Elekta Unity
Intérêt et points de vigilance

Audrey Planquelle – Global Product Marketing

Why MR/RT?

See clearly

Reduce margins

Stereotactic treatments

Monitor motion

Minimize OAR toxicity

Improve local control

Adapt real-time

Inter-fractional changes

Daily plan optimization

Assess response

Biological information

Earlier treatment adaptation

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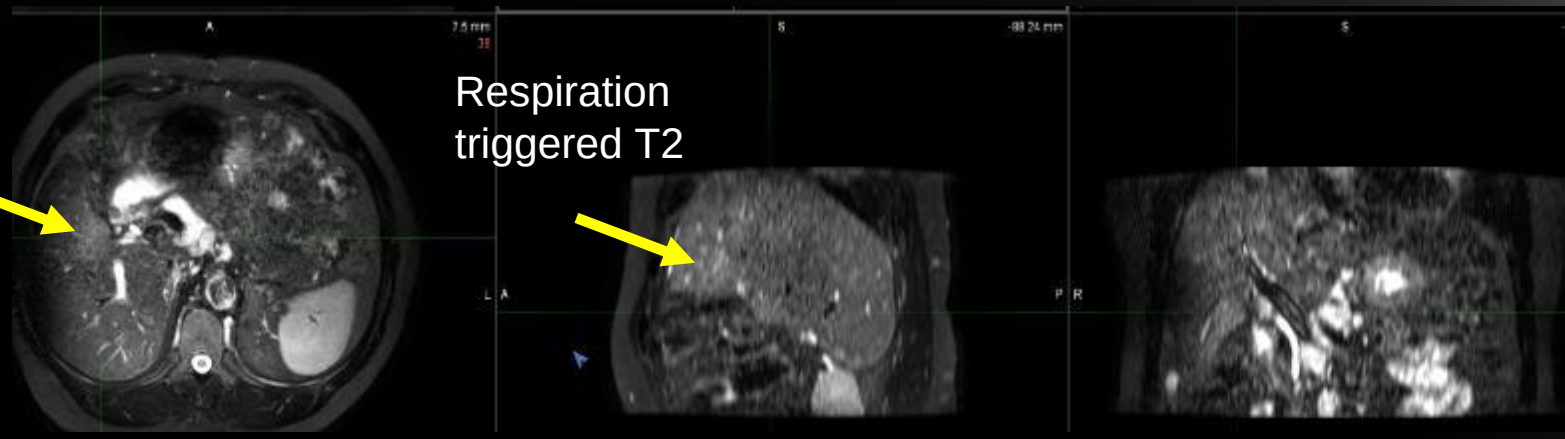
Hard to treat cancers



SBRT 40Gy / 5 fx

Navigated T2 Pre Tx MR

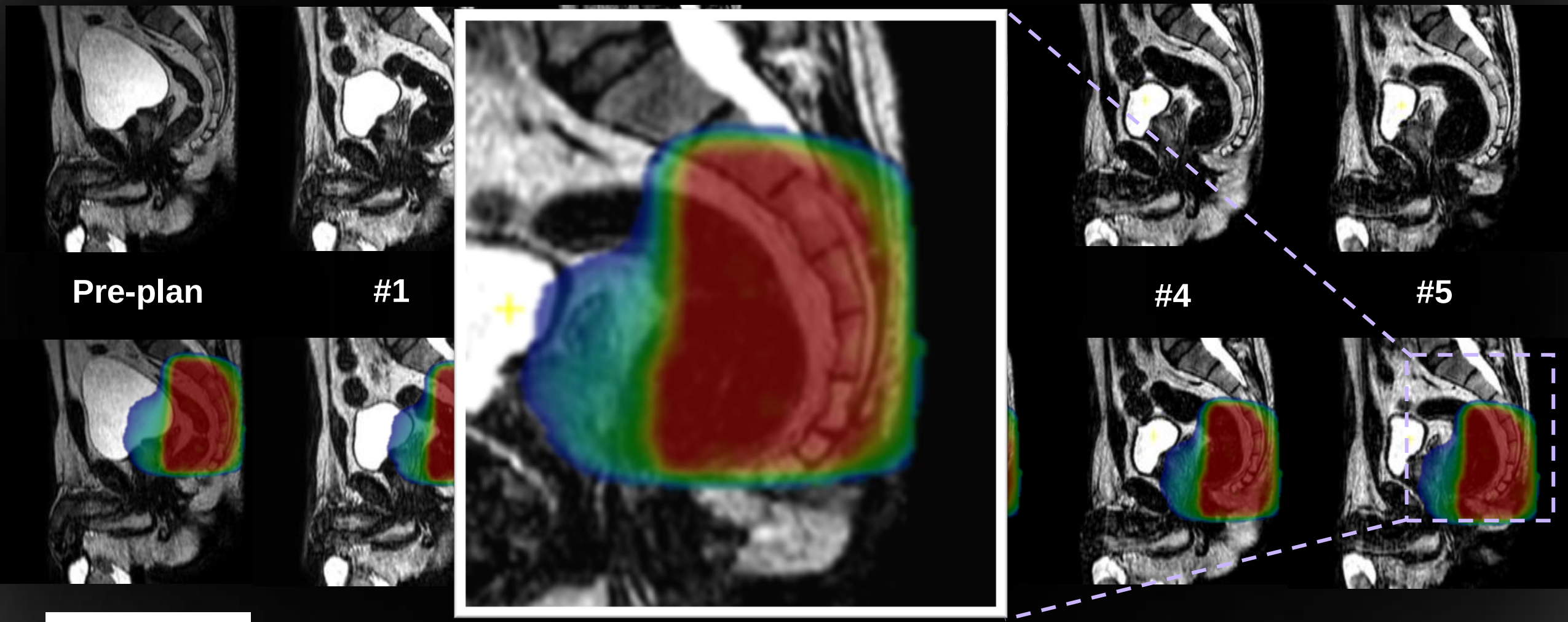
Adapt to shape

Beam-on motion monitoring

On-table time 52 min

Courtesy of Froedtert Hospital / Medical College of Wisconsin.

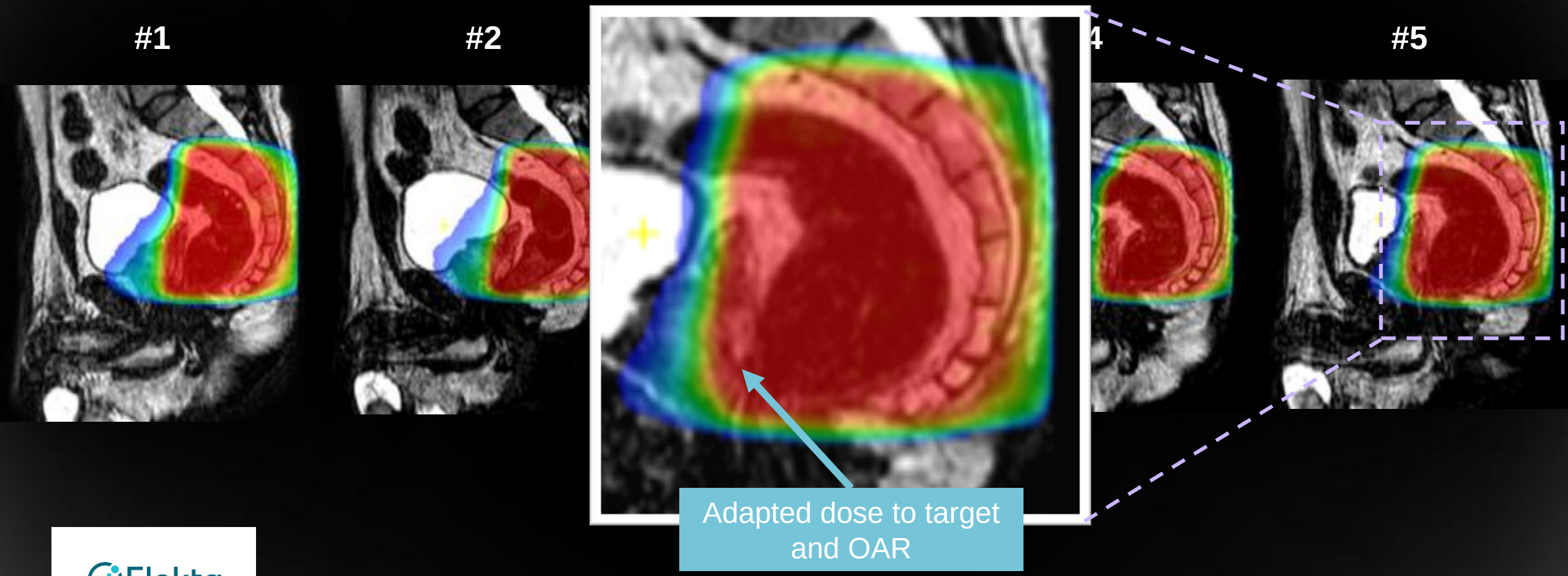
Current clinical practice without adaptation



