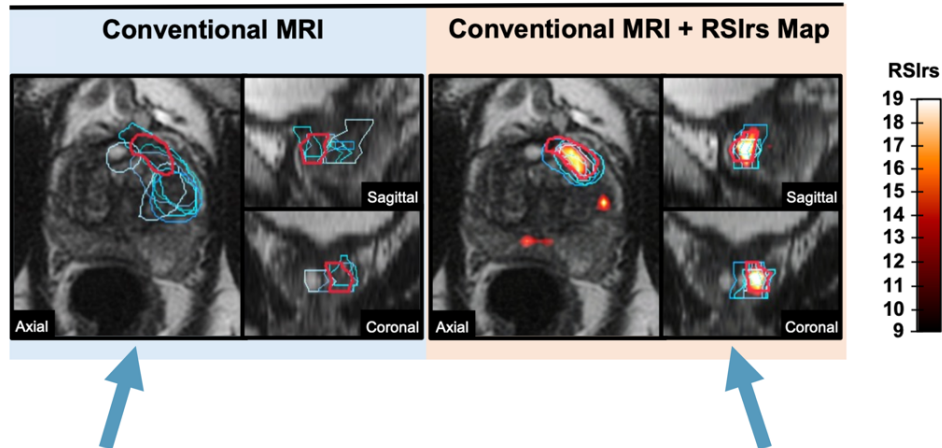


## Precision radiation therapy for prostate cancer

Standard radiation therapy for prostate cancer treats the entire gland with the same dose. A major randomized clinical trial (FLAME) showed that boosting the radiation dose to the tumor visible on MRI improved cure rates and reduced the chance of spread (metastasis) to other parts of the body. Amazingly, this was achieved without any additional toxicity or side effects for patients. However, in that trial, an expert radiologist assisted in the tumor targeting—a luxury not available in routine care. Most patients today are not offered focal radiation therapy boost. In the ReIGNITE RT Boost study, we found that radiation oncologists struggle to identify the tumors on conventional MRI. When they were shown our advanced MRI Restriction Spectrum Imaging restriction score (RSIs), the oncologists were much more accurate in targeting prostate cancer.

- Expert radiologists outlined the **tumor in red**
- Radiation oncologists' **attempts** to outline the tumor are shown in **shades of blue**



With only conventional MRI, many oncologists

With RSIs maps, these same oncologists each

Radiation oncologists were asked to outline the tumors on prostate cancer patients' scans. Sometimes, they were given only conventional MRI. For other cases, they were also given RSIs maps derived from advanced MRI tools developed in the Seibert Lab. Results showed that tumor targeting was much better when oncologists used RSIs maps.

- Selected publications:
  - Lui et al., *in press* <http://medrxiv.org/lookup/doi/10.1101/2022.12.13.22283420>
  - Zhong et al., *under review* <http://medrxiv.org/lookup/doi/10.1101/2023.02.01.23285345>
- Ongoing projects:
  - ReIGNITE dosimetry. We are studying how the variations in radiation oncologists' tumor targeting impacts the dose delivered to the tumor and the probability of cancer recurrence.
  - FLAME proved a focal radiation boost yields better outcomes for patients. ReIGNITE showed oncologists are better at targeting tumors when they have our advanced MRI (RSIs). We are now improving imaging accuracy even further by comparing MRI cancer detection to what is found in prostates that have been removed surgically (whole-mount histopathology from radical prostatectomy). We aim to optimize tumor targeting for radiation therapy to millimeter-level accuracy.