



Cost-effectiveness Evaluation of Human Papilloma Virus test in comparison with cytology in Uruguay from the public health system perspective.

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1. What is the impact of Human Papilloma Virus in Uruguay?

- ❑ Cervical cancer is the fourth most common cancer in women worldwide. The etiology of CC in 99% of cases is a persistent infection by Human Papilloma Virus (HPV). It is recognized that 14 types of this virus are at high risk of causing cancer (HR-HPV), and only two of them -serotypes 16 and 18- are responsible for approximately 70% of cases.
- ❑ The Uruguayan Ministry of Health has proposed an inter-institutional effort aimed at evaluating a strategy to improve coverage of screening for early detection of CC. Several guidelines proposed that preferred screening strategy should be the molecular test, but the decision should consider information about the cost-effectiveness in the country.

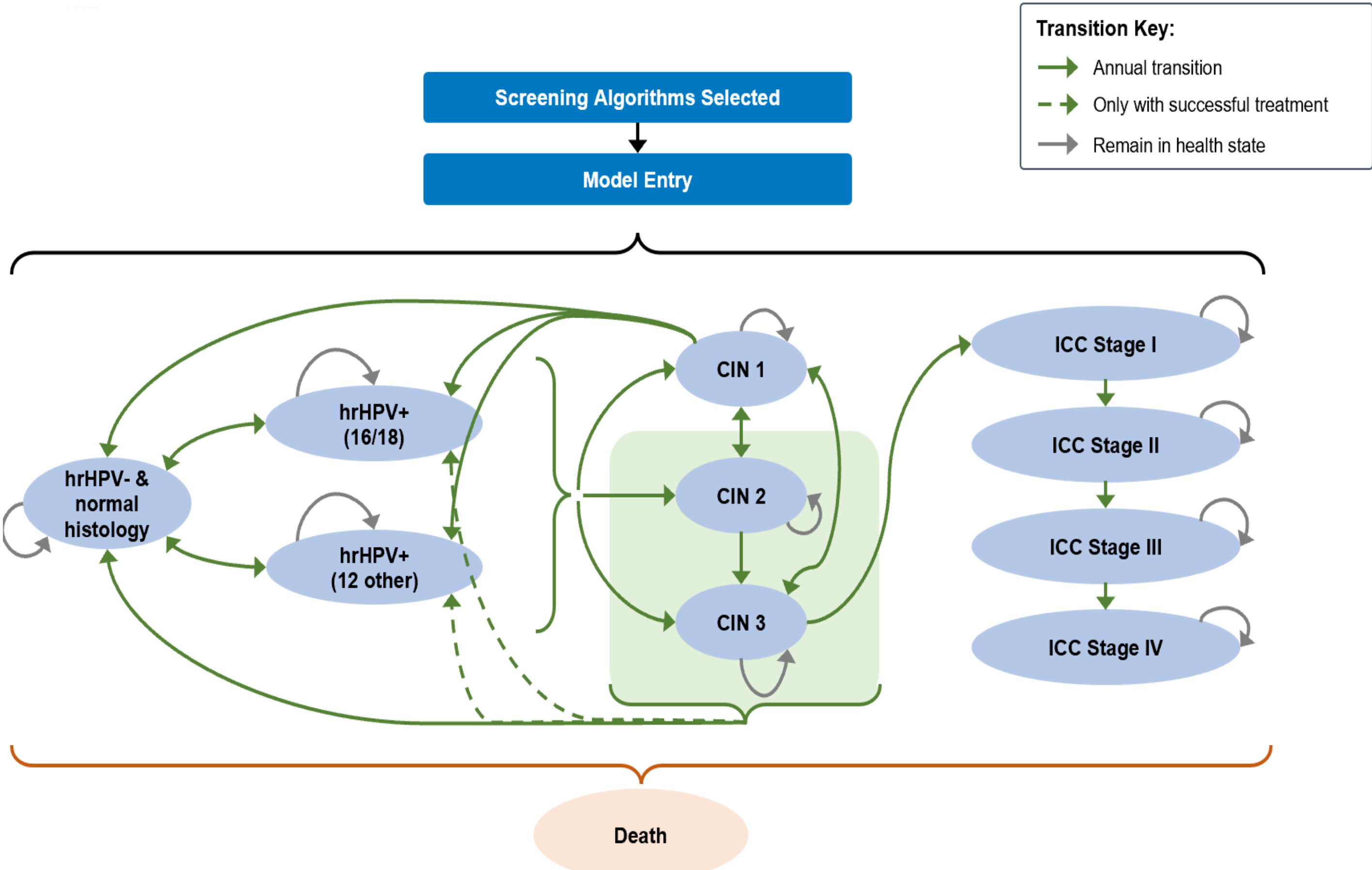
❑ OBJECTIVE

To estimate the cost-effectiveness of a population-based screening strategy with molecular test with genotyping 16/18 (mHPV) compared to conventional cytology to prevent cervical cancer in Uruguay, from the perspective of the Uruguayan National Health System.

2. Methods

- ❑ Model. A Microsimulation health-state transition model that characterize the natural history of the HPV infection was adapted to the Uruguayan setting (Figure 1).
