



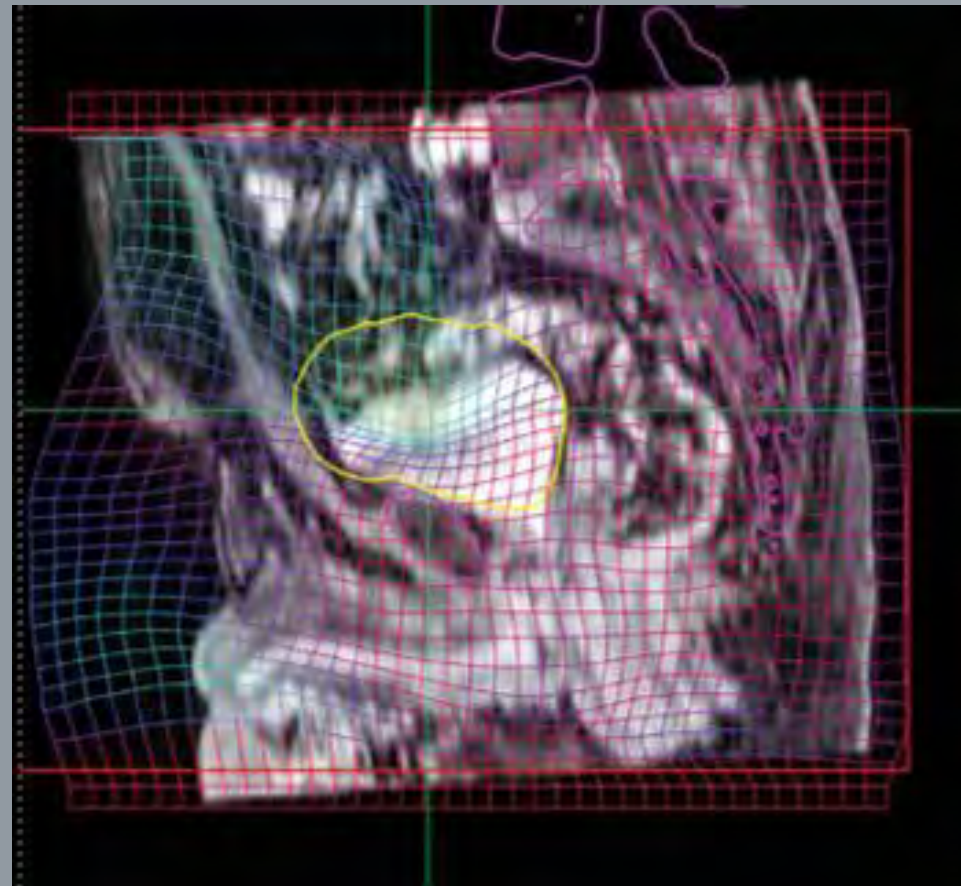
Offline Adaptive Prostate Radiotherapy in Rural Medicine and other Low-Resource Settings

Ellie Bacon

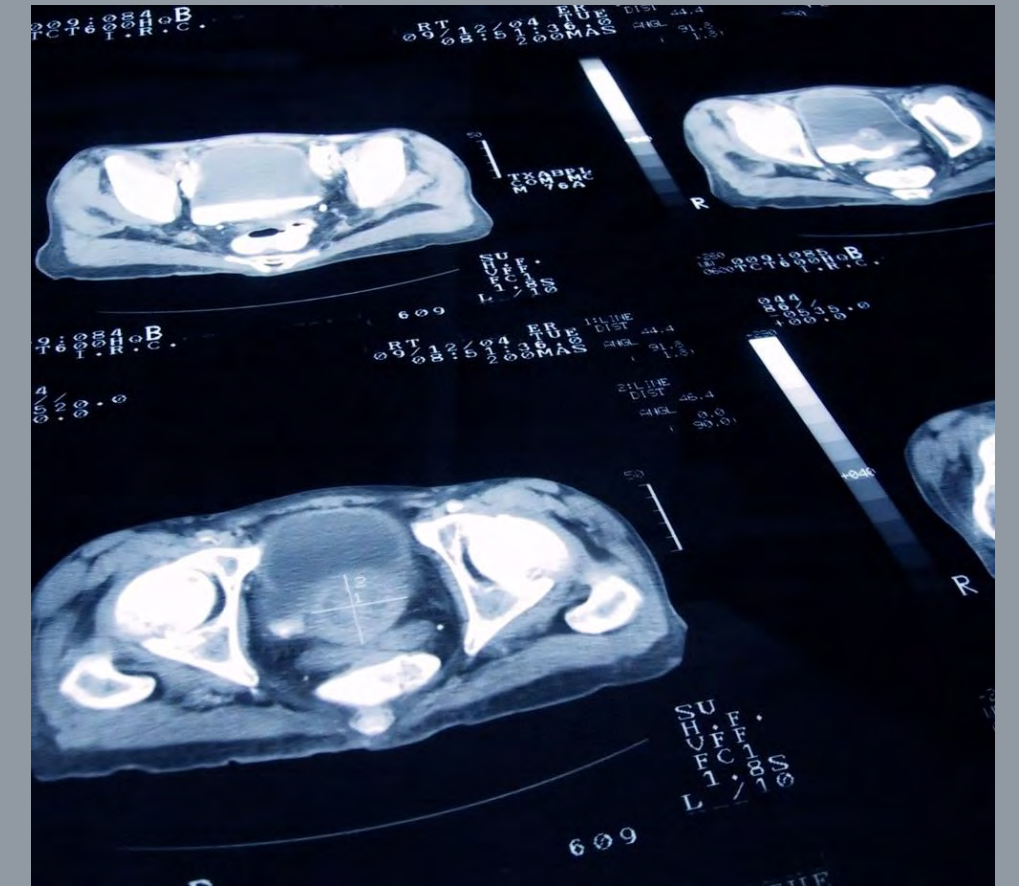
Overview



**What are the
Limitations in
Rural Medicine?**



**What is Adaptive
Radiation Therapy?**



**Why Prostate
Cancer Patients?**



Rural Health

Common Limitations





Rural Health

Patient Limitations



World–Wide Connections

Low- and middle-income countries often share common limitations in health care access with rural areas in the US

