JHEOR Journal of Health Economics and Outcomes Research

Online Supplementary Material

The Long-term Clinical and Economic Impact of Universal Varicella Vaccination in Slovenia. *JHEOR*. 2022;9(2):95-102. doi:10.36469/jheor.2022.37308

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

Table S1. Vaccine Characteristics for Modeled Vaccine Formulations

Vaccine/Dose	Failure (%)	Vaccine Take, Range (%)	Duration of Protection, Range (y)	References
First dose				
MSD varicella-containing vaccines	4	100 (93-100)	25 (15-67)	Kuter et al (2004)[1]; van Hoek et al (2011)[2]
GSK varicella-containing vaccines	5	65.4 (57.2-72.1)	17 (NR)	Holl et al (2016)[3]; Kuter et al (2004)[1]; Ouwens et al (2015)[4]; Prymula et al (2014)[5]; van Hoek et al (2011)[2]
Second dose				
MSD varicella-containing vaccines	NA	100 (97-100)	77 (38-200)	Kuter et al (2004)[1]; van Hoek et al (2011)[2]
GSK varicella-containing vaccines	NA	94.9 (92.4-96.6)	77 (NR)	Holl et al (2016)[3]; Ouwens et al (2015)[4]; Prymula et al (2014)[5]

Abbreviations: GSK, GlaxoSmithKline Biologicals, Belgium, UK; MSD, Merck & Co, Inc, Rahway, New Jersey; NA, not applicable; NR, not reported.

Table S2. Base Model Parameters (Disease-Specific)

Symbol	Description	Value	Source
$1/\omega_m$	Average period of passive immunity	6 months	Gershon et al (1976)[6]
$1/\varepsilon_n$, $1/\varepsilon_{vb}$	Average latent period (natural, breakthrough varicella)	14 days	Marin & Bialek (2015)[7]; Brisson et al (2000)[8]
$1/\gamma_n$	Average infectious period for natural varicella	7 days	Bernstein et al (1993)[9]; Marin & Bialek (2015)[7]
$1/\gamma_{bv}$	Average infectious period for breakthrough varicella	4.5 days	Izurieta et al (1997)[10]
ρ_v	Relative infectivity of breakthrough varicella infection	50%	Seward et al (2004)[11]; Brisson et al (2000)[8]
ξ_n, ξ_{vv}, ξ_{vb}	Rate of endogenous boosting	0	Assumed
χ	Reactivation rate factor on vaccine arms	1/6	Poletti et al (2013)[12]
β	Transmission matrix		From calibration
μ	Force of mortality		Derived
d_v	Case fatality rate for natural varicella (per 100 000)	<1 y: 1.04	Wolfson et al (2019)[13]
		1-5 y: 0.26	
		5-10 y: 0.65	
		10-15 y: 3.12	
		15-45 y: 31.22	
		45-65 y: 322.56	
		≥65 y: 1461.06	

Table S3. Key Model Inputs and Data Source for Varicella Infection in Slovenia

Parameter	Values	Source
Vaccination Costs		
Vaccine[a,b] (€)	Varicella: 31.84	Centralna baza zdravil[14]; Österreichischer Apotheker-Verlag[15]; Uradni List Republike Slovenije, 2020[16]
	MMRV: 51.52	
Vaccine administration[c] (€)	5.62	Zavod Za Zdravstveno Zavarovanje Slovenije[17]
Direct Costs		
Percentage of cases requiring outpatient visits	0-5 y: 69%	Dozsa et al (2017)[18]
	5–9 y: 57%	
	≥10 y: 100%	
Cost per outpatient visit (€)	<15 y: 8.83	Zavod Za Zdravstveno Zavarovanje Slovenije[17]
	≥15 y: 14.28	
Percentage of cases requiring hospitalization	<15 y: 0.69	Ahčan et al. 2002[19]; Heininger & Seward (2006)[20]
	≥15 y: 1.38	
Cost per hospitalization (€)	672.78	Zavod Za Zdravstveno Zavarovanje Slovenije[17]
Indirect Costs		
Days lost from work (outpatient and inpatient)	<18 y: 5.5	Statistical office of the National Institute of Public Health[21]
	18-65 y: 12.3	
	65+ y: 0	
Cost per workday lost (€)	64.06	Republika Slovenija Statistični Urad[22]