- ❑ Comparators: mHPV at three different intervals: five (mHPV-5), four (mHPV-4), and three (mHPV-3), years were compared with conventional cytology (CC) every three years.
- ❑ Costs were expressed in USD as of June 2022 and outcomes in quality-adjusted life years (QALYs). Utilities were obtained from literature.
- ❑ A lifetime time horizon and a discount rate of 3% for costs and outcomes were considered
- ❑ Sensitivity and specificity of different screening strategy were obtained from the ATHENA study
- ❑ Cost were obtained from the Centralized Procurement Unit (UCA). Also, the State Regulatory Agency (ARCE) was consulted..
- ❑ Deterministic and Probabilistic Sensitivity Analysis (PSA) were performed. For PSA, 1,000 MonteCarlo simulation were carried out to the 100,000 microsimulation.

Figure 1. Microsimulation health-sate transition model based on natural history of HPV progression



3. Results of CEA

Table 1. Incremental Analysis

Strategy	Total cost (USD)	Total QALYs	Δ Cost (USD)	Δ QALY	ICER	iHNB
Cytology	\$434	14.1827				
mHPV-3	\$299	14.1836	-\$134	0.000882	-\$152,251	0.0084818
Cytology	\$436	14.2295				
mHPV-4	\$344	14.2321	-\$93	0.002637	-\$35,161	0.0078838
Cytology	\$444	14.1542				
mHPV-5	\$410	14.1592	-\$34	0.005001	-\$6,748	0.0069105

mHPV-3: molecular test of Human Papilloma Virus screening every three years; mHPV-4: molecular test of Human Papilloma Virus screening every four years; mHPV-5: molecular test of Human Papilloma Virus screening every five years. ICER: Incremental Cost-effectiveness ratio. iHNB: Incremental health net benefit

