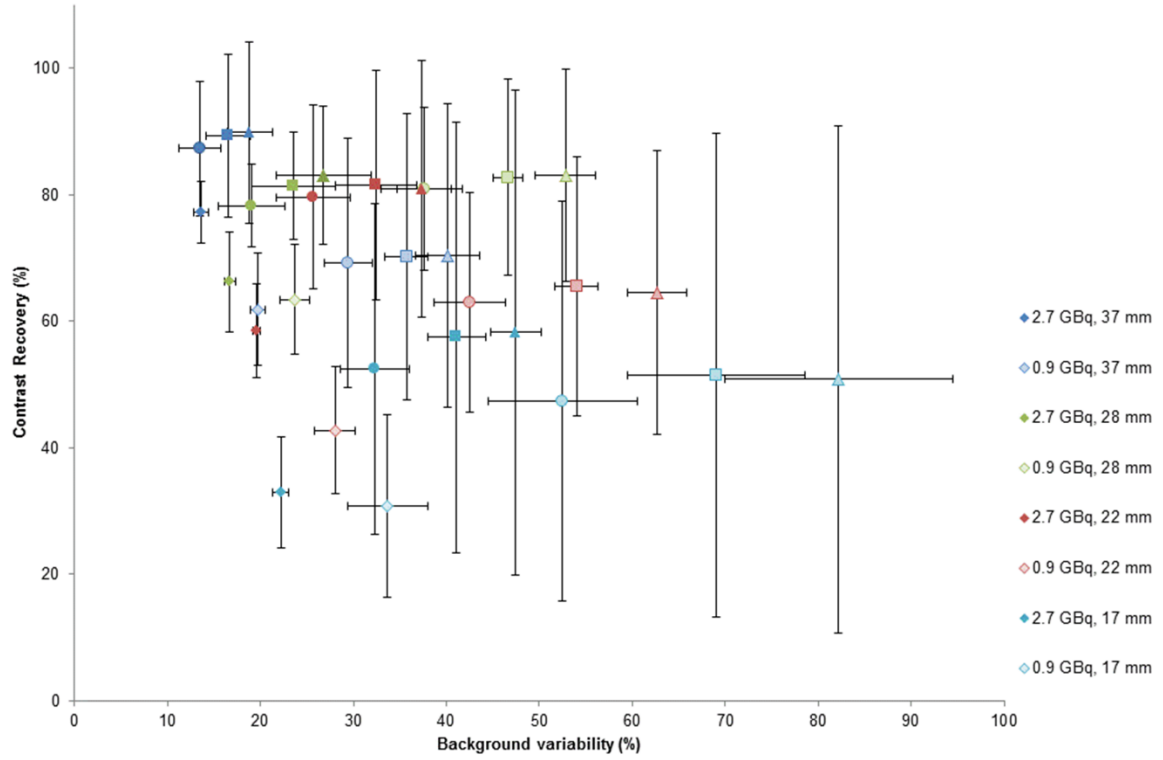
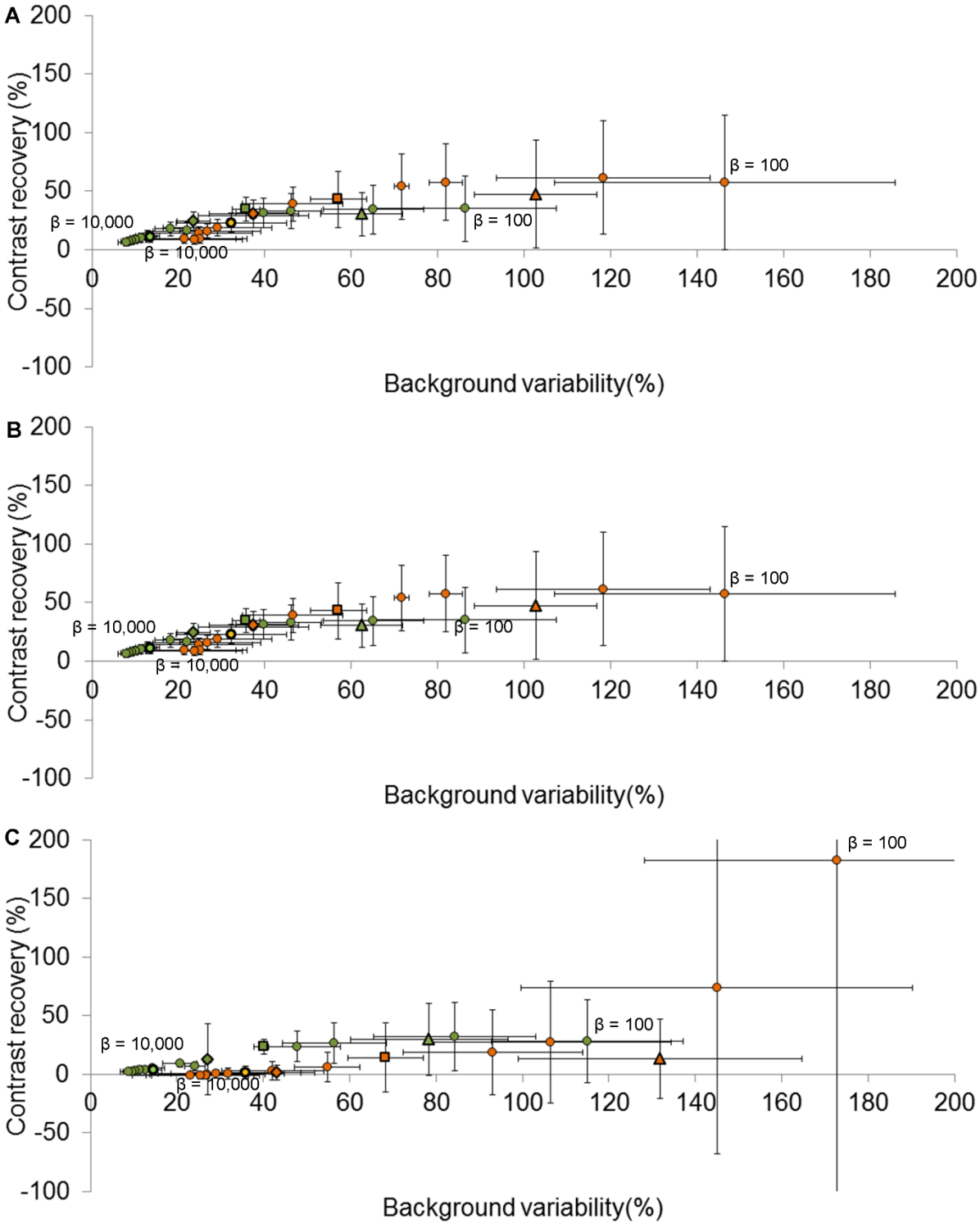


