Poster code: EE715

Simulation of Standard-Dose Influenza Vaccine Effectiveness Variation on the Cost-Effectiveness of High-Dose Influenza Vaccine: A Case Study in Japan

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Based on the simulation results, high-dose influenza vaccine appears to have the potential for greater cost-effectiveness when accounting for variations in standard dose efficacy

OBJECTIVE

To estimate the cost-effectiveness of high-dose (HD) influenza vaccine against standard-dose (SD) influenza vaccine under varying levels of SD vaccine effectiveness from recent data to support decision-making

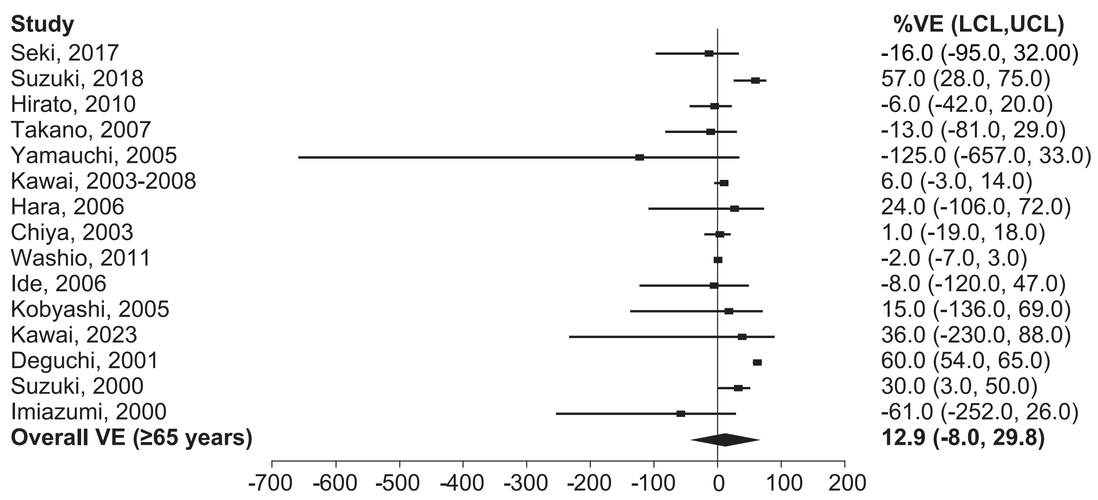
CONCLUSIONS

- **Simulation results reveal, HD showed the potential to be more cost-effective considering the SD efficacy variation**
- **This highlights the need for robust and continuous real-world data collection to accurately evaluate the value of new prevention strategies**

BACKGROUND

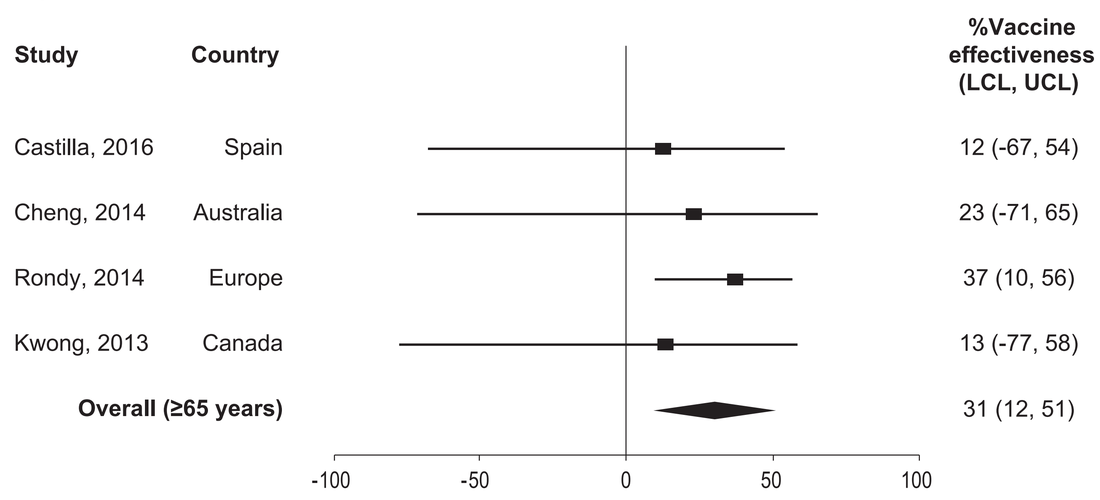
- Results from a previous study conducted in 1991-1992 suggests that SD provides approximately 50% protection against influenza in older adults[1]
- However, recent data from Japan[2] **(Figure 1)** and global studies[3] **(Figure 2)** show that while SD efficacy in numerous studies offers some protection against influenza-related illness and hospitalization in older adults, its effectiveness has been inconsistent across influenza seasons
- Consequently, SD efficacy deviates from the previously assumed 50% used in HD cost-effectiveness models, highlighting the need to recalibrate the cost-effectiveness analysis using updated data

