Modelling Herpes Zoster Burden and Public Health Impact of Adjuvanted Recombinant Zoster Vaccine among Adults Aged ≥50 Years Old in Seven Countries in Central and South America

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Conclusions

This modelling study suggests a **substantial HZ disease burden** in Central and South America **among 50+ adults. RZV vaccination** might significantly **reduce this burden.**

Aims

Modelling the **HZ-related public health burden** (number of cases) and **public health impact of RZV** (number of cases avoided) in 50+ Y/O population

Background

- Varicella zoster virus is a neurotropic herpes zoster virus causing chickenpox (primary infection) in children and shingles (HZ reactivation) in adults.[1]
- Studies in Latin America have indicated an incidence density of 6–37 HZ cases per 1,000 person-year among higher-risk patients.[2]
- A pooled analysis of studies from Argentina, Brazil, and Mexico found that 79% of patients with HZ visited a doctor's office, 49% visited the emergency room, 38% visited a specialist, and 6% were hospitalized, resulting in a direct cost of $763 per case (2015 US$).[3]
- A modelling study predicted that nearly 5 millions of an estimated 24 millions cases of HZ could be avoided by vaccinating 35% of older adults with RZV in Argentina, Brazil, Mexico, Chile, and Colombia.[4]
- RZV has gained approval in Argentina, Brazil, and Mexico.[4]
- Modelling studies can help assess the public health burden (PHB) of HZ and the public health impact (PHI) of RZV in Central and South America, where data is limited.[5]

Demographics

50+

The RZV vaccinated 50+ Y/O population of **Peru**, **Ecuador**, **Panama**, **Guatemala**, **Dominican Republic**, **Costa Rica**, **Trinidad & Tobago**, compared with non vaccinated comparable population during their remaining lifetime.

Study design

HZ and complications cases without vaccination | **Cases Avoided by RZV** | **Number Needed to Vaccinate, NNV**

ZONA model[4] follows five age cohorts over their remaining lifetime

Epidemiology
- **Annual HZ incidence**
- **% with PHN**
- **% non-PHN complications**
- HZ-related mortality

Vaccine
- Initial efficacy of RZV
- Waning of RZV efficacy
- Dosing schedule
- AE incidence from RZV
- **1st-dose coverage**
- **2nd-dose compliance**

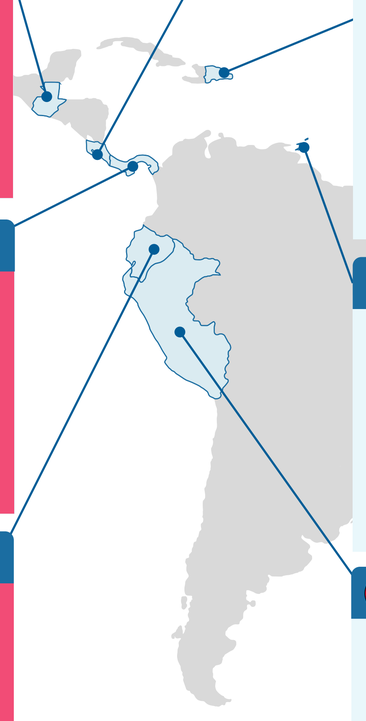
Demographic
- **Sizes of age cohorts in 2023**
- **All-cause mortality in 2023**

Each model input was adjusted ±20% or 95% confidence interval from the base case value to evaluate the relative impact on the number of HZ cases avoided from vaccination.
**Bolded inputs are local values.*

Results

Baseline vs RZV avoided cases of HZ, PHN, non-PHN complications, and NNV* per country

In total, 734,491 HZ cases and 179,664 PHN cases were avoided via vaccination with 35% 1st-dose coverage and 75% 2nd-dose compliance rate, leading to a reduction of 20% of HZ cases across the countries assessed



Guatemala

Cases:	without RZV	avoided with RZV	NNV
HZ	116,464	24,560	HZ: 11
PHN	97,578	19,622	PHN: 44
Complications (non-PHN)	388,700	81,970	

Panama

Cases:	without RZV	avoided with RZV	NNV
HZ	67,103	12,903	HZ: 9
PHN	58,257	10,639	PHN: 35
Complications (non-PHN)	223,956	43,063	

Ecuador

Cases:	without RZV	avoided with RZV	NNV
HZ	231,640	45,793	HZ: 9
PHN	199,792	37,605	PHN: 36
Complications (non-PHN)	773,097	152,835	

