Appendix Table A2. UT Southwestern Institutional Radiation Dose Constrains, December 2016

One Fraction

Serial Tissue	Volume	Volume Max (Gy)	Max Point Dose (Gy)**	Endpoint (≥Grade 3)
Optic Pathway	<0.2 cc	8 Gy	10 Gy	neuritis
Cochlea			9 Gy	hearing loss
Brainstem (not medulla)	<0.5 cc	10 Gy	15 Gy	cranial neuropathy
Spinal Cord and medulla	<0.35 cc	10 Gy	14 Gy	myelitis
Cauda Equina	<5 cc	14 Gy	16 Gy	neuritis
Sacral Plexus	<5 cc	14.4 Gy	16 Gy	neuropathy
Esophagus*	<5 cc	20 Gy	24 Gy	esophagitis
Brachial Plexus	<3 cc	13.6 Gy	16.4 Gy	neuropathy
Heart/Pericardium	<15 cc	16 Gy	22 Gy	pericarditis
Great vessels	<10 cc	31 Gy	37 Gy	aneurysm
Trachea and Large Bronchus*	<4 cc	27.5 Gy	30 Gy	impairment of pulmonary toilet
Bronchus- smaller airways	<0.5 cc	17.4 Gy	20.2 Gy	stenosis with atelectasis
Rib	<5 cc	28 Gy	33 Gy	Pain or fracture
Skin	<10 cc	25.5 Gy	27.5 Gy	ulceration
Stomach	<5 cc	17.4 Gy	22 Gy	ulceration/fistula
Bile duct			30 Gy	stenosis
Duodenum*	<5 cc	17.4 Gy	22 Gy	ulceration
Jejunum/Ileum*	<30 cc	17.6 Gy	20 Gy	enteritis/obstruction
Colon*	<20 cc	20.5 Gy	31 Gy	colitis/fistula
Rectum*	<3.5 cc <20 cc	30 Gy 23 Gy	33.7 Gy	proctitis/fistula
Ureter			35 Gy	stenosis
Bladder wall	<15 cc	12 Gy	25 Gy	cystitis/fistula
Penile bulb	<3 cc	16 Gy		impotence
Femoral Heads	<10 cc	15 Gy		necrosis
Renal hilum/vascular trunk	15 cc	14 Gy		malignant hypertension
Parallel Tissue	**Critical Volume (cc)**	**Critical Volume Dose Max (Gy)**		**Endpoint (≥Grade 3)**
Lung (Right & Left)	1500 cc for male and 950cc for female***	7.2 Gy		Basic Lung Function
Lung (Right & Left)			V-8Gy <37%	Radiation Pneumonitis
Liver	700 cc***	11.6 Gy		Basic Liver Function
Renal cortex (Right & Left)	200 cc***	9.5 Gy		Basic renal function

***Avoid circumferential irradiation**

**** "point" defined as 0.035cc or less**

*****or one third of the "native" total organ volume (prior to any resection or volume reducing disease), whichever is greater**

Three Fractions

Serial Tissue	Volume	Volume Max (Gy)	Max Point Dose (Gy)**	Endpoint (≥Grade 3)
Optic Pathway	<0.2 cc	15.3 Gy	17.4 Gy	neuritis
Cochlea			14.4 Gy	hearing loss
Brainstem (not medulla)	<0.5 cc	15.9 Gy	23.1 Gy	cranial neuropathy
Spinal Cord and medulla	<0.35 cc	15.9 Gy	22.5 Gy	myelitis
Cauda Equina	<5 cc	21.9 Gy	25.5 Gy	neuritis
Sacral Plexus	<5 cc	22.5 Gy	25.5 Gy	neuropathy
Esophagus*	<5 cc	27.9 Gy	32.4 Gy	esophagitis
Brachial Plexus	<3 cc	22 Gy	26 Gy	neuropathy
Heart/Pericardium	<15 cc	24 Gy	30 Gy	pericarditis
Great vessels	<10 cc	39 Gy	45 Gy	aneurysm
Trachea and Large Bronchus*	<5 cc	39 Gy	43 Gy	impairment of pulmonary toilet
Bronchus- smaller airways	<0.5 cc	25.8 Gy	30 Gy	stenosis with atelectasis
Rib	<5 cc	40 Gy	50 Gy	Pain or fracture
Skin	<10 cc	31 Gy	33 Gy	ulceration
Stomach	<5 cc	22.5 Gy	30 Gy	ulceration/fistula
Bile duct			36 Gy	stenosis
Duodenum*	<5 cc	22.5 Gy	30 Gy	ulceration
Jejunum/Ileum*	<30 cc	20.7 Gy	28.5 Gy	enteritis/obstruction
Colon*	<20 cc	28.8 Gy	45 Gy	colitis/fistula
Rectum*	<3.5 cc <20 cc	43 Gy 30.3 Gy	47 Gy	proctitis/fistula
Ureter			40 Gy	stenosis
Bladder wall	<15 cc	17 Gy	33 Gy	cystitis/fistula
Penile bulb	<3 cc	25 Gy		impotence
Femoral Heads	<10 cc	24 Gy		necrosis
Renal hilum/vascular trunk	15 cc	19.5 Gy		malignant hypertension
Parallel Tissue	**Critical Volume (cc)**	**Critical Volume Dose Max (Gy)**		**Endpoint (≥Grade 3)**
Lung (Right & Left)	1500 cc for males and 950cc for females***	10.8 Gy		Basic Lung Function
Lung (Right & Left)			V-11.4Gy<37%	Pneumonitis
Liver	700 cc***	17.7 Gy		Basic Liver Function
Renal cortex (Right & Left)	200 cc***	14.7 Gy		Basic renal function

