# Optimising investment in HIV testing in Australia: an allocative efficiency model

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# Acknowledgement

I would like to acknowledge the Kaurna people, the traditional owners of the land I am on today, and pay my respect to elders past, present and emerging.

# Background

- Australia has surpassed global targets for:
  - **Treatment uptake** among diagnosed people living with HIV (97%)
  - **Viral suppression** among those on treatment (98%)

- But 8% of people living with HIV do not know their status (2023 estimate).

- Late diagnoses are more common among people reporting heterosexual sex as an exposure risk and people born overseas.

# Aims

**To identify how new HIV investment could be optimally allocated across HIV testing interventions to achieve greatest impact.**

- Impact defined as minimising cumulative person-years with undiagnosed HIV infection over 2026-2030
- Optima HIV model was used
- Modelling specifications and parameters were based on available data and expert advice from an advisory group comprising community, clinical, research and government stakeholders.

# Model population groups

- The Australian population was disaggregated into 22 mutually exclusive subpopulation groups, defined by age category, sex, other demographic factors, and HIV acquisition risk.

- The number and granularity of groups was aligned with:
  - National HIV Strategy priorities
  - The way that HIV data is currently reported
  - The availability of data to inform population size, HIV burden estimates, and patterns of risk, service access and HIV testing.

| Population | Disaggregation |
|---|---|
| Gay, bisexual and other men who have sex with men[1,2] | Overseas-born, recently arrived in Australia (within five years), 15-49 years |
| | Overseas-born, not recently arrived in Australia, 15+ years |
| | Australian-born, 15-24 years[1] |
| | Australian-born, 25-49 years[1] |
| | Australian-born, 50+ years[1] |
| People who inject drugs[2] | Men, 15+ years |
| | Women, 15+ years |
| Sex workers | Women, 15-49 years |
| People born overseas | Women, recently arrived in Australia (within five years), 15-49 years |
| | Heterosexual men, recently arrived (within five years), 15-49 years |
| | Women, not recently arrived, 15+ years |
| | Heterosexual men, not recently arrived, 15+ years |
| Aboriginal and Torres Strait Islander people[3] | Men, 15+ years |
| | Women, 15+ years |
| Australian-born men[4] | 15-24 years |
| | 25-49 years |
| | 50+ years |
| Australian-born women[4] | 15-24 years |
| | 25-49 years |
| | 50+ years |
| Children | 0-14 years |

Notes: 1, Unless specified, any subsequent mention of "gay, bisexual and other men who have sex with men" refers to both Australian and overseas-born men; 2, Including Aboriginal and Torres Strait Islander people; 3, Excluding Aboriginal and Torres Strait Islander gay, bisexual and other men who have sex with men and Aboriginal and Torres Strait Islander people who inject drugs (counted under respective key population groups); 4, Non-Indigenous Australian-born people not part of above-listed priority populations.

# HIV testing interventions

- 32 HIV testing interventions were included, based on service mapping, literature review, and expert input from the advisory group
- Interventions were defined by a target population, unit cost, current coverage, and maximum achievable coverage.
  - Some testing was not explicitly modelled due to existing commitments (e.g. antenatal testing, testing through Aboriginal Community Controlled Health Services and Aboriginal Medical Services, and immigration testing).

| Type | Service type | Populations reached |
|---|---|---|
| Laboratory testing | General practice | • Gay, bisexual and other men who have sex with men<br>• Female sex workers<br>• People who inject drugs<br>• People born overseas<br>• Aboriginal and Torres Strait Islander people<br>• Other Australian-born men and women, aged 15+ |
| | Sexual health clinics | • Gay, bisexual and other men who have sex with men<br>• Female sex workers<br>• People who inject drugs<br>• People born overseas<br>• Aboriginal and Torres Strait Islander people<br>• Other Australian-born men and women, aged 15-24 years |
| | Direct-to-pathology telehealth | • Gay, bisexual and other men who have sex with men<br>• Female sex workers |
| | Opt-out in emergency departments | • All populations, aged 15+ |
| | Screening in custodial settings | • People who inject drugs<br>• Aboriginal and Torres Strait Islander people<br>• Other Australian-born men aged 15+ |
| | Dried blood spot testing | • Aboriginal and Torres Strait Islander people<br>• People who inject drugs<br>• People born overseas |
| Point-of-care testing (POCT) | Peer-led community-based testing | • Gay, bisexual and other men who have sex with men |
| | POCT in rural and remote communities | • Aboriginal and Torres Strait Islander adults |
| | POCT at needle and syringe programs | • People who inject drugs |
| Self-testing | HIV self-tests (user-pays) | • Gay, bisexual and other men who have sex with men<br>• Recently-arrived people born overseas<br>• Aboriginal and Torres Strait Islander adults |
| | HIV self-tests (free) | • Gay, bisexual and other men who have sex with men<br>• Recently-arrived people born overseas<br>• Aboriginal and Torres Strait Islander people |

