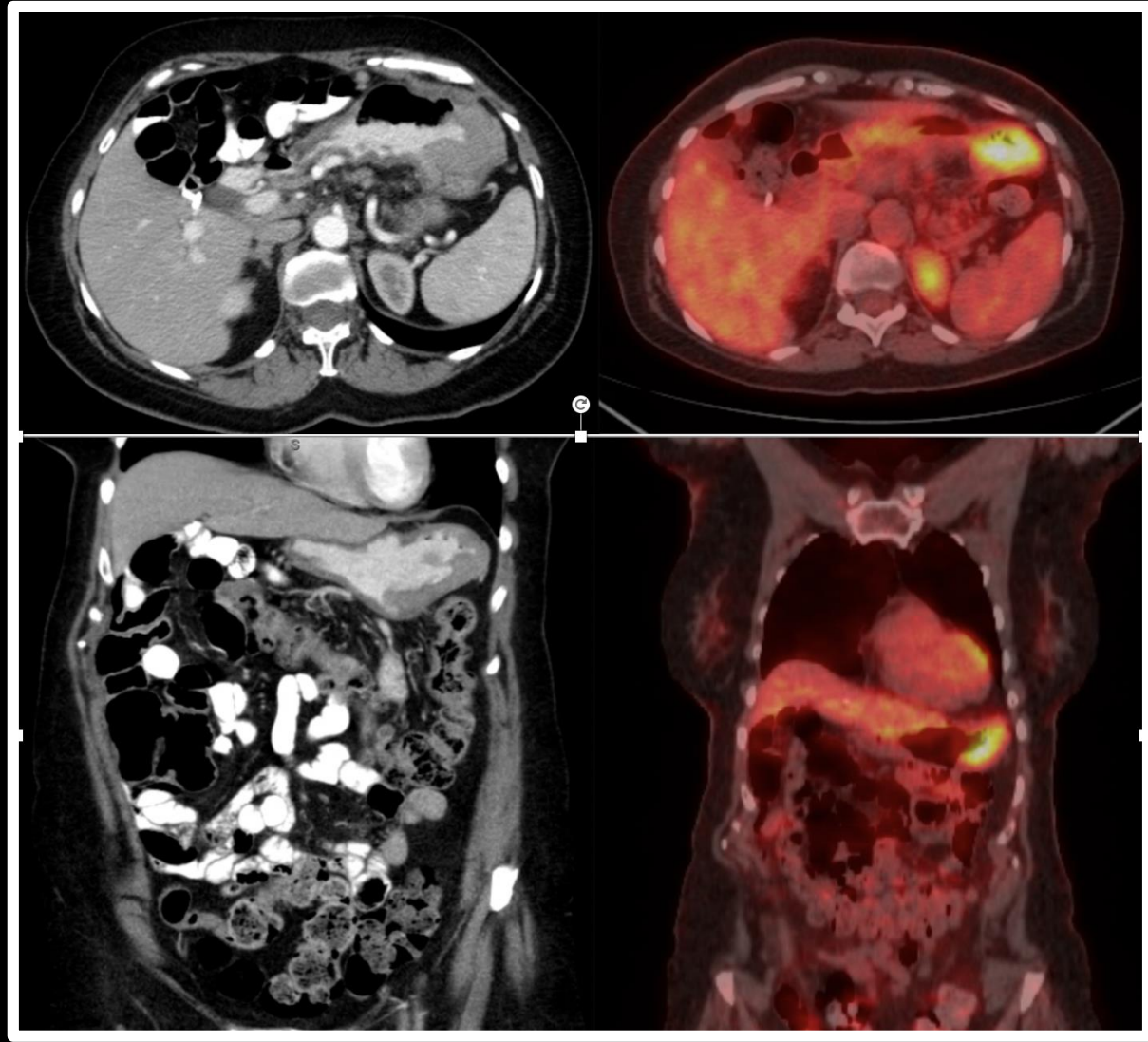


ILROG Mini-Atlas: Stomach Location

52-year-old man, presents with bulky diffuse large B-cell lymphoma of the stomach, 12 cm in diameter.

He received 6 cycles of R-CHOP and achieved a metabolic complete remission (Deauville 2).

He presents for consolidative radiation using ISRT to 3000 cGy.



