

# Cardiac Sparing Whole Lung (WL)- IMRT Study

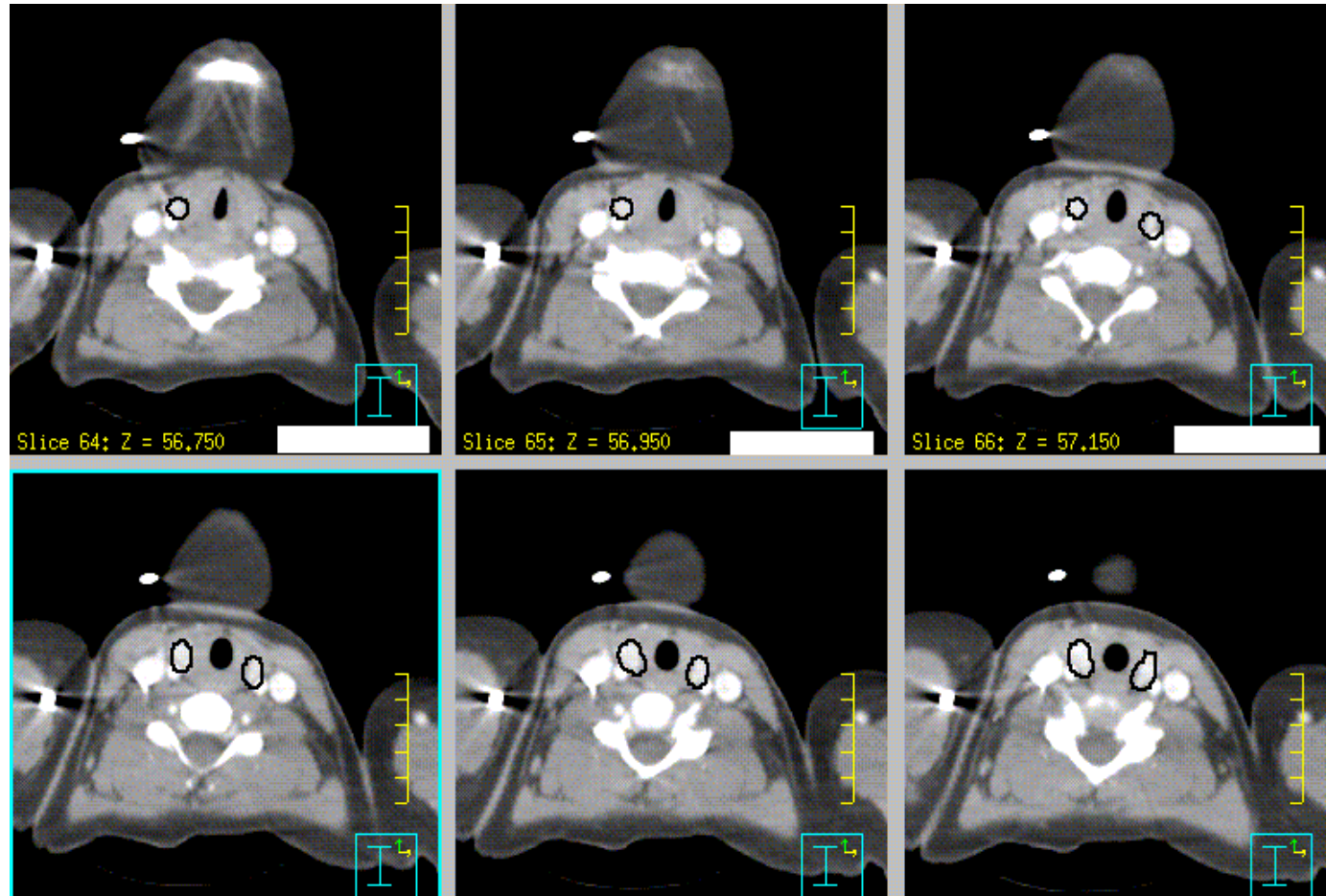
*Target Volumes, Organs At Risk, Dose-Volume  
histograms: Reference Case*

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Principal Investigator  
Northwestern University

