Rethinking Pre-Treatment Workflows for Better Outcomes Webinar (3-16-2022)

# Overview

As the first of Radformation’s Insight Series Webinars, this webinar focused on increasing efficiency, preventing errors, and improving patient experience in the workflow leading up to patient treatment in order to improve patient treatment response and satisfaction. The webinar featured two presentations.

# A New Perspective on Pre-Treatment Workflow Design

## Pre-Treatment Workflow

This webinar provided a broad perspective of one clinic’s work toward truly transforming the pre-treatment workflow. If you think about it, the pre-treatment workflow really hasn’t changed since 3D-CRT was introduced 10 years ago:

1. Initial consult
2. Sim
3. Tx design
   1. Import & fuse images
   2. Contour targets
   3. Contour OARs
   4. Create tx plan
   5. Review & approve plan
   6. Write up plan
   7. Check plan
4. Tx fx’s and OTVs
5. f/u

Obviously, the exact workflow varies by case, but the excessive back and forth is inefficient and time consuming. Whether you assign tasks in order of urgency, assign one employee to each patient, or assign tasks another way, automation tools can decrease time spent on any given task in the pre-treatment workflow.

## Improving the Treatment Design Phase

The clinic tried inserting several automation tools into their workflow and found that while that produced significant time savings, time savings were not drastic. Indeed, it’s the workflow itself, not the individual steps, that needs overhauling. Their approach for overhauling the overall pre-treatment workflow tries to organize the workflow around automation tools instead of vice versa. Specifically, automation tools allow the clinic to combine multiple workflow steps into one. For example, autocontour software combines image import and fusing, with OAR contouring. Knowledge-based planning in Varian Eclipse, and even end-to-end solutions like Varian Ethos, make progress toward combining target contouring, plan generation, and plan review and approval, but the necessary technology isn’t realistically available for all disease sites. This streamlining is important because with so much time between target contouring and plan review, the MD must spend time reorienting himself with the case.

The clinic’s specific pre-treatment workflow initiatives include implementing Varian Ethos, and generally streamlining technically challenging but well understood SBRT lung planning.

## Physics Direct Patient Care Initiative

Beyond the treatment design phase of the pre-treatment planning workflow, research shows improved patient outcomes when patients are more involved in their care, provided information caters to limited health literacy, and patient distress is alleviated.

The clinic’s Physics Direct Patient Care Initiative Physics adds two physicist-patient consults: one between initial physician consult, the other between sim and first treatment. A clinical trial involving a pilot study, phase II, and phase III shows increased patient satisfaction, decreased patient anxiety, and increased survival.

# Optimization of Pre-Treatment Workflow with Automation

## Overview

We know that time-to-treat (treatment waiting time) affects patient survival and other metrics. Time-to-treatment metrics include consult-to-treatment initiation (CTI); sim-to-treatment initiation (STI), which is largely controlled by insurance; and consult-to-sim (CTS), which is almost entirely under rad onc control. The presenter discussed her clinic’s efforts to decrease CTS and decrease errors in the pre-treatment workflow.

## Quantitative Metric and Auditing Program (QMAP)

The clinic tracks median CTI, STI, and CTS and provides them to patients. Without intervention, these have remained largely constant for the past five or 10 years.

As part of their Quantitative Metric and Automatic Auditing Program, the clinic tracks the time spent in each stage of the STI workflow:

1. Sim
2. Ready for tumor
3. Tumor volume and critical structures ready
4. Plan approved
5. Physics check complete
6. IMRT QA complete
7. Chart arrived on machine list
8. Therapy check complete
9. Ready for tx

The metrics are automatically read from R&V, and daily task alerts are sent out to prevent a user’s not noticing a task that is just waiting for them in the R&V.

QMAP also set time goals for each step, either maximum time to complete or minimum time before first treatment. QMAP significantly decreased the percent of each task that did not meet the time goals. Example improved tasks are plan completion at least four hours before first fraction, and CBCT reviewed on acquisition day.

## Automation to Improve Treatment Planning

ASTRO’s Radiation Oncology Incident Learning Sys (RO-ILS), a national database of patient safety data, found that most events occur pre-treatment. This means that physicists either directly caused the events or didn’t catch them. The AAPM has two Task Groups on chart and plan checking: TG-275 (*Strategies for effective physics plan and chart review in radiation therapy*), and TG-315, a work in progress that the presenter leads.

The presenter’s thesis is that clinics should move from catching to minimizing errors. To this end, her clinic has implemented and recommends the following.

### Standardization

* Nomenclature:
  + Tumor volumes. They use <target type>\_<Rx> (e.g., PTV\_5040) in accordance with TG-263.)
  + OARs.
  + Beam names.
  + Beam/treatment order. This is especially important with multiple tumors, such as oligomets. The clinic orders sup to inf, and left to right.
  + Rx name. Their Rx names include the dose and the anatomic site.
* Plan documentation. Their plan documents include:

1. Plan summary
2. Tx beam parameter details
3. Dose distributions in sagittal, coronal, and transverse views
4. Etc.

### Automation

The clinic has a plan check script in their TPS called the Auto Plan Integrity Check (APIC). It renames beams to match convention, checks that all beams have the same machine and isocenter, that there will be no collision, that there are no ambiguous (180°) VMAT gantry angles, and inserts the couch for SBRT plans to account for beam attenuation in the couch. The script is a checklist of buttons for each task. Each button calls another script that does that task. Each task has a button that calls another script that performs that task.

### Error Categories

The clinic categorizes chart parameter errors into five categories: bookkeeping (5), clinical interruption (4), flow impediment (3), etc.