

Nodule Volumetry Literature Review

Reference	Setting	# Subjects	# Nodules	Nodule size (mm)	CT Scanner	Scan number/time	kVp	effective mAs	mAs	mA	Scan time (sec)	Pitch	Detector collimation (mm)	Section thickness (mm)	Section increment (mm)	Kernel	FOV (mm)	Software	Segmentation	Scan-rescan volume difference	95% CI	Comments
Wormanns D et al. Eur. Radiol. 2004; 14:86-92	Metastases	10	151	7,024.5 mm (2.2-30.3 mm) 105 nodules < 10 mm	Siemens VZ 4	2 within 10 minutes after getting up	120	20			0.5 sec	1.75	1	1.25	0.8	"Standard lung reconstruction kernel"	274-381	Siemens LungCare	Automated	0.7 to 10.6% (4.1-29%)	20.4 to 21.9%	
Goodman L et al. AIR 2006; 186:888-894	Known and unsuspected pulmonary nodules	29	43	< 20 mm; 35 (81%) < 10 mm; Volume 345,54361.1 mm³	GE Lightspeed 8 or 16	2 separated by 10-20 min pause	120	X		200-400	0.5-0.8	1.35-1.375	X	1.25	X	Bone	X	GE Advantage Windows workstation	Automated	X	±25.6%	IV contrast in 8 for initial scan; 45000-123 127% B to < 9 mm (n=16) 152.4% ± 15 mm (n=16) ±17.9%
Gietema H et al. Radiology 2007; 245:888-894	Metastases	20	218	Volume 123 Du101.9 cm³ (16.4-472.7)	Philips MX8000 16	2 scans after getting up from table	120 (680 kg) or 140 (480 kg)	X	30	X	X	X	X	1	0.7	B ("moderately soft")	Outer rib margins	Siemens LungCare	Automated	2.4mm³ (1.3%) (53-120.8 mm³)	21.2 to 23.8%	106 completely segmented; 11.9 to 12.4% incompletely segmented; 26.8 to 30.0%
Rampinell C. AIR 2009; 192:1657-1661	Known indeterminate pulmonary nodules	66	83	5-10 mm	GE Lightspeed 16	2 without getting up	140	X (18.2 calc)	32	40	0.8	1.75	X	2.5	X	"lung reconstruction kernel"	320-380	GE ALA Single	Automated	X	-38 to 60%	Excluded nodules completely segmented or attached to vessels or pleura
Rampinell C. AIR 2009; 192:1657-1661	Known indeterminate pulmonary nodules	66	83	5-10 mm	GE Lightspeed 16	2 without getting up	120		X	100-440 (ACMI)	X	0.938	X	0.625	X	"lung reconstruction kernel"	320-380	GE ALA Single	Automated	X	-27 to 40%	Excluded nodules completely segmented or attached to vessels or pleura
Marchiano A. Radiology 2009; 251:919-925	Lung Screening	101	233	99,14127.5 mm³ (median 92, range 5-839)	Siemens Sensation 16	3 (baseline, 3 and 12 months)	120	30	X	X	0.5	1.5	0.75	1	1	B30f and B50f	300-400	Siemens LungCare	Automated	<10% in 70.4% (3 miss) and 63.8% (12 miss)	±27%	Kernel used for segmentation not specified
deHoop B. Eur Radiol 2009; 19:800-808	Metastases	20	214	Mean 10.9 mm (range 3.3-30.0)	Philips MX8000 16	2 within 10 minutes after getting up	120 or 140 depending on wt.	X	30	X	X	X	X	1	0.7	"moderately soft kernel"	Outer rib margins	Compare 6 programs: GE, Philips, Siemens LungCare and It, Mevis, Vital	Automated, some with manual correction	X	Upper limit of 95% CI for 89 nodules adequately segmented by all 6 programs: 15.7, 18.4, 22.3, 17.8, 20.0, 19.6%	Same group and details as Gietema H et al. Radiology 2007; 245:888-894, probably same nodules. Upper 95% CI for all nodules with some manual corrections: 19.2, 17.8, 21.8, 17.7, 20.0, 21.3%