Courtesy of UMC Utrecht

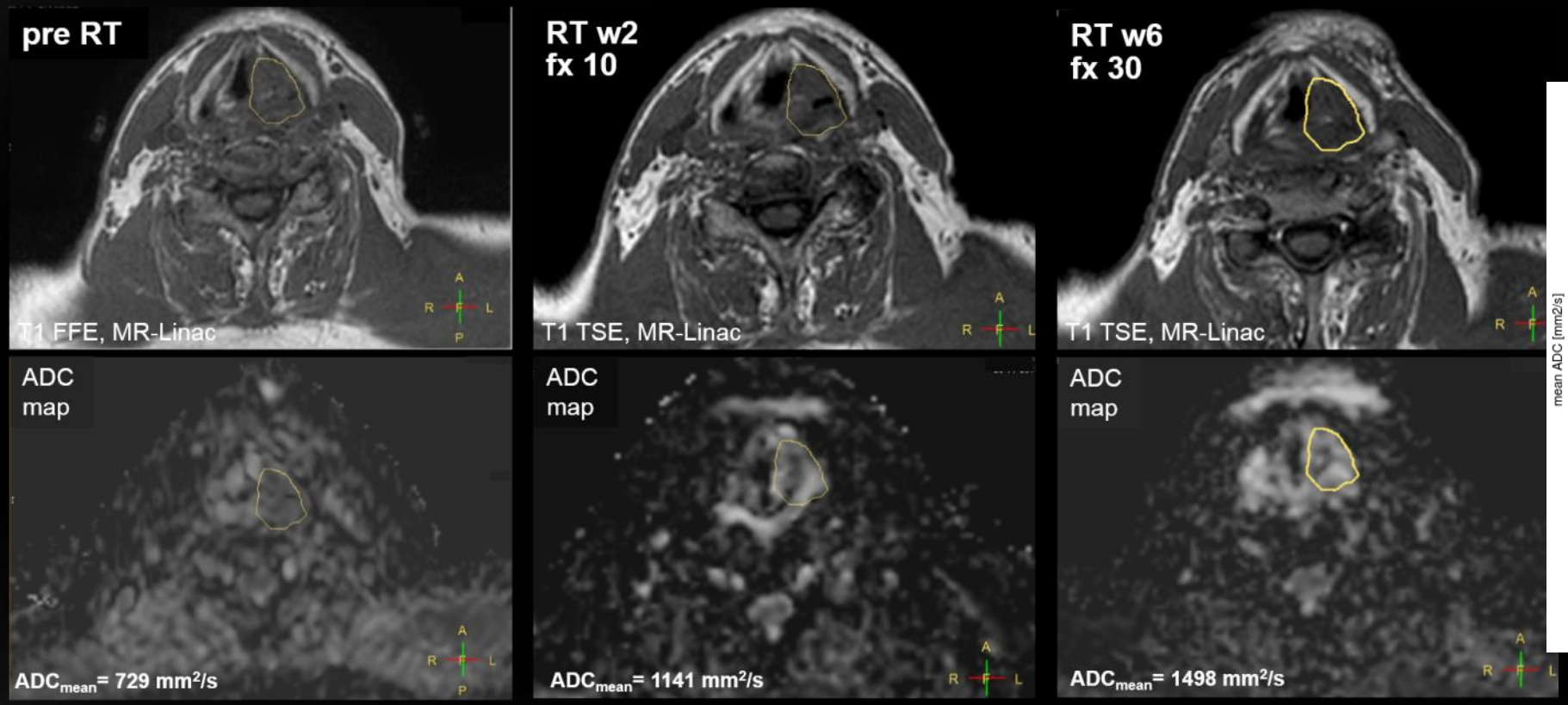
Daily dose reshaping

SBRT – 25 Gy / 5 fx

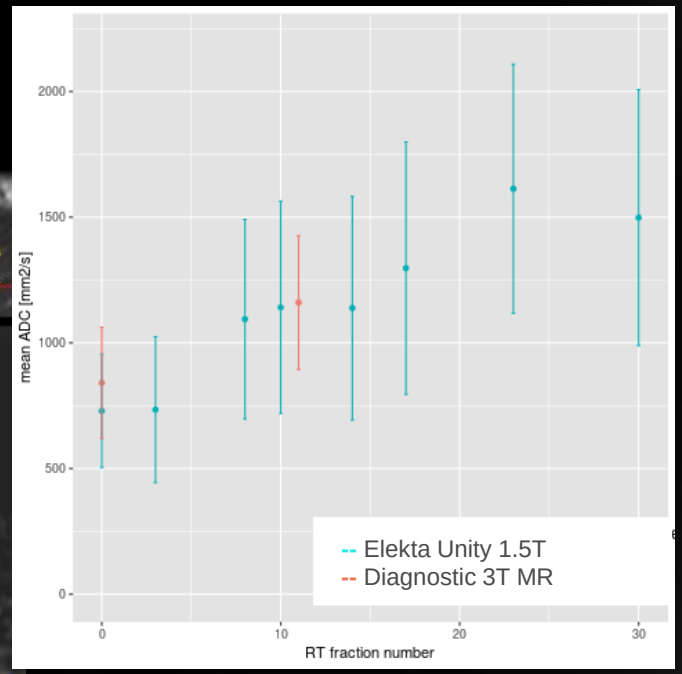


Courtesy of UMC Utrecht

Potential for early tumor response assessment

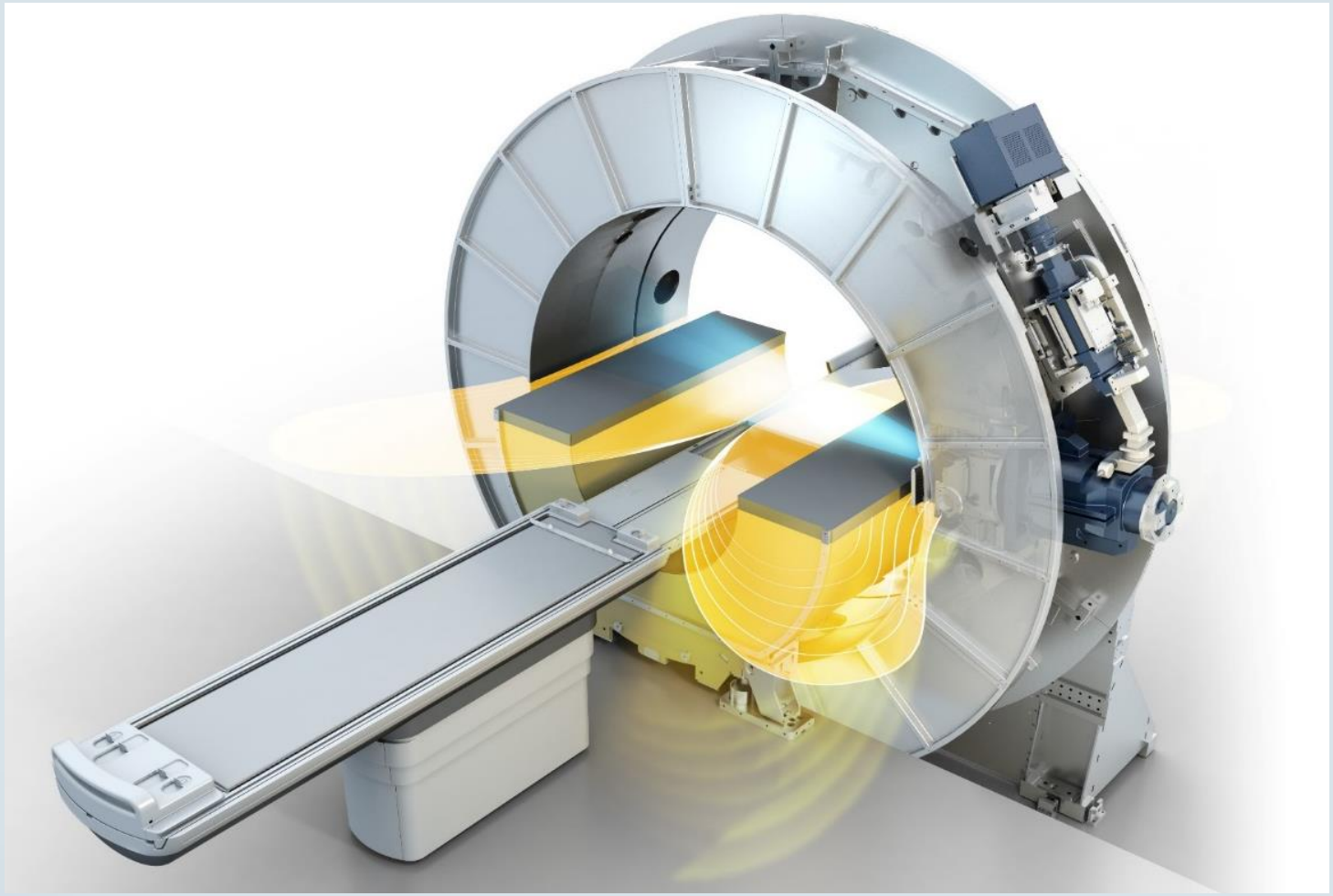


ADC changes over time



Courtesy of University of Tubingen
DWI is CE-marked for brain application imaging and pending U.S. FDA 510(k). Intended for imaging purposes

