2018 / CLEARCHECK CASE STUDY

Thomas Jefferson University Hospital Conducts Planning Efficiency Study Using ClearCheck

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Purpose

Planning efficiency (PE) and quality are essential to a safe, effective, and productive radiation oncology department. Simultaneously comparing multiple dosimetric criteria is challenging when performing DVH analysis. As number of structures increases, the complexity, likelihood for error, and time required for dosimetric evaluation also increase.

ClearCheck is an FDA approved software by Radformation built directly into the Eclipse treatment planning system through use of ESAPI (Eclipse Scripting Application Programming Interface). It **quickly and intuitively displays dosimetric quantities** from customizable templates with pass/fail criteria. ClearCheck pulls information directly from dose-volume data and RT structures; therefore, has no numerical discrepancy to manual dosimetric calculations and is less error-prone than manual calculations.

Materials & Methods

A typical inverse-planning process can be seen in Figure 1. With a standard DVH analysis, step 2 can be cumbersome and time-consuming for plans with many structures, as well as not allowing simultaneous analysis of dosimetry metrics.

The time taken to evaluate various dose constraints (physician and/or protocol based) for 17 plans (10 H&N, 5 prostate, and 2 SBRT lung with 25-29, 11, and 14-15 constraints, respectively) was measured as an indication of PE without ClearCheck. Subsequently, ClearCheck templates with the same constraints were created for each treatment site and populated instantly by running the script.

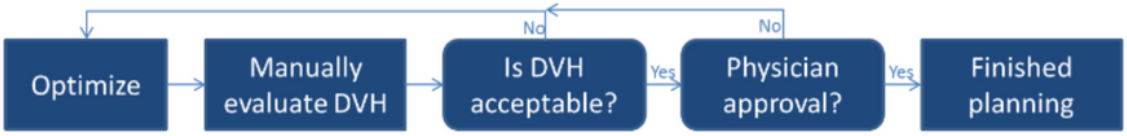

Figure 1: Flowchart of a typical inverse-planning process

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Results

The times taken for a single manual iteration of dosimetric plan evaluation for H&N, prostate, and SBRT lung cases without ClearCheck can be seen in Table 1. If any changes to the plan occurred after evaluation, dosimetric evaluation would be repeated iteratively, increasing planning time.

Single iteration of dosimetric plan evaluation	
Plan type	Time (mins)
H&N	8.1±1.3
Prostate	5.6±0.9
SBRT Lung	6.5±0.7

Table 1: Times taken for a single manual iteration of dosimetric plan evaluation for various sites

In contrast, ClearCheck displays dosimetric indices and pass/fail information **instantaneously**.

Conclusion

ClearCheck enhances the planning efficiency of treatment planning by instantly displaying all dose constraints of interest through customizable templates. ClearCheck's automation decreases confusion arising from numerous structures or non-intuitive dose-volume constraints and allows simultaneous cross-comparison of multiple constraints.

Future studies will evaluate plan quality as a result of ClearCheck implementation as well as initial physics check concordance with TG-275 guidelines.

"ClearCheck **enhances planning efficiency** by instantly displaying all dose constraints of interest through customizable templates. ClearCheck's automation **decreases confusion** and allows simultaneous cross-comparison of multiple constraints."