# Evaluating the potential impact of scaling-up point-of-care HIV viral load testing in Papua New Guinea: a mathematical modelling study

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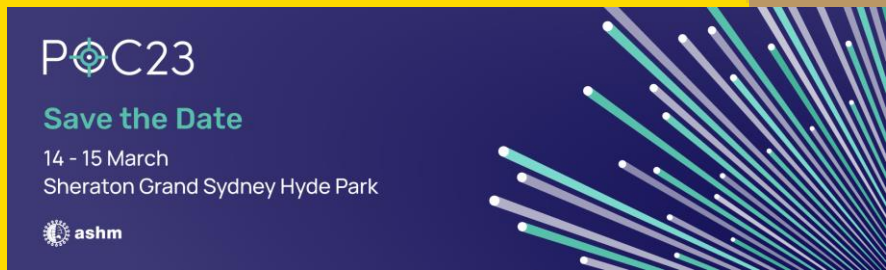

# Backgrounds

- Papua New Guinea has a high HIV prevalence (~1%) and a high prevalence of drug resistance to antiretroviral therapy (18.4% pre-treatment drug resistance*)
- The country is making progress in implementing WHO recommendations on the care of people living with HIV

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*Gare et al. BMC Infectious Diseases (2022)

# ACTUP-PNG Program overview

- Accelerating the UPtake of HIV Drug Resistance surveillance initiatives in Papua New Guinea (ACTUP-PNG)
- Establishment of two laboratories within Hospital HIV clinics.
- Ongoing workforce training and skills development for clinical and lab staff.
- Addressing gaps in vertical transmission, timely adherence referral and retention in care.
- Qualitative evaluations of POC acceptability and other innovations
- Health economics modelling and analyses.

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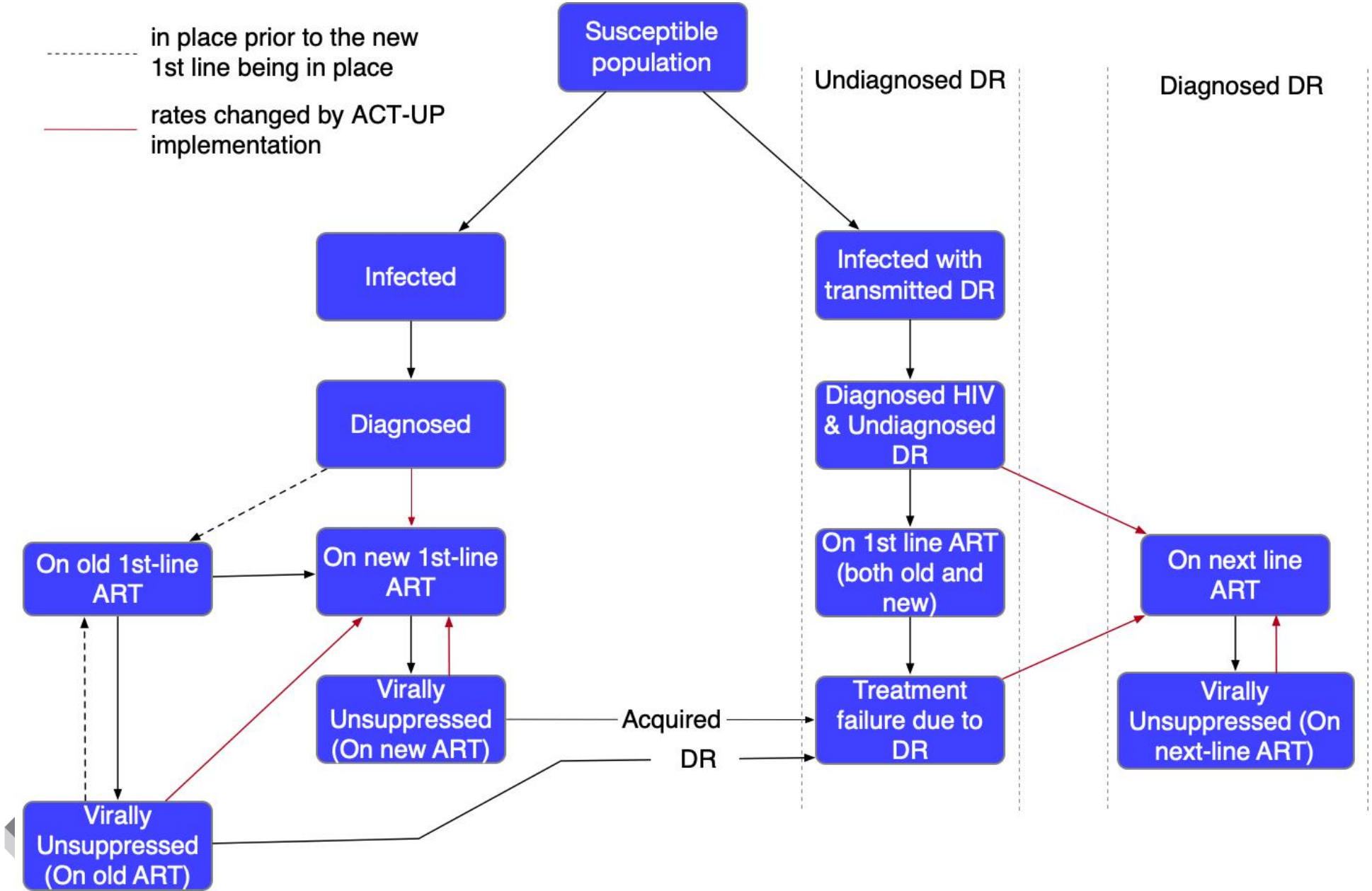
# Objectives of the modelling study

- Assess the potential impact of scaling up point-of-care VL testing on the adults population in Papua New Guinea (PNG) on viral suppression levels
- Reflect this impact on the overall HIV epidemics in PNG


U.S. Department of Health and Human Services. (n.d.). HIV/AIDS Care Continuum. HIV.gov. Retrieved March 7, 2023, from https://www.hiv.gov/federal-response/policies-issues/hiv-aids-care-continuum/