September 2010

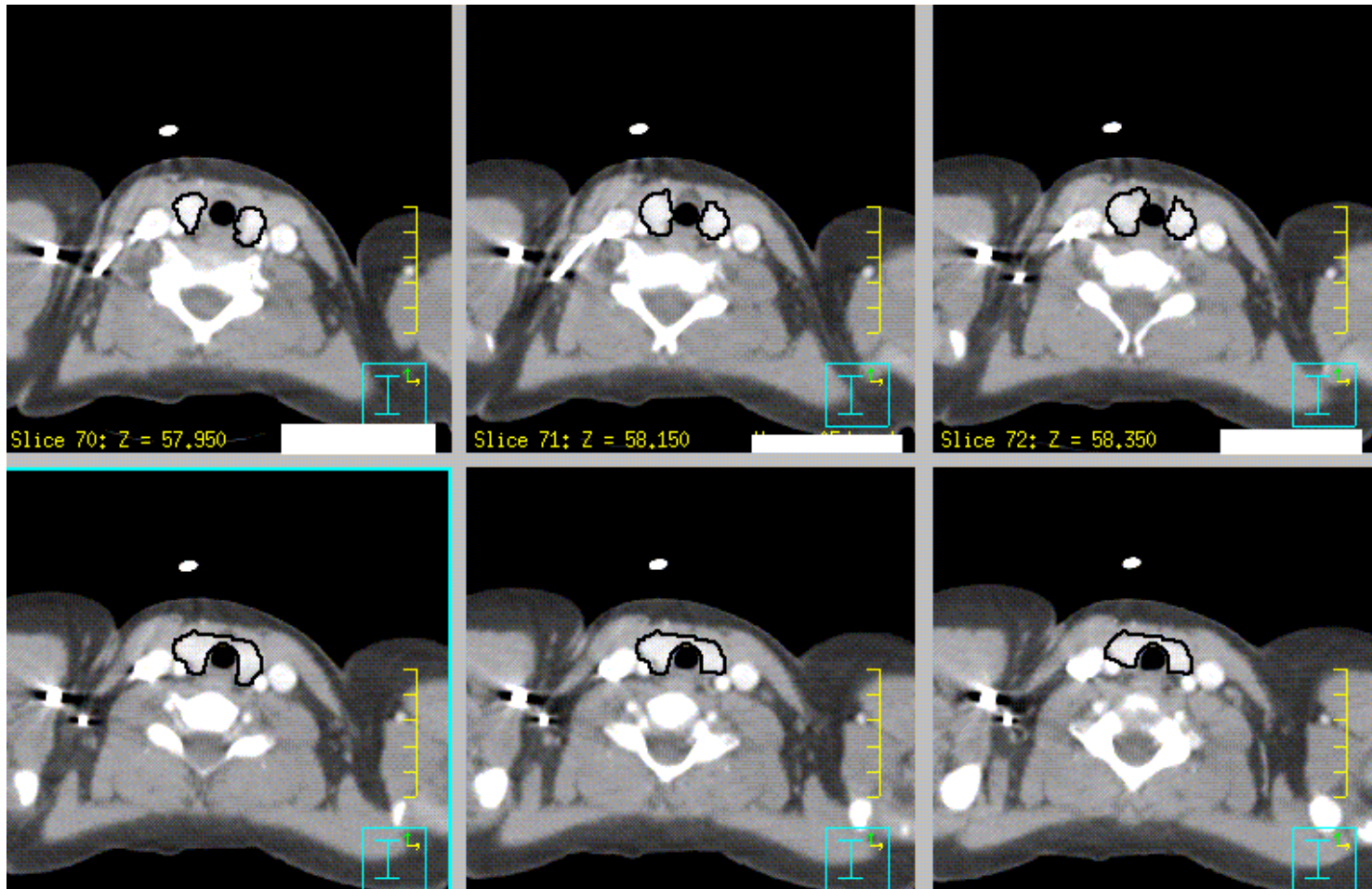
# WL-IMRT Contours

Thyroid ---- Black



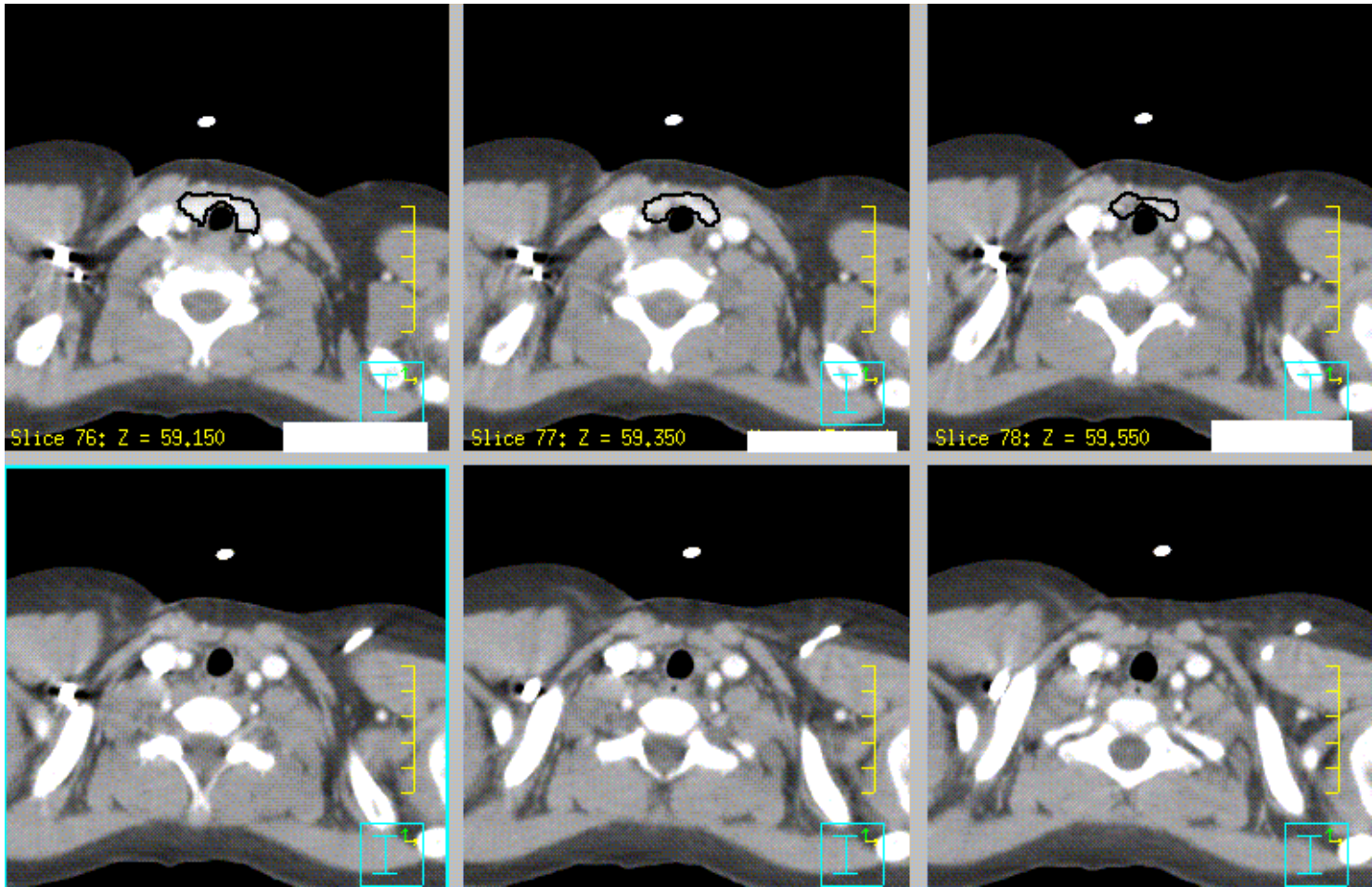
# WL-IMRT Contours

Thyroid ---- Black



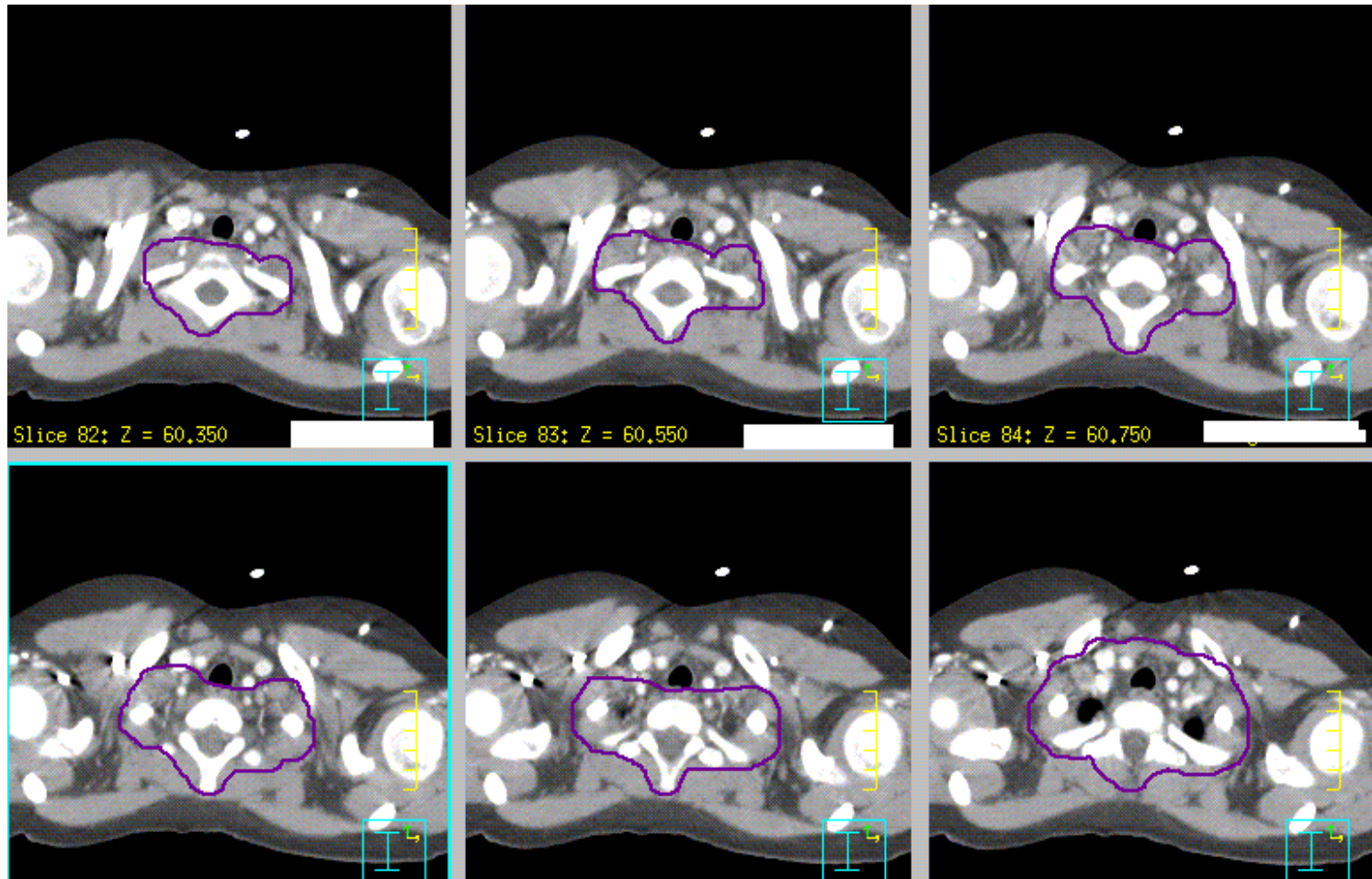
# WL-IMRT Contours

Thyroid ---- Black



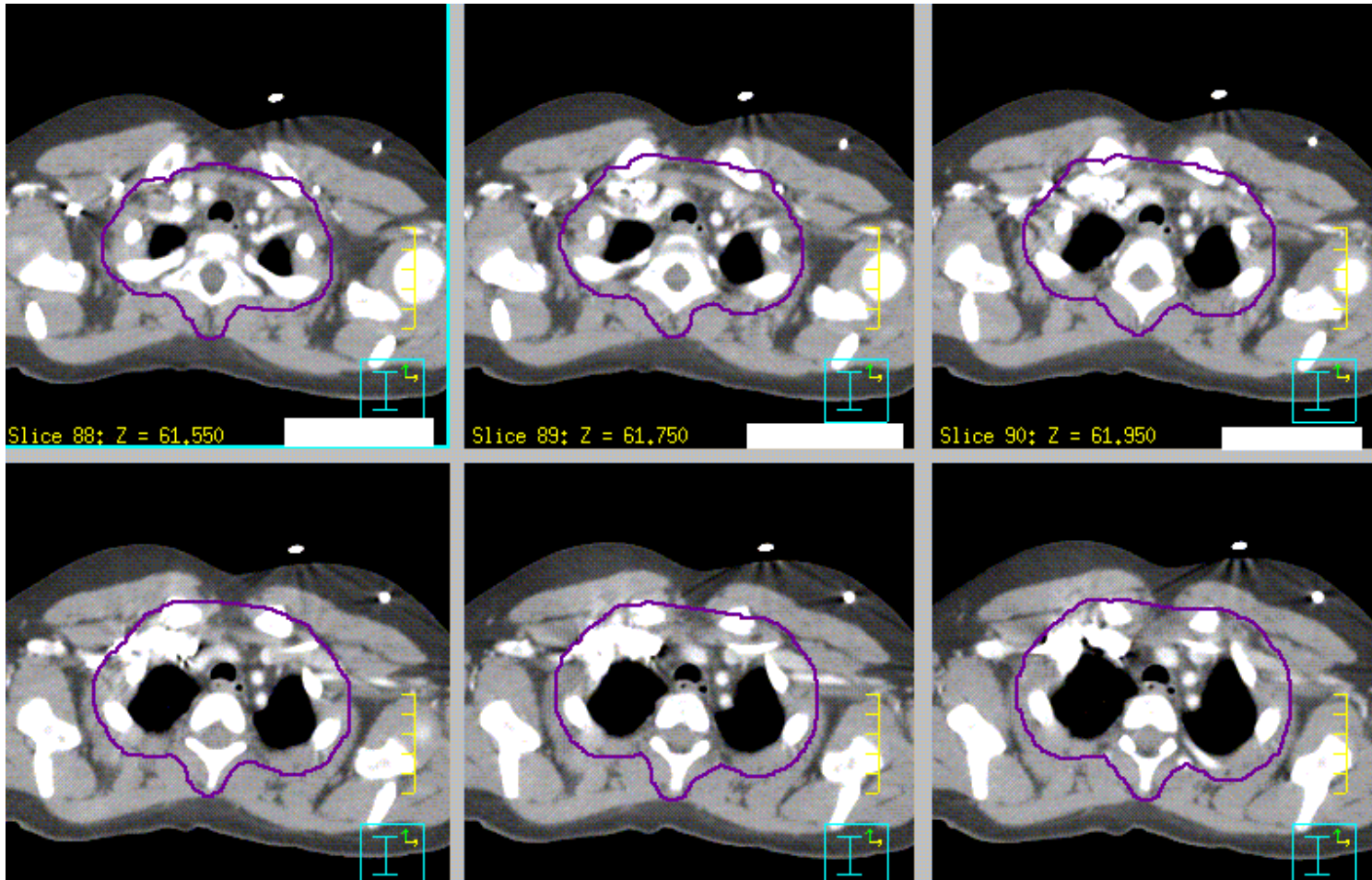
# WL-IMRT Contours

PTV---- Purple



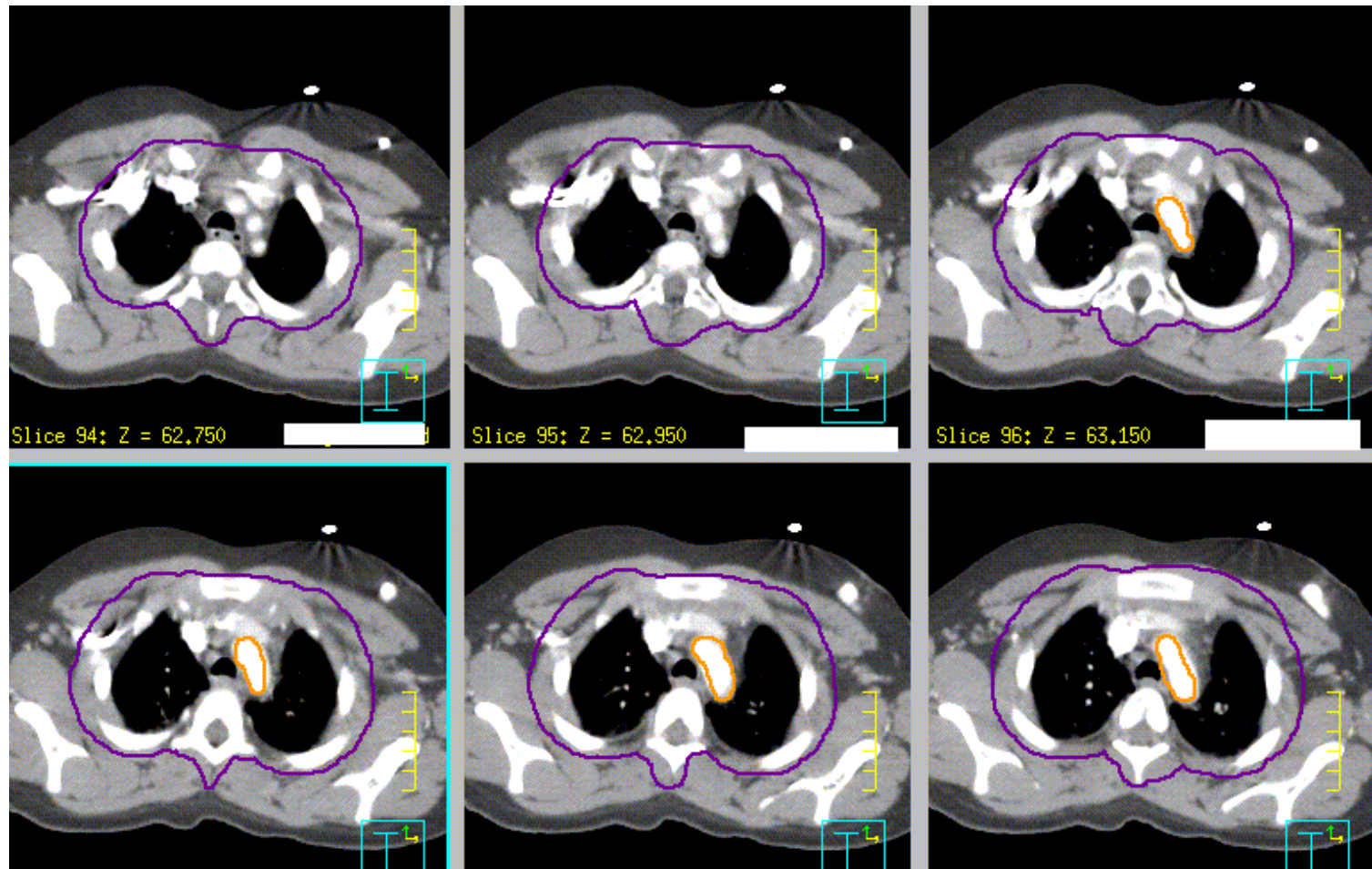
# WL-IMRT Contours

PTV---- Purple



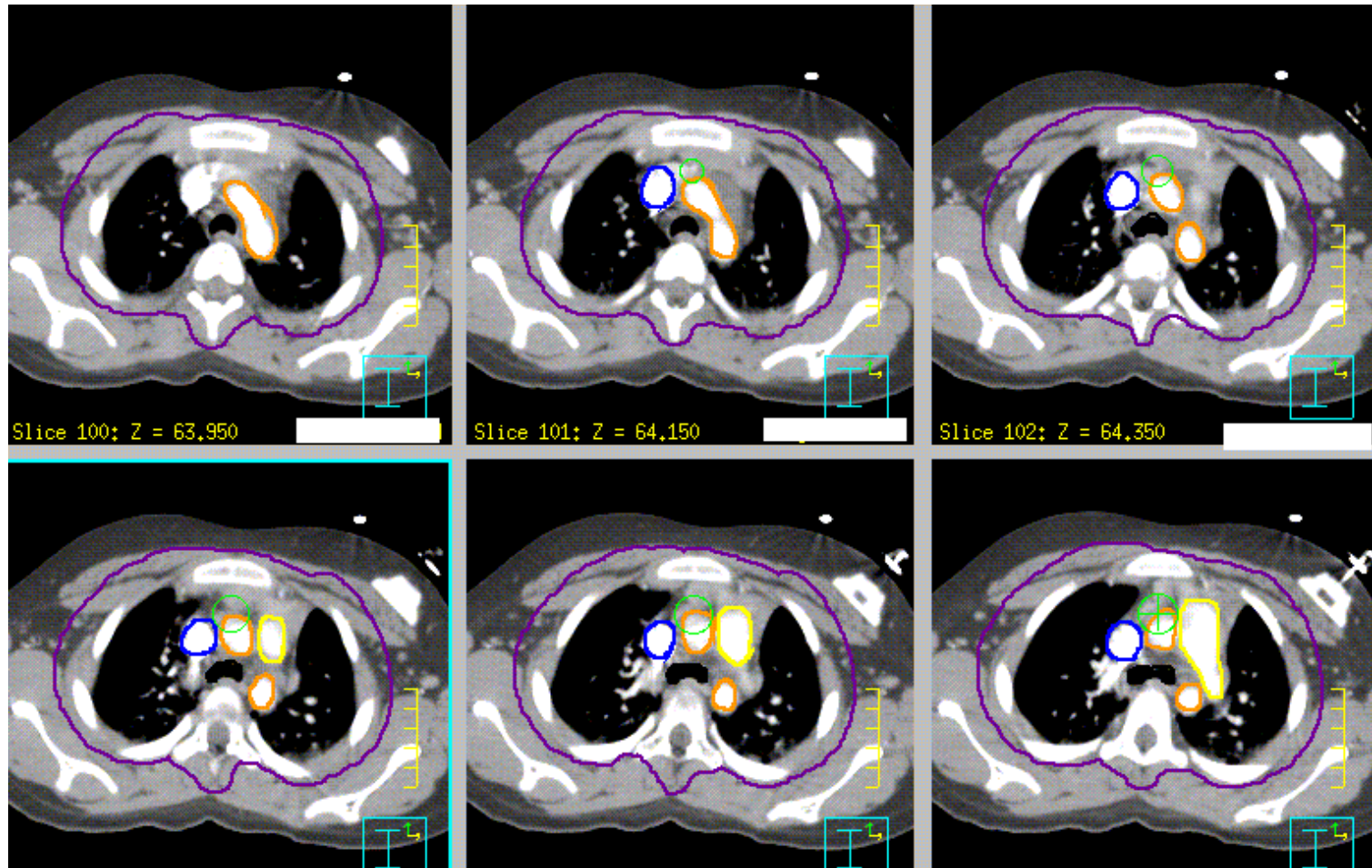
# WL-IMRT Contours

PTV---- Purple  
Aorta----Orange



# WL-IMRT Contours

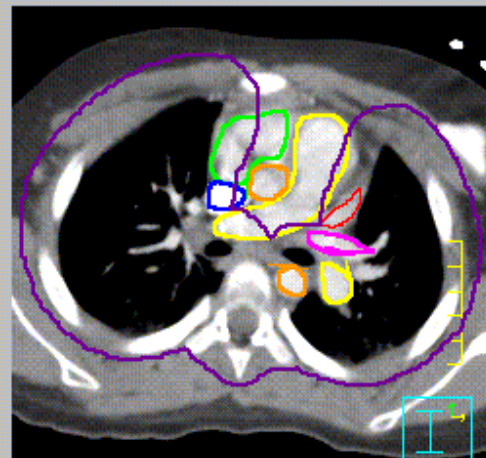
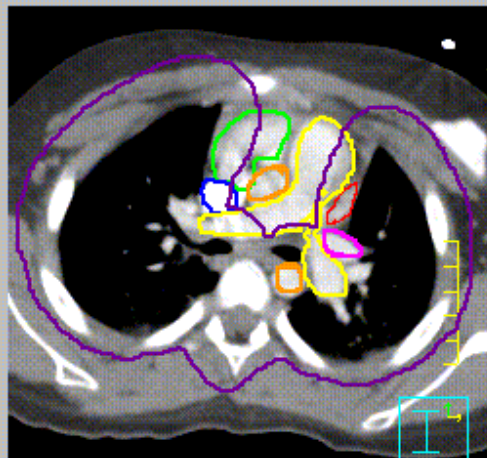
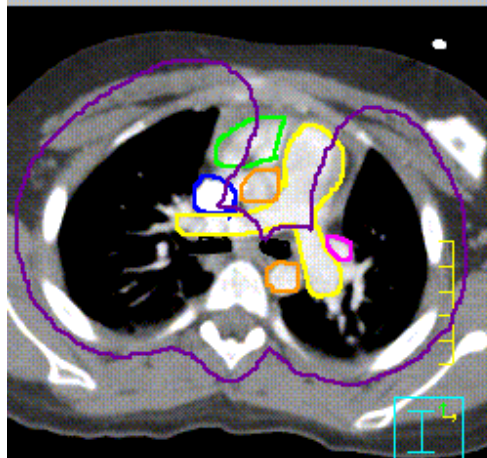
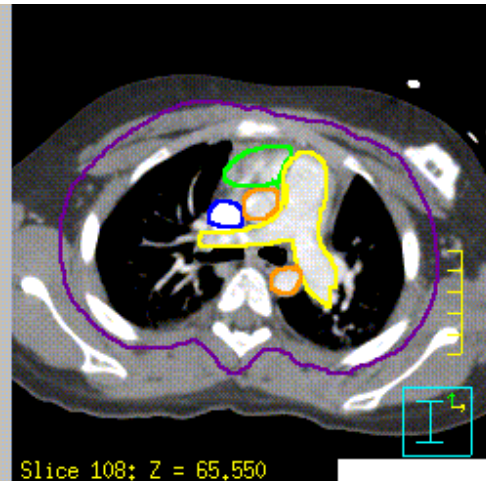
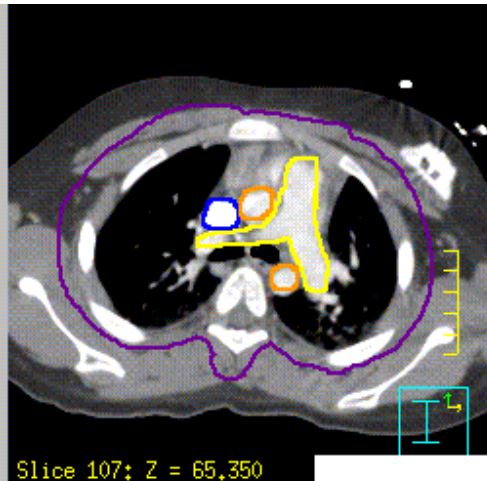
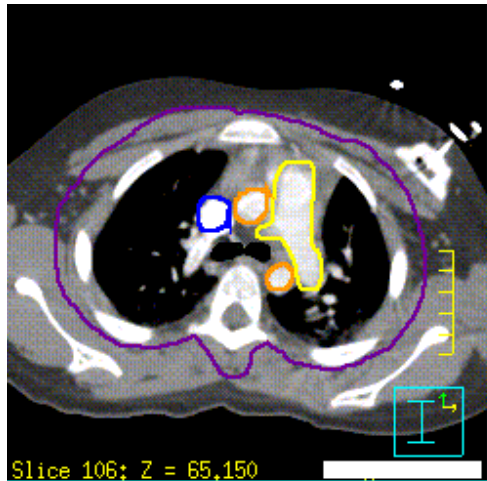
PTV--- Purple  