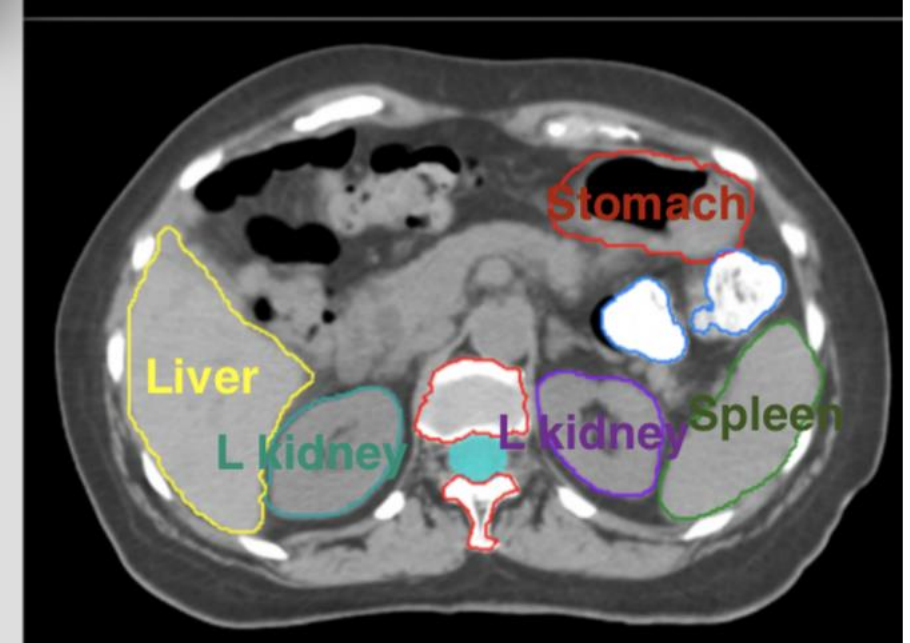
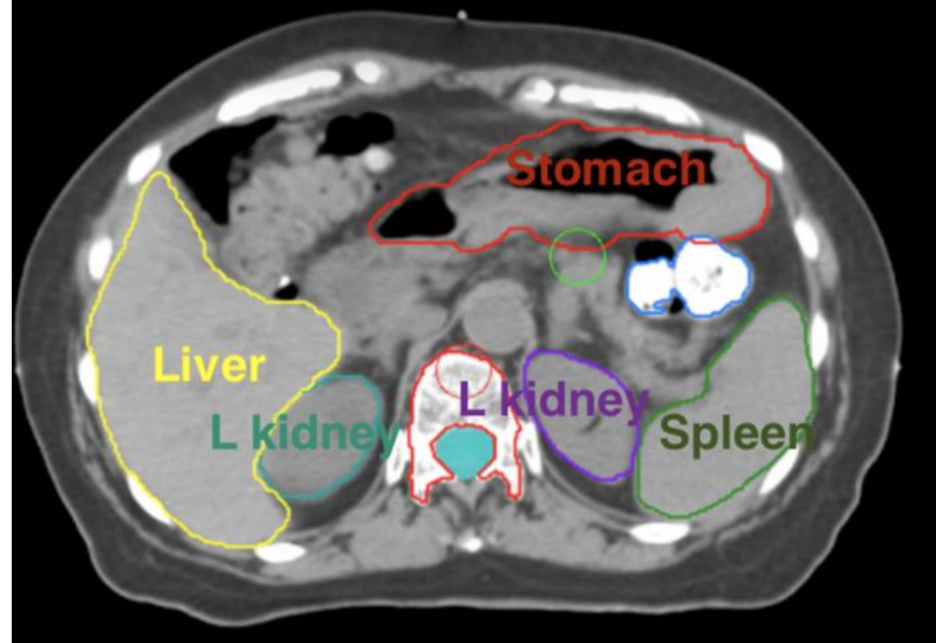
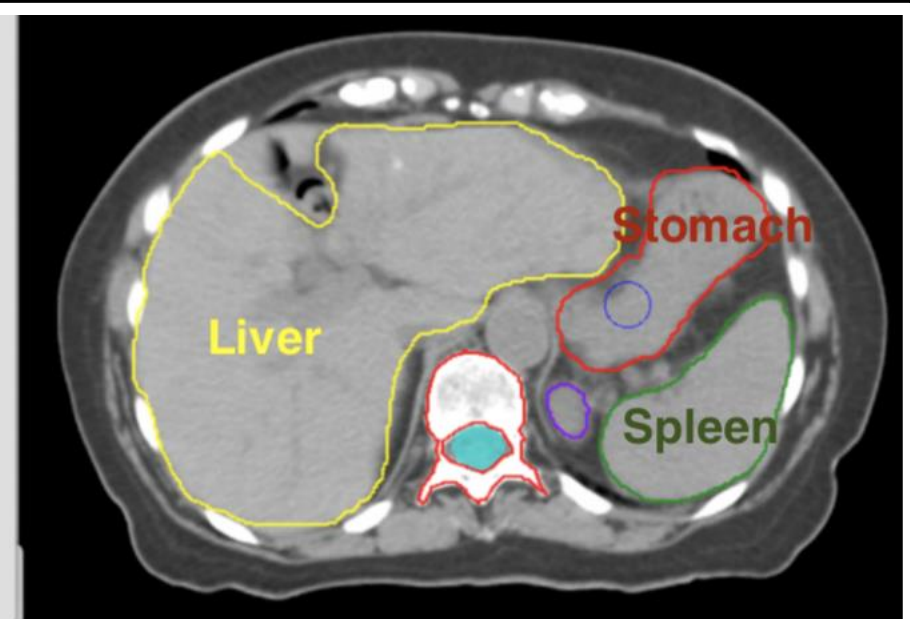
