

Appendix A. Supplementary Material

Table A1. Constraints for treatment planning. These were also used as robust evaluation dose/volume measures. The bowel constraint labelled 'optimal' was aimed for in treatment planning but was rarely achieved and was not included in the present analysis.

Structure	Constraint
CTVp	$V95\% \geq 98\%$
CTVe	$V95\% \geq 98\%$
Rectum	$V75\text{Gy} \leq 3\%$
	$V70\text{Gy} \leq 15\%$
	$V65\text{Gy} \leq 30\%$
	$V50\text{Gy} \leq 60\%$
	$V40\text{Gy} \leq 70\%$
	$V30\text{Gy} \leq 80\%$
Bladder	$V80\text{Gy} \leq 15\%$
	$V70\text{Gy} \leq 35\%$
	$V65\text{Gy} \leq 50\%$
Bowel	$V35\text{Gy} \leq 40\%$
	$V45\text{Gy} \leq 195\text{ cm}^3$ (optimal)

Robust evaluation scenarios for patients A-E

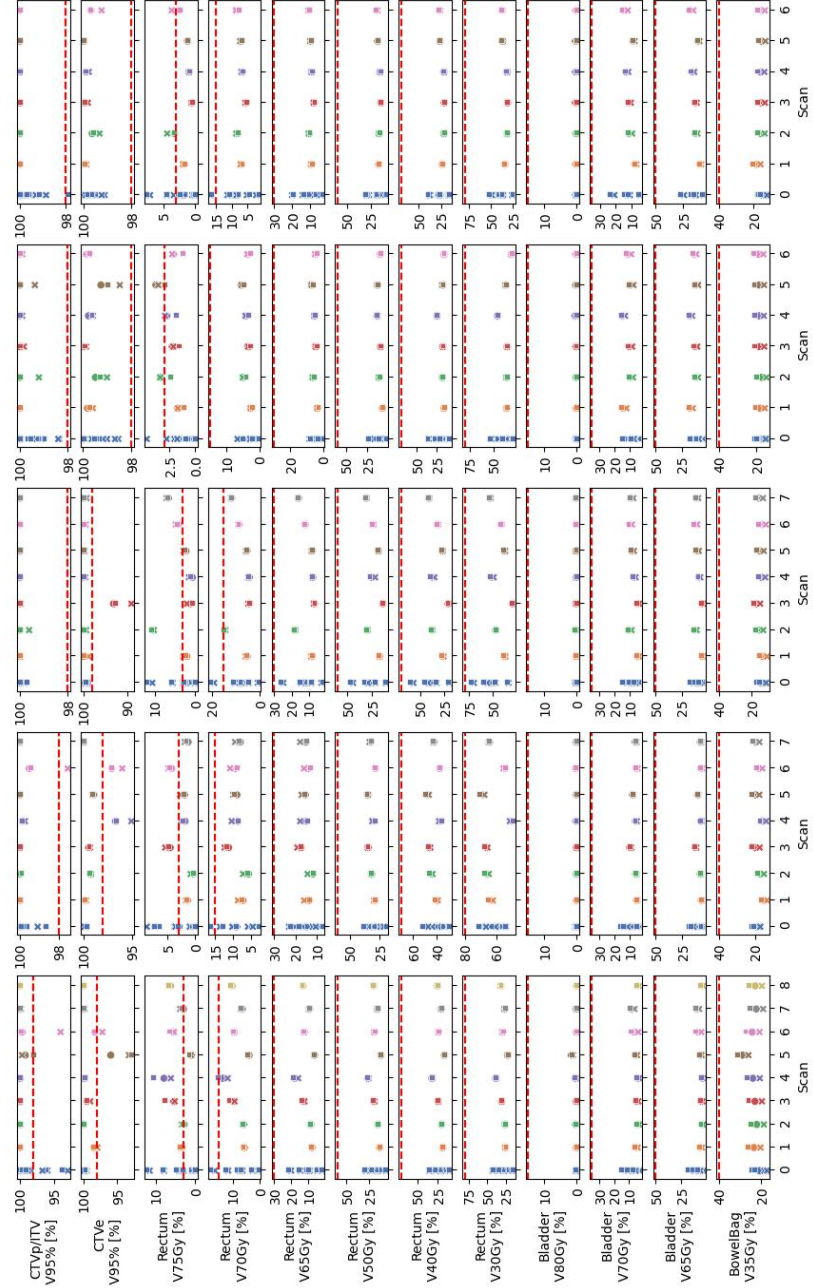


Figure A1. Figure of dose/volume measures for the pre-treatment robust evaluation associated with the planning computed tomography scan (pCT, scan 0) and the during-treatment robust evaluations associated with the weekly control computed tomography scans (cCTs, scans 1 to 6-8) for five patient. The red dashed lines mark the constraint values corresponding to the dose/volume measures. A circular dot signifies a nominal treatment plan with no distal edge uncertainty, a cross means that the value corresponds to a scenario with distal edge uncertainty +3.5% and equivalently, a square signifies a -3.5% distal edge uncertainty scenario. The figure is continued for five additional patients in Figure A2.