***Avoid circumferential irradiation**

**** "point" defined as 0.035cc or less**

*****or one third of the "native" total organ volume (prior to any resection or volume reducing disease), whichever is greater**

Five Fractions

Serial Tissue	Volume	Volume Max (Gy)	Max Point Dose (Gy)**	Endpoint (≥Grade 3)
Optic Pathway	<0.2 cc	23 Gy	25 Gy	neuritis
Cochlea			22 Gy	hearing loss
Brainstem (not medulla)	<0.5 cc	23 Gy	31 Gy	cranial neuropathy
Spinal Cord and medulla	<0.35 cc	22 Gy	28 Gy	myelitis
Cauda Equina	<5 cc	30 Gy	31.5 Gy	neuritis
Sacral Plexus	<5 cc	30 Gy	32 Gy	neuropathy
Esophagus*	<5 cc	32.5 Gy	38 Gy	esophagitis
Brachial Plexus	<3 cc	27 Gy	32.5 Gy	neuropathy
Heart/Pericardium	<15 cc	32 Gy	38 Gy	pericarditis
Great vessels	<10 cc	47 Gy	53 Gy	aneurysm
Trachea and Large Bronchus*	<5 cc	45 Gy	50 Gy	impairment of pulmonary toilet
Bronchus- smaller airways	<0.5 cc	32 Gy	40 Gy	stenosis with atelectasis
Rib	<5 cc	45 Gy	57 Gy	Pain or fracture
Skin	<10 cc	36.5 Gy	38.5 Gy	ulceration
Stomach	<5cc	26.5 Gy	35 Gy	ulceration/fistula
Bile duct			41 Gy	stenosis
Duodenum*	<5 cc	26.5 Gy	35 Gy	ulceration
Jejunum/Ileum*	<30 cc	24 Gy	34.5 Gy	enteritis/obstruction
Colon*	<20 cc	32.5 Gy	52.5 Gy	colitis/fistula
Rectum*	<3.5 cc <20 cc	50 Gy 37.5 Gy	55 Gy	proctitis/fistula
Ureter			45 Gy	stenosis
Bladder wall	<15 cc	20 Gy	38 Gy	cystitis/fistula
Penile Bulb	<3 cc	30 Gy		impotence
Femoral Heads	<10 cc	30 Gy		necrosis
Renal hilum/vascular trunk	15 cc	23 Gy		malignant hypertension
Parallel Tissue	**Critical Volume (cc)**	**Critical Volume Dose Max (Gy)**		**Endpoint (≥Grade 3)**
Lung (Right & Left)	1500 cc for males and 950cc for females***	12.5 Gy		Basic Lung Function
Lung (Right & Left)			V-13.5Gy<37%	Pneumonitis
Liver	700 cc***	21.5 Gy		Basic Liver Function
Renal cortex (Right & Left)	200 cc***	17.5 Gy		Basic renal function

***Avoid circumferential irradiation**

**** "point" defined as 0.035cc or less**

*****or one third of the "native" total organ volume (prior to any resection or volume reducing disease), whichever is greater**