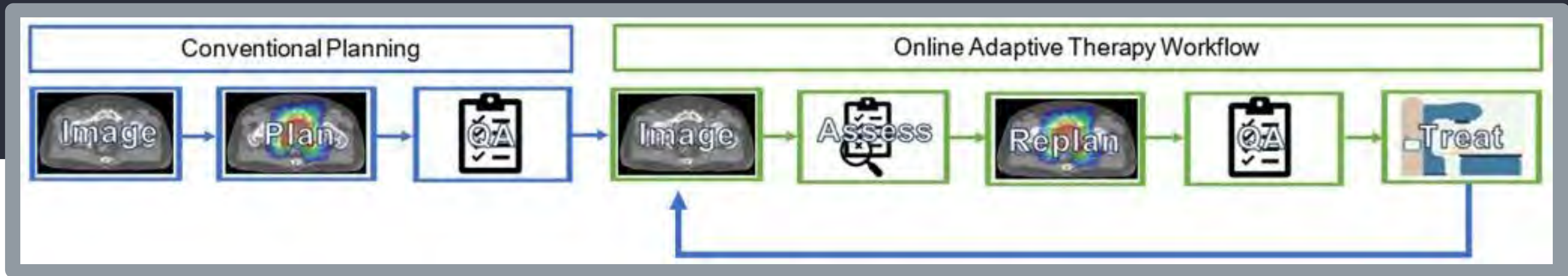




What is ART?

(Adaptive Radiation Therapy)





Online ART

- Daily reoptimization
- Adds at least 15min to treatment duration
- Modification done at the machine
- Specialized machines/software required

Online Technology

MR-LINAC

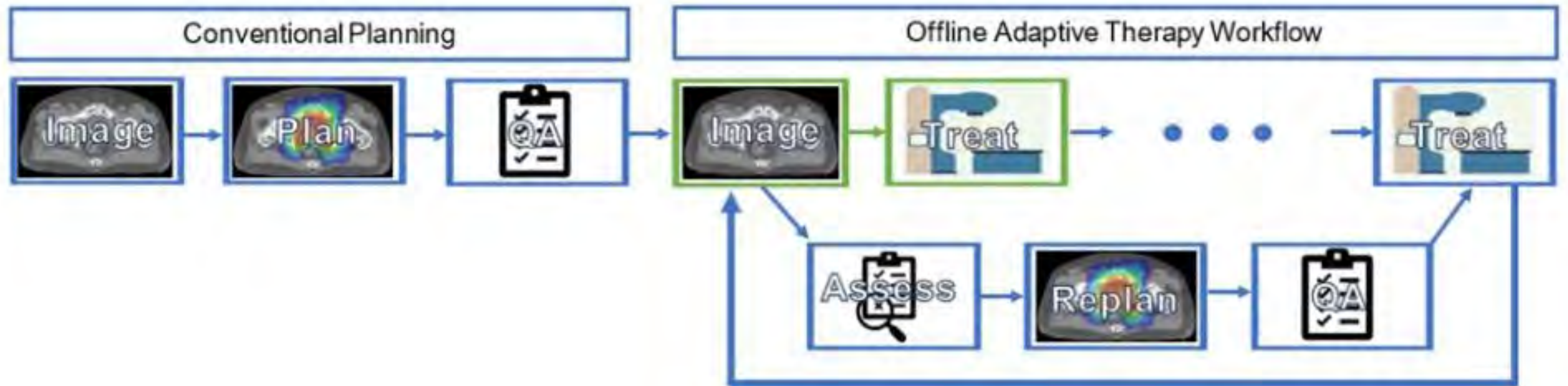
Pros:

- Superior soft-tissue contrast
- Real-time tumor tracking

Cons:

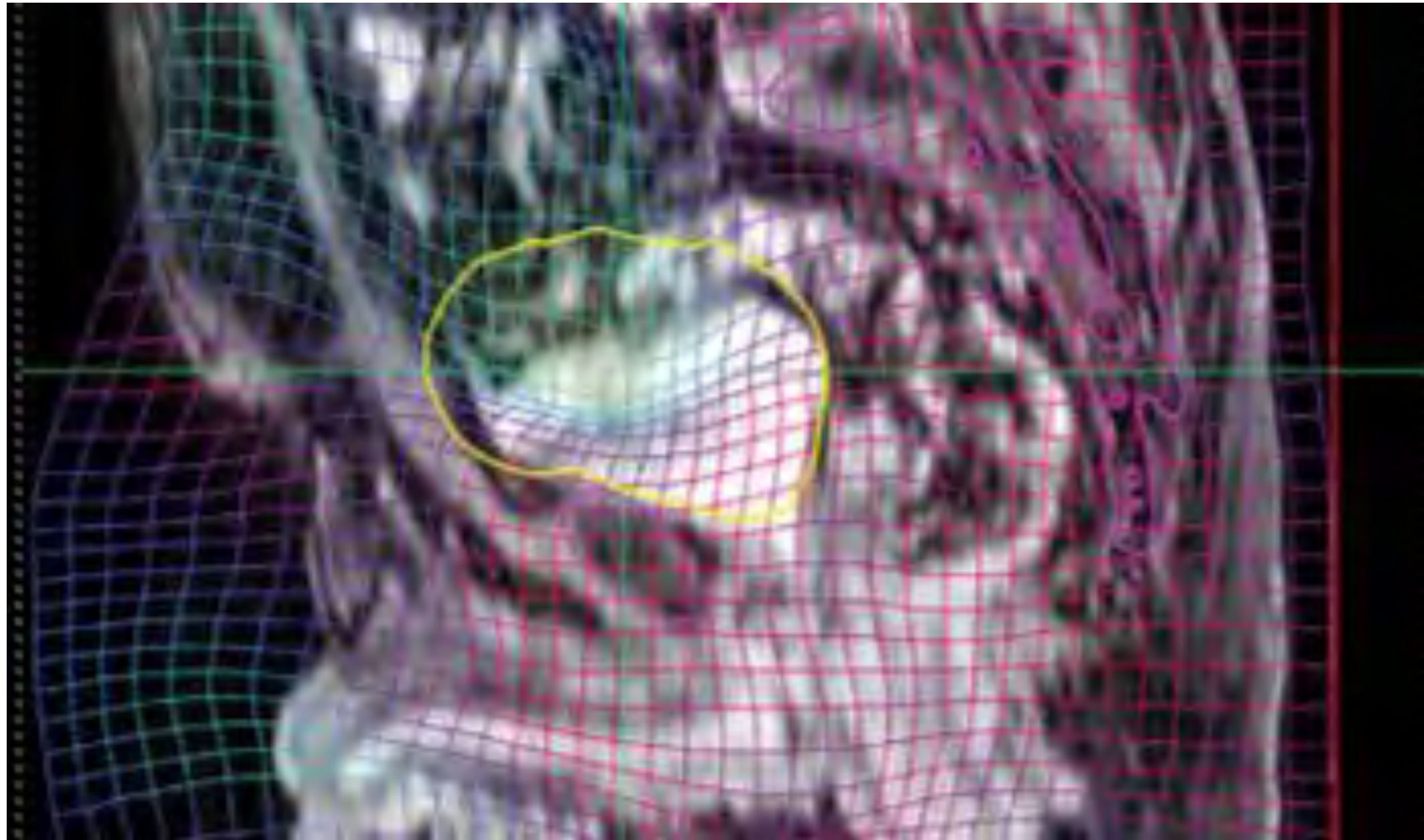
- Expensive (~3x more than a traditional linac)
- Needs extra staffing (MR physicist)
- Special Vault Shielding considerations





Offline ART

- Routine monitoring of treatment progress
- Adapt between treatments
- Adapt at planned time intervals or when triggered by observation