# Methods and model structure

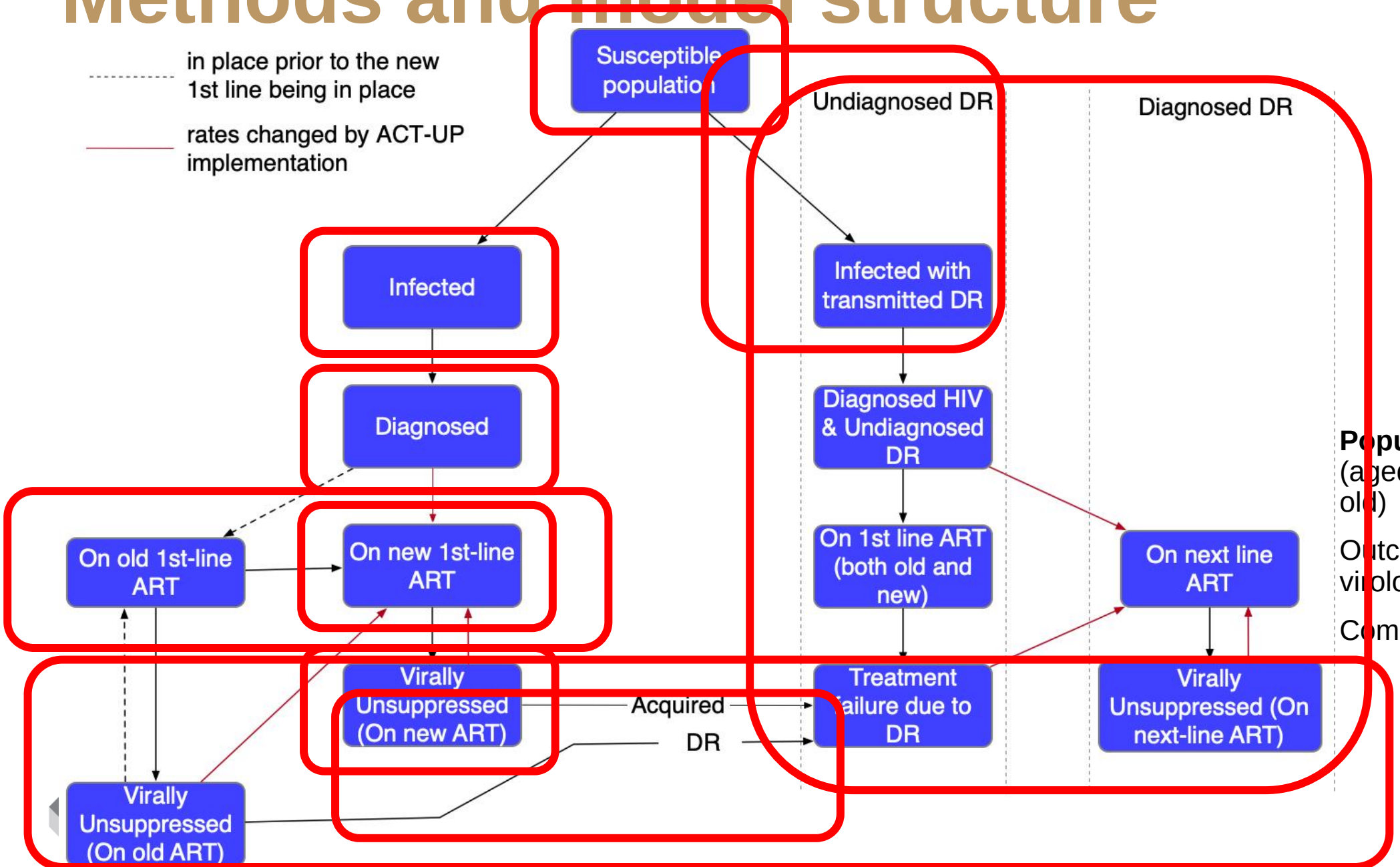



**Population**: adults (aged over 15 years old)

Outcome: number of virological failures

Compartmental model

# Methods and model structure

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