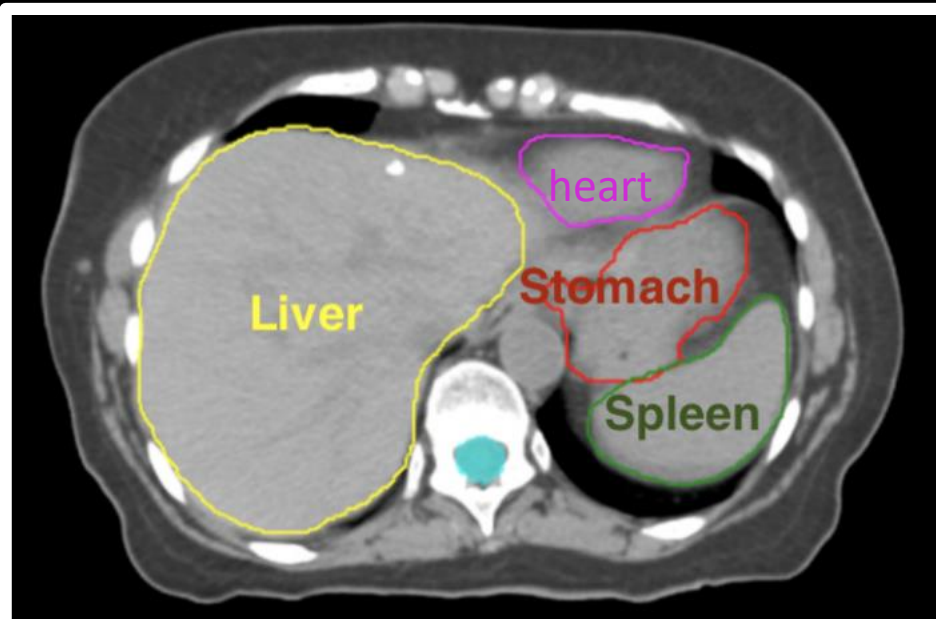
Presenting contrast enhanced CT and PET/CT illustrating the gastric disease location

