



Prostata

Plan

AA-ProstataF

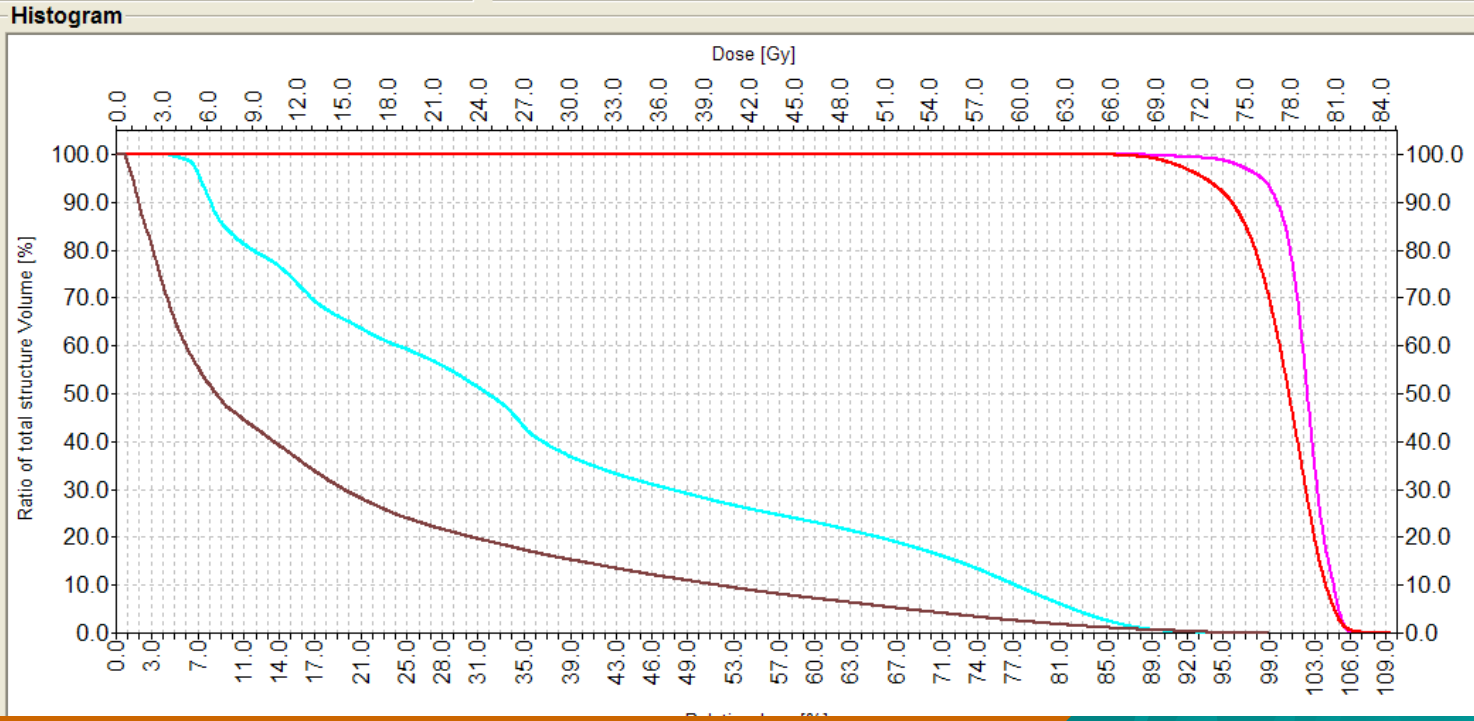
Treatment %: 100

Prescribed dose [Gy]: 77.4

Structures and Expressions

Structure	Coverage [%] / [%]	Volume [cm ³]	Min [%]	Max [%]	Mean [%]	Modal [%]	Median [%]	STD
<input type="checkbox"/> Body								
<input checked="" type="checkbox"/> Boost	100.0 / 99.7	10.7	85.2	106.6	102.1	102.9	102.4	2.21
<input type="checkbox"/> CT-Punkte								
<input checked="" type="checkbox"/> Harnblase	100.0 / 98.5	10.1	4.0	96.1	36.6	6.8	31.9	25.09
<input type="checkbox"/> Harnröhre								
<input type="checkbox"/> NVB								
<input checked="" type="checkbox"/> PTV	100.0 / 99.9	51.7	74.0	109.5	100.2	102.4	100.8	3.42
<input type="checkbox"/> PTV CT	100.0 / 99.9	58.8	24.4	109.5	97.2	102.4	100.3	9.61
<input type="checkbox"/> PTV MRT	100.0 / 100.0	40.3	42.7	108.4	97.9	102.4	100.9	8.78
<input checked="" type="checkbox"/> Rektum	100.0 / 99.9	27.1	0.7	99.0	18.1	4.8	8.6	20.87

Add... Edit... Delete Contents:



Calculate

Print... Export...

Dose preference:

- Relative [%]
- Absolute [Gy]

Grid

Type:

- Cumulative
- Differential

Volume scale:

- Relative [%]
- Absolute [cm³]

Dose range [%]:

0 to 110

Apply Range

Close

Optimization

Structures and Constraints

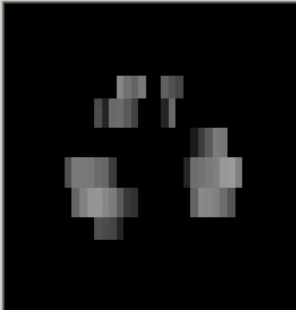
Structure	Type	Volume [cc]	Points	Resolution [mm]	Priority
Body	Upper	12417	122639	4.50	1000
	Lower	12417	122639	4.50	1000
Boost	Upper	11	2000	1.69	500
	Lower	11	2000	1.69	500
	Line	11	2000	1.69	500
CT-Punkte		2	1474	1.00	
Harnblase	Line	10	2000	1.66	200
		76.8	0.0		
		60.0	3.1		
		43.6	8.8		
		29.1	16.2		
		16.0	24.8		
		8.0	36.5		
		2.2	49.2		
Harnröhre	Upper	1	612	1.00	450
	Lower	1	612	1.00	450
NVB		6	2000	1.41	
PTV	Upper	52	2000	2.86	250
	Lower	52	2000	2.86	550
PTV CT		59	2000	2.98	
PTV MRT		40	2000	2.63	
Rektum	Upper	27	2000	2.30	200
	Lower	27	2000	2.30	200

Base dose plan:

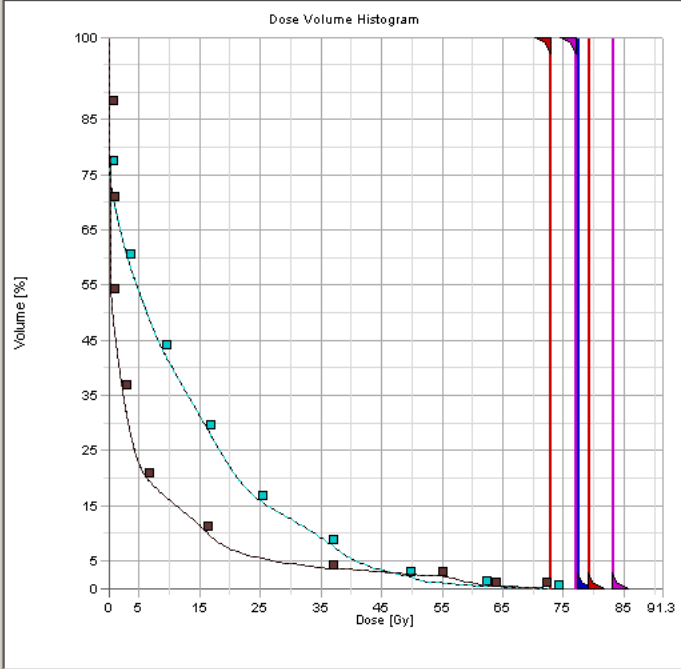
MLC	Method	X Smooth	Y Smooth	Minimize Dose	Fixed Jaws	Field Weight
01AA 1...	Standard 80	Beamlet	40	30	<input type="checkbox"/>	1.000
02AA 2...	Standard 80	Beamlet	40	30	<input type="checkbox"/>	1.000
03AA 2...	Standard 80	Beamlet	40	30	<input type="checkbox"/>	1.000
04AA 3...	Standard 80	Beamlet	40	30	<input type="checkbox"/>	1.000
05AA 40*	Standard 80	Beamlet	40	30	<input type="checkbox"/>	1.000
06AA 80*	Standard 80	Beamlet	40	30	<input type="checkbox"/>	1.000
07AA 1...	Standard 80	Beamlet	40	30	<input type="checkbox"/>	1.000

View with interpolation
 Use color

Max time (min):
 Max iterations:



Dose Volume Histogram



Optimization

Structures and Constraints

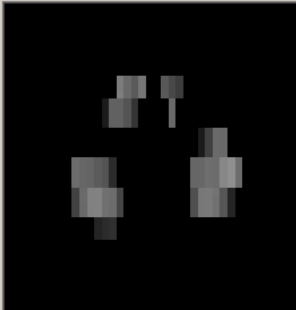
Structure	Type	Volume [cc]	Points	Resolution [mm]	Priority
Body		12417	143288	4.50	
Upper	Volume [%]	0.0	Dose [Gy]	83.0	1000
Boost	Volume [cc]	11	Points: 2415	Resolution [mm]: 1.69	
Upper	Volume [%]	0.0	Dose [Gy]	83.0	500
Lower	Volume [%]	100.0	Dose [Gy]	77.0	500
CT-Punkte	Volume [cc]	2	Points: 1752	Resolution [mm]: 1.00	
Harnblase	Volume [cc]	10	Points: 2959	Resolution [mm]: 1.66	
Line	Volume [%]	76.8	Dose [Gy]	0.0	200
		60.0		3.1	
		43.6		8.8	
		29.1		16.2	
		16.0		24.8	
		8.2		32.3	
		2.2		49.2	
		1.0		59.6	
		0.0		71.9	
Harnröhre	Volume [cc]	1	Points: 725	Resolution [mm]: 1.00	
Upper	Volume [%]	0.0	Dose [Gy]	77.4	450
NVB	Volume [cc]	6	Points: 2405	Resolution [mm]: 1.41	
PTV	Volume [cc]	52	Points: 2534	Resolution [mm]: 2.86	
Upper	Volume [%]	0.0	Dose [Gy]	79.0	250
Lower	Volume [%]	100.0	Dose [Gy]	73.0	550
PTV CT	Volume [cc]	59	Points: 2556	Resolution [mm]: 2.98	
PTV MRT	Volume [cc]	40	Points: 2464	Resolution [mm]: 2.63	
Rektum	Volume [cc]	27	Points: 3165	Resolution [mm]: 2.30	
Line	Volume [%]	87.9	Dose [Gy]	0.0	200

Base dose plan:

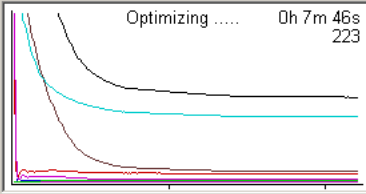
	MLC	Method	X Smooth	Y Smooth	Minimize Dose	Fixed Jaws	Field Weight
01AA 1...	Standard 80	Beamlet	40	30	0	<input type="checkbox"/>	1.000
02AA 2...	Standard 80	Beamlet	40	30	0	<input type="checkbox"/>	1.000
03AA 2...	Standard 80	Beamlet	40	30	0	<input type="checkbox"/>	1.000
04AA 3...	Standard 80	Beamlet	40	30	0	<input type="checkbox"/>	1.000
05AA 40*	Standard 80	Beamlet	40	30	0	<input type="checkbox"/>	1.000
06AA 80*	Standard 80	Beamlet	40	30	0	<input type="checkbox"/>	1.000
07AA 1...	Standard 80	Beamlet	40	30	0	<input type="checkbox"/>	1.000

View with interpolation
 Use color

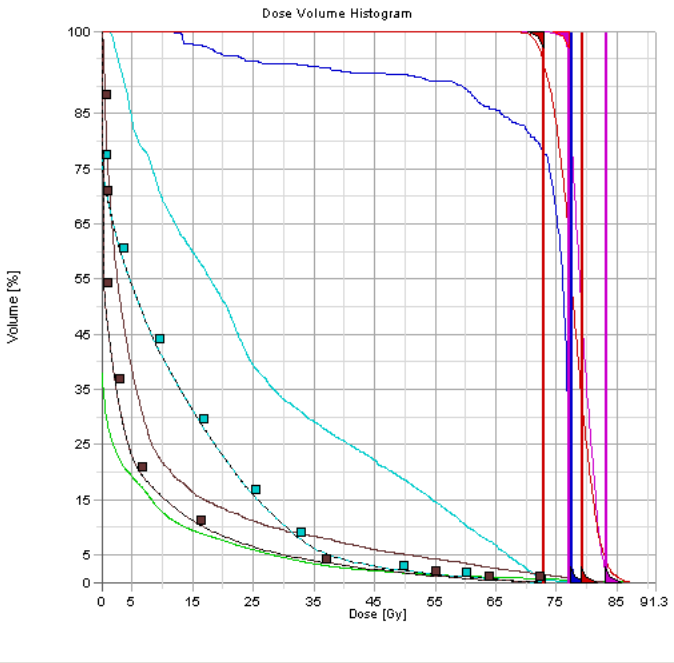
Max time (min):
 Max iterations:



Optimizing 0h 7m 46s 223



Dose Volume Histogram

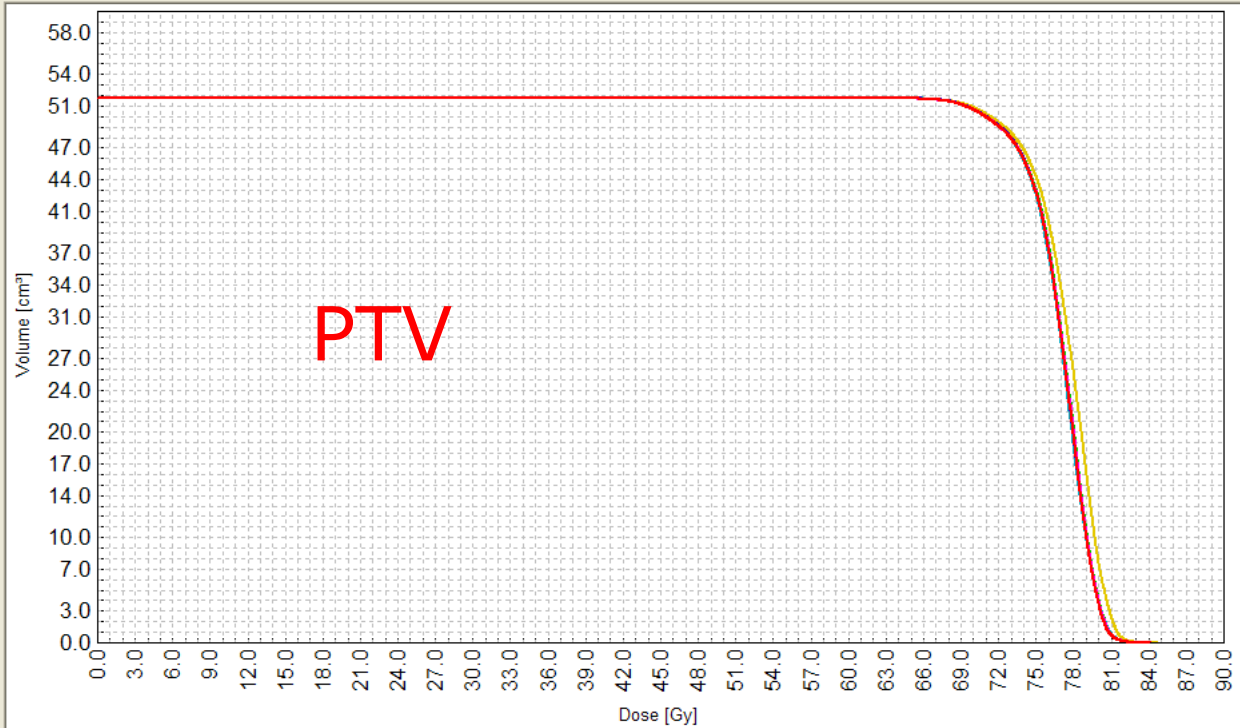


								Differenz
Feld1	82	94	93	99	98	94	90	17
Feld2	117	115	115	115	116	115	115	2
Feld3	331	246	256	203	218	249	233	128
Feld4	191	141	145	121	129	142	135	70
Feld5	97	86	86	76	78	85	80	21
Feld6	235	207	209	189	195	208	202	46
Feld7	131	128	129	131	131	130	130	3

Plan Comparison with Dose Volume Histogram

Histogram

Plan	Structure	Prescr. Dose [Gy]	Treat. [%]	Cov. [%] / [%]	Volume [cm ³]	Min [Gy]	Max [Gy]	Mean [Gy]	Modal [Gy]	Median [Gy]	STD
✓ C1/AA-Prostata	PTV	77.4	100.0	100.0 / 99.9	51.7	57.3	84.7	77.6	79.3	78.0	2.64
✓ C1/Test	PTV	77.4	100.0	100.0 / 99.9	51.7	58.4	84.1	77.1	78.4	77.5	2.55
✓ C1/Test1	PTV	77.4	100.0	100.0 / 99.9	51.7	59.8	84.1	77.0	78.9	77.3	2.53
✓ C1/Test2	PTV	77.4	100.0	100.0 / 99.9	51.7	59.4	84.1	77.0	78.0	77.4	2.52
✓ C1/Test21	PTV	77.4	100.0	100.0 / 99.9	51.7	58.3	83.9	77.0	80.6	77.4	2.55
✓ C1/Test3	PTV	77.4	100.0	100.0 / 99.9	51.7	58.6	84.1	77.0	78.2	77.4	2.53



Selections...

Grid

Type:

- Cumulative
- Differential
- Natural

Dose range [Gy]:

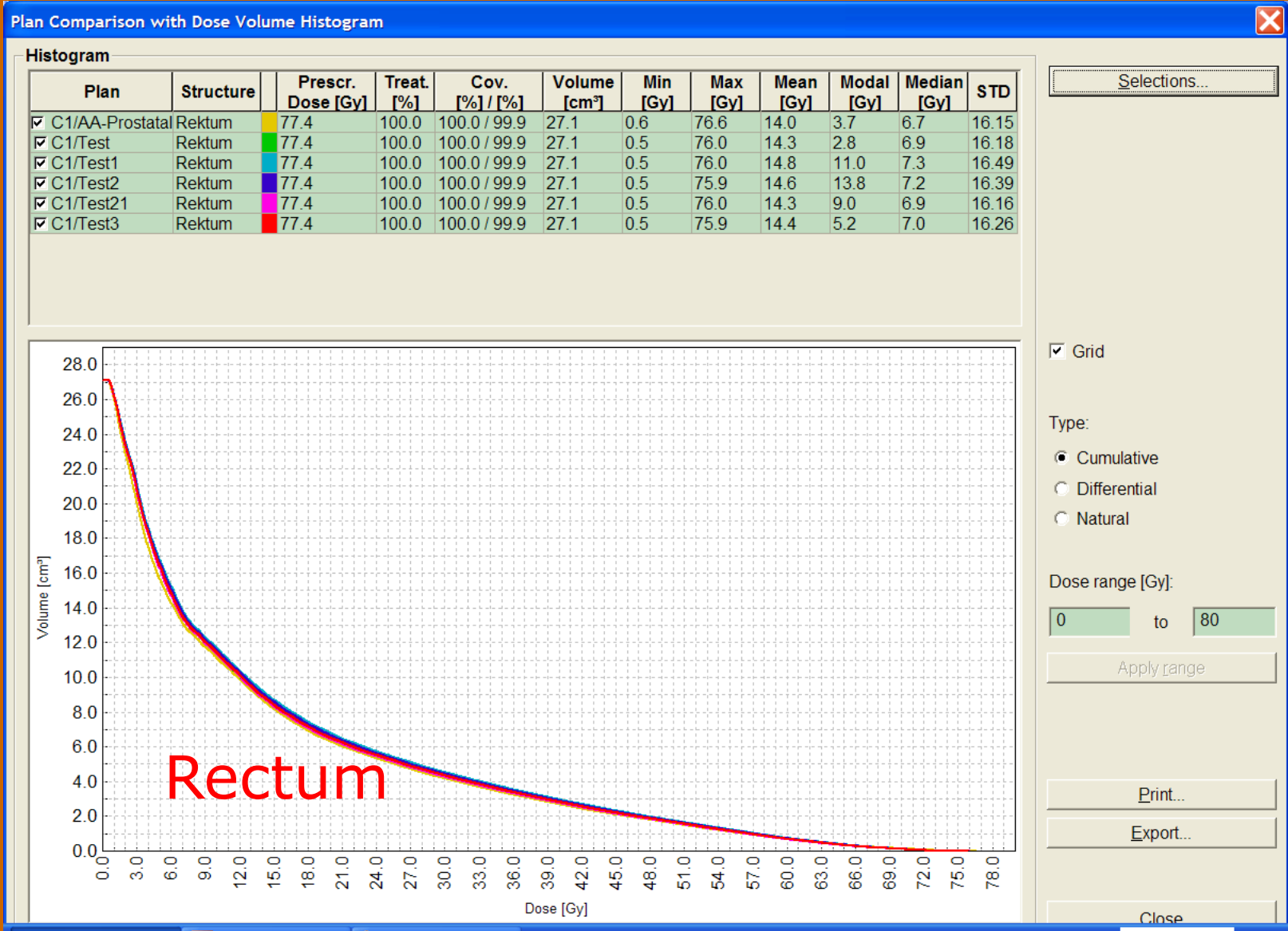
0 to 90

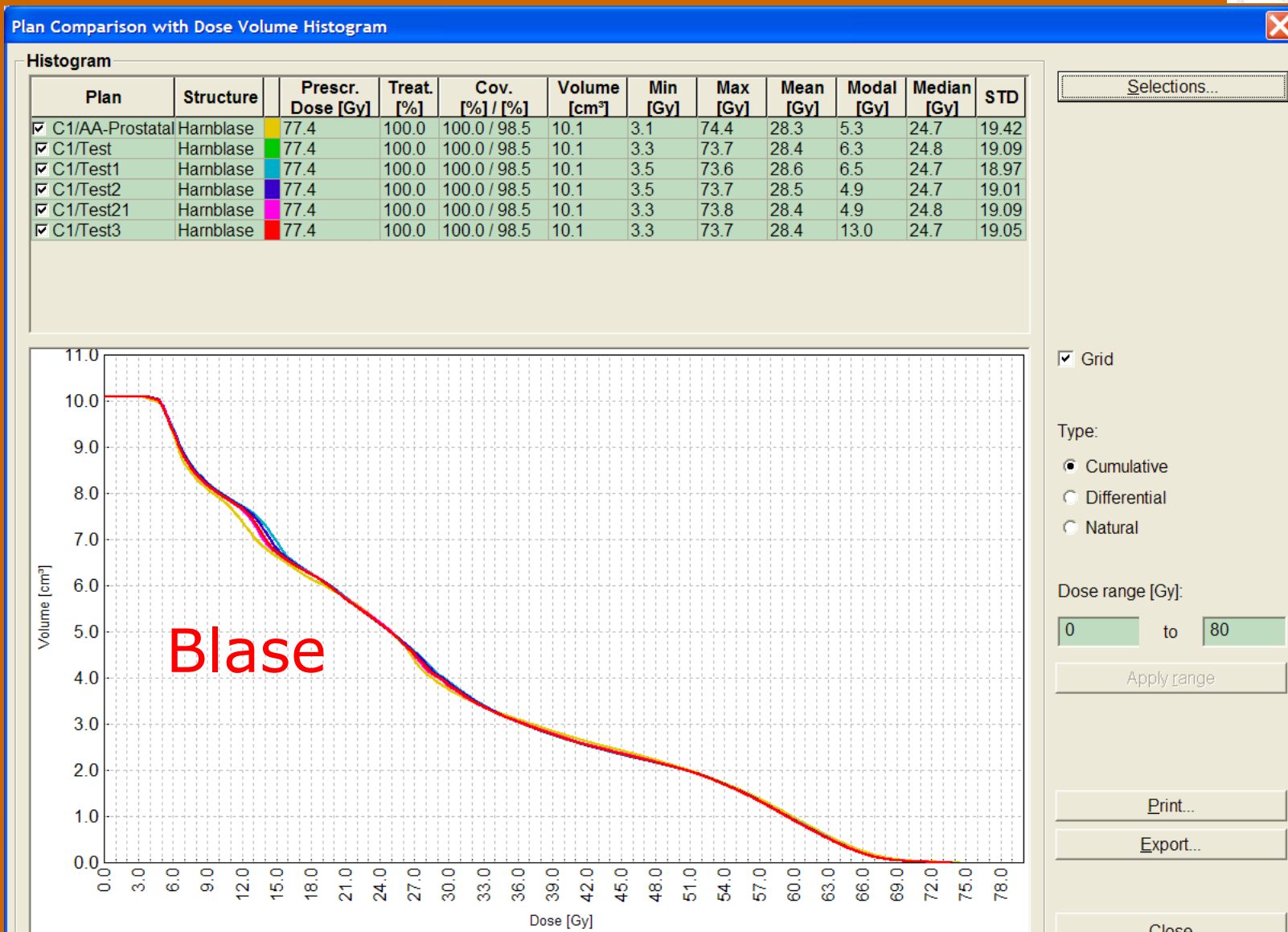
Apply range

Print...

Export...

Close





Selections...

Grid

Type:

- Cumulative
- Differential
- Natural

Dose range [Gy]:

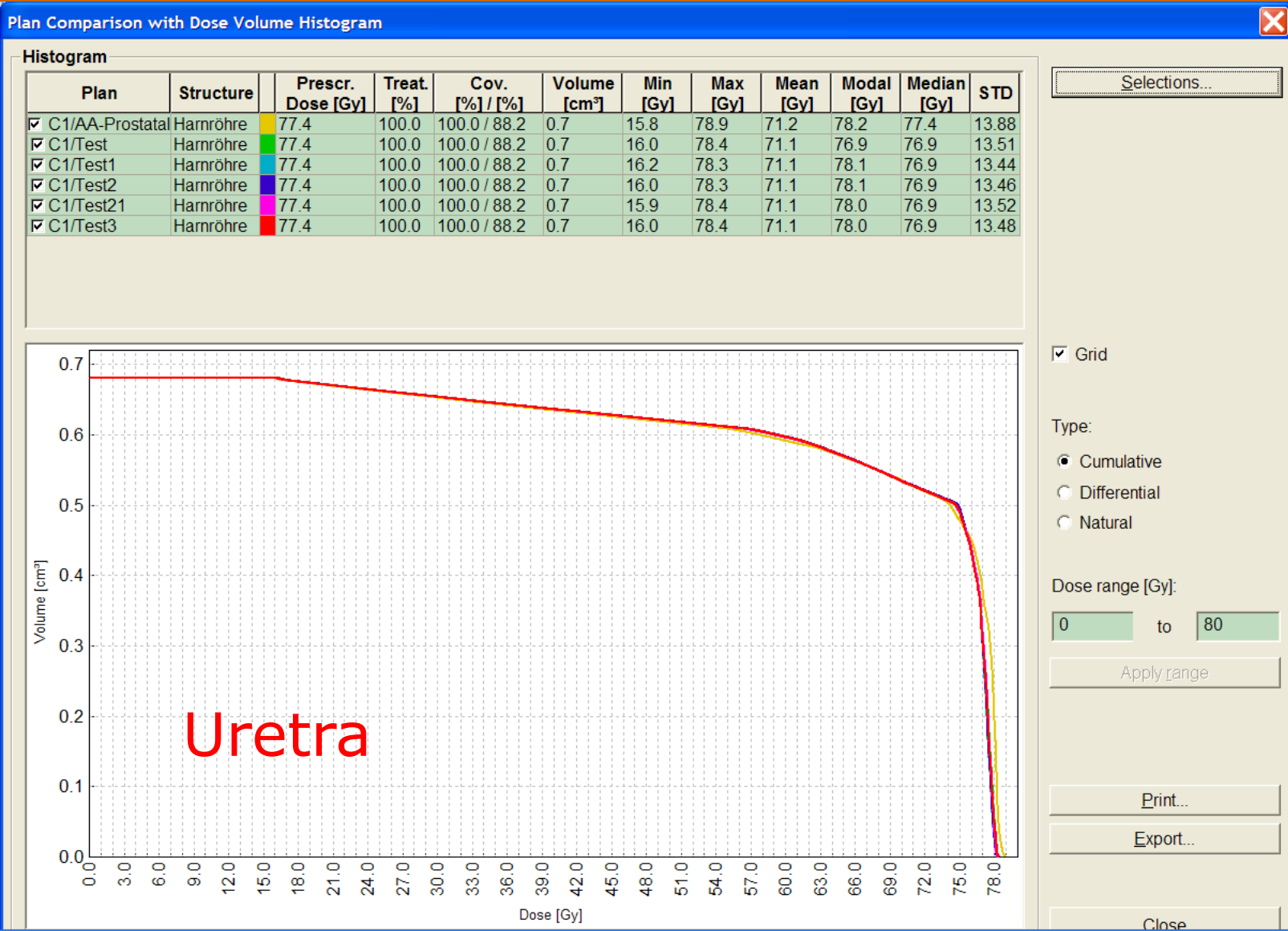
0 to 80

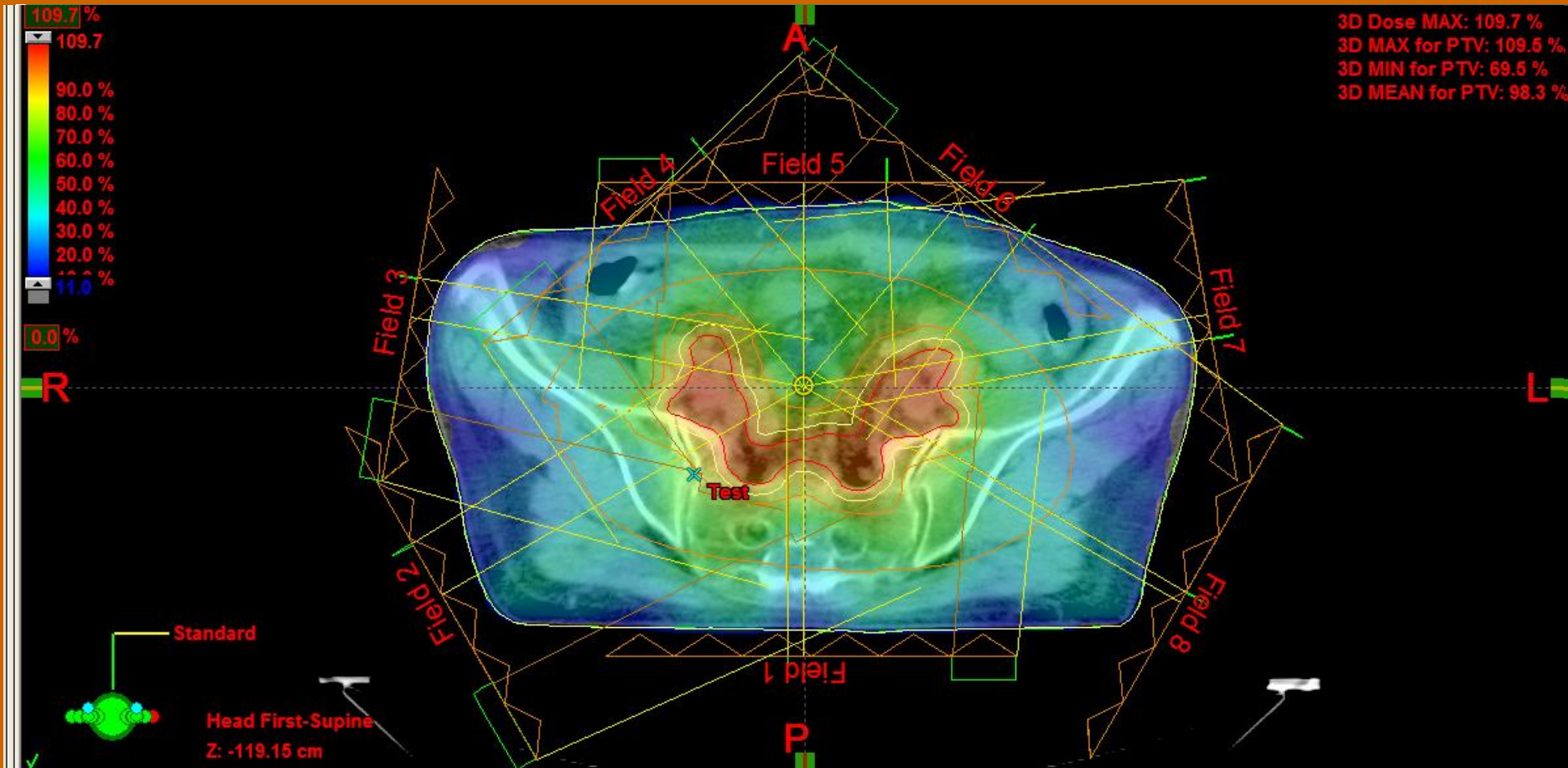
Apply range

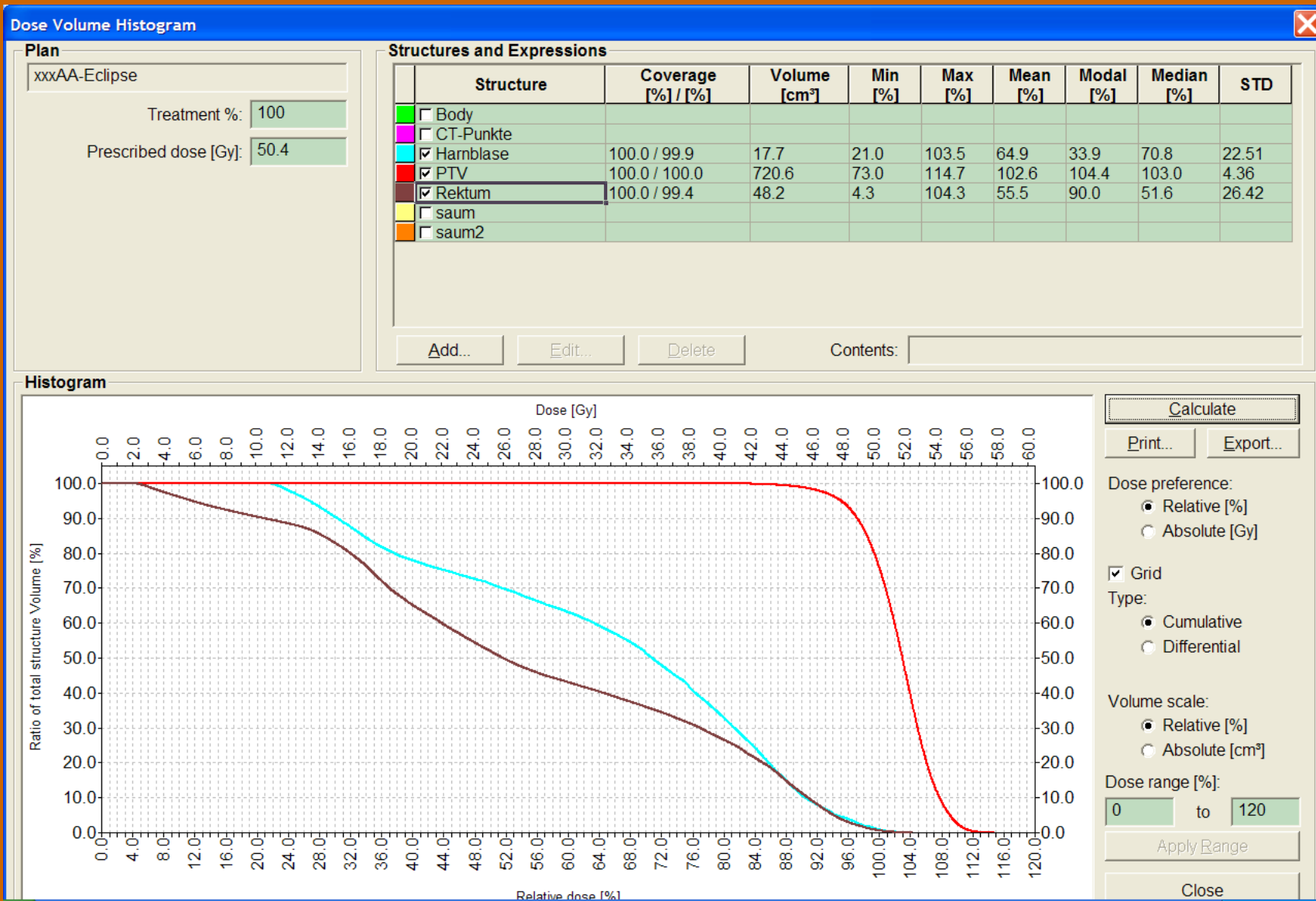
Print...

Export...

Close







Feld	1	2	3	4	5	6	7	8	9	10	11
Feld 1	171	137	135	162	136	140	139	190	184	112	167
Feld 2	192	178	177	189	175	185	176	208	205	109	187
Feld 3	174	164	163	169	164	166	160	194	187	105	172
Feld 4	211	198	196	215	197	201	200	231	226	105	209