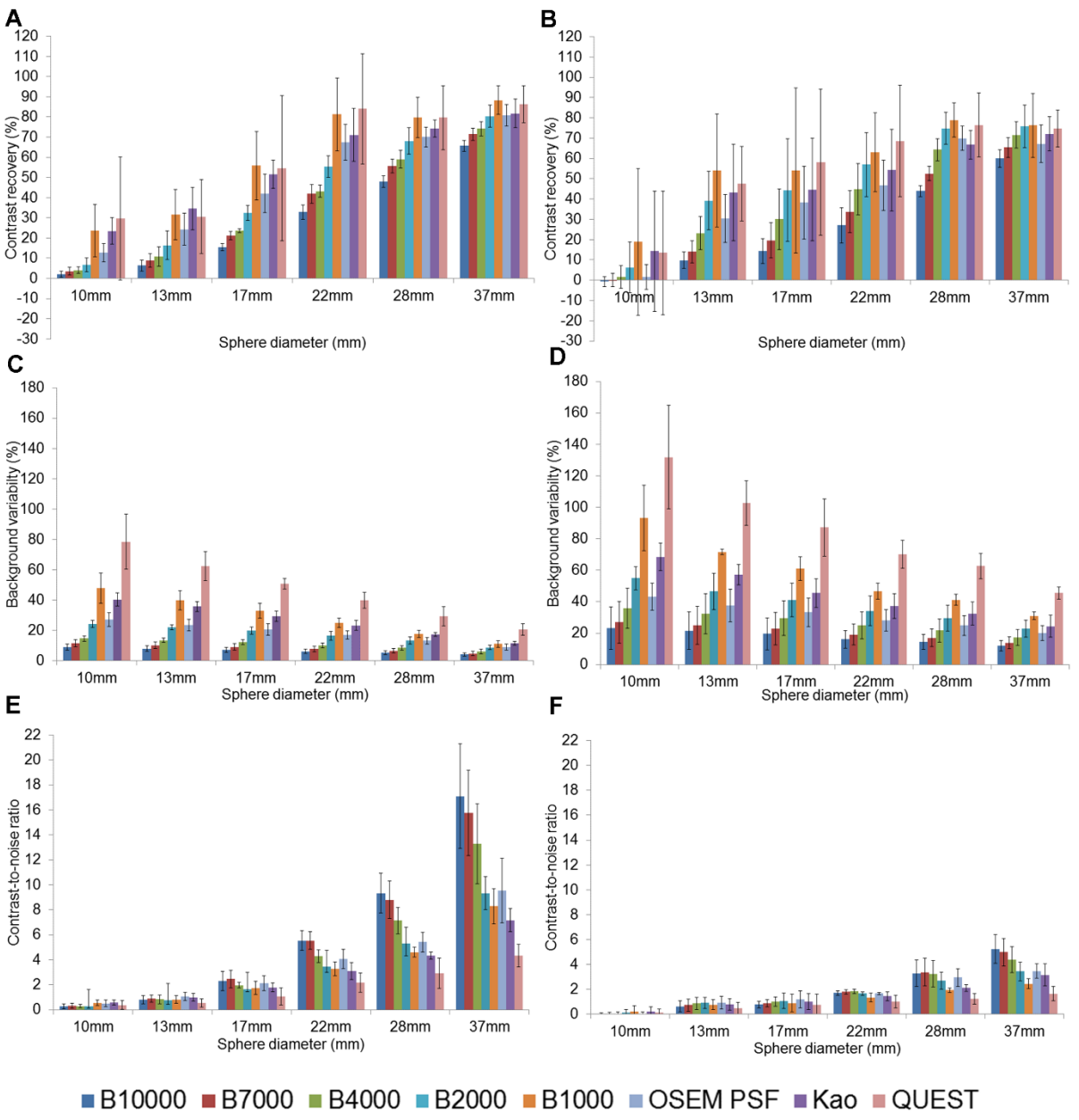
SUPPLEMENTAL FIGURE 1.

