Poster # EE494

ISPOR Europe 2022
November 6-9
Viena, Austria

A cost-benefit evaluation for trivalent to quadrivalent influenza vaccination switch for 40+ years old dyslipidemia patients with and without previous cardiovascular event in Colombia

Londoño S[1], Penagos JC[1], Garcia W[1].
[1]Sanofi, Bogotá, Colombia

INTRODUCTION

Influenza vaccination has been associated with a decreased risk for macrovascular complications in patients with dyslipidemia (with and without previous cardiovascular event).

OBJECTIVE

To determine the potential savings of reducing macrovascular complications, with the synergistic effect of switching from a trivalent to a quadrivalent standard-dose influenza vaccine (TIV to QIV-SD) and increasing vaccination coverage rates (VCRs) in Colombia from the healthcare system perspective.

METHODS

- A cost-benefit model comparing two influenza vaccination scenarios for the dyslipidemia patients aged 40+ was developed.
- Outcomes included were the number and expected total cost of Acute Myocardial Infarction (AMI), Stroke, and Revascularization (RV) complications.
- Vaccination effectiveness was established at a reduction of 29%, 18% and 29% for AMI, stroke and RV respectively[1,2,3]. QIV-SD additional effectiveness was calculated using epidemiological data[4] with the formula: VE(QIV) = VE(TIV) + VE(TIV)*%B(circulation)*(1-%B(match))*(1- cross-protection (49%)) .
- The compared scenarios correspond to expected total cost of macrovascular events in the base case (current standard of care with TIV, 20% VCR) versus a switch to QIV-SD and VCR increase to 30%, 40%, and 50%.
- Total dyslipidemia patients were calculated based on local estimated prevalence.
- Previous cardiovascular events profile, probability of complications and effectiveness for vaccines were obtained and derived from published scientific literature[5,6].
- Pan American Health Organization vaccine acquisition price and costs for complications obtained from local published literature were included and expressed in 2021 $USD.
- One-way sensitivity analyses were performed for the cost of vaccines, events, vaccine effectiveness, and diabetic risk profile for each event.

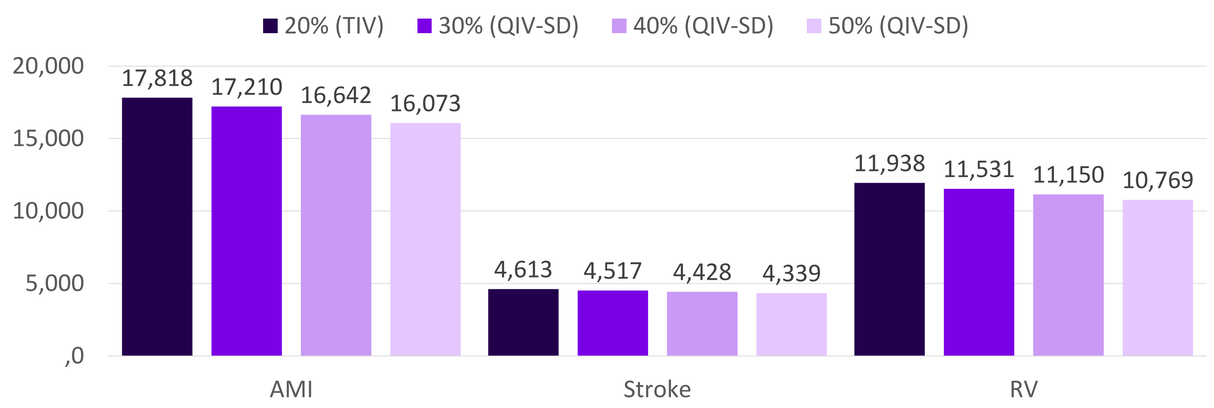
POSTER HIGHLIGHT: Vaccination with QIV-SD and increased coverage for patients with dyslipidemia allows for avoided macrovascular events and its associated costs for the healthcare system.

