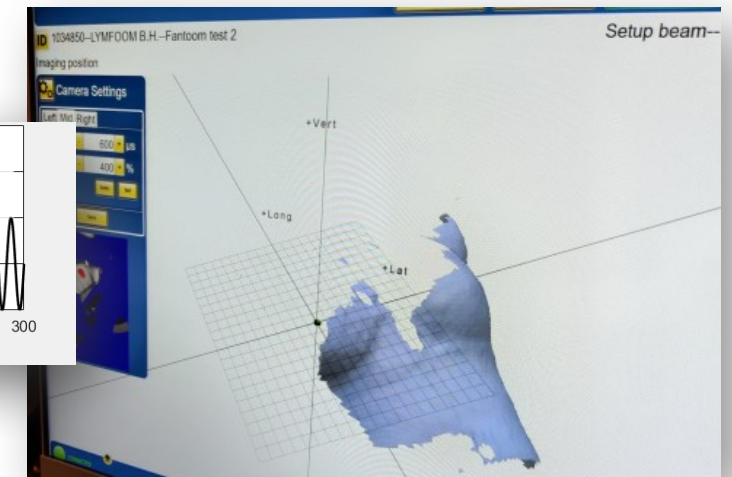
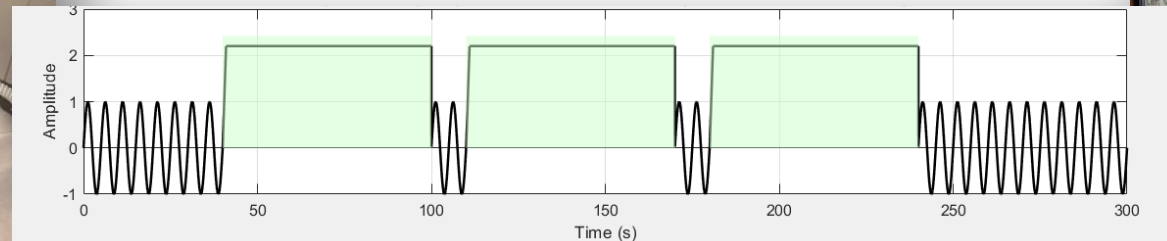
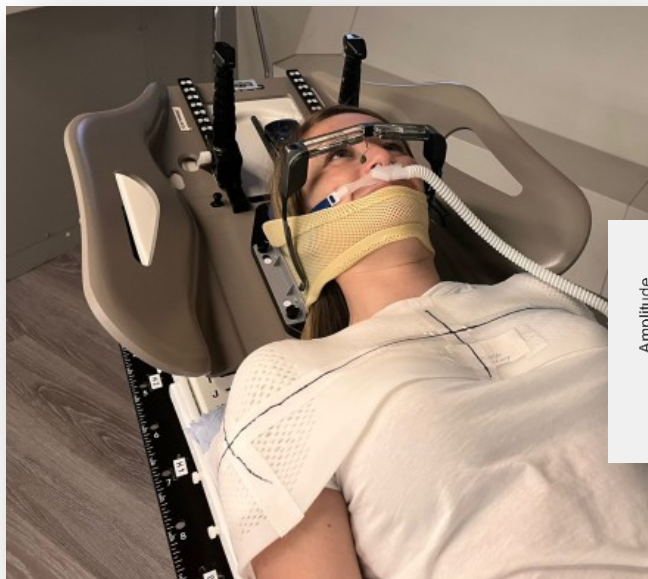
Technical data

- 2-60 l/min airflow
- Bottle or wall oxygen connection possible
- 21% - 80% oxygen
- Heating of air to body temperature
- Humidification of air flow
- Self disinfection cycle



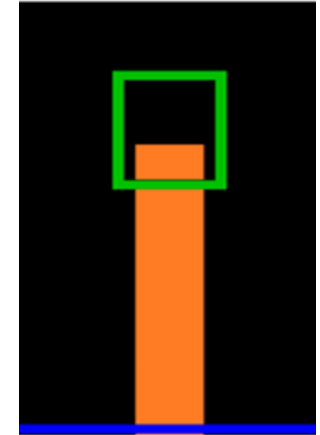
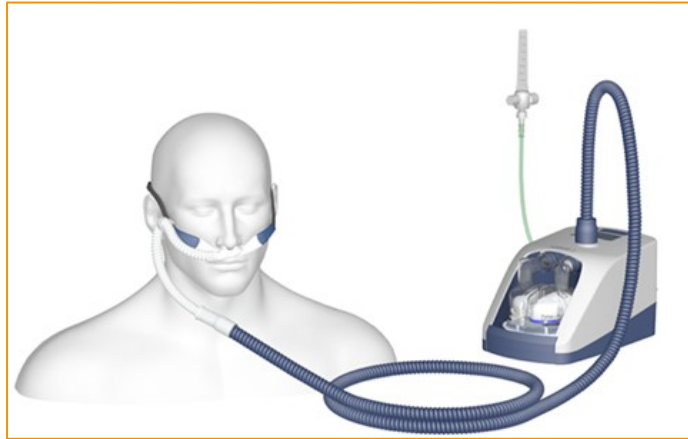
Application in Maastrro

- Prolonging breath hold
 - Lymphoma (XT and PT)
 - Liver SBRT
 - Lung SBRT
 - Pancreas SBRT
- Used in combination with SGRT and gating