CR v BV for a range of OSEM reconstructions with varying iterations and subsets. PSF and ToF were applied. There was no filtering. Results are shown for a total phantom activity of 2.7GBq (2100kBq/cc sphere concentration) and orange 0.9GBq (700kBq/cc sphere concentration). Triangles are 4 iterations, squares are 3 iterations, circles are 2 iterations, diamonds are 1 iterations.



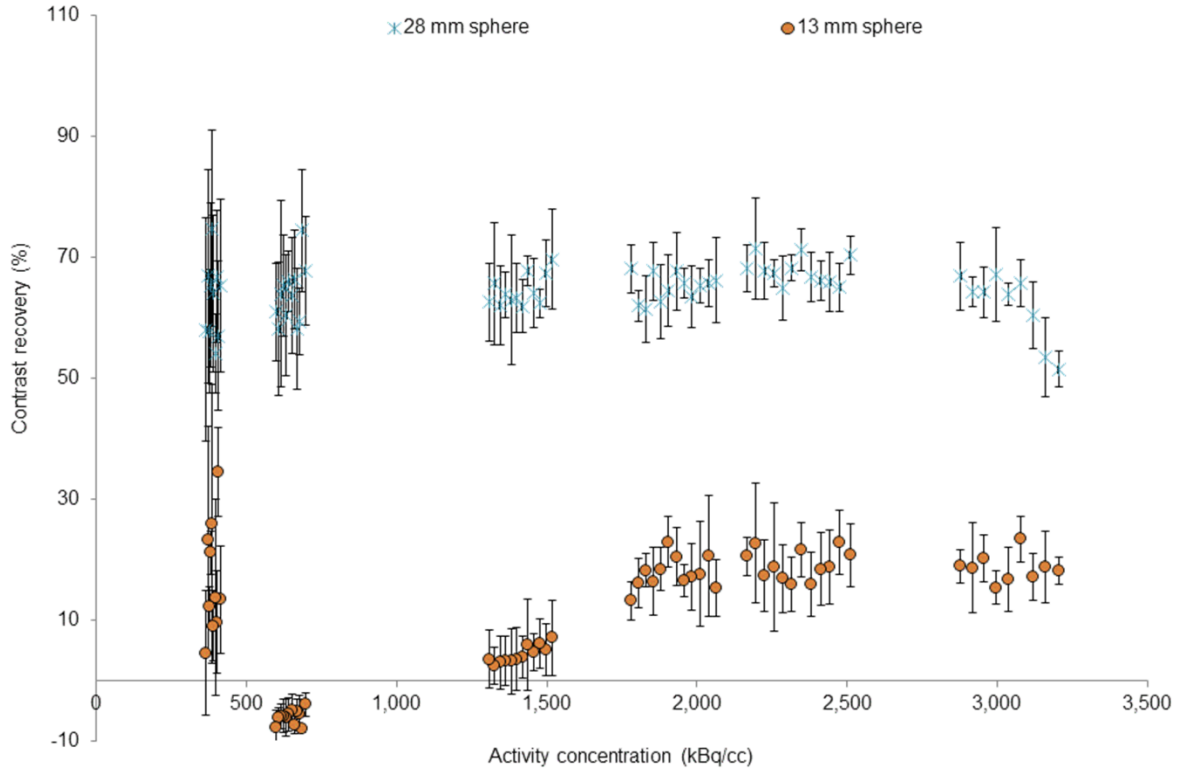
SUPPLEMENTAL FIGURE 2.

