TOWARDS AUTOMATION OF TREATMENT PLANNING SYSTEM QUALITY CONTROL

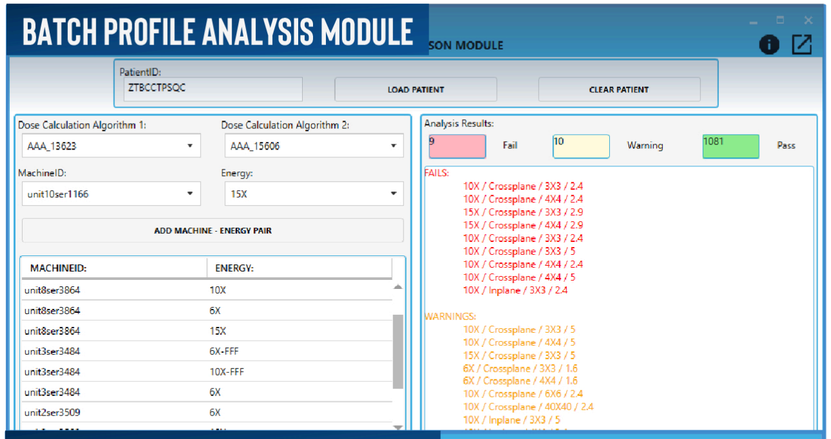
JORDAN A LOVIS, LUKAS VAN DYKE, MICHAEL ROUMELIOTIS, KUNDAN THIND, SARAH QUIRK
[1] TOM BAKER CANCER CENTRE, CALGARY ALBERTA, CANADA
[2] UNIVERSITY OF CALGARY, CALGARY ALBERTA, CANADA

Alberta Health Services

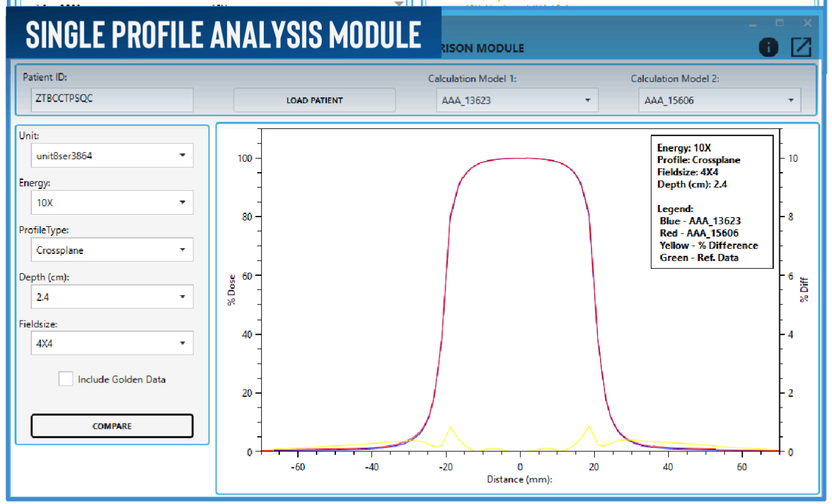
PURPOSE

- TO DEVELOP AND VALIDATE A SUITE OF AUTOMATED SOFTWARE MODULES DESIGNED TO STREAMLINE ROBUST, AND EFFICIENT QUALITY CONTROL (QC) OF VARIAN ECLIPSE EXTERNAL-BEAM TREATMENT PLANNING SYSTEM (TPS).

BATCH PROFILE ANALYSIS MODULE



SINGLE PROFILE ANALYSIS MODULE



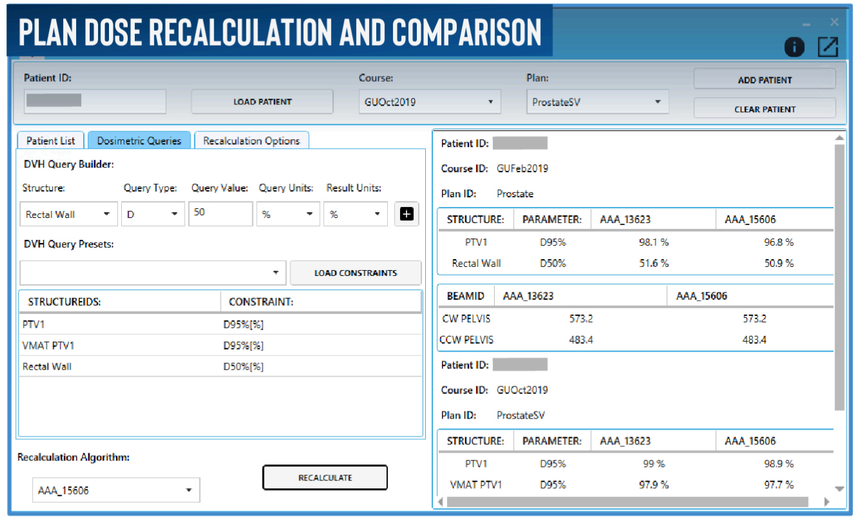
PATIENT PLAN RECALCULATION AND COMPARISON