Groundbreaking technology



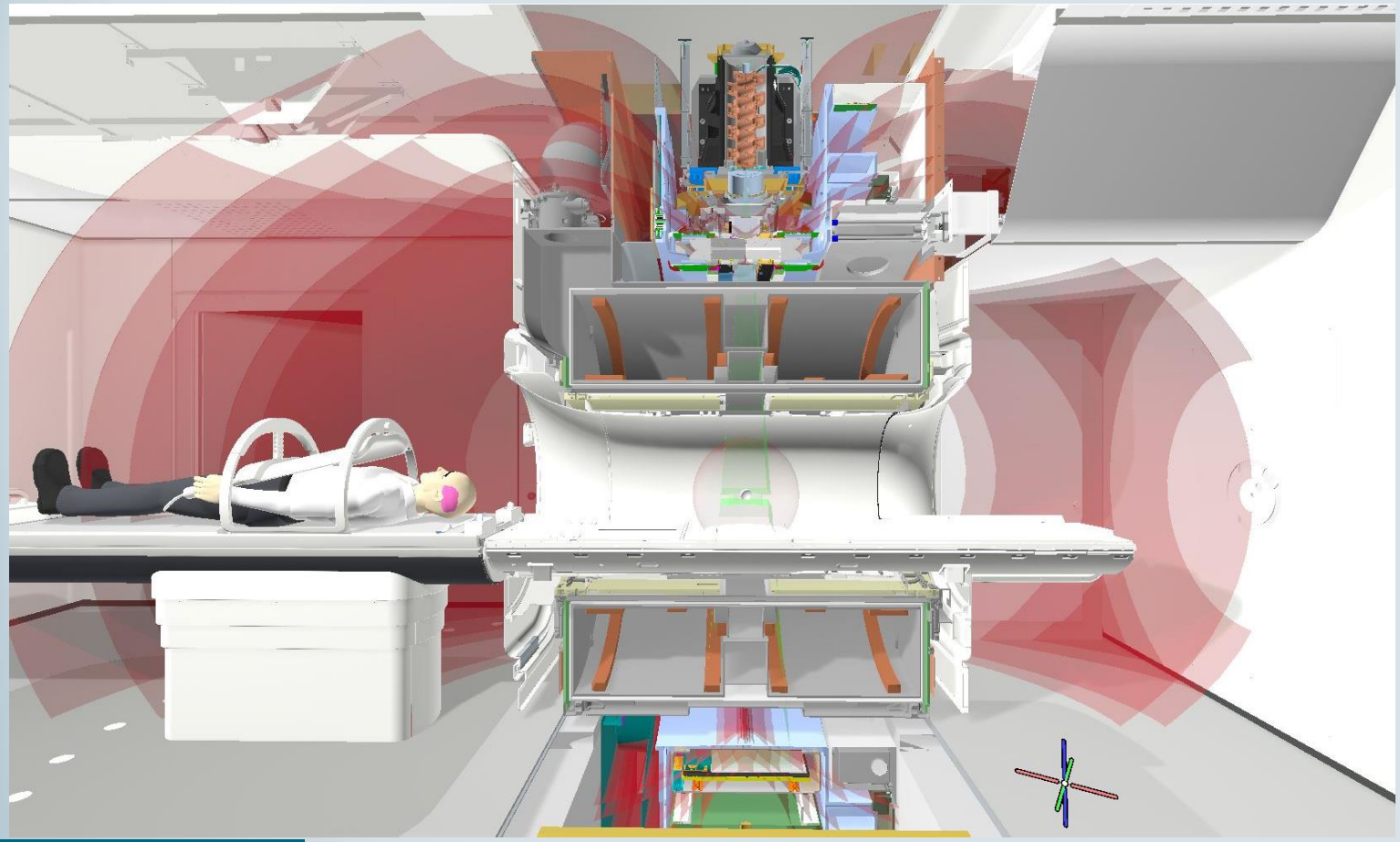
Partnering with the MR/RT experts

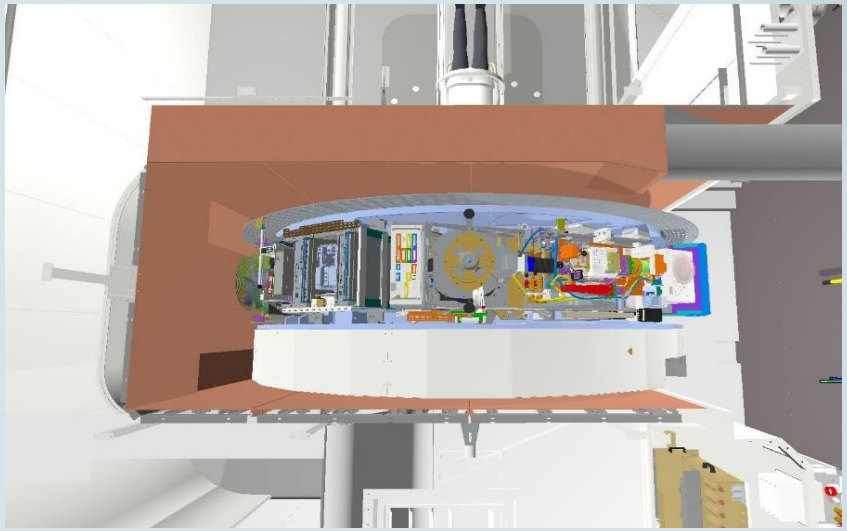
MR-Linac Consortium

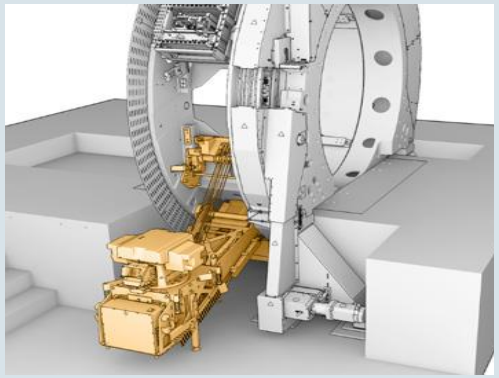
MOMENTUM

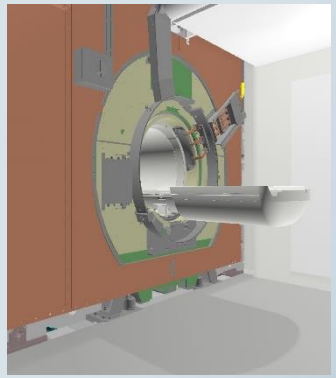
- Clinical outcome reports
- Reimbursement changes
- Protocol standardization
- Artificial Intelligence

Bringing two worlds together









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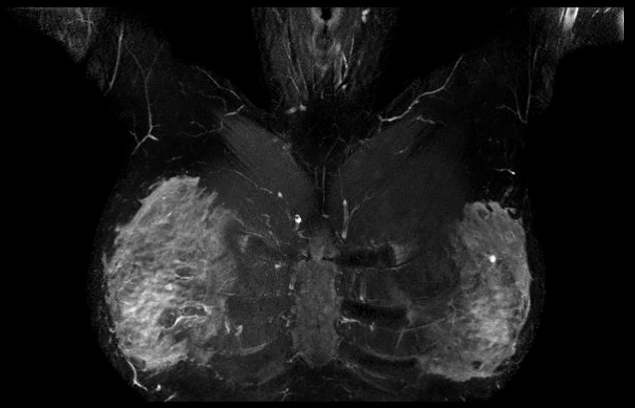
The power of 1.5T MR – Unmatched image clarity