Figure 1. Japanese Meta-Analysis: SD Vaccine Efficacy (VE) of 12.9% (95% CI: -8.0, 29.8)



Note: Figure was adapted from Taniguchi K et al.[2] VE was calculated from reported relative risks. Study weights were not applied due to unavailability in the source publication

Figure 2. Seasonal SD Vaccine effectiveness of 31% (95% CI: 12%-51%)



Note: Figure was adapted from Rondy M et al.[3]

METHODS

Model structure and population: A static, decision-tree model for Japanese older adults (aged over 65 years) was developed to assess cost-effectiveness of HD. The model structure and different hospitalization approaches incorporated in the model are presented in **Figure 3**

Model Input: Data inputs were sourced from a recently published study[4] Key model parameters are summarized in **Table 1**

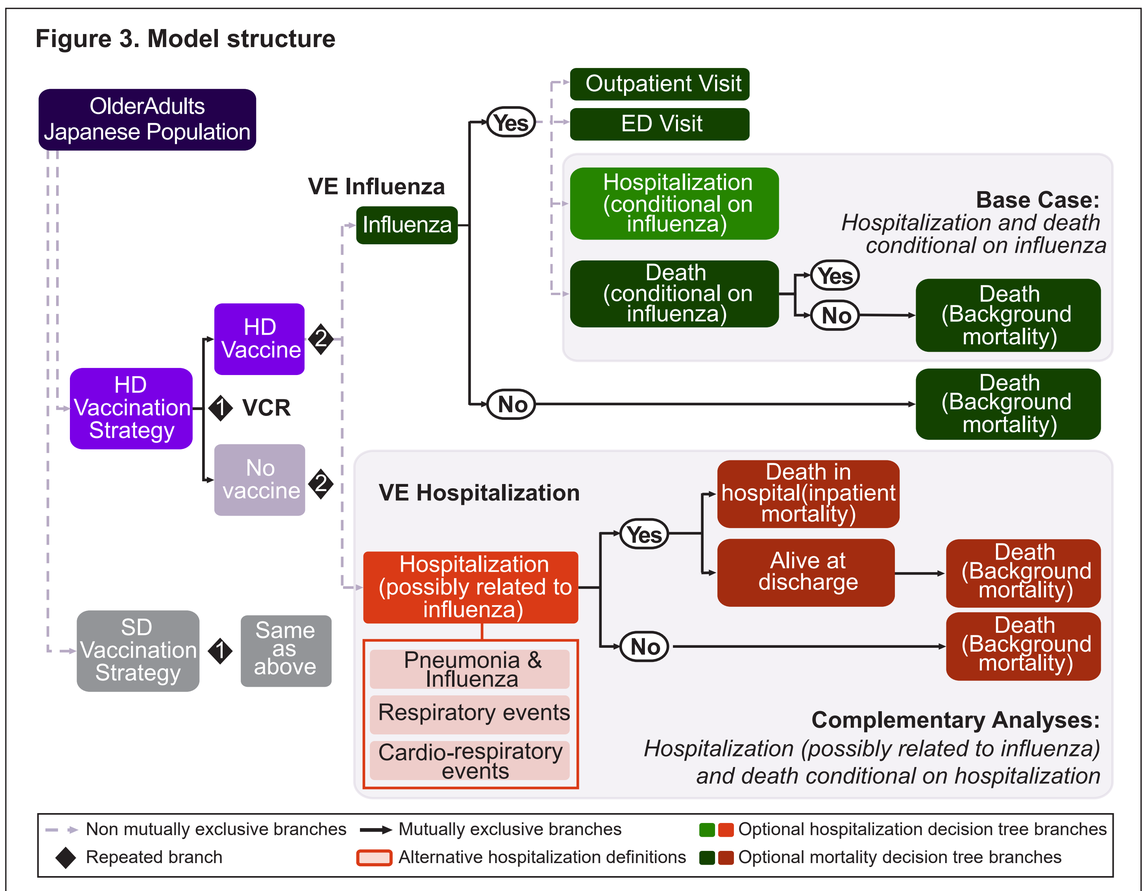
Analyses: The study modeled the cost-effectiveness of HD across scenarios with varying SD vaccine effectiveness (10%, 20%, 40%, and 60%) to account for variability across studies

