

Supplemental Online Content

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This supplemental material has been provided by the authors to give readers additional information about their work.

eTable 1. Input parameters—Dermatology

Prevalence, accuracy, lesion development and progression				
Estimate	Source (reference)	Values		
Sensitivity Standard	Brinker et al. (4)	0.894		
Specificity Standard	Brinker et al. (4)	0.644		
Sensitivity AI diagnostic	Brinker et al. (4)	0.894		
Specificity AI diagnostic	Brinker et al. (4)	0.682		
Probability of being tested at any cycle	Losina et al. (25)	0.05		
Probability of lesion development (Incidence)	Balch et al. 2001 (41)	0.00196		
If undiagnosed, progression rate to next stage	Tsao et al. (42)	0.1		
If disease has been diagnosed and treated, the risk of disease progression to next stage	Shumate et al. 1995(43)	(Table obtained from 19) -		
Health state	Source (reference)	Transition probability per cycle	Transition to	Health state utility
Stage I	Balch et al. 2001 (41)	0.90 (0.81 – 0.99)	Disease progression Remain undiagnosed Screening (Standard or AI) Death	0.937
Stage II	Balch et al. 2001 (41)	0.72 (0.65 – 0.79)	Disease progression Remain undiagnosed Screening (Standard or AI) Death	0.937
Stage III	Balch et al. 2001 (41)	0.5 (0.45 – 0.55)	Disease progression Remain undiagnosed Screening (Standard or AI) Death	0.52
Stage IV	Balch et al. 2001 (41)	0.13 (0.11 – 0.15)	Disease progression Remain undiagnosed Screening (Standard or AI) Death to Melanoma Death	0.52
History of melanoma- Stage I, II, III, IV	Svedman et al. 2016 (19)	Table is taken from Svedman et al. (19)	Disease progression Remain in the same stage (Death to Melanoma) Death	

Death	2007 Mortality table (45)	Table taken from (21)	Death	0
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Sensitivities and specificities of disease detection with and without AI assistance were derived from the economic analysis and compared with the existing meta-analysis. If possible, we calculated mean values and 95% confidence intervals or ranges to estimate normal distributions (in parentheses) for random sampling during microsimulation.

eTable 2. Input parameters—Dentistry

Prevalence, accuracy, lesion development and progression				
Estimate	Source (reference)	Initial lesions (up to inner third of enamel) (E2)	Initial lesions (up outer third of dentin) (D1)	Advanced lesions (middle third of dentin) (D2)
Prevalence				
Low risk	Schwendicke et al. (23)	0.14	0.025	0.005
High risk	Schwendicke et al. (23)	2.14×0.14	1.66×0.025	1.66×0.005
Sensitivity and specificity				
Sensitivity Visual-tactile	Schwendicke et al. (23)	0.00	0.00	0.311 (0.270-0.353)
Specificity Visual-tactile	Schwendicke et al. (23)	1.00	1.00	0.922 (0.892-0.945)
Sensitivity Radiography w/o AI (control)*	Schwendicke et al. (38)	0.24 (0.21-0.26)	0.36 (0.24-0.49)	0.64 (0.59-0.70)
Specificity Radiography w/o AI (control)*	Schwendicke et al. (38)	0.97 (0.95-0.98)	0.94 (0.89-0.97)	0.98 (0.97-0.98)
Sensitivity Radiography w AI (test)	Garcia Cantu et al. (39)	0.68	0.68	0.58
Specificity Radiography w AI (test)	Garcia Cantu et al. (39)	0.86	0.86	0.96
Probability of being tested	KZBV- Statutory Guideline (46)	2 per year	2 per year	2 per year
Probability of lesion development	Schwendicke et al. (23)	$p = 1.26 \times 0.57252 \times 2.7^{-0.1472 \times 2\alpha}$ distribution: 1.24-1.29	$p = 1.26 \times 0.0426 \times 2.7^{-0.0521 \times 2\alpha}$ distribution: 1.24-1.29	$p = 1.26 \times 0.57 \times 0.0426 \times 2.7^{-0.0521 \times 2\alpha}$ distribution: 1.24-1.29
Probability of lesion progression				
Progression to		D1 lesion	D2 lesion	D3 lesion
If untreated	Schwendicke et al. (23)	$p = 2.63 \text{ (high risk)} / 2.13 \text{ (low risk)} \times 3.0984 \times (2\alpha)^{-1.343}$ (distribution: $p \times 0.87 - p \times 1.13$)	$p = 2.63 \text{ (high risk)} / 2.13 \text{ (low risk)} \times 161.52 \times (2\alpha)^{-2.078}$ (distribution: $p \times 0.87 - p \times 1.13$)	$p = 1.32 \times 161.52 \times (2\alpha)^{-2.078}$ (distribution: $p \times 0.87 - p \times 1.13$)
If infiltrated	Schwendicke et al. (23)	$p = 0.4289 \times (2\alpha)^{-1.391}$ (distribution: $p \times 0.23 - p \times 5.15$)	$p = 68.869 \times (2\alpha)^{-2.078}$ (distribution: $p \times 0.23 - p \times 4.17$)	-
Transition probabilities				
Health state	Source (reference)	Transition probability per cycle	Transition to	Allocation probability
Composite ¹¹	(Pallesen et al.)	0.016	Composite Crown Repair Rootcanal treatment	0.45 0.10 0.10 0.25