Aorta--- Orange  
Superior Vena Cava--- Blue  
Pulmonary Artery--- Yellow





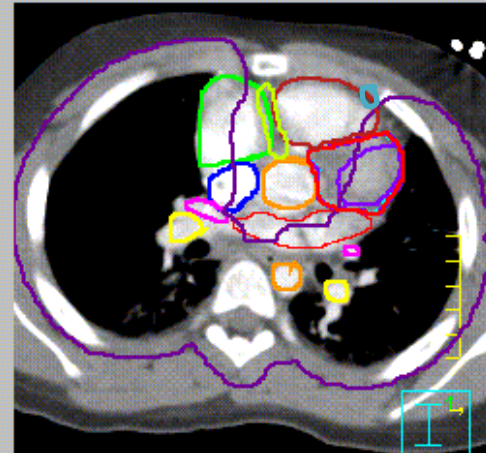
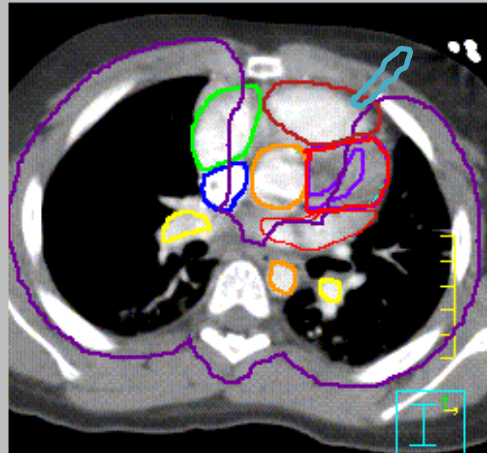
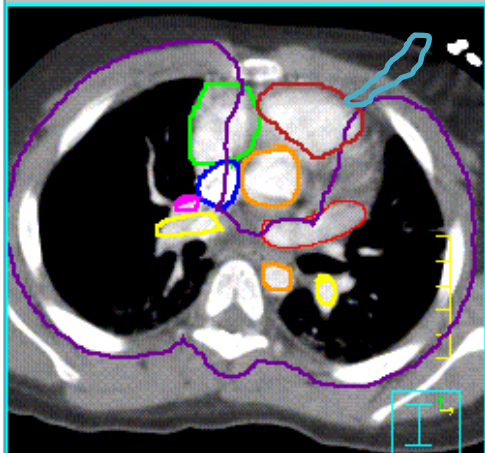
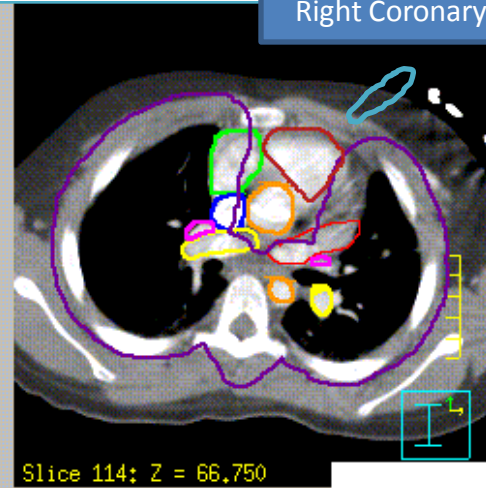
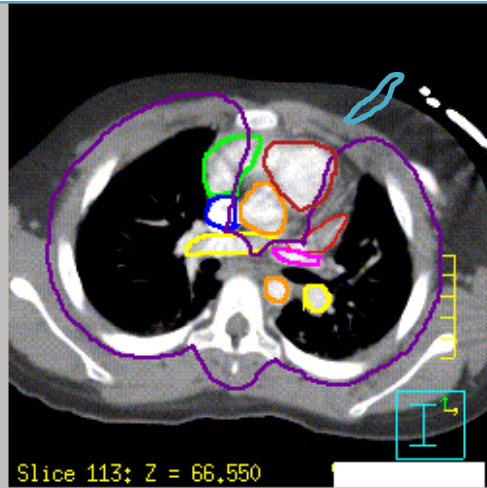
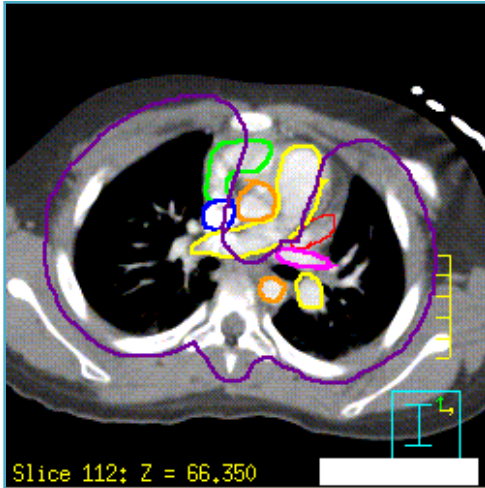
# WL-IMRT Contours

- PTV---- Purple
- Aorta----Orange
- Superior Vena Cava-----Blue
- Pulmonary Artery-----Yellow
- Pulmonary Vein----- Magenta
- Right Atrium----- Green
- Left Atrium ---- Thick Red



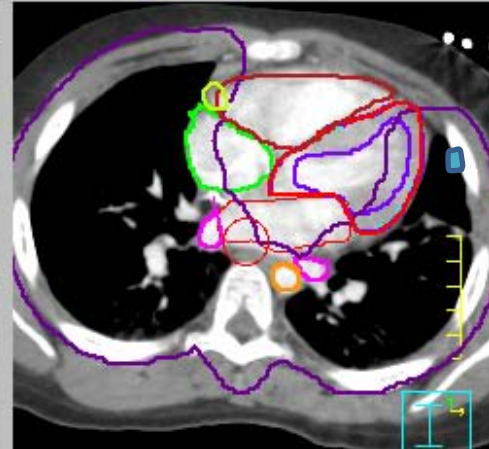
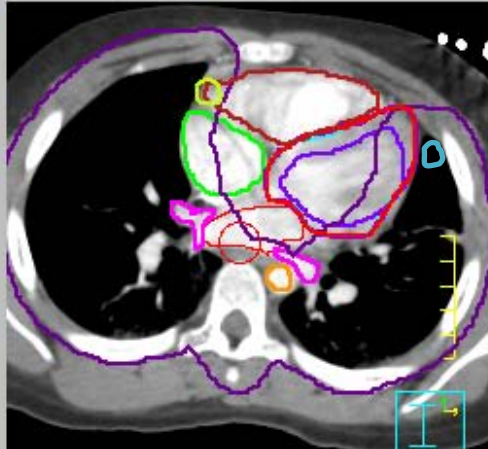
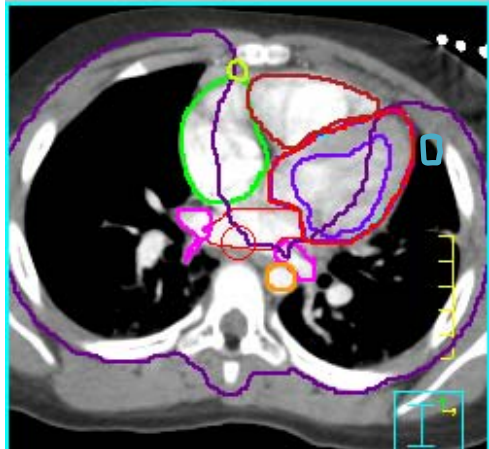
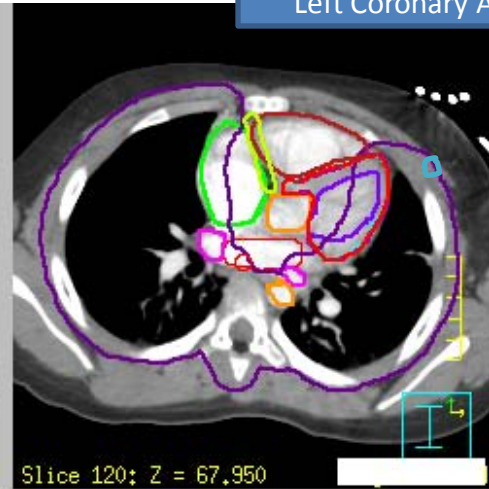
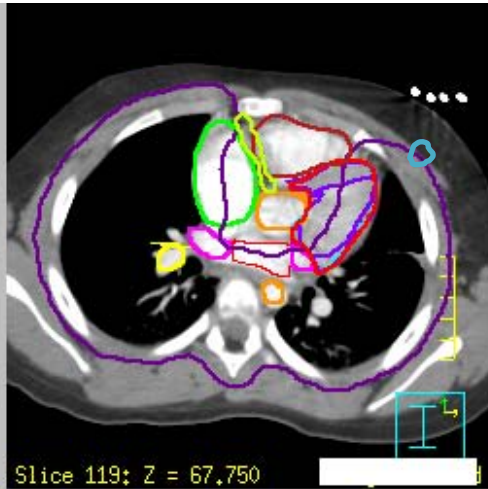
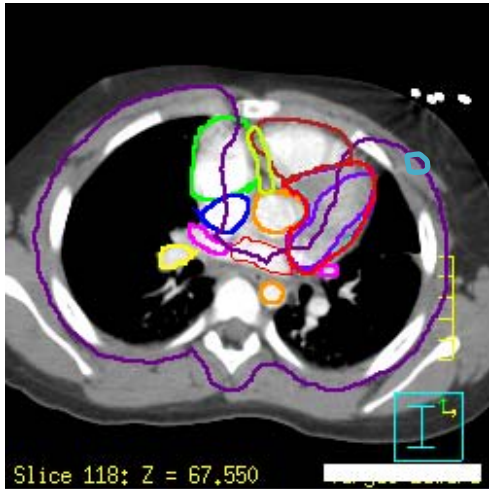
# WL-IMRT Contours

