

SUPPLEMENTARY APPENDIX

Accompanying the manuscript:

Moving towards an organised cervical cancer screening: costs and impact

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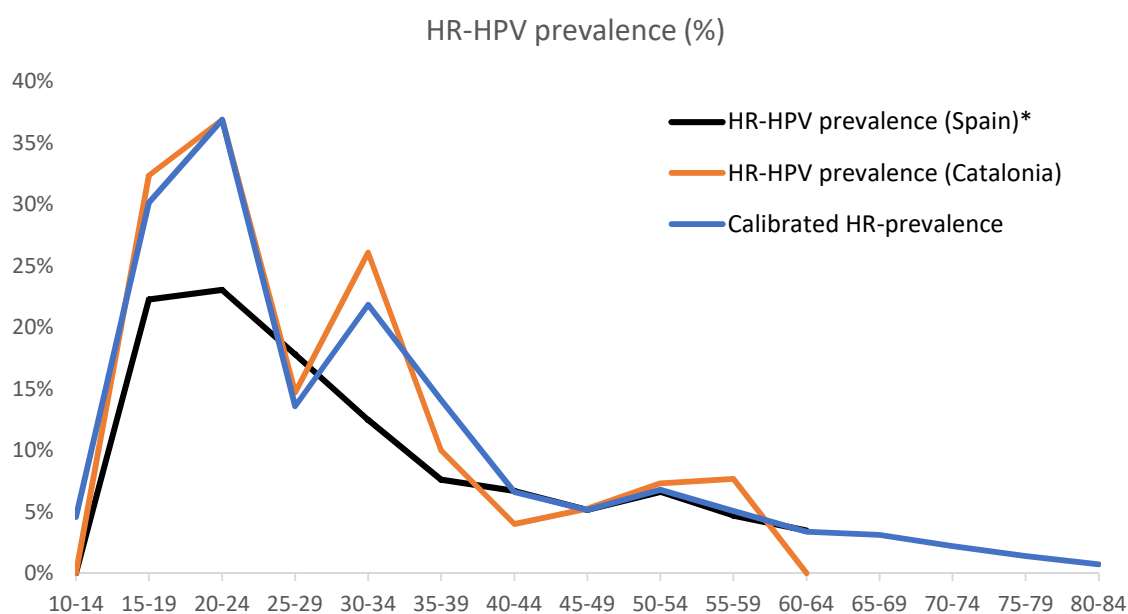
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For additional information on the model calibration, and epidemiological and cost data, see Georgalis et al 2016¹ and Moríña et al 2017².

Table S1. High risk HPV (HR-HPV) prevalence in Catalonia based on data from the CLEOPATRE study³.

Age group	HR-HPV prevalence (Spain)*	HR-HPV prevalence (Catalonia) ³	Calibrated HR-HPV prevalence
11-14	-	-	0.0459
15-19	0.2229	0.3235	0.3015
20-24	0.2307	0.3689	0.3690
25-29	0.1783	0.1471	0.1358
30-34	0.1250	0.2609	0.2184
35-39	0.0764	0.1000	0.1409
40-44	0.0671	0.0400	0.0662
45-49	0.0519	0.0526	0.0516
50-54	0.0663	0.0732	0.0681
55-59	0.0471	0.0769	0.0508
60-64	0.0348	-	0.0339
65-69	-	-	0.0312
70-74	-	-	0.0221
75-79	-	-	0.0140
80-84	-	-	0.0074

Figure S1. High risk HPV (HR-HPV) prevalence in Catalonia based on data from the CLEOPATRE study¹.

