

BELdART-SBRT

BELgian dosimetry Audits in Radio Therapy

*Results of the national remote lung SBRT
dosimetry audits after 1 year*

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Introduction



10 audits performed/11 beams audited

	TPS	Energy	Algorithm	Resolution dose matrix (mm)	Prescription dose/fraction (Gy)	CT slice thickness (mm)
Audit 1	Eclipse	6 MV FFF	AAA	2.5	11	2
Audit 2	Eclipse	6 MV FFF	Acuros Dm	2.5	12	3
Audit 3	Raystation	6 MV FFF	CCC	1.5	12	2
Audit 4	Eclipse	6 MV	AAA	2.5	20	2
Audit 5	Raystation	6 MV	CCC	2	15	2.5
Audit 6	Eclipse	6 MV FFF	Acuros Dm	1.25	15	2
Audit 7	Eclipse	6 MV	Acuros Dm	2.5	11	2.5
Audit 8	Raystation	6 MV	CCC	1.2	11	2
Audit 9	Raystation	6 MV FFF	CCC	2	12	2
Audit 10	Eclipse	6 MV	AAA	1	12	1

Audit 10: 2 beams audited

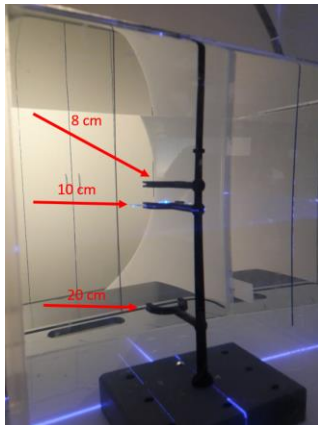
Other audits: 1 beam audited

Audit methodology

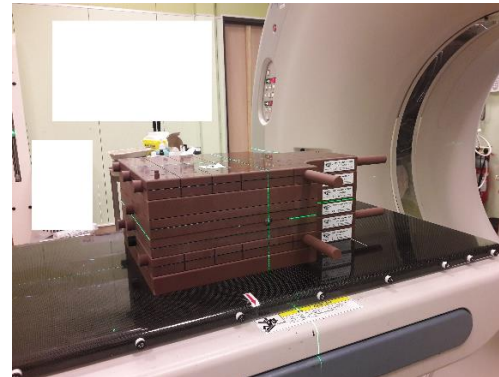


- Mailed audit
- Basic tests
 - With alanine/EPR dosimetry
 - Same as SRS procedure
- E2E test dose delivery on a commercial lung phantom (using film/alanine dosimetry)