- MODULES WERE GENERATED FOR PATIENT PLAN DOSE RECALCULATION AND RE-OPTIMIZATION RESPECTIVELY.
- USERS SELECT CLINICAL OR QA PLAN(S), ALONG WITH A NEW CALCULATION MODEL FOR PLAN RECALCULATION AND COMPARISON.
- FOR DOSIMETRIC PLAN COMPARISON, USERS CAN SELECT FROM A VARIETY OF USER PRESET DOSE CONSTRAINTS, OR BUILD THEIR OWN.

AUTOMATED PROFILE ANALYSIS

- BATCH PROFILE ANALYSIS MODULE COMPLETELY AUTOMATES QC PLAN GENERATION AND DOSE PROFILE BETWEEN DOSE CALCULATION ALGORITHMS.
- MODULES PULL INFORMATION SPECIFIED DOSE CALCULATION FRAMEWORK (DCF) ALLOWING USERS TO SPECIFY MACHINE ID - ENERGY PAIRS
- REGIONAL PROFILE DEVIATIONS ARE ANALYZED WITH TOLERANCES SUGGESTED BY VENSELAAR ET AL.[1]

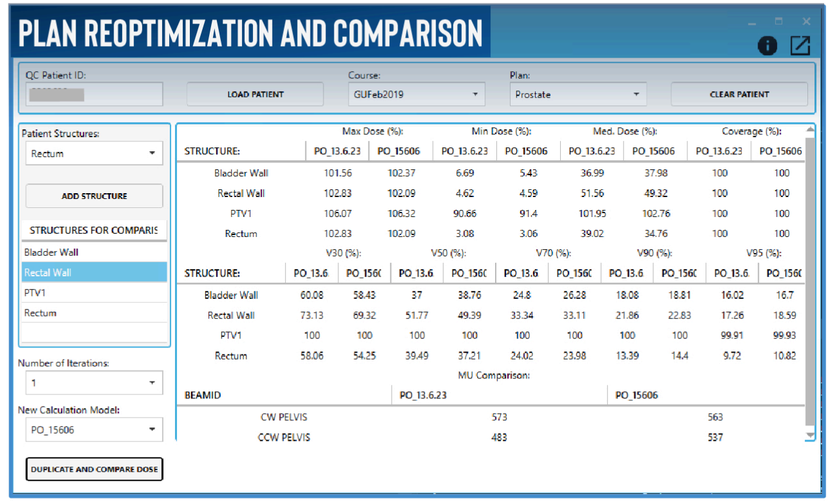
PLAN DOSE RECALCULATION AND COMPARISON



DOSE CALCULATION FRAMEWORK INTEGRITY CHECK

- THE ECLIPSE TREATMENT PLANNING SYSTEM (VARIAN MEDICAL SYSTEMS, PALO ALTO , CA) UTILIZES A DCF FRAMEWORK WHICH CONTAINS REFERENCED INFORMATION USED BY THE TPS FOR DOSE CALCULATION.
- DCF INTEGRITY CHECK MODULE PARSES THE DCF SERVER TO IDENTIFY CHANGES BETWEEN THE CLINICAL DCF AND A BACKUP OF THE DCF AT A KNOWN 'SAFE STATE'.

PLAN REOPTIMIZATION AND COMPARISON



ADDITIONAL FUNCTIONALITY

- CONFIGURABLE TO ANY CENTRE*
- 3D GAMMA COMPARISON MODULE
- POINT DOSE COMPARISON MODULE
- DVH QUERY BUILDER
- CUSTOMIZABLE DVH QUERY PRESETS

* CENTERS MUST HAVE ECLIPSE TPS AND SCRIPTING LICENSE

SCAN TO DOWNLOAD THE ABSTRACT!

REFERENCES

1. VENSELAAR J, WELLEWEERD H, MIJNHEER B. TOLERANCES FOR THE ACCURACY OF PHOTON BEAM DOSE CALCULATIONS OF TREATMENT PLANNING SYSTEMS. RADIOTHER ONCOL 2001;60(2):191–201.