Cost-Effectiveness of Chikungunya Vaccination with IXCHIQ in Adults in Puerto Rico

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BACKGROUND

Chikungunya is becoming an increasing global health issue as it spreads across the world

- Chikungunya virus (CHIKV) poses **significant health risks** in endemic regions such as Puerto Rico, as seen in a previous outbreak (Fig. 1).[1,2]
- Chikungunya disease knows an **acute phase**, with high fever and joint pain, and a **chronic phase**, characterized by persistent debilitating joint pain.[3,4]
- The live attenuated vaccine **IXCHIQ** is the world's first and only approved vaccine against CHIKV.[5,6]

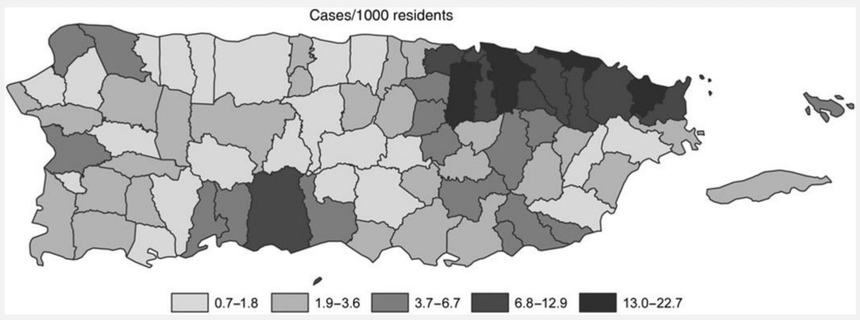

Figure 1. Cases of suspected CHIKV by municipality in Puerto Rico, reported through passive surveillance, May 2014 – April 2015.[1]

METHODS

This study evaluates the cost-effectiveness of vaccinating Puerto Rican adults aged ≥18 with IXCHIQ compared to no vaccination

- **Markov model** in a hypothetical cohort of persons in Puerto Rico over a 20 years timeframe.
- **Base case** from an US societal perspective
- Model accounts for natural immunity with CHIKV;
- **CHIKV outbreak risk was depicted stochastically with an annual risk of 0.05** in every year of follow up.
- **Vaccination** with 98.8% protection and **vaccine uptake** is modelled to reach 40% coverage within the first year.[5]

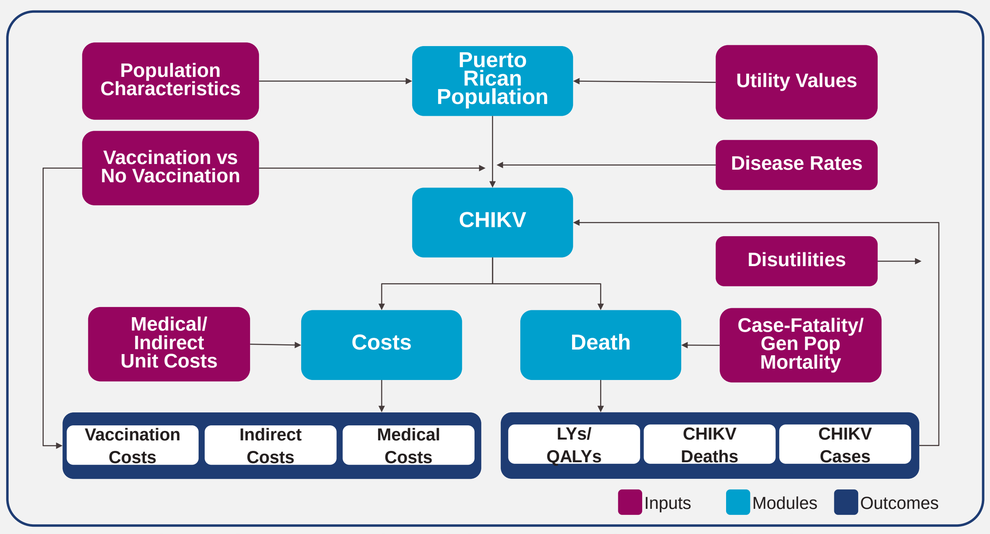

Figure 2. Schematic presentation of the Puerto Rico cost-effectiveness model. Population characteristics with age distribution are included in the model, as well as the serostatus of individuals. Abbreviations: CHIKV = chikungunya virus, LY = life year, QALY = quality-adjusted life year