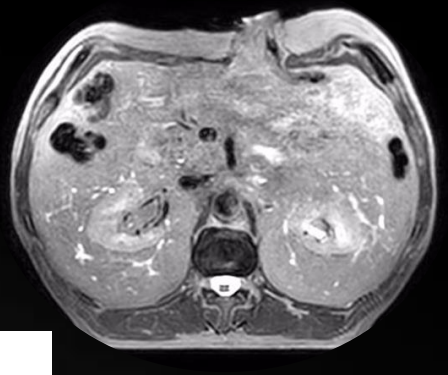
Uniform tissue contrast
(<0.17ppm @ 30cm)



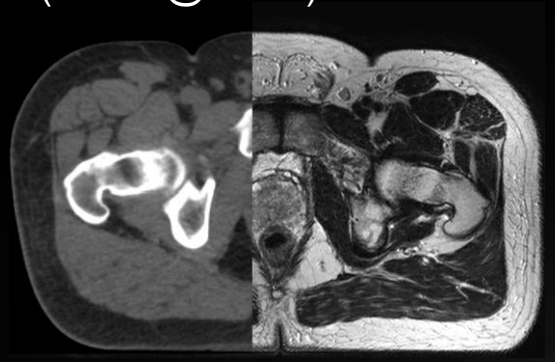
Real-time motion monitoring
(5Hz)

Large imaging field
(50cm)

Sub-millimetric, isotropic resolution



Guaranteed geometric accuracy
(≤2mm @ 42cm)



Courtesy of UMC Utrecht, Univ. Tubingen, AvL-NKI

Management of Electron Return Effect

Total beam path modelling

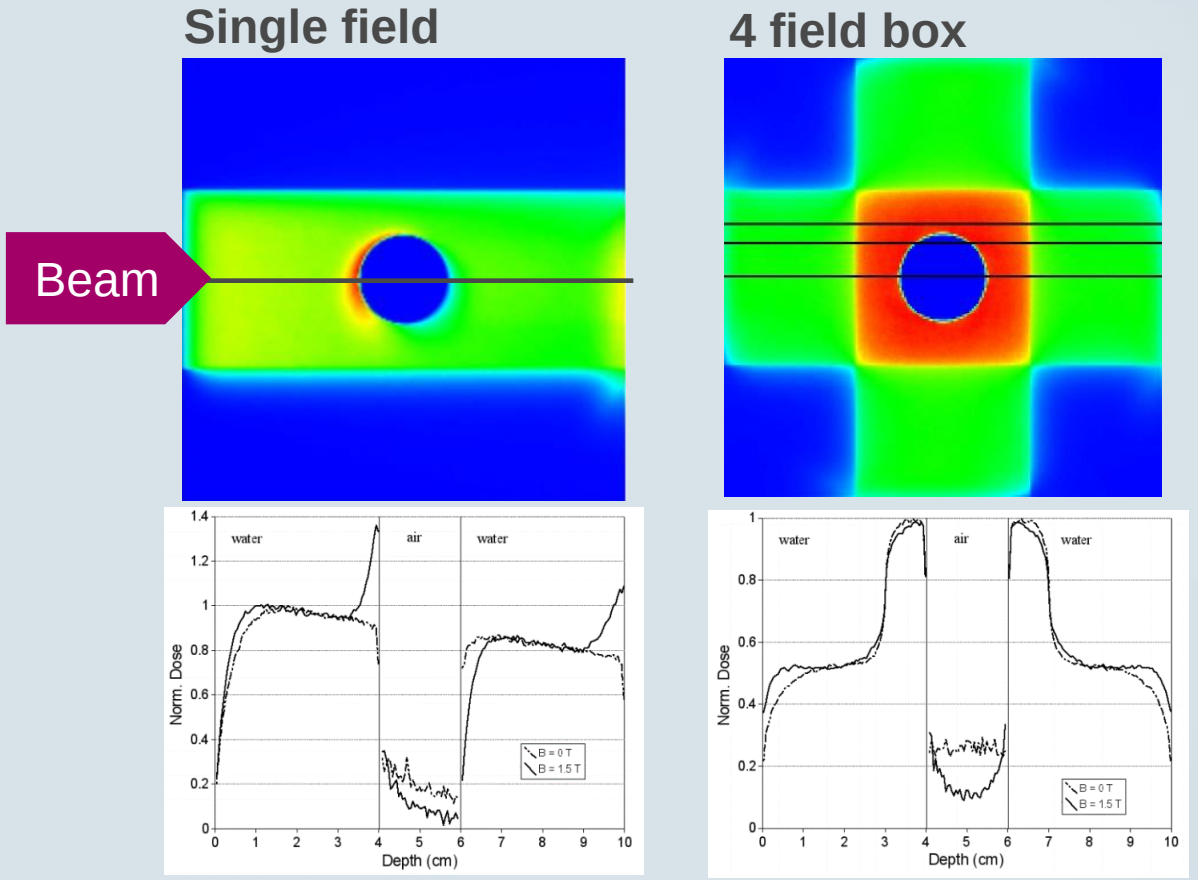
Cryostat & modified scattering

Coils, positioning devices & table

Magnetic fields

Modelling of secondary electrons

Part of constraints in optimizer

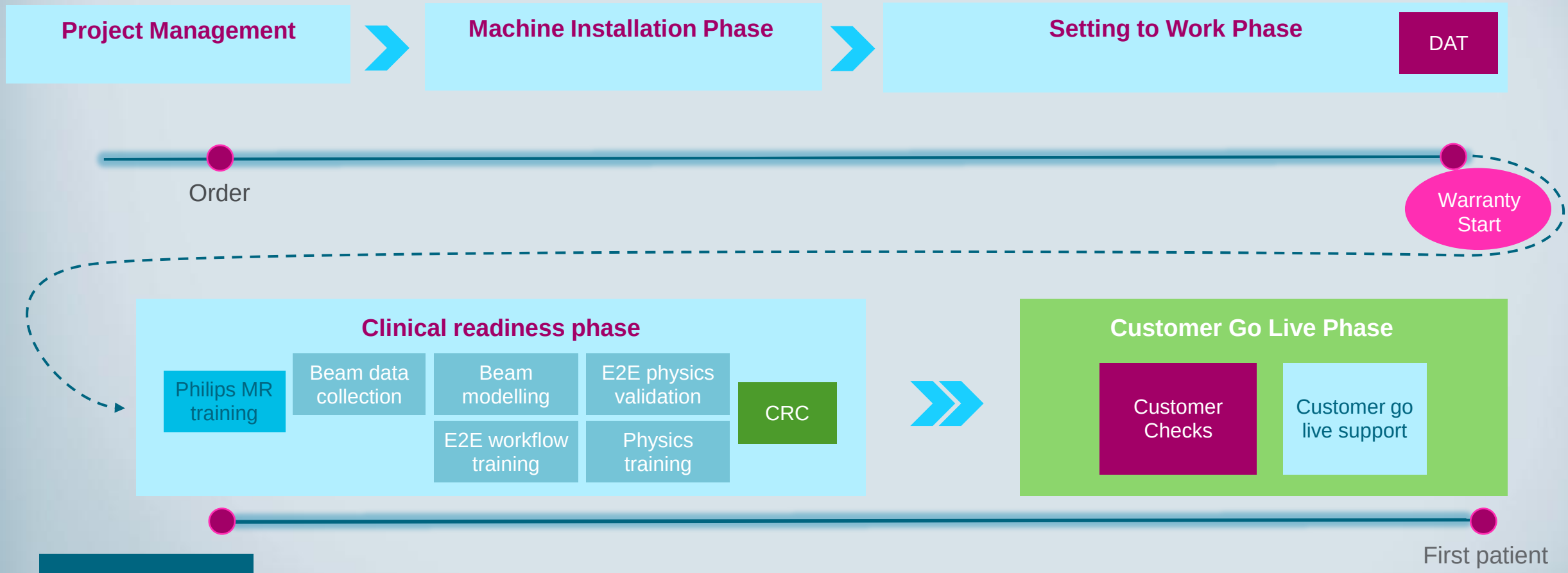


Using just 4 beams reduces the peak dose from 35% to 3%

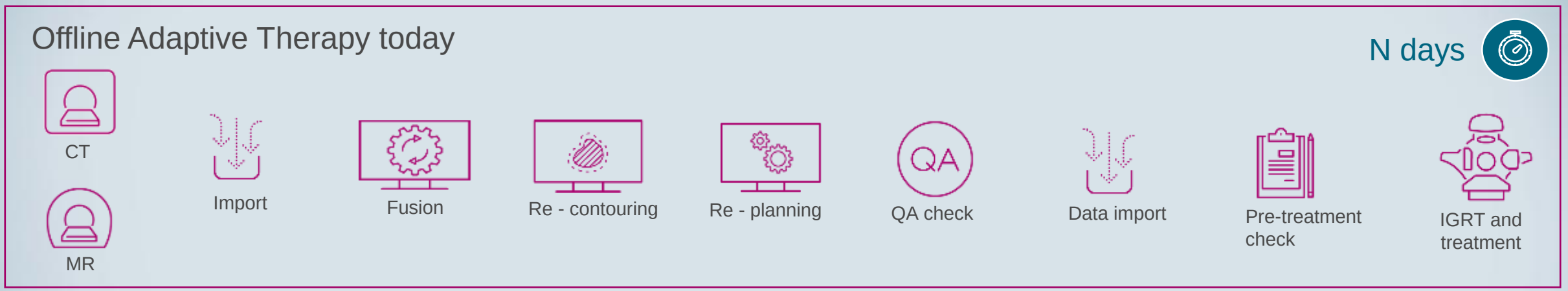
Central axis 0T vs. 1.5T

Raaijmakers et al PMB 2005

Full support with Elekta



Simplify the adaptation with online Scan – Plan – Treat



N minutes

Scan

Acquire pre-selected daily MR images with superior soft tissue visualisation.

