

# Utilizing Artificial Intelligence for Auto-contouring in Radiation Therapy and Oncology

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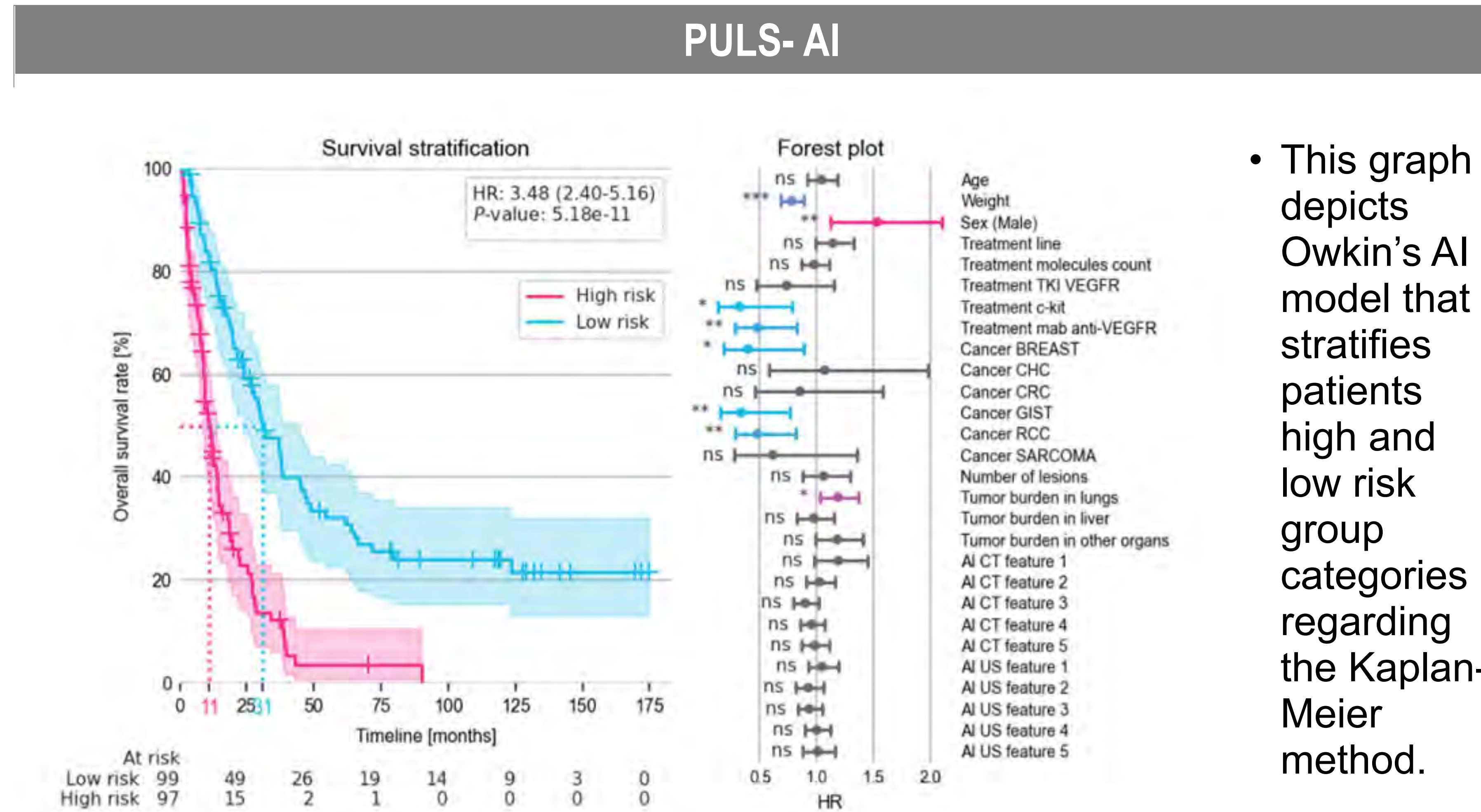


Bridge UnderGrad Science (BUGS) Summer Research Program

## Abstract

Artificial intelligence continues to grow and transform the future of healthcare, allowing access to help for healthcare providers and complex automated tasks. AI has created many opportunities for improvements in patient hospitalization and has forever changed the possibilities in developments, specifically among radiation therapy and oncology in many different ways. This includes the revolutionizing of patient outcome statistics and cancer care treatments.