- Aorta----Orange
- Superior Vena Cava----Blue
- Pulmonary Artery----Yellow
- Pulmonary Vein---- Magenta
- Right Atrium---- Green
- Left Atrium ---- Thin Red
- Right Ventricle ---- Brown
- Left Ventricle ---- Thick red
- LV Myocardium border ---- Stale blue
- Left Coronary Artery---- Aqua blue
- Right Coronary Artery ---- Yellow green



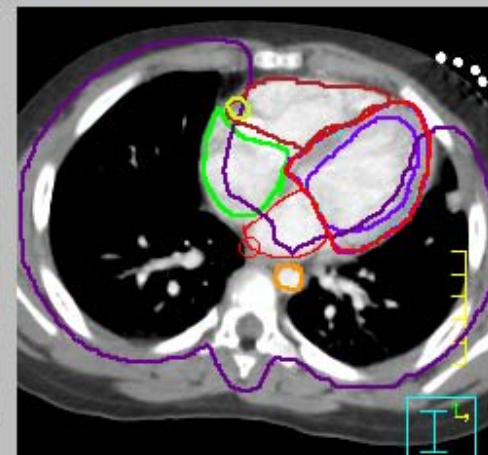
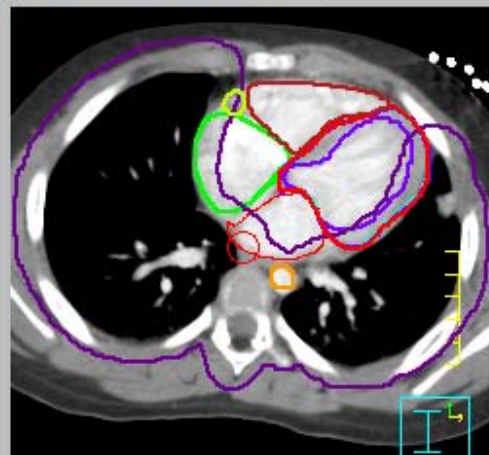
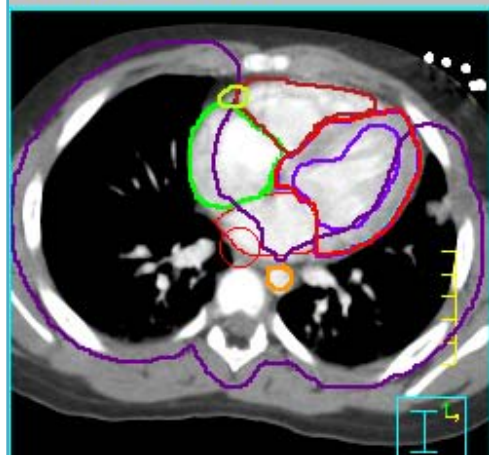
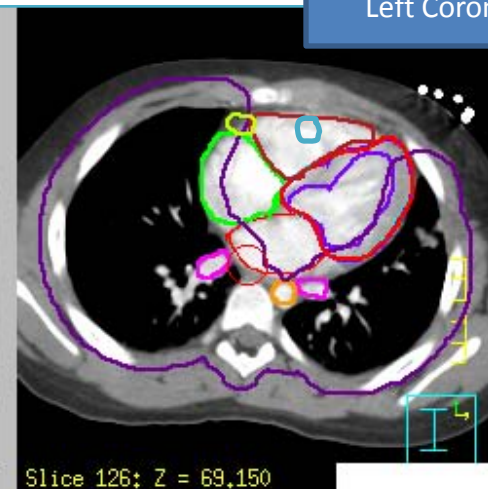
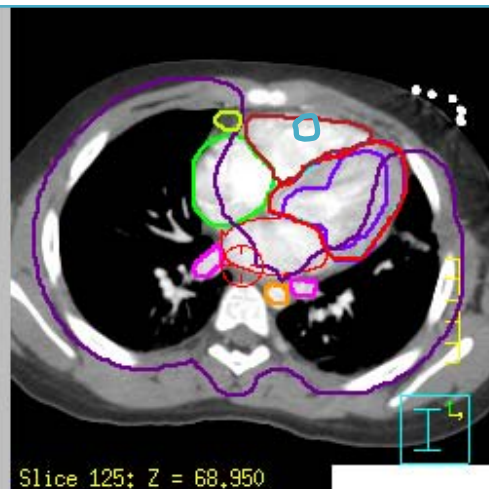
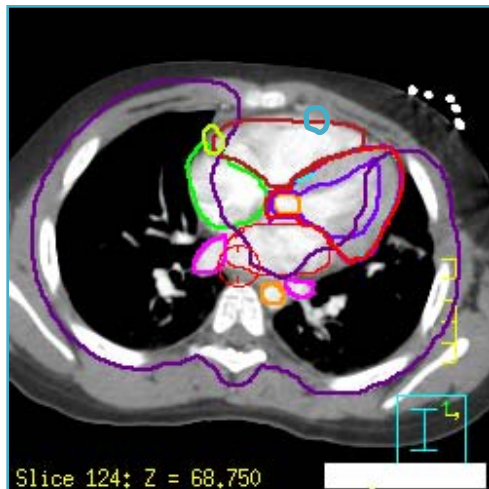
# WL-IMRT Contours

- Aorta----Orange
- Superior Vena Cava-----Blue
- Pulmonary Artery-----Yellow
- Pulmonary Vein----- Purple
- Right Atrium----- Green
- Left Atrium ---- Thin Red
- Right Ventricle ----- Brown
- Left Ventricle ---- Thick red
- LV Myocardium border ---- Stale blue
- Right Coronary Artery ---- Yellow green
- Left Coronary Artery ---- Aqua blue



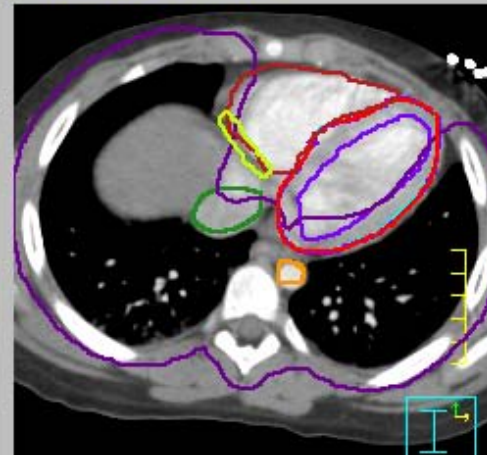
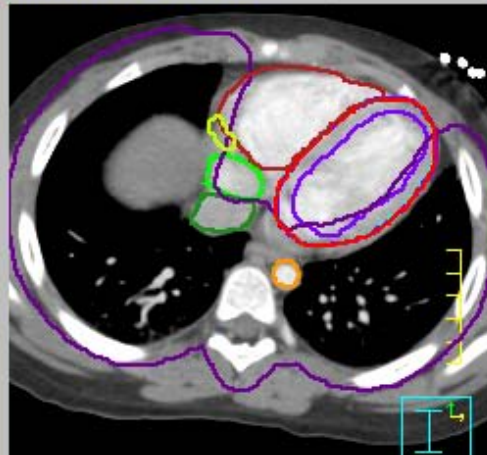
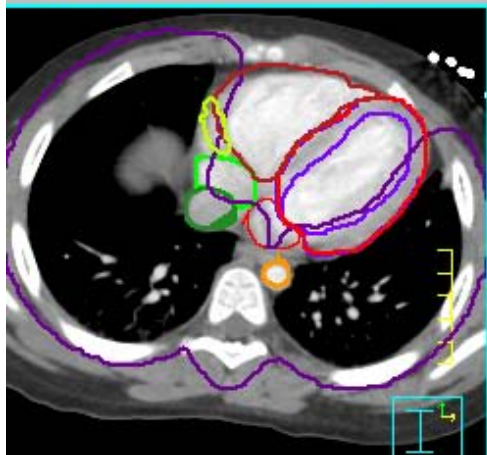
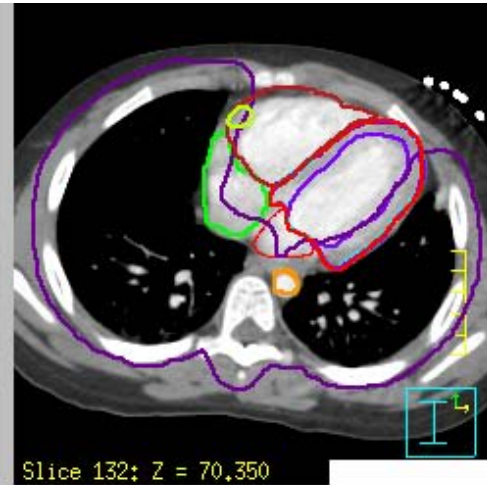
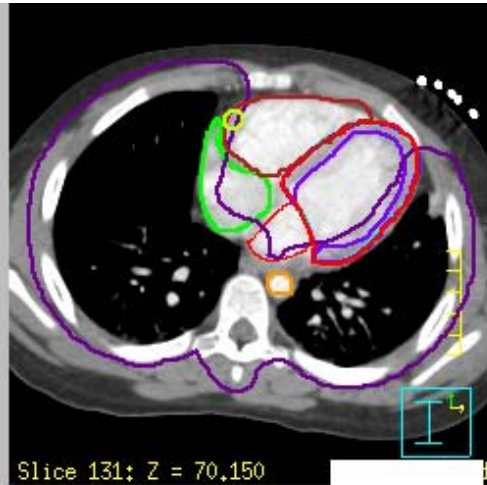
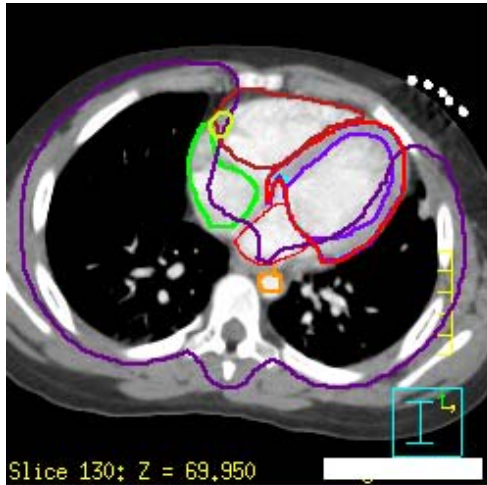
# WL-IMRT Contours

- Aorta----Orange
- Superior Vena Cava-----Blue
- Pulmonary Artery-----Yellow
- Pulmonary Vein----- Purple
- Right Atrium----- Green
- Left Atrium ---- Thin Red
- Right Ventricle ----- Brown
- Left Ventricle ---- Thick red
- LV Myocardium border ---- Stale blue
- Right Coronary Artery ----- Yellow green
- Left Coronary artery --- Aqua blue



# WL-IMRT Contours

- PTV---- Purple
- Aorta----Orange
- Right Atrium----- Green
- Left Atrium ---- Thin Red
- Right Ventricle ----- Brown
- Left Ventricle ---- Thick red
- LV Myocardium border ---- Stale blue
- Inferior Vena Cava ----- Light green
- Right Coronary Artery ----- Yellow green

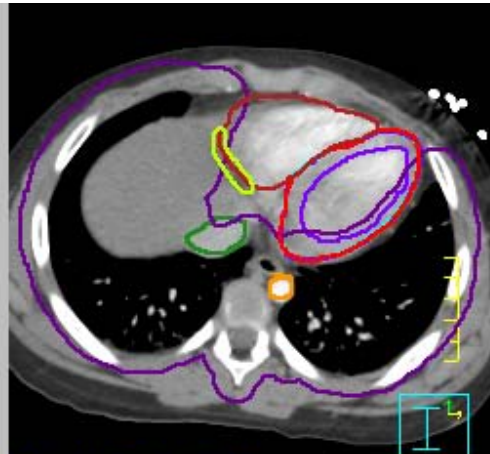


# WL-IMRT Contours

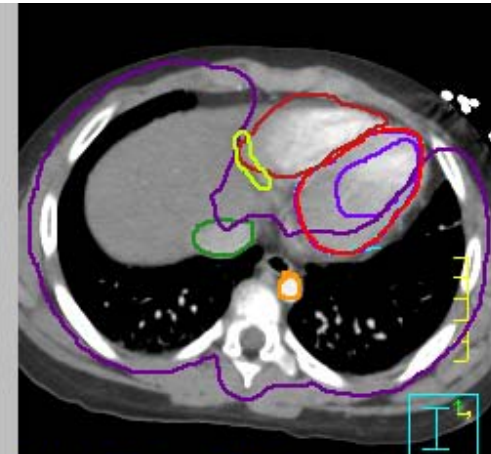
- PTV---- Purple
- Aorta----Orange
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- Left Ventricle ---- Thick red
- LV Myocardium border ---- Stale blue
- Right Coronary Artery ---- Yellow green
- Inferior Vena Cava ---- Light green



