# Evaluating the impact and cost-effectiveness of interventions to prevent vertical transmission of HIV in Papua New Guinea

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## Background
Papua New Guinea (PNG) has a high mother-to-child transmission rate, estimated at 32%. This study evaluates the impact and cost-effectiveness of strategies to prevent the vertical transmission of HIV to neonates and reduce HIV-related mortality among infants in PNG.

## Methods
We used a decision analysis combined with Markov models to evaluate the costs and outcomes, i.e. HIV infection, infant deaths, and disability-adjusted-life-years (DALYs), of interventions for pregnant women and infants versus the status-quo in PNG. Five strategies were evaluated: (1) increased coverage of HIV testing and treatment during pregnancy (up to 75%), (2) increased coverage of viral load testing with enhanced counselling for HIV-positive mothers, (3) increased coverage of infant HIV post-exposure prophylaxis, (4) switching to new effective infant prophylaxis against drug resistance, and (5) diagnosis of HIV-exposed infants within 6 weeks of birth. All modelling analyses were conducted from the payers' perspective with costs reported in 2022 PNG kina (K). Incremental cost-effectiveness ratio (ICERs) were compared to K6,546 per DALY averted threshold (GDP per capita).

## Results
Our model estimated the vertical transmission rate (excluding breastfeeding) under status quo in 2022 to be 28.3% (with 1012 newly infected infants). Infant HIV infections averted every year compared to status quo are 61, 1, 15, 9 and 0 for strategies (1)-(5), respectively. Infant deaths averted by age of 5 are 27, 0, 6, 4, and 12 for strategies (1)-(5), respectively. Increasing prophylaxis coverage is dominant with cost-saving K22,585 and 39.0 DALYs averted. The ICERs for strategies (1), (2), (4) and (5) are K2,930, K6,386, K864, and K1,834 per DALY averted, respectively.

## Conclusion
Although the evaluated strategies resulted in modest reductions in infection and deaths, all are cost-effective. Closing the gap in HIV testing, treatment, and antenatal care for pregnant women in PNG might enhance overall impact of these strategies.

## Disclosure of Interest Statement:
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Dr Badman commenced working for Cepheid in 2022 and maintains a senior investigator position within the PNG ACT UP Program for its duration.