ENTheR study

Visually guided breath-hold with nasal high flow therapy



Non-small cell lung cancer patients

Reduce breathing motion

NHFT with humidified air (flow 40 L/min and 80% O₂)

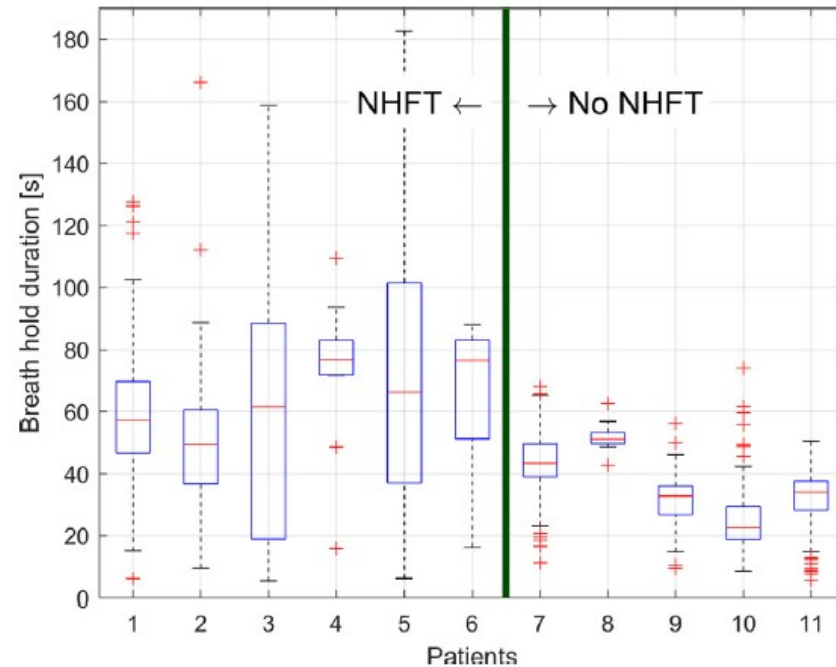
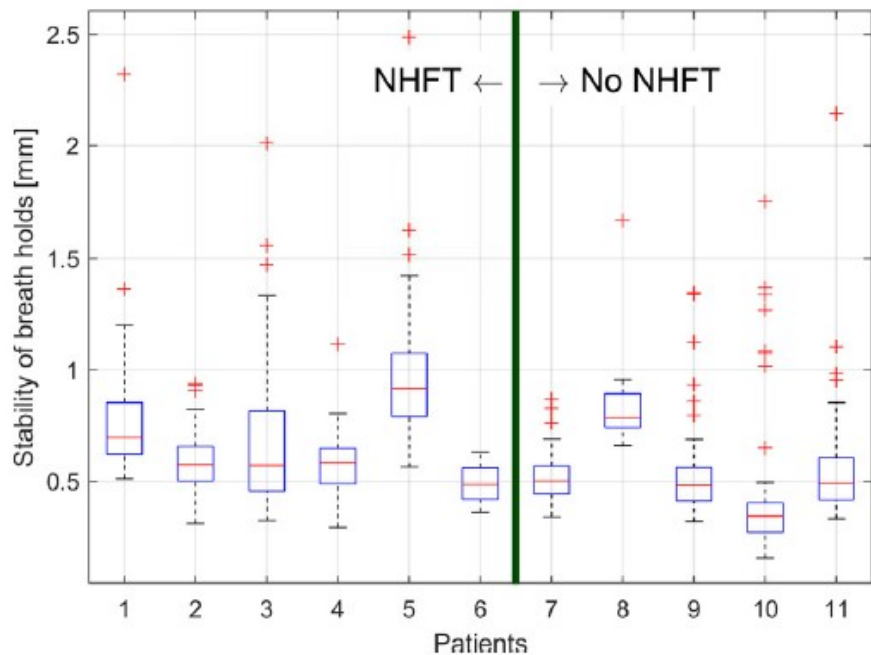
First time used in RT setting

Lymphoma, photons

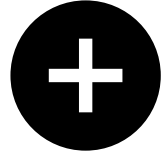
- Breath holds were stable
- Similar stability with and without NHFT
- NHFT +/- doubled BH duration
- Larger spread in BH duration in NHFT: beam on time

Table 2
Overview of inter and intra fraction random (σ) and systematic (Σ) setup errors in left-right (LR), craniocaudal (CC), and anterior-posterior (AP) direction as well as the resulting margins, both for free breathing as well as breath hold.

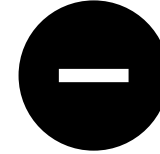
	Inter fraction motion DIBH [mm]	Intra fraction motion DIBH [mm]	Inter fraction motion free breathing [mm]
Σ_{LR}	0.9	0.8	0.7
Σ_{CC}	1.3	0.7	2.1
Σ_{AP}	1.1	0.5	1
σ_{LR}	1.2	1.0	0.6
σ_{CC}	1.9	1.7	1.8
σ_{AP}	1.3	1.2	1.1
Margins [mm]			
LR	4		3
CC	5		7
AP	4		4



Why airvo optiflow?



- Easy to use (airflow, O₂ level, humidity)
- No support from IC/anesthesiologie necessary
- Breath holds twice the normal length
- Stable breath holds



- No control over breath hold depth (combined with SGRT this is largely solved)
- No control over lung volume

Thank you for your attention!

RTTs

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Slides courtesy Stephanie Peeters and Bastiaan Ta