Poster number: EE598

Copies of this poster obtained through Quick Response (QR) Code are for personal use only

Cost-utility of influenza vaccination for the Brazilian elderly population with a high dose quadrivalent vaccine in the public healthcare sector

Sarah Watanabe[1], José Cassio de Moraes[2], Rosana Richtmann[3,4], Rodrigo A Ribeiro[5], Endi L Galvão[6], Caroline Courville[7], Karina Ribeiro[1], Juliana Santoro[1]

[1] Sanofi, São Paulo, Brazil, [2] Department of Collective Health, Faculdade de Ciências Médicas da Santa Casa de São Paulo, Brazil; [3] Grupo Santa Joana, São Paulo, Brazil; [4] Instituto de Infectologia Emilio Ribas, São Paulo, Brazil; [5] HTAnalyze Consulting and Training, Porto Alegre, Brazil; [6] Universidade Federal dos Vales do Jequitinhonha e Mucuri, Diamantina, Brazil; [7] Sanofi, Lyon, France

BACKGROUND

- Influenza is an important cause of morbidity and mortality worldwide.
- The elderly population is especially susceptible to worst outcomes of this infection, with a hospital admission rate 2.7 higher than the younger population. (1)
- In Brazil, through National Immunization Program (NIP) the standard-dose influenza trivalent (SD-TIV) vaccine is currently available.
- However, the standard-dose (SD) vaccine provides suboptimal protection in the elderly due to immunosenescence.
- To meet this medical need, a high-dose quadrivalent (HD-QIV) vaccine was developed, with four times more antigens than the SD vaccine. HD-QIV has a good risk/benefit profile, and a 24% higher efficacy, when compared to SD. (2)

OBJECTIVES

- The aim of this study was to evaluate the cost-utility of influenza HD-QIV versus SD-TIV in the Brazilian elderly population (≥60y), in the public healthcare system perspective.

METHODS

- A cost-utility analysis comparing HD-QIV versus SD-TIV was conducted using a statistic decision-tree model (Figure1).
- The model estimates health outcomes conditional on influenza using a broader approach: the benefits include reduction of hospital admissions considering all causes of hospitalization with influenza broader definition and cardiorespiratory ICDs codes, but also from other causes.
- These benefits attributable to HD influenza vaccines were previously demonstrated in a meta-analysis that included data of ≥22 million subjects, with reduction of 8.4% in all-cause hospitalization, when compared to SD. (3)
- HD-QIV relative vaccine efficacy vs. SD-TIV (24.20%): obtained from the FIM12 trial and immunobridging studies. (2)
- The costs of the HD-QIV vaccine was taken from the Brazilian CMED (Câmara de Regulação do Mercado de Medicamentos) list, considering the "Preço Fábrica" with 18% tax price from April 2023. (4) The cost of the standard dose vaccine was considered as R$ 16,21 in the analysis, based on the last purchase of Brazilian Minister of Health in March, 2023. The model used a lifetime horizon, and a discount rate of 5%. (5)
- Costs of medications, hospital visits and admissions are displayed in Table 2; all values were from 2023.

Table 1. Input parameters used in the model: epidemiological data.

Model parameters	Age Group			
	60-69 y	70-79 y	80+ y	Source
Vaccine Coverage (%) *	75.1	82.4	69.1	6
All cause hospitalization rates (per 100,000 person, per year)	11,286	16,809	25,255	7
Probability of death conditional on being hospitalized: all-cause admissions (%) **	7.61	11.13	18.25	7
Probability of ED visit conditional on developing influenza (%)	5.43	10.39	21.23	7
Probability of GP visit conditional on developing influenza (%)	17.39	17.20	16.43	7
Proportion of hospitalizations for respiratory causes (%) **	7.5	11.9	20.2	7
Proportion of hospitalizations for cardiovascular causes (%) **	11.7	12.4	11.0	7
Length of stay of all cause hospitalizations (days) **	5.8	5.9	5.9	7
General population utility norms (EQ-5D)	0.842	0.822	0.822	8

Legend: y, years; ED, Emergency Department; GP, General Practitioner.

Table 2. Input parameters used in the model: costs.

Model parameters	Cost (BRL)	Source
Prescription influenza medications	179.40	9
Influenza-related GP visit	28.00	10
Influenza-related ED presentations	87.19	10
All cause hospitalization costs		
60-69 y	2,249.97	11
70-79 y	2,205.78	11
80+ y	1,811.08	11

Legend: y, years.
Costs (expressed in Brazilian reais [R$]) were estimated from SIGTAP, DATASUS and other publicly available Brazilian sources.