Simulation was performed in a supine position, empty stomach (≥ 6 hours NPO) , arms up, using deep inspiration breath hold¹.

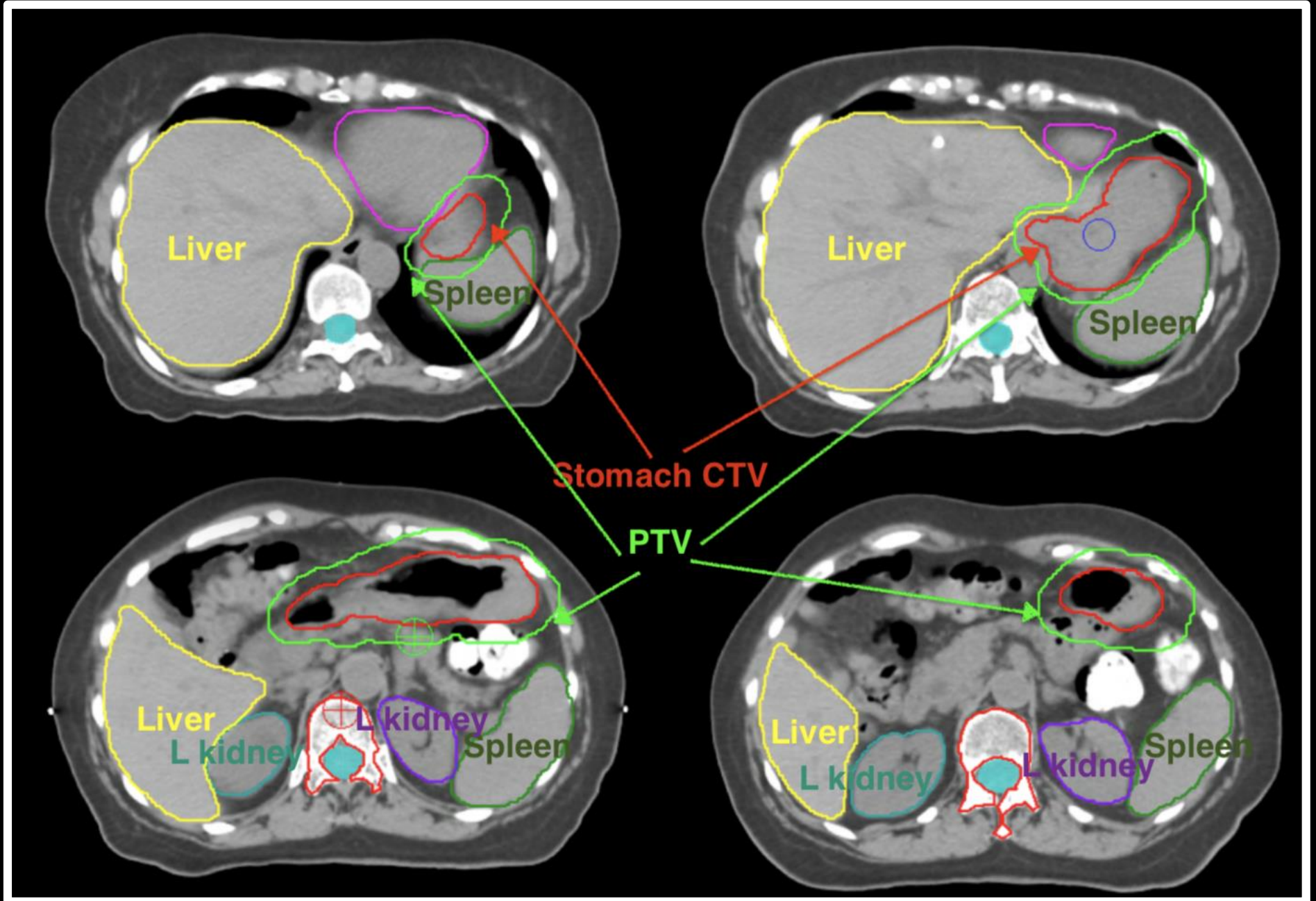


¹Wang et al; Practical Radiation Oncology (2017) 7, e471-e478

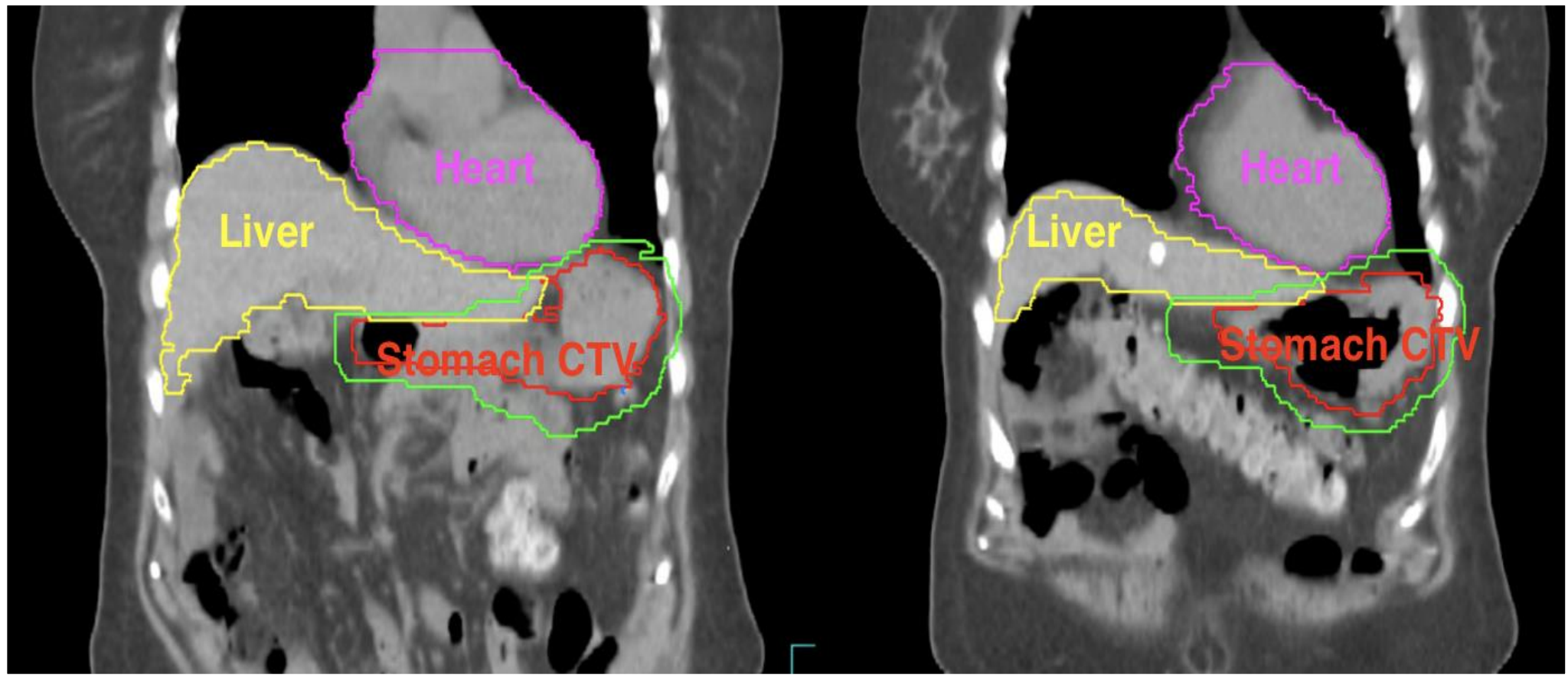
Axial images showing the CTV volume (red) on the CT