

**Analisi basata su conoscenza di massa di DVH in SBRT: primi passi verso un audit virtuale nazionale**

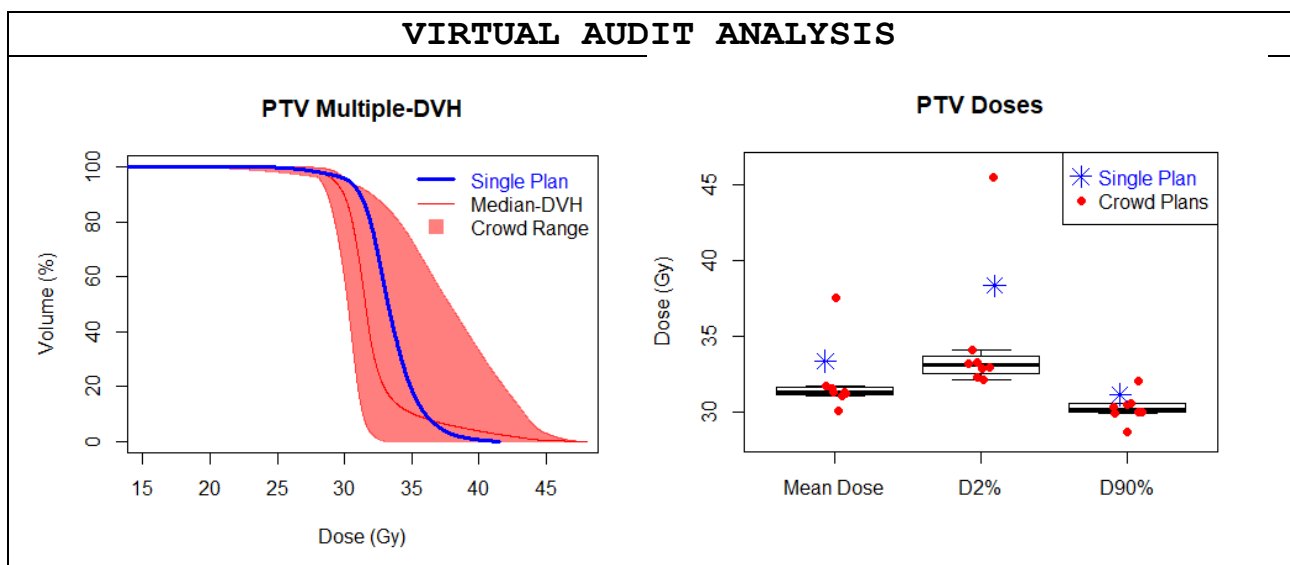
**A crowd-knowledge-based analysis of DVHs in SBRT: first steps towards a national virtual audit**

**Purpose:** Currently, most of the multicenter analyses on treatment planning rely on the extraction of selected data from the DVH of each plan. A grouped analysis can be biased due to the different algorithms used to generate the DVH in different treatment planning systems. In this work we used a consistent method to present a preliminary analysis of multiple data coming from a national survey on stereotactic body radiotherapy (SBRT) planning.

**Methods and materials:** A single spine case was shared among several radiation oncology centers. The dose prescription was 30 Gy in 3 fractions with specific constraints on target coverage and dose to nearby organs at risk. The VMAT delivery technique was employed by each center. All data were collected in DICOM-RT format. A script was developed in R language using the RadOnc R-Package for recalculating the DVHs using a homogeneous algorithm. Specific DVH points collected from the centers were compared with those recalculated with RadOnc.

**Results:** Differences between collected and recalculated DVHs were minimal, however in some cases deviations up to 1.5% were observed. The multiple-DVH analysis showed a notable variability on target dose level (Fig.1). This variability was caused mainly by different planning optimization strategies, rather than by the use of a specific treatment technology.

**Conclusion:** A grouped analysis of SBRT plans was performed eliminating the bias due to different DVH calculation algorithms. The observed variability suggests that comparable standards in patient treatment among different centers can be obtained if a consistent high-level data sharing capability is granted. In the strive to harmonize the planning process, this analysis constitutes a first step toward the creation of a platform of crowd-knowledge-based planning guidelines. This platform could represent a high-quality benchmark to confront with for centers that are willing to implement SBRT techniques (concept expressed in Fig.1).



**Figure 1**