Robust evaluation scenarios for patients F-J

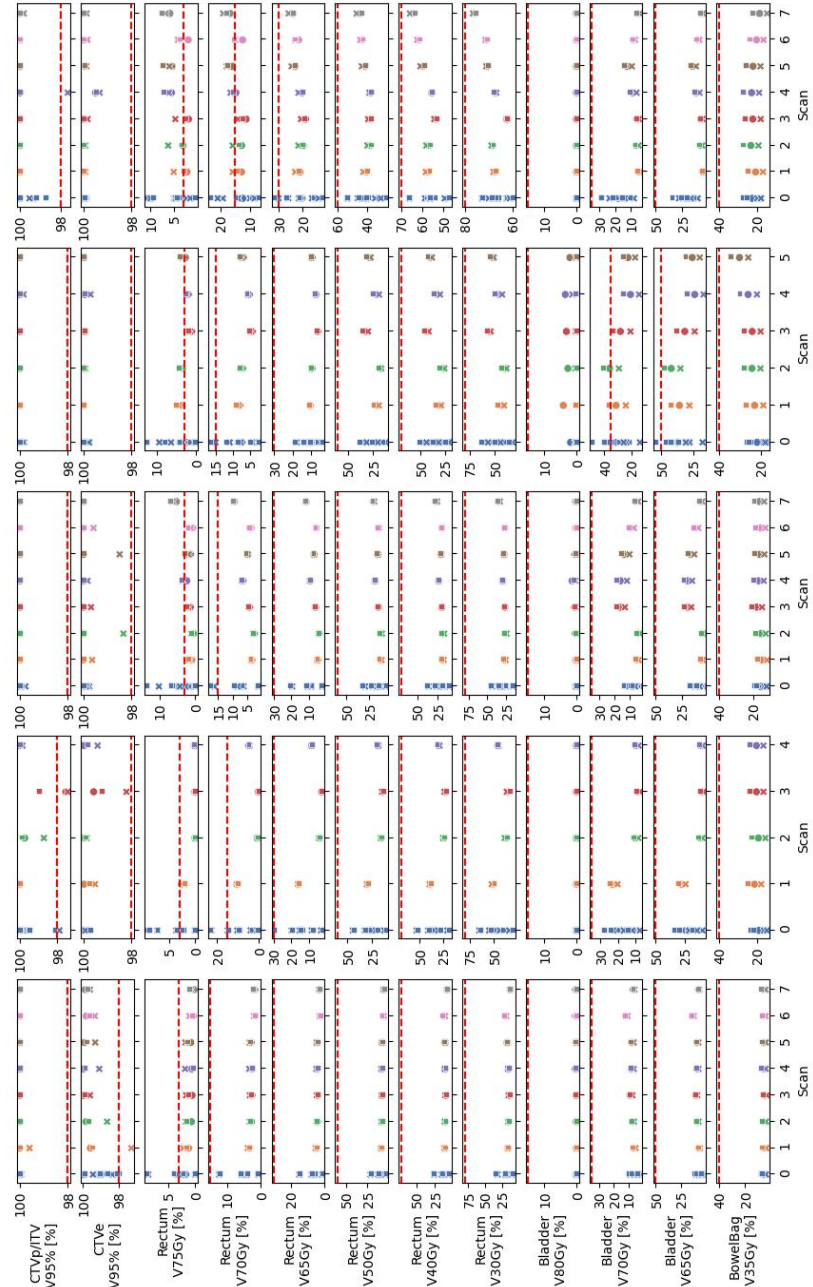


Figure A2. Figure continued from Figure A1 with five additional patients.

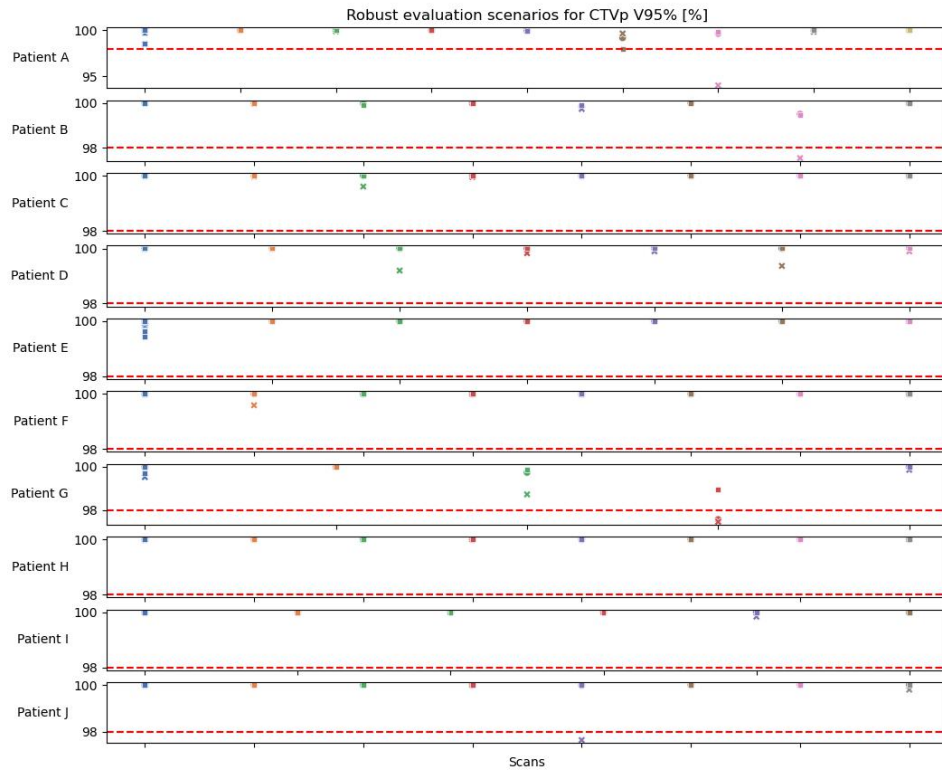


Figure A3. The figure show time trends in a specific dose/volume measure: The percentage of the volume of the primary clinical target volume that receives 95% of the prescribed dose. This is denoted CTVp V95%. The figure displays the pre-treatment robust evaluation associated with the planning computed tomography scan (blue leftmost markers) and the during-treatment robust evaluations associated with the weekly control computed tomography scans (remaining markers, one colour for each week's scan) for ten patient. The red dashed lines mark the constraint values corresponding to the dose/volume measures. A circular dot signifies a nominal treatment plan with no distal edge uncertainty, a cross means that the value corresponds to a scenario with distal edge uncertainty +3.5% and equivalently, a square signifies a -3.5% distal edge uncertainty scenario.