Plan

Instantaneously react to daily tumor changes with automatic image fusion, plan adaptation and plan review tools

Treat

See the tumor in 3 planes while treating with stereotactic precision

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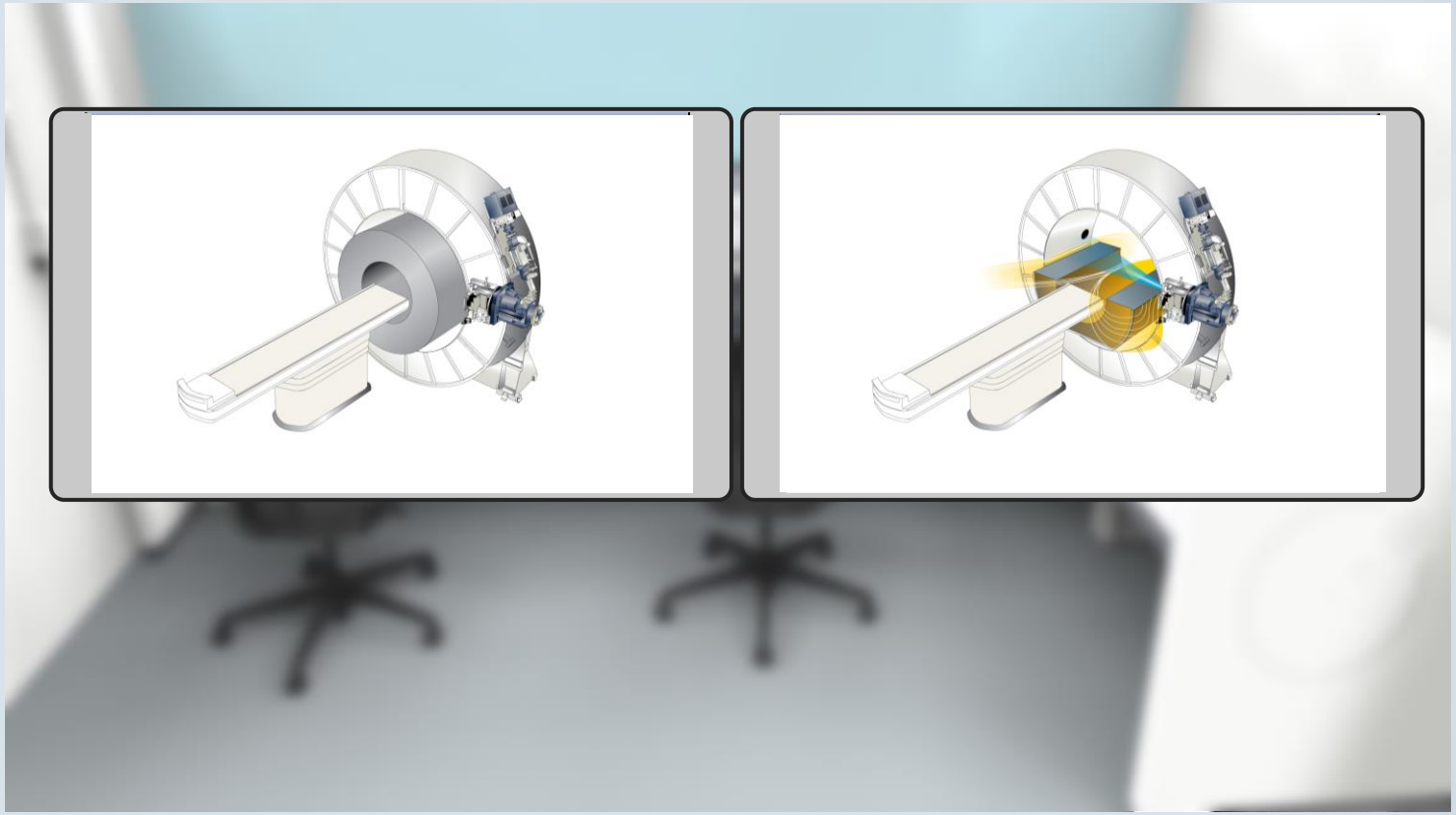
New integrated user interface

- Data Management
- Online Adaptive Planning
- RT-optimized Plug&Play MR
- Integrated workflow console