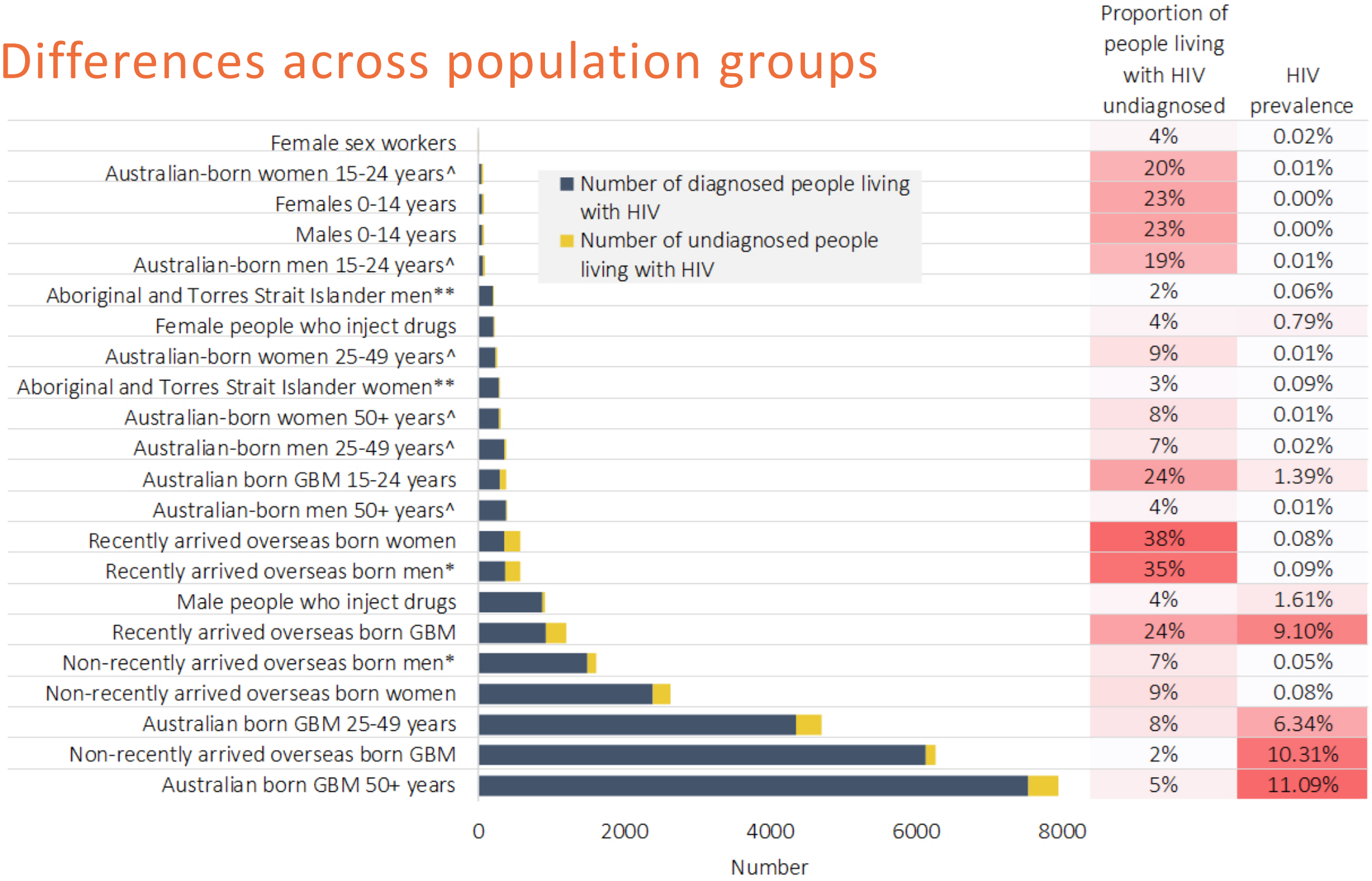
# Scenarios

The following were projected for the five-year period 2026-2030:

- **Status quo**: current conditions and existing program spending continued.

