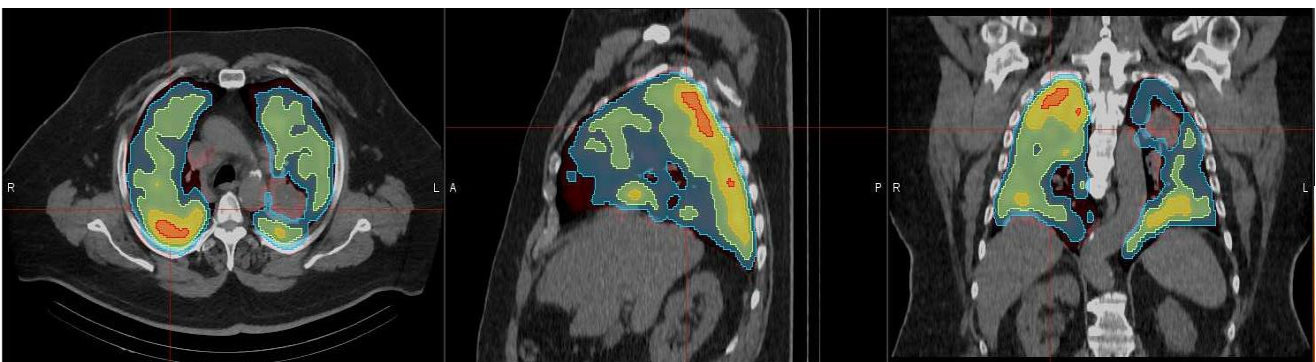


**Supplementary Figure S1.** Perfusion SPECT/CT. Functional lung (FL) segmented contours in colour, FL 20% of maximum perfusion intensity within total lung minus gross tumour volume in blue, FL 40%- green, FL 60%- yellow, FL 80%- red.



## Supplementary Table S1

### A. Dosimetric results for IMRT functional avoidance (FA) and standard reference (SR) plans

Parameter/ structure	Plan:	SR	FA	Mean difference	95% CI	t -test
		Mean ± SD	Mean ± SD	(±SE)		p value
Mean lung* dose, Gy		14.49 ± 3.71	14.13 ± 3.69	0.36 ± 0.21	-0.09; 0.81	0.11
Lung V5, %		56.29 ± 16.50	57.18 ± 14.71	-0.89 ± 2.02	-5.23; 3.45	0.67
Lung V20, %		27.59 ± 7.21	25.57 ± 6.82	2.02 ± 0.57	0.81; 3.24	<b>0.01</b>
Lung V30, %		17.12 ± 6.27	16.10 ± 6.09	1.03 ± 0.35	0.27; 1.78	<b>0.01</b>
Functional lung:						
FL20%: Mean dose, Gy		14.19 ± 4.24	13.44 ± 4.03	0.75 ± 0.24	0.25; 1.26	<b>0.01</b>
V5, %		56.91 ± 1.29	57.33 ± 15.31	-0.41 ± 1.94	-4.58; 3.76	0.84
V20, %		25.41 ± 8.87	22.72 ± 7.84	2.69 ± 0.59	1.43; 3.95	<b>&lt;0.01</b>
V30, %		16.27 ± 7.51	14.91 ± 7.16	1.35 ± 0.39	0.51; 2.19	<b>0.01</b>
FL40%: Mean dose, Gy		13.34 ± 5.38	11.61 ± 4.49	1.73 ± 0.40	0.87; 2.58	<b>&lt;0.01</b>
V5, %		56.98 ± 21.37	55.25 ± 19.09	1.74 ± 1.70	-1.90; 5.37	0.32
V20, %		22.15 ± 11.97	16.91 ± 8.67	5.24 ± 1.39	2.26; 8.22	<b>&lt;0.01</b>
V30, %		14.48 ± 9.94	11.45 ± 7.38	3.03 ± 1.17	0.51; 5.54	<b>0.02</b>
FL60%: Mean dose, Gy		10.96 ± 5.20	8.82 ± 4.55	2.15 ± 0.52	1.04; 3.25	<b>&lt;0.01</b>
V5, %		57.91 ± 23.37	51.40 ± 22.81	6.50 ± 2.68	0.77; 12.24	<b>0.03</b>
V20, %		14.51 ± 12.69	9.56 ± 10.37	4.95 ± 1.68	1.36; 8.53	<b>0.01</b>
V30, %		8.39 ± 11.93	5.84 ± 7.24	2.55 ± 1.57	-0.82; 5.91	0.13
FL80%: Mean dose, Gy		9.0 ± 5.73	6.70 ± 4.68	2.30 ± 0.54	1.14; 3.45	<b>&lt;0.01</b>
V5, %		60.19 ± 34.62	50.68 ± 37.86	9.50 ± 4.17	0.56; 18.45	<b>0.04</b>
V20, %		7.49 ± 12.90	4.13 ± 9.10	3.36 ± 1.44	0.28; 6.44	<b>0.04</b>
V30, %		2.93 ± 10.10	1.07 ± 3.44	1.86 ± 1.72	-1.83; 5.56	0.29
Max dose to spinal cord, Gy		40.71 ± 10.33	40.55 ± 13.64	0.16 ± 1.86	-3.86; 4.18	0.93
Mean heart dose, Gy		11.52 ± 7.89	11.52 ± 7.65	-0.01 ± 0.47	-1.02; 1.00	0.98
Heart V30, %		14.51 ± 13.77	14.23 ± 11.75	0.28 ± 1.19	-2.27; 2.82	0.82