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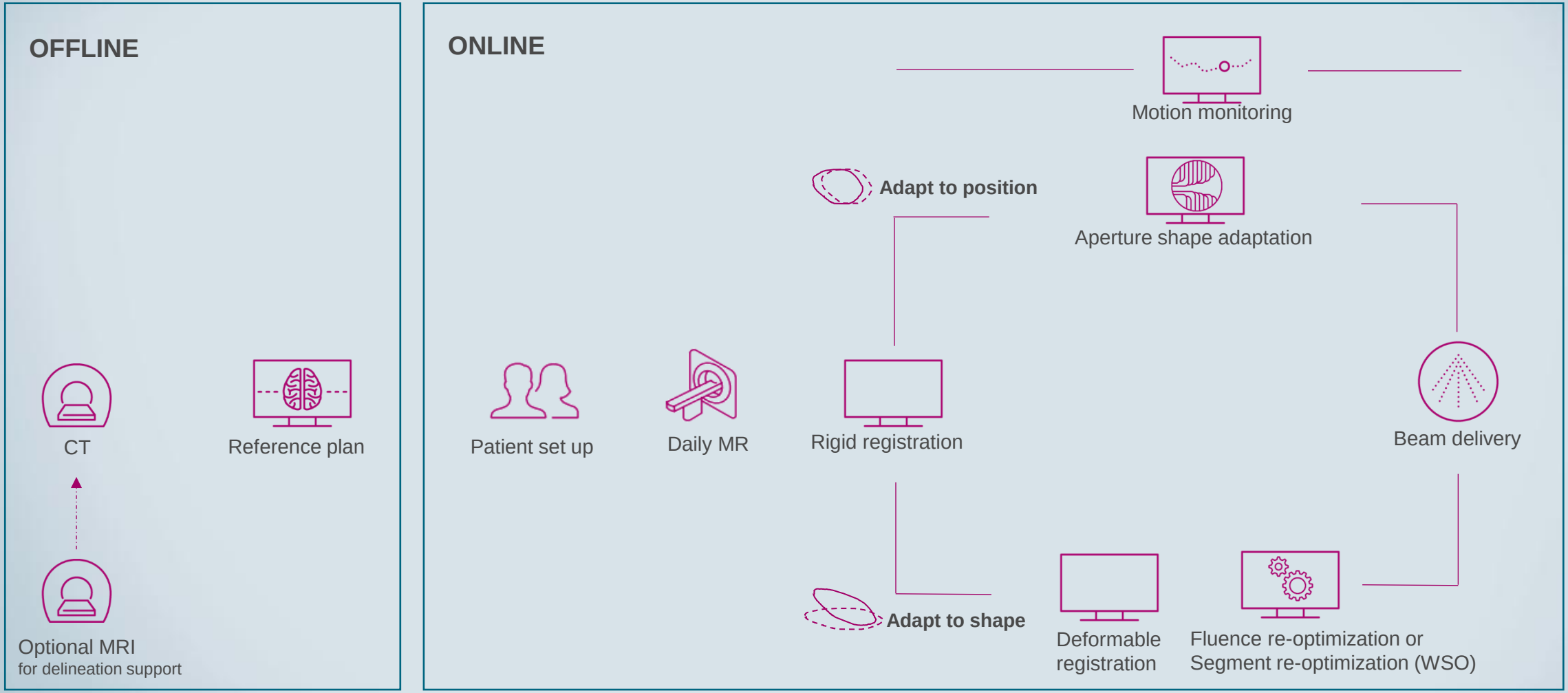
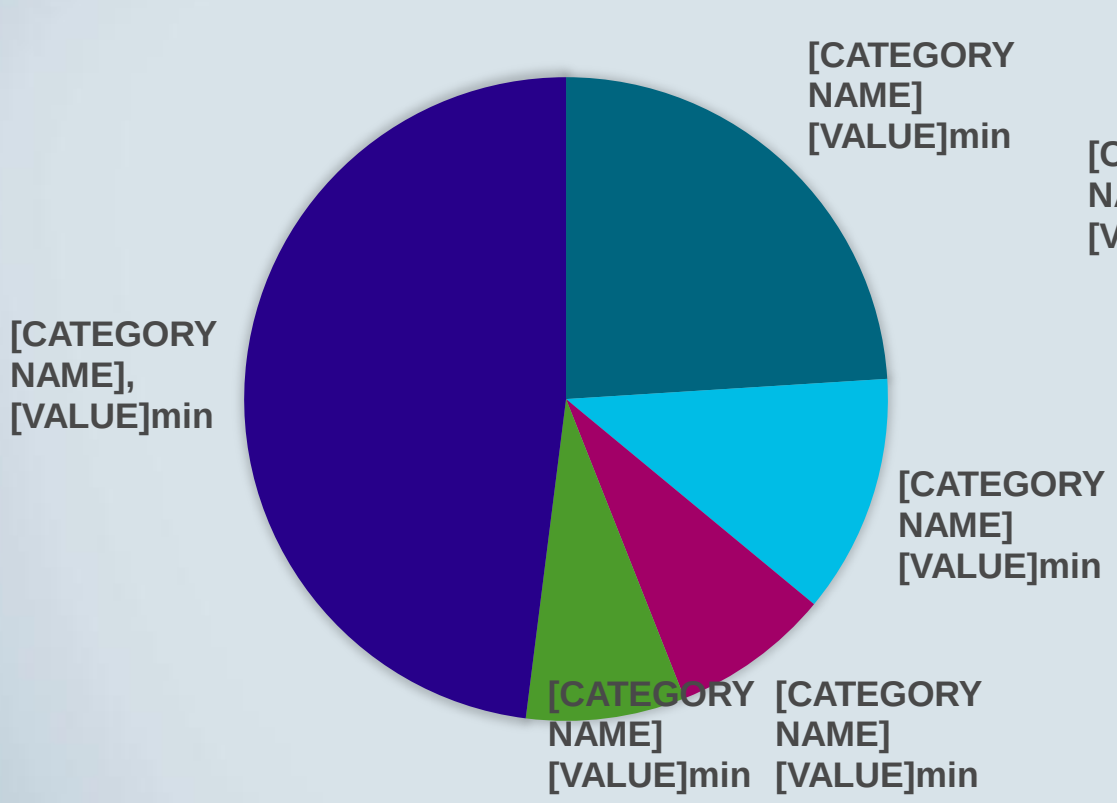
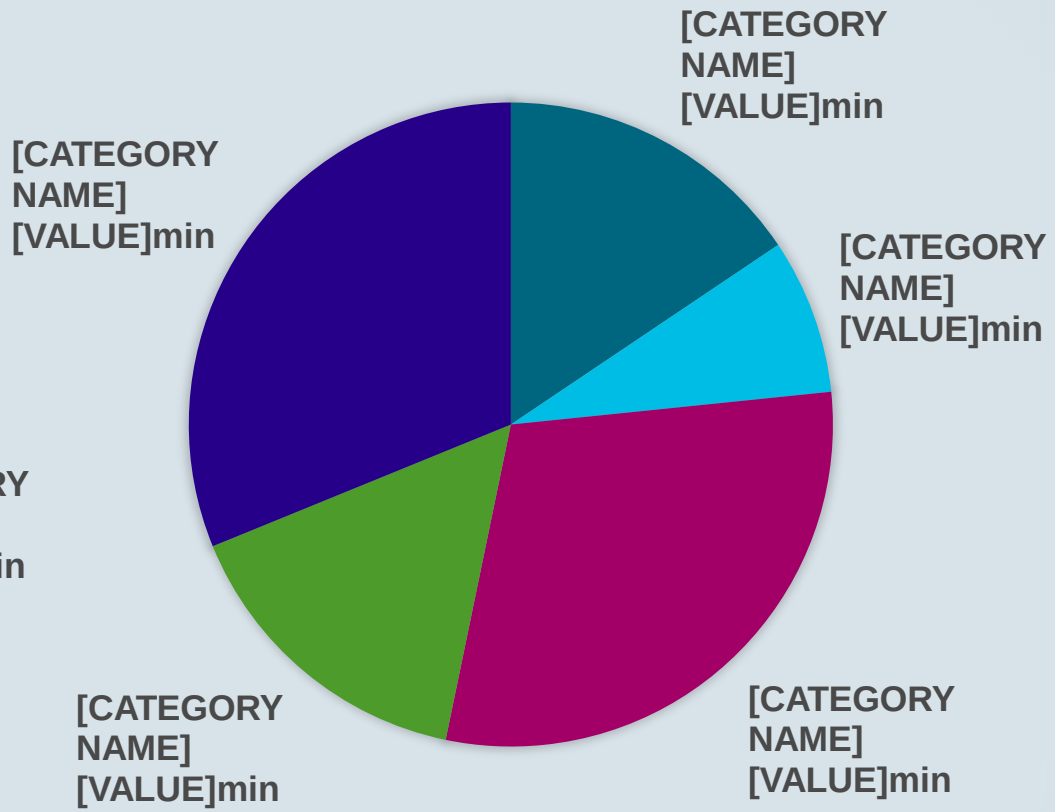
Personalized adaptive radiotherapy



Workflow timings



Mean time ATP = 26 min



Mean time ATS = 42 min

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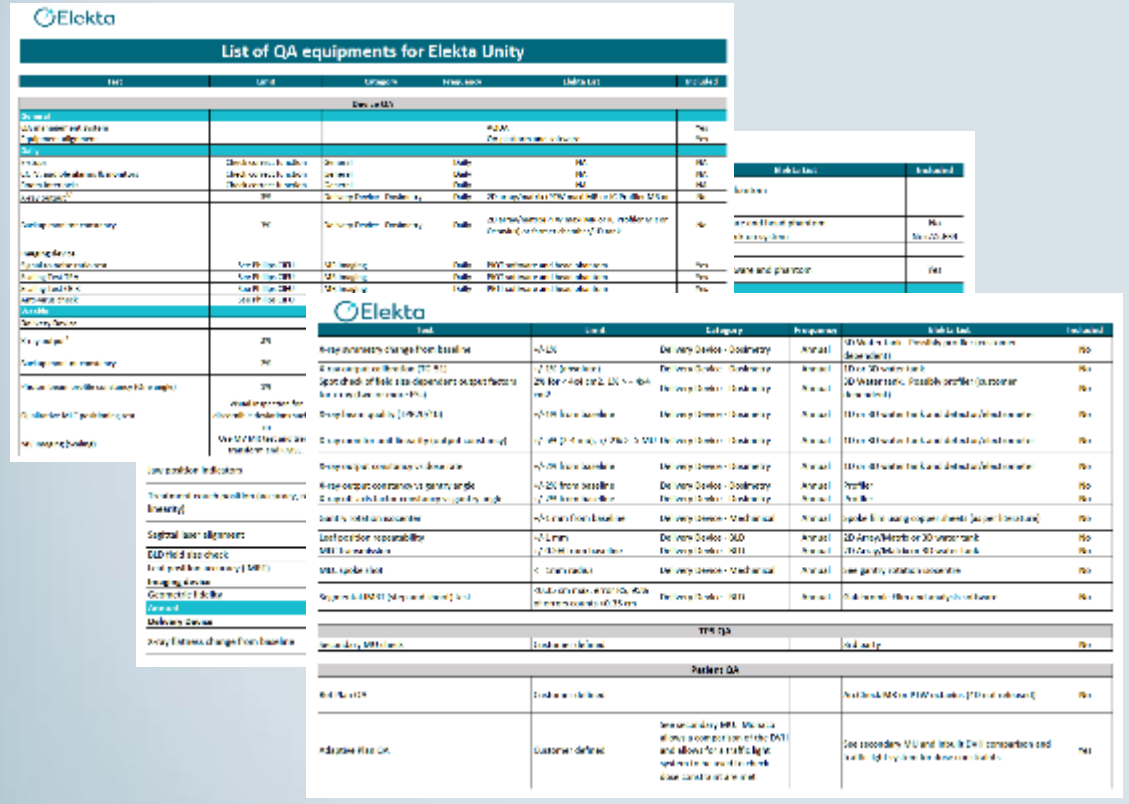
Bertelsen AS, Schytte T, Møller PK, et al. First clinical experiences with a high field 1.5 T MR linac, Acta Oncologica.