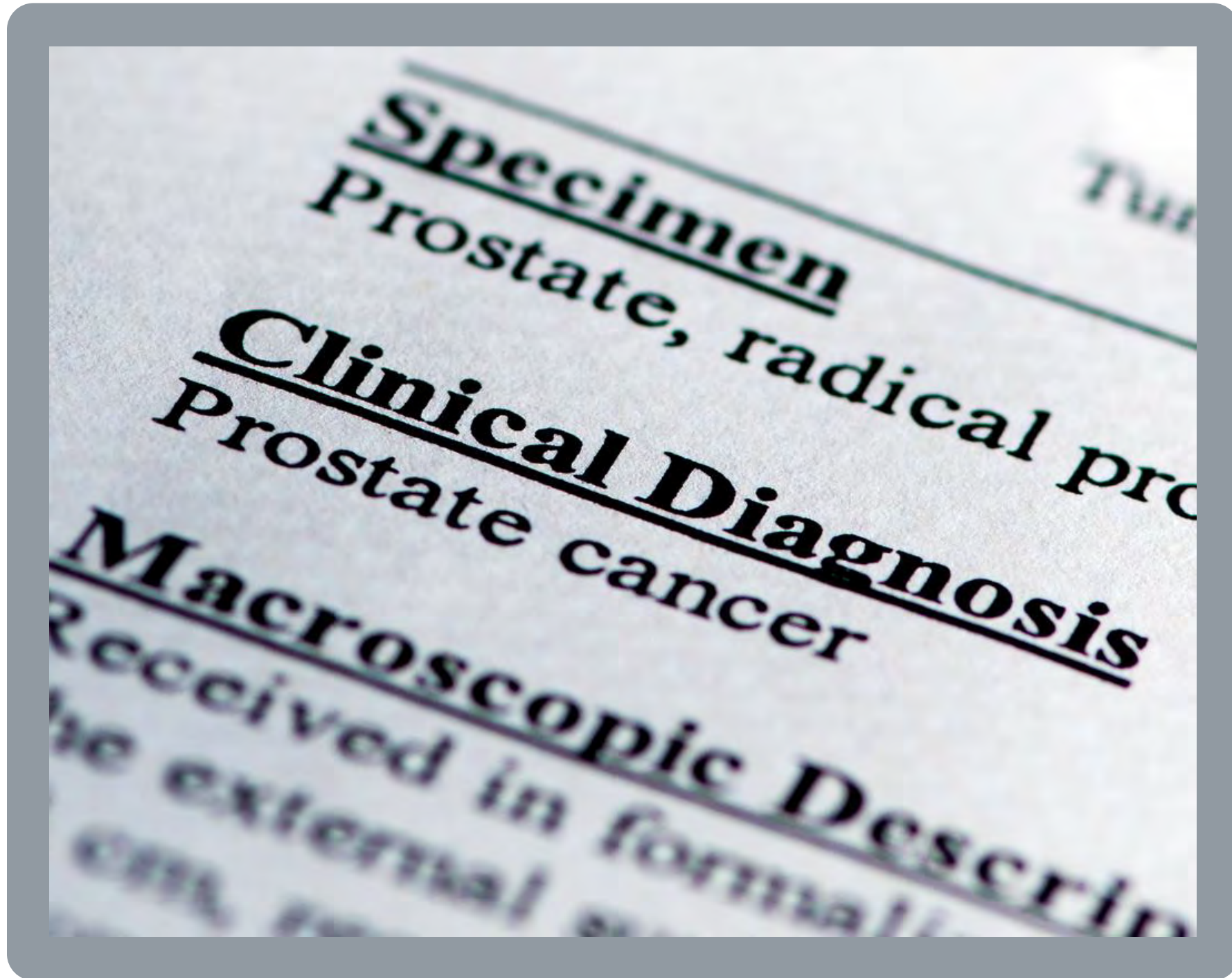
Offline Technology

Velocity

MIM

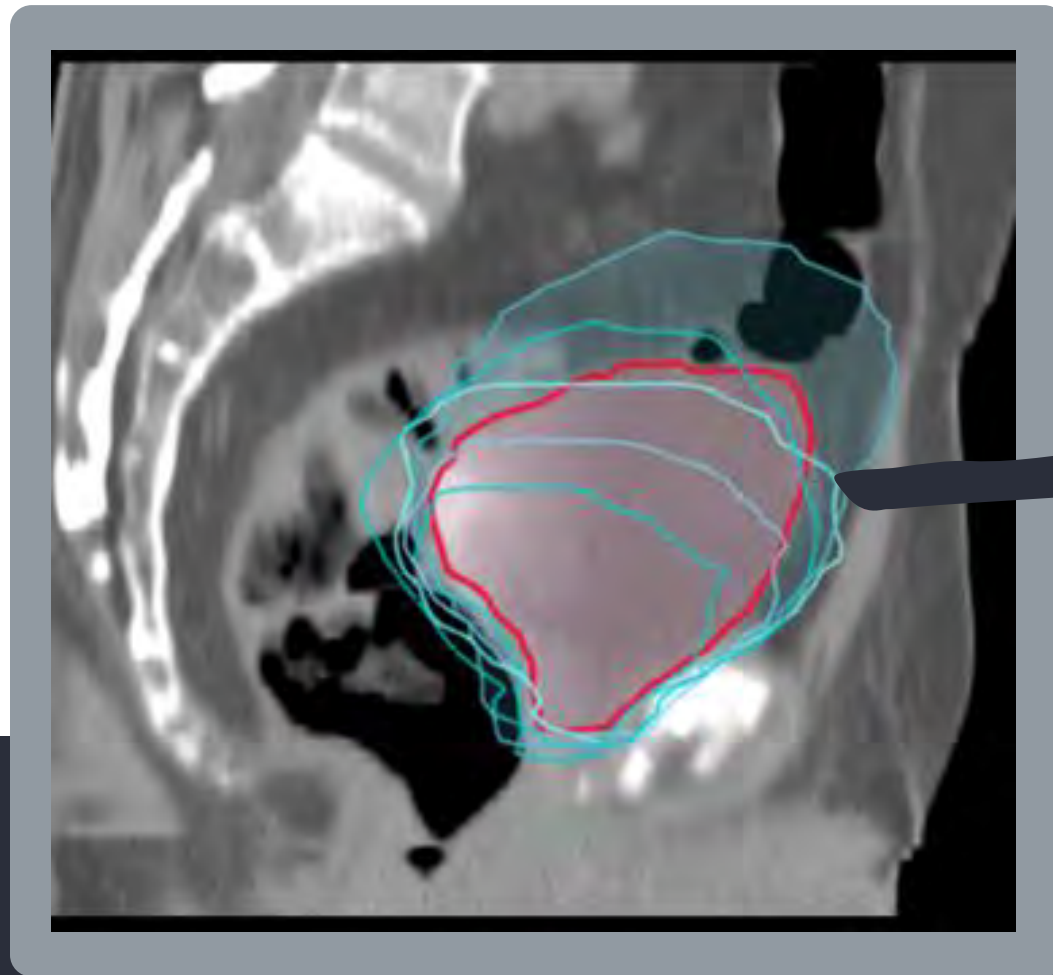
Radformation

- Allows for deformable image registration
- No specialty machine required
- Widely available



Why Adapt
Prostate
Cancer
Patients?