CR v BV for a range of BPL (left to right beta = 10000, 5000, 4000, 3000, 2000, 1000, 800, 400 and 100), OSEM PSF, Kao and the QUEST reconstructions for the 28mm (A), 13mm (B) and 10mm (C) diameter spheres of the NEMA IQ Phantom. Green points have a total phantom activity of 2.7GBq (2100kBq/cc sphere concentration) and orange 0.9GBq (700kBq/cc sphere concentration).



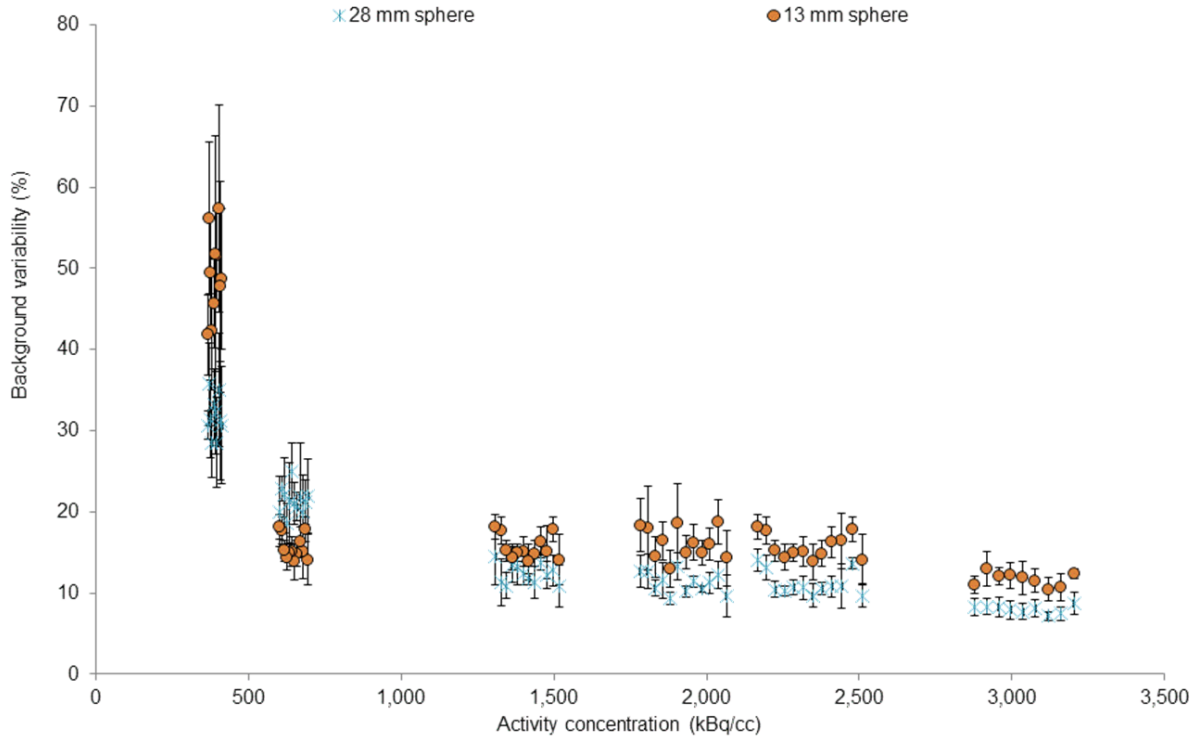
SUPPLEMENTAL FIGURE 3.

