RapidPlan™ PT Knowledge-Based Planning

Global Knowledge Sharing for Proton Therapy

Machine Learning

RapidPlan PT knowledge-based planning[1] represents the next generation of individualized proton treatment planning, allowing clinics to make high quality plans in a fraction of the time.

The power of RapidPlan PT is the innovative software that leverages existing clinical knowledge combined with machine learning to create quality plans, quickly and consistently. By building and sharing models based on previously treated patients, RapidPlan PT can allow clinics to reduce variability in treatment planning to achieve greater consistency, efficiency, and quality in patient care.

Using patient-specific anatomy, treatment plans, and prescription information, RapidPlan PT can build a model that will then estimate the DVH for a new patient. This estimated DVH can be used as a personalized starting point for intensity modulated proton therapy (IMPT). The models do not include patient information, so they can easily be shared between proton centers, providing a realistic pathway to share experience.

Key Benefits

Now with IMPT DVH prediction capability in addition to intensity modulated radiation therapy (IMRT) and volumetric modulated arc therapy (VMAT), RapidPlan PT lays the framework for efficient patient-specific decision support. High quality patient-specific plans can be created for each modality, streamlining the time-consuming process of comparative planning.

Moving beyond static templates, DVH estimation models are powerful dynamic tools that adapt and evolve to meet the unique planning needs of each institution. As the DVH estimation model improves quality and consistency in treatment planning, these improved plans can be fed back into the model, thereby improving the model in a machine learning framework.

Knowledge-Guided Decision Support

RapidPlan PT can help guide the right treatment for each patient. Currently, the decision to treat patients by protons or photons is often done by generating comparative treatment plans, which is time-consuming and challenging. In the first study of its kind, researchers from VU University Medical Center (VUMC), now part of Amsterdam University Medical Centers, were able to build a decision support tool using RapidPlan predictions. They did this by creating radiotherapy and proton therapy RapidPlan dose prediction models for head and neck cancer and then used these models to predict which treatment modality would spare more healthy tissue. According to VUMC researchers, RapidPlan model-based dose prediction capabilities may help eliminate the need to make a comparative plan, allowing for quick decisions based on a chosen threshold.

IMPT Novice
Increase confidence and improve plan quality using models from centers

IMPT Expert
Increase consistency and reduce variability by benchmarking against prior clinical practice

Health Network
Streamline high quality plan creation for photon & proton treatments to more efficiently determine the best treatment modality for the patient

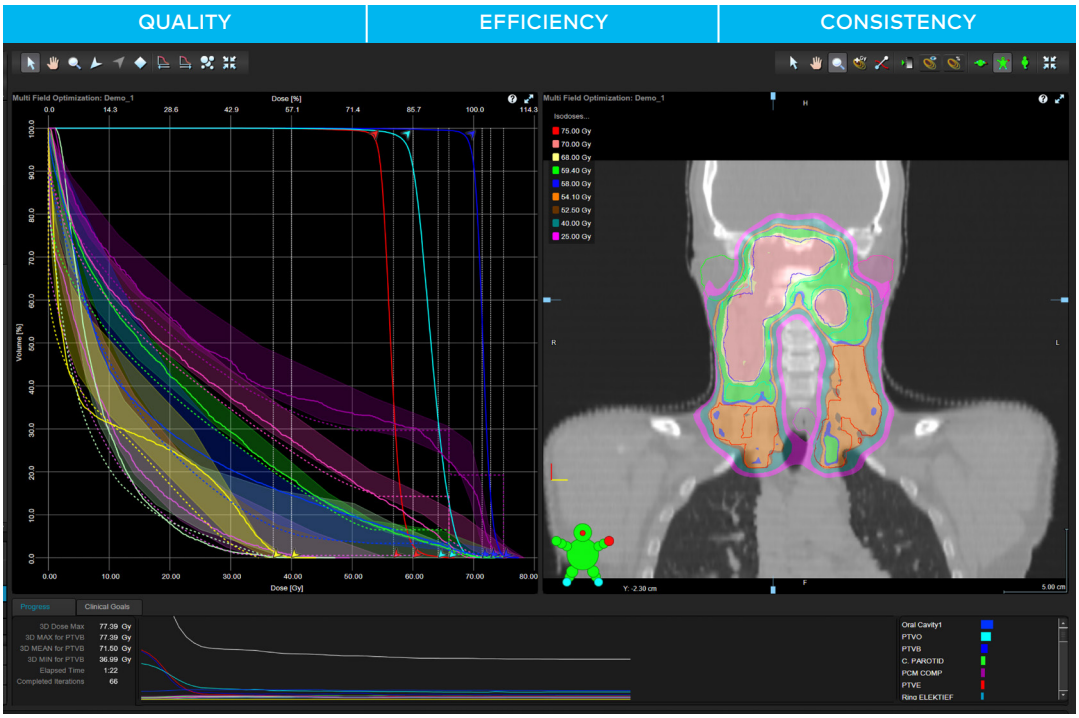
Busy Clinic
Increase efficiency by reducing the time spent during treatment planning