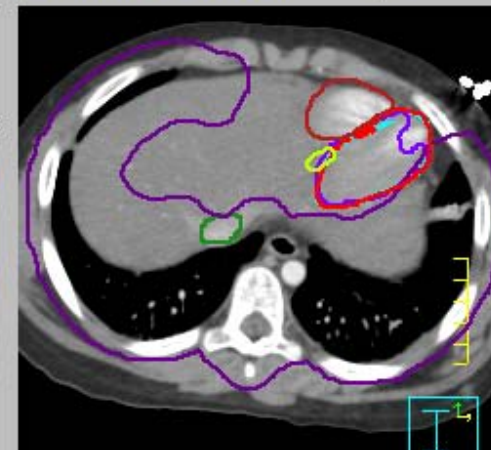
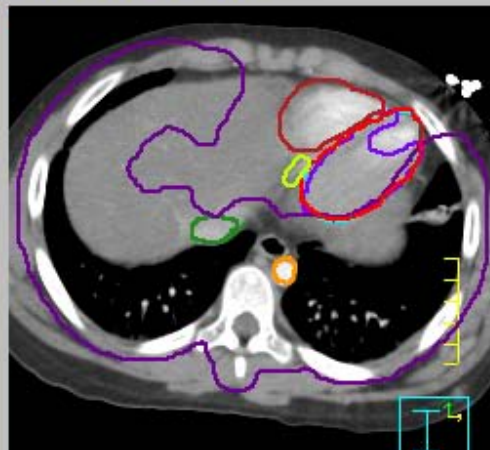
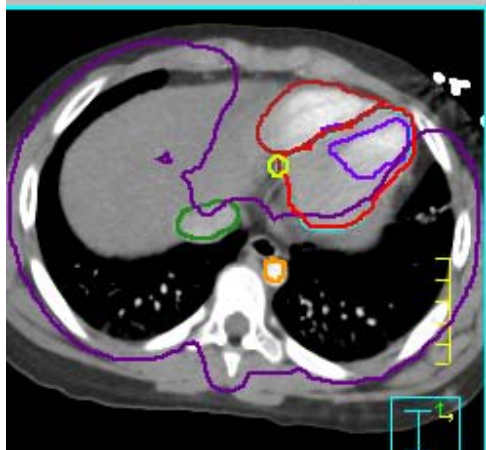
Slice 136: Z = 71,150



Slice 137: Z = 71,350

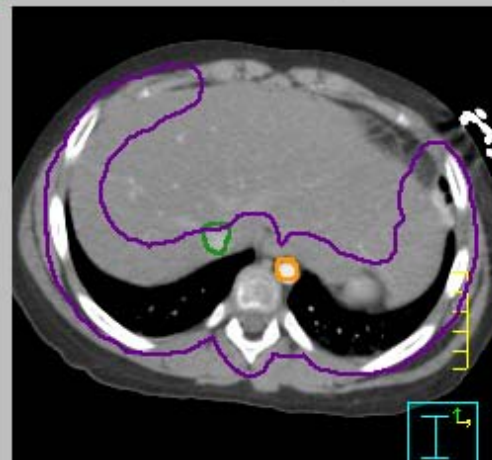
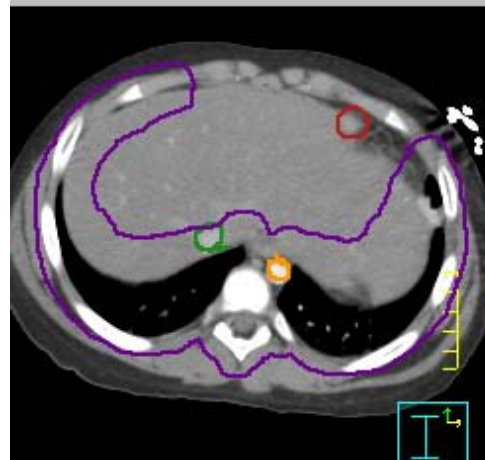
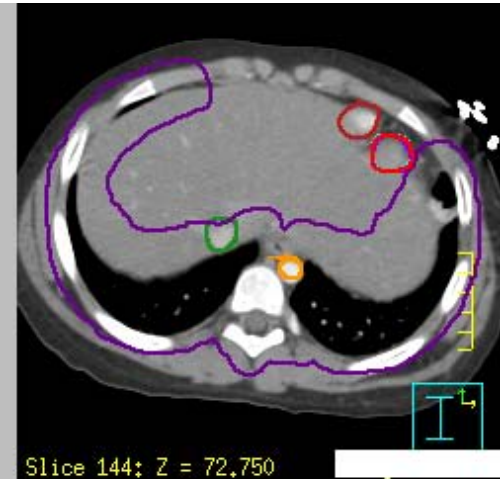
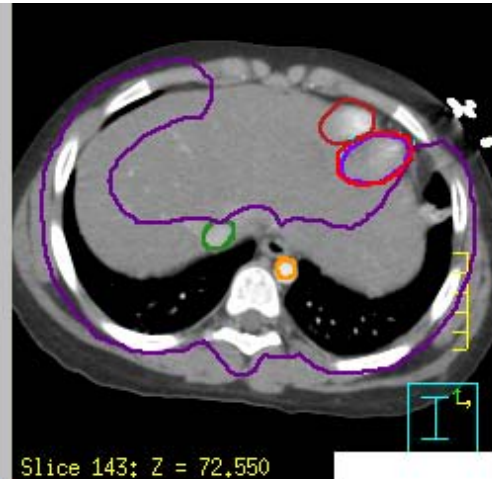
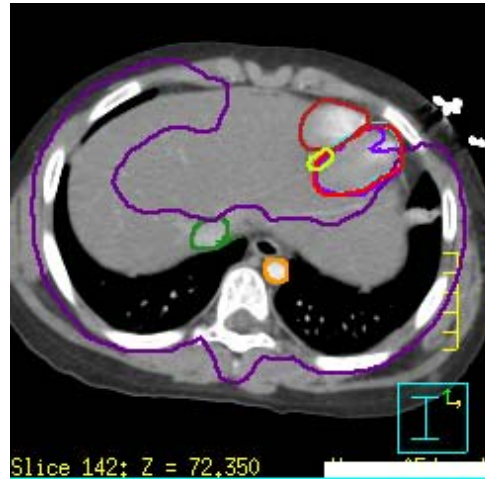


Slice 138: Z = 71,550



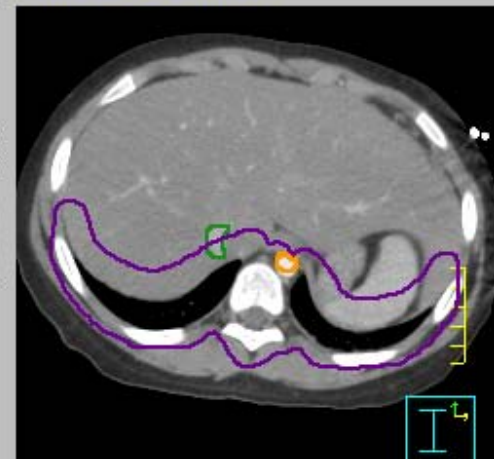
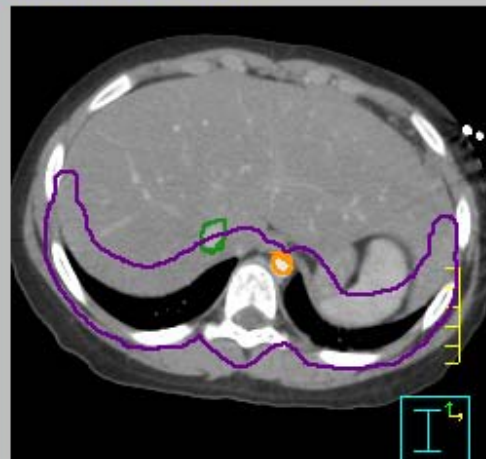
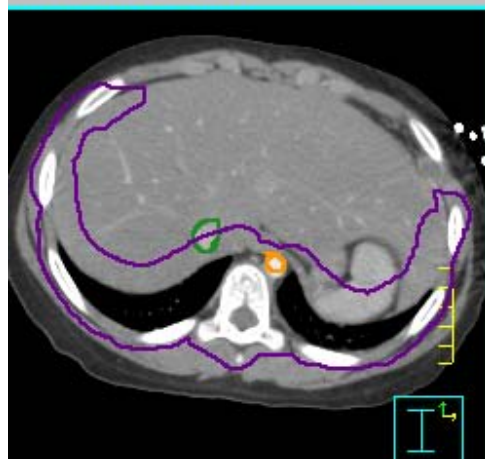
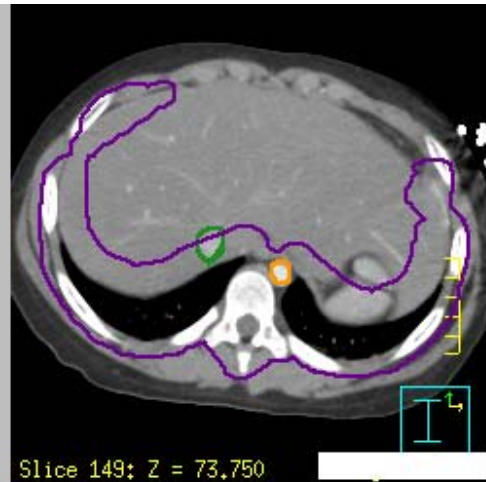
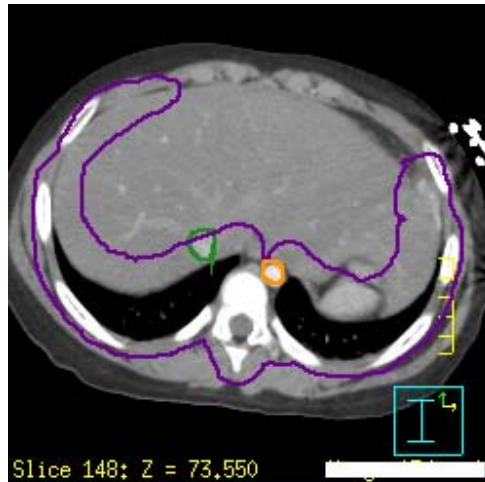
# WL-IMRT Contours

PTV---- Purple  
Aorta----Orange  
Right Ventricle ----- Brown  
Left Ventricle ---- Thick red  
Right Coronary Artery ----- Yellow green  
Inferior Vena Cava ----- Light green



# WL-IMRT Contours

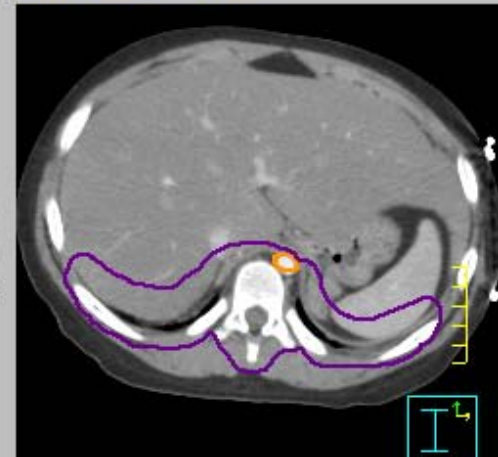
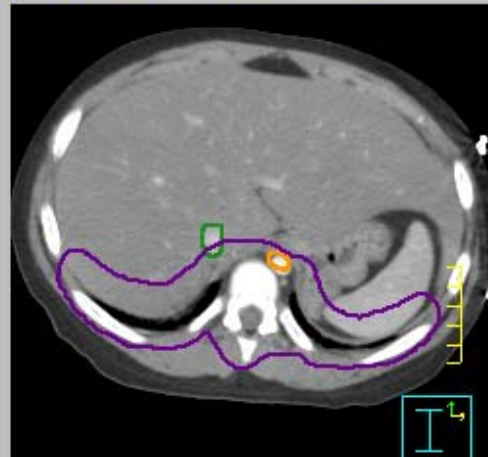
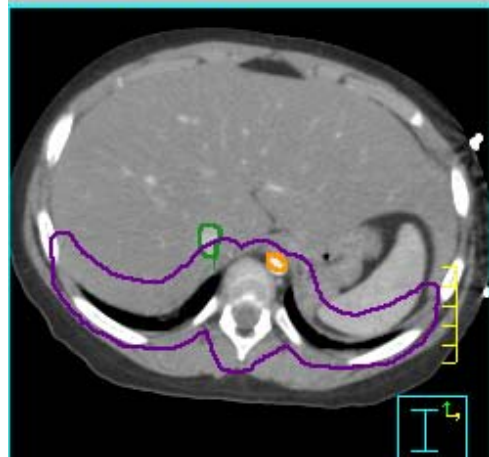
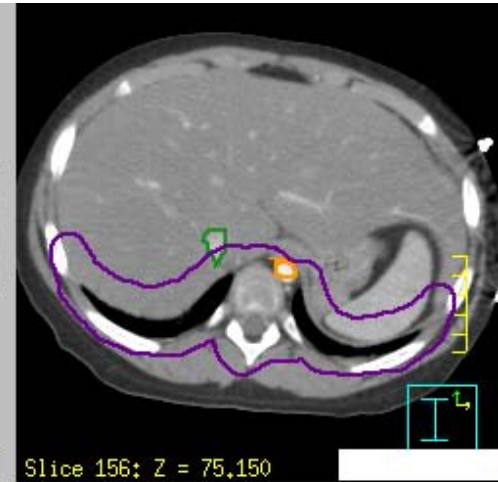
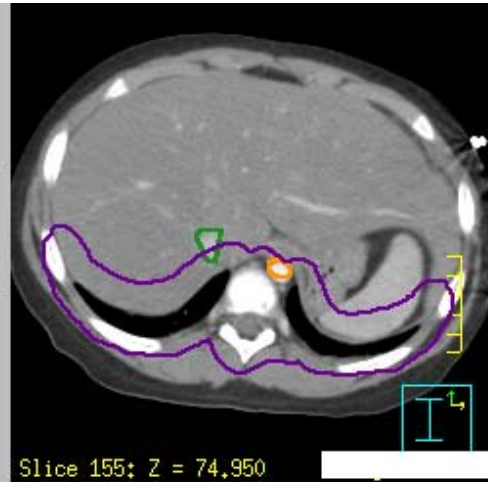
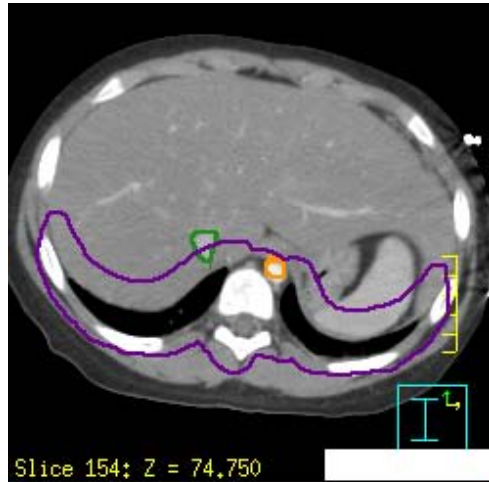
PTV---- Purple  
Aorta----Orange  
Inferior Vena Cava ----- Light green





