Cost-Utility of Standard-Dose vs High-Dose Influenza Vaccination in Italians Aged ≥65 Years

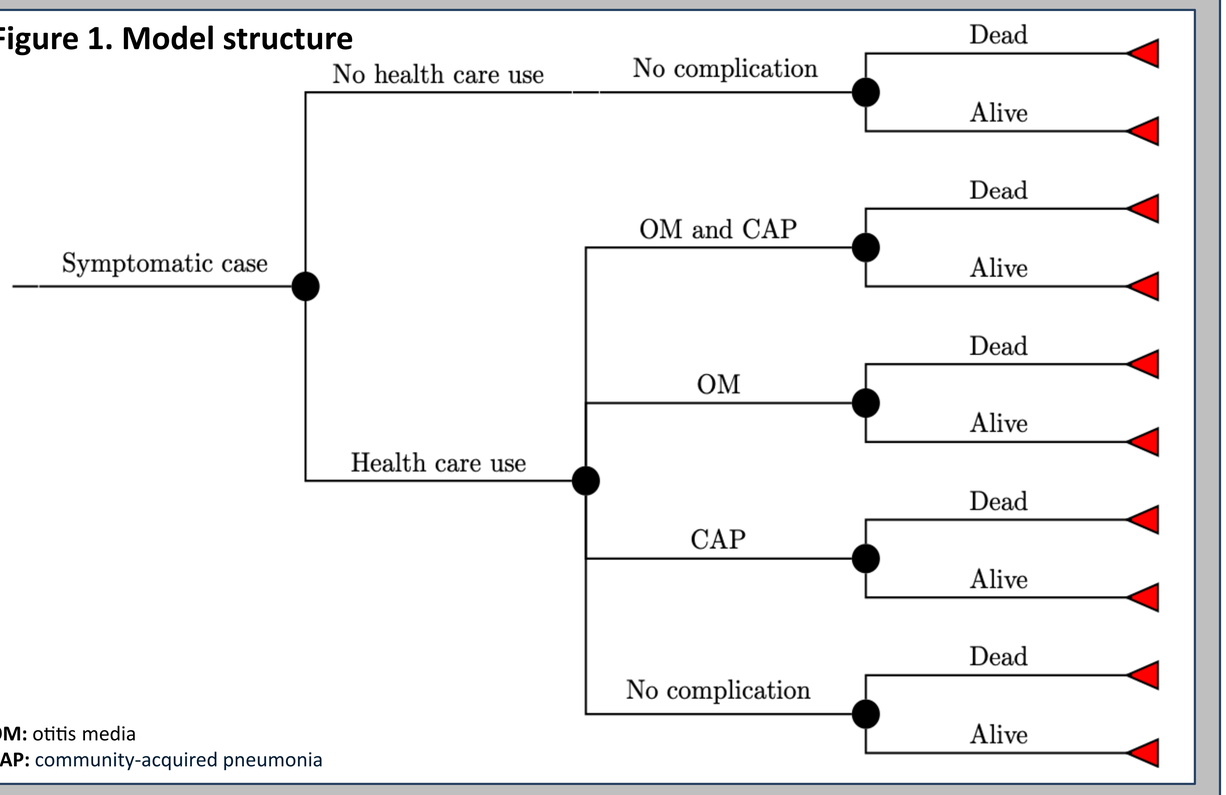
EE308

Giuseppe Pompilio, MSc[1]; Claudio Bellomo, PharmaD [1]; Andrea Pannunzio, PharmaD [2]; Elisa Fugazza, MSc [2]; Federica Zingaro, PhD [2]; Ilaria Valentini, PhD [3]; Michele Basile, MSc [3].
[1] Viatris, Rome, Italy; [2] Viatris, Milan, Italy; [3] ALTEMS Advisory, Catholic University of Sacred Heart, Rome, Italy.

INTRODUCTION

- Seasonal influenza is a major cause of morbidity and mortality in older adults. Annual vaccination remains the most effective strategy to prevent infection and its complications.
- Vaccine compositions are updated each season based on WHO surveillance and strain selection, and they contain inactivated antigens that elicit protective immunity without causing disease.
- Vaccination is associated with reduced hospitalizations and deaths, particularly in high-risk groups;[1] population benefits also increase through indirect (herd) protection when coverage is high, though effectiveness varies with the circulating A/H1N1, A/H3N2, and B strain mix.

Figure 1. Model structure



OM: otitis media
CAP: community-acquired pneumonia

OBJECTIVES

To assess the cost-utility of standard-dose (SD) versus high-dose (HD) inactivated influenza vaccine (IIV) in Italians aged ≥65 years, over one influenza season from the Italian National Health Service (NHS) perspective.