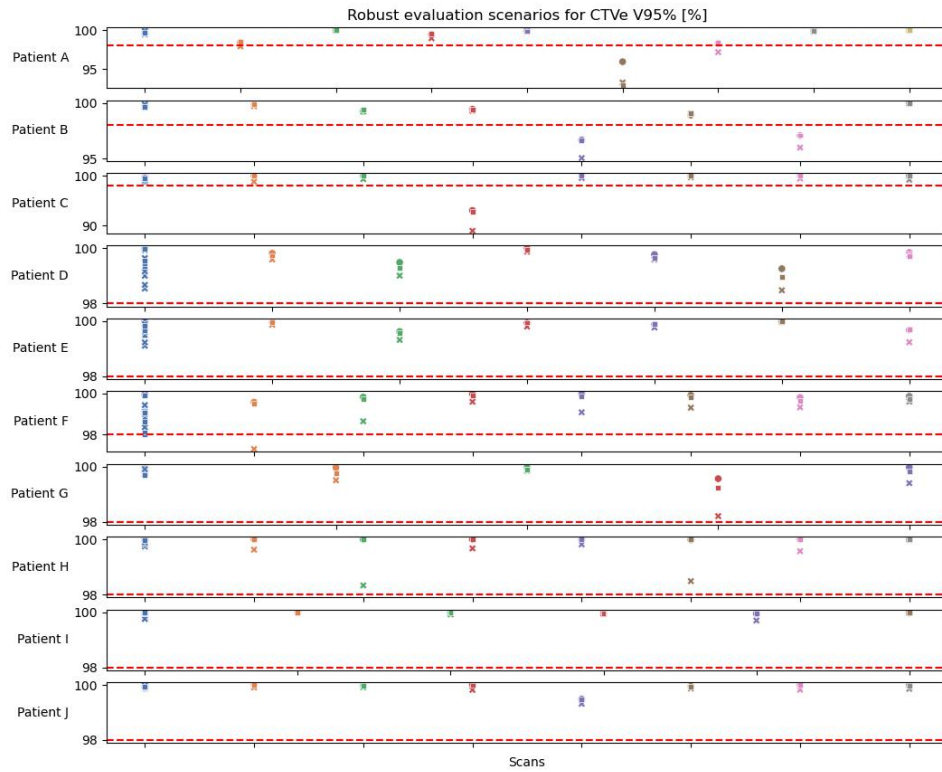


Figure A4. The figure show time trends in a specific dose/volume measure: The percentage of the volume of the elective clinical target volume that receives 95% of the prescribed dose. This is denoted CTVe V95%. The figure displays the pre-treatment robust evaluation associated with the planning computed tomography scan (blue leftmost markers) and the during-treatment robust evaluations associated with the weekly control computed tomography scans (remaining markers, one colour for each week's scan) for ten patient. The red dashed lines mark the constraint values corresponding to the dose/volume measures. A circular dot signifies a nominal treatment plan with no distal edge uncertainty, a cross means that the value corresponds to a scenario with distal edge uncertainty +3.5% and equivalently, a square signifies a -3.5% distal edge uncertainty scenario.