simulation scan. Other organs at risks contoured include the liver, spleen, bilateral kidneys, the spinal cord, and the heart.



Axial images showing the CTV (red) with a 7 mm expansion to PTV (green).



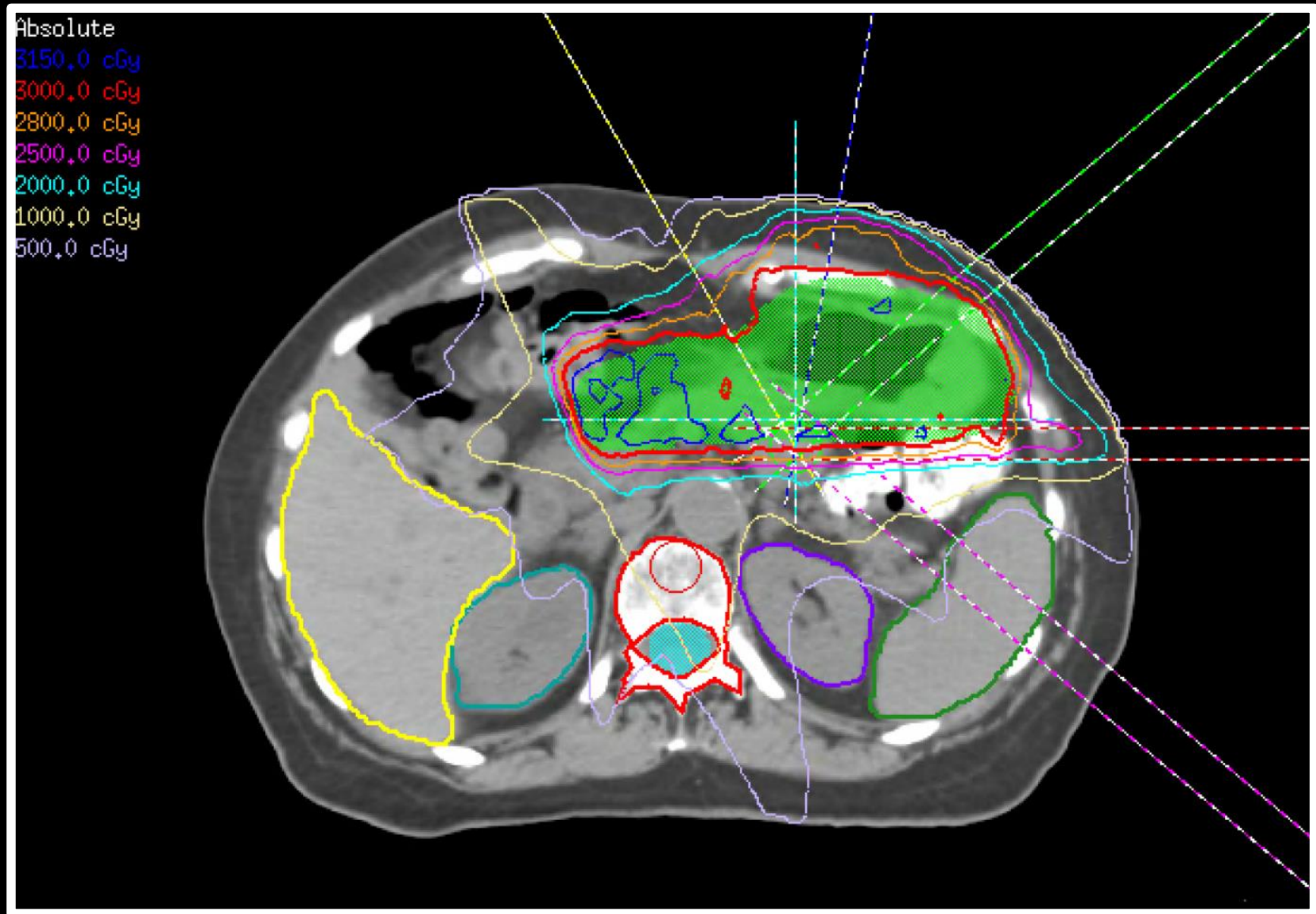
Coronal images showing the CTV (red) with a 7 mm expansion to PTV (green).