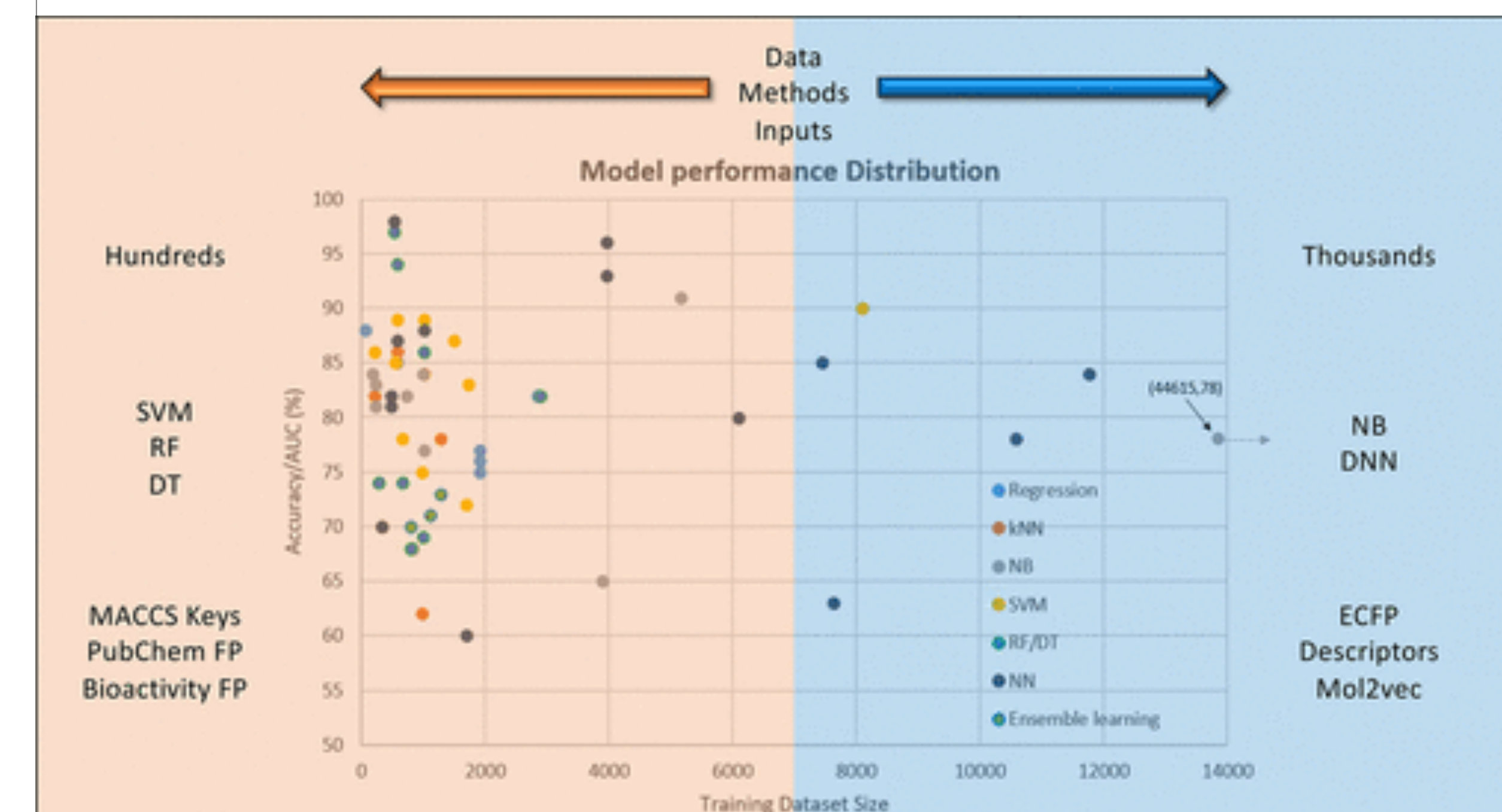
This project allowed me to research upon AI's overall effect on the several aspects in radiation therapy that are used to improve cancer treatment.