METHODS

A probabilistic decision-tree model was developed to evaluate the cost-effectiveness of seasonal influenza vaccination strategies in the Italian elderly population based on four health states: no influenza, influenza without complications, influenza with complications, and death. (Figure 1)

- The target population (~15.3 million) included individuals aged ≥65, stratified into three age groups: 65-74, 75-84, and ≥85 years. Historical surveillance data reported a cumulative influenza-like illness (ILI) incidence of 14.80% in the population aged ≥65 years.[2] The distribution of circulating influenza strains during the modeled influenza season was estimated from literature.[3]
- The effectiveness of SD-IIV in the prevention of laboratory-confirmed influenza and the relative effectiveness of HD-IIV versus SD-IIV in reducing ILI and hospitalizations was derived from literature review and meta-analyses.[4,5,6]
- Health state utilities associated with different health states were estimated from literature[5,7,8] and were used to calculate quality-adjusted life years (QALYs), the probability of developing complications, the probability of hospitalization in symptomatic patients as well as the mean duration of hospitalizations.[9]
- Vaccine costs were estimated from average acquisition costs per unit in regional Italian tenders: €22.14 for HD-IIV and €3.54 for SD-IIV, with a fixed administration cost of €10.86.
- The cost of hospital management of influenza-related complications was estimated from national DRG tariffs, and the cost of outpatient management of influenza was derived from literature.[10,11,12]

RESULTS

Base-case analysis

- Incremental cost-effectiveness ratio (ICER) of SD- vs HD-IIV was € 4,040.30 per QALY gained in the overall population, well below the commonly accepted willingness-to-pay (WTP) threshold in Italy (€25,000-€40,000).
- Age-specific ICERs were €7,931, €2,650 and €2,828 per QALY gained respectively.
- Although SD-IIV was slightly less effective, showing a 0.5% reduction in total QALY (12,616,093 vs 12,679,074; equivalent to -0.004 QALYs per individual), it was substantially less costly, resulting in a 46.3% cost reduction of €254.46 million (€294.67 million vs €549.13 million total costs). (Table 1)

Table 1. Results from base-case analysis

	STANDARD DOSE		HIGH DOSE		SD vs HD		
	COSTS	QALYs	COSTS	QALYs	INCREMENTAL COSTS	INCREMENTAL QALYs	ICER
65-74 Years	€ 132,022,475.36	6,284,785	€ 259,576,604.31	6,300,863	-€ 127,554,128.96	-16,078.53	€ 7,933.20
Per patient	€ 18.28	0.8702352	€ 35.94	0.8724615	-€ 17.66	-0.00223	
75-84 Years	€ 109,740,210.83	4,381,227	€ 194,519,451.71	4,413,222	-€ 84,779,240.88	-31,995.13	€ 2,649.75
Per patient	€ 20.21	0.8069741	€ 35.83	0.8128673	-€ 15.62	-0.00589	
Over 85	€ 52,910,399.70	1,950,082	€ 95,071,349.23	1,964,988	-€ 42,160,949.52	-14,906.73	€ 2,828.32
Per patient	€ 19.72	0.7269677	€ 35.44	0.7325248	-€ 15.72	-0.00556	
All over	€ 294,673,085.89	12,616,093	€ 549,167,405.25	12,679,074	-€ 254,494,319.36	-62,980.38	€ 4,040.85
Per patient	€ 19.22	0.8227728	€ 35.81	0.8268802	-€ 16.60	-0.00411	

Sensitivity analysis

The probabilistic sensitivity analysis (PSA) showed that vaccination with SD-IIV remained cost-effective in over 90% of simulations at a WTP of €10,000/QALY for the overall population, with age-specific probabilities ranging from approximately 80% in the 65-74 group to over 95% in the older cohorts. (Figure 2, Figure 3)