- **Optimised spending:** an *additional* $5, $10, $20, $40 or $80 million per annum optimally distributed across testing interventions
  - To minimise cumulative person-years of undiagnosed HIV.
  - Additional spending commences from the beginning of 2026 and is maintained for five-years.

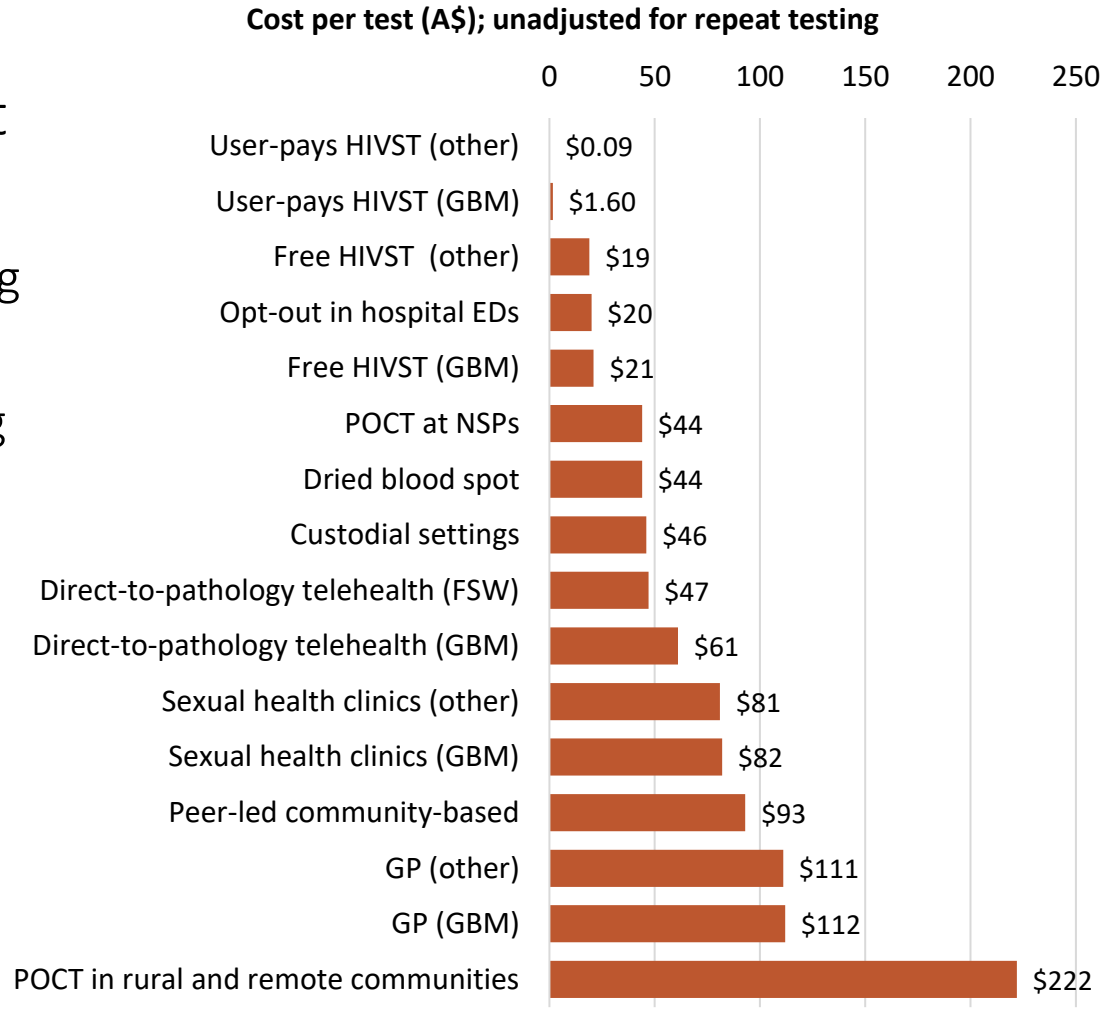
# Differences across population groups




| | Proportion of people living with HIV undiagnosed | HIV prevalence |
|---|---|---|
| Female sex workers | 4% | 0.02% |
| Australian-born women 15-24 years^ | 20% | 0.01% |
| Females 0-14 years | 23% | 0.00% |
| Males 0-14 years | 23% | 0.00% |
| Australian-born men 15-24 years^ | 19% | 0.01% |
| Aboriginal and Torres Strait Islander men** | 2% | 0.06% |
| Female people who inject drugs | 4% | 0.79% |
| Australian-born women 25-49 years^ | 9% | 0.01% |
| Aboriginal and Torres Strait Islander women** | 3% | 0.09% |
| Australian-born women 50+ years^ | 8% | 0.01% |
| Australian-born men 25-49 years^ | 7% | 0.02% |
| Australian born GBM 15-24 years | 24% | 1.39% |
| Australian-born men 50+ years^ | 4% | 0.01% |
| Recently arrived overseas born women | 38% | 0.08% |
| Recently arrived overseas born men* | 35% | 0.09% |
| Male people who inject drugs | 4% | 1.61% |
| Recently arrived overseas born GBM | 24% | 9.10% |
| Non-recently arrived overseas born men* | 7% | 0.05% |
| Non-recently arrived overseas born women | 9% | 0.08% |
| Australian born GBM 25-49 years | 8% | 6.34% |
| Non-recently arrived overseas born GBM | 2% | 10.31% |
| Australian born GBM 50+ years | 5% | 11.09% |

# Status quo estimated spending on HIV testing interventions

- Unit costs were adapted from Williams et al. 2021 and were adjusted to account for repeat testing in some population groups
  - Includes staffing, commodities, pathology (including confirmatory testing)
  - Costs from a government perspective, representing a mix of commonwealth and jurisdictional costs
- Estimated spending in 2023 on the modelled HIV testing interventions was $147.7 million
- Most spending (84%) was for HIV testing in general practice settings.