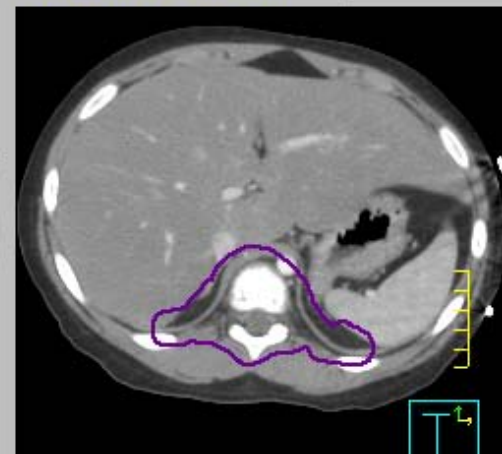
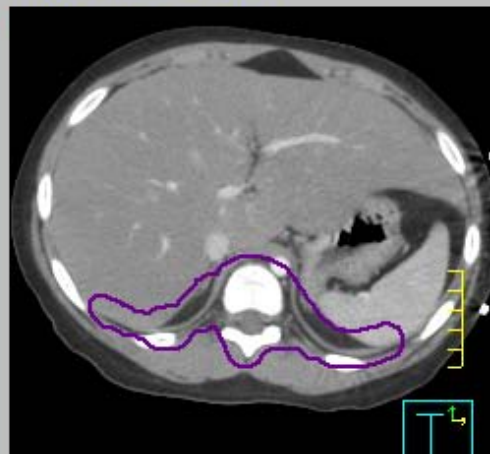
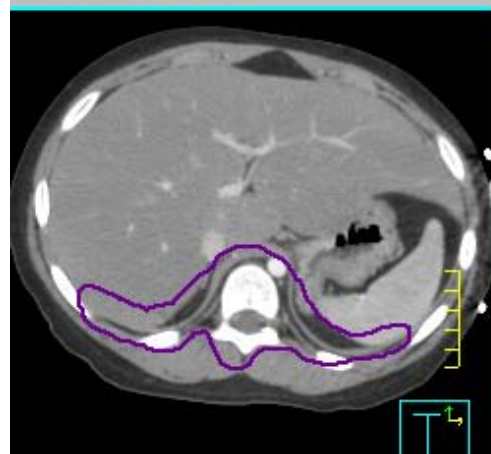
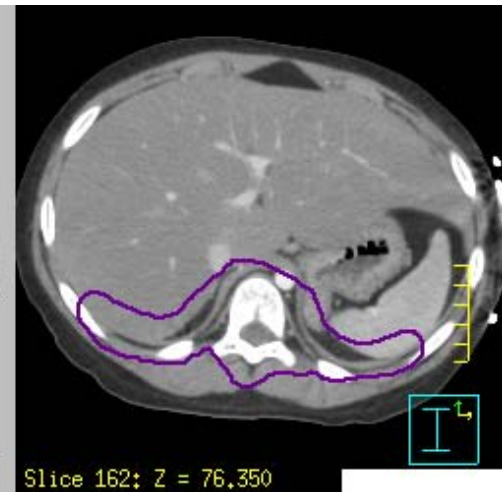
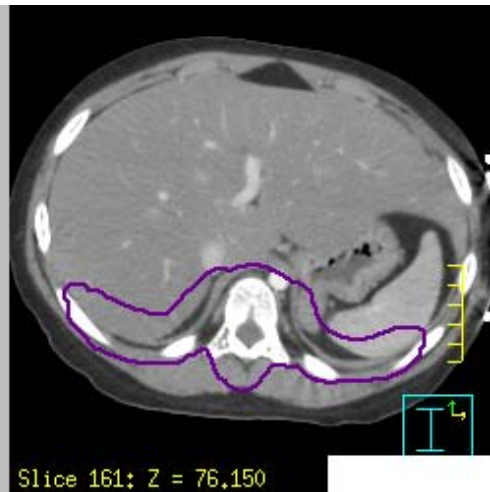
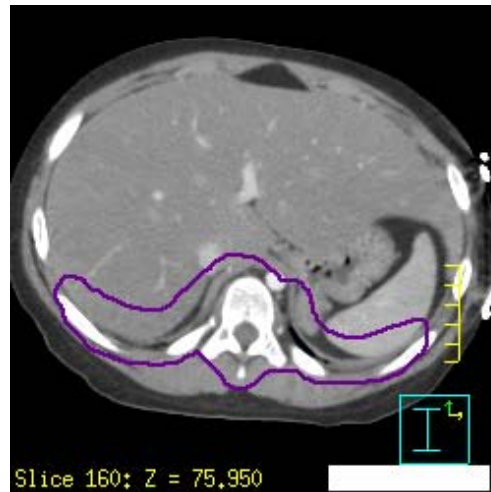
# WL-IMRT Contours