Motivation

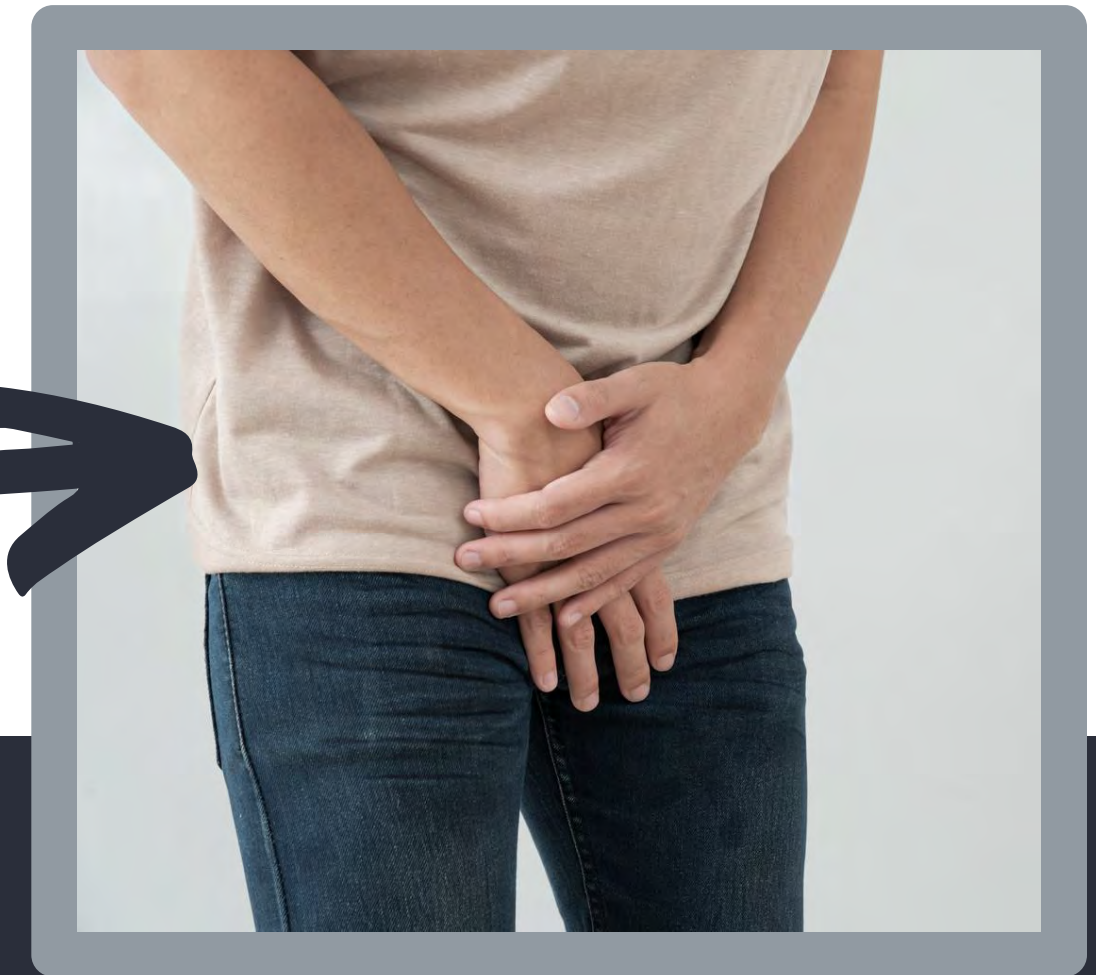


Bladder Fill
Fluctuations

A table with a grid structure. The top row has a header 'E'. The second row shows '49.4%'. Below are several rows of percentages in different colored cells (red, green, grey).