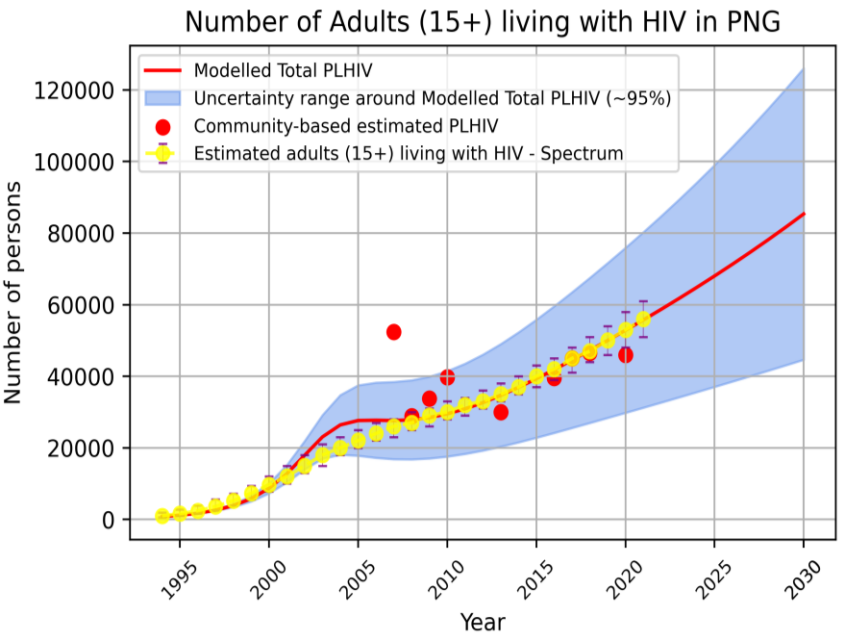
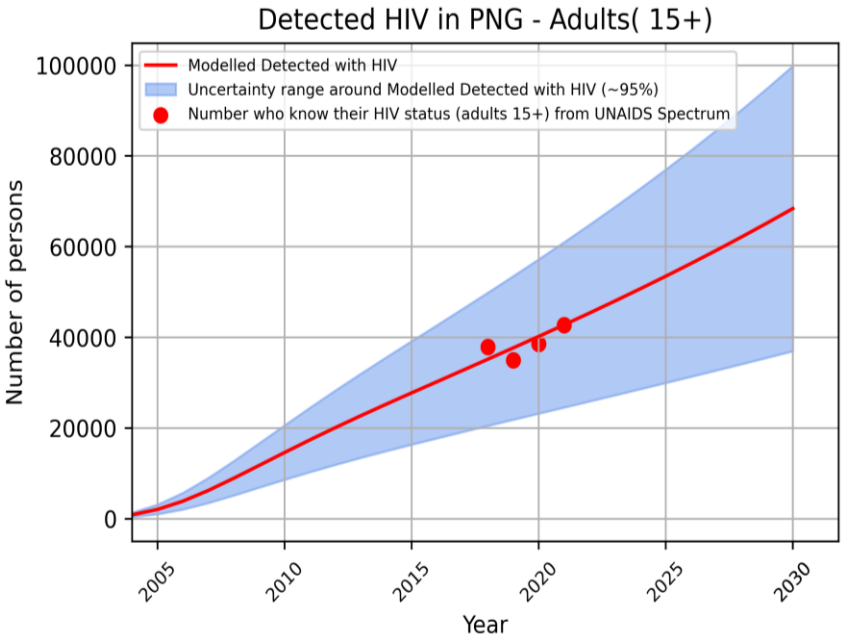
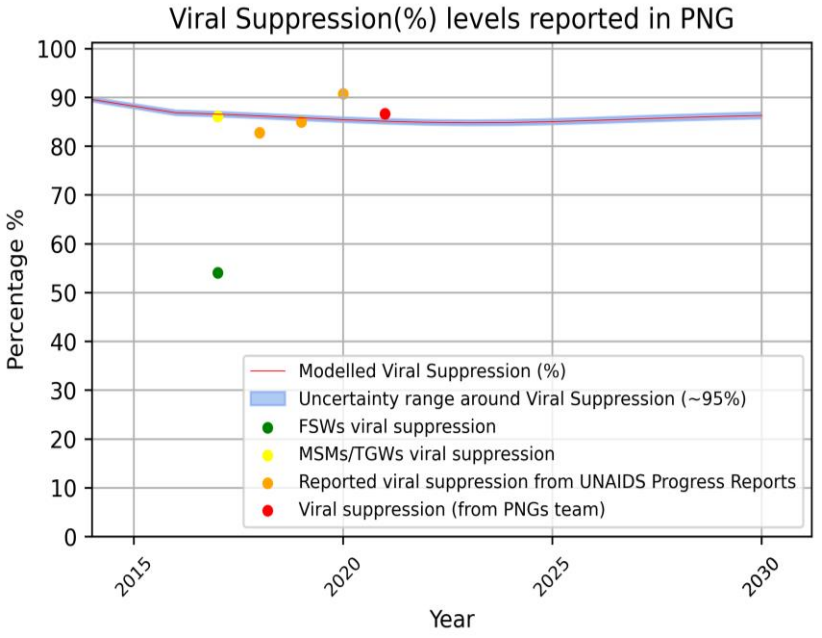
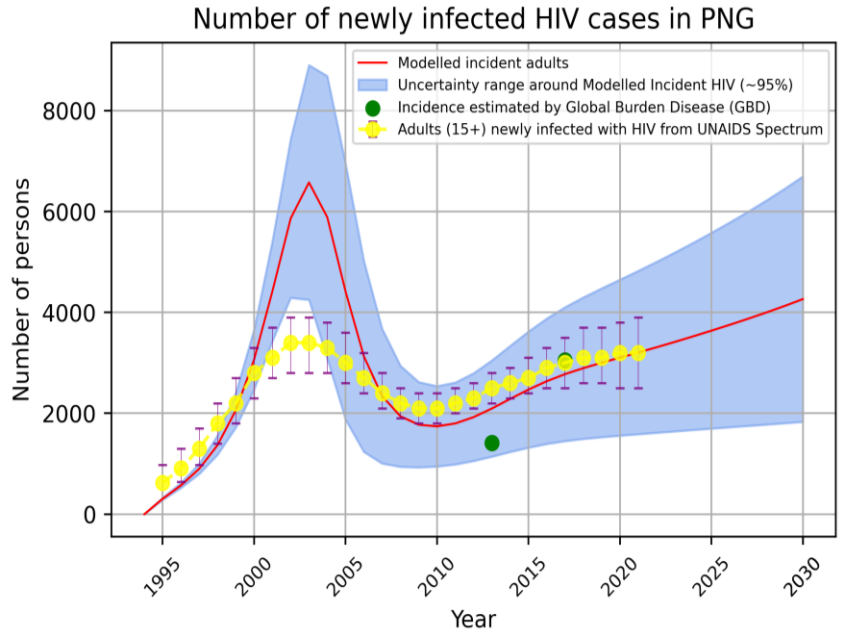
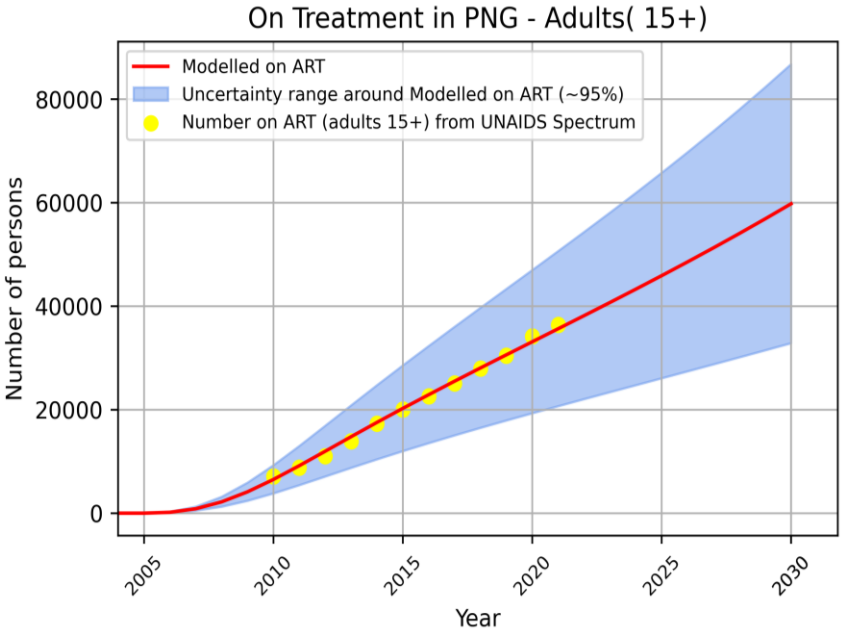
# Model fitting with uncertainty estimates