Basic tests



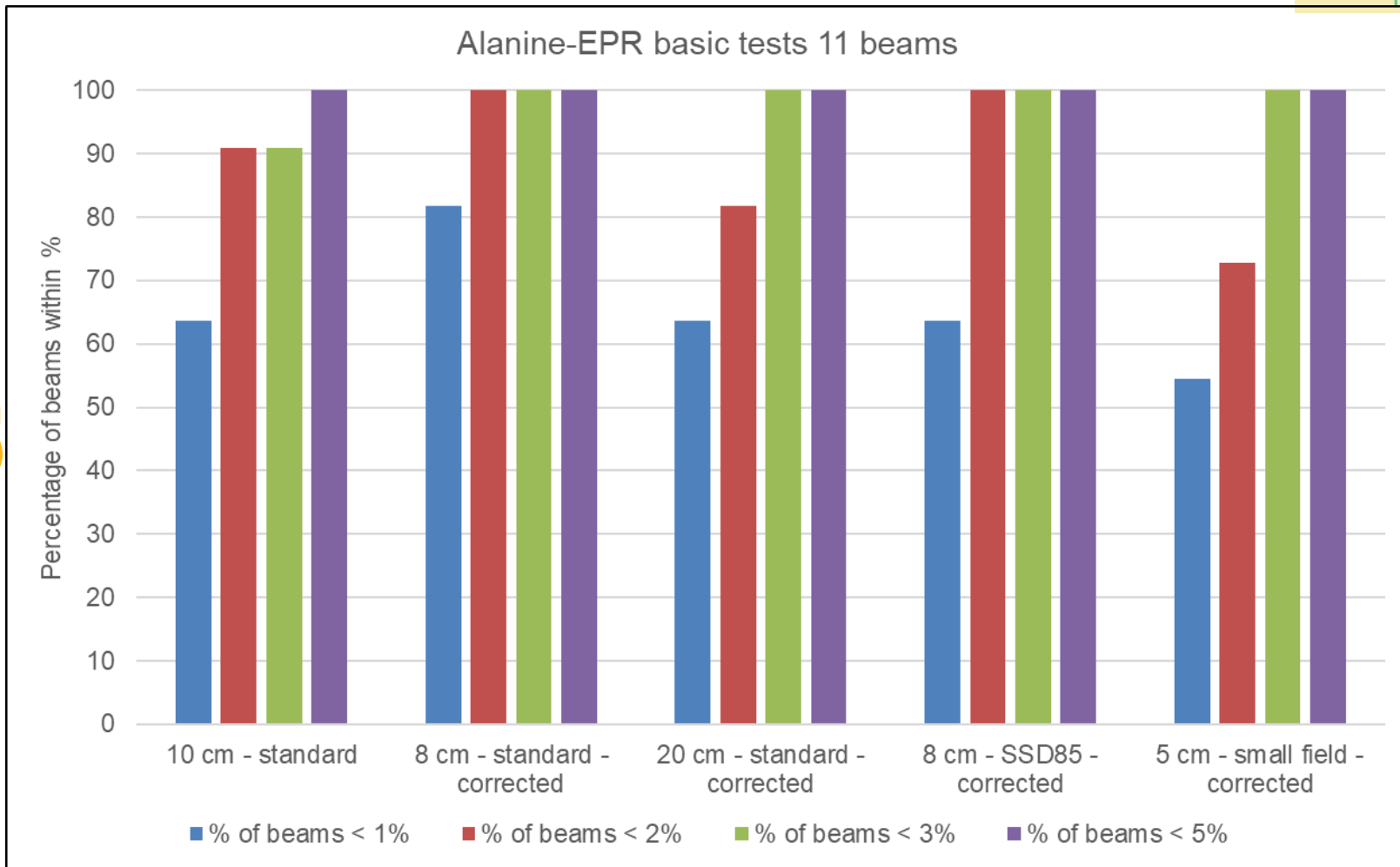
E2E test



Basic tests – corrected for output



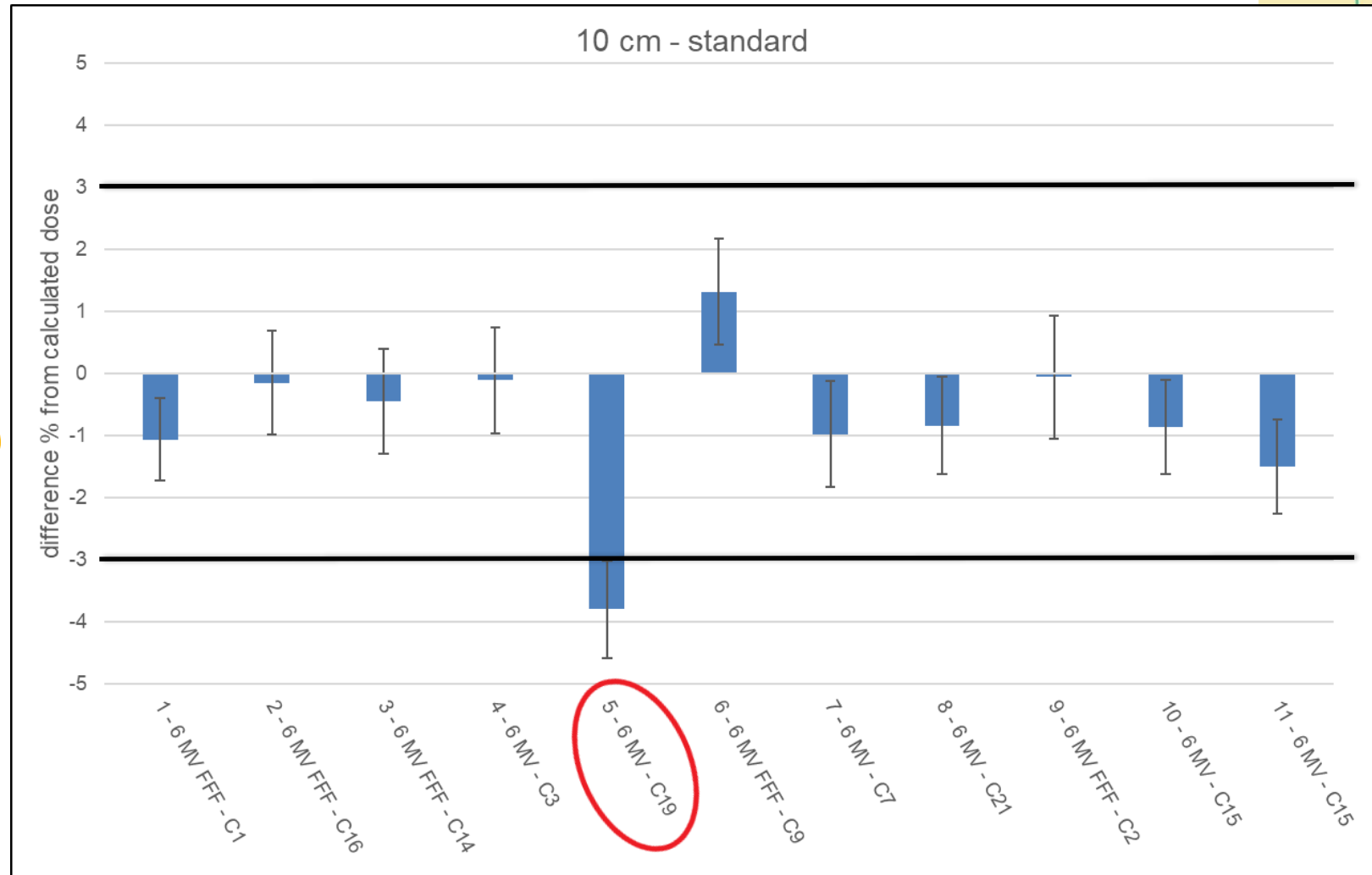
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10 cm – output