E		
49.4%		
36%	86%	37%
4%	66%	17%
8%	51%	1%
30%	49%	0%
11%	38%	-11%

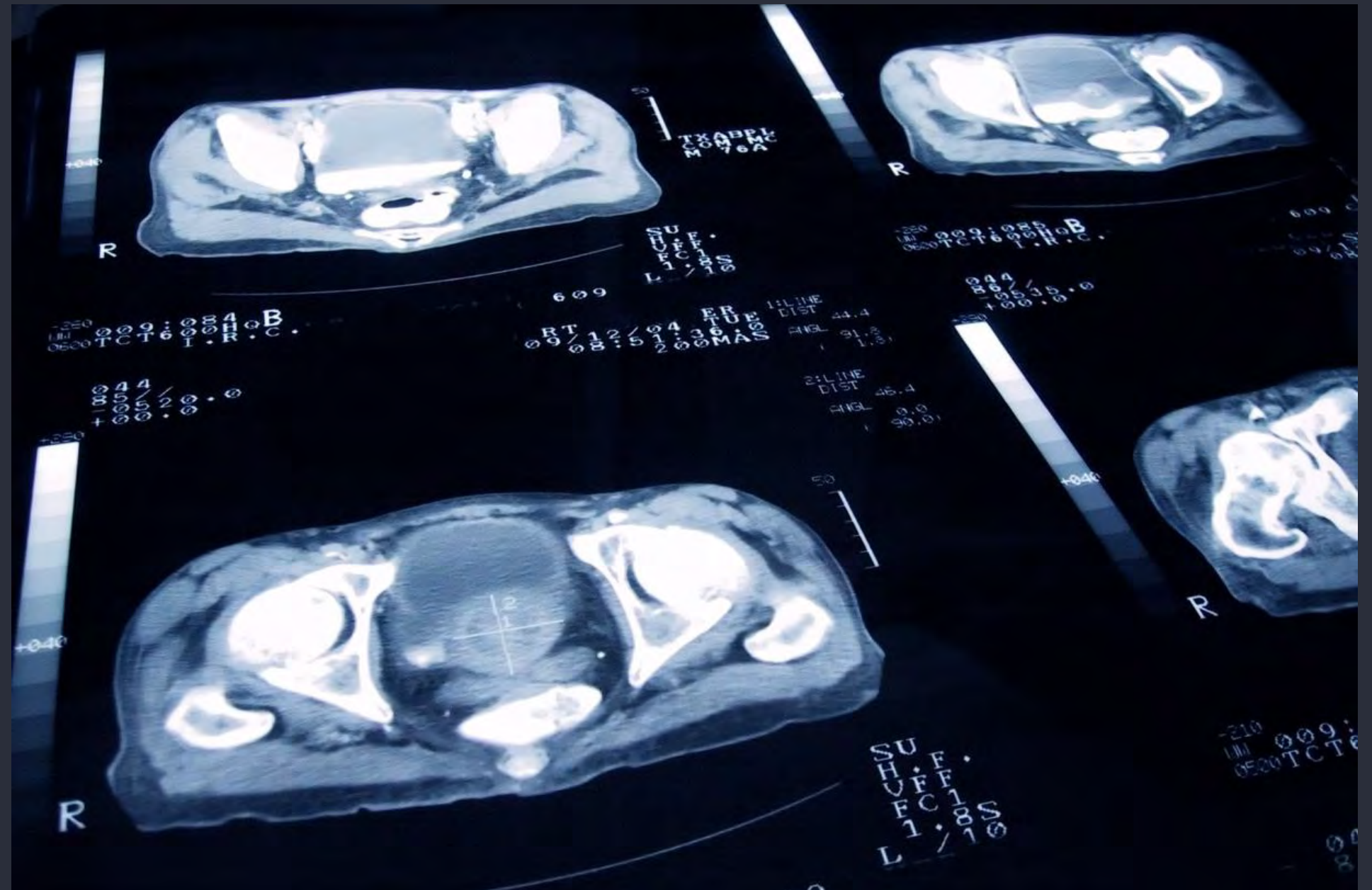
Dose Variation



Side Effects

Possible Solutions

Plan Library
"Triggered" ART



Plan Library

Pre-make multiple plans to fit a variety of bladder fills