[a]Varilrix® is not currently available in Slovenia, therefore, price parity with Varivax® was assumed.
[b]MMRV prices have been adjusted to reflect the V-component of the vaccine only.
[c]Vaccine administration costs include immunization, exam, organization, vaccination schedule, vaccine purchase, editing records, and reports. No additional administration costs are assumed for MMRV at the second dose.

Table S4. Health State Utility Values Used in the Model

Health State	Utility by Age (y)							
	<18	**18-25**	**25-35**	**35-45**	**45-55**	**55-65**	**65-75**	**75+**
Healthy (q_h)[23]	0.869	0.869	0.841	0.794	0.712	0.619	0.554	0.498
	Utility by Age (y)							
	<15	**15-40**	**40-60**	**60-70**	**70-80**		**80+**	
Natural varicella (q_n)[24]	0.79	0.74	0.74	0.74	0.74		0.74	
Breakthrough varicella (q_{vv})[24]	0.92	0.92	0.92	0.92	0.92		0.92	

Figure S1. Model Calibration to Observed Prevaccination Varicella Seroprevalence by Age in Slovenia

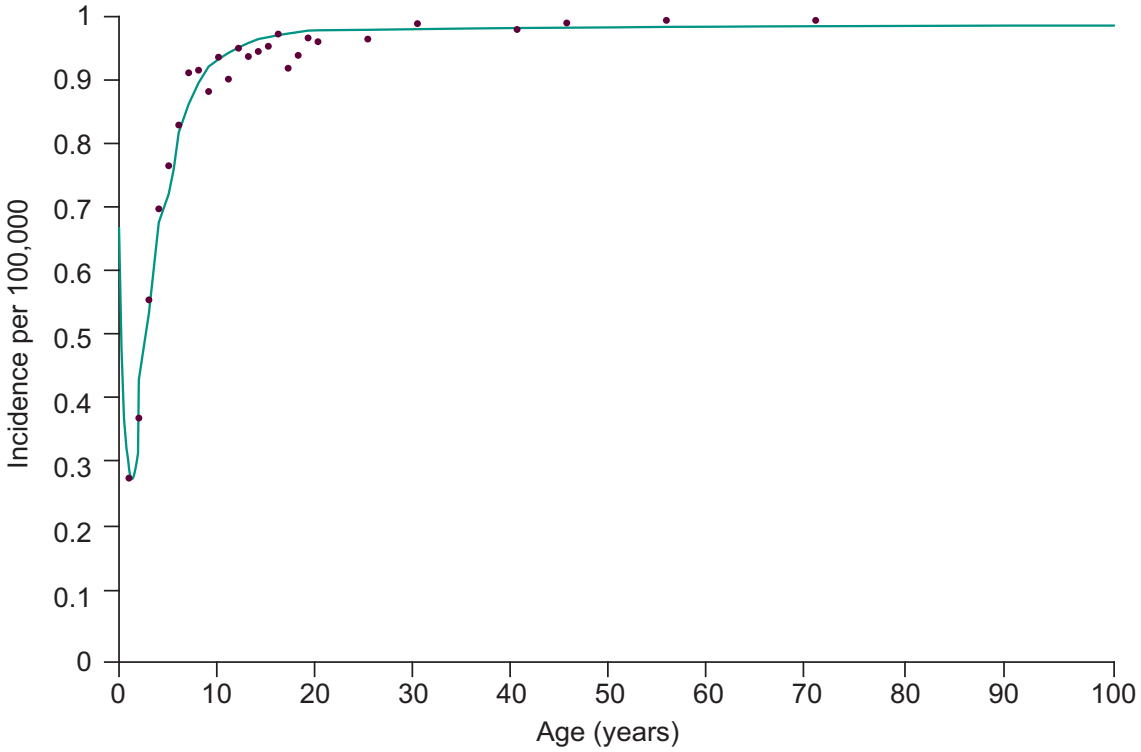


Figure S2. Model Calibration to Observed Prevaccination Herpes Zoster Incidence by Age in Slovenia

