Clinical implementation of plan transformation: A process description

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PURPOSE
• To propose a methodology for clinical implementation of “plan transformation”.

INTRODUCTION
• Our center is the busiest radiation-oncology department in Canada treating about 50/linac/day, 7 days/week.
• In case of a linac breakdown, patients cannot be transferred from ML to HD MLC unit since there is no straightforward method to move patients from Millennium120 to HD MLC Varian units.
• This increases workload on other Millennium units while HD units have empty spots. Patients have to be cancelled and/or rescheduled increasing strain on our already heavy workload in our department (Fig 1.).

PROPOSED METHODOLOGY
• Our center is equipped with 4 Millennium120 and 2 High Definition MLC Varian units.
• Transformation is initiated when there is need to move patients from Millennium to High Definition MLC units (Ref 1).
• An in-house developed API script automatically identifies plans that are eligible for transformation in ARIA. Eligibility criteria for a plan being non-VMAT with Y-jaw collimation of 21.6 cm or less.
• Transformation allows a patient to be transferred for a given number of fractions or the entire treatment course.
• Plan transformation is initiated by therapy, performed by dosimetry and checked by physicist before going for treatment.
• During transformation nothing in beam geometry or MUs change. Only MLCs are changed (Fig 2).

RESULTS
• On a given day, about 25% of appointments on all Millennium units were eligible for transformation. The majority of those were forward-planned step and shoot breast tangent and boost (Fig 3). The difference between the original and the transformed plan is usually not-clinically significant.

CONCLUSIONS
• Plan transformation is feasible and a better alternative to replanning in order to divert the high load of our Millennium MLC units to HD MLC units, if needed.
• Transformation allows for operational flexibility for bookings that can offset unplanned downtime.
• Plan transformation process saves time to planners by taking less than a quarter the time required for a replan which represents a huge time gain for our centre.

REFERENCES
1. A feasibility study of plan transformation between Millennium & HD MLCs: A novel workaround enabling patient transfer between different Varian machines, Afsharpour et al. AAPM 2019