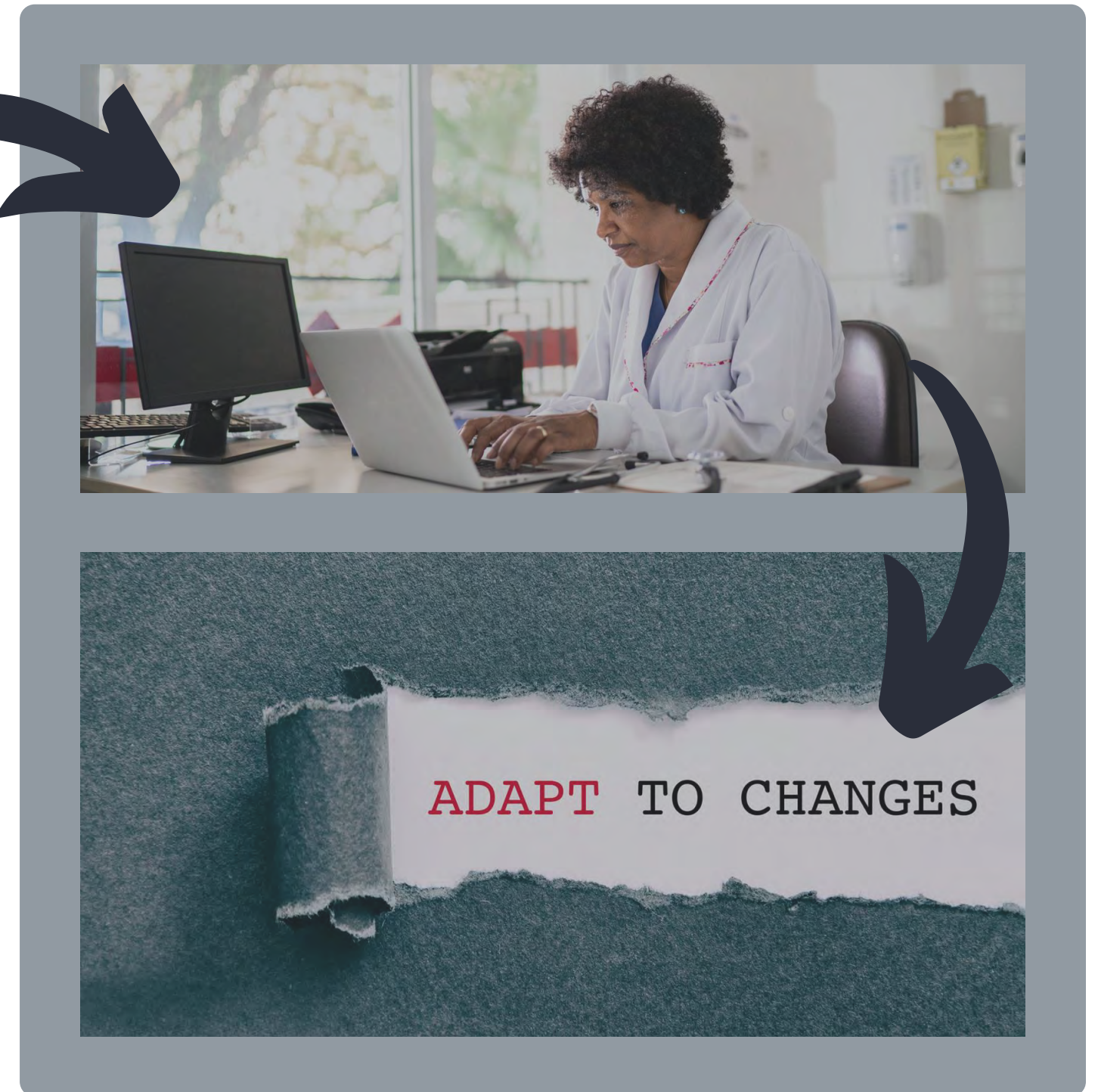
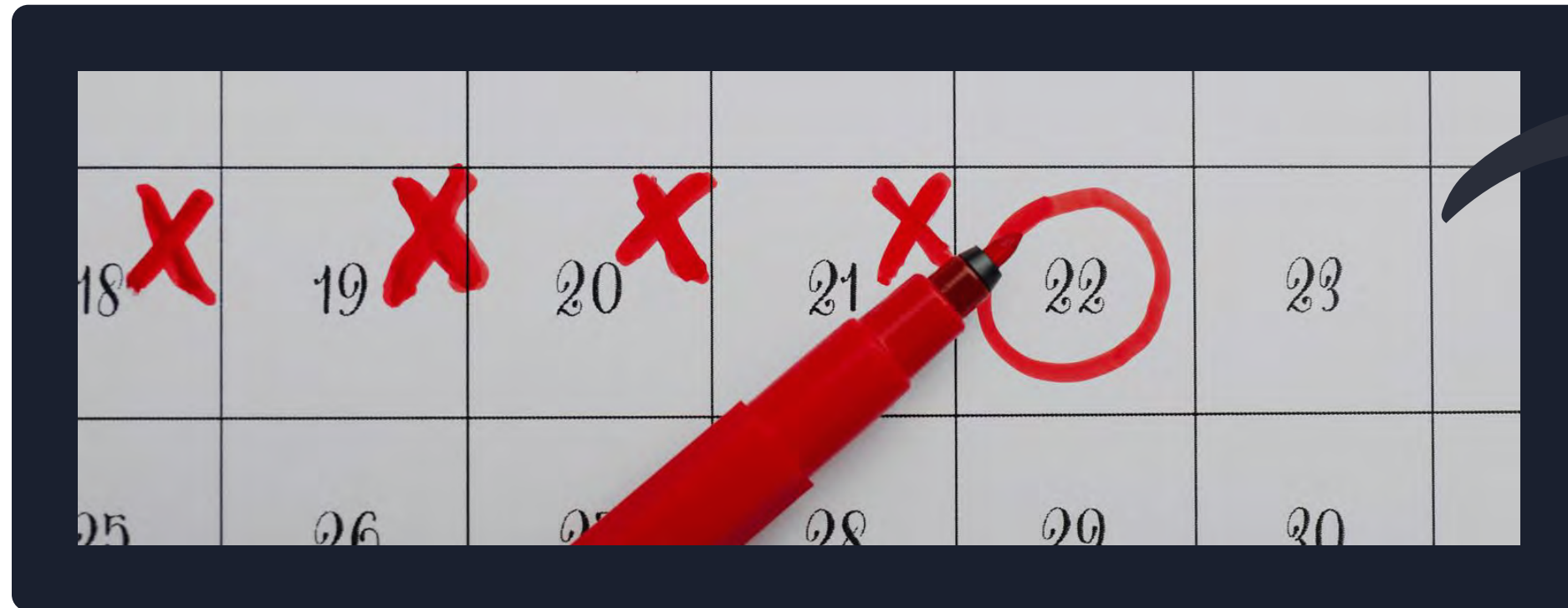
Pros:

- Can apply the most "correct" plan the day-of

Cons:

- Extra SIM CT scans
- Dosimetry makes multiple plans
- May not be compatible with some R&V systems