			Extraction	0.10
Direct capping ²	Schwendicke et al. (47)	0.111	Rootcanal treatment	0.95
			Extraction	0.05
Crown on vital tooth ³	Burke and Lucarotti (48)	0.036	Rootcanal treatment	0.25
			Recementation	0.15
			Repair	0.10
			Re- crown	0.40
			Extraction	0.10
Root canal treatment	Lumley et al. (49)	0.021	Non-surgical re-treatment	0.20
			Surgical re-treatment	0.30
			Extraction	0.50
Crown on non-vital tooth ³	Burke and Lucarotti (48)	0.029	Recementation	0.20
			Repair	0.10
			Re- crown ³	0.60
			Extraction	0.10
Non-surgical root-canal treatment	Ng et al. (50)	0.085(Ng et al. 2008)	Surgical re-treatment	0.25
			Extraction	0.75
Surgical root-canal treatment	Torabinejad et al. (51)	0.061	Extraction	1.00
Implant and implant-supported crown	Torabinejad et al. (52)	0.010	Recementation/refixing	0.60
			Re-crown	0.20
			Re-implant	0.20

¹ Data from 15-19-year-olds. The risk of pulpal exposure during re-composite assumed to be 10%. Crowning assumed if re-restored before.

² 95% of exposed pulps were treated using direct capping, 5% were assumed to receive immediate root canal treatment.

³ For non-vital crowned teeth, the risk of endodontic complications was calculated separately (Ferrari et al. 2012).

Analyses were performed for populations with low and high caries prevalence and risks, respectively. Sensitivities and specificities of caries detection with and without AI assistance were derived from our primary study and a meta-analysis as described. The probabilities of lesion development and progression if untreated or infiltrated were calculated according to the patient's age (α) using hazard functions. If possible, we calculated mean values and 95% confidence intervals or ranges to estimate distributions (in parentheses) for random sampling during microsimulation.

eTable 3. Input parameters—Ophthalmology

Prevalence, accuracy, disease development and progression			
Estimate	Source (reference)	Values	
Type II diabetes, prevalence	Mansberg et al. (53)	0.14 (0.09-0.25)	
Sensitivity and specificity			
Sensitivity Standard	Lin et al. (27)	0.829 (0.805-0.85)	
Specificity Standard		0.92 (0.88-0.96)	
Sensitivity AI diagnostic	Abramoff et al. (40)	0.87 (0.81-0.91)	
Specificity AI diagnostic		0.91 (0.83-0.93)	
Probability of being tested	An et al. (54)	0.50 (0.15-0.90)	
Utility values			
No diabetic retinopathy (No-DR)	Ben et al. (55)	*0.748 (0.698-0.798)	
Non-sight threatening diabetic retinopathy (Non-STDR)		0.752 (0.679-0.825)	
Sight threatening diabetic retinopathy (STDR)		0.628 (0.521-0.726)	
Bilateral blindness (BB)		0.355 (0.105-0.606)	
Treatment effects			
Risk reduction of worsening using laser treatment	Evans et al. (56)	0.49 (0.37-0.64)	
Transition probabilities			
Health state	Source (reference)	Transition to	Transition probability per cycle
No-DR to	Janghorbani et al. / UKDPS(57,58)	Non-STDR	0.0541(0.0516–0.0555)
		STDR	0.0541(0.0516–0.0555)
		BB	0.0016 (0.0014–0.0020)
Non-STDR		STDR	0.0541(0.0516–0.0555)
		BB	0.0040(0.0034–0.0050)
STDR		BB	0.0080 (0.0068–0.0090)
Death	Brazilian ministry of health(59)	Death	Table 2013
Annual costs/ state	Source (Reference)	Cost	
From NoDR to other states	Ben et al. (55), Brazilian ministry of health (60)	R\$16 (R\$14–R\$19)	
From NoDR/ Non-STDR to STDR		R\$122 (R\$104–R\$140)	
From NoDR/ Non-STDR to BB		R\$15 (R\$12–R\$17)	