Table 1. Key input parameter

Parameter	Value	Source
VE against influenza cases		
SD VE vs. No vaccine	50.0%	1
Relative VE of HD vs. SD	24.2%	5
Probability of outpatient and ED visits*		
Outpatient visit probability	72.8%	6
ED visit probability	0.12%	6
Hospitalization rate per 100,000 people*		
Influenza*	66.4	6
Pneumonia and influenza	480.28	
Respiratory	992.41	
Cardiorespiratory	2,414.39	

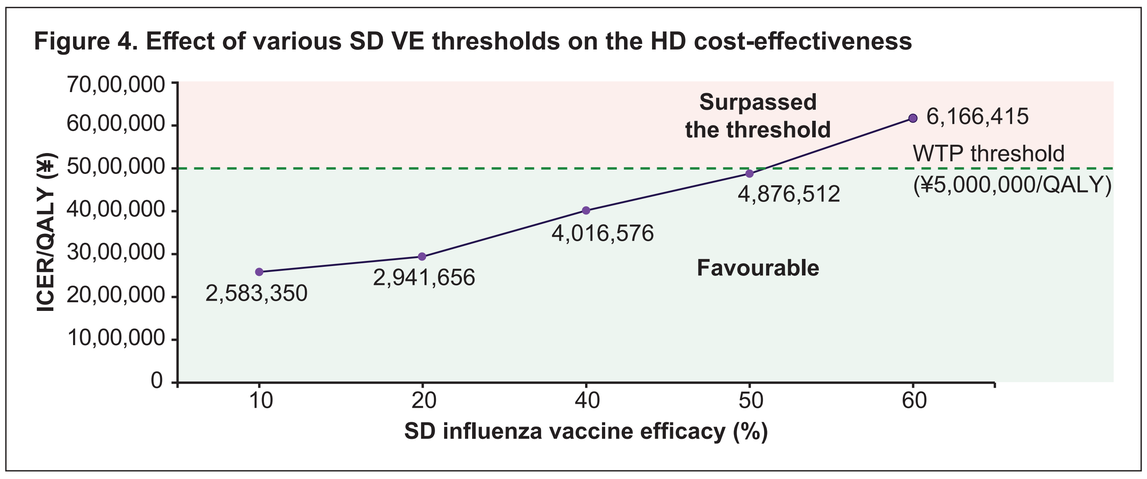
*Average across 4 influenza seasons: 2015/2016, 2016/2017, 2017/2018 and 2019/2020; during this period all patients vaccinated received SD quadrivalent influenza vaccine

Figure 3. Model structure



RESULTS

Figure 4. Effect of various SD VE thresholds on the HD cost-effectiveness



- Stimulated SD effectiveness values influence the cost-effectiveness of HD:
  - At 10%, 20%, and 40% SD effectiveness, HD ICERs ranged from ¥2,583,350/QALY, ¥2,941,656/QALY, and ¥4,016,576/QALY, respectively. These **estimates were more favorable compared to the existing HD ICER of ¥4,876,512/QALY**, which was based on 50% efficacy **(Figure 4)**
  - At 60% SD effectiveness, the ICER reached ¥6,166,415/QALY, surpassing the ¥5,000,000/QALY threshold in Japan **(Figure 4)**

POLICY IMPLICATIONS

- The health economic value of HD must account for variations in SD efficacy
- To enable sound decision-making, high-quality local evidence should be collected to ensure that economic evaluations incorporate regularly updated data

REFERENCES: 1. Govaert TM et al. JAMA. 1994; 7;272(21):1661-5; **2.** Taniguchi K et al. Influenza Other Respir Viruses. 2021 Mar;15(2):293-314; **3.** Rondy M et.al J Infect. 2017 Nov;75(5):381-394; **4.** de Courville, C et al. J. Med. Econ., 2025; 28(1), 544–555; **5.** DiazGranados CA, N Engl J Med. 2014; 14;371(7):635-45; **6.** Arashiro T et al. Influenza Other Respir Viruses. 2024 Nov;18(11):e70032

ABBREVIATIONS: ED, emergency department; HD, high-dose influenza vaccine; ICER, incremental cost effectiveness ratio; LCL, Lower Confidence Limit; SD, standard-dose influenza vaccine; QALY, Quality adjusted life years; UCL, Upper Confidence Limit; VE, Vaccine efficacy; WTP, Willingness to pay

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