

Supplementary Material

Cost-Effectiveness Analysis Update of the Adjuvanted Recombinant Zoster Vaccine in Japanese Older Adults

Lida Teng,¹ Akiko Mizukami,² Cheryl Ng,³ Nikolaos Giannelos,⁴ Desmond Curran,⁴
Tomohide Sato,² Christa Lee,³ Taizo Matsuki²

¹Department of Health Economics and Outcomes Research, Graduate School of
Pharmaceutical Sciences, The University of Tokyo, Tokyo, Japan

²GSK, Tokyo, Japan

³GSK, Singapore

⁴GSK, Wavre, Belgium

Correspondence to:

Taizo Matsuki

GSK, 1-8-1 Akasaka, Minato-ku, Tokyo 107-0052, Japan

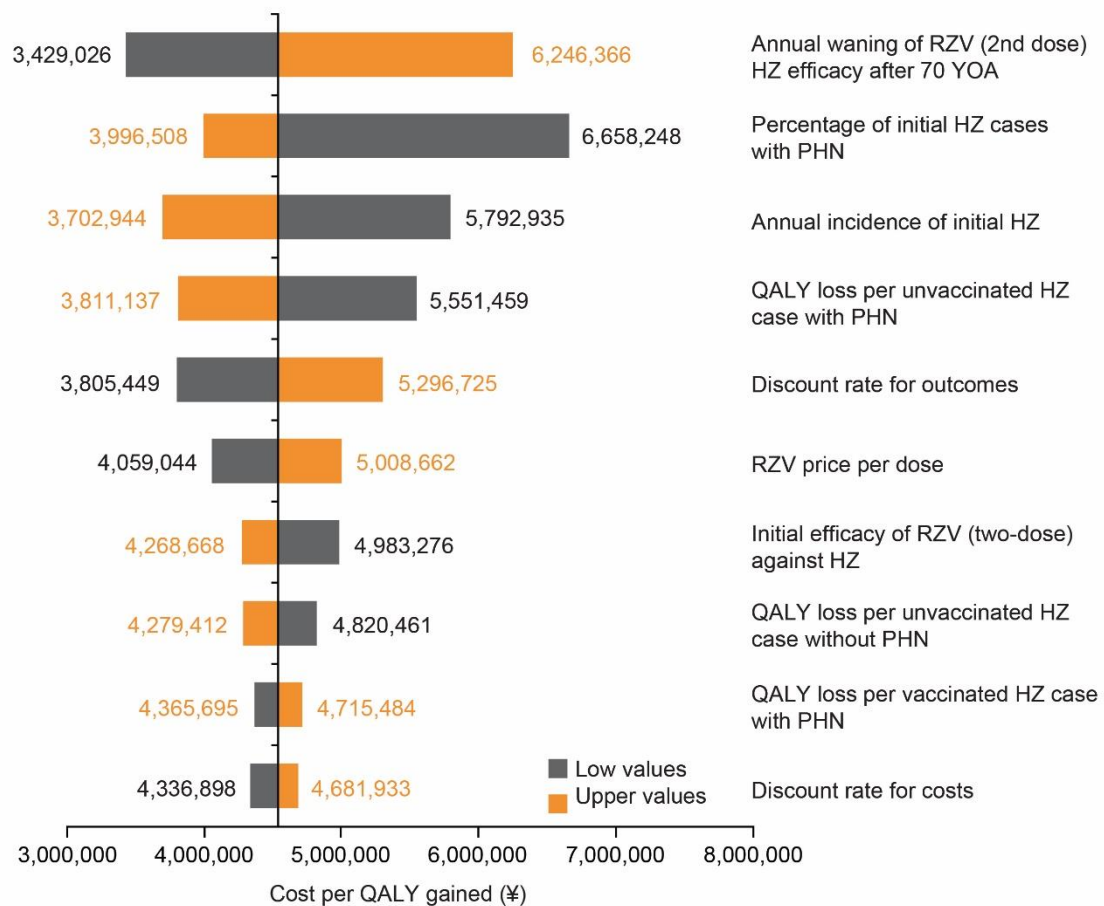
Email address: taizo.2.matsuki@gsk.com

Supplementary Table 1. Population demographics, epidemiology, and quality of life input values applied in base-case, sensitivity, and scenario analyses.