From STDR to BB		R\$79 (R\$67–R\$91)
Cost Non-STDR		R\$235 (R\$199–R\$270)
Cost STDR		R\$15 (R\$12–R\$17)
Cost BB		R\$37 (R\$31–R\$43)
Cost AI screening	(16)	R\$8 (R\$0–R\$40)

Sensitivities and specificities of disease detection with and without AI assistance were derived from the economic analysis and compared with the existing meta-analysis. If possible, we calculated mean values and 95% confidence intervals or ranges for random sampling during microsimulation.

*The population modelled consists of already diabetic patients, reason why utility even without DR is never 1. Transition probability to other stages can be sudden, however, patients are assumed to already accrue costs for their standard treatment.

eTable 4. Sensitivity analysis—Discounting rate

Dermatology

Discount Rate	Strategy	Strategy Index	Cost	Inc Cost	Eff	Increase Eff	ICER	NMB	C/E	Dominance
0	AI recognition	1	731.93	0	87.25	0	0	2.62E+07	8.38	
0	Visual recognition	0	738.50	6.57	87.23	-0.015	-412.64	2.62E+07	8.46	(Dominated)
0.01	Visual recognition	0	678.21	0	69.63	0	0	2.09E+07	9.73	
0.01	AI recognition	1	679.75	1.53	69.64	0.010	141.89	2.09E+07	9.76	
0.02	Visual recognition	0	634.46	0	56.78	0	0	1.70E+07	11.17	
0.02	AI recognition	1	641.94	7.47	56.79	0.007	1010.29	1.70E+07	11.30	
0.03	Visual recognition	0	602.14	0	47.25	0	0	1.42E+07	12.74	
0.03	AI recognition	1	614.04	11.90	47.25	0.0051	2333.74	1.42E+07	12.99	
0.04	Visual recognition	0	577.85	0	40.04	0	0	1.20E+07	14.42	
0.04	AI recognition	1	593.11	15.25	40.04	0.0035	4306.27	1.20E+07	14.80	
0.05	Visual recognition	0	559.28	0	34.50	0	0	1.04E+07	16.20	
0.05	AI recognition	1	577.12	17.83	34.50	0.0024	7189.68	1.04E+07	16.72	
0.06	Visual recognition	0	544.87	0	30.17	0	0	9051062	18.059	
0.06	AI recognition	1	564.73	19.85	30.17	0.0017	11329.3	9051568	18.71	
0.07	Visual recognition	0	533.52	0	26.72	0	0	8018135	19.96	
0.07	AI recognition	1	554.98	21.46	26.73	0.00125	17168.06	8018488	20.76	
0.08	Visual recognition	0	524.46	0	23.95	0	0	7184593	21.89	
0.08	AI recognition	1	547.21	22.75	23.95	9.01E-04	25253.64	7184840	22.84	
0.09	Visual recognition	0	517.13	0	21.67	0	0	6502180	23.85	
0.09	AI recognition	1	540.94	23.80	21.67	6.57E-04	36230.48	6502353	24.95	
0.1	Visual recognition	0	511.14	0	19.78	0	0	5935946	25.83	
0.1	AI recognition	1	535.82	24.67	19.78	4.86E-04	50805.69	5936067	27.07	