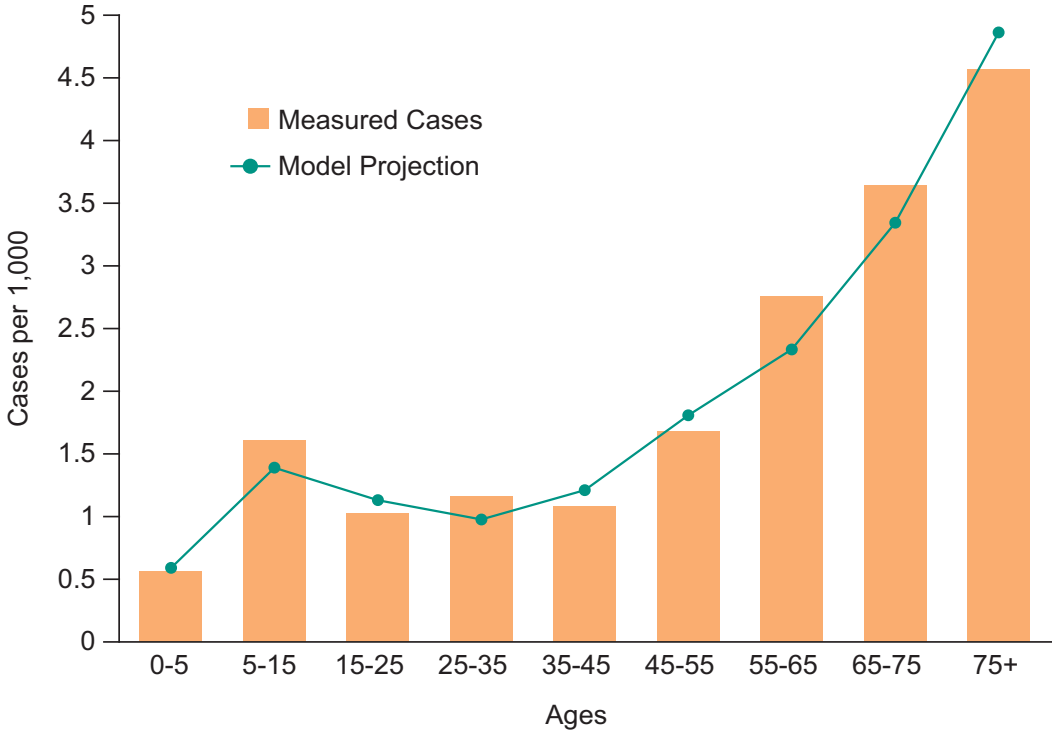