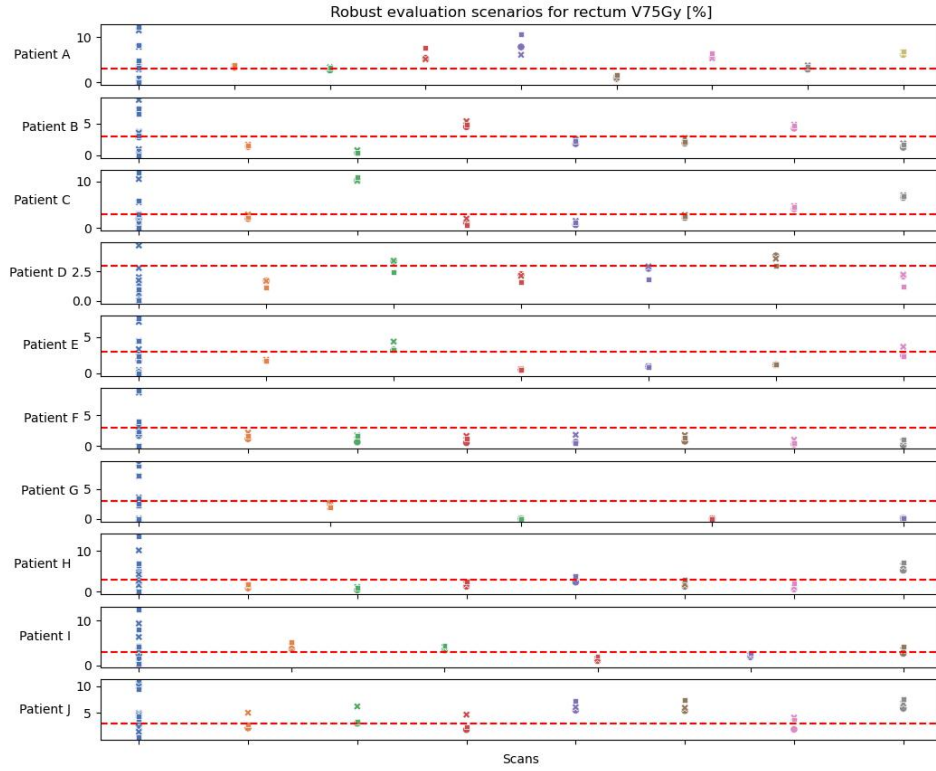


Figure A5. The figure show time trends in a specific dose/volume measure: The percentage of the volume of the rectum that receives 75 Gy. This is denoted rectum V75Gy. The figure displays the pre-treatment robust evaluation associated with the planning computed tomography scan (blue leftmost markers) and the during-treatment robust evaluations associated with the weekly control computed tomography scans (remaining markers, one colour for each week's scan) for ten patient. The red dashed lines mark the constraint values corresponding to the dose/volume measures. A circular dot signifies a nominal treatment plan with no distal edge uncertainty, a cross means that the value corresponds to a scenario with distal edge uncertainty +3.5% and equivalently, a square signifies a -3.5% distal edge uncertainty scenario.