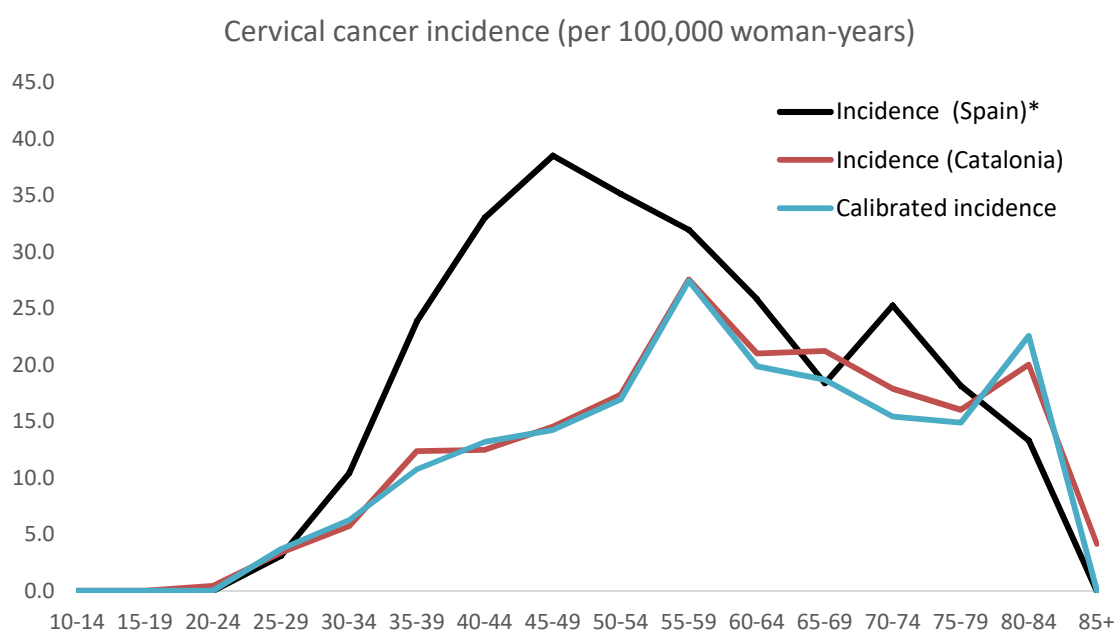


* Initial values for Nelder-Mead calibration¹

Table S2. Cervical cancer incidence rates per 100,000 woman-years before any intervention in Catalonia based on data from the Cancer Incidence in Five Continents report and applying the correction factor described by Peto et al.^{1,4,5}.

Age group	Cervical cancer incidence (Spain)*	Cervical cancer incidence (Catalonia) ^{1,4,5}	Calibrated cervical cancer incidence
10-14	0.0000	0.0000	0.0000
15-19	0.0000	0.0000	0.0000
20-24	0.0000	0.4427	0.0000
25-29	3.1280	3.3793	3.6892
30-34	10.4000	5.7153	6.2327
35-39	23.8760	12.3704	10.7475
40-44	33.0840	12.4870	13.1929
45-49	38.5680	14.5096	14.2280
50-54	35.1600	17.3822	16.9602
55-59	31.9800	27.5696	27.4427
60-64	25.8240	21.0001	19.8791
65-69	18.3960	21.2341	18.6855
70-74	25.3040	17.8969	15.4388
75-79	18.1780	16.0337	14.8822
80-84	13.3440	20.0293	22.5735
85+	-	4.1573	-

Figure S2. Cervical cancer incidence rates before any intervention in Catalonia based on data from the Cancer Incidence in Five Continents report and applying the correction factor described by Peto et al.^{1,4,5}



* Initial values for Nelder-Mead calibration¹

Table S3. Comparison of model predictions and observed data for Catalonia.

Outcomes	Observed data in Catalonia	Model predictions*
Annual number of cytologies (women aged 25-64), 2008-2015 ⁶	137,968-163,389	144,043
Crude annual incidence rate, 2003-2007 ⁴	10.7	10.1
Crude annual mortality rate, 2003-2008 ⁷	2.6	2.5

* Current opportunistic screening with 3y-cytology

Table S4. Summary of unit costs introduced in the cervical cancer simulation model for Catalonia indexed to 2017.

Component	Description	DMC	DNMC	TOTAL
SCREENING				
Cytology	Cost of cytology/HPV collection kit, staff, disposable supplies, laboratory transport, equipment, other supplies, facilities, patient transport and patient time	€ 57.4	€ 17.9	€ 75.3
HPV DNA test		€ 64.6	€ 17.9	€ 82.5
FOLLOW-UP AND TREATMENT				
CIN 1		€ 251.0	€ 80.4	€ 331.3
CIN 2		€ 1,477.2	€ 191.7	€ 1,669.0
CIN 3	Follow-up visits and complementary procedures (cytologies, HPV testing, colposcopies, biopsies), treatment and hospitalisation for CIN 2-3+, treatment-specific staff time, supplies, equipment, patient time to receive services, and patient transport	€ 1,477.2	€ 191.7	€ 1,669.0
Invasive cervical cancer, stage I		€ 5,477.2	€ 216.4	€ 5,693.9
Invasive cervical cancer, stage II		€ 12,271.3	€ 216.4	€ 12,487.6
Invasive cervical cancer, stage III		€ 22,834.7	€ 216.4	€ 23,051.1
Invasive cervical cancer, stage IV		€ 33,591.9	€ 216.4	€ 33,808.3
VACCINATION				
Cost per dose (3 doses)	Vaccination cost per dose and administration costs	€4.40		€102.9€

DMC: direct medical cost; DNMC: direct non-medical cost

Table S5. Estimated annual **undiscounted** costs of the current opportunistic cytology screening vs an organised programme based on primary HPV screening at different coverage rates (€ 2017)

Cost category	Opportunistic screening with 3y-cytology		Organised screening with 5y-HPV testing and cytology triage		
	40%	70%	40%	70%	100%
Total direct cost	€ 28,050,016	€ 43,137,236	€ 18,666,460	€ 26,805,323	€ 35,103,879
Direct medical cost	€ 23,044,544	€ 34,493,831	€ 16,038,665	€ 22,301,404	€ 28,742,250
Direct non-medical cost	€ 5,005,471	€ 8,643,405	€ 2,627,795	€ 4,503,919	€ 2,856,429
Programmatic cost	€ 0	€ 0	€ 1,140,566	€ 1,997,743	€ 14,282,144
Indirect cost	€ 9,679,273	€ 8,163,734	€ 9,807,769	€ 8,195,959	€ 6,868,317
TOTAL COST	€ 37,729,288	€ 51,300,971	€ 29,614,795	€ 36,999,025	€ 52,749,140