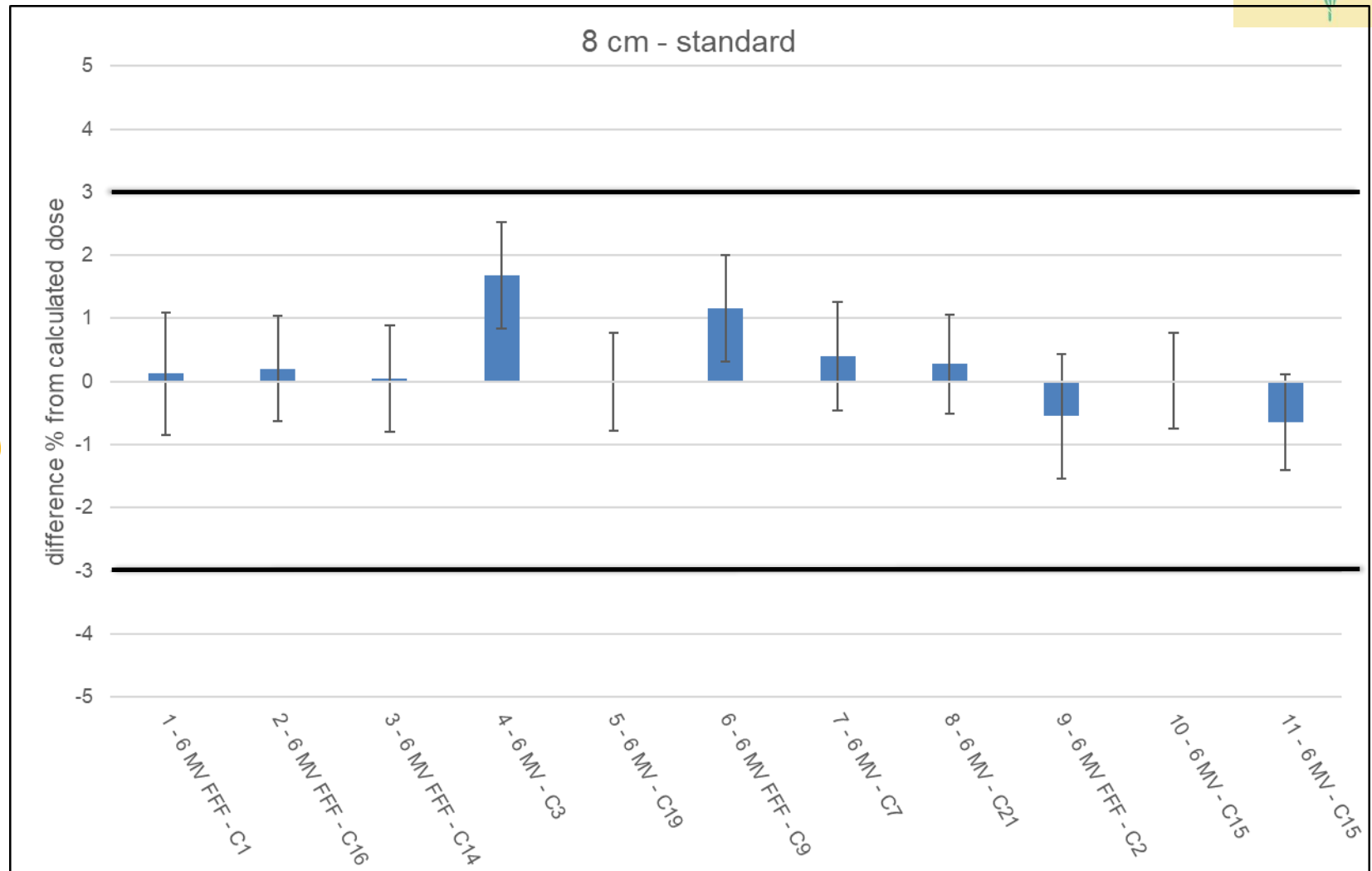
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8 cm – corrected for output



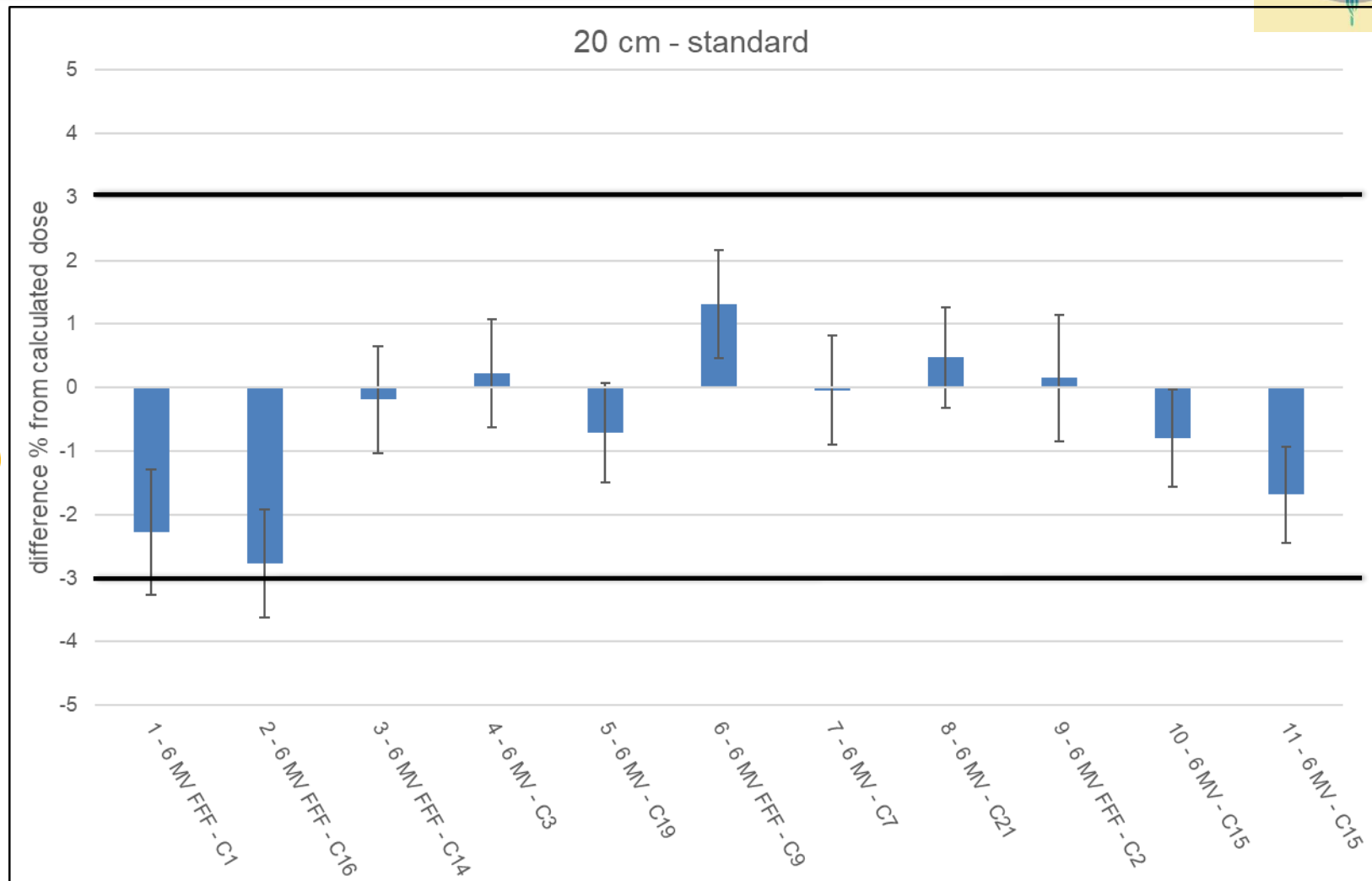
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20 cm – corrected for output