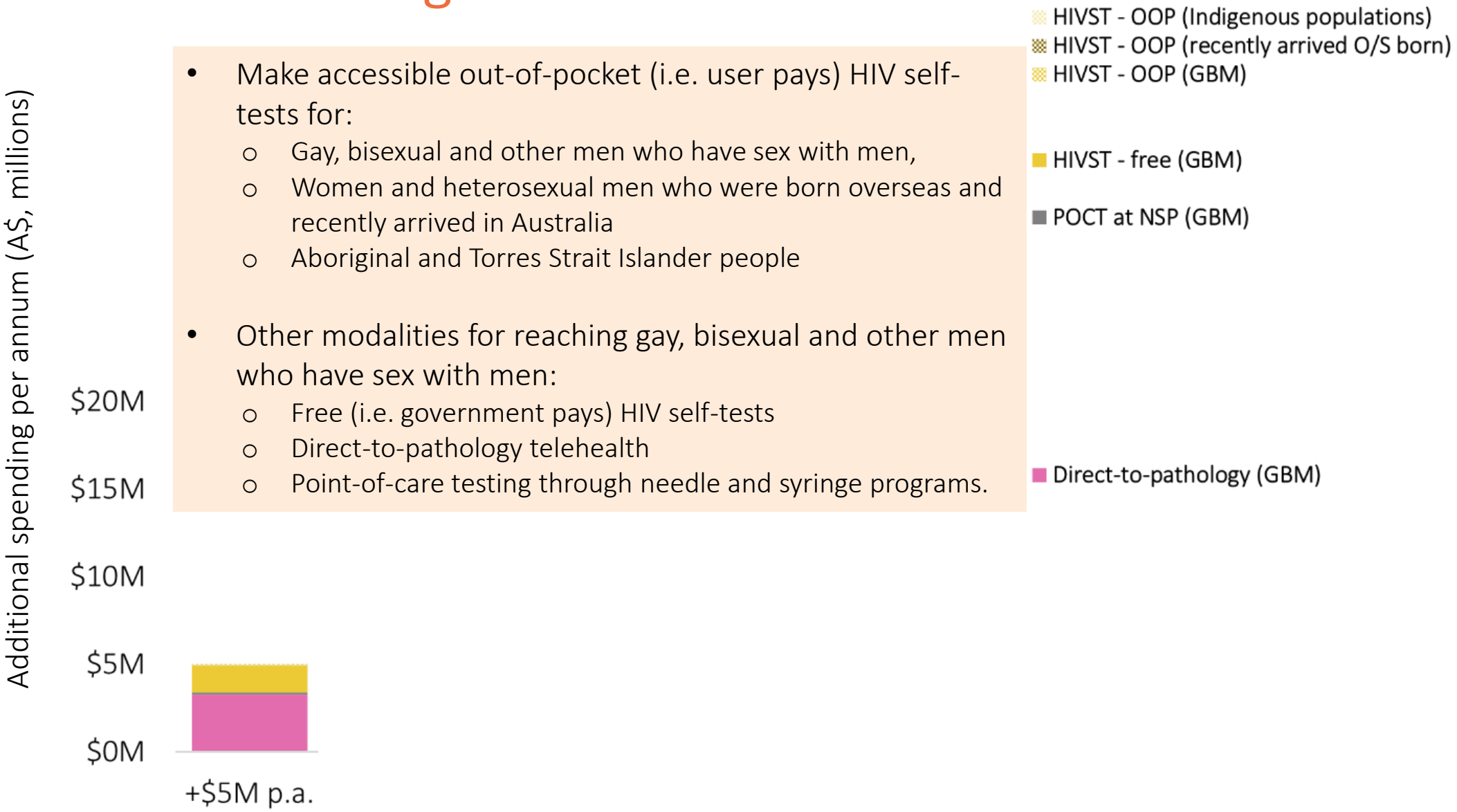



FSW, female sex workers; GBM, gay bisexual and other men who have sex with men (including men born overseas); HIVST, HIV self-testing; NSP, needle and syringe programs; POCT, point-of-care testing; PWID, people who inject drugs

# Results: budget allocations

- Make accessible out-of-pocket (i.e. user pays) HIV self-tests for:
  - Gay, bisexual and other men who have sex with men,