QA overview for Elekta Unity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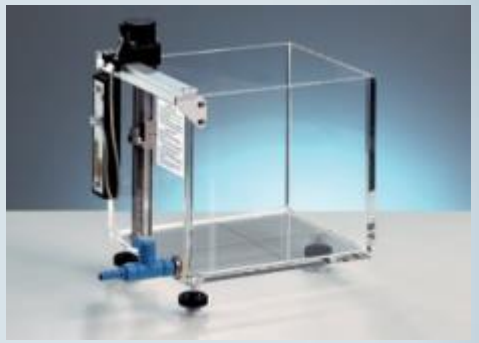
List of QA equipments for Elekta Unity



Secondary MU check solution

Fast

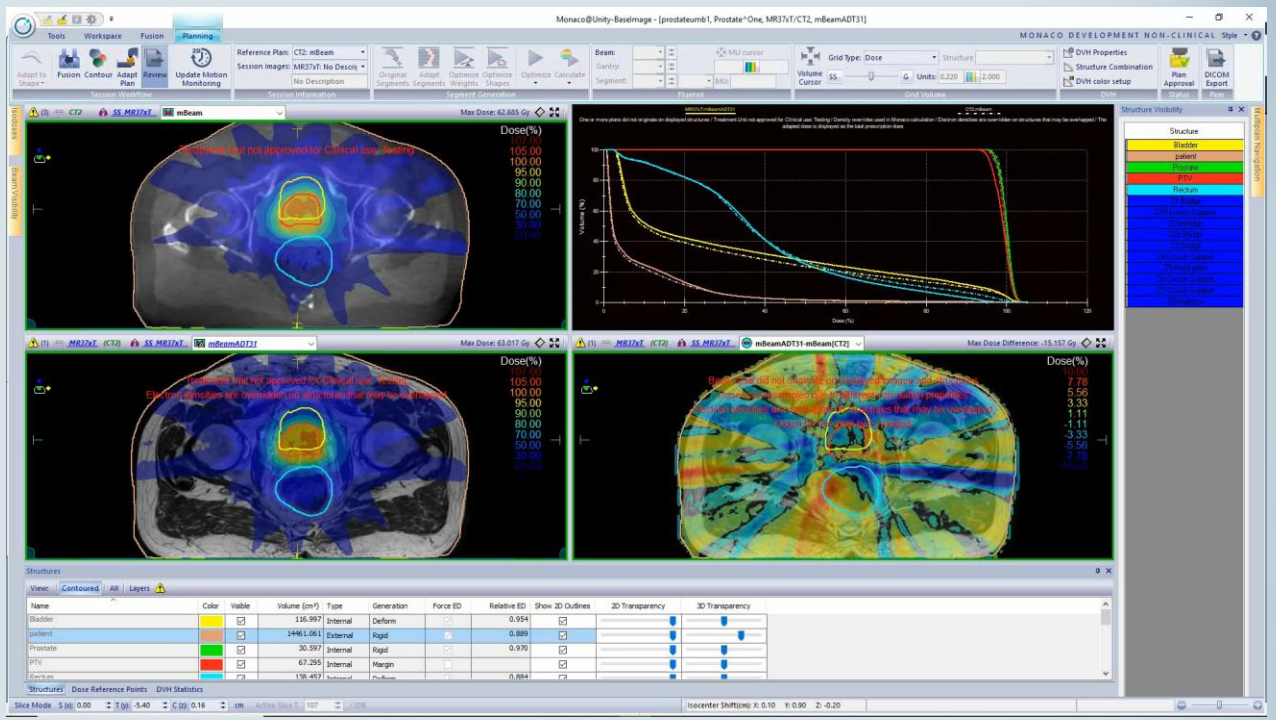
Secondary MU check calculation completed in seconds