Table S6. Estimated annual **undiscounted** costs per adult woman of the current opportunistic cytology screening vs an organised programme based on primary HPV screening at different coverage rates (€ 2017)

Cost category	Opportunistic screening with 3y-cytology		Organised screening with 5y-HPV testing and cytology triage		
	40%	70%	40%	70%	100%
Total direct cost	€ 8.6	€ 13.3	€ 5.7	€ 8.2	€ 10.8
Direct medical cost	€ 7.1	€ 10.6	€ 4.9	€ 6.9	€ 8.8
Direct non-medical cost	€ 1.5	€ 2.7	€ 0.8	€ 1.4	€ 2.0
Programmatic cost	€ 0.0	€ 0.0	€ 1.8	€ 3.1	€ 4.4
Indirect cost	€ 3.0	€ 2.5	€ 3.0	€ 2.5	€ 2.1
TOTAL COST	€ 11.6	€ 15.8	€ 10.5	€ 13.8	€ 17.3

Table S7. Estimated annual **undiscounted** costs per screened woman aged 25 to 64 of the current opportunistic cytology screening vs an organised programme based on primary HPV screening at different coverage rates (€ 2017)

Cost category	Opportunistic screening with 3y-cytology		Organised screening with 5y-HPV testing and cytology triage		
	40%	70%	40%	70%	100%
Total direct cost	€ 40.4	€ 35.5	€ 26.9	€ 22.1	€ 20.2
Direct medical cost	€ 33.2	€ 28.4	€ 23.1	€ 18.4	€ 16.6
Direct non-medical cost	€ 7.2	€ 7.1	€ 3.8	€ 3.7	€ 3.7
Programmatic cost	€ 0.0	€ 0.0	€ 4.4	€ 4.4	€ 4.4
Indirect cost	€ 7.4	3.6	€ 7.5	€ 3.6	€ 2.1
TOTAL COST	€ 47.8	€ 39.1	€ 38.8	€ 30.0	€ 26.7

Table S8. Estimated annual **discounted** costs of the current opportunistic cytology screening vs an organised programme based on primary HPV screening at different coverage rates (€ 2017)

Cost category	Opportunistic screening with 3y-cytology		Organised screening with 5y-HPV testing and cytology triage		
	40%	70%	40%	70%	100%
Total direct cost	€ 9,911,396	€ 15,819,725	€ 6,478,753	€ 9,859,336	€ 13,282,524
Direct medical cost	€ 8,017,296	€ 12,540,614	€ 5,443,275	€ 8,073,315	€ 10,752,081
Direct non-medical cost	€ 1,894,100	€ 3,279,110	€ 1,035,478	€ 1,786,022	€ 2,530,443
Programmatic cost	0	0	€ 388,106	€ 679,724	€ 971,850
Indirect cost	€ 3,420,144	€ 2,993,888	€ 3,404,079	€ 3,014,577	€ 2,598,818
TOTAL COST	€ 13,331,540	€ 18,813,612	€ 10,270,938	€ 13,553,638	€ 16,853,191

Table S9. Estimated annual **discounted** costs per adult woman of the current opportunistic cytology screening vs an organised programme based on primary HPV screening at different coverage rates (€ 2017)

Cost category	Opportunistic screening with 3y-cytology		Organised screening with 5y-HPV testing and cytology triage		
	40%	70%	40%	70%	100%
Total direct cost	€ 3.0	€ 4.9	€ 2.0	€ 3.0	€ 4.1
Direct medical cost	€ 2.5	€ 3.9	€ 1.7	€ 2.5	€ 3.3
Direct non-medical cost	€ 0.6	€ 1.0	€ 0.3	€ 0.5	€ 0.8
Programmatic cost	€ 0.0	€ 0.0	€ 0.6	€ 1.0	€ 1.5
Indirect cost	€ 1.1	€ 0.9	€ 1.0	€ 0.9	€ 0.8
TOTAL COST	€ 4.1	€ 5.8	€ 3.6	€ 5.0	€ 6.4

Table S10. Estimated annual **discounted** costs per screened woman aged 25 to 64 of the current opportunistic cytology screening vs an organised programme based on primary HPV screening at different coverage rates (€ 2017)

Cost category	Opportunistic screening with 3y-cytology		Organised screening with 5y-HPV testing and cytology triage		
	40%	70%	40%	70%	100%
Total direct cost	€ 14.3	€ 13.0	€ 9.3	€ 8.1	€ 7.7
Direct medical cost	€ 11.5	€ 10.3	€ 7.8	€ 6.6	€ 6.2
Direct non-medical cost	€ 2.7	€ 2.7	€ 1.5	€ 1.5	€ 1.5
Programmatic cost	€ 0.0	€ 0.0	€ 1.5	€ 1.5	€ 1.5
Indirect cost	€ 2.6	€ 1.3	€ 2.6	€ 1.3	€ 0.8
TOTAL COST	€ 16.9	€ 14.3	€ 13.4	€ 10.9	€ 9.9

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