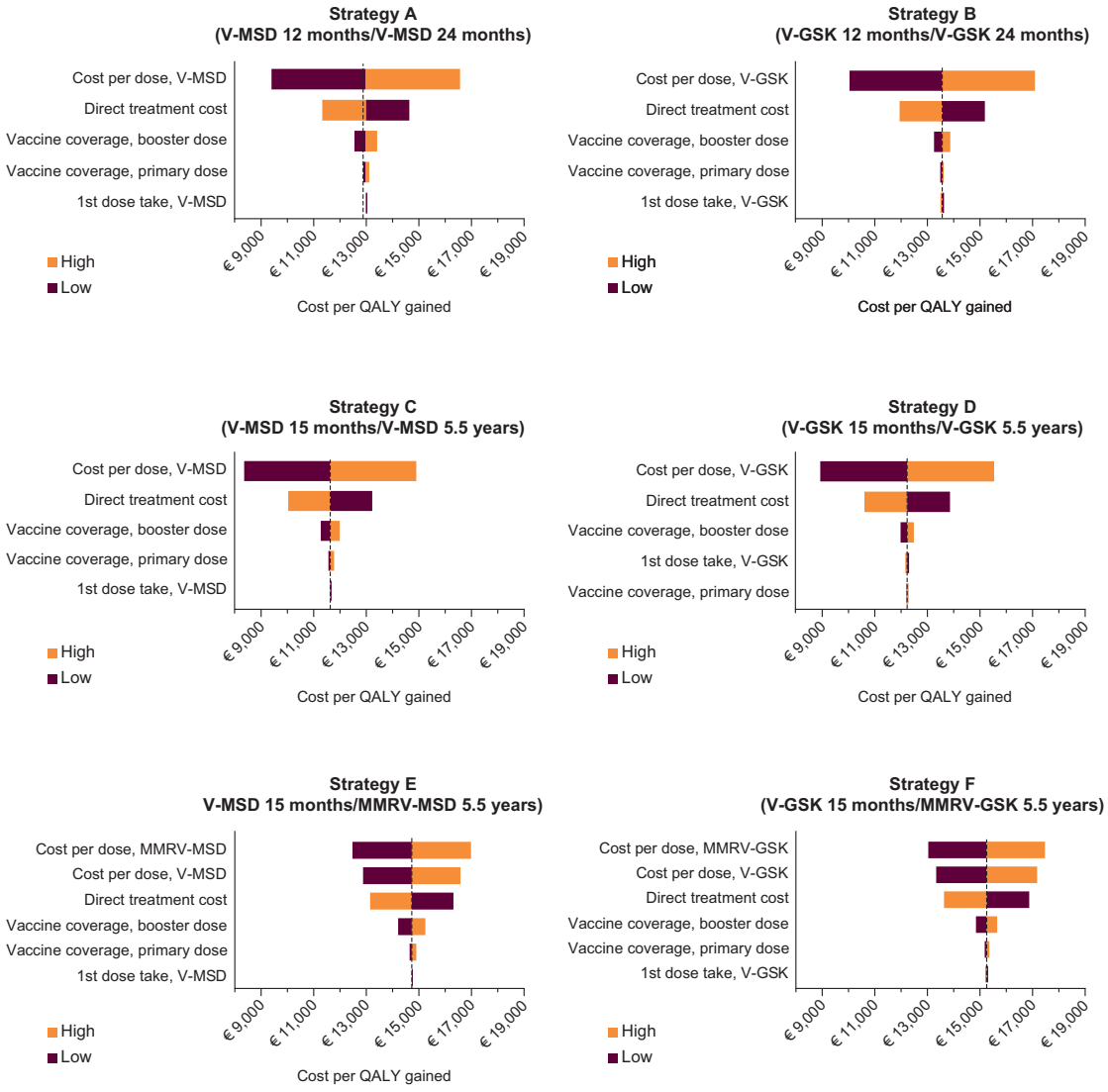