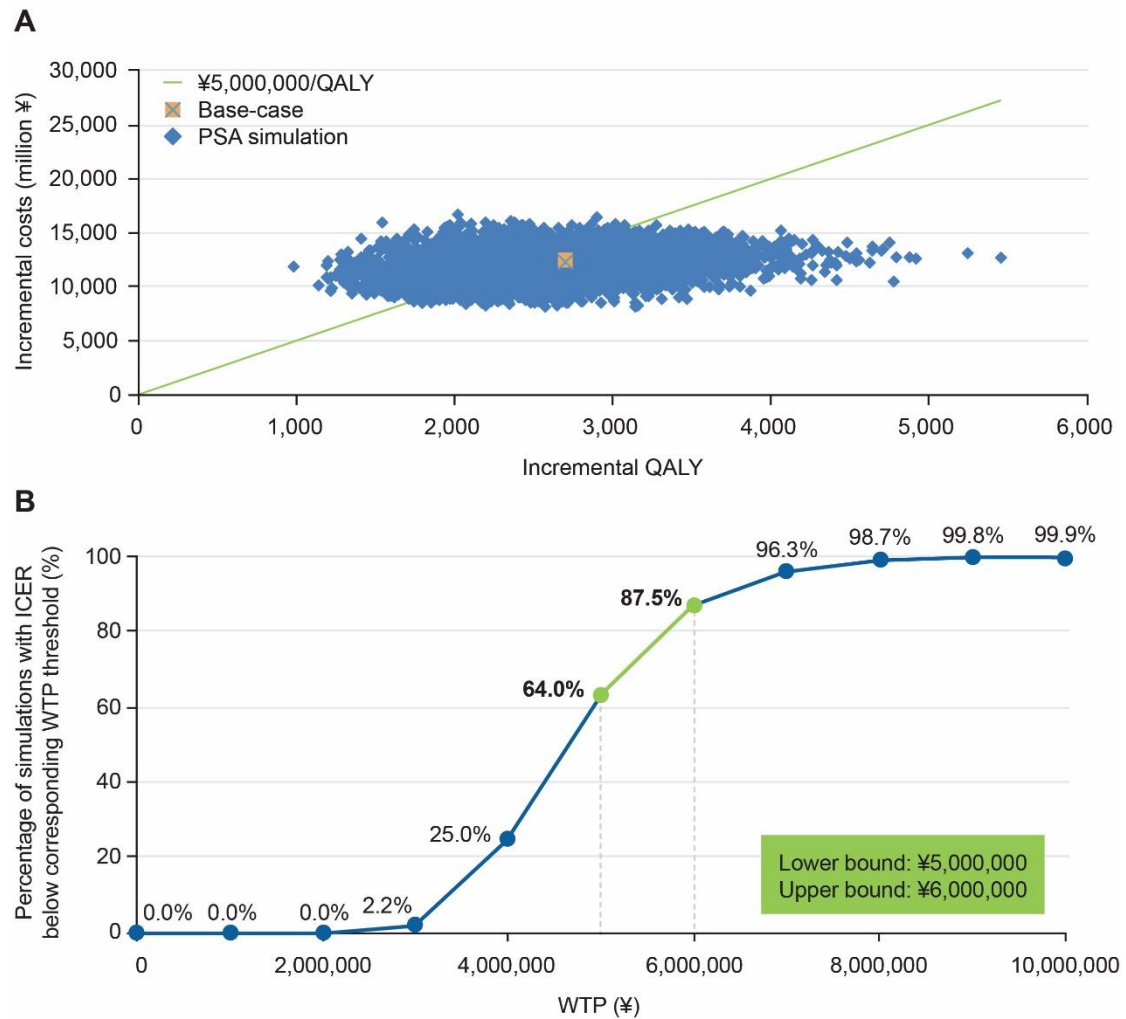
	Age group (years)	Base value	Range for DSA		Standard error for PSA
			Lower limit	Upper limit	
Demographics					
Population size [1]	50–59	16,278,000	–	–	–
	60–64	7,524,000	–	–	–
	65–69	8,708,000	–	–	–
	70–79	15,928,000	–	–	–
	≥80	11,248,000	–	–	–
	50	1,842,000	–	–	–
	60	1,529,000	–	–	–
	65	1,553,000	–	–	–
	70	2,124,000	–	–	–
	80	1,078,000	–	–	–
All-cause mortality probability [1]	50–54	0.002324	–	–	–
	55–59	0.003610	–	–	–
	60–64	0.005589	–	–	–
	65–69	0.008861	–	–	–
	70–74	0.014083	–	–	–
	75–79	0.023034	–	–	–
	80–84	0.041701	–	–	–
	85–89	0.078777	–	–	–
	90–94	0.140109	–	–	–
	95–99	0.241655	–	–	–
	≥100	0.382059	–	–	–
Epidemiology					
HZ incidence (per 1,000 person-years) [2, 3]	50–59	9.2	–	–	–
	60–69	9.6	7.68	11.52	0.980
	70–79	12.9	10.32	15.48	1.320
	≥80	12.6	10.08	15.12	1.290
PHN (% of HZ cases) [2, 3]	50–59	14.6%	–	–	–
	60–69	14.6%	0.073	0.1752	0.0261
	70–79	20.2%	0.101	0.2424	0.0361
	≥80	32.9%	0.165	0.3948	0.0588
Recurrent HZ incidence (per 1,000 person-years) [2]	50–59	9.2	–	–	–
	60–69	9.6	7.68	11.52	0.980
	70–79	12.9	10.32	15.48	1.320
	≥80	12.6	10.08	15.12	1.290
PHN (% of recurrent HZ cases) [2]	50–59	14.6%	–	–	–
	60–69	14.6%	0.073	0.1752	0.0261
	70–79	20.2%	0.101	0.2424	0.0361
	≥80	32.9%	0.165	0.3948	0.0588