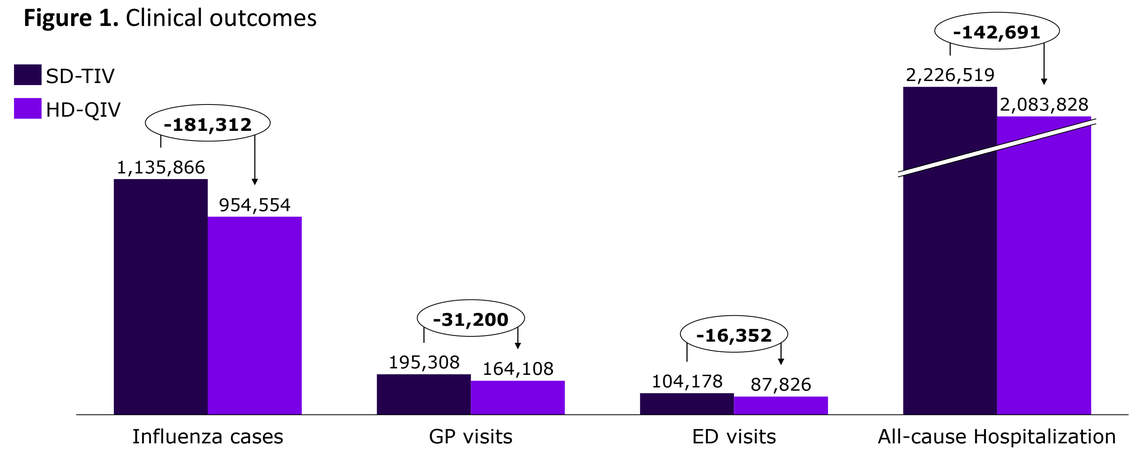
SOURCE OF FUNDING: This study was funded by Sanofi.

CONFLICT OF INTEREST STATEMENT: Sarah Watanabe, Caroline de Courville, Karina Ribeiro and Juliana Santoro are Sanofi's employees and may hold shares and/or stock options in the company; Rodrigo Ribeiro and Endi L. Galvão received professional service fees from Sanofi for conducting this research; José Cassio de Moraes and Rosana Richtmann provided expert consultation and informed opinion in a board of experts.

RESULTS

- The Incremental Cost-Utility Ratio (ICUR) of HD-QIV vs SD-TIV was R$24,420.00/QALY, making it a cost-effective technology when considering a local 1x GDP per capita (R$ 40,000) ICUR threshold (Table 3).
- Analysis by age group shows the ICUR more favorable in the ≥70y and ≥80y population (Table 4).
- Probabilistic sensitivity analysis showed that, in the 60+ population, the probability that the ICUR was below the ICUR threshold was 99% (Figure 2).

Figure 1. Clinical outcomes



Legend: n, number of cases; ED, Emergency Department; GP, General Practitioner.
Costs (expressed in Brazilian reais [R$]).

Table 3. Clinical outcomes and cost-effectiveness results in base case.

	SD TIV	HD QIV	Difference
Total costs (R$)	202.24	309.11	106.77
Total QALY	8.0555	8.0599	0.0043
ICUR	-	-	24,420.00

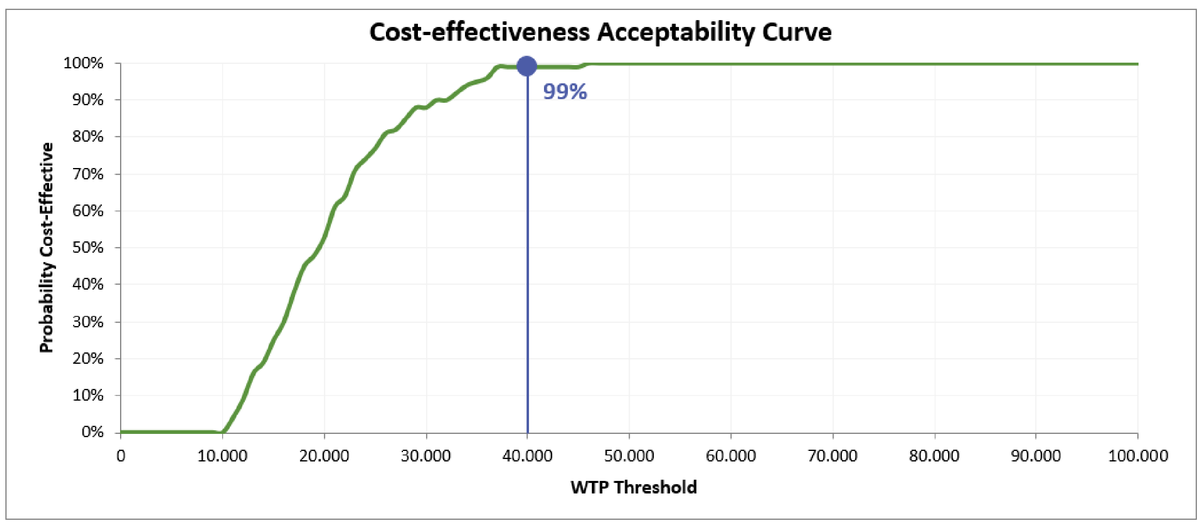
Legend: n, number of cases; ED, Emergency Department; GP, General Practitioner.
Costs (expressed in Brazilian reais [R$]).