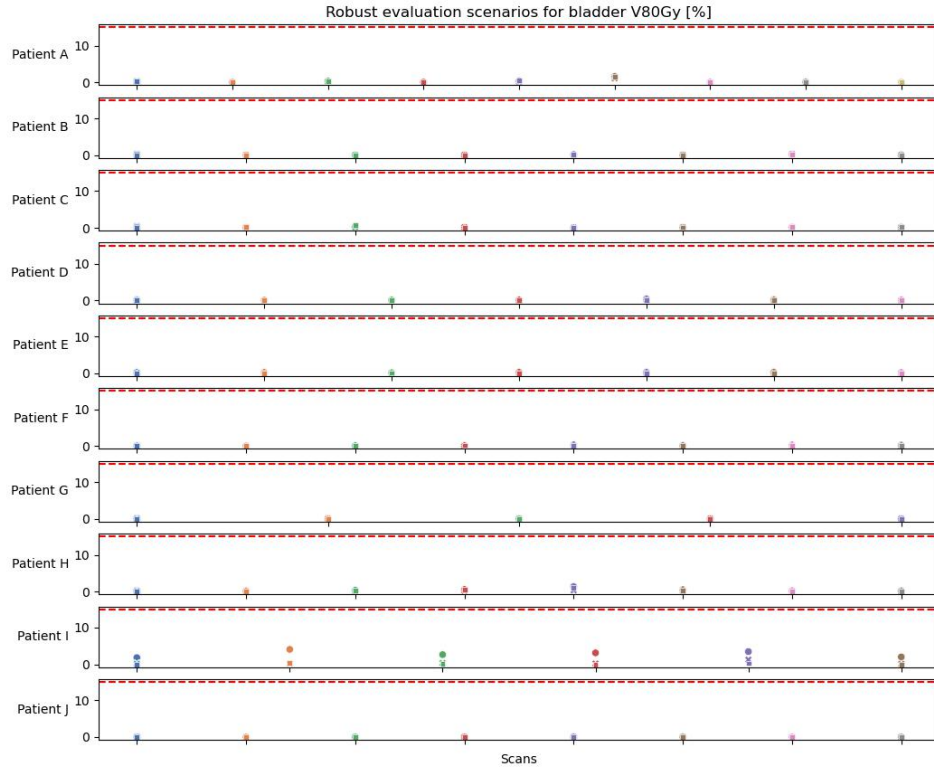


Figure A6. The figure show time trends in a specific dose/volume measure: The percentage of the volume of the bladder that receives 80 Gy. This is denoted bladder V80Gy. The figure displays the pre-treatment robust evaluation associated with the planning computed tomography scan (blue leftmost markers) and the during-treatment robust evaluations associated with the weekly control computed tomography scans (remaining markers, one colour for each week's scan) for ten patient. The red dashed lines mark the constraint values corresponding to the dose/volume measures. A circular dot signifies a nominal treatment plan with no distal edge uncertainty, a cross means that the value corresponds to a scenario with distal edge uncertainty +3.5% and equivalently, a square signifies a -3.5% distal edge uncertainty scenario.

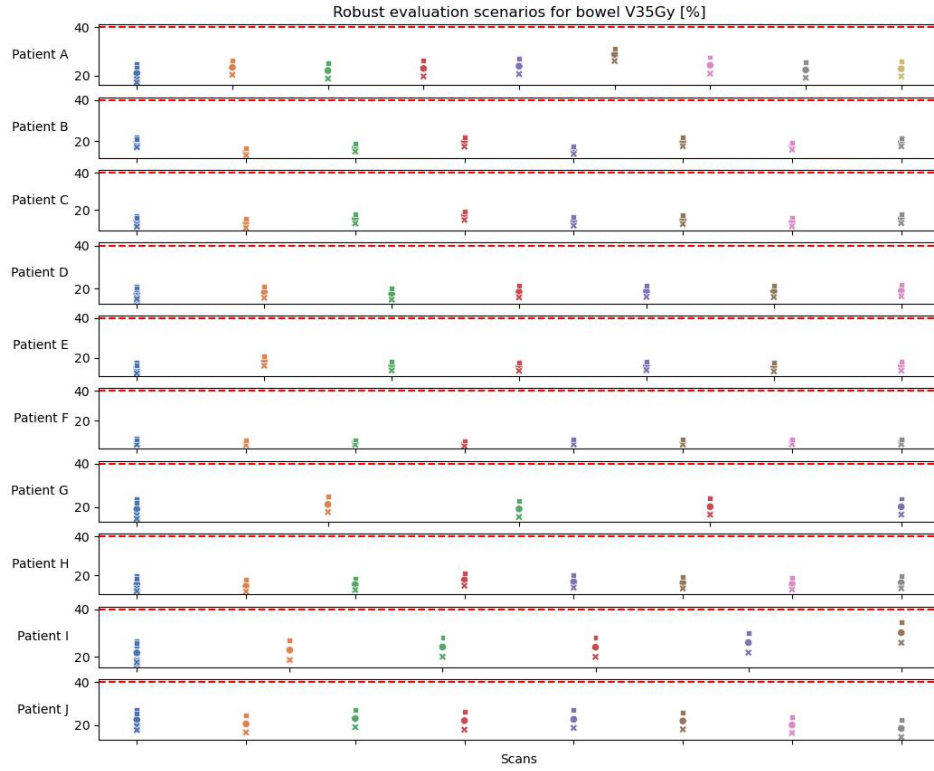


Figure A7. The figure show time trends in a specific dose/volume measure: The percentage of the volume of the bowel that receives 35 Gy. This is denoted bowel V35Gy. The figure displays the pre-treatment robust evaluation associated with the planning computed tomography scan (blue leftmost markers) and the during-treatment robust evaluations associated with the weekly control computed tomography scans (remaining markers, one colour for each week's scan) for ten patient. The red dashed lines mark the constraint values corresponding to the dose/volume measures. A circular dot signifies a nominal treatment plan with no distal edge uncertainty, a cross means that the value corresponds to a scenario with distal edge uncertainty +3.5% and equivalently, a square signifies a -3.5% distal edge uncertainty scenario.