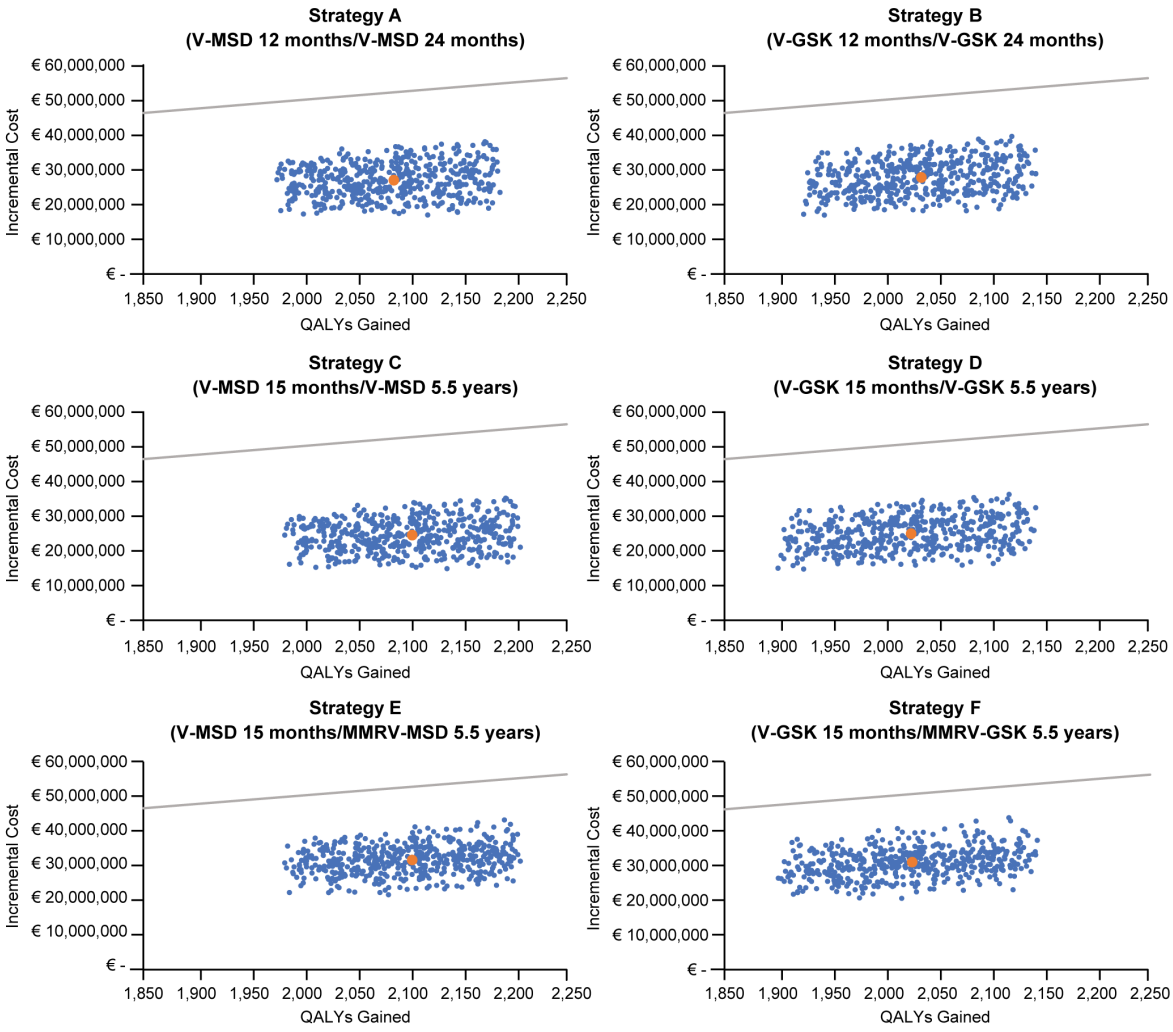