Graphs showing mean CR (A,B), BV (C,D) and CNR (E,F) for all size spheres in the NEMA IQ phantom. Graphs on the left (A,C,E) have a total phantom activity of 2.7GBq (2100kBq/cc sphere concentration). Graphs on the right (B,D,F) have a total phantom activity of 0.9GBq (700kBq/cc sphere concentration).



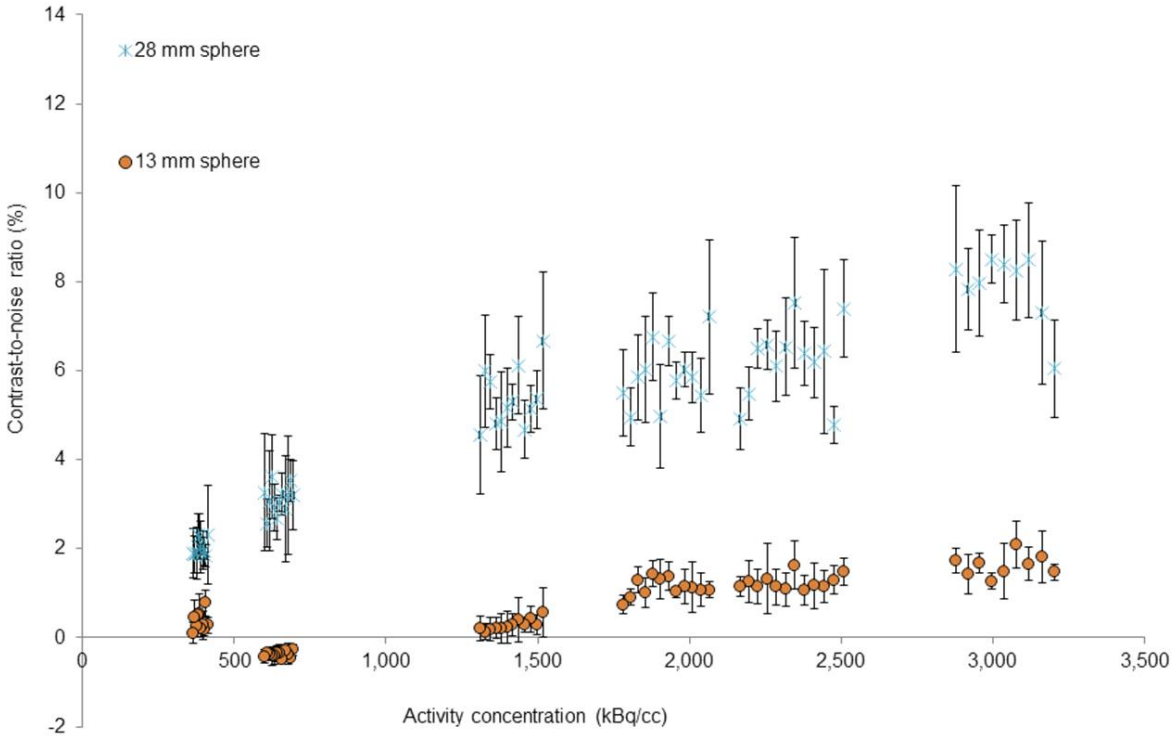
SUPPLEMENTAL FIGURE 4.

Mean contrast recovery verses sphere activity concentration for the 28 and 13 mm diameter spheres in the NEMA IQ phantom. Errors are 1SD.



SUPPLEMENTAL FIGURE 5.

Mean background variability verses sphere activity concentration for the 28, and 13 mm diameter spheres in the NEMA IQ phantom. Errors are 1SD.



SUPPLEMENTAL FIGURE 6.

Mean contrast-to-noise ratio verses sphere activity concentration for the 28 and 13 mm diameter spheres in the NEMA IQ phantom. Errors are 1SD.

SUPPLEMENTAL TABLE 1.

Mean CR and BV for different reconstructions.