Feld 5	188	168	167	180	168	168	166	207	203	111	184
Feld 6	175	187	183	194	185	188	182	209	202	107	173
Feld 7	155	157	155	158	156	156	155	161	159	99	151
Feld 8	194	177	181	195	175	178	183	215	213	110	192

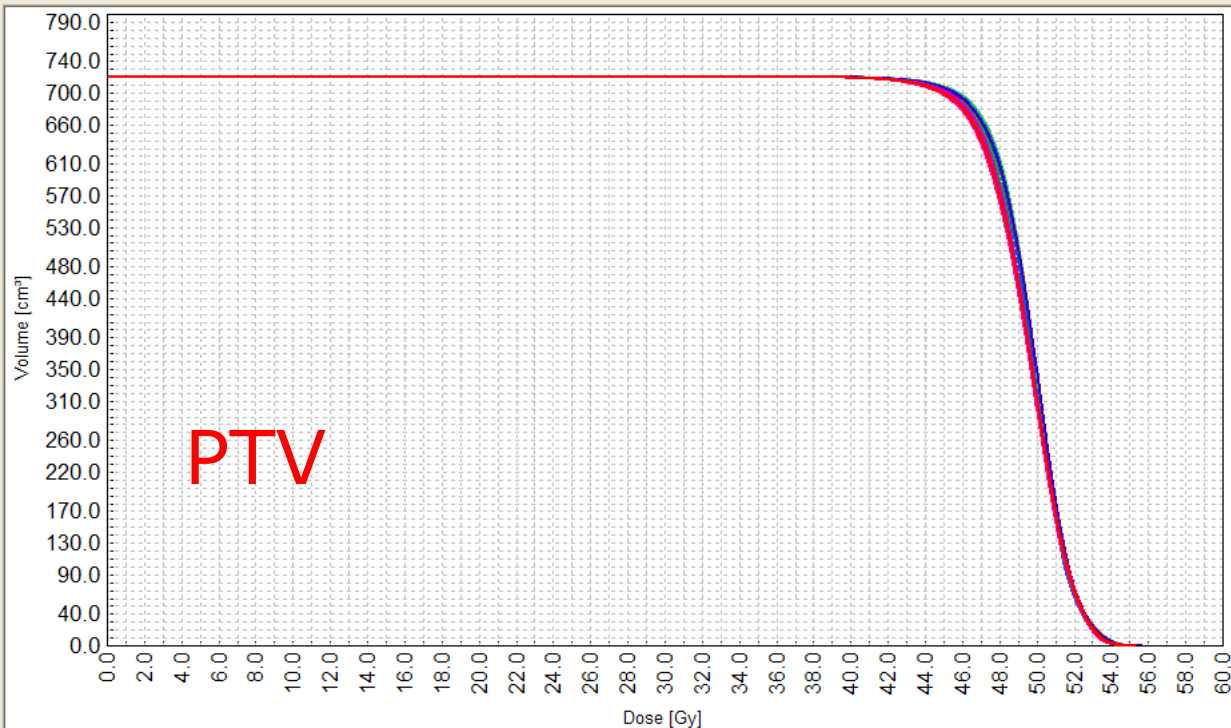
Max	Min	Diff	Min	Diff
190	112	78	135	55
208	109	99	175	33
194	105	89	160	34
231	105	126	196	35
207	111	96	166	41
209	107	102	173	36
161	99	62	151	10
215	110	105	175	40
1615	858	757	1356	259