Figure S3. Change in ICER vs No Vaccination After Varying Economic Parameters and Vaccine Properties, From the Payer Perspective



Abbreviations: GSK, GlaxoSmithKline Biologicals, Belgium, UK; MMRV, measles, mumps, rubella, and varicella vaccine; MSD, Merck & Co, Inc, Rahway, New Jersey; QALY, quality-adjusted life-year; V, varicella vaccine.

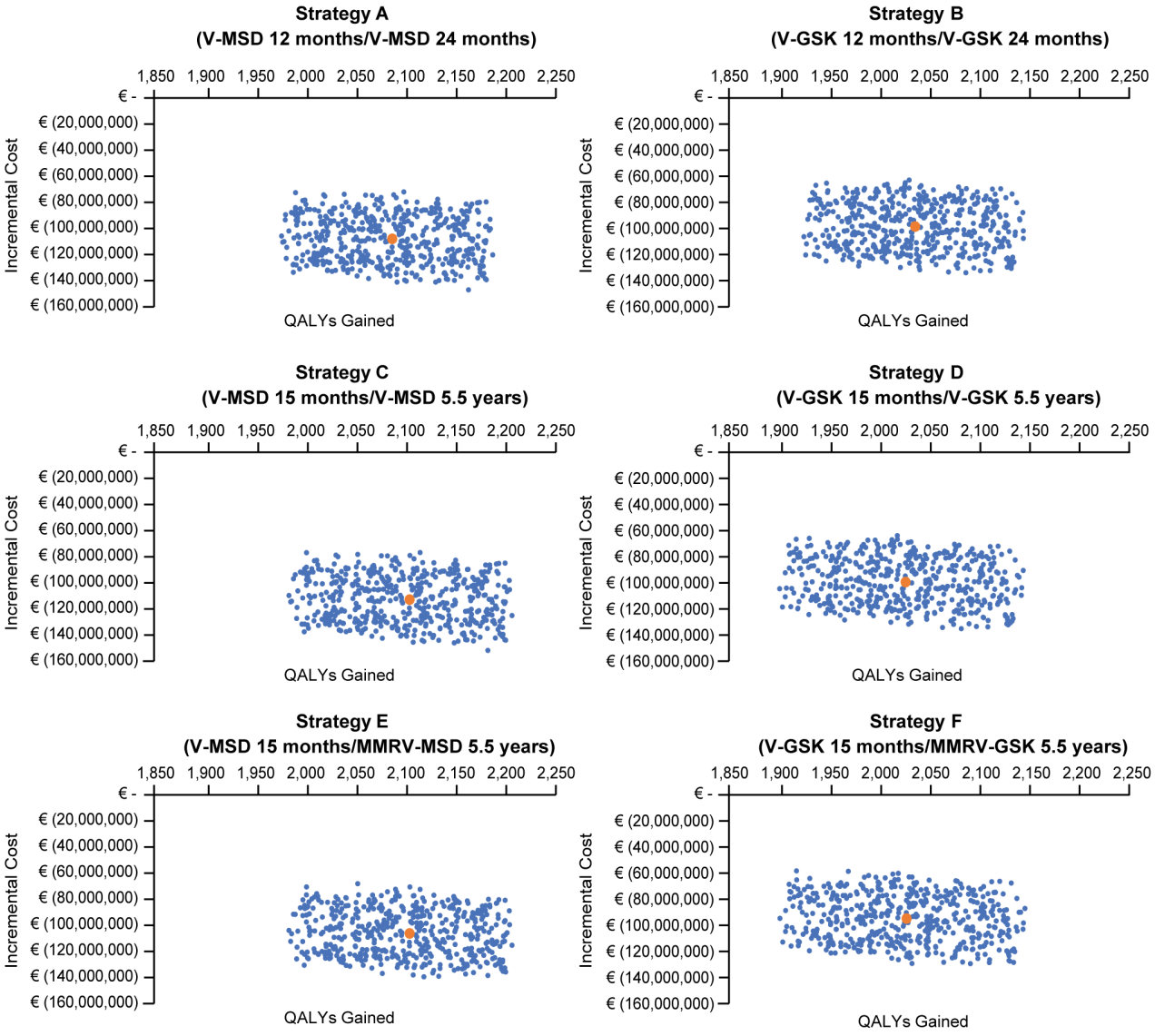
Figure S4. Results of Probabilistic Sensitivity Analysis Varying Economic Parameters and Vaccine Properties, From the Payer Perspective



Solid gray line represents the cost-effectiveness threshold of €25 000 per QALY gained for Slovenia.

Abbreviations: GSK, GlaxoSmithKline Biologicals, Belgium, UK; MMRV, measles, mumps, rubella, and varicella vaccine; MSD, Merck & Co, Inc, Rahway, New Jersey; QALYs, quality-adjusted life-years; V, varicella vaccine.

Figure S5. Results of Probabilistic Sensitivity Analysis Varying Economic Parameters and Vaccine Properties, From the Societal Perspective



Abbreviations: GSK, GlaxoSmithKline Biologicals, Belgium, UK; MMRV, measles, mumps, rubella, and varicella vaccine; MSD, Merck & Co, Inc, Rahway, New Jersey; QALYs, quality-adjusted life-years; V, varicella vaccine.

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