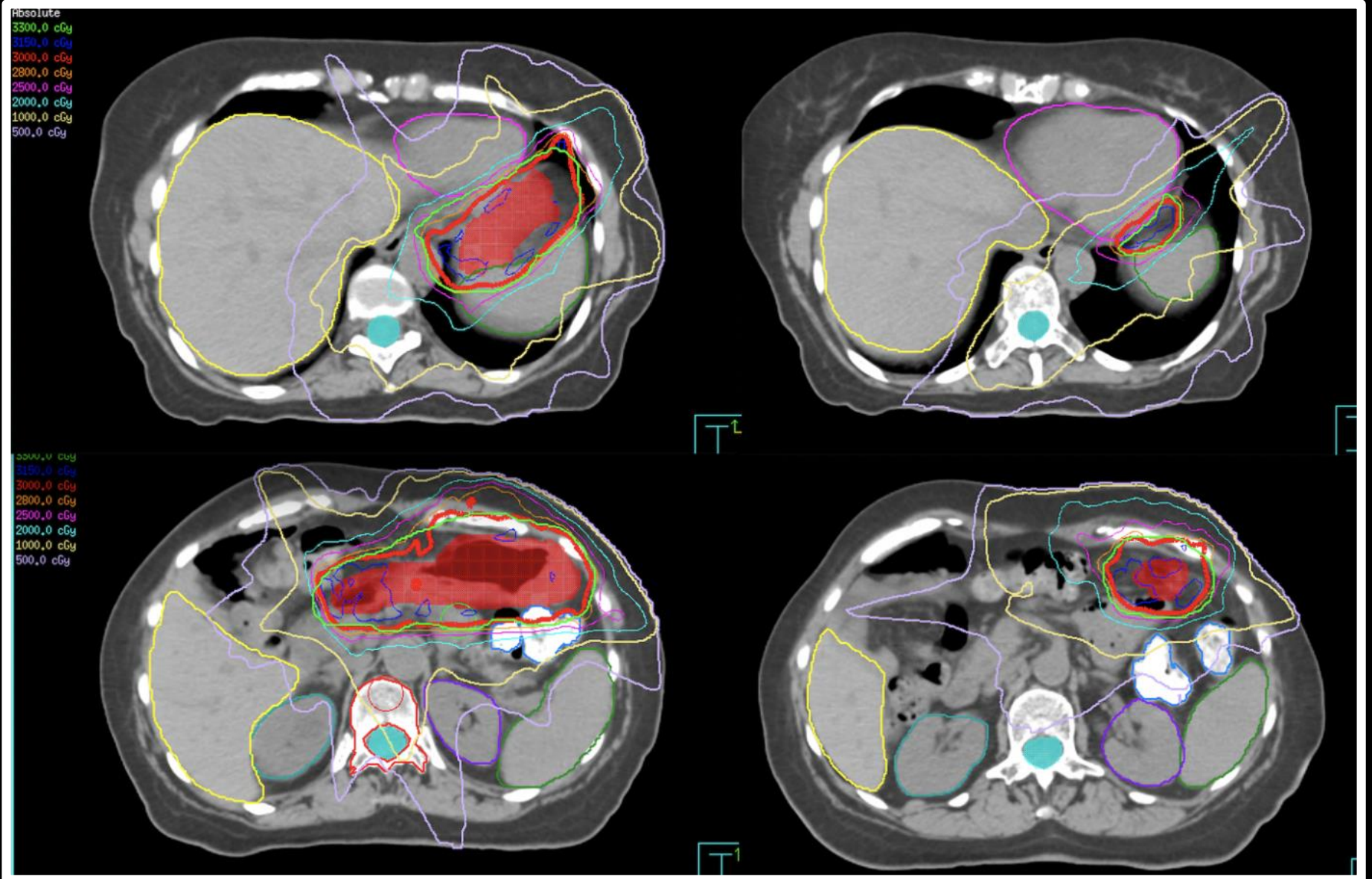
Planning simulation is done using breath hold technique to decrease respiratory induced motion of the gastric target as well as to provide increased distance between the inferior aspect of the heart and the target.