RESULTS

Clinical and economic outcomes of IXCHIQ cost-effectiveness model

		No Vaccination	Vaccination	Difference
Clinical outcomes	Number of CHIKV cases	409,121	221,613	- 187,508
	Number of deaths due to CHIKV	1805	884	- 922
	Number of QALYs	38,916,998	38,928,358	11,359
Cost outcomes	Cost of medical care	$ 235.4 million	$ 126.7 million	- $108.7 million
	Vaccination costs	-	$ 240.4 million	$ 240.4 million
	Non-medical costs	$ 172.6 million	$ 96.0 million	- $ 76.5 million
	Total costs	$ 408.0 million	$ 463.2 million	$ 55.2 million

- Across the 1000 modelling simulations, vaccination with IXCHIQ in Puerto Rico is expected to prevent 187,508 cases and leads to 11,359 QALY gains assuming a 40% coverage rate
- The vaccination program would cost $240 million and is expected to safe $185 million in direct medical and indirect costs

Vaccination with IXCHIQ is a cost-effective tool for the prevention of CHIKV

	Healthcare Perspective	Societal Perspective
Cost per live-year gained	$ 20,677	$ 8,663
Cost per QALY gained	**$ 11,596**	**$ 4,859**
Number needed to vaccinate to prevent one case	5.73	5.73

- IXCHIQ vaccine would cost $4,859 per QALY gained among adults aged ≥18 years

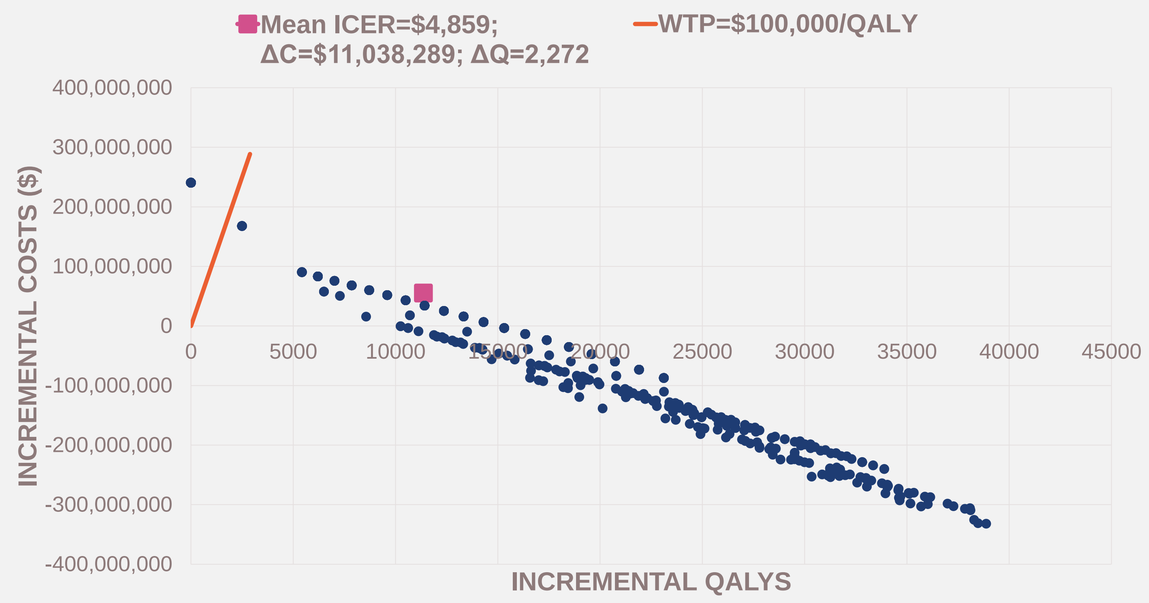

Figure 3. Scatter Plot of Simulations on Cost-Effectiveness Plane (vaccination vs. no vaccination). The figure shows a mean ICER of $4,859. 41% of simulations fall within the southeast quadrant, where vaccination is less costly and more effective (dominant) over no vaccination. Abbreviations: ICER = Incremental Cost-Effectiveness Ratio, QALY = Quality-Adjusted Life Year, WTP = Willingness To Pay

CONCLUSION

Implementing the IXCHIQ vaccination program is a cost-effective strategy that significantly reduces CHIKV cases and related mortality, supporting its public health value in Puerto Rico.

- Vaccination with IXCHIQ in Puerto Rico is projected to prevent **187,508 chikungunya cases**.
- The prevention is estimated to yield **11,359 QALYs** and prevent **922 deaths** attributed to CHIKV.
- The vaccination program incurs an incremental cost-effectiveness ratio (**ICER**) of **$4,859 per QALY**, indicating favorable cost-effectiveness.

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Disclosures

This study was funded by Valneva

Poster presented at ISPOR, November 18-20, 2024

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