  - Women and heterosexual men who were born overseas and recently arrived in Australia
  - Aboriginal and Torres Strait Islander people

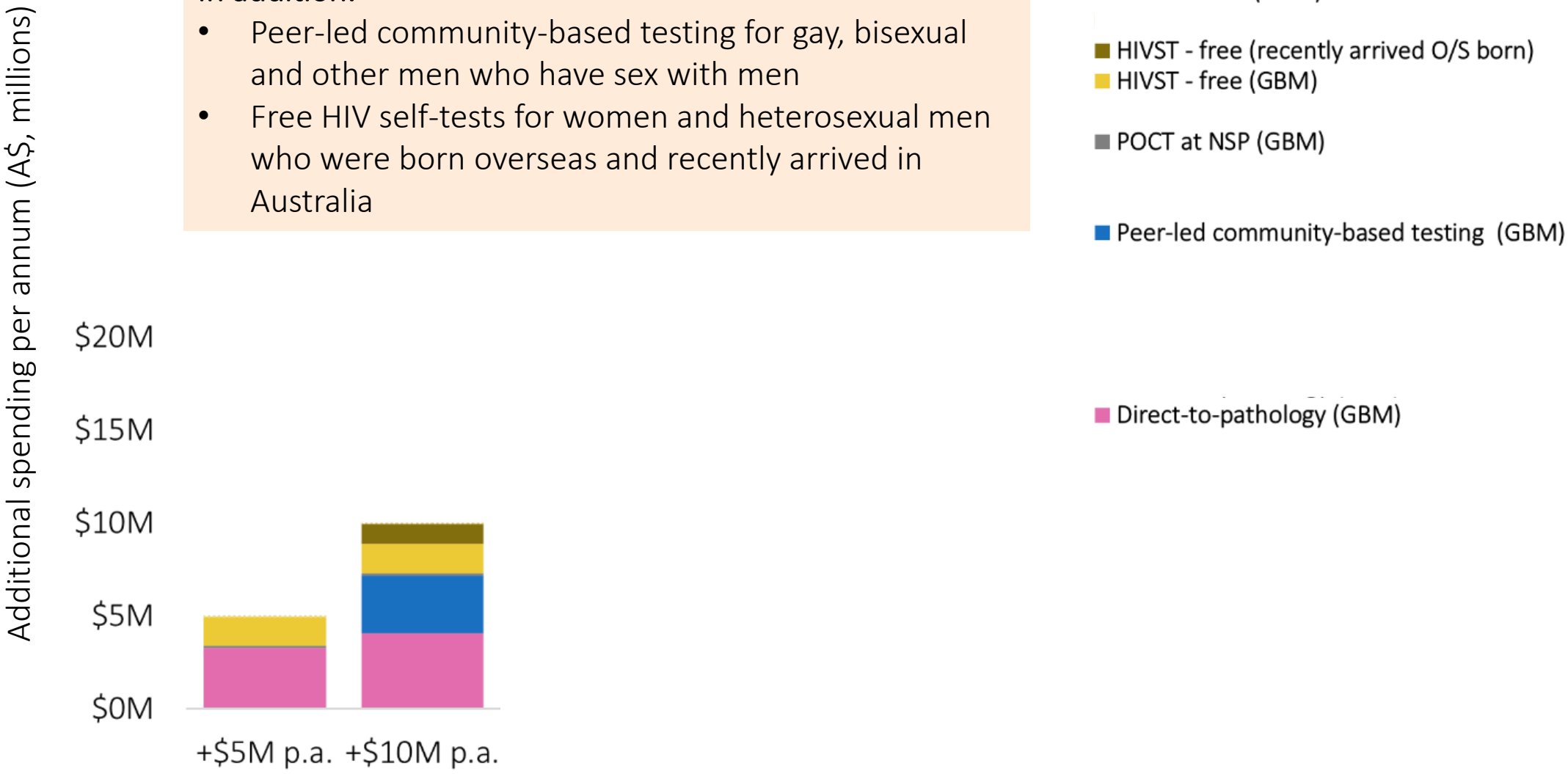
- Other modalities for reaching gay, bisexual and other men who have sex with men:
  - Free (i.e. government pays) HIV self-tests
  - Direct-to-pathology telehealth
  - Point-of-care testing through needle and syringe programs.



