

Appendix 1: Type- and age-specific parameters for the natural history of human papillomavirus (HPV) infection used in the mathematical model to predict the number needed to vaccinate to prevent HPV-related diseases and death

Variable	HPV type; prior parameter ranges*					HPV type; posterior parameter ranges†			
	Type 16	Type 18	Other high oncogenic risk	Low oncogenic risk	References‡	Type 16	Type 18	Other high oncogenic risk	Low oncogenic risk
HPV infection									
Force of HPV infection, per woman-year	0.00-0.14	0.00-0.04	0.00-0.28	0.00-0.28	1-9	0.01-0.11	0.00-0.03	0.02-0.21	0.02-0.23
Clearance of HPV infection, per woman-year	0.08-1.54	0.08-1.71	0.33-2.06	0.61-4.29	2-7,10,11	0.24-1.18	0.32-1.43	0.50-1.74	0.94-3.65
Natural immunity following infection, %	0-100	0-100	NA	NA	–¶	18-90	18-90	NA	NA
Cervical intraepithelial neoplasia, per woman-year									
Progression of HPV infection to grade 1 cervical intraepithelial neoplasia	0.01-0.18	0.01-0.18	0.02-0.18	0.02-0.29	2,3,6,8,11-13	0.03-0.13	0.03-0.13	0.03-0.14	0.04-0.21
Progression of HPV infection to grade 2 or 3 cervical intraepithelial neoplasia	0.00-0.21	0.00-0.21	0.00-0.10	0.00-0.01	3,9,11,12	0.01-0.13	0.01-0.12	0.00-0.07	0.00-0.01
Progression of cervical intraepithelial neoplasia from grade 1 to grade 2 or 3	0.00-0.39	0.00-0.39	0.00-0.39	0.00-0.04	3,13-15	0.03-0.26	0.03-0.23	0.04-0.25	0.00-0.03
Clearance of grade 1 cervical intraepithelial neoplasia	0.06-1.75	0.06-1.75	0.22-2.62	0.28-4.36	3,13-15	0.15-1.30	0.18-1.24	0.40-2.06	0.59-3.15
Clearance of grade 2 or 3 cervical intraepithelial neoplasia	0.04-1.15	0.04-1.15	0.15-1.73	0.15-2.88	3,13-15	0.12-0.87	0.13-0.92	0.29-1.39	0.37-2.14
Regression of grade 1 cervical intraepithelial neoplasia to HPV infection	0.06-1.00	0.06-1.00	0.06-1.00	0.06-1.00	–¶	0.17-0.75	0.15-0.71	0.14-0.76	0.15-0.75
Regression of grade 2 or 3 cervical intraepithelial neoplasia to HPV infection	0.00-1.00	0.00-1.00	0.00-1.00	0.00-1.00	–¶	0.04-0.65	0.05-0.65	0.05-0.65	0.05-0.65
Regression of cervical intraepithelial neoplasia from grade 2 or 3 to grade 1	0.00-0.30	0.00-0.30	0.00-0.30	0.00-0.30	–¶	0.01-0.20	0.01-0.20	0.01-0.20	0.01-0.21
Genital warts§									
Progression from HPV infection to genital warts, %	NA	NA	NA	0-79	16	NA	NA	NA	31-71

Note: NA = not available.

*Minimum and maximum of the age-specific prior parameter ranges.

†10th and 90th percentiles of the age-specific posterior parameter ranges. Posterior parameter sets were identified during model fitting; parameter sets were judged to produce “acceptable” fit if the associated model predictions fell simultaneously within prespecified targets defined using epidemiologic data specific to North America for prevalence and annual incidence of HPV, genital warts, cervical intraepithelial neoplasia and cervical cancer.

‡See page 2 of this appendix for a list of the references.

§Natural history parameters for genital warts were fitted to the age-specific data in Insinga et al.¹⁷

¶Assumption (parameter values were not available from the literature review).

References

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