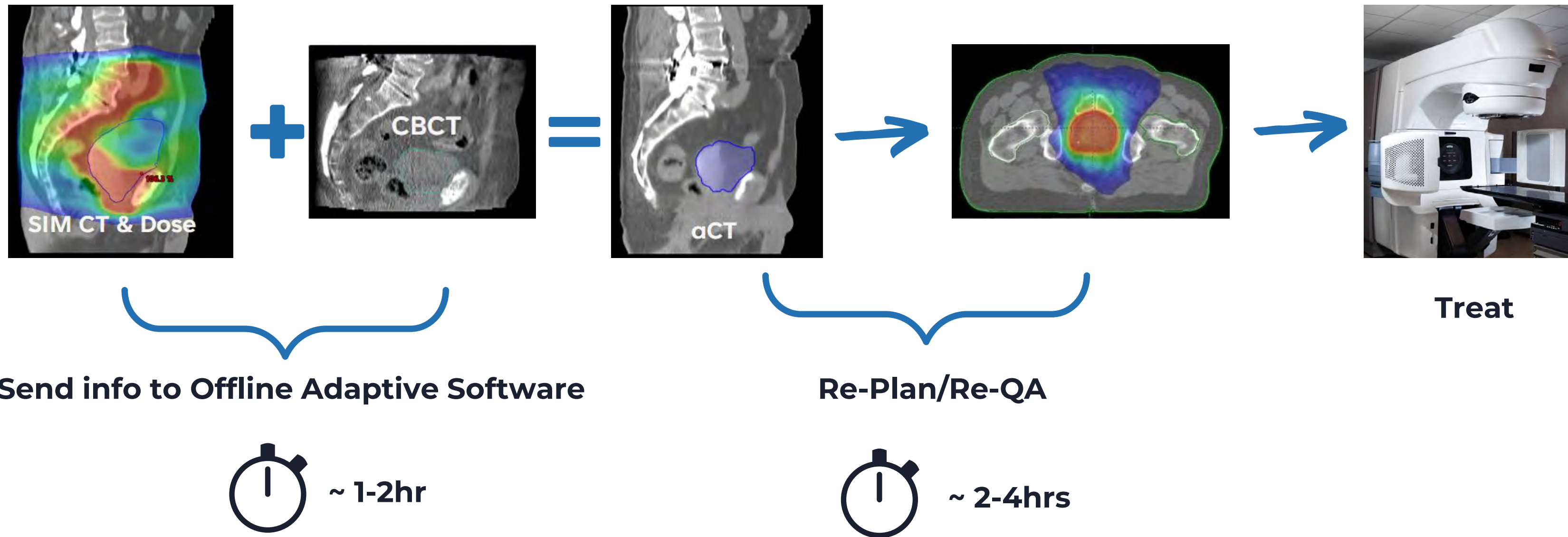




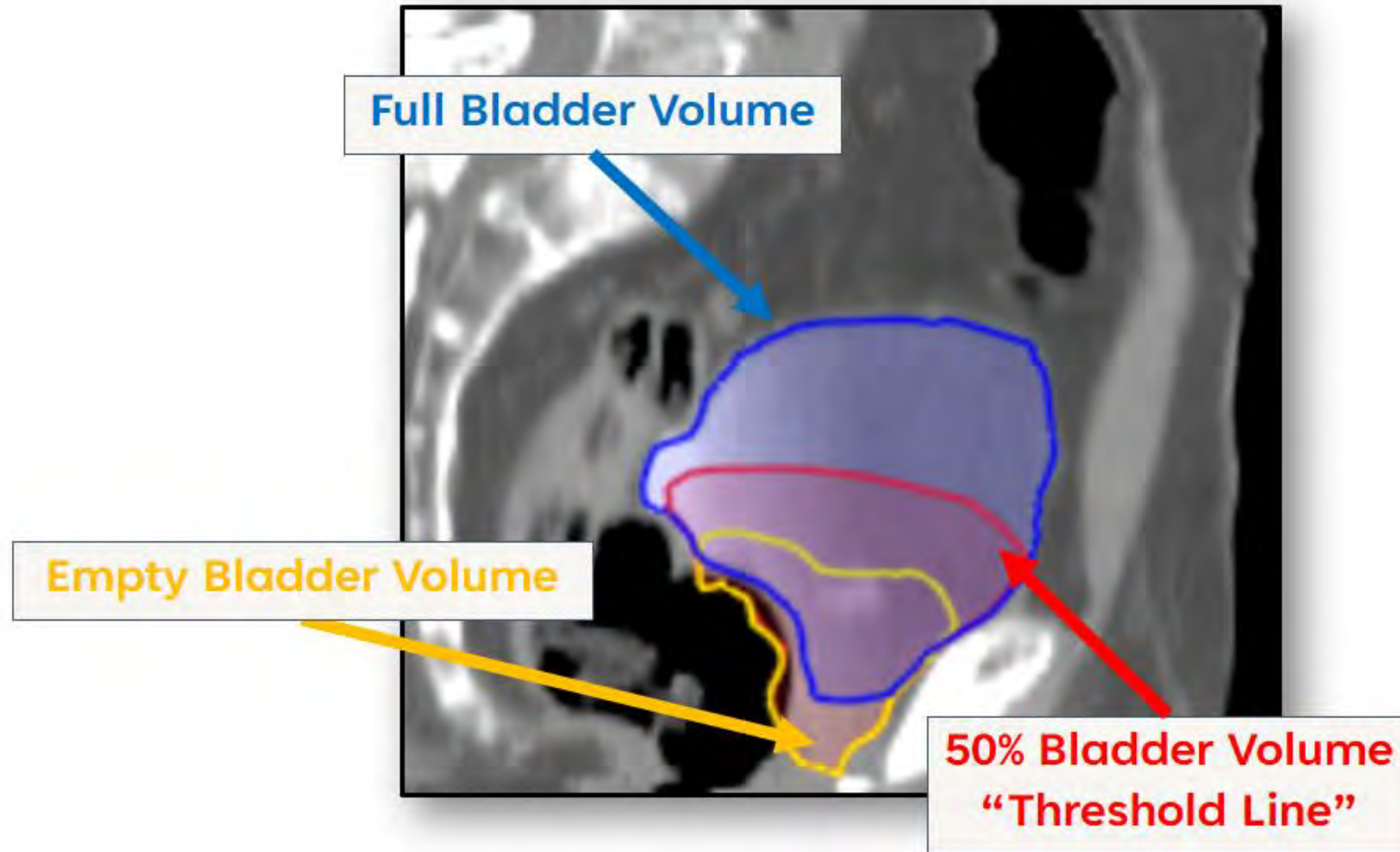
"Triggered" ART

Weekly monitoring of bladder fill average

Only adapt once the **average** falls below "threshold"



"Triggered" ART Workflow



Bladder Fill Intervention

Provides therapists a visual guide to know if bladder is full enough to proceed with treatment





RURAL ART



“THE AIM OF **ART** IS NOT TO REPRESENT THE OUTWARD APPEARANCE OF THINGS, BUT RATHER THEIR INWARD SIGNIFICANCE.”

- ARISTOTLE



Thank You