Heart V60, %	0.7 ± 1.15	0.7 ± 1.16	0.01 ± 0.1	-0.21; 0.22	0.95
Mean oesophagus dose, Gy	19.53 ± 7.03	19.68 ± 6.90	-0.16 ± 0.39	-0.99; 0.68	0.69
Oesophagus V60	4.88 ± 5.28	3.38 ± 3.40	1.5 ± 0.57	0.29; 2.72	<b>0.02</b>
PTV coverage**, %	98.59 ± 1.59	98.49 ± 1.67	0.11 ± 0.19	-0.31; 0.53	0.58

### B. Dosimetric results for VMAT functional avoidance (FA) and standard reference (SR) plans

Parameter/ structure	Plan:	SR	FA	Mean difference	95% CI	t-test
		Mean ± SD	Mean ± SD	(±SE)		p value
Mean lung* dose, Gy		13.99 ± 3.50	13.95 ± 3.67	0.04 ± 0.31	-0.64; 0.71	0.91
Lung V5, %		58.20 ± 16.07	57.27 ± 14.81	0.93 ± 1.01	-1.23; 3.09	0.37
Lung V20, %		25.04 ± 6.48	25.31 ± 7.54	-0.27 ± 0.95	-2.31; 1.77	0.78
Lung V30, %		15.11 ± 5.29	15.79 ± 5.84	-0.69 ± 0.43	-1.61; 0.23	0.13
Functional lung:						
FL20%: Mean dose, Gy		13.86 ± 4.11	13.43 ± 3.98	0.43 ± 0.29	-0.19; 1.04	0.16
V5, %		59.05 ± 17.43	58.20 ± 15.49	0.85 ± 1.23	-1.80; 3.50	0.5
V20, %		24.16 ± 8.47	22.26 ± 7.89	1.89 ± 0.83	0.11; 3.67	<b>0.04</b>
V30, %		14.90 ± 6.69	14.66 ± 6.64	0.24 ± 0.39	-0.59; 1.07	0.55
FL40%: Mean dose, Gy		12.87 ± 5.30	11.68 ± 4.60	1.18 ± 0.37	0.38; 1.98	<b>0.01</b>
V5, %		58.91 ± 22.70	56.86 ± 20.52	2.05 ± 1.49	-1.14; 5.24	0.19
V20, %		21.24 ± 11.69	16.72 ± 8.72	4.52 ± 1.41	1.49; 7.55	<b>0.01</b>
V30, %		12.97 ± 8.63	11.30 ± 6.93	1.67 ± 0.91	-0.29; 3.63	0.09
FL60%: Mean dose, Gy		10.53 ± 5.43	8.96 ± 4.82	1.57 ± 0.46	0.58; 2.55	<b>0.01</b>
V5, %		57.10 ± 23.64	53.94 ± 23.74	3.15 ± 3.10	-3.49; 9.80	0.33
V20, %		15.08 ± 14.25	9.51 ± 10.64	5.57 ± 1.60	2.14; 9.00	<b>0.01</b>
V30, %		7.69 ± 10.28	5.84 ± 7.24	1.85 ± 0.98	-0.25; 3.96	0.08
FL80%: Mean dose, Gy		9.17 ± 7.02	7.44 ± 5.63	1.73 ± 0.60	0.45; 3.01	<b>0.01</b>
V5, %		58.47 ± 35.25	55.55 ± 36.61	2.92 ± 2.26	-1.93; 7.78	0.22
V20, %		11.26 ± 21.21	6.61 ± 17.70	4.64 ± 2.69	-1.12; 10.41	0.11
V30, %		5.31 ± 13.76	1.69 ± 4.25	3.62 ± 2.49	-1.71; 8.96	0.17