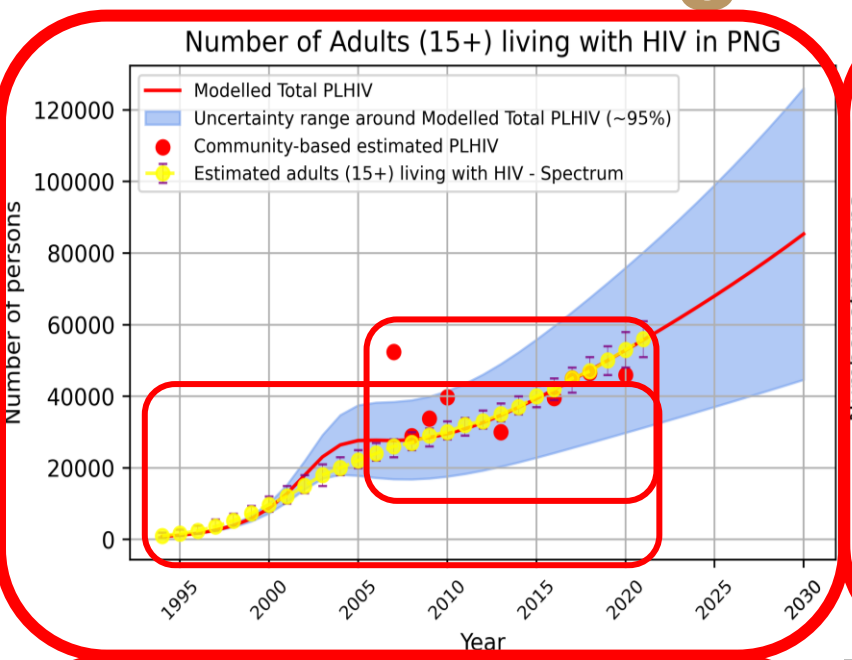



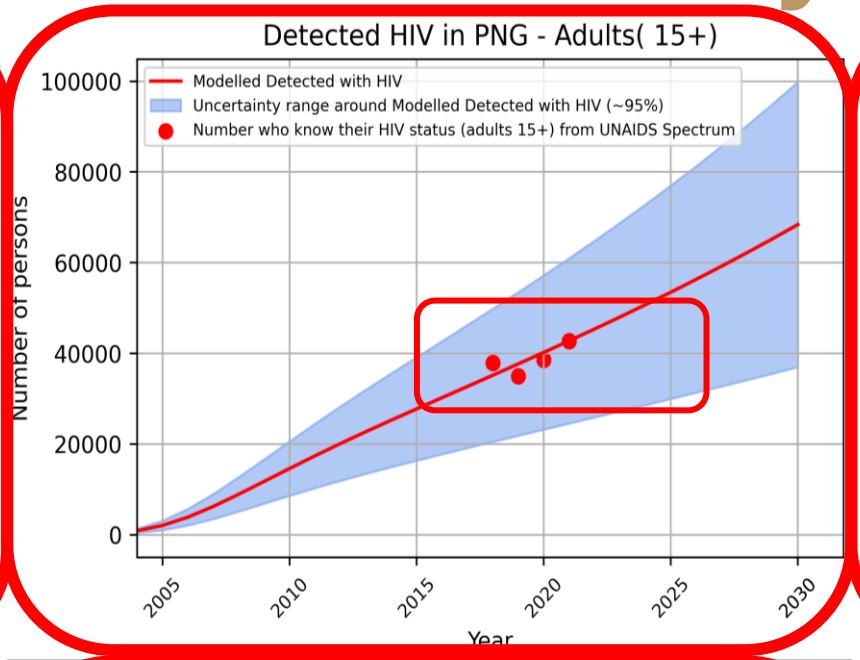



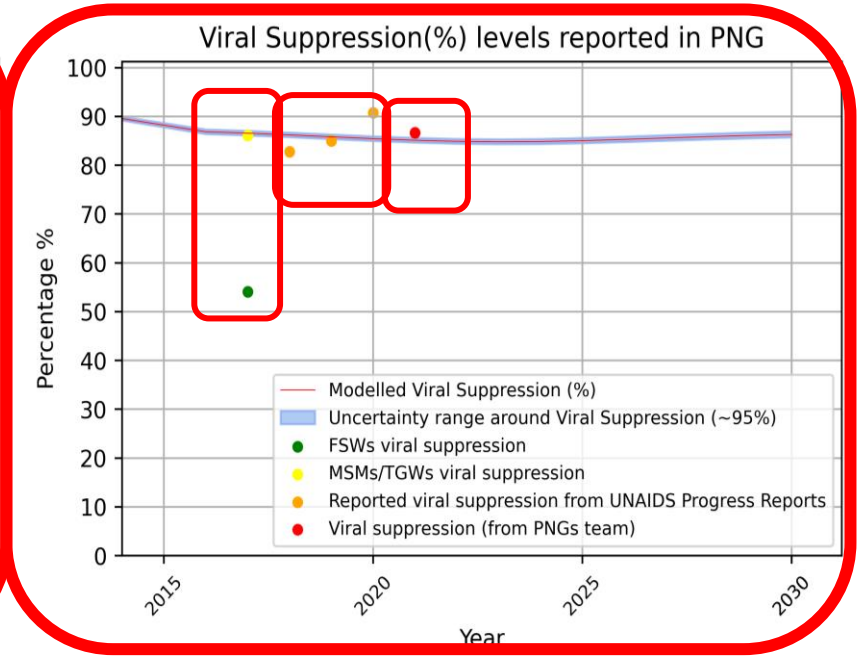



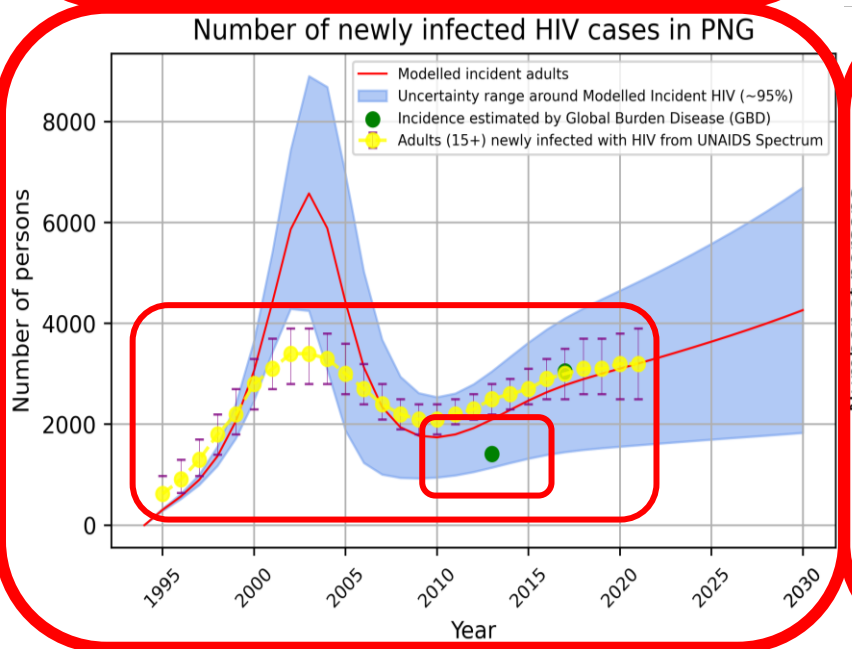

- **full list of references on data sources at the end of presentation*