Dentistry

Discount Rate	Strategy	Strategy Index	Cost	Incr Cost	Eff	Incr Eff	ICER	NMB	C/E	Dominance
0.01	AI	0	552.72	0	62.35	0	0	-552.73	8.86	
0.01	Dentists	1	620.61	67.88	60.91	-1.44	-46.95	-620.61	10.18	(Dominated)
0.019	AI	0	421.33	0	62.35	0	0	-421.33	6.75	
0.019	Dentists	1	462.61	41.28	60.91	-1.44	-28.55	-462.61	7.59	(Dominated)
0.028	AI	0	335.92	0	62.35	0	0	-335.92	5.38	
0.028	Dentists	1	360.63	24.70	60.91	-1.44	-17.08	-360.63	5.92	(Dominated)
0.037	AI	0	277.52	0	62.35	0	0	-277.52	4.45	
0.037	Dentists	1	291.28	13.75	60.91	-1.44	-9.51	-291.28	4.78	(Dominated)
0.046	AI	0	235.91	0	62.35	0	0	-235.91	3.78	
0.046	Dentists	1	242.09	6.18	60.91	-1.44	-4.28	-242.1	3.97	(Dominated)
0.055	AI	0	205.20	0	62.35	0	0	-205.20	3.29	
0.055	Dentists	1	205.98	0.77	60.91	-1.44	-0.53	-205.98	3.38	(Dominated)
0.064	Dentists	1	178.65	0	60.91	0	0	-178.65	2.93	
0.064	AI	0	181.86	3.21	62.35	1.44	2.22	-181.87	2.91	
0.073	Dentists	1	157.44	0	60.91	0	0	-157.44	2.58	
0.073	AI	0	163.65	6.21	62.35	1.44	4.29	-163.66	2.62	
0.082	Dentists	1	140.59	0	60.91	0	0	-140.6	2.30	
0.082	AI	0	149.11	8.51	62.35	1.44	5.89	-149.11	2.39	
0.091	Dentists	1	126.95	0	60.91	0	0	-126.95	2.08	
0.091	AI	0	137.26	10.31	62.35	1.44	7.13	-137.26	2.20	
0.1	Dentists	1	115.70	0	60.91	0	0	-115.70	1.89	
0.1	AI	0	127.43	11.73	62.35	1.44	8.11	-127.43	2.04	

Ophthalmology

Discount Rate	Strategy	Strategy Index	Cost	Incr Cost	Eff	Incr Eff	ICER	NMB	C/E	Dominance
0	Ophthalmologist	0	2871.83	0	15.08	0	0	-2871.83	190.43	
0	Screening AI	1	2956.04	84.216	15.07	-0.00251	-33591.6	-2956.05	196.05	(Dominated)
0.01	Ophthalmologist	0	2380.24	0	13.12	0	0	-2380.25	181.34	
0.01	Screening AI	1	2458.09	77.844	13.12	-0.00202	-38536.6	-2458.09	187.30	(Dominated)
0.02	Ophthalmologist	0	1996.99	0	11.56	0	0	-1997	172.66	
0.02	Screening AI	1	2069.50	72.504	11.56	-0.00164	-44162.4	-2069.5	178.95	(Dominated)
0.03	Ophthalmologist	0	1694.97	0	10.30	0	0	-1694.98	164.46	
0.03	Screening AI	1	1762.97	67.992	10.30	-0.00135	-50541.5	-1762.97	171.08	(Dominated)
0.04	Ophthalmologist	0	1454.45	0	9.27	0	0	-1454.45	156.78	
0.04	Screening AI	1	1518.59	64.148	9.27	-0.00111	-57753.7	-1518.6	163.71	(Dominated)
0.05	Ophthalmologist	0	1260.90	0	8.42	0	0	-1260.91	149.64	
0.05	Screening AI	1	1321.76	60.851	8.42	-9.24E-04	-65888.4	-1321.76	156.88	(Dominated)
0.06	Ophthalmologist	0	1103.60	0	7.71	0	0	-1103.61	143.03	
0.06	Screening AI	1	1161.60	58.001	7.71	-7.73E-04	-75045.3	-1161.61	150.56	(Dominated)
0.07	Ophthalmologist	0	974.51	0	7.11	0	0	-974.51	136.94	
0.07	Screening AI	1	1030.03	55.524	7.11	-6.51E-04	-85337.5	-1030.04	144.75	(Dominated)
0.08	Ophthalmologist	0	867.58	0	6.60	0	0	-867.58	131.33	
0.08	Screening AI	1	920.93	53.357	6.60	-5.51E-04	-96893.9	-920.93	139.42	(Dominated)
0.09	Ophthalmologist	0	778.21	0	6.16	0	0	-778.21	126.19	
0.09	Screening AI	1	829.66	51.450	6.16	-4.68E-04	-109862	-829.66	134.54	(Dominated)
0.1	Ophthalmologist	0	702.89	0	5.78	0	0	-702.89	121.47	
0.1	Screening AI	1	752.65	49.764	5.78	-4.00E-04	-124412	-752.65	130.08	(Dominated)