PTV---- Purple  
Aorta----Orange  
Inferior Vena Cava ----- Light green



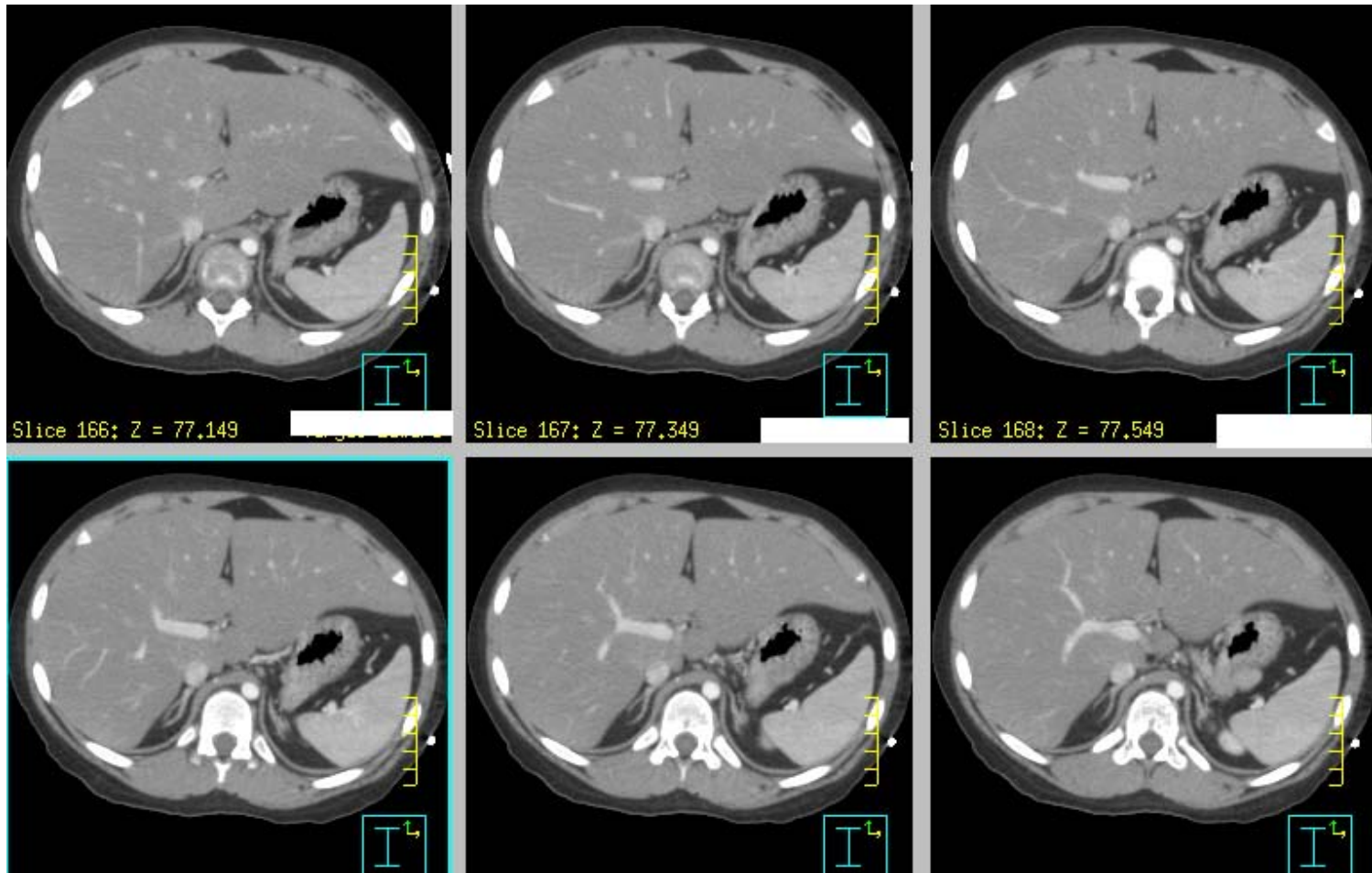
# WL-IMRT Contours

PTV---- Purple

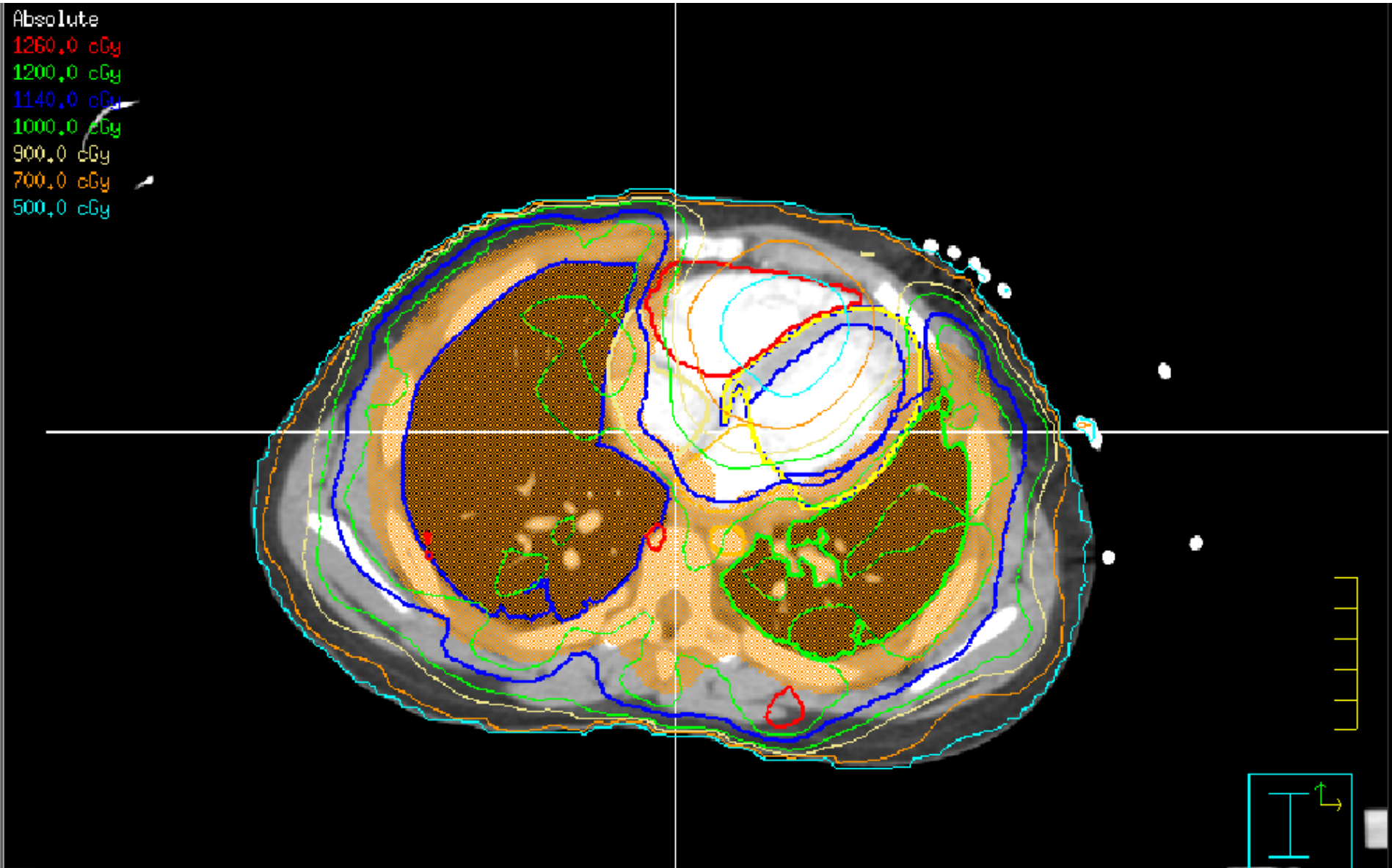


# WL-IMRT Contours

PTV---- Purple



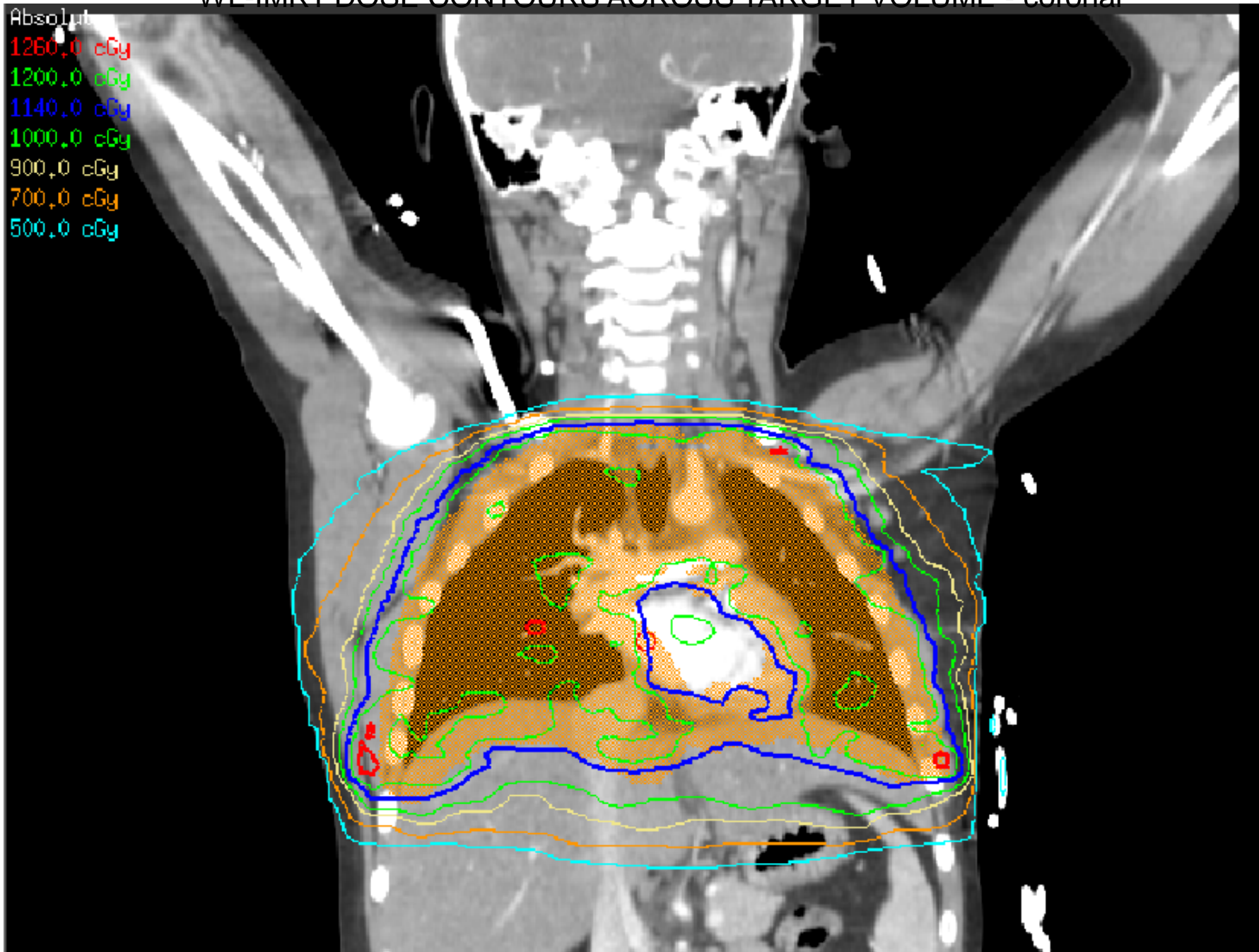
# WL-IMRT DOSE CONTOURS ACROSS TARGET VOLUME - axial



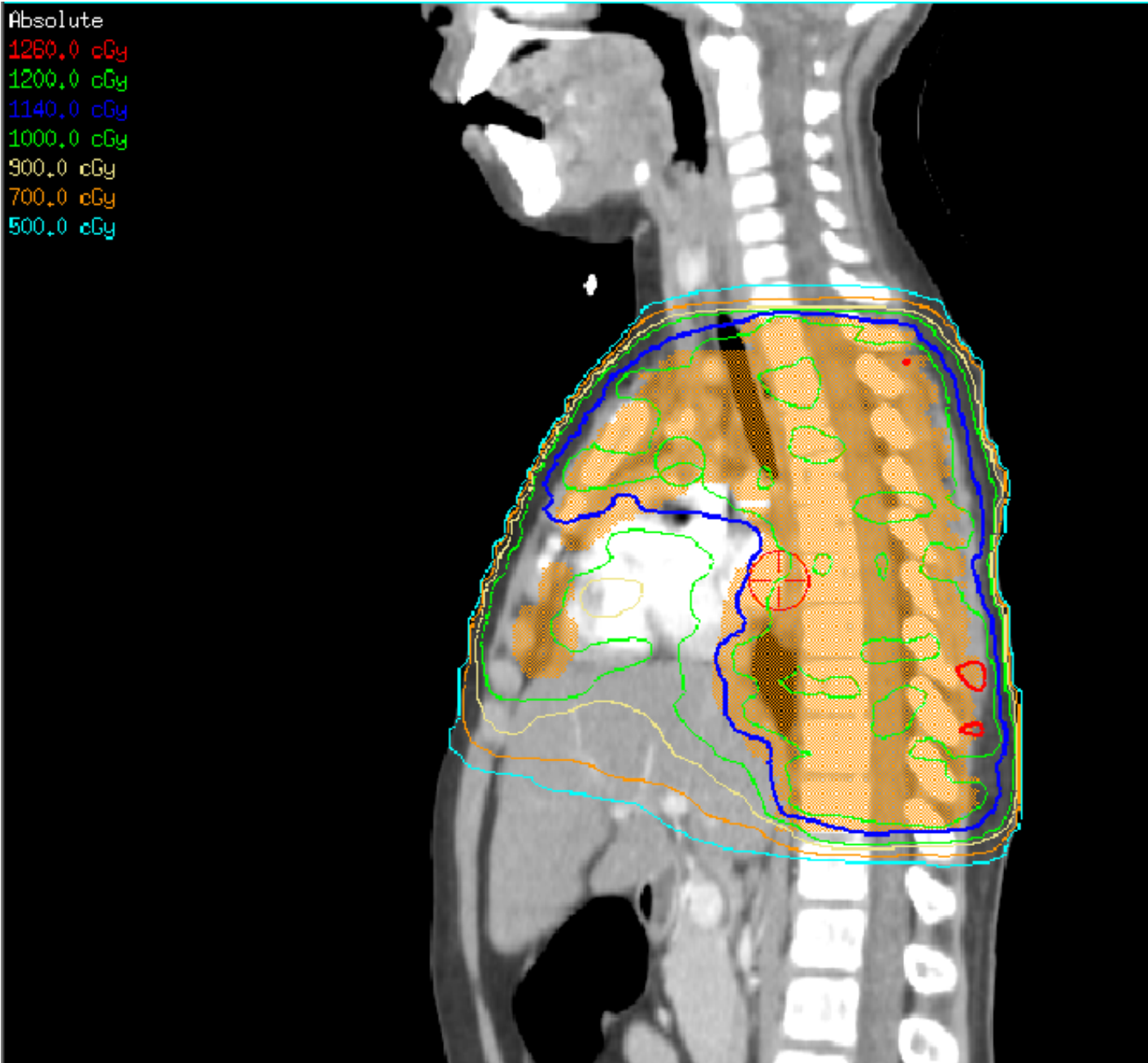
# WL-IMRT DOSE CONTOURS ACROSS TARGET VOLUME - coronal

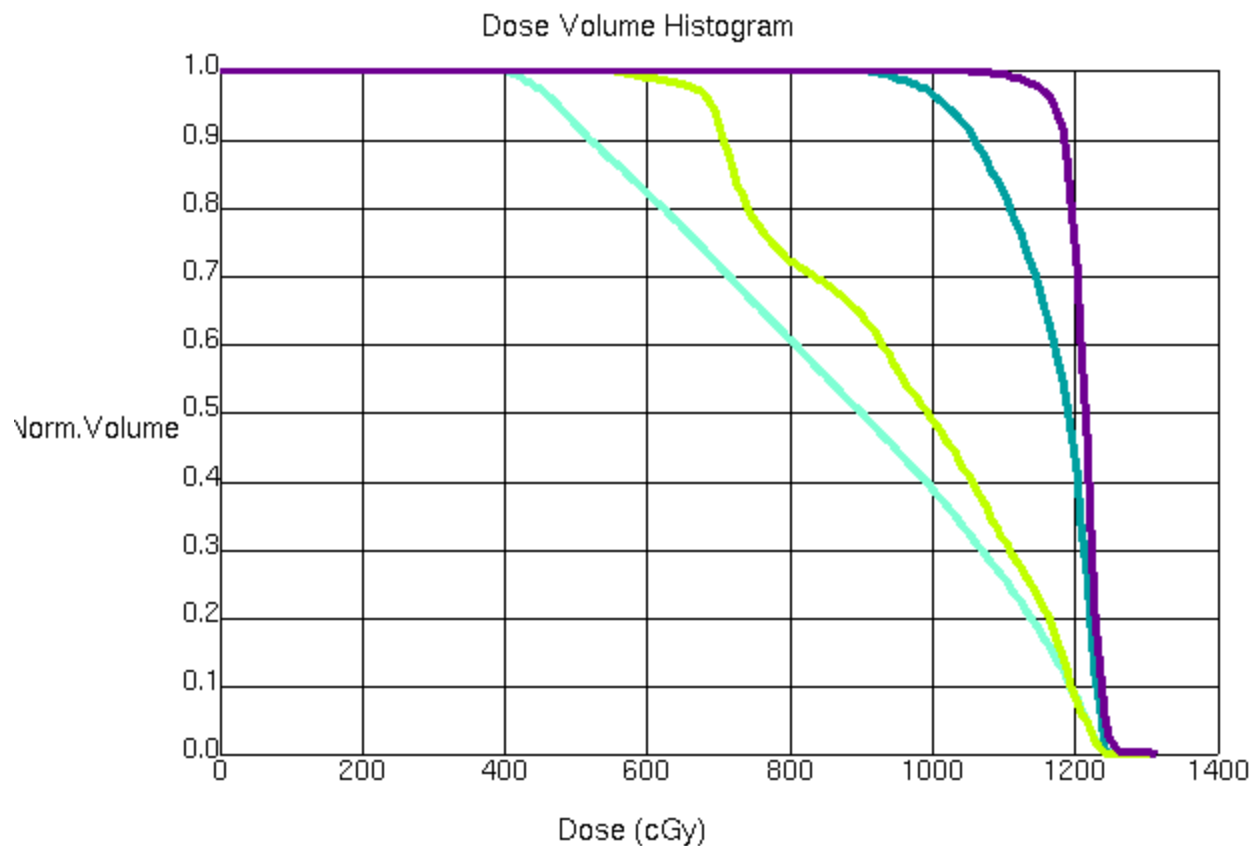
Absolute

- 1260.0 cGy
- 1200.0 cGy
- 1140.0 cGy
- 1000.0 cGy
- 900.0 cGy
- 700.0 cGy
- 500.0 cGy



# WL-IMRT DOSE CONTOURS ACROSS TARGET VOLUME - sagittal





#### DVH Calculation

- Cumulative
- Differential

#### Dose Axis Display

- Normalized Dose
- Absolute Dose
- Auto-Compute Max
- Specify Max Dose

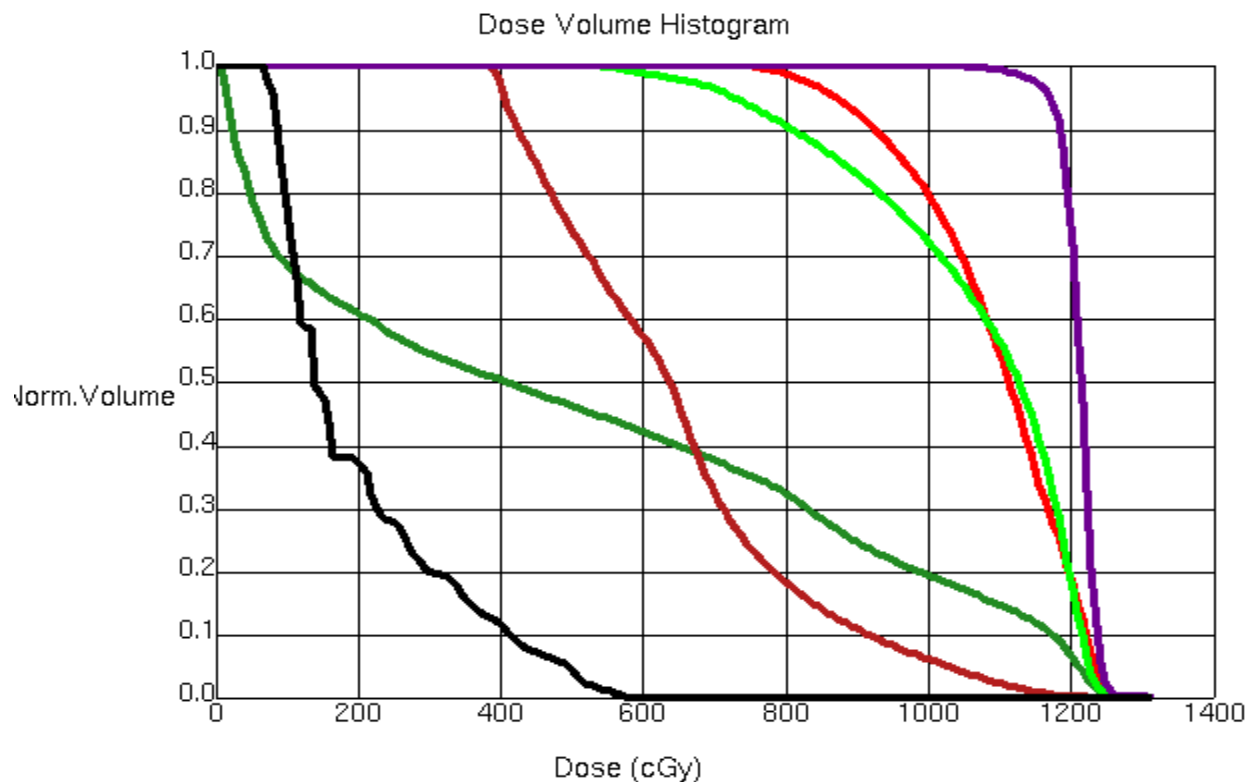
#### Volume Axis Display

- Normalized Volume
- Absolute Volume

Tabular DVH...