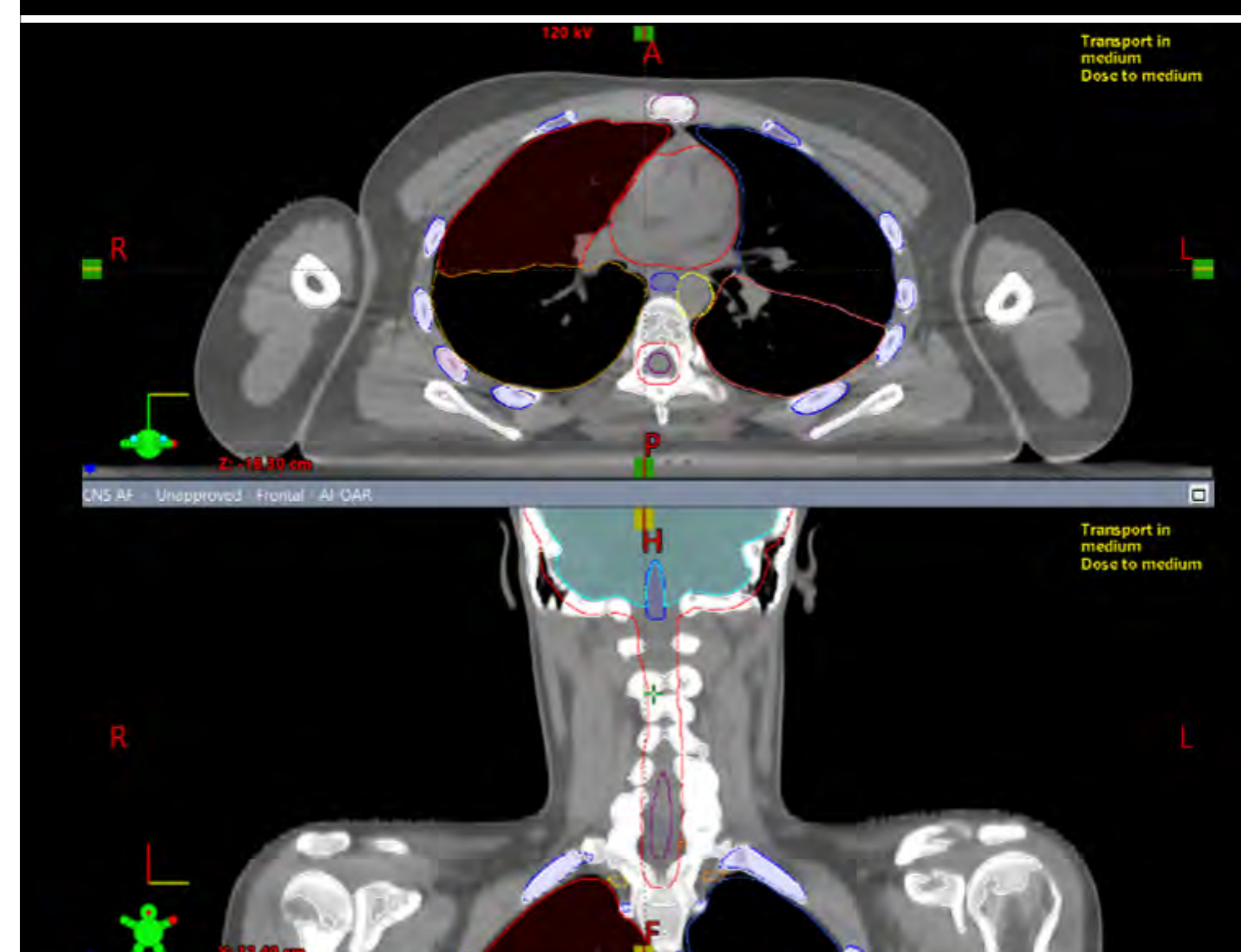
This graph depicts Owkin's AI model that stratifies patients high and low risk group categories regarding the Kaplan-Meier method.

## Predictive Toxicology

- Machine learning methods applied in predictive toxicology has shown to be very successful, including the support of vector machines, DTs, regression models, and neural networks.
- Identifies effects of toxic effects in new compounds that are tested throughout clinical trials.