Table 1: Costs Summary

Cost Item	Value ($USD)	Source
TIV	$2.86	PAHO 2021
QIV-SD	$6.00	PAHO 2021
Acute Myocardial Infarction	$ 4,372	GPC Minsalud 2014
Stroke	$ 4,441	GPC Minsalud 2015
Revascularization	$ 1,511	GPC Minsalud 2014

Cost expressed in 2021 constant values and inflated accordingly

Figure 1: Total events, costs and potential savings with switch to QIV-SD and VCR increase



Coverage	Total Cost	Difference	OWSA range
20% (TIV)	$ 170,712,359	-	-
30% (QIV-SD)	$ 166,856,956	$ 3,855,402	$752,840 - $6,182,324
40% (QIV-SD)	$ 162,525,038	$ 8,187,320	$2,185,505 - $12,688,682
50% (QIV-SD)	$ 158,193,120	$ 12,519,238	$3,618,171 - $19,195,039

Table 2: Vaccinated and non-vaccinated costs per patient profile

	Non-vaccinated patient		Vaccinated patient (QIV-SD)	
Controlled dyslipidemia and no previous CV event				
Event	Event Probability	Expected cost	Event Probability	Expected cost
Acute Myocardial Infarction	0.85%	$ 62.6	0.60%	$ 44.5
Stroke	0.27%	$ 11.8	0.22%	$ 9.7
Revascularization	0.57%	$ 8.4	0.40%	$ 6.0
Total expected cost		$ 82.8		$ 60.1
Savings per patient				$ 22.7
Controlled dyslipidemia and previous CV event				
Event	Event Probability	Expected cost	Event Probability	Expected cost
Acute Myocardial Infarction	2.45%	$ 180.9	1.74%	$ 128.4
Stroke	0.42%	$ 18.7	0.34%	$ 15.3
Revascularization	1.64%	$ 24.2	1.16%	$ 17.2
Total expected cost		$ 223.8		$ 160.9
Savings per patient				$ 62.8
Uncontrolled dyslipidemia and previous CV event				
Event	Event Probability	Expected cost	Event Probability	Expected cost
Acute Myocardial Infarction	2.83%	$ 209.6	2.01%	$ 148.8
Stroke	0.58%	$ 25.7	0.48%	$ 21.1
Revascularization	1.90%	$ 28.1	1.35%	$ 19.9
Total expected cost		$ 263.4		$ 189.9
Savings per patient				$ 73.6

RESULTS

Calculations were made for a population of 1.468.243 dyslipidemia patients. Expected mean costs per QIV vaccinated and non-vaccinated individual due to complications were calculated at USD$136.00 and USD$191.01 respectively.

Compared to the base case, switching to QIV-SD and increasing the rates to 30%, 40% and 50%, represents potential net savings of USD$3,855,402 ($752,840-$6,182,324), USD$8,187,320 ($2,185,505-$12,688,682) and USD$12,519,238 ($3,618,171-$19,195,039) respectively for the healthcare system.

CONCLUSIONS

- Switching from TIV to QIV-SD vaccination and an increase in VCR for the high blood cholesterol levels (dyslipidemia) population could represent potential net savings due to macrovascular events avoided for the healthcare system.
- With the increase in VCR, the reduction in macro vascular events and costs related to them is an additional benefit on top of the prevention of clinical events due to influenza.
- Therefore, identifying and vaccinating this high-risk population with QIV-SD could be advantageous to maximize overall economic and health outcomes.

REFERENCES

1. Barnes M, Heywood A, Mahimbo A, Rahman B, Newall A, Macintyre R. Acute myocardial infarction and influenza: a meta-analysis of case control studies (OR 0.71) 2015
2. Lee K, Hun J, Hwang I. Effect of influenza vaccination on risk of stroke: A systematic review and meta-analysis (OR 0.82) 2017
3. De Ferrari GM, et al. Outcomes among non-ST-segment elevation cute coronary syndromes patients with no angiographically obstructive coronary artery disease: observations from 37,101 patients. Eur Heart J Acute Cardiovasc Care 2014;3:37–45.
4. Jamotte A, *et al*. Public health impact and economic benefits of quadrivalent influenza vaccine in Latin America. Hum Vaccin Immunother. 2017 Apr 3;13(4):877-888
5. Berry JD, Dyer A, Cai X, Garside DB, Ning H, Thomas A, Greenland P, Van Horn L, Tracy RP, Lloyd-Jones DM. Lifetime risks of cardiovascular disease. N Engl J Med. 2012 Jan 26;366(4):321-9
6. Schwartz GG, et al. Alirocumab and Cardiovascular Outcomes after Acute Coronary Syndrome. N Engl J Med. 2018 Nov 29;379(22):2097-2107
7. PAHO Revolving Fund Vaccine Prices for 2021.
8. Guía de práctica clínica para la prevención, detección temprana, diagnóstico, tratamiento y seguimiento de las dislipidemias en la población mayor de 18 años. Minsalud 2014
9. Guía de Práctica Clínica para el diagnóstico, tratamiento y rehabilitación del episodio agudo del Ataque Cerebrovascular Isquémico en población mayor de 18 años. Minsalud 2015

Author contact information: Sergio Londoño – sergio.londono@sanofi.com
Study sponsored by Sanofi.