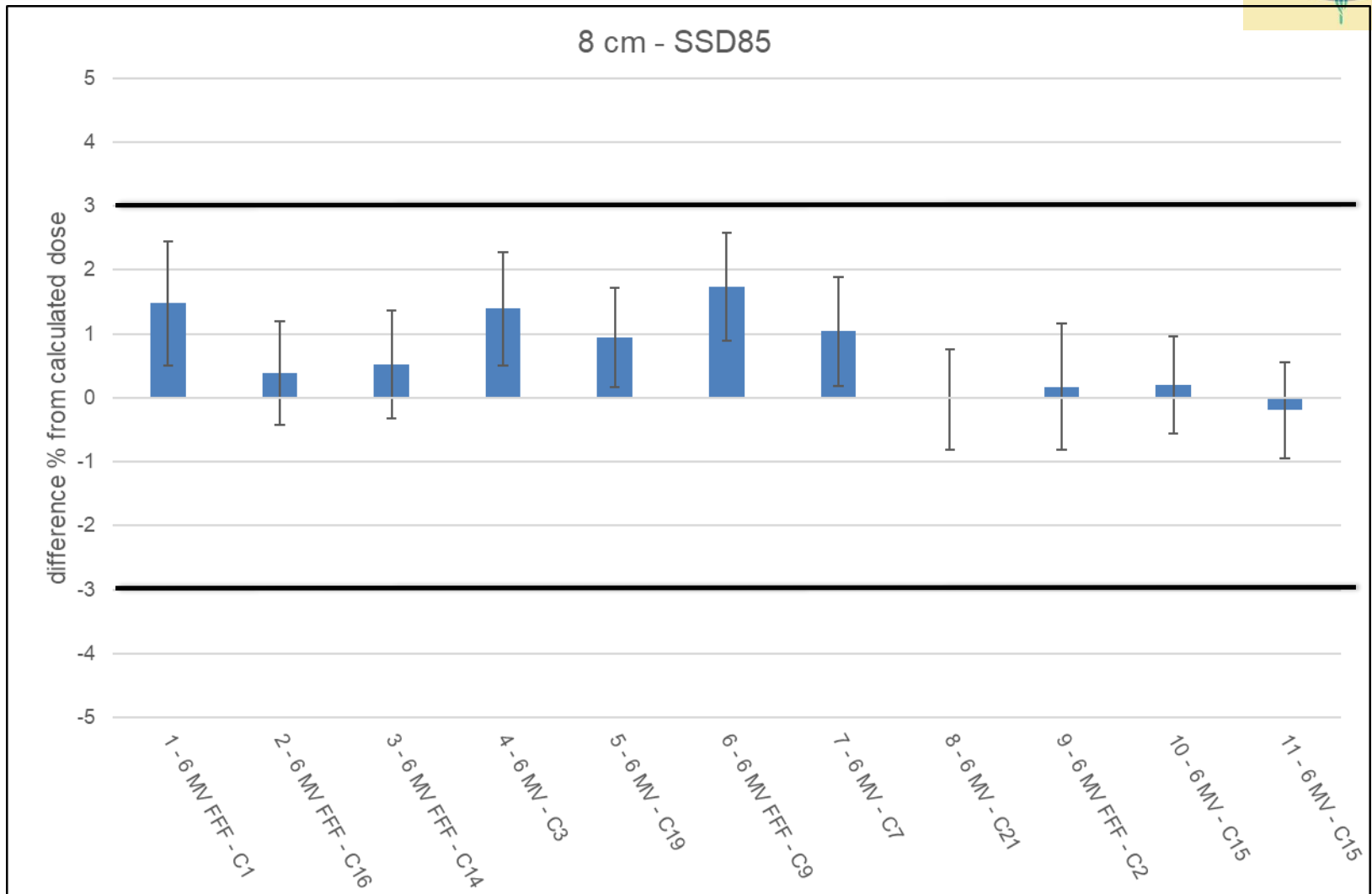
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8 cm – SSD85 – corrected for output