Sphere diameter (mm)	Contrast Recovery (%)												Background Variability (%)											
	10		13		17		22		28		37		10		13		17		22		28		37	
QUEST*	29.7	(30.4)	30.6	(18.3)	54.6	(36.0)	84.0	(27.4)	79.6	(15.9)	86.3	(9.1)	78.4	(18.2)	62.4	(9.5)	50.9	(3.4)	39.9	(5.4)	29.4	(6.3)	20.5	(3.7)
	13.4	(33.8)	47.4	(45.9)	58.1	(65.3)	68.6	(30.9)	76.5	(25.7)	74.8	(25.4)	131.8	(32.8)	102.6	(14.1)	87.1	(18.4)	70.1	(8.8)	62.7	(8.0)	45.4	(3.8)
Kao†	23.4	(6.6)	34.7	(10.5)	51.5	(7.0)	71.1	(13.0)	74.3	(4.1)	81.7	(7.0)	40.3	(4.4)	35.7	(3.1)	29.3	(3.4)	23.3	(3.3)	17.2	(1.2)	11.5	(1.1)
	14.2	(29.7)	43.2	(23.9)	44.6	(25.3)	54.2	(20.2)	66.7	(7.1)	72.1	(8.4)	68.4	(8.8)	57.0	(6.5)	45.5	(9.0)	37.1	(7.8)	32.3	(7.3)	24.3	(7.0)
OSEM PSF‡	12.7	(4.5)	24.3	(7.9)	42.1	(9.5)	67.4	(8.8)	70.1	(4.9)	80.7	(5.3)	27.1	(4.5)	23.5	(3.9)	20.6	(3.8)	16.9	(2.7)	13.2	2.1)	8.9	(1.9)
	1.5	(6.1)	30.4	(11.7)	38.2	(18.0)	46.6	(12.3)	69.9	(6.1)	67.2	(9.2)	43.2	(8.6)	37.4	(10.4)	33.2	(9.1)	28.0	(6.9)	24.8	(6.3)	19.9	(4.8)
B100	28.3	(35.5)	35.1	(28.1)	57.7	(43.5)	75.0	(26.6)	84.7	(19.1)	90.7	(17.4)	115.0	(22.2)	86.3	(21.2)	65.8	(11.4)	52.3	(5.1)	36.2	(6.8)	25.4	(3.8)
	182.7	(375.1)	57.6	(57.5)	52.5	(52.4)	66.2	(26.7)	81.7	(16.1)	76.3	(21.3)	172.8	(44.6)	146.4	(39.5)	126.9	(31.9)	85.7	(14.8)	69.1	(6.4)	48.5	(6.6)
B400	32.2	(29.1)	34.3	(20.6)	59.0	(31.7)	82.6	(23.8)	84.0	(15.4)	90.9	(13.1)	84.3	(18.8)	65.1	(11.7)	50.7	(3.1)	38.7	(3.4)	25.9	(6.2)	17.2	(3.1)
	73.7	(141.8)	61.5	(48.3)	55.5	(54.6)	66.7	(23.0)	79.7	(13.2)	76.0	(20.7)	145.0	(45.3)	118.4	(24.7)	101.5	(20.8)	71.1	(8.3)	60.0	(5.2)	43.1	(4.4)
B800	26.7	(17.0)	33.1	(14.6)	57.6	(20.4)	83.0	(20.1)	81.1	(11.4)	89.3	(8.3)	56.4	(12.1)	46.2	(6.9)	37.5	(4.5)	28.1	(3.4)	19.4	(3.5)	12.2	(2.6)
	27.5	(51.9)	57.6	(32.7)	55.2	(45.2)	64.6	(19.6)	78.9	(9.0)	76.0	(17.4)	106.4	(28.0)	81.9	(3.8)	69.9	(9.2)	52.2	(4.8)	45.7	(3.0)	34.1	(1.6)
B1000	23.6	(13.0)	31.6	(12.6)	55.8	(16.9)	81.3	(18.1)	79.7	(10.1)	88.3	(7.0)	47.8	(10.0)	39.8	(6.4)	32.9	(4.9)	24.9	(3.3)	17.7	(2.5)	11.1	(2.2)
	18.9	(36.2)	54.0	(27.8)	54.1	(40.6)	63.0	(19.5)	78.9	(8.4)	76.3	(15.8)	93.1	(20.8)	71.6	(1.7)	60.9	(7.6)	46.7	(5.1)	41.1	(3.5)	31.0	(2.3)
B2000	6.8	(3.4)	16.4	(7.2)	32.4	(3.7)	55.4	(5.4)	68.1	(6.5)	80.4	(5.5)	24.2	(2.4)	22.1	(1.8)	19.9	(2.3)	16.4	(3.0)	13.2	(2.3)	8.8	(1.3)
	6.3	(12.6)	39.2	(14.4)	44.4	(25.4)	57.0	(15.8)	74.9	(7.8)	75.7	(10.5)	54.8	(7.5)	46.5	(11.6)	41.0	(10.7)	34.1	(9.4)	29.4	(8.3)	22.8	(5.5)
B3000	9.0	(3.0)	17.9	(6.1)	38.5	(4.9)	62.8	(8.5)	69.6	(5.2)	81.2	(3.9)	20.7	(3.9)	18.3	(3.8)	16.2	(3.6)	13.3	(2.5)	10.5	(1.9)	7.1	(1.5)
	3.0	(7.6)	29.3	(10.2)	36.1	(19.0)	50.3	(14.0)	69.3	(6.5)	73.8	(8.0)	42.2	(11.8)	37.3	(12.8)	33.7	(11.2)	28.5	(9.3)	24.6	(8.1)	19.3	(5.4)
B4000	4.1	(1.6)	10.9	(4.7)	23.6	(0.9)	43.2	(3.1)	59.0	(4.4)	74.1	(3.6)	14.6	(1.9)	13.4	(1.5)	12.2	(1.6)	10.2	(1.6)	8.4	(1.6)	5.9	(1.6)
	1.6	(5.6)	23.1	(8.1)	30.0	(14.8)	44.9	(12.7)	64.3	(5.4)	71.6	(6.6)	35.9	(12.7)	32.3	(12.8)	29.4	(11.1)	24.9	(8.5)	21.6	(7.3)	17.2	(5.0)