Integrated

Data import directly from the main user console to web-based platform

Independent

New algorithm based on limited number of experimental data



Dosimetric Accuracy

ArcCheck pass rate measured

Cryostat & modified scattering

Coils, positioning devices & table

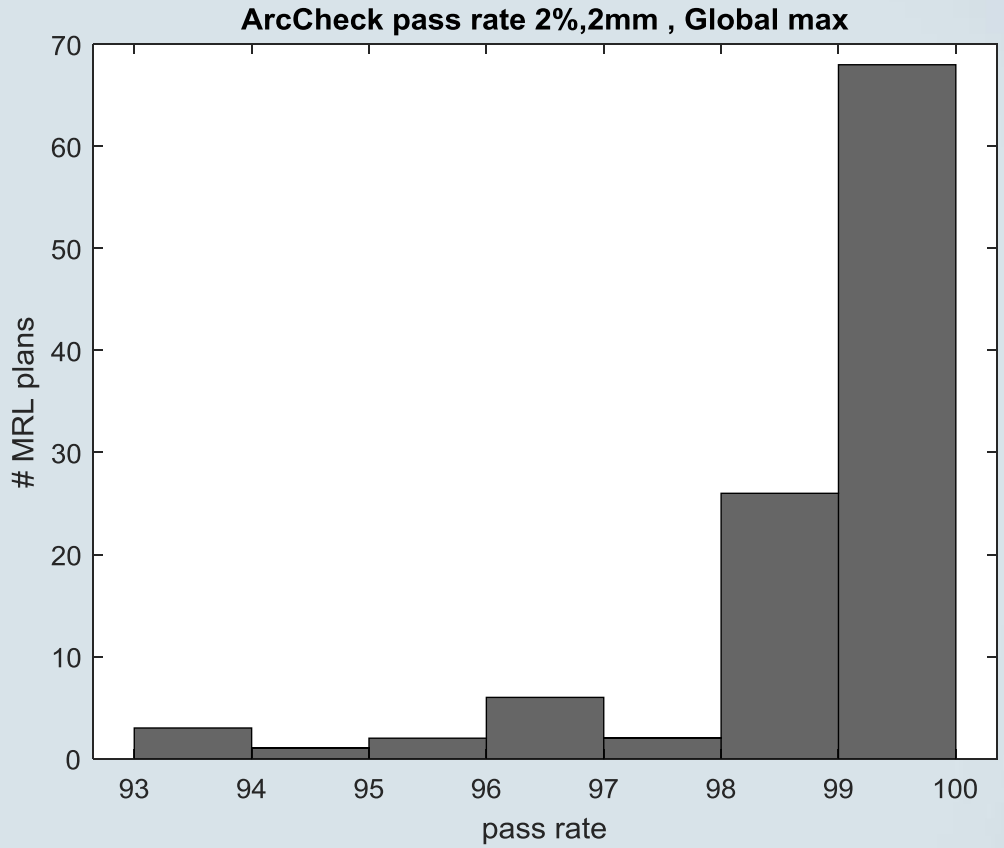
Median pass rate of 99.2%

Range 93.4–100%

Excellent agreement

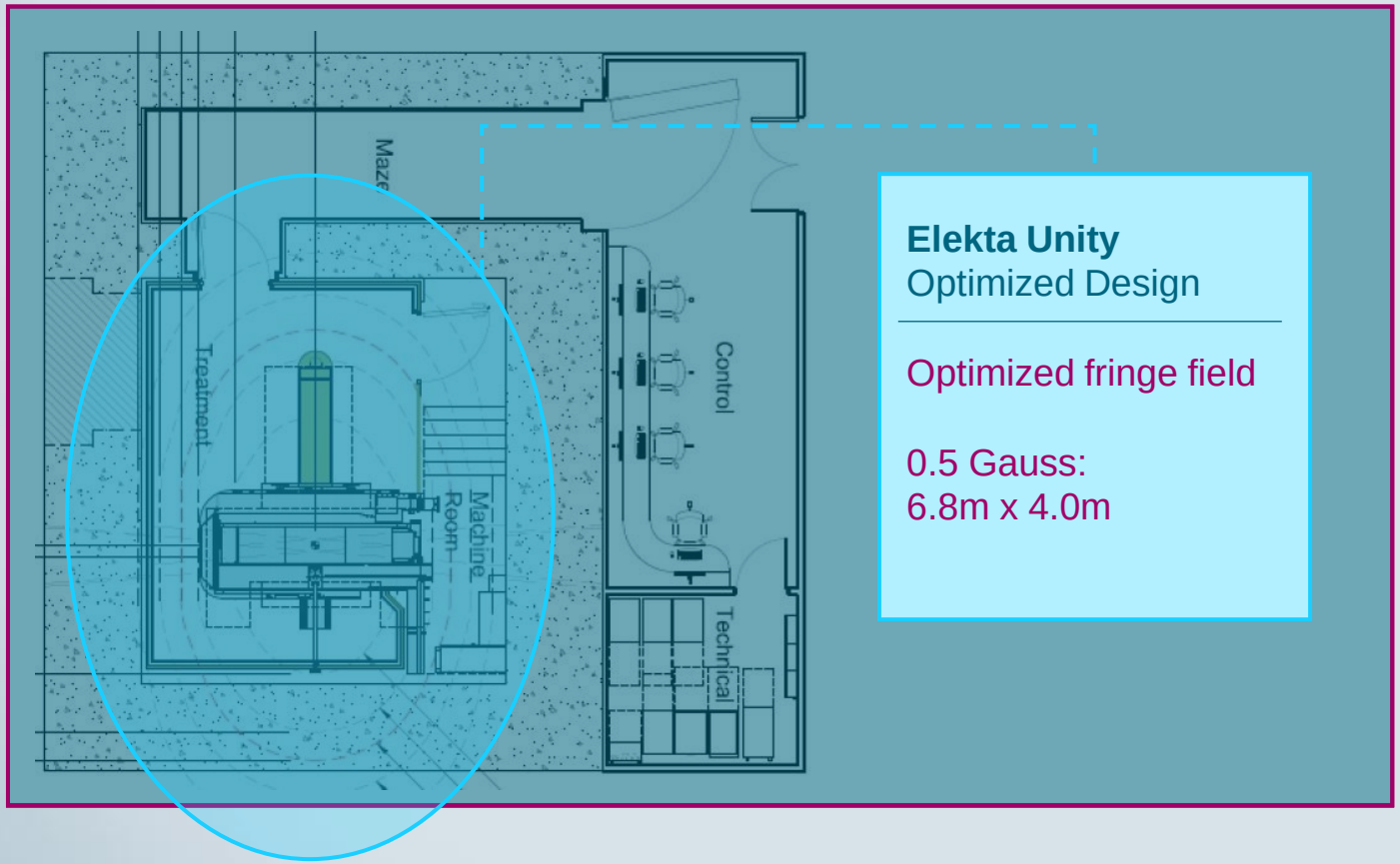
Excellent delivery accuracy

Magnetic field effects are fully managed



AS. Bertelsen et al (2019), Acta Oncologica

Unique & optimized magnetic design



Dimension	MR-linac	Standard linac
Width	6.7 m	6 m
Length	6.7 m	5.8 m
Height	3.25 m	3.2 m
Pit	1.05 m	0.45 m

Designed for minimal magnetic presence outside treatment area
Comparable to Magnetic Earth field

Easy integration in RT clinics
*Normative calibration for surrounding Linacs***

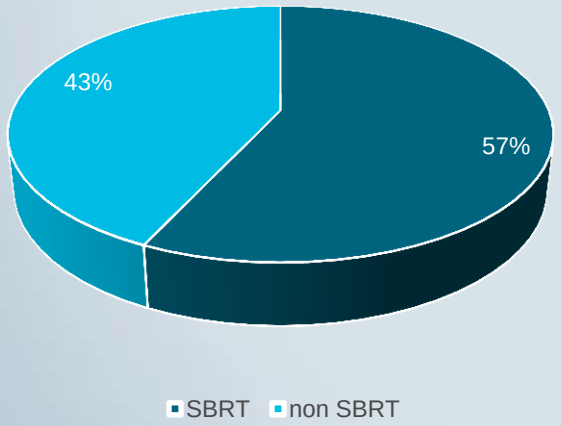
*Data from Unity Site planning guide;
**The impact of a 1.5 T MR-Linac fringe field on neighbouring linear accelerators. T.J. Perika et al.

Clinical experience so far

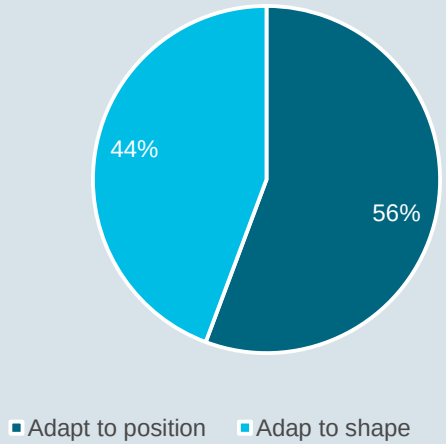
>350 patients treated across

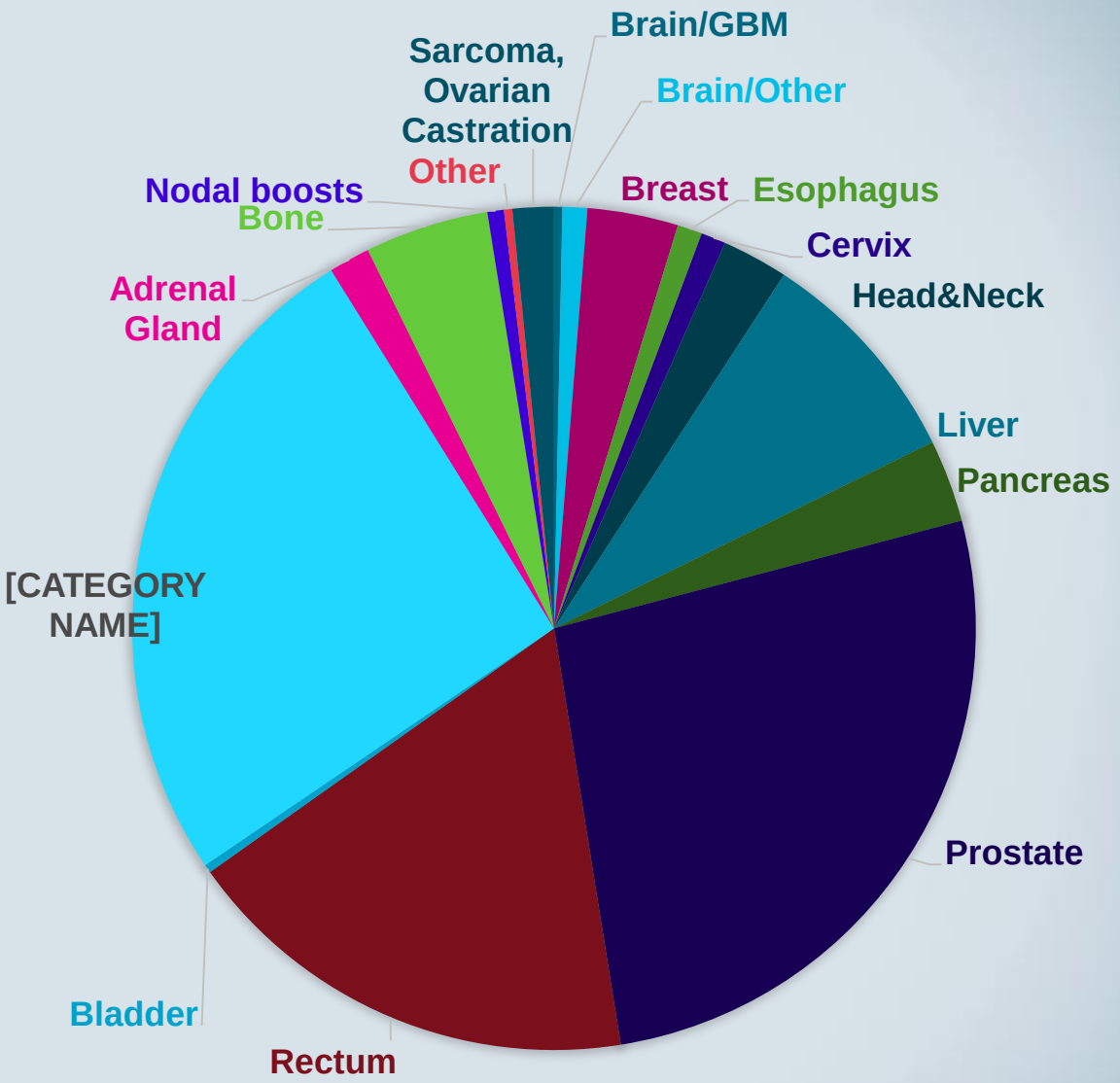
11 sites

Type of treatments



Type of plan adaptation





Clinical indications are presented by the MR-Linac Consortium from Elekta Medical Affairs.

Thank You