Plan Comparison with Dose Volume Histogram

Histogram

Plan	Structure	Prescr. Dose [Gy]	Treat. [%]	Cov. [%] / [%]	Volume [cm ³]	Min [Gy]	Max [Gy]	Mean [Gy]	Modal [Gy]	Median [Gy]	STD
✓ C1/Test	PTV	50.4	100.0	100.0 / 100.0	720.6	36.0	55.5	49.8	49.5	50.0	1.89
✓ C1/Test1	PTV	50.4	100.0	100.0 / 100.0	720.6	36.0	55.5	49.8	49.7	49.9	1.88
✓ C1/Test11	PTV	50.4	100.0	100.0 / 100.0	720.6	35.6	55.2	49.6	49.9	49.7	1.97
✓ C1/Test111	PTV	50.4	100.0	100.0 / 100.0	720.6	36.0	55.5	49.8	50.1	49.9	1.89
✓ C1/Test1112	PTV	50.4	100.0	100.0 / 100.0	720.6	35.9	55.3	49.7	49.3	49.8	1.91
✓ C1/Testng	PTV	50.4	100.0	100.0 / 100.0	720.6	35.6	55.6	49.8	50.0	50.0	1.96
✓ C1/sm	PTV	50.4	100.0	100.0 / 100.0	720.6	35.1	55.2	49.6	50.2	49.8	2.04
✓ C1/sm2	PTV	50.4	100.0	100.0 / 100.0	720.6	35.1	55.3	49.4	50.4	49.6	2.12
✓ C1/xxxAA test	PTV	50.4	100.0	100.0 / 100.0	720.6	35.3	55.4	49.5	50.4	49.7	2.10

Selections...



Grid

Type:

- Cumulative
- Differential
- Natural

Dose range [Gy]:

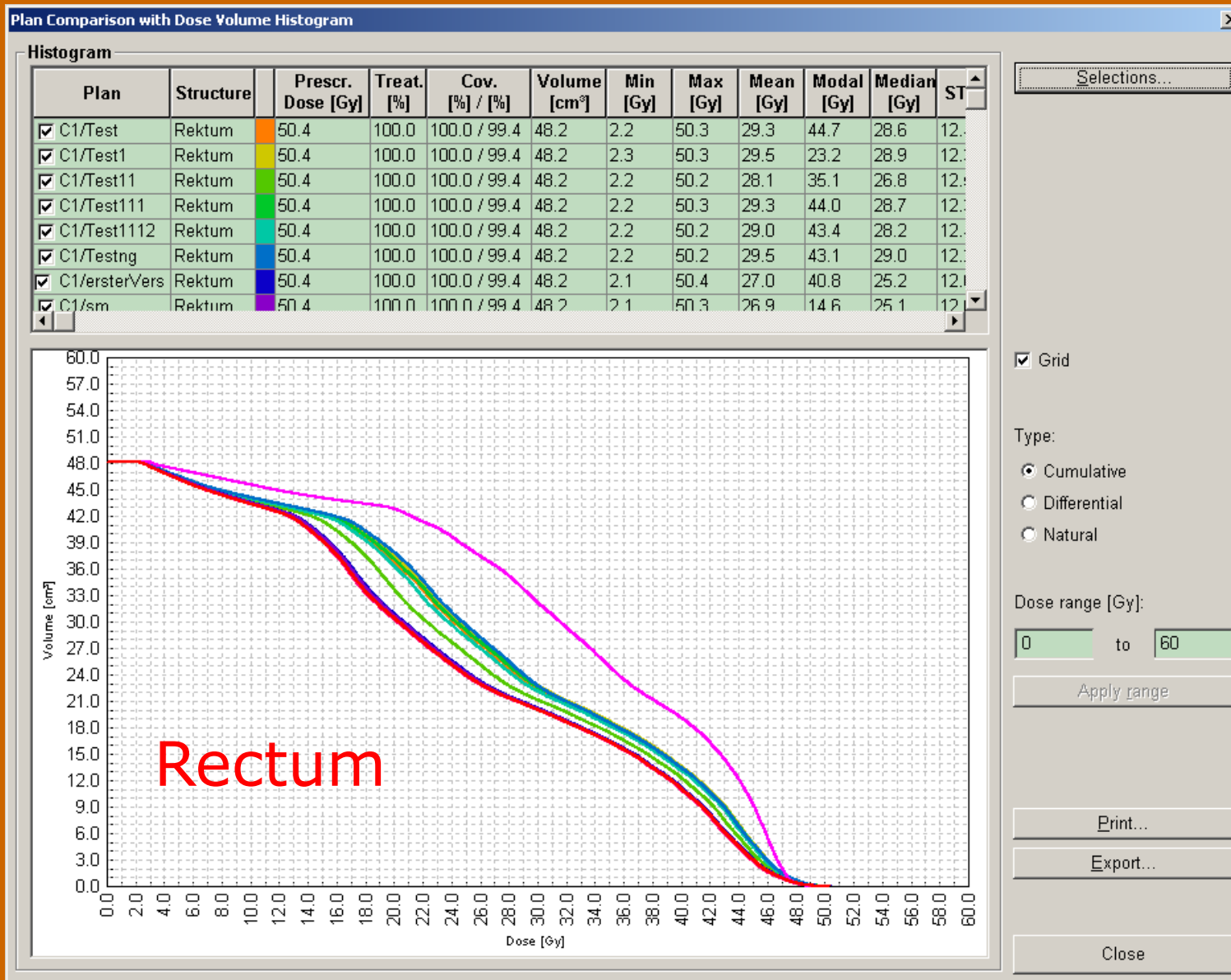
0 to 60

Apply range

Print...

Export...

