



PHILIPS

Radiation oncology

Treatment planning

Save hours on adapting a patient's treatment plan

Philips Pinnacle Dynamic Planning with Deformable Image Registration (DIR) overview

Pinnacle Dynamic Planning provides fast assessment and re-planning tools to ease and automate the time-consuming treatment plan adaptation process. It generates “at-a-glance” information to help monitor treatment efficacy and create new plans - eliminating the need to start all over.

Deformable Image Registration adds the capability to deformably fuse multiple CT and/or cone beam CT images together. This provides the clinician with insight to make informed decisions while creating a new treatment plan, and to move forward with optimal dose distribution for the patient's next treatment.

Key advantages:

- Fast assessment of changes in a patient's treatment plan
- Efficient, automated re-planning workflow
- Robust image and dose deformation capabilities
- Registration quality assurance tools

The challenge of plan adaptation

Achieving a more efficient planning process

With more patients returning for additional radiation treatments; technologies allowing for greater precision in the delivery; and clinicians expecting to adapt the treatment plan as often as needed during delivery; the treatment planning system must keep pace with these demands.

Pinnacle Dynamic Planning with Deformable Image Registration enables clinicians to make informed decisions on how best to adapt the treatment plan as anatomical changes occur.

Designed with a fast assessment and automated replanning workflow in mind, **Dynamic Planning with DIR** provides:

- **Deformed contour propagation** between CT/CT and CT/CBCT images to evaluate organ movements and tumor growth or regression between two patient data sets.

- **Complete transfer of plan parameters**, such as prescription and beam set up, to new image sets with minimal user intervention, eliminating the need to create a new treatment plan for the same patient.
- **Review of multiple CT and cone beam CT images (CBCT)**, allowing for display of valuable information about organ deformation, movement and tumor changes over time.



Enhancements to Dynamic Planning

Deformable Image Registration integration into Pinnacle Dynamic Planning allows for a fast assessment and automated re-planning workflow when comparing the accumulated dose distribution from multiple radiation treatments.

DIR adds many highlights to **Pinnacle Dynamic Planning**:

- **Perform deformable and rigid registration**
Enables registration between CT/CT and CT/CBCT images
- **Measure registration quality**
Quantify algorithm performance and estimate registration accuracy
- **Approve registration results**
User-specific approval for an accepted registration result is captured
- **Accumulate and deform dose**
Assess the re-irradiation impact to organs from previously delivered dose



How does **Dynamic Planning with DIR** work?

Pinnacle Dynamic Planning with DIR helps clinicians to make effective planning decisions for patients with either a history of prior radiation therapy deliveries or who have experienced anatomical changes during their current course of treatment.

These treatments could have been delivered a week or a year ago, planned with different treatment systems or imaged on different CT devices. The following clinical workflows are :

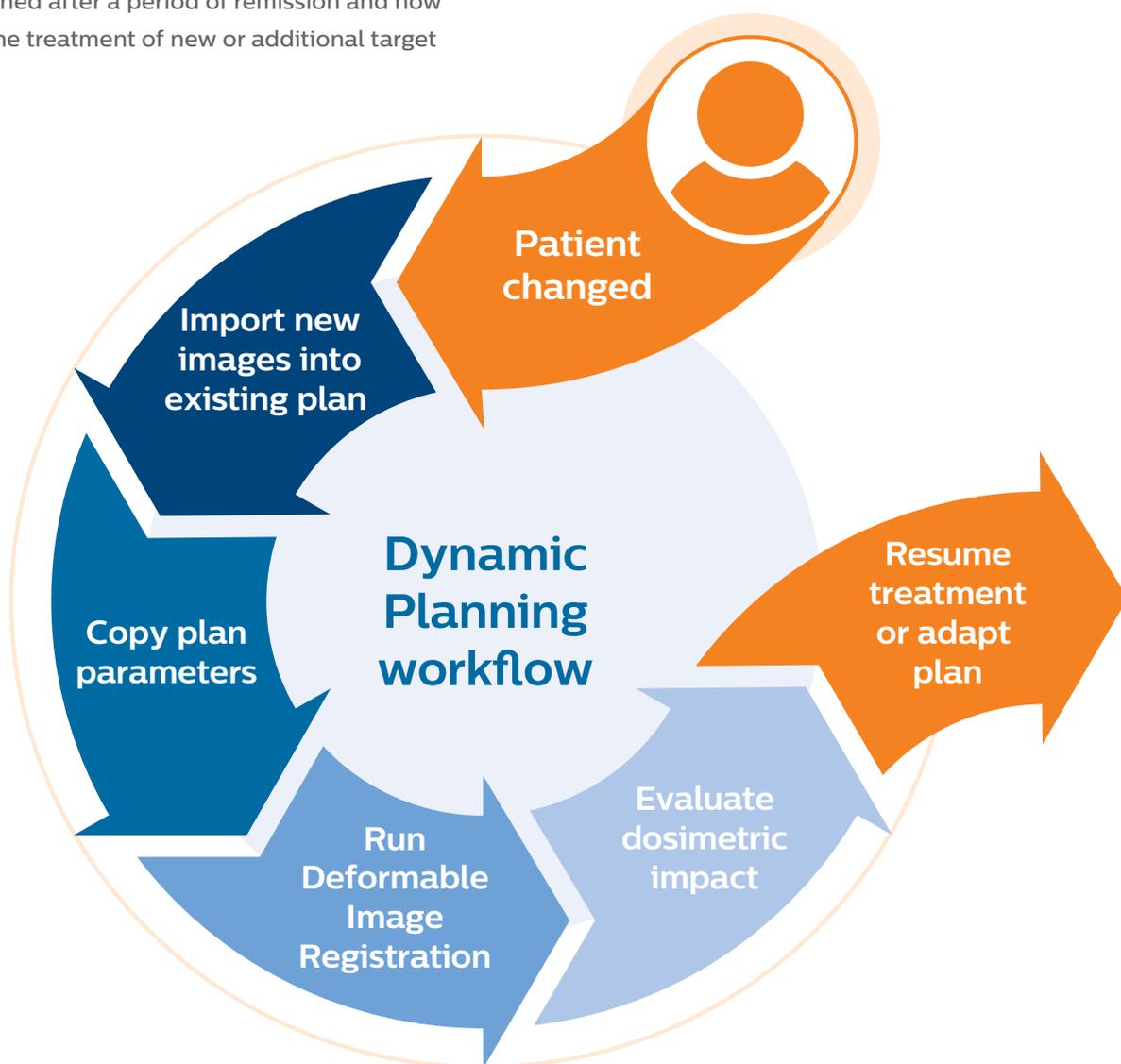
- **Composite planning: Create a new plan from a previously-delivered plan**

Composite plans are created when a patient may have returned after a period of remission and now requires the treatment of new or additional target

areas. A “composite plan” assesses the normal tissue dose tolerances, taking both the prior and current radiation dose into account.

- **Adaptive planning: Create a new plan for the same course of treatment**

During a single course of treatment, target changes or organ movement may require assessment of the need to re-plan. When necessary, adaptive planning creates a new plan that accounts for both the estimated delivered dose and planned dose.



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