# Results: budget allocations

**In addition:**

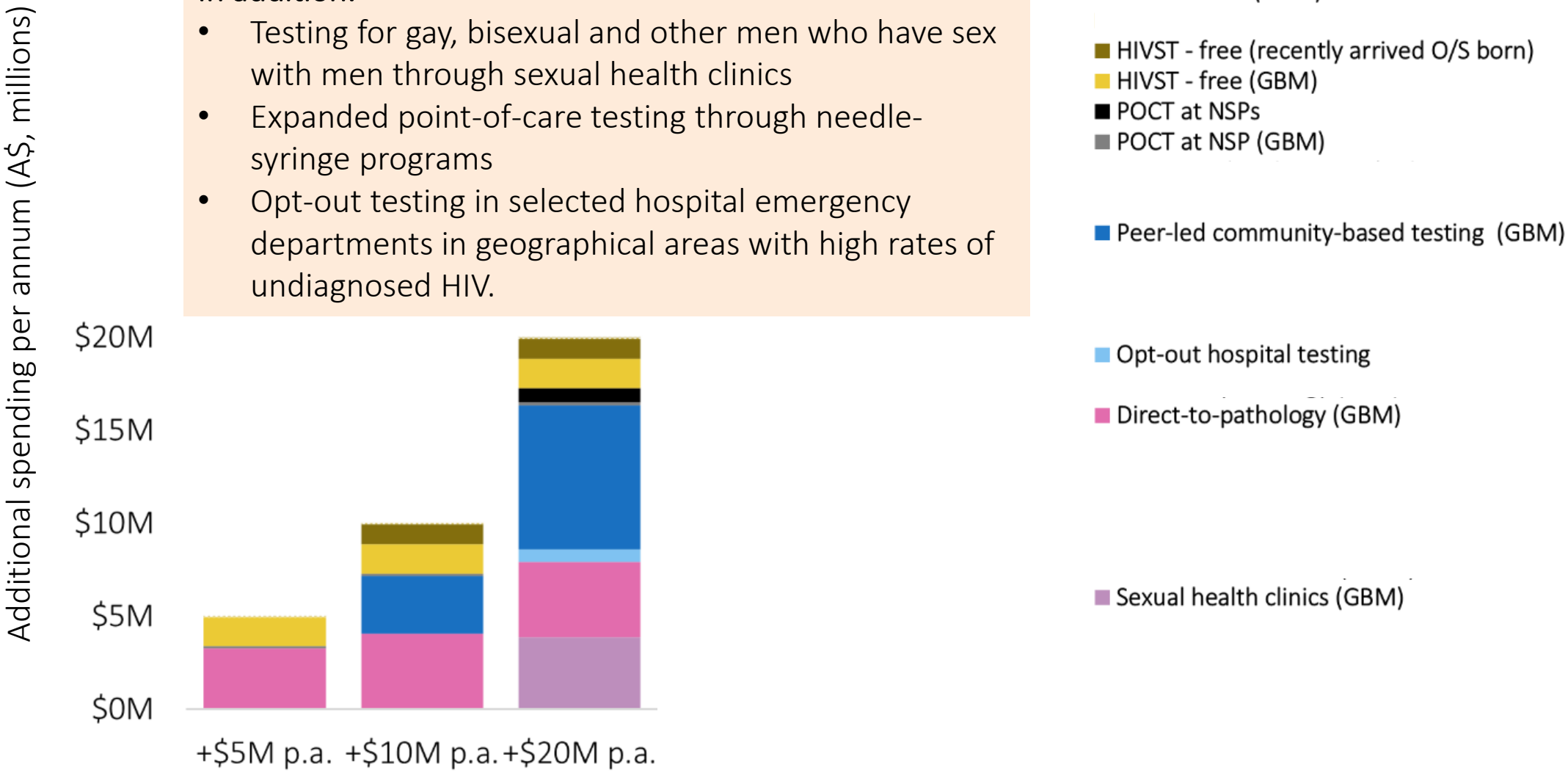
- Peer-led community-based testing for gay, bisexual and other men who have sex with men
- Free HIV self-tests for women and heterosexual men who were born overseas and recently arrived in Australia