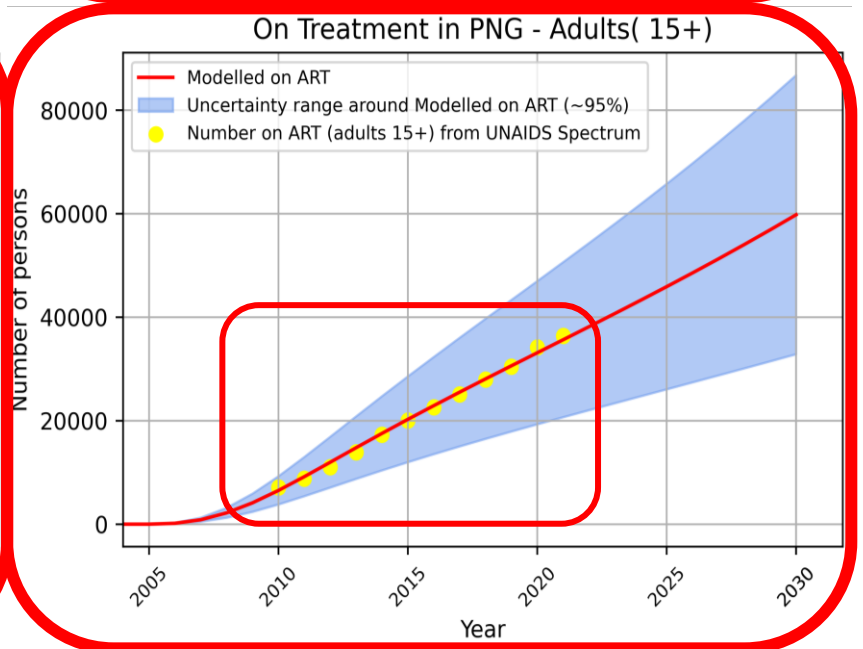
# Model fitting with uncertainty estimates

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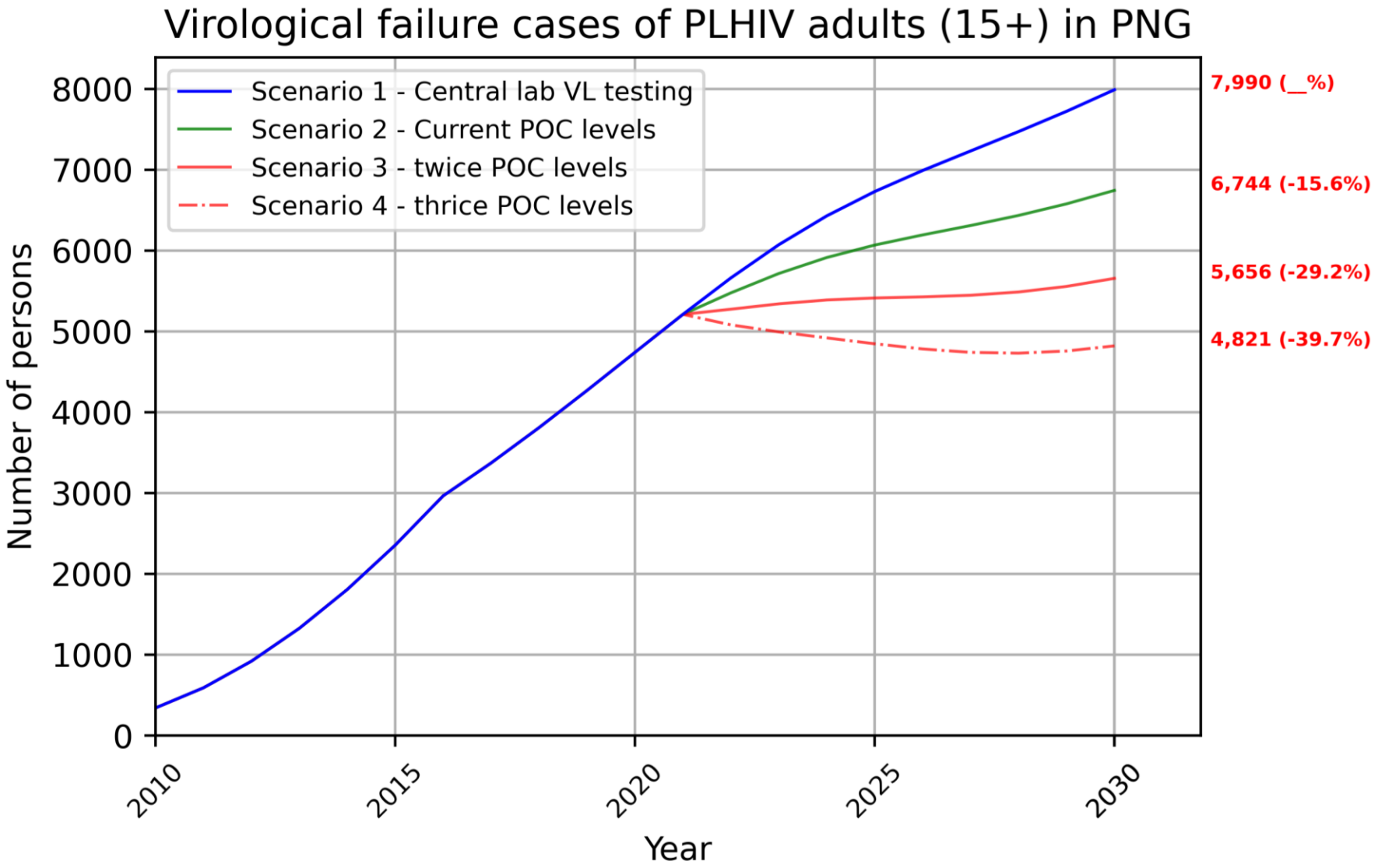
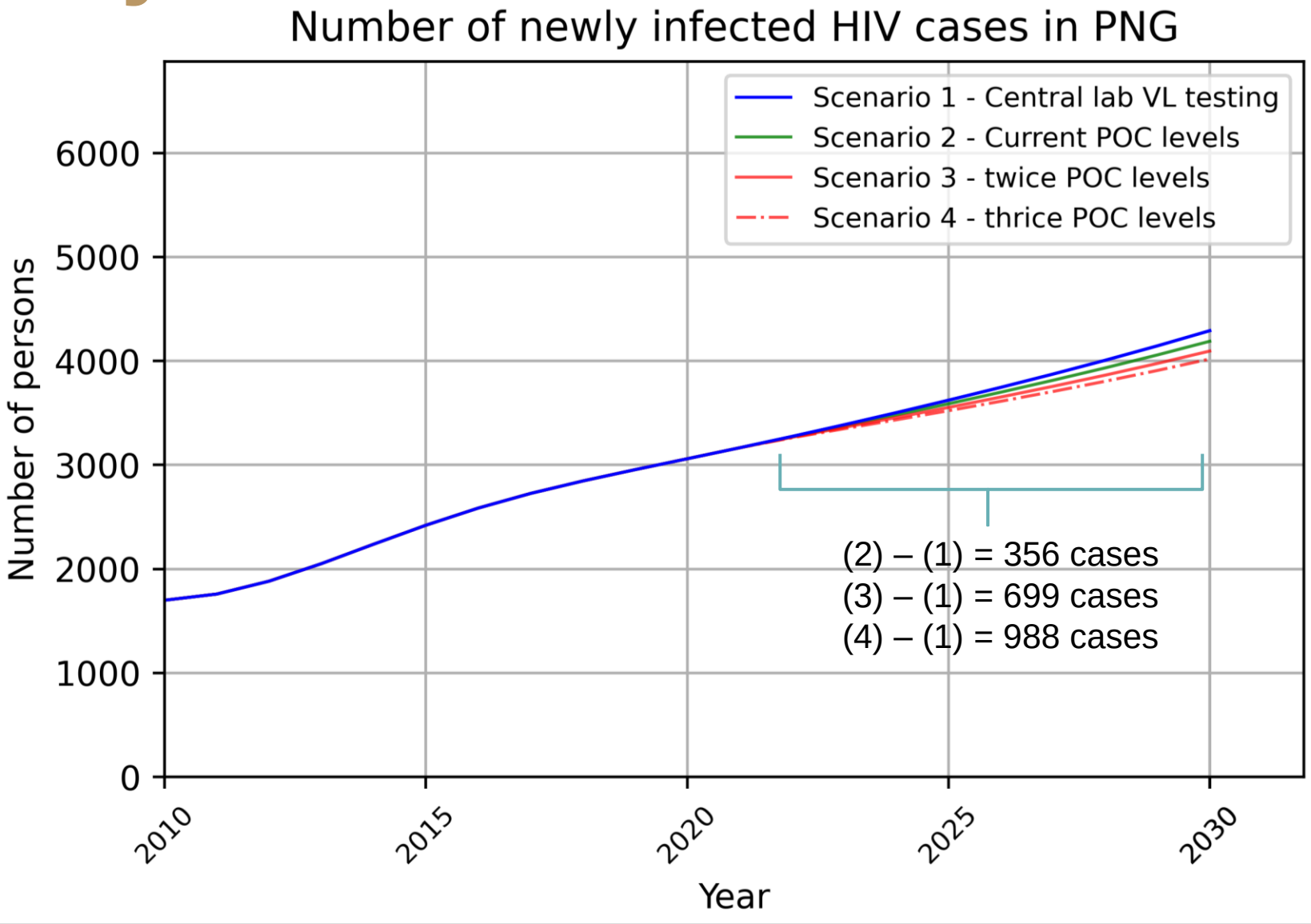
# Evaluation of scaling up strategies

- Scaling-up strategies:
  - (1) Base case – central lab-based testing
  - (2) continued POC VL testing at current ACTUP-PNG study sites;
  - (3) expanding POC VL testing coverage with twice the number of people having access;
  - (4) expanding POC VL testing coverage with three times the number having access
- Outcomes:
  - Number of virological failures
  - Number of newly infected HIV cases

# Impact of VL scaling-up monitoring: virological failures



# Impact of VL scaling-up monitoring: HIV newly infected



# Discussion

- While having a small impact on HIV transmission, scaling up point-of-care viral load testing would lead to large reductions in the number of people experiencing virological failure in PNG.
- This would likely reduce morbidity, mortality, and the development of drug resistance.
- Future research into the full impact of POC VL scale-up on population-level drug resistance and its overall cost-effectiveness is required.

# Limitations

- We do not consider the impact of transmission between/within different subpopulations in the country (e.g., children, key populations) and the potential differences in their respective adherence on the overall HIV epidemics in Papua New Guinea

# Reference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# Acknowledgements


- Researchers from the Kirby Institute and PNG Institute of Medical Research
  - Dr Richard Gray
  - Dr Sophy Shih
  - Dr Tanya Applegate
  - A/Prof Angela Kelly-Hanku
  - Dr Janet Gare
  - Dr Melissa Schulz
  - Dr Gillian Scott
  - And everyone from the ACTUP-PNG study
  - To ASHM POC2023 for the conference scholarship

ACTUP-PNG is funded by the Centre for Health Security, Australian Department of Foreign Affairs and Trade.

ACTUP-PNG would like to acknowledge the following stakeholders-

- Papua New Guinea National Department of Health
- Provincial health authorities in Western Highlands Province and National Capital District
- Igat Hope
- Central Pathology Health Laboratory
- Burnet Institute

No pharmaceutical or industry grants were received in the development of this study.

The Kirby Institute is funded by the Australian Government Department of Health and is affiliated with the Faculty of Medicine, UNSW Sydney, Australia.

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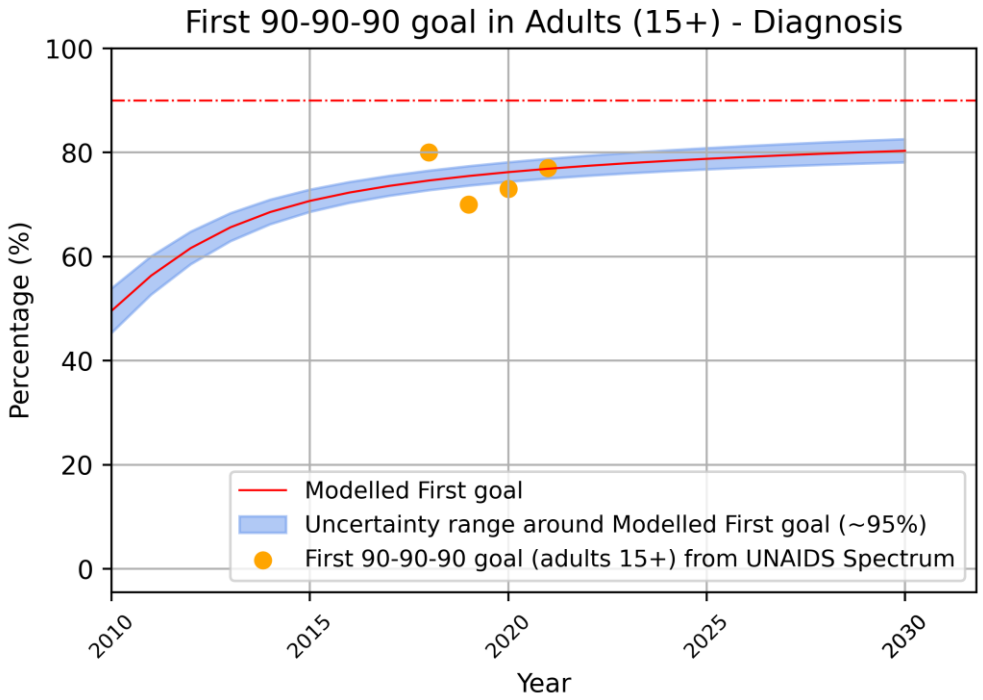


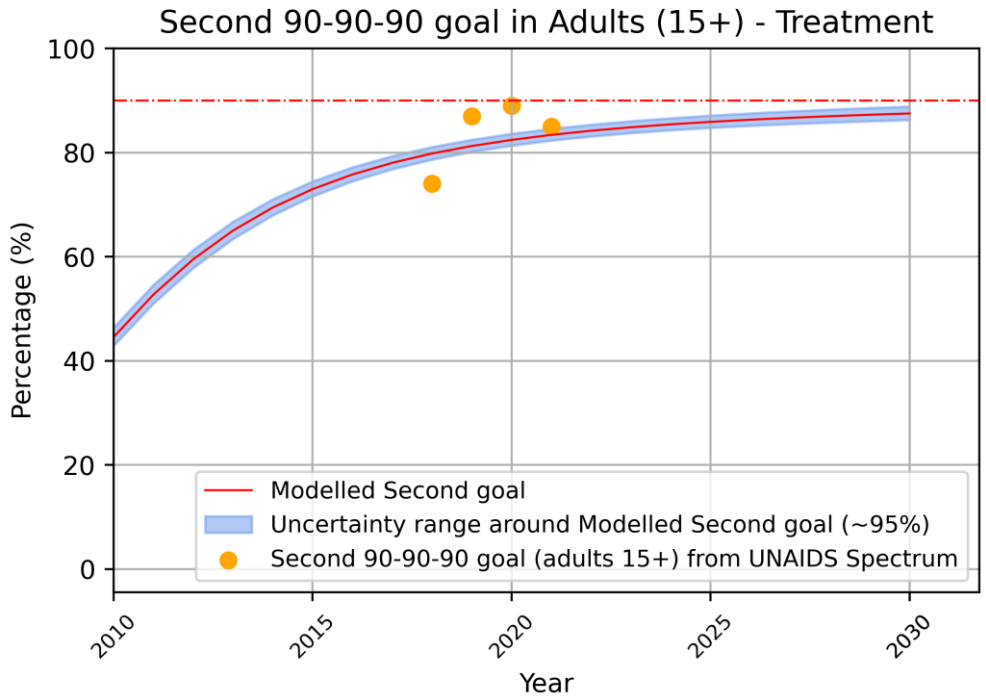


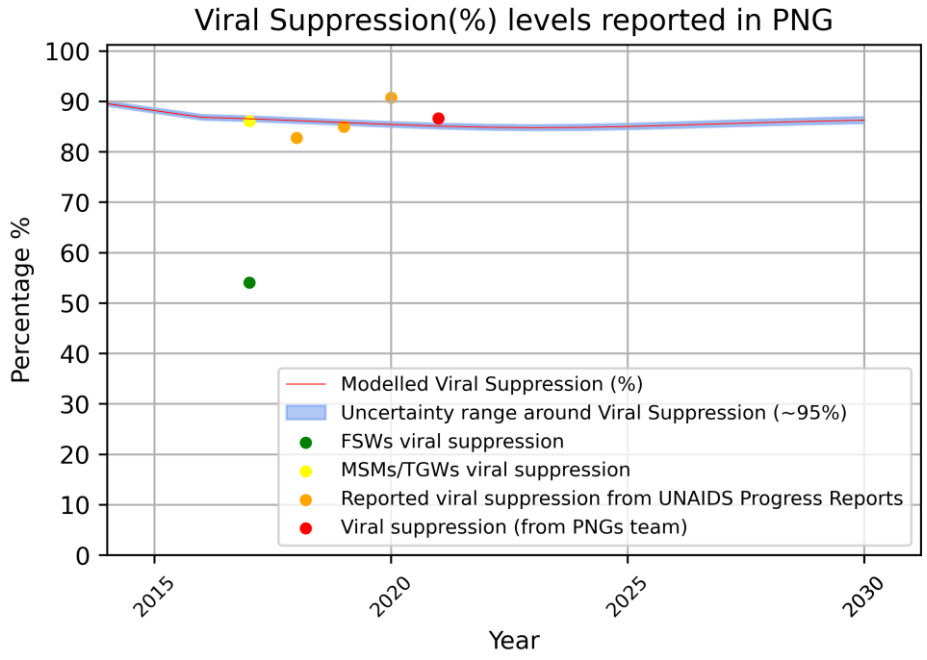


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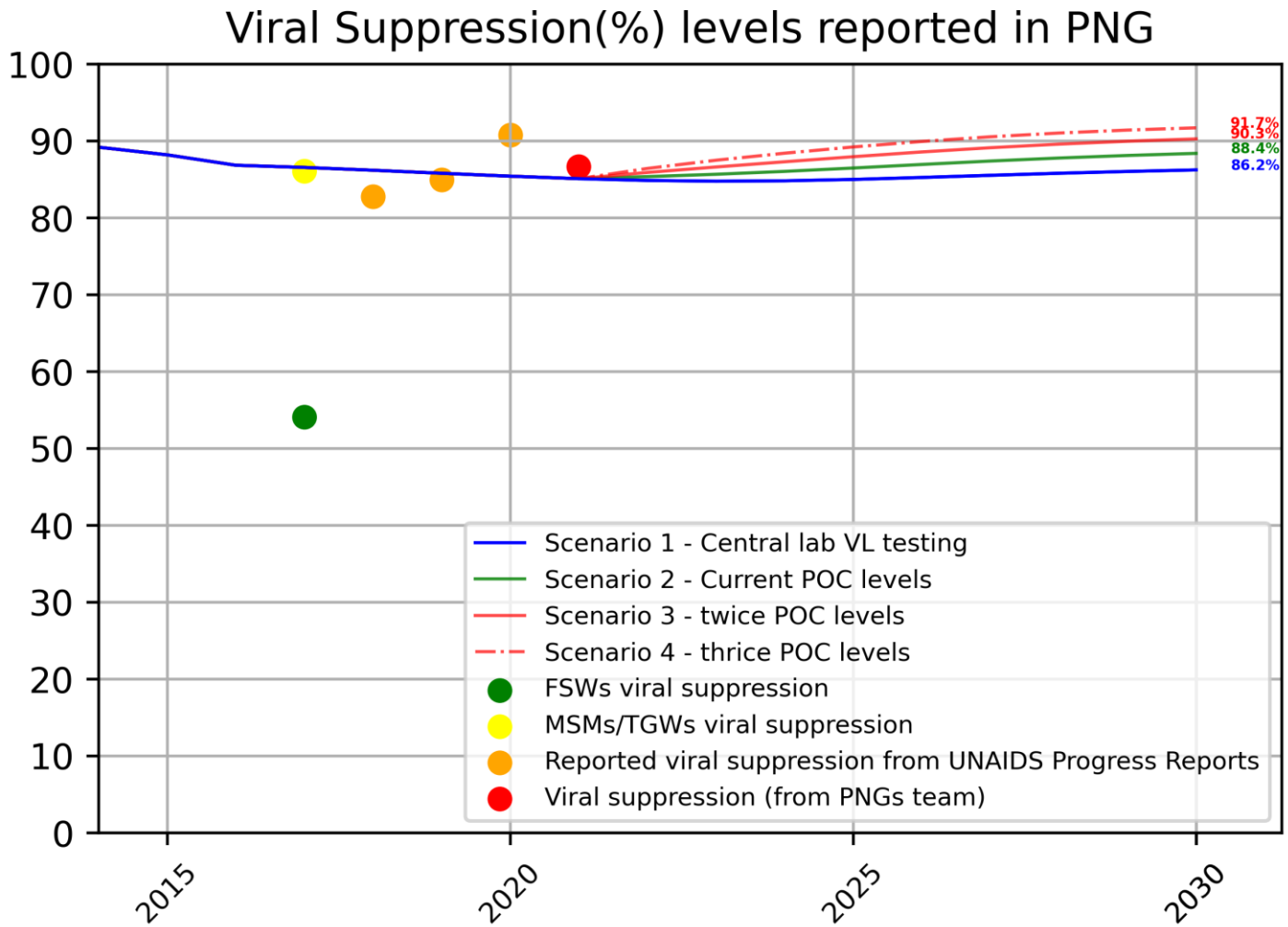

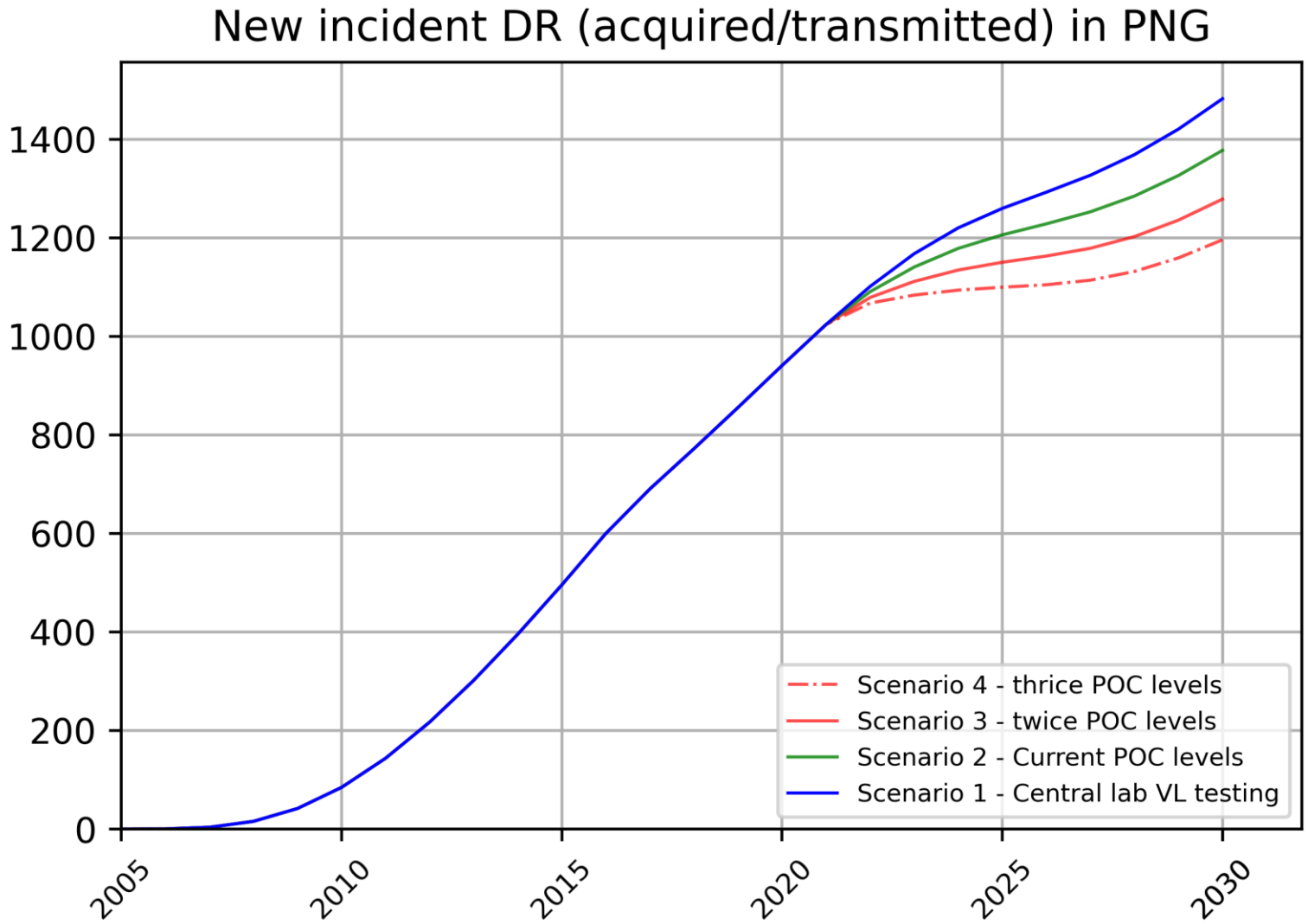
New incident DR (acquired/transmitted) in PNG
1400
1200
1000
800
600
400
200
0
2005
2010
2015
2020
2025
2030
Scenario 4 - thrice POC levels
Scenario 3 - twice POC levels
Scenario 2 - Current POC levels
Scenario 1 - Central lab VL testing