CT simulation and treatment should be administered with an empty stomach (NPO for ≥ 6 hours) to ensure the stomach volume is stable and reproducible.

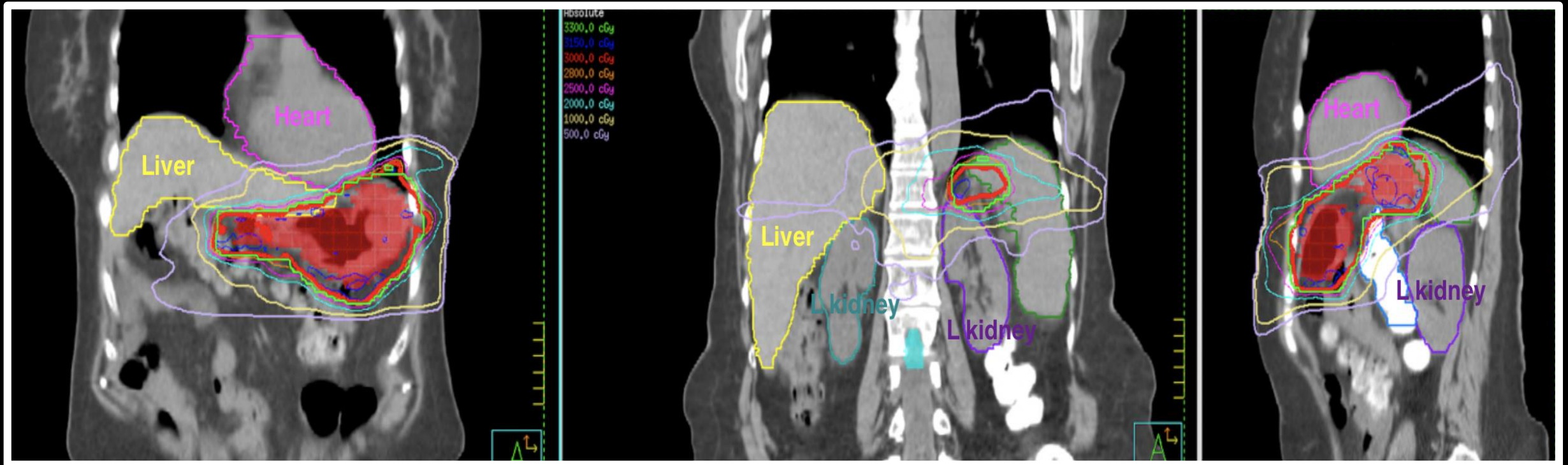
Planning is done using IMRT with beams limited to anterior and posterior orientations to avoid excess dose to both kidneys.