eTable 5. Sensitivity analysis—Cost of AI

Dermatology

AI costs (US\$)	Base case	Strategy	Strategy Index	Cost	Incr Cost	Eff	Incr Eff	ICER	NMB	C/E	Dominance
0		AI recognition	1	727.99	0	86.62	0	0	2.60E+07	8.40	
0		Visual recognition	0	762.32	34.33	86.62	0.0015	22350.23	2.60E+07	8.80	
4		AI recognition	1	736.90	0	86.62	0	0	2.60E+07	8.50	
4		Visual recognition	0	762.32	25.42	86.62	0.0015	16550.96	2.60E+07	8.80	
8	Base case	AI recognition	1	745.81	0	86.62	0	0	2.60E+07	8.61	
8	Base case	Visual recognition	0	762.32	16.51	86.62	0.0015	10751.69	2.60E+07	8.80	
12		AI recognition	1	754.72	0	86.62	0	0	2.60E+07	8.71	
12		Visual recognition	0	762.32	7.60	86.62	0.0015	4952.42	2.60E+07	8.80	
16		Visual recognition	0	762.32	0	86.62	0	0	2.60E+07	8.80	
16		AI recognition	1	763.63	1.30	86.62	-0.0015	-846.85	2.60E+07	8.81	(Dominated)
20		Visual recognition	0	762.32	0	86.62	0	0	2.60E+07	8.80	
20		AI recognition	1	772.54	10.21	86.62	-0.0015	-6646.12	2.60E+07	8.91	(Dominated)
24		Visual recognition	0	762.32	0	86.62	0	0	2.60E+07	8.80	
24		AI recognition	1	781.45	19.12	86.62	-0.0015	-12445.4	2.60E+07	9.02	(Dominated)
28		Visual recognition	0	762.32	0	86.62	0	0	2.60E+07	8.80	
28		AI recognition	1	790.36	28.03	86.62	-0.0015	-18244.7	2.60E+07	9.12	(Dominated)
32		Visual recognition	0	762.32	0	86.62	0	0	2.60E+07	8.80	
32		AI recognition	1	799.27	36.94	86.62	-0.0015	-24043.9	2.60E+07	9.22	(Dominated)
36		Visual recognition	0	762.32	0	86.62	0	0	2.60E+07	8.80	
36		AI recognition	1	808.18	45.85	86.62	-0.0015	-29843.2	2.60E+07	9.33	(Dominated)
40		Visual recognition	0	762.32	0	86.62	0	0	2.60E+07	8.80	

40		AI recognition	1	817.09	54.76	86.62	-0.0015	-35642.5	2.60E+07	9.43	(Dominated)
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Dentistry