B5000	5.2	(2.3)	12.0	(4.4)	27.7	(2.8)	50.6	(6.0)	62.0	(4.1)	75.9	(3.3)	14.5	(2.7)	12.9	(2.8)	11.5	(2.8)	9.7	(2.1)	8.0	(1.8)	5.6	(1.4)
	0.8	(4.5)	19.0	(6.8)	25.5	(12.0)	40.5	(11.7)	59.8	(4.6)	69.4	(5.8)	31.8	(13.1)	29.0	(12.6)	26.5	(10.8)	22.4	(7.8)	19.6	(6.6)	15.7	(4.5)
B6000	4.2	(2.1)	10.2	(3.9)	24.1	(2.4)	45.9	(5.2)	58.7	(3.7)	73.6	(3.2)	12.7	(2.4)	11.4	(2.5)	10.2	(2.5)	8.6	(2.0)	7.2	(1.7)	5.1	(1.4)
	0.3	(3.8)	16.1	(6.0)	22.2	(10.1)	36.8	(11.0)	55.9	(4.0)	67.3	(5.3)	29.0	(13.3)	26.6	(12.4)	24.4	(10.6)	20.5	(7.2)	18.1	(6.0)	14.6	(4.2)
B7000	3.4	(1.9)	8.9	(3.5)	21.2	(2.1)	41.9	(4.7)	55.7	(3.5)	71.4	(3.0)	11.4	(2.3)	10.2	(2.3)	9.1	(2.3)	7.7	(1.8)	6.5	(1.6)	4.8	(1.3)
	0.0	(3.2)	14.0	(5.4)	19.6	(8.7)	33.7	(10.4)	52.5	(3.5)	65.3	(4.9)	27.0	(13.3)	24.9	(12.2)	22.8	(10.4)	19.1	(6.6)	16.9	(5.5)	13.8	(3.9)
B8000	2.9	(1.8)	7.9	(3.2)	18.8	(2.0)	38.5	(4.2)	52.9	(3.2)	69.4	(2.9)	10.4	(2.2)	9.3	(2.1)	8.3	(2.1)	7.1	(1.7)	6.0	(1.5)	4.5	(1.3)
	-1.0	(2.9)	9.8	(4.3)	15.9	(6.3)	29.3	(9.9)	44.1	(2.6)	64.0	(4.2)	26.6	(12.4)	24.9	(11.0)	22.8	(9.1)	18.7	(4.8)	16.4	(3.5)	13.1	(2.4)
B9000	2.5	(1.6)	7.0	(2.9)	16.9	(1.9)	35.5	(3.8)	50.3	(3.0)	67.5	(2.8)	9.6	(2.1)	8.6	(2.0)	7.7	(1.9)	6.5	(1.6)	5.7	(1.4)	4.2	(1.2)
	-1.2	(2.7)	8.9	(4.1)	14.5	(5.7)	27.3	(9.3)	41.7	(2.4)	62.0	(4.0)	25.4	(12.5)	23.8	(11.1)	21.7	(9.1)	17.6	(4.5)	15.5	(3.3)	12.5	(2.3)
B10000	2.1	(1.6)	6.3	(2.7)	15.3	(1.8)	32.9	(3.5)	47.9	(2.8)	65.7	(2.7)	8.9	(2.0)	7.9	(1.8)	7.1	(1.8)	6.1	(1.5)	5.3	(1.3)	4.1	(1.2)
	-0.7	(2.3)	9.8	(4.1)	14.5	(6.1)	27.1	(8.7)	43.9	(2.7)	59.9	(4.3)	23.1	(13.5)	21.4	(11.9)	19.6	(10.2)	16.1	(5.6)	14.5	(4.7)	12.0	(3.3)