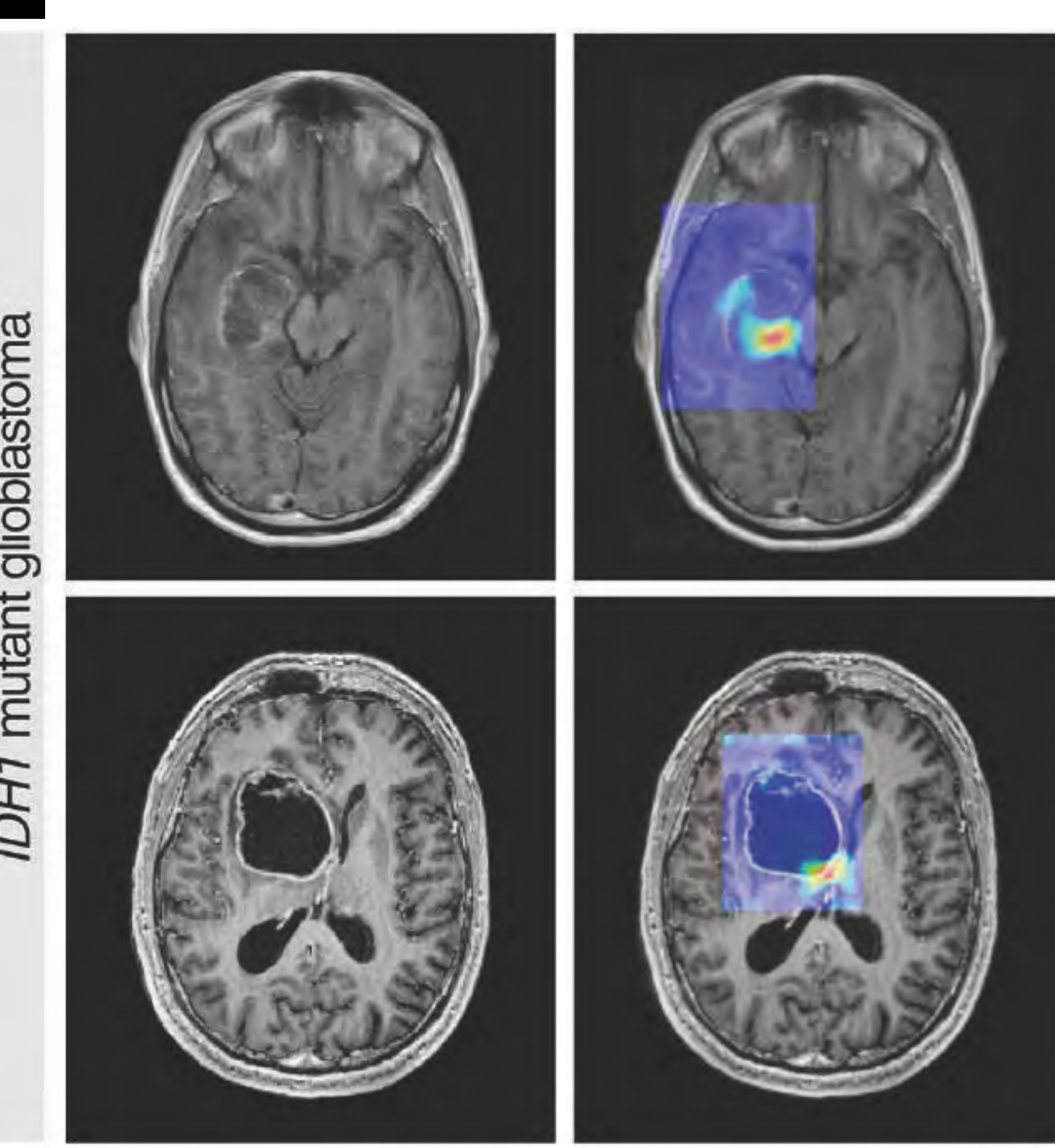


## What is Auto-contouring?



- Auto-contouring is an AI exercised method that contours areas throughout a certain threshold in a more systematic method in comparison to manual contouring seen in oncology.
- Artificial Intelligence poses significant changes upon auto contouring by enhancing the efficiency of identifying tumor structures and removing mistakes that are seen widely in manual contouring.

- Cancer Researchers continue to create Ai that is more suitable for molecular imaging, generating a much more accurate depiction of cancers that can be otherwise found in MRI scans.
- This alone poses many possibilities for better interpretations rather than reliance on humans where error is more susceptible.
- CT (computed tomography) scans are used for imaging and gather X-ray images using several angles of the body to detect injuries or in this case, cancerous tumors.
- (left shows radiologist prediction while right shows AI scanned image)



## Summary

Artificial intelligence has impacted several key aspects of radiation technology.