	Age group (years)	Base value	Range for DSA		Standard error for PSA
			Lower limit	Upper limit	
Non-PHN complications (% of HZ cases) [2, 4]	50–59	5.1%	–	–	–
	60–69	5.1%	0.019	0.083	0.0165
	70–79	10.6%	0.067	0.145	0.0201
	≥80	10.6%	0.067	0.145	0.0201
HZ-related mortality probability (% of HZ cases) [1, 3]	50–54	0.0007%	–	–	–
	55–59	0.0007%	–	–	–
	60–64	0.0013%	–	–	–
	65–69	0.0013%	–	–	–
	70–74	0.0036%	–	–	–
	75–79	0.0075%	–	–	–
	80–84	0.0313%	–	–	–
	85–89	0.0418%	–	–	–
	90–94	0.1352%	–	–	–
	95–99	0.2651%	–	–	–
	≥100	1.0352%	–	–	–
Resource utilization (Mean number per HZ case)					
Outpatient visits [4]	50–69	4.8	–	–	–
	≥70	6.4	–	–	–
Hospitalizations [4, 5]	50–69	0.020	–	–	–
	≥70	0.044	–	–	–
Utilities					
Baseline utility [2, 6]	50–59	0.962	–	–	–
	60–69	0.975	–	–	–
	70–79	0.942	–	–	–
	≥80	0.883	–	–	–
QALY loss per HZ					
Without PHN [2, 6]	50–59	0.014	–	–	–
	60–69	0.015	0.0120	0.0180	0.0015
	70–79	0.020	0.0160	0.0240	0.0020
	≥ 80	0.017	0.0136	0.0204	0.0017
With PHN [2, 6, 7]	50–59	0.118	–	–	–
	60–69	0.135	0.1080	0.1620	0.0138
	70–79	0.154	0.1232	0.1848	0.0157
	≥ 80	0.179	0.1432	0.2148	0.0183
QALY loss from AE [2, 8]					
Local, emergency visit, or outpatient visit	All ages	0.0001	–	–	–
Serious (hospitalization)	All ages	0.0082	–	–	–
Weighted AE QALY loss ^a	50–59	0.00009	–	–	–
	60–69	0.00008	0.000041	0.000166	0.000032
	≥ 70	0.00007	0.000036	0.000144	0.000028