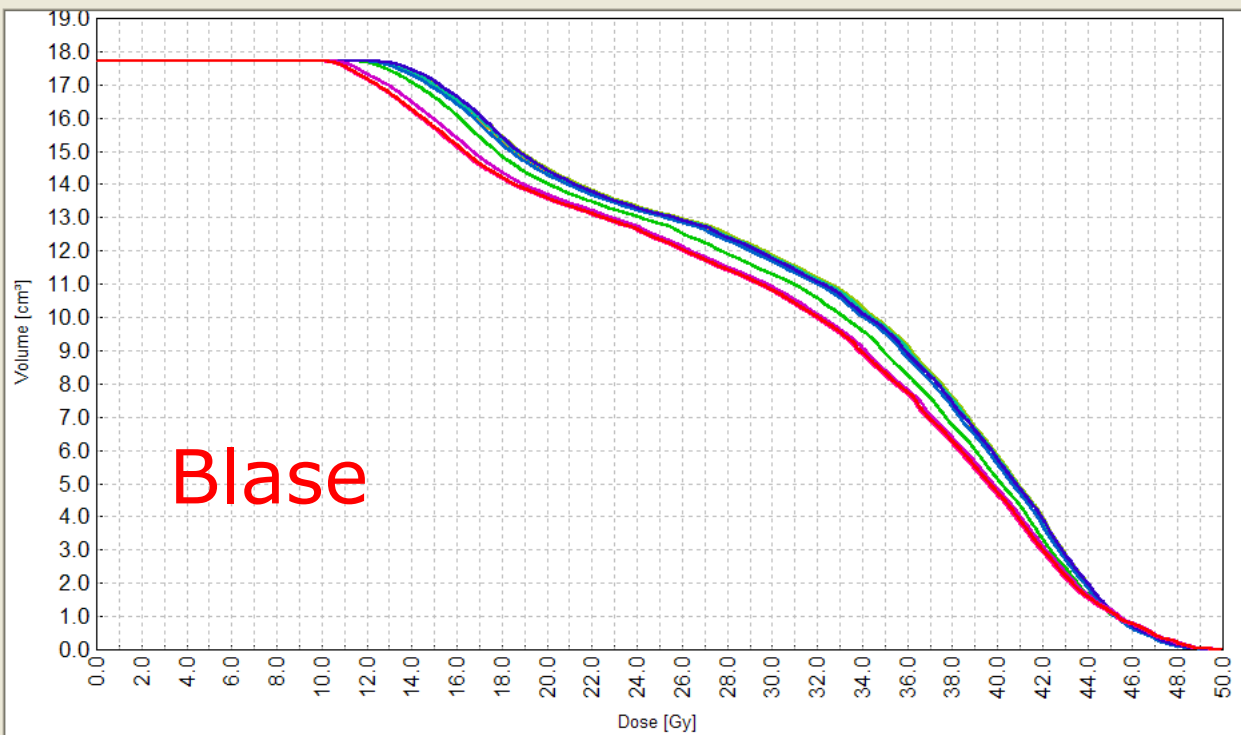
Close



Plan Comparison with Dose Volume Histogram

Histogram

Plan	Structure	Prescr. Dose [Gy]	Treat. [%]	Cov. [%] / [%]	Volume [cm ³]	Min [Gy]	Max [Gy]	Mean [Gy]	Modal [Gy]	Median [Gy]	STD
<input checked="" type="checkbox"/> C1/Test	Harnblase	50.4	100.0	100.0 / 99.9	17.7	12.1	49.7	33.1	25.5	36.2	10.13
<input checked="" type="checkbox"/> C1/Test1	Harnblase	50.4	100.0	100.0 / 99.9	17.7	12.4	49.6	33.3	25.6	36.4	10.05
<input checked="" type="checkbox"/> C1/Test11	Harnblase	50.4	100.0	100.0 / 99.9	17.7	11.6	49.8	32.3	20.7	35.1	10.32
<input checked="" type="checkbox"/> C1/Test111	Harnblase	50.4	100.0	100.0 / 99.9	17.7	12.1	49.7	33.2	38.8	36.2	10.09
<input checked="" type="checkbox"/> C1/Test1112	Harnblase	50.4	100.0	100.0 / 99.9	17.7	12.0	49.6	32.9	15.1	35.9	10.15
<input checked="" type="checkbox"/> C1/Testng	Harnblase	50.4	100.0	100.0 / 99.9	17.7	12.4	49.8	33.2	15.7	36.1	10.05
<input checked="" type="checkbox"/> C1/sm	Harnblase	50.4	100.0	100.0 / 99.9	17.7	10.6	50.0	31.6	14.0	34.4	10.75
<input checked="" type="checkbox"/> C1/sm2	Harnblase	50.4	100.0	100.0 / 99.9	17.7	10.0	49.9	31.2	11.7	34.1	10.86
<input checked="" type="checkbox"/> C1/xxxAA test	Harnblase	50.4	100.0	100.0 / 99.9	17.7	10.1	50.0	31.3	16.3	34.2	10.86



Selections...

Grid

Type:

- Cumulative
- Differential
- Natural

Dose range [Gy]:

0 to 50

Apply range

Print...

Export...

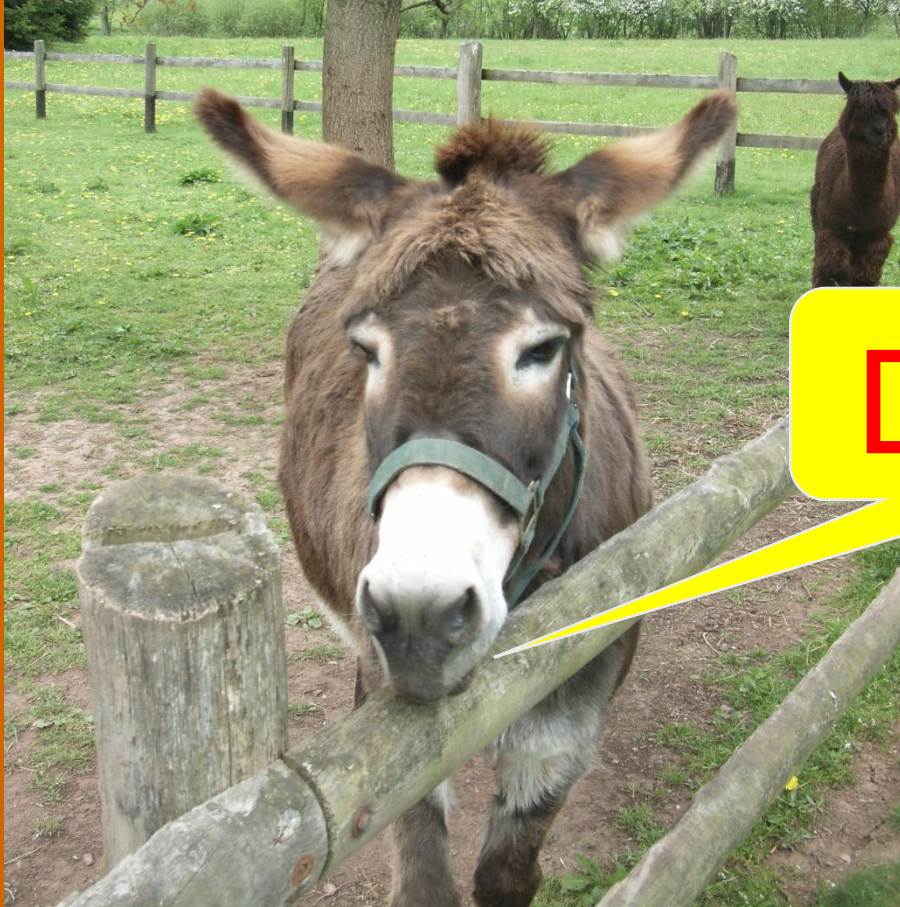
Close

Schlussfolgerungen:

Zur Reproduktion von sliding window Bestrahlungsplänen ist es notwendig die Optimierungsvorgaben (Constraints) und die Optimierungszeit (Zahl der Iterationsschritte) zu kennen.

Ohne Kenntnis der Optimierungszeit können die Monitorwerte pro Feld um 50% schwanken, das DVH für das PTV wird dabei in der Regel kaum beeinflusst. Bei kleineren PTV's ist die Auswirkung auf die Risikoorgane auch eher gering. Bei größeren PTV's hingegen können sich die Kurven merklich unterscheiden, jedoch eher im mittleren Dosisbereich.

Ohne Optimierungsvorgaben (Constraints) kann das Ergebnis erheblich vom ursprünglichen Plan abweichen.



Danke