

Introduction:

The Varian Ethos system represents a cutting-edge platform for adaptive radiotherapy (ART), offering personalized and real-time treatment adjustments with the goal of improving patient outcomes. A suite of planning directive templates is a critical component of the Ethos system which guides development of the initial plan as well as decision-making at the treatment console. This document outlines our approach in developing the AOS-provided templates, emphasizing evidence-based design, clinical adaptability, and clinically relevant goal prioritization. *Note: These templates were developed in the Ethos 2.0 environment and tested for compatibility with IOE2 only.*

Development Methodology:

1. Leveraging Multi-Institutional Trials
  - Evidence-Based Foundation: Where possible, the directive templates prioritize recommendations derived from high-quality, multi-institutional clinical trials.
  - oART Contextualization: While many of these trials are not specifically designed for online Adaptive Radiotherapy (oART), the treatment planning directives have been adjusted to account for the unique implications of online treatment adaptation using the Ethos system.
2. Judicious Application of PTV Expansion Margins
  - Context-Specific Adjustments: Recognizing the differences between conventional and adaptive radiotherapy, PTV (Planning Target Volume) margins have been tailored accordingly. The ability to adapt the PTV to account for daily anatomical changes are carefully considered.
3. Supplementing OAR Objectives
  - Incorporating Additional References: When existing trials or guidelines lack comprehensive data on Organ at Risk (OAR) objectives, supplementary clinical judgement has been utilized. These include published studies, institutional protocols, and expert consensus guidelines.
  - Customization for oART: OAR constraints are fine-tuned to reflect the capabilities of daily adaptive planning, ensuring optimal sparing of healthy tissues while maintaining effective dose delivery to targets.
4. Prioritization of Planning Objectives
  - Hierarchical Structuring: Planning objectives within the templates are assigned priority levels based on clinical significance, potential impact on patient outcomes, and the feasibility of achieving specific constraints in an adaptive setting.
  - Clinical Judgment: Priority levels are informed by both evidence and practical considerations, ensuring that the most critical objectives are emphasized without overburdening planning workflows.

Conclusion:

The AOS-provided Ethos planning directive templates are based on multi-institutional clinical trials when such are available for the treatment sites and prescription/fractionation and are offered as a starting point and clinically relevant examples for building your clinic's own tailored planning directives for Ethos online adaptive treatment. In addition, we encourage the use of appropriate RapidPlan DVH Estimation models.