4. Results of the Cost Effectiveness Analysis

Figure 2. Incremental Cost-effectiveness Plane

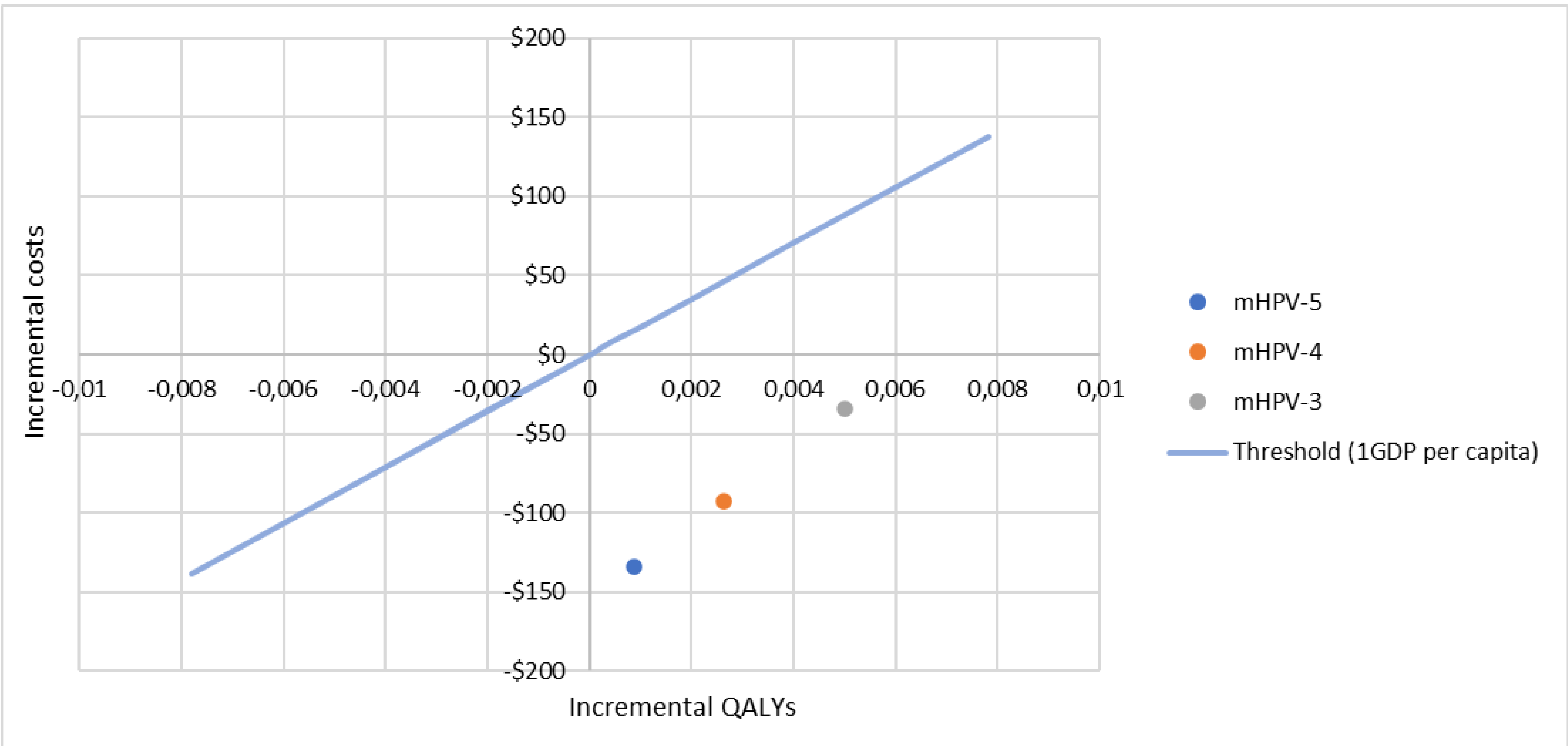
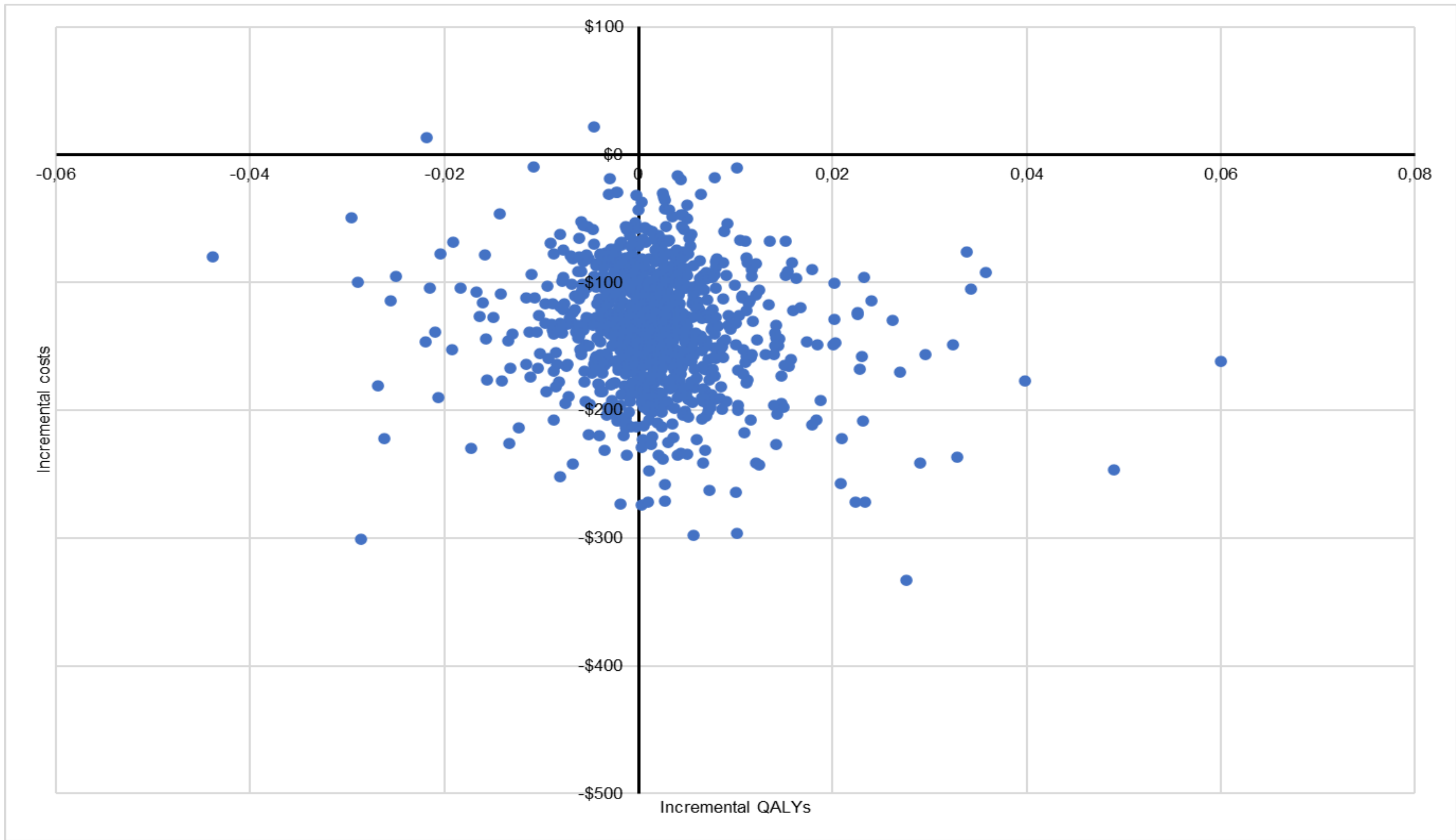


Figure 3. Probabilistic Sensitivity Analysis (PSA) mHPV-5 compared to Cytology



5. Key Messages

- ❑ All three comparisons showed to be dominant against CC because their ICER are below the reference threshold of Uruguay (1 GDP per capita = USD \$17,673).
- ❑ Among the three alternative intervals for mHPV, mHPV-5 was the most cost-effective. This is because, the savings offset the lower QALY gains compared to the other strategies
- ❑ The PSA shows that there are high uncertainty regarding the incremental QALY. This second order uncertainty is mainly explained by the parameters used that populate the epidemiological status of the population.

6. Conclusions

Although the three comparisons of the molecular test with genotyping 16/18 were dominant strategies for Uruguay, the most cost-effective screening strategy is the one implemented in intervals every five years, because it shows the highest health net benefit for the public health system.

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