"This is the first investigation which demonstrates the feasibility of patient selection for proton therapy based solely on patient-specific knowledge-based predictions of proton and photon plan dosimetry, without necessitating actual plan creation."

- A. Delaney et. al.[2]

This knowledge-based planning approach can also potentially be used to predict differential side effects of proton therapy vs. radiotherapy through normal tissue complication probability (NTCP) models. By linking the NTCP to each treatment plan model for each modality, clinicians could predict the likelihood of a patient-specific adverse side effects based on different estimated doses. This approach could easily be extended to take patients' preferences into account, allowing them to choose their treatment based on likelihood of toxicities.

With the number of proton centers increasing rapidly worldwide, RapidPlan PT has the potential to bridge the IMPT learning curve, improve quality and consistency, increase efficiency, and provide truly individualized patient care.



RapidPlan PT head and neck proton model created by VUMC.

[1]Part of the Eclipse™ treatment planning system knowledge-based solutions offerings.
[2]Using a knowledge-based planning solution to select patients for proton therapy." Delaney, A. et al. Radiation Oncology 2017.

Not all features or products are available in all markets.

Intended Use Summary
RapidPlan knowledge-based planning and its models are not intended to replace clinical decisions, provide medical advise or endorse any particular radiation plan or treatment procedure. The patient's medical professionals are solely responsible for and must reply on their professional clinical judgement when deciding how to plan and provide radiation therapy.

Important Safety Information
Radiation treatments may cause side effects that can vary depending on the part of the body being treated. The most frequent ones are typically temporary and may include, but are not limited to, irritation to the respiratory, digestive, urinary or reproductive systems, fatigue, nausea, skin irritation, and hair loss. In some patients, they can be severe. Treatment sessions may vary in complexity and time. Radiation treatment is not appropriate for all cancers.

Medical Advice Disclaimer
Varian as a medical device manufacturer cannot and does not recommend specific treatment approaches. Individual treatment results may vary.

varian

varian.com

USA, Corporate Headquarters
Varian Medical Systems, Inc
3100 Hansen Way
Palo Alto, CA 94304
Tel: 650.424.5700
800.544.4636

Manufacturer
Varian Medical Systems
Particle Therapy GmbH
Mottmannstr. 2
53842 Troisdorf
Germany
Tel: 49.2241.938.4000

Headquarters Europe, Eastern Europe, Middle & Near East, India, Africa
Varian Medical Systems
International AG
Steinhausen, Switzerland
Tel: 41.41.749.8844

Asia Pacific Headquarters
Varian Medical Systems
Pacific, Inc.
Kowloon, Hong Kong
Tel: 852.2724.2836

Australasian Headquarters
Varian Medical Systems Australasia Pty Ltd.
Sydney, Australia
Tel: 61.2.9485.0111

Latin American Headquarters
Varian Medical Systems
Brasil Ltda.
São Paulo, Brazil
Tel: 55.11.3457.2655

RAD 10673 08/2019