Table 4. Cost-effectiveness for influenza vaccines by age groups (HD QIV vs. SD TIV).

Description	SD TIV			HD QIV		
	60-69 y	70-79 y	80+ y	60-69 y	70-79 y	80+ y
Total Cost (R$)	164.38	234.94	284.83	271.67	347.77	376.36
Total QALYs	9.5233	7.0116	4.3938	9.5264	7.0171	4.4008
ICUR	-	-	-	34,337	20,585	13,068

Legend: y, years.
Costs (expressed in Brazilian reais [R$]).

Figure 2. Cost-effectiveness acceptability curve (HD QIV vs. SD TIV).



CONCLUSION

Despite the incremental cost of the vaccine and considering the willingness-to-pay threshold of R$40,000/QALY in Brazil, HD-QIV is a cost-effective strategy vs SD-TIV according to the present analysis and should be considered by policy makers.

REFERENCES:
1. Ministério da Saúde, "Morbidade hospitalar do SUS - por local de internação - Brasil," 2018. [Online]. Available: http://tabnet.datasus.gov.br/cgi/tabcgi.exe?sih/cnv/niuf.def. [Acesso em 10 10 2019].
2. N Engl J Med 2014 Aug 14;371(7):635-45. Efficacy of high-dose versus standard-dose influenza vaccine in older adults.
3. Lee JKH., Lam GKL., Shin T., Samson SI., Greenberg DP., Chit A. Efficacy and effectiveness of high-dose influenza vaccine in older adults by circulating strain and antigenic match: An updated systematic review and meta-analysis. Vaccine 2021;39 Suppl 1:A24–35. Doi: 10.1016/j.vaccine.2020.09.004.
4. Listas de preços de medicamentos (https://www.gov.br/anvisa/pt-br/assuntos/medicamentos/cmed/preços). Accessed April, 2023.
5. INFORME TÉCNICO OPERACIONAL. Vacinação contra a Influenza. (https://www.gov.br/saude/pt-br/assuntos/saude-de-a-a-z/c/calendario-nacional-de-vacinacao/informes-tecnicos/informe-tecnico-operacional-de-vacinacao-contra-a-influenza-2023). Accessed April, 2023.
6. SI-PNI Web. Available at http://sipni-gestao.datasus.gov.br/si-pni-web/faces/relatorio/consolidado/dosesAplicadasCampanhaInfluenzaFaixa.jsf. Accessed March, 2023.
7. TabNet Win32 3.0: Morbidade Hospitalar do SUS - por local de internação - Brasil. Available at http://tabnet.datasus.gov.br/cgi/tabcgi.exe?sih/cnv/niuf.def. Accessed March 16, 2023.
8. Revista Brasileira de Psiquiatria. 2017;39:62–68. doi:10.1590/1516-4446-2015-1853
9. Banco de Preços em Saúde (https://www.gov.br/saude/pt-br/acesso-a-informacao/banco-de-preços), accessed March, 2023.
10. Sistema de Gerenciamento da Tabela de Procedimentos, Medicamentos e OPM do SUS (http://sigtap.datasus.gov.br/tabela-unificada/app/sec/inicio.jsp). Accessed March, 2023.
11. TabNet Win32 3.0: Morbidade Hospitalar do SUS - por local de internação - Brasil. Available at http://tabnet.datasus.gov.br/cgi/tabcgi.exe?sih/cnv/niuf.def. Accessed March, 2023.

Poster presented at the 2023 ISPOR European Meeting