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Cost-Effectiveness of High-Dose versus Adjuvanted Trivalent Influenza Vaccines in Older Adults in Korea

Minseok Gong, PharmD[1]* · Hyun Woo Jeong, PharmD[1] · Eunjin Bae, MPH, MS[1] ·Soyeon Lee, PharmD[2] · Eugene Kim, PhD[3]

[1]Sanofi-Aventis Korea | [2]Ewha Womans University | [3]Graduate School of Public Health, Seoul National University

*Presenting Author (Email: Minseok.Gong@sanofi.com)

[Key Takeaways]

HD-TIV is a robustly cost-effective strategy for preventing influenza in Korean adults ≥65 years — more so for ≥75 years — compared with aTIV, even under extensive sensitivity analyses.

OBJECTIVE

- To assess the cost-effectiveness of HD-TIV versus aTIV in Korean adults aged ≥65 years, with subgroup analyses for ≥75 years and two event scenario analyses (respiratory vs cardio-respiratory events) through a model-based approach.

CONCLUSIONS

- **HD-TIV showed consistent and robust cost-effectiveness compared with aTIV in Korean adults aged ≥65 years. Cost-effectiveness was strongest in the ≥75-year group and in the cardio-respiratory scenario.**
- **Implementing HD-TIV for older adults in Korea may improve health outcomes, reduce hospitalizations and deaths, and alleviate healthcare and societal costs.**

BACKGROUND

- Seasonal influenza remains a major cause of morbidity, hospitalizations, and mortality among older adults in Korea. Following the discontinuation of influenza B/Yamagata lineage, WHO recommends trivalent vaccines for older adults.
- For adults aged ≥65 years, high-dose trivalent (HD-TIV) or adjuvanted trivalent (aTIV) vaccines are advised over standard-dose formulations. Although aTIV shows relatively modest effectiveness, both are considered high-immunogenicity options; this study aimed to compare their cost-effectiveness in the Korean context.

METHODS

Study Design & Perspective

A cost-effectiveness analysis was performed according to the HIRA Economic Evaluation Guidelines (2021) from the Korean healthcare payer perspective, using a decision-tree model with a lifetime horizon.

Scenarios

1. Respiratory events (influenza-related)
2. Cardio-respiratory events (respiratory + cardiovascular complications)

Model Inputs

- Vaccine coverage[1]
- Relative vaccine effectiveness (rVE)[2,3]
- Hospitalization risk, mortality, and costs[4]
- Utilities: age-specific EQ-5D values[5]
- Prices: aTIV = ₩30,000 (assumed); HD-TIV = ₩50,000 (base)
- Discount rate: 4.5% annually[6]

Age Group
≥65 yr
≥75 yr (Subgroup)

Study Location
South Korea

Analyses

- *Incremental cost-effectiveness ratios (ICERs)* for HD-TIV vs aTIV
- *Sensitivity analysis*
  - *Deterministic sensitivity analyses* (tornado diagrams)
  - *Probabilistic sensitivity analysis* (1,000 simulations; CE planes and CEAC)
- *Economically Justifiable Price (EJP)* of HD-TIV at WTP thresholds

RESULTS

Incremental cost-effectiveness ratios

- HD-TIV showed favorable ICERs across all scenarios, with the lowest ratios in the ≥75 yr cardio-respiratory group, indicating strong value for this population.**(Table 1)**
- HD-TIV substantially reduced influenza-related outpatient visits, ED visits, and all-cause mortality compared with aTIV.**(Figure 1)**

Economically Justifiable Price

- At WTP = 1 GDP/QALY, the economically justifiable price of HD-TIV was 2.6–3.8× the aTIV price when only respiratory outcomes were considered, and 4.8–7.5× when cardio-respiratory outcomes were included. **(Figure 2)**
- Higher allowable prices in older adults and broader outcomes.

Sensitivity Analysis

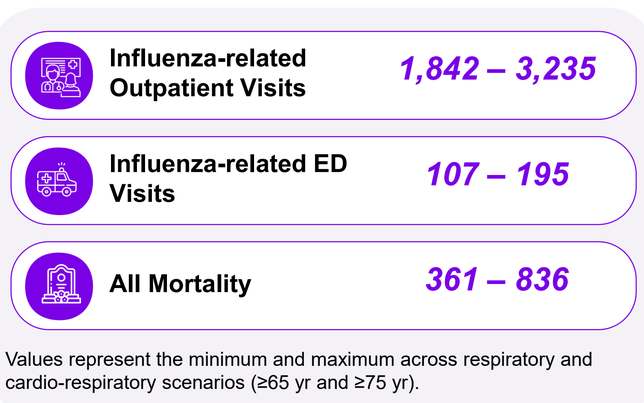
- Even with the weak and limited evidence for aTIV, extensive sensitivity analyses confirmed that HD-TIV remained consistently cost-effective across all scenarios.
- ICERs were most influenced by HD-TIV price, HD-TIV rVE against hospitalizations, and aTIV rVE assumptions. **(Figure 3)**
- PSA showed >99% probability that HD-TIV is cost-effective at 1 GDP/QALY across all scenarios. **(Figure 4)**