^aThe model calculated a weighted AE QALY loss per dose based on the incidence of the four AEs and the QALY losses per event. No ranges were used for the individual QALY loss per AE in the DSA and PSA. Shaded cells indicate parameters that have been updated in the current model, from the analysis performed by Shiragami *et al.* [2]. AE: adverse event; DSA: deterministic sensitivity analysis; HZ: herpes zoster; PHN: post-herpetic neuralgia; PSA: probabilistic sensitivity analysis; QALY: quality-adjusted life year; RZV: recombinant zoster vaccine.



Supplementary Figure 1. Deterministic sensitivity analysis results for the ICER of RZV versus no vaccine for Japanese adults aged ≥ 65 years from a payer perspective. An ICER below the threshold range of ¥5–6 million/QALY gained was considered cost-effective in Japan. HZ: herpes zoster; ICER: incremental cost-effectiveness ratio; PHN: post-herpetic neuralgia; QALY: quality-adjusted life year; RZV: recombinant zoster vaccine; YOA: years of age.



Supplementary Figure 2. Probabilistic sensitivity analysis results of RZV versus no vaccine for Japanese adults aged ≥ 65 years from a payer perspective, based on 5,000 Monte Carlo simulations, presented in a **(A)** scatterplot (lower bound threshold was used) and **(B)** cost-effectiveness acceptability curve. 64.0% and 87.5% of simulations (green) resulted in an ICER (cost per QALY gained) below the lower and upper bounds of the generally accepted WTP threshold range, respectively. ICER: incremental cost-effectiveness ratio; PSA: probabilistic sensitivity analysis; QALY: quality-adjusted life years; RZV: recombinant zoster vaccine; WTP: willingness-to-pay.

REFERENCES

1. Statistics Bureau (Ministry of Internal Affairs and Communications). e-Stat: Portal Site of Official Statistics of Japan. Available from: <https://www.e-stat.go.jp/>. (Accessed: Aug 2021)
2. Shiragami M, Mizukami A, Kaise T, et al. Cost-effectiveness of the adjuvant recombinant zoster vaccine in Japanese adults aged 65 years and older. *Dermatol Ther (Heidelb)*. 2019;9(2):281-97.
3. Takao Y, Miyazaki Y, Okeda M, et al. Incidences of herpes zoster and postherpetic neuralgia in Japanese adults aged 50 years and older from a community-based prospective cohort study: The SHEZ study. *J Epidemiol*. 2015;25(10):617-25.
4. Nakamura H, Mizukami A, Adachi K, et al. Economic burden of herpes zoster and post-herpetic neuralgia in adults 60 Years of age or older: Results from a prospective, physician practice-based cohort study in Kushiro, Japan. *Drugs Real World Outcomes*. 2017;4(4):187-98.
5. Sato K, Adachi K, Nakamura H, et al. Burden of herpes zoster and postherpetic neuralgia in Japanese adults 60 years of age or older: Results from an observational, prospective, physician practice-based cohort study. *J Dermatol*. 2017;44(4):414-22.
6. Mizukami A, Sato K, Adachi K, et al. Impact of herpes zoster and post-herpetic neuralgia on health-related quality of life in Japanese adults aged 60 Years or older: Results from a prospective, observational cohort study. *Clin Drug Investig*. 2018;38(1):29-37.
7. Imafuku S, Nakayama J, Higa K, et al. One-year follow-up of zoster-associated pain in 764 immunocompetent patients with acute herpes zoster treated with famciclovir (FAMILIAR study). *J Eur Acad Dermatol Venereol*. 2014;28(12):1716-22.
8. Le P, Rothberg MB. Cost-effectiveness of herpes zoster vaccine for persons aged 50 years. *Ann Intern Med*. 2015;163(7):489-97.