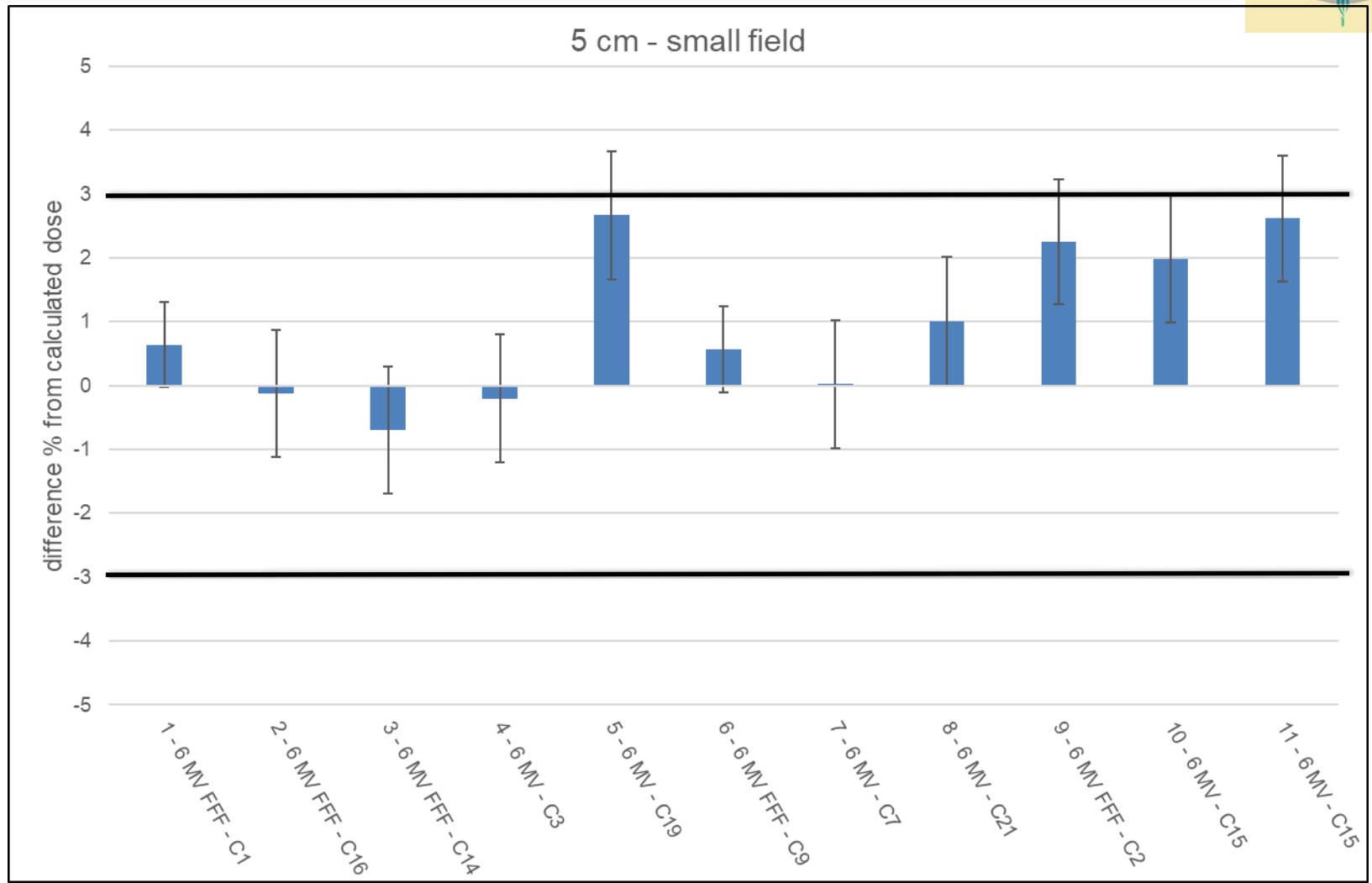
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5 cm – small field- corrected for output



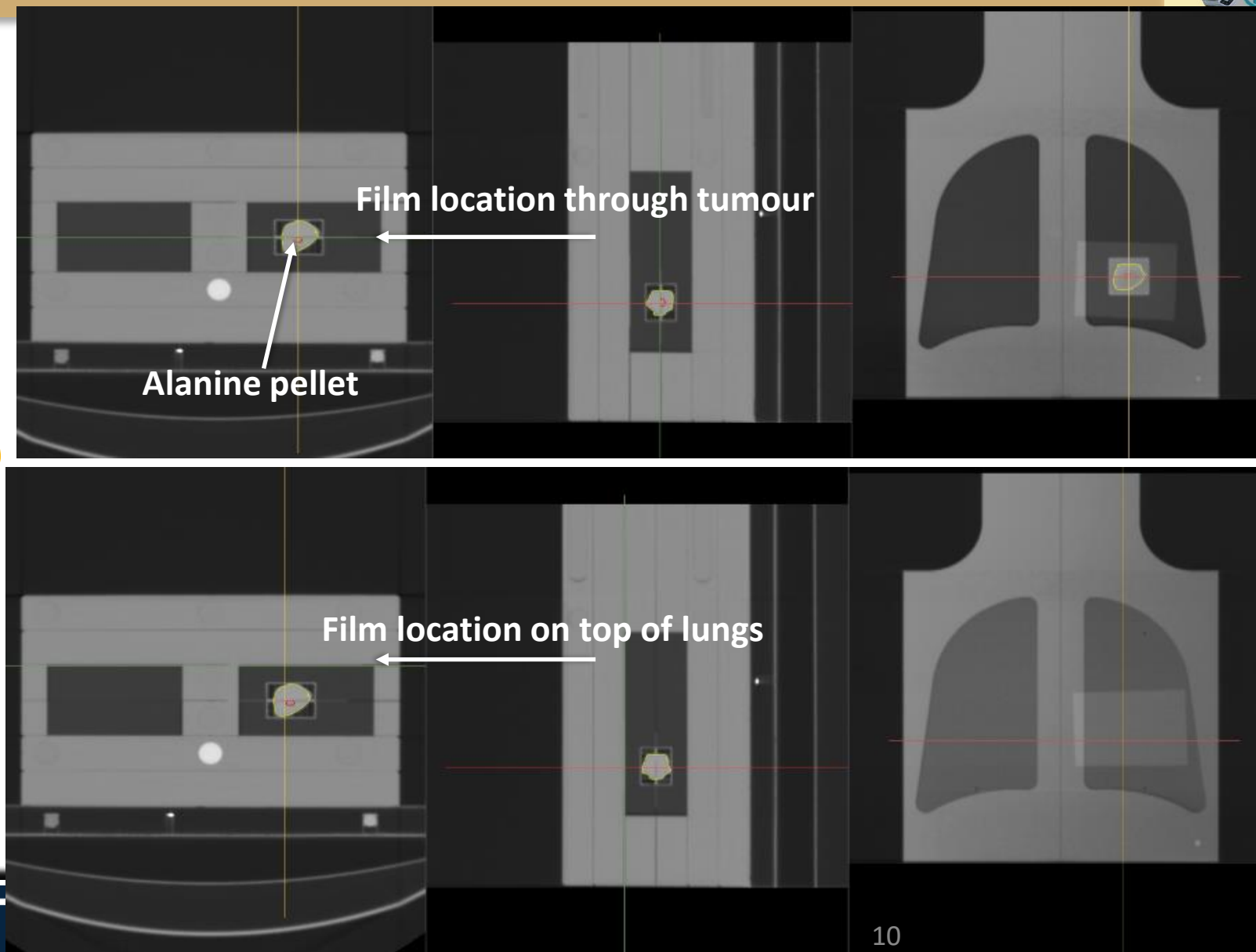
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SBRT delivery



