

# Exploring Advanced Practice: Therapeutic radiographer/RTT/Dosimetrist contouring of target volumes for low and intermediate risk prostate cancer

Susannah Jansen van Rensburg, MSc<sup>1</sup> & Dr Mark Collins<sup>2</sup>  
<sup>1</sup>GenesisCare, UK <sup>2</sup>Sheffield Hallam University

## Introduction

The purpose of this work was to evaluate the accuracy of clinical target volumes (CTV) completed by a therapeutic radiographer/RTT/dosimetrist in prostate radiotherapy. Other studies have demonstrated the viability of radiographer contouring in specific areas such as MR-Linac<sup>1</sup>, whilst this study sought to demonstrate the potential for this staff group in the conventional radiotherapy planning pathway, as advanced practice opportunities may contribute to increased job satisfaction and workforce retention<sup>2</sup>.

## Methods

A retrospective contour comparison was performed across 55 CT datasets from 26 different clinical oncologists, using absolute volume, Dice coefficient and mean distance to agreement. Contours were compared using a custom workflow in MIM Maestro (Figure 1).

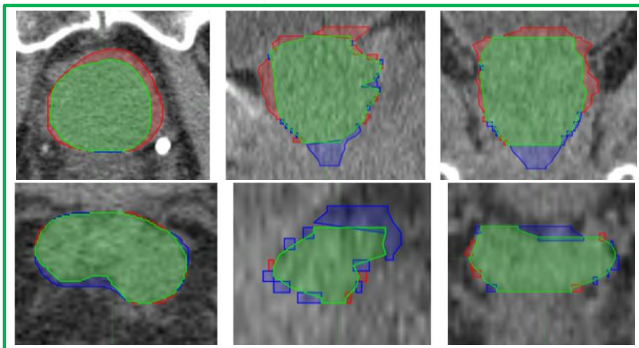


Figure 1. Example contours – Prostate and SV MIM Maestro Workflow

Green = Areas of overlap Blue = Oncologist volume larger  
 Red = Dosimetrist volume larger

These results were evaluated across prostate and SV contours independently to allow objective assessment of anatomical accuracy for prostate, and evaluation of clinical interpretation for extent of seminal vesicle inclusion.

## Results

The researcher's contouring was consistently close to the clinical oncologist for prostate contouring, whilst more variation was seen across SV contours as per Dice and Mean Distance to Agreement (Figure 2). Mean absolute volume difference for prostate contours was 3.45cc and 1.75cc for seminal vesicles (which, relatively speaking, is more significant due to the size difference of these structures). For prostate absolute volume difference, the researcher volumes were more conservative than practitioner (p=0.012), whilst for SV they were larger (p<0.001).

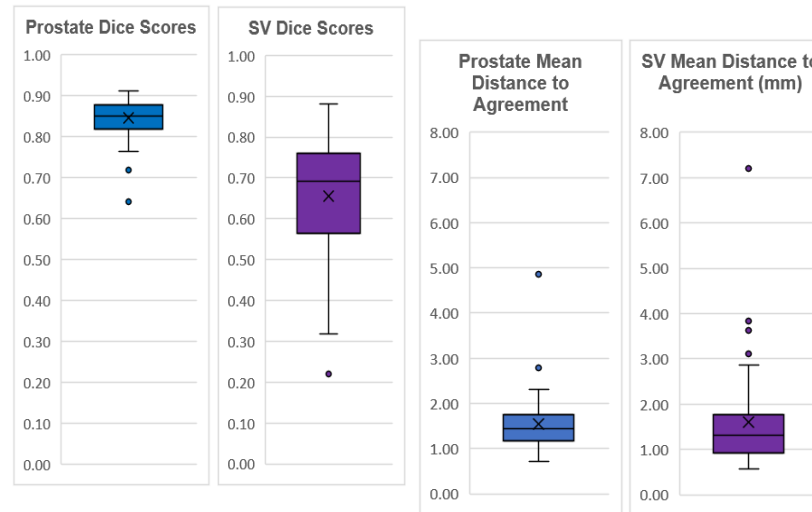


Figure 2. Results – Prostate & SV Dice and Mean Distance to Agreement

## Interpretation

The therapeutic radiographer was accurately able to identify and contour the prostate CTV<sup>3</sup>. Seminal Vesicle CTV was more varied, which likely relates to different approaches to risk-based contouring for these patients. With accurate therapeutic radiographer contours, there is scope for streamlining the planning pathway (Figures 3 & 4).



Figure 3. Example Standard RT Planning Pathway in GenesisCare



Figure 4. Proposed Planning Pathway with Dosimetrist-led Contouring

## Implications for Practice

Therapeutic radiographers working in dosimetry may be able to accurately contour CTVs for low- and intermediate- risk prostate cancer with appropriate training. This could allow for streamlining radiotherapy planning pathways (Figures 3 & 4) and provide an advanced practice opportunity for HCPC-registered therapeutic radiographers working in dosimetry<sup>4</sup>.

## Acknowledgments

GenesisCare UK  
 Sheffield Hallam University, Sheffield, UK  
 MIM Software, Beachwood, Ohio

## References

1. Pathmanathan A U, McNair H A, Schmidt M A, Brand D H, Delacroix L, Eccles C L, Gordon A, Herbert T, Van As N J, Huddart R A, Tree A C (2019). Comparison of prostate delineation on multimodality imaging for MR-guided radiotherapy. *British Journal of Radiology* 92: 20180948
2. Nightingale J, Burton M, Appleyard R, Stevens T, Campbell S (2021). Retention of radiographers: A qualitative exploration of factors influencing decisions to leave or remain within the NHS. *Radiography* 27 (3): 795-802
3. Velker V M, Rodrigues G B, Dinniwel R, Hwee J, Louie A V (2013). Creation of RTOG compliant patient CT-atlases for automated atlas-based contouring of local regional breast and high-risk prostate cancers. *Radiation Oncology* 8:188.
4. Tsang Y (2021). Advanced practice in radiotherapy: How to move to the next level? *Technical Innovations & Patient Support in Radiation Oncology*: 57-58.