Table 1: Base-Case ICERs and events avoided (HD-TIV vs aTIV)

* 1 USD=₩ 1,404

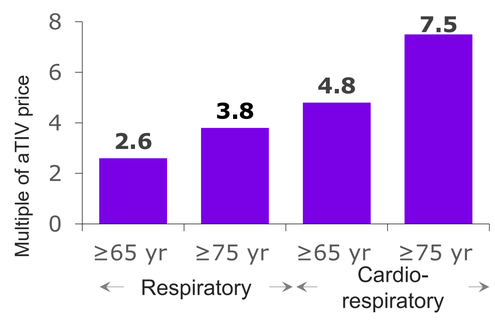
	Respiratory		Cardio-respiratory	
	65+	75+	65+	75+
ICER (₩/QALY)	20,883,288	9,667,573	5,422,399	1,468,581

Figure 1: Events avoided (HD-TIV vs aTIV)



Values represent the minimum and maximum across respiratory and cardio-respiratory scenarios (≥65 yr and ≥75 yr).

Figure 2: EJP of HD-TIV (Multiples of aTIV Price)



EJP estimates calculated under the WTP threshold of 1 GDP/QALY*
*1 GDP/QALY = 50,120,000 ₩/QALY

Figure 3: Tornado plots for (A) respiratory (≥65 yr), (B) cardio-respiratory (≥75 yr) events

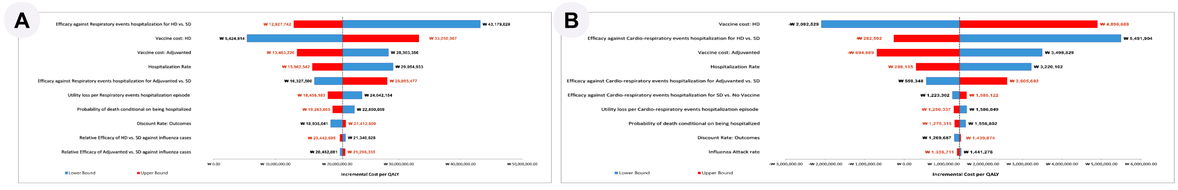
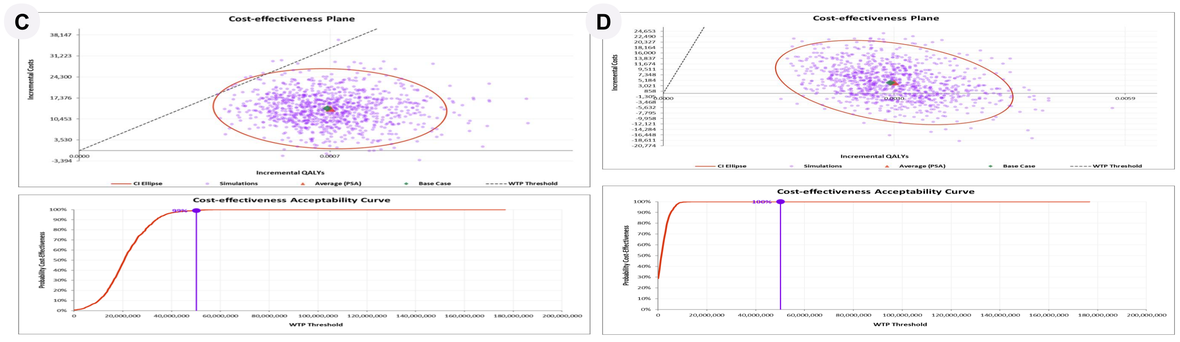


Figure 4: PSA and CEAC results for (C) respiratory (≥65 yr), (D) cardio-respiratory (≥75 yr) events



DISCUSSION

- This study provides timely evidence supporting HD-TIV as an optimal strategy, as HD-TIV reduced influenza incidence and hospitalizations more than aTIV, contributing to individual health improvement, healthcare cost savings, and broader social benefits.7, 8
- Previous studies from other countries also showed HD-TIV to be more effective and cost-effective than aTIV in reducing influenza-related hospitalizations among older adults, consistent with the present findings.
- In Korea, where hospitalization burden and vaccination coverage are both high, integrating HD-TIV into the NIP may further improve health and economic outcomes.
- The model reflected Korea's high vaccination coverage among older adults, but not herd immunity, suggesting the actual benefits may be greater.

ABBREVIATIONS: HD-TIV: high-dose trivalent influenza vaccine, aTIV: adjuvanted trivalent influenza vaccine, ED: emergency department, QALY: quality-adjusted life year, ICER: incremental cost-effectiveness ratio, PSA: probabilistic sensitivity analysis, CEAC: cost-effectiveness acceptability curve, HIRA: Health Insurance Review and Assessment Service, rVE: relative vaccine effectiveness, EQ-5D: EuroQol 5-dimensions, EJP: economically justifiable price, WTP: willingness-to-pay

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