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Alanine results summary



Alanine results (For beams calculated with Acuros: Dm used)

	Nr. of beams	%
Beams < 1%	1	9.09
Beams < 2%	8	72.73
Beams < 3%	8	72.73
Beams < 5%	11	100.00

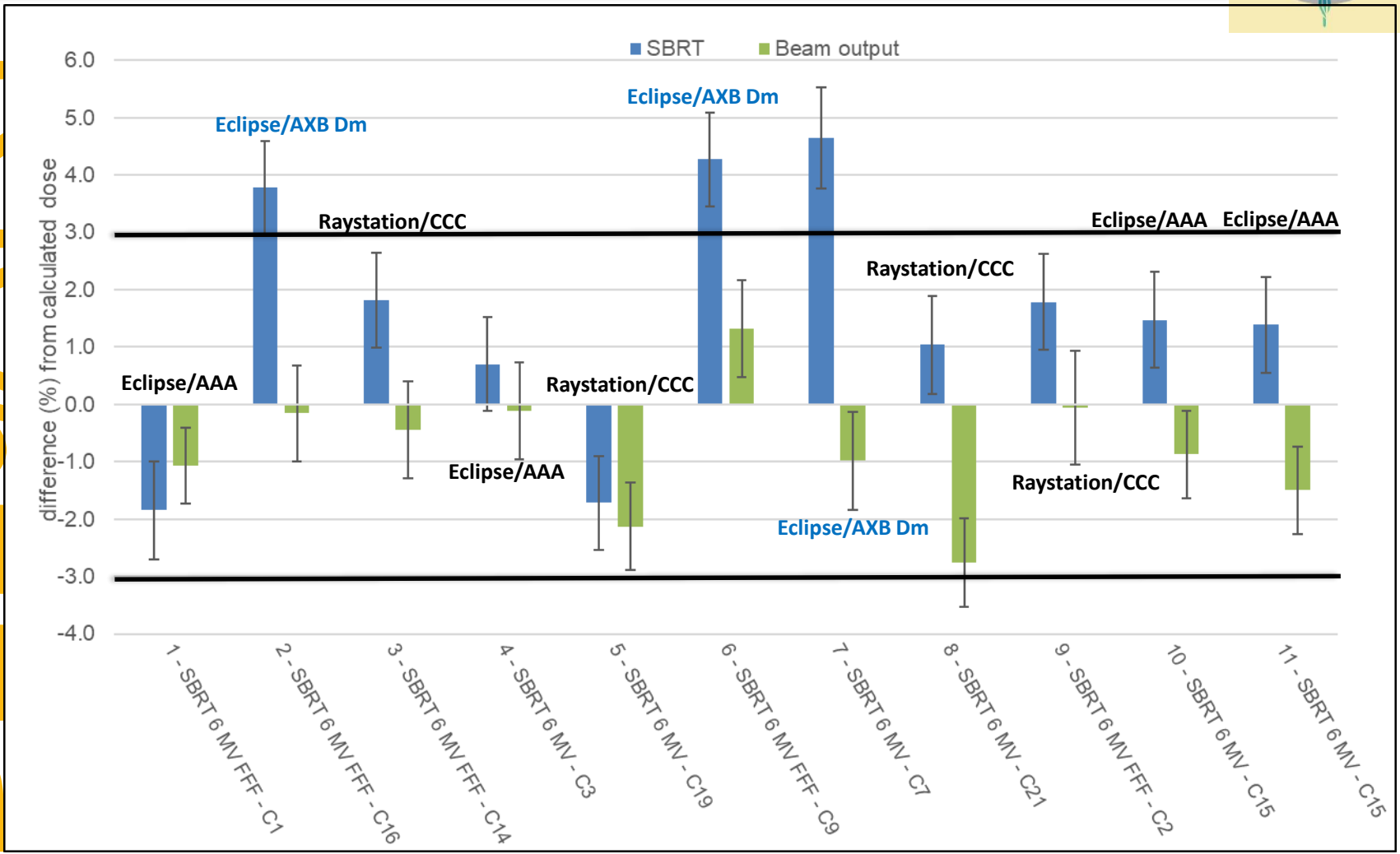
Alanine results (For beams calculated with Acuros: Dw used)

	Nr. of beams	%
Beams < 1%	1	9.09
Beams < 2%	9	81.82
Beams < 3%	11	100.00
Beams < 5%	11	100.00