Figure 2. Probabilistic sensitivity analysis SD vs HD

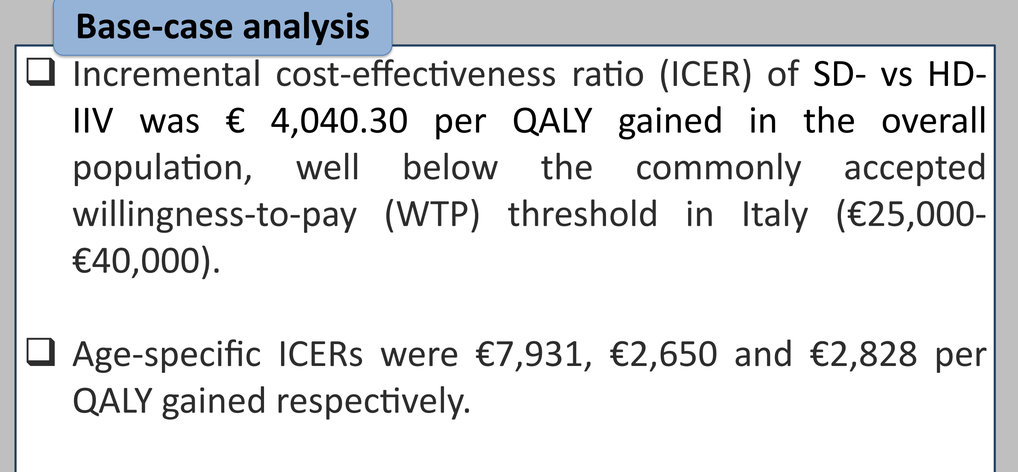
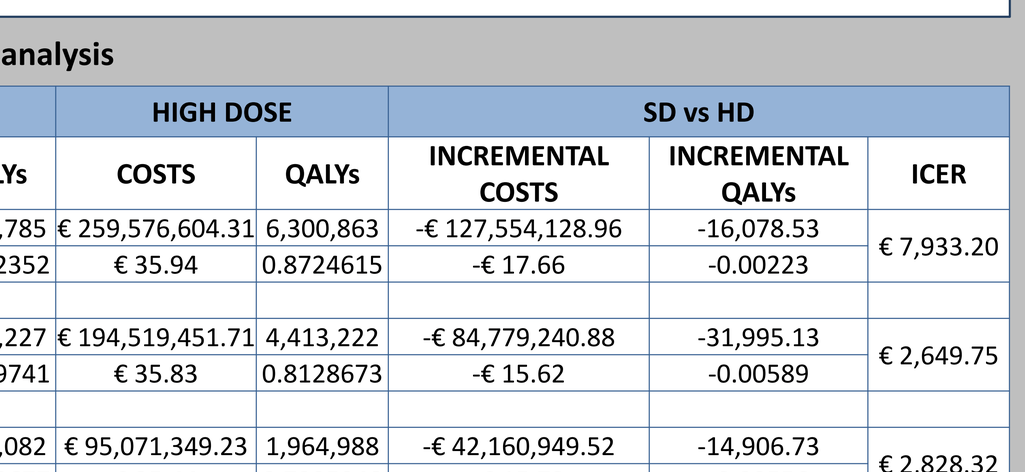


Figure 3. Cost-Effectiveness Acceptability Curve SD vs HD



CONCLUSIONS

The **standard-dose influenza vaccine** represents the **most economically advantageous strategy** for influenza vaccination in older adults. Compared to the **high-dose** vaccine, SD-IIV offers a **substantial cost reduction**, enables vaccination of a **larger number of individuals**, and ensures **comparable effectiveness** in terms of **QALYs**. The **resulting budget savings** could be **reinvested to enhance vaccination coverage**, strengthen **preventive health programs**, and ultimately **improve public health outcomes.**

REFERENCES

1. Presa J, Arranz-Herrero J, Alvarez-Losa L, Rius-Rocabert S, Pozuelo MJ, Lalueza A, et al. Influenza vaccine outcomes: a meta-analysis revealing morbidity benefits amid low infection prevention. Eur Respir Rev. 2025 Jan 8;34(175):240144.; 2. Boccalini S, Bechini A. Assessment of Epidemiological Trend of Influenza-Like Illness in Italy from 2010/2011 to 2023/2024 Season: Key Points to Optimize Future Vaccination Strategies against Influenza. Vaccines (Basel). 2024 Jul 25;12(8):841; 3. Trentini F, Pariani E, Bella A, et al. Characterizing the transmission patterns of seasonal influenza in Italy: lessons from the last decade. BMC Public Health. 2022 Jan 6;22(1):19; 4. Belongia EA, Simpson MD, King JP, et al. Variable influenza vaccine effectiveness by subtype: a systematic review and meta-analysis of test-negative design studies. Lancet Infect Dis. 2016 Aug;16(8):942–51; 5. Bedford T, Riley S, Barr IG, et al. Global circulation patterns of seasonal influenza viruses vary with antigenic drift. Nature. 2015 Jul 9;523(7559):217–20; 6. Lee JKH, Lam GKL, Yin JK, et al. High-dose influenza vaccine in older adults by age and seasonal characteristics: Systematic review and meta-analysis update. Vaccine X. 2023 Aug;14:100327; 7. Scalone L, Ciampichini R, Fagiuoli S, et al. Comparing the performance of the standard EQ-5D 3L with the new version EQ-5D 5L in patients with chronic hepatic diseases. Qual Life Res Int J Qual Life Asp Treat Care Rehabil. 2013 Sep;22(7):1707–16; 8. CDC. People at Increased Risk for Flu Complications [Internet]. Influenza (Flu). 2025 [cited 2025 Mar11]; 9. Scholz SM, Weidemann F, Damm O, et al. Cost-Effectiveness of Routine Childhood Vaccination Against Seasonal Influenza in Germany. Value Health. 2021 Jan 1;24(1):32–40; 10. Ministero della Salute. Principali caratteristiche Diagnosis Related Groups (DRG). Available from: https://www.salute.gov.it/portale/assistenzaOspedaliera/; 11. Ministero della Salute. Nomenclatori e tariffe nazionali delle prestazioni del SSN. Available from: https://www.salute.gov.it/portale/programmazioneFinanziamentoSSN/; 12. Lists of Class A and Class H medicinal products. Available from: https://www.aifa.gov.it/liste-farmaci-a-h.

Contact: Giuseppe Pompilio, giuseppe.pompilio@viatris.com