Max dose to spinal cord, Gy					
Mean heart dose, Gy	10.67 ± 6.94	10.86 ± 7.19	-0.19 ± 0.32	-0.88; 0.49	0.55
Heart V30, %	11.15 ± 10.64	11.51 ± 10.21	-0.37 ± 1.39	-3.35; 2.6	0.8
Heart V60, %	1.16 ± 1.71	1.41 ± 2.26	-0.25 ± 0.17	-0.62; 0.12	0.16
Mean oesophagus dose, Gy	19.85 ± 7.43	20.10 ± 7.79	-0.26 ± 0.33	-0.96; 0.45	0.45
Oesophagus V60	6.80 ± 5.80	8.09 ± 7.16	-1.29 ± 0.48	-2.3; -0.27	<b>0.02</b>
PTV coverage**, %	98.08 ± 1.71	98.47 ± 1.11	-0.39 ± 0.01	-1.03; 0.26	0.22

### C. Dosimetric results for 3D conformal functional avoidance (FA) and standard reference (SR) plans

Parameter/ structure	Plan:	SR	FA	Mean difference	t -test
		Mean ± SD	Mean ± SD	(±SE)	p value
				95% CI	
Mean lung* dose, Gy		16.25 ± 4.35	16.52 ± 4.56	-0.27 ± 0.40	0.51
Lung V5, %		57.83 ± 13.67	59.09 ± 15.62	-1.26 ± 2.05	0.55
Lung V20, %		31.31 ± 9.60	31.19 ± 10.34	0.13 ± 1.25	0.92
Lung V30, %		21.54 ± 7.55	21.14 ± 7.64	0.40 ± 0.68	0.56
Functional lung:					
FL20%: Mean dose, Gy		15.88 ± 4.97	16.14 ± 5.02	-0.26 ± 0.38	0.5
V5, %		58.78 ± 14.90	60.65 ± 17.56	-1.86 ± 2.22	0.42
V20, %		28.78 ± 10.56	28.63 ± 10.97	0.14 ± 1.09	0.9
V30, %		20.64 ± 8.95	19.54 ± 7.63	1.09 ± 0.96	0.27
FL40%: Mean dose, Gy		14.46 ± 6.32	14.1 ± 5.95	0.37 ± 0.51	0.49
V5, %		57.08 ± 19.36	58.86 ± 22.01	-1.78 ± 3.31	0.6
V20, %		24.75 ± 13.46	22.02 ± 11.87	2.73 ± 1.02	<b>0.02</b>
V30, %		18.32 ± 12.37	15.07 ± 9.27	3.25 ± 1.67	0.07
FL60%: Mean dose, Gy		10.97 ± 6.05	10.84 ± 5.3	0.13 ± 0.58	0.83
V5, %		56.44 ± 21.50	58.71 ± 23.57	-2.27 ± 4.81	0.64
V20, %		14.56 ± 13.21	12.35 ± 12.13	2.21 ± 1.7	0.22
V30, %		9.59 ± 12.48	7.41 ± 7.92	2.17 ± 1.72	0.23
FL80%: Mean dose, Gy		9.33 ± 6.39	8.82 ± 5.46	0.52 ± 0.72	0.48
V5, %		60.61 ± 31.99	60.92 ± 33.93	-0.31 ± 5.57	0.96

V20, %	9.68 ± 18.23	6.89 ± 12.52	2.78 ± 2.75	-3.11; 8.67	0.33
V30, %	4.46 ± 11.22	1.94 ± 4.27	2.53 ± 2.19	-2.21; 7.28	0.27
Max dose to spinal cord, Gy	43.83 ± 14.22	43.59 ± 14.88	0.23 ± 1.39	-2.75; 3.22	0.87
Mean heart dose, Gy	13.2 ± 9.40	12.94 ± 8.78	0.27 ± 0.58	-0.98; 1.51	0.65
Heart V30, %	18.54 ± 17.08	18.15 ± 16.82	0.38 ± 0.92	-1.58; 2.35	0.68
Heart V60, %	2.35 ± 2.83	2.24 ± 3.01	0.11 ± 0.24	-0.41; 0.63	0.67
Mean oesophagus dose, Gy	22.35 ± 8.18	23.02 ± 8.40	-0.67 ± 0.57	-1.90; 0.56	0.27
Oesophagus V60	10.38 ± 11.93	10.08 ± 10.57	0.30 ± 1.98	-3.95; 4.54	0.88
PTV coverage**, %	97.22 ± 2.98	97.24 ± 1.99	-0.025 ± 0.15	-0.35; 0.30	0.87

FL 20-80%= functional lung >20-80% of maximum perfusion

GTV=gross tumour volume

PTV= planning tumour volume

MLD= mean lung dose

Vx, %=volume receiving x Gy radiation

\* both lungs from CT minus GTV

\*\* Percent of PTV volume covered by the 95% isodose