SBRT alanine results



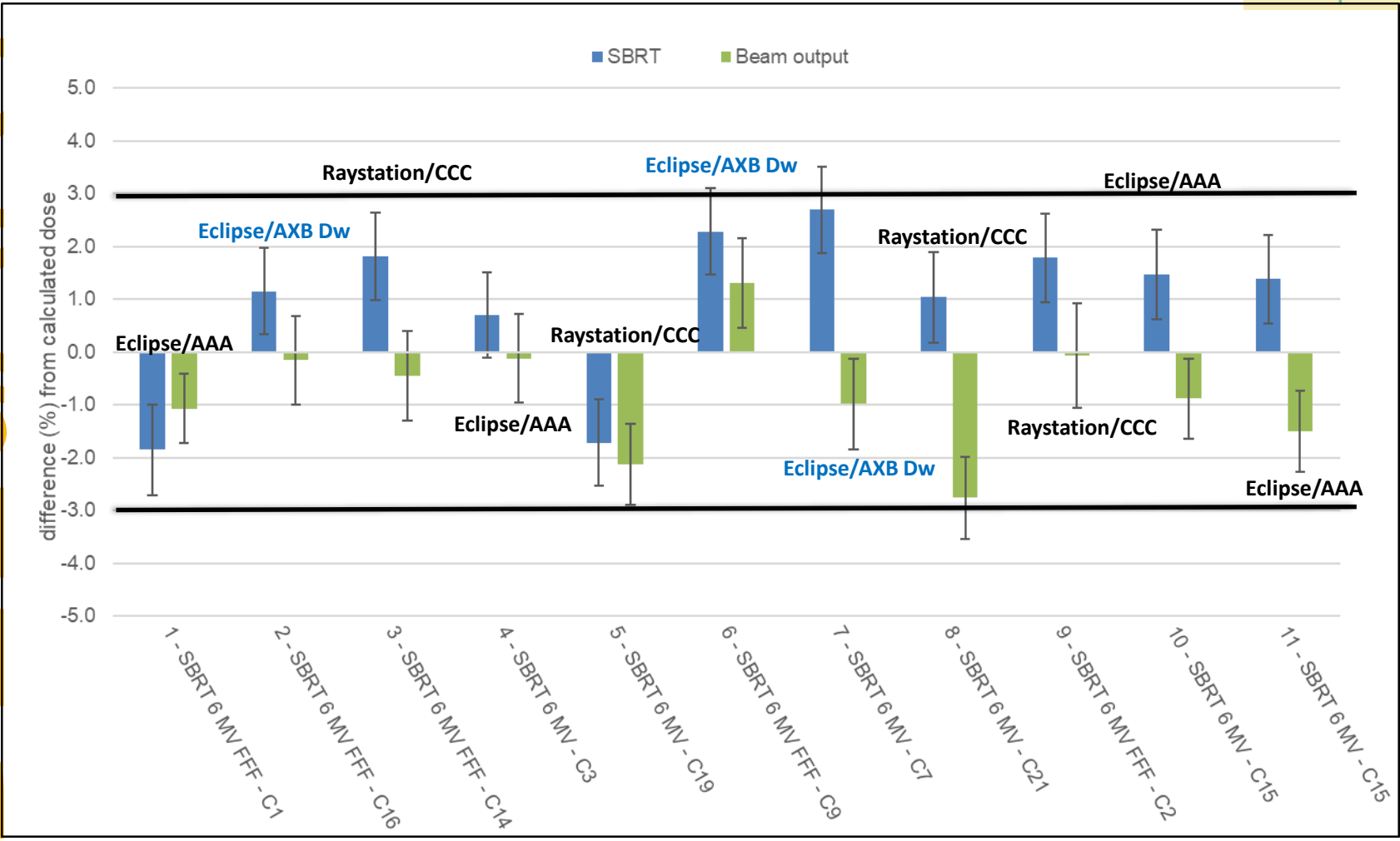
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SBRT alanine results



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Film results summary



Film results summary (For beams calculated with Acuros: Dm used)

	Through target (5%/1mm)		Top of lungs (3%/2mm)	
	Number of beams	%	Number of beams	%
Beams >98%	8	72.7	4	36.4
Beams 98%-95%	1	9.1	6	54.5
Beams 95%-90%	2	18.2	0	0.0
Beams <90%	0	0.0	1	9.1
Total	11	100.00	11	100.00

Film results summary (For beams calculates with Acuros: Dw used)

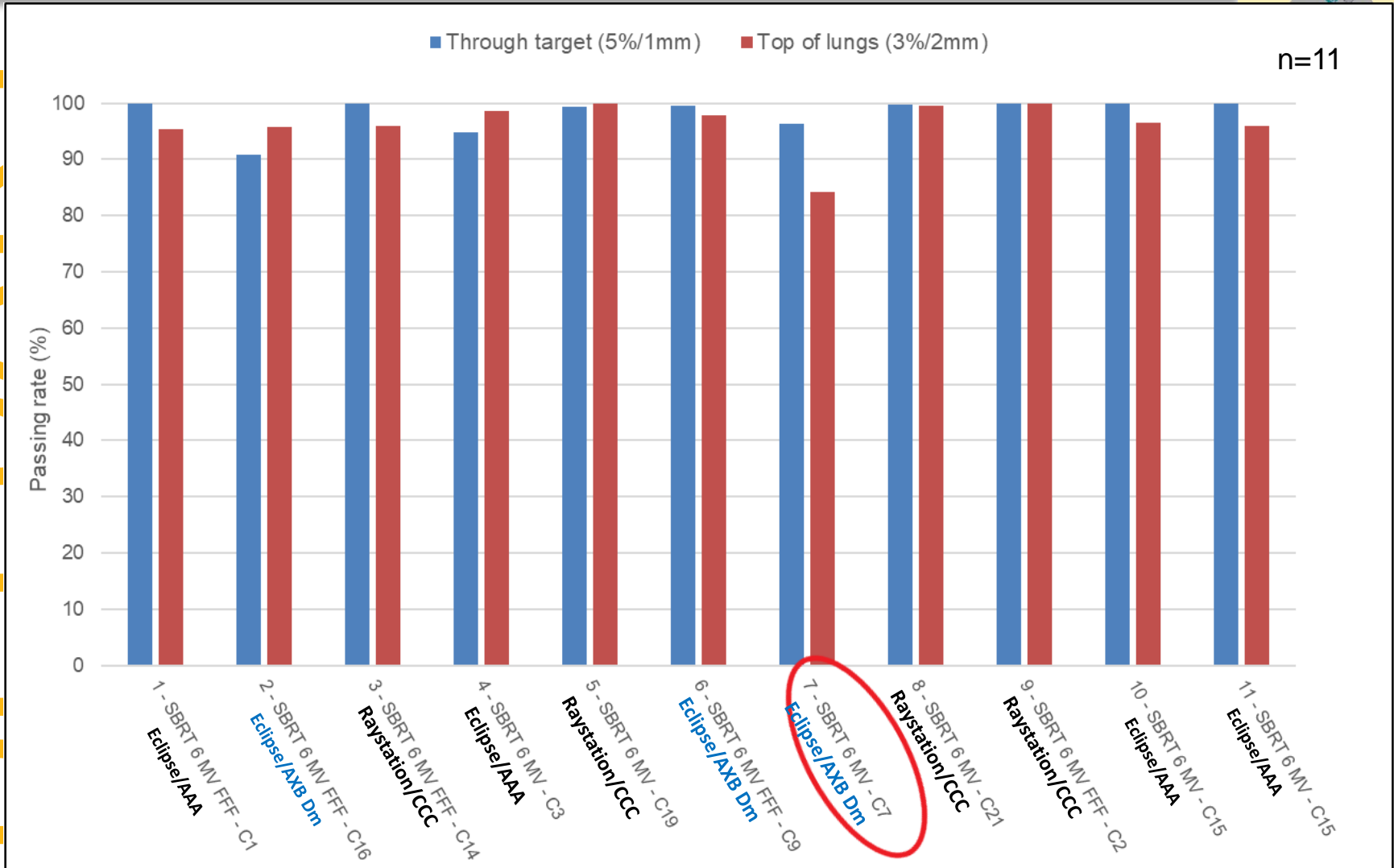
	Through target (5%/1mm)		Top of lungs (3%/2mm)	
	Number of beams	%	Number of beams	%
Beams >98%	9	81.8	4	36.4
Beams 98%-95%	0	0.0	5	45.5
Beams 95%-90%	2	18.2	1	9.1
Beams <90%	0	0.0	1	9.1
Total	11	100.00	11	100.00