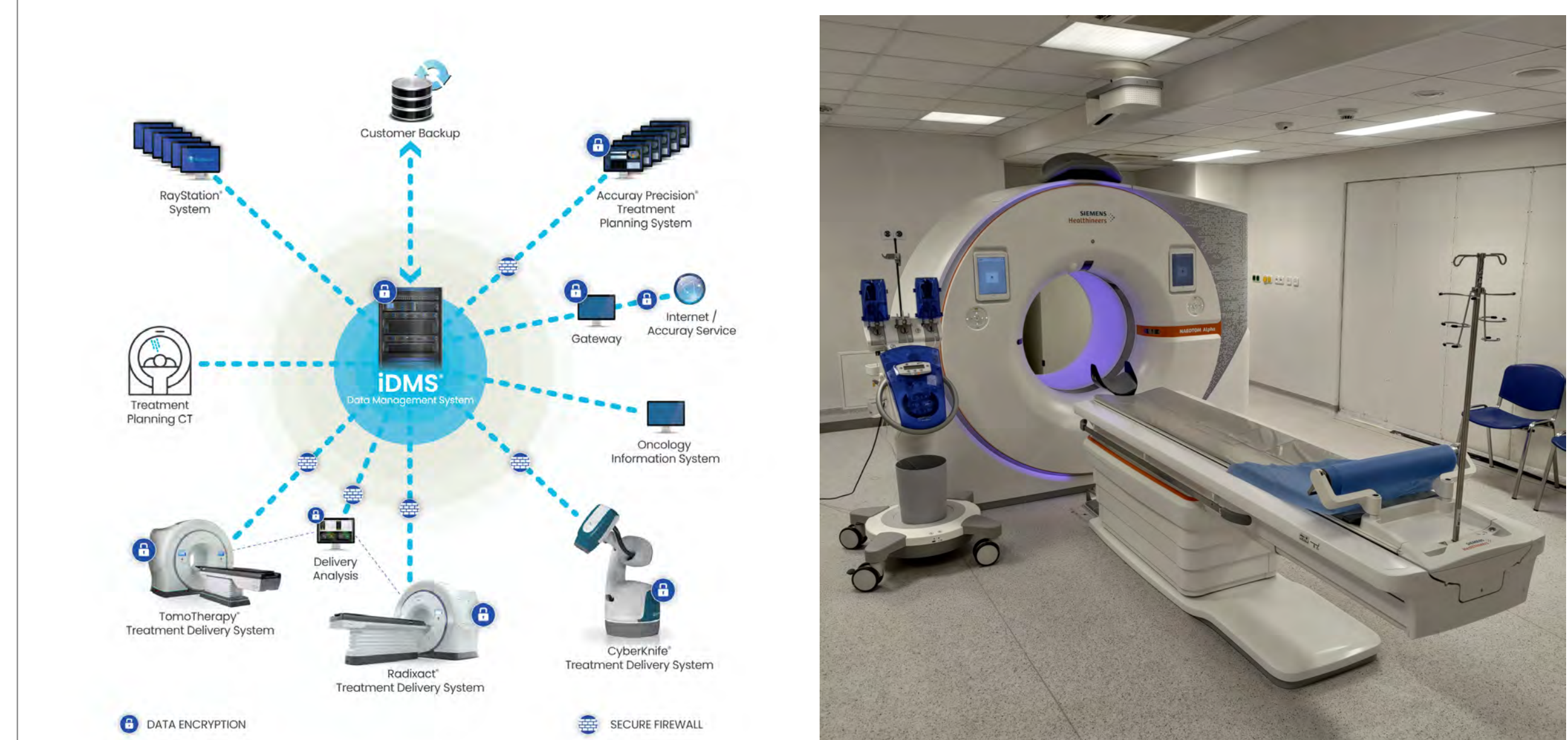
- Automated contouring:** reduces time spent and implements consistency
- Image Enhancing:** improves resource utilization for imaging sessions
- Patient Selections:** Successful clinics and advancements in cancer research
- Data Analysis:** Improved Treatment responses
- Toxicity Predictions:** Treatment plans to improve patient settings

## References/ Photo Citations

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## Precision Treatment Planning

- Precision medicine: personalized care/medicine that health care providers plan for their patients depending on their particular genetic makeup
- Treatment planning systems: used for maximizing tumor control and diminishing tissue complications in radiotherapy
- Locates cancer inducing genes
- Quality of OARs (organs at risk) are equal to those under manual contours