Costa Rica

Cases:	without RZV	avoided with RZV	NNV
HZ	88,469	17,605	HZ: 9
PHN	76,658	14,560	PHN: 35
Complications (non-PHN)	295,267	58,757	

Dominican Republic

Cases:	without RZV	avoided with RZV	NNV
HZ	455,381	27,286	HZ: 15
PHN	116,675	22,170	PHN: 68
Complications (non-PHN)	136,444	91,066	

Trinidad & Tobago

Cases:	without RZV	avoided with RZV	NNV
HZ	83,675	5,081	HZ: 10
PHN	21,589	4,173	PHN: 39
Complications (non-PHN)	25,071	16,959	

Peru

Cases:	without RZV	avoided with RZV	NNV
HZ	424,495	86,844	HZ: 10
PHN	362,780	70,894	PHN: 38
Complications (non-PHN)	1,416,753	289,841	

**NNV is the number of individuals needed to vaccinate to avoid one case of HZ and PHN.*

Abbreviations

AE: adverse events; HZ: herpes zoster; NNV: number needed to vaccinate; PHB: public health burden; PHI: public health impact; PHN: post-herpetic neuralgia; RZV: recombinant zoster vaccine; US: United States; VZV: varicella zoster virus; Y/O: year old.

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Disclosures

Ru Han and Laura Naranjo are employed by GSK. Désirée A. M. van Oorschot, Tamara Rosales, Adriana Guzman-Holst and Jorge A. Gomez are employed by and hold shares in GSK. The authors declare no other financial and non-financial relationships and activities.

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Digital poster
Supplemental data
References
Narrated summary

SCAN ME | Audio File

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Supplementary material: inputs

Model inputs for annual HZ incidence, recurrence rates %, PHN incidence, other complications incidences, efficacy, waning rates of RZV.[6,7]

Input	Base case value	Source
Annual HZ incidence and recurrence rate*, %		8, 9, 6, 10
50-59 YO	0.55	
60-64 YO	0.73	
65-69 YO	0.8	
70-79 YO	0.99	
80+ YO	1.08	
PHN incidence, % of the first or recurrent HZ cases		7, 11, 3
50-59 YO	16.78	
60-64 YO	20.41	
65-69 YO	20.41	
70-79 YO	29.48	
80+ YO	29.48	
Non-PHN complication incidence, % of the first HZ cases		7
Ocular	7.62	
Neurological	4.49	
Cutaneous	16.10	
Other non-pain complication	1.75	

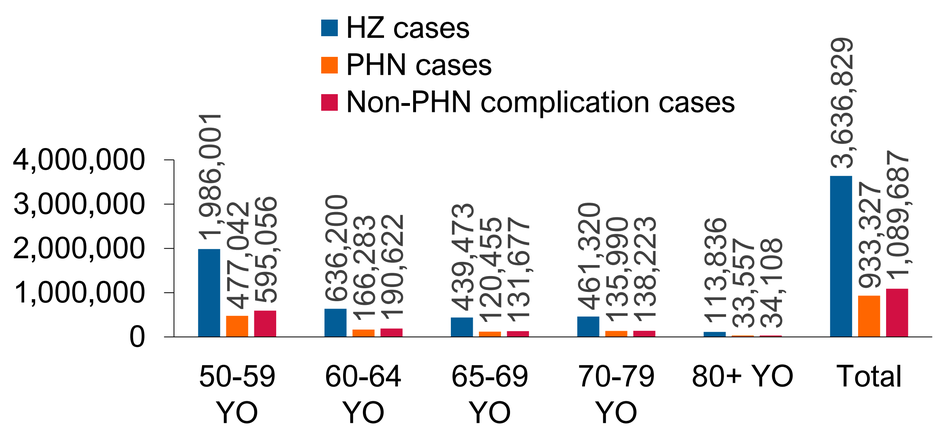
*The recurrence rate of HZ episodes was assumed to be the same as the first occurrence rate. Population size and all-cause mortality in 2023 were sourced from the United Nation.[8]
HZ: Herpes Zoster; NNV: Number needed to vaccinate;; PHB: Public Health Burden; PHI: Public health Impact
PHN: post-herpetic Neuralgia; OWSA: One way deterministic sensitivity analysis; RZV: Recombinant Zoster Vaccine; Y/O: year old.