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SBRT film



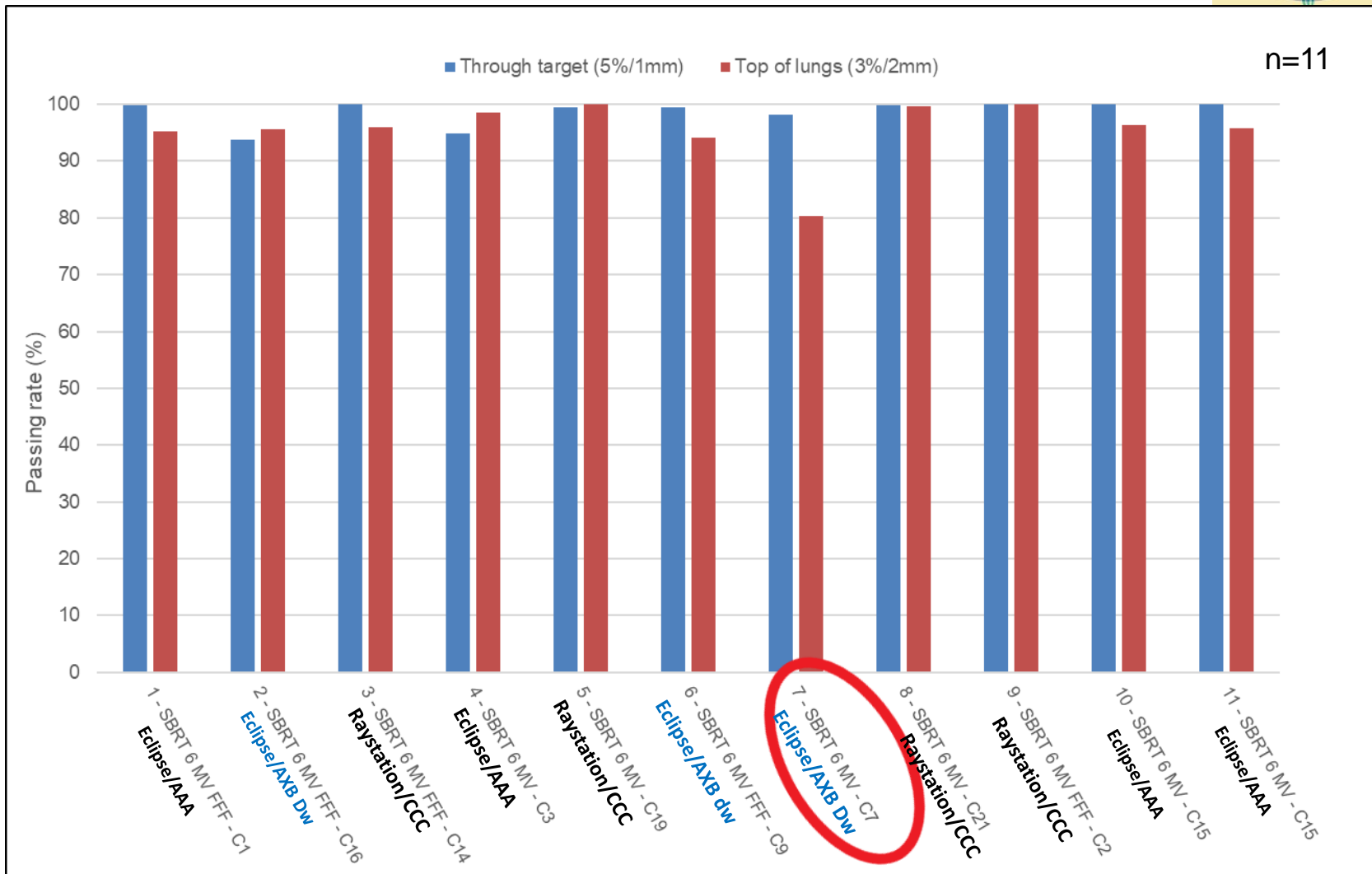
BEI DART



SBRT film



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Conclusions SBRT



- Basic test results are good
 - $\approx 90\%$ of the tests $\leq 2\%$ difference with TPS calculated dose
- E2E test results are good
 - Acuros Dw should be used for audit analysis
 - Good performance at the interface region

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