Error (1SD) shown in brackets.

Greyed and white values are with a total phantom activity of 2.7GBq (2100kBq/cc sphere specific activity) and 0.9GBq (700kBq/cc sphere specific activity) respectively.

* 2 iterations, 24 subsets, no filtering, SharpIR, 256x256

† 3 iterations, 18 subsets, 6.0mm, heavy filter, SharpIR, 192x192

‡ 2 iterations, 12 subsets, 7.0mm, heavy filter, SharpIR, 256x256

SUPPLEMENTAL TABLE 2.

Results of the Wilcoxon signed rank test used to compare the CR and BV for B4000 against OSEM PSF, Kao, B1000 and QUEST reconstructions respectively for a total phantom activity of 2.7GBq and 0.9BGq. Figures in bold represent a significant difference, with CR being higher for OSEM PSF, Kao, B1000 and QUEST compared to B4000, and BV being lower for B4000 as compared to PSF, Kao, B1000 and QUEST.

		CR		BV	
	Recon	B4000			
Sphere size		2.7GBq	0.9GBq	2.7GBq	0.9GBq
37mm	OSEM PSF	**p=0.043 z=-2.023**	p=0.08 z=1.753	**p=0.043 z=-2.023**	**p=0.043 z=-2.023**
28mm	OSEM PSF	**p=0.043 z=-2.023**	p=0.138 z=-1.483	**p=0.043 z=-2.023**	**p=0.043 z=-2.023**
22mm	OSEM PSF	**p=0.043 z=-2.023**	p=0.138 z=-1.483	**p=0.043 z=-2.023**	p=0.138 z=1.483
17mm	OSEM PSF	**p=0.043 z=-2.023**	**p=0.043 z=-2.023**	**p=0.043 z=-2.023**	p=0.225 z=-1.214
37mm	Kao	**p=0.043 z=2.023**	p=0.686 z=0.405	**p=0.043 z=2.023**	**p=0.043 z=2.023**
28mm	Kao	**p=0.043 z=2.023**	p=0.345 z=0.944	**p=0.043 z=2.023**	**p=0.043 z=2.023**
22mm	Kao	**p=0.043 z=2.023**	p=0.138 z=1.483	**p=0.043 z=2.023**	**p=0.043 z=2.023**
17mm	Kao	**p=0.043 z=2.023**	**p=0.043 z=2.023**	**p=0.043 z=2.023**	**p=0.043 z=2.023**
37mm	B1000	**p=0.043 z=2.023**	**p=0.043 z=2.023**	**p=0.043 z=2.023**	**p=0.043 z=-2.023**
28mm	B1000	**p=0.043 z=-2.023**	**p=0.043 z=2.023**	**p=0.043 z=2.023**	**p=0.043 z=2.023**
22mm	B1000	**p=0.043 z=2.023**	**p=0.043 z=-2.023**	**p=0.043 z=-2.023**	**p=0.043 z=-2.023**

17mm	B1000	**p=0.043 z=2.023**	**p=0.043 z=2.023**	**p=0.043 z=-2.023**	**p=0.043 z=-2.023**
37mm	QUEST	**p=0.043 z=2.023**	**p=0.043 z=2.023**	**p=0.043 z=2.023**	**p=0.043 z=2.023**
28mm	QUEST	**p=0.043 z=2.023**	**p=0.043 z=2.023**	**p=0.043 z=2.023**	**p=0.043 z=2.023**
22mm	QUEST	**p=0.043 z=2.023**	**p=0.043 z=2.023**	**p=0.043 z=2.023**	**p=0.043 z=2.023**
17mm	QUEST	p=0.080 z=1.753	**p=0.043 z=2.023**	**p=0.043 z=2.023**	**p=0.043 z=2.023**