Inputs of vaccine efficacy and waning rates after 1st and 2nd dose[4,13]

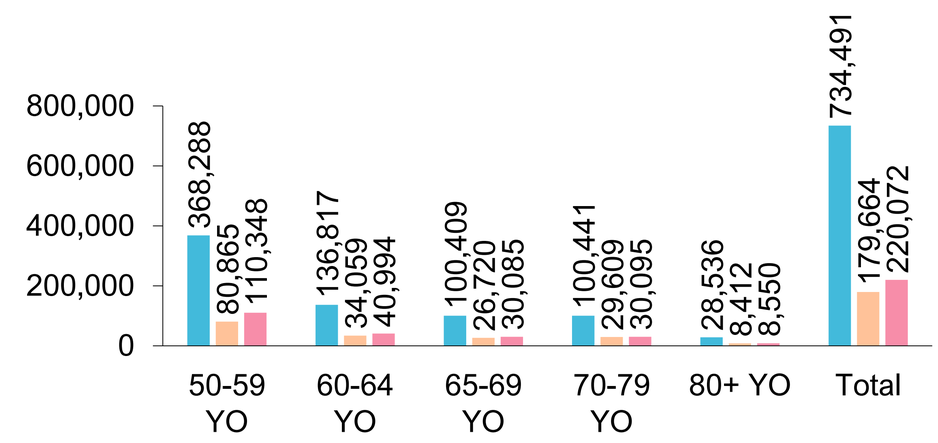
	1st dose		2nd dose	
Age group	VE against HZ/PHN	Waning rate	VE against HZ/PHN	Waning rate
50-59 YO	90.10%	5.40% in the first 4 years and 5.10% in the following years	98.90%	1.50%
60-64 YO	90.10%		98.90%	1.50%
65-69 YO	90.10%		98.90%	1.50%
70-79 YO	69.50%		95.40%	2.30%
80+ YO	69.50%		95.40%	2.30%

Supplementary results: per age

PHB overall and by age group for the 7 countries



PHI overall and by age group for the 7 countries



Supplementary results: per country

Base case total per country of HZ, PHN, and complications cases for Central and South American countries involved.

Country	HZ cases	PHN cases	Complication cases	Ocular	Neurological	Cutaneous	Other
Peru	1,416,753	362,780	424,495	107,893	63,674	228,166	24,762
Ecuador	773,097	199,792	231,640	58,875	34,746	124,506	13,512
Panama	223,956	58,257	67,103	17,055	10,065	36,068	3,914
Guatemala	388,700	97,578	116,464	29,601	17,470	62,600	6,794
Dominican Republic	455,381	116,675	136,444	34,679	20,467	73,339	7,959
Costa Rica	295,267	76,658	88,469	22,486	13,270	47,552	5,161
Trinidad & Tobago	83,675	21,589	25,071	6,372	3,761	13,476	1,462

Avoided total cases per country after RZV, NNV HZ and NNV PHN for Central and South American countries involved.*

Country	HZ cases avoided	PHN cases avoided	Complication cases avoided	Ocular avoided	Neurological avoided	Cutaneous avoided	Other avoided
Peru	289,841	70,894	86,844	22,073	13,027	46,679	5,066
Ecuador	152,835	37,605	45,793	11,639	6,869	24,614	2,671
Panama	43,063	10,639	12,903	3,279	1,935	6,935	753
Guatemala	81,970	19,622	24,560	6,242	3,684	13,201	1,433
Dominican Republic	91,066	22,170	27,286	6,935	4,093	14,666	1,592
Costa Rica	58,757	14,560	17,605	4,475	2,641	9,463	1,027
Trinidad & Tobago	16,959	4,173	5,081	1,292	762	2,731	296

*One-way deterministic sensitivity analyses (OWSA) were performed to assess the robustness and uncertainty of base case inputs for each country setting included in the study. OWSA showed that first-dose coverage, HZ incidence, and vaccine efficacy waning had the largest impact on the estimated number of HZ cases avoided.

Limitations

Underestimated Value of RZV:
- The comprehensive value of the RZV vaccine might have been underestimated since it didn't consider its impact on HZ severity, PHN, economic savings through disease prevention, and social psychological benefits.

Incomplete HZ Data in South and Central America is due to:
- Scarcity of data in the literature regarding HZ incidence and healthcare resource usage in South and Central American nations.
- Underreporting of HZ's PHB in the region due to passive surveillance methods and the non-mandatory notifiable status of HZ.

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