AI costs (Euro)	AI costs PPP International \$ 2020 OECD	Base case	Strategy	Strategy Index	Cost	Incr Cost	Eff	Incr Eff	ICER	NMB	C/E	Dominance
0	0		AI	0	299.93	0	63.40	0	0	-299.93	4.73	
0	0		Dentists	1	324.04	24.10	61.85	-1.55	-15.54	-324.04	5.23	(Dominated)
4	3		Dentists	1	324.04	0	61.85	0	0	-324.04	5.23	
4	3		AI	0	336.89	12.85	63.40	1.55	8.29	-336.89	5.31	
8	6	Base case	Dentists	1	324.04	0	61.85	0	0	-324.04	5.23	
8	6	Base case	AI	0	373.86	49.82	63.40	1.55	32.13	-373.86	5.89	
12	9		Dentists	1	324.04	0	61.85	0	0	-324.04	5.23	
12	9		AI	0	410.83	86.79	63.40	1.55	55.97	-410.83	6.47	
16	12		Dentists	1	324.04	0	61.85	0	0	-324.04	5.23	
16	12		AI	0	447.8	123.75	63.40	1.55	79.81	-447.8	7.06	
20	15		Dentists	1	324.04	0	61.85	0	0	-324.04	5.23	
20	15		AI	0	484.76	160.72	63.40	1.55	103.65	-484.76	7.64	
24	18		Dentists	1	324.04	0	61.85	0	0	-324.04	5.23	
24	18		AI	0	521.73	197.69	63.40	1.55	127.49	-521.73	8.22	
28	21		Dentists	1	324.04	0	61.85	0	0	-324.04	5.23	
28	21		AI	0	558.70	234.65	63.40	1.55	151.33	-558.70	8.81	
32	24		Dentists	1	324.04	0	61.85	0	0	-324.04	5.23	
32	24		AI	0	595.66	271.62	63.40	1.55	175.17	-595.66	9.39	
36	27		Dentists	1	324.04	0	61.85	0	0	-324.04	5.23	
36	27		AI	0	632.63	308.59	63.40	1.55	199.01	-632.63	9.97	
40	30		Dentists	1	324.04	0	61.85	0	0	-324.04	5.23	
40	30		AI	0	669.60	345.56	63.40	1.55	222.85	-669.60	10.55	

Ophthalmology

AI costs (Reales)	AI costs PPP International \$ 2020 OECD	Base case	Strategy	Strategy Index	Cost	Incr Cost	Eff	Incr Eff	ICER	NMB	C/E	Dominance
0	0		Ophthalmologist	0	1260.90	0	8.42	0	0	-1260.91	149.64	
0	0		Screening AI	1	1294.89	33.98	8.42	-9.24E-04	-36800.2	-1294.9	153.69	(Dominated)
4	1,73		Ophthalmologist	0	1260.90	0	8.42	0	0	-1260.91	149.64	
4	1,73		Screening AI	1	1308.32	47.41	8.42	-9.24E-04	-51344.3	-1308.33	155.28	(Dominated)
8	3,46	Base case	Ophthalmologist	0	1260.90	0	8.42	0	0	-1260.91	149.64	
8	3,46	Base case	Screening AI	1	1321.76	60.85	8.42	-9.24E-04	-65888.4	-1321.76	156.88	(Dominated)
12	5,19		Ophthalmologist	0	1260.90	0	8.42	0	0	-1260.91	149.64	
12	5,19		Screening AI	1	1335.19	74.28	8.42	-9.24E-04	-80432.4	-1335.19	158.47	(Dominated)
16	6,92		Ophthalmologist	0	1260.90	0	8.42	0	0	-1260.91	149.64	
16	6,92		Screening AI	1	1348.62	87.71	8.42	-9.24E-04	-94976.5	-1348.62	160.06	(Dominated)
20	8,65		Ophthalmologist	0	1260.90	0	8.42	0	0	-1260.91	149.64	
20	8,65		Screening AI	1	1362.05	101.14	8.42	-9.24E-04	-109521	-1362.06	161.66	(Dominated)
24	10,39		Ophthalmologist	0	1260.90	0	8.42	0	0	-1260.91	149.64	
24	10,39		Screening AI	1	1375.48	114.57	8.42	-9.24E-04	-124065	-1375.49	163.25	(Dominated)
28	12,12		Ophthalmologist	0	1260.90	0	8.42	0	0	-1260.91	149.64	
28	12,12		Screening AI	1	1388.92	128.01	8.42	-9.24E-04	-138609	-1388.92	164.85	(Dominated)
32	13,85		Ophthalmologist	0	1260.90	0	8.42	0	0	-1260.91	149.64	
32	13,85		Screening AI	1	1402.35	141.44	8.42	-9.24E-04	-153153	-1402.35	166.44	(Dominated)
36	15,58		Ophthalmologist	0	1260.90	0	8.42	0	0	-1260.91	149.64	
36	15,58		Screening AI	1	1415.78	154.87	8.42	-9.24E-04	-167697	-1415.79	168.03	(Dominated)
40	17,31		Ophthalmologist	0	1260.90	0	8.42	0	0	-1260.91	149.64	
40	17,31		Screening AI	1	1429.21	168.30	8.42	-9.24E-04	-182241	-1429.22	169.63	(Dominated)

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