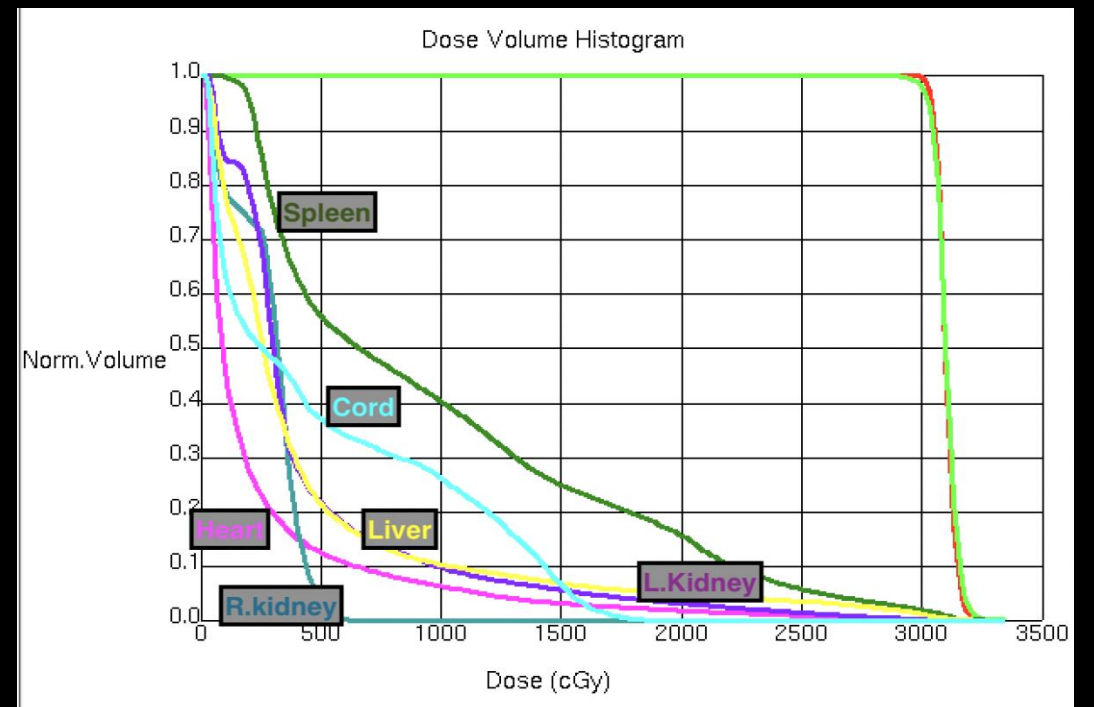
Isodose lines shown on axial images, note the low dose (5 Gy) shying away from the heart, kidneys, and spleen.



Isodose lines shown on coronal and sagittal images, note the dose shying away from the heart, kidneys, and spleen.



Dose Volume Histogram showing a mean dose < 500 cGy for the heart, liver, right and left kidneys. Spleen mean dose 970 cGy.



ROI Statistics

Line Type	ROI	Min.	Max.	Mean	Std. Dev.
<input type="radio"/>	iStomach	2873.3	3298.8	3099.7	37.7
<input type="radio"/>	PTV	2151.8	3339.6	3100.1	48.3
<input type="radio"/>	Spleen	78.9	3259.2	978.0	801.2
<input type="radio"/>	Heart	20.4	3151.1	249.8	429.9
<input type="radio"/>	Rt Kidney	24.4	610.8	281.9	139.4
<input checked="" type="radio"/>	Lt Kidney	36.3	3180.2	448.0	492.6
<input type="radio"/>	Liver	17.8	3216.7	448.4	604.0
<input type="radio"/>	Spinal Cord	29.8	1838.4	524.6	546.8

Take home message:

When treating the stomach It is important to account for the inter-fractional motion including: variability in stomach shape on daily basis, breathing, and bowel filling change. To mitigate these changes, making sure that the patient is NPO, modify to a low gas producing diet, use breath hold during treatment, and if possible utilize daily CT verification to ensure that isodose lines are encompassing the target and avoiding the normal and critical organs.

Doses to organs at risks should be minimal, especially since these patients have been exposed to cardiotoxic and nephrotoxic therapy. Moreover, there is a risk that they might need further chemotherapy if relapse occurs.

Avoidance of radiation to the spleen is intended to decrease the risk of lymphopenia, as it has been shown to be important when treating gastrointestinal malignancies.¹