### ROI Statistics

Line Type	ROI	Trial	Min.	Max.	Mean	Std. Dev.	% Outside Grid	% > Max	Generalized EUD
<input checked="" type="checkbox"/>	LV	Imrt	394.3	1265.1	877.4	245.9	0.00 %	0.00 %	877.158
<input type="checkbox"/>	Left Coronary Artery	Imrt	885.7	1245.5	1163.6	70.4	0.00 %	0.00 %	1164.49
<input type="checkbox"/>	Right Coronary Artery	Imrt	548.6	1245.3	964.8	186.2	0.00 %	0.00 %	965.109
<input type="checkbox"/>	Whole Lung IMRT ptv	Imrt	813.9	1311.4	1210.0	26.3	0.00 %	0.00 %	1210.14



**DVH Calculation**

- Cumulative
- Differential

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**Dose Axis Display**

- Normalized Dose
- Absolute Dose

---

- Auto-Compute Max
- Specify Max Dose

---

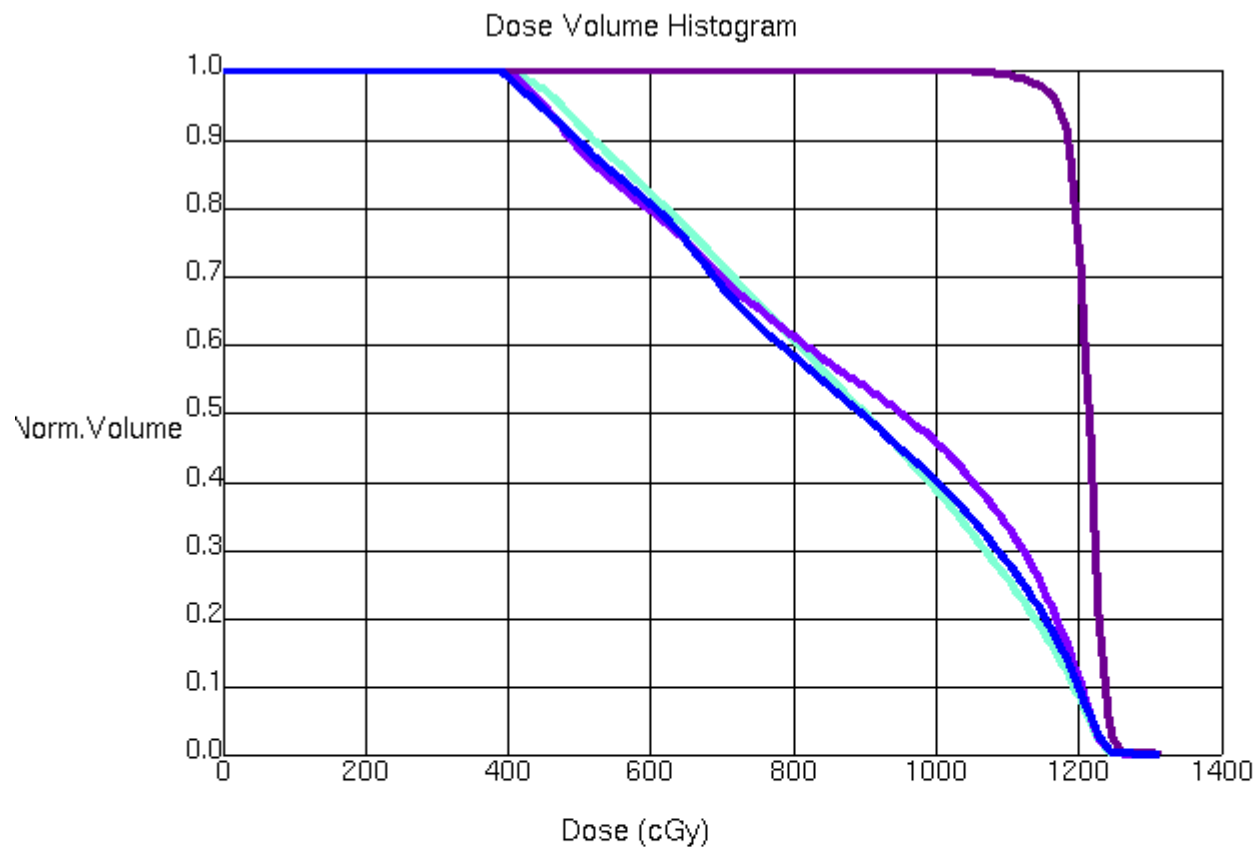
**Volume Axis Display**

- Normalized Volume
- Absolute Volume

### ROI Statistics

Line Type	ROI	Trial	Min.	Max.	Mean	Std. Dev.	% Outside Grid	% > Max	Generalized EUD
<input type="checkbox"/>	LA	Imrt	702.0	1253.9	1090.8	112.5	0.00 %	0.00 %	1091
<input type="checkbox"/>	Liver	Imrt	7.3	1291.8	502.3	435.9	0.00 %	0.00 %	502.292
<input type="checkbox"/>	RA	Imrt	503.9	1276.2	1063.9	162.0	0.00 %	0.00 %	1064.04
<input type="checkbox"/>	RV	Imrt	385.3	1223.0	646.3	184.0	0.00 %	0.00 %	645.425
<input type="checkbox"/>	Whole Lung IMRT ptv	Imrt	813.9	1311.4	1210.0	26.3	0.00 %	0.00 %	1210.14
<input checked="" type="checkbox"/>	thyroid	Imrt	68.0	580.9	198.5	128.5	0.00 %	0.00 %	198.287





#### DVH Calculation

- Cumulative
- Differential

#### Dose Axis Display

- Normalized Dose
- Absolute Dose
- Auto-Compute Max
- Specify Max Dose

#### Volume Axis Display

- Normalized Volume
- Absolute Volume

Tabular DVH...

### ROI Statistics

Line Type	ROI	Trial	Min.	Max.	Mean	Std. Dev.	% Outside Grid	% > Max	Generalized EUD
<input type="checkbox"/>	LV	Imrt	394.3	1265.1	877.4	245.9	0.00 %	0.00 %	877.158
<input type="checkbox"/>	Myocardium	Imrt	393.8	1265.1	890.7	268.6	0.00 %	0.00 %	890.482
<input checked="" type="checkbox"/>	Whole Lung IMRT ptv	Imrt	813.9	1311.4	1210.0	26.3	0.00 %	0.00 %	1210.14
<input type="checkbox"/>	heart	Imrt	385.3	1276.2	871.2	260.6	0.00 %	0.00 %	870.942

# Plan Text

Patient Name:	Lung volume study, Do not delete, ...	Date/Time:	Fri Sep 17 09:31:55 2010
Patient ID:	Do not delete	Comment:	
Plan Name:	Cp Patient_12	Institution:	8.0m-physics only
Trial Name:	Imrt	Physician/Physicist:	/
Revision:	R02.P01.D01	Planner:	
Lock Status:	Not Locked		

## Plan Summary Sheet

### Beam Setup

Beam	Machine	Energy	Modality	Prescription	Isocenter	SSD (cm)		MU Per Fraction
						Start / Avg		
200	SL A	6 MV	Photons	Imrt whole lun...	Ct iso	91.89 / 91.89		52.6
240	SL A	6 MV	Photons	Imrt whole lun...	Ct iso	87.85 / 87.85		71.6
280	SL A	6 MV	Photons	Imrt whole lun...	Ct iso	86.34 / 86.34		61.9
320	SL A	6 MV	Photons	Imrt whole lun...	Ct iso	88.65 / 88.65		67.6
0	SL A	6 MV	Photons	Imrt whole lun...	Ct iso	90.16 / 90.16		69.5
40	SL A	6 MV	Photons	Imrt whole lun...	Ct iso	88.62 / 88.62		69.5
80	SL A	6 MV	Photons	Imrt whole lun...	Ct iso	86.89 / 86.89		106.4
120	SL A	6 MV	Photons	Imrt whole lun...	Ct iso	86.15 / 86.15		39.2
160	SL A	6 MV	Photons	Imrt whole lun...	Ct iso	91.17 / 91.17		55.2

Beam	Collimators (cm) (Control Pt 1)				Gantry							
	Y1	Y2	X2	X1	Start / Stop	Couch	Coll	Block	Wedge	Bolus	Comp	
200	12.52	12.07	9.00	10.00	200.0/200.0	0.0	0.0	MLC	None	No	No	
240	12.47	9.55	9.00	9.00	240.0/240.0	0.0	0.0	MLC	None	No	No	
280	10.08	7.49	10.00	9.00	280.0/280.0	0.0	0.0	MLC	None	No	No	
320	12.02	9.96	9.00	10.00	320.0/320.0	0.0	0.0	MLC	None	No	No	
0	13.05	12.03	9.00	10.00	0.0 / 0.0	0.0	0.0	MLC	None	No	No	
40	11.75	9.05	7.00	9.00	40.0 / 40.0	0.0	0.0	MLC	None	No	No	
80	8.60	10.54	8.00	10.00	80.0 / 80.0	0.0	0.0	MLC	None	No	No	
120	8.07	10.50	8.00	8.00	120.0/120.0	0.0	0.0	MLC	None	No	No	
160	10.43	13.03	9.00	10.00	160.0/160.0	0.0	0.0	MLC	None	No	No	

### Prescriptions

#### Imrt whole lung

Prescribe 150 cGy per fraction to 100 % of point dose at "Calc pt" for 8 fractions.  
 Beam weights are proportional to monitor units.  
 Actual point dose at "Calc pt" from all prescriptions/beams is 1200.06 cGy.  
 9 beams are assigned to this prescription.

#### Isocenter

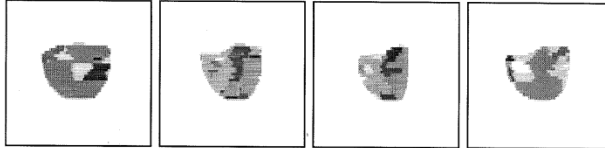
##### Ct iso

Position patient such that lasers line up with patient marks.  
 Move the laser RIGHT 1.34 cm (looking from foot of table.)  
 Move the table UP 0.73 cm.  
 Move the table OUT (away from the gantry) 5.49 cm.

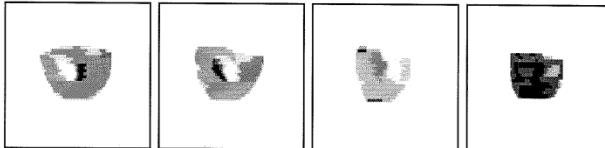
# Plan Text

Patient Name:	Lung volume study, Do not delete, ...	Date/Time:	Fri Sep 17 09:32:00 2010
Patient ID:	Do not delete	Comment:	
Plan Name:	Cp Patient_12	Institution:	8.0m-physics only
Trial Name:	Imrt	Physician/Physicist:	/
Revision:	R02.P01.D01	Planner:	
Lock Status:	Not Locked		

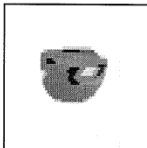
~~Deliverable OBM~~



Beam Name (#CPs)	200 (5)	240 (7)	280 (7)	320 (6)
Machine Name	SL A	SL A	SL A	SL A
Energy / Modality	6 MV Photons	6 MV Photons	6 MV Photons	6 MV Photons
Couch /Gantry /Collimator	0.0/ 200.0/ 0.0	0.0/ 240.0/ 0.0	0.0/ 280.0/ 0.0	0.0/ 320.0/ 0.0
Jaw Positions	Y1 (12.5)/ Y2 (12.1) X2 (10.0)/ X1 (10.0) Y Jaw (24.6) X Jaw (20.0)	Y1 (12.5)/ Y2 (9.6) X2 (10.0)/ X1 (10.0) Y Jaw (22.0) X Jaw (20.0)	Y1 (10.1)/ Y2 (7.5) X2 (10.0)/ X1 (10.0) Y Jaw (17.7) X Jaw (20.0)	Y1 (12.0)/ Y2 (10.4) X2 (9.0)/ X1 (10.0) Y Jaw (22.4) X Jaw (19.0)
MU/Fraction	52.6	71.6	61.9	67.6



Beam Name (#CPs)	0 (6)	40 (6)	80 (7)	120 (5)
Machine Name	SL A	SL A	SL A	SL A
Energy / Modality	6 MV Photons	6 MV Photons	6 MV Photons	6 MV Photons
Couch /Gantry /Collimator	0.0/ 0.0/ 0.0	0.0/ 40.0/ 0.0	0.0/ 80.0/ 0.0	0.0/ 120.0/ 0.0
Jaw Positions	Y1 (13.1)/ Y2 (12.0) X2 (9.0)/ X1 (10.0) Y Jaw (25.1) X Jaw (19.0)	Y1 (11.8)/ Y2 (12.5) X2 (9.0)/ X1 (10.0) Y Jaw (24.3) X Jaw (19.0)	Y1 (8.6)/ Y2 (10.7) X2 (10.0)/ X1 (10.0) Y Jaw (19.3) X Jaw (20.0)	Y1 (8.1)/ Y2 (10.5) X2 (8.0)/ X1 (8.0) Y Jaw (18.6) X Jaw (16.0)
MU/Fraction	69.5	69.5	106.4	39.2



Beam Name (#CPs)	160 (6)
Machine Name	SL A
Energy / Modality	6 MV Photons
Couch /Gantry /Collimator	0.0/ 160.0/ 0.0
Jaw Positions	Y1 (10.5)/ Y2 (13.0) X2 (10.0)/ X1 (10.0) Y Jaw (23.5) X Jaw (20.0)
MU/Fraction	55.2

Plan Authorization: \_\_\_\_\_