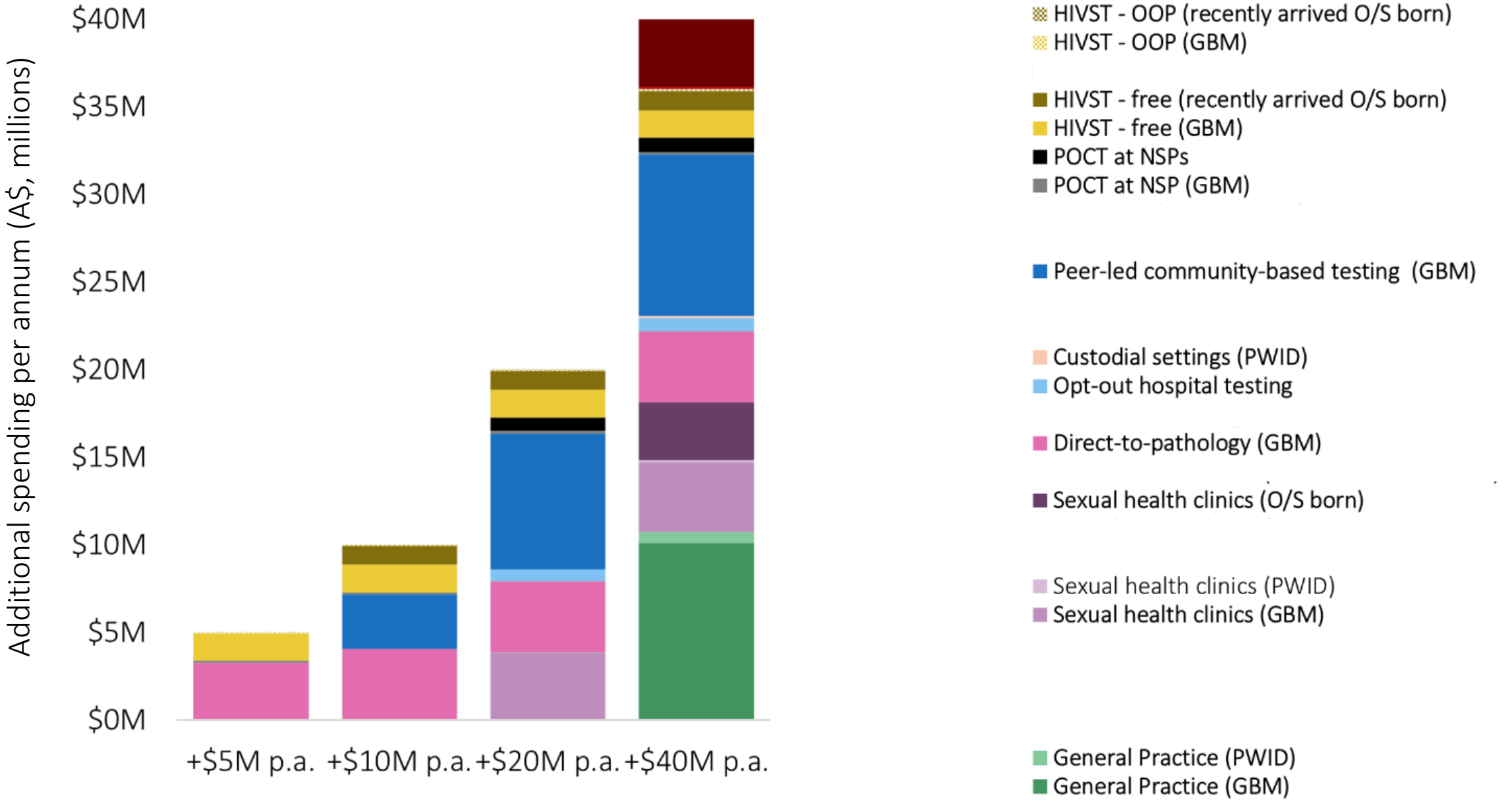
# Results: budget allocations

**In addition:**

- Testing for gay, bisexual and other men who have sex with men through sexual health clinics
- Expanded point-of-care testing through needle-syringe programs
- Opt-out testing in selected hospital emergency departments in geographical areas with high rates of undiagnosed HIV.



# Results: budget allocations

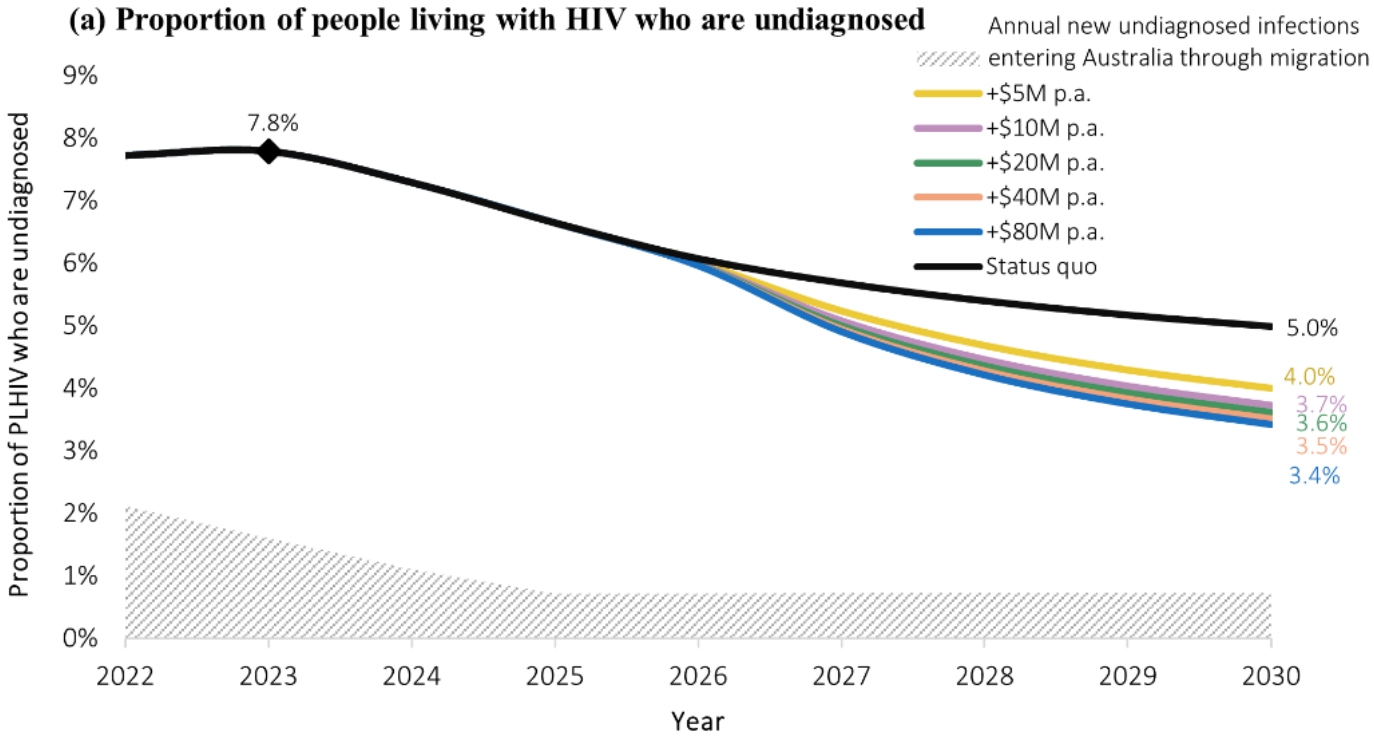


# Impact on people with undiagnosed HIV

- **Status quo:** people living with HIV who are undiagnosed decreases from 7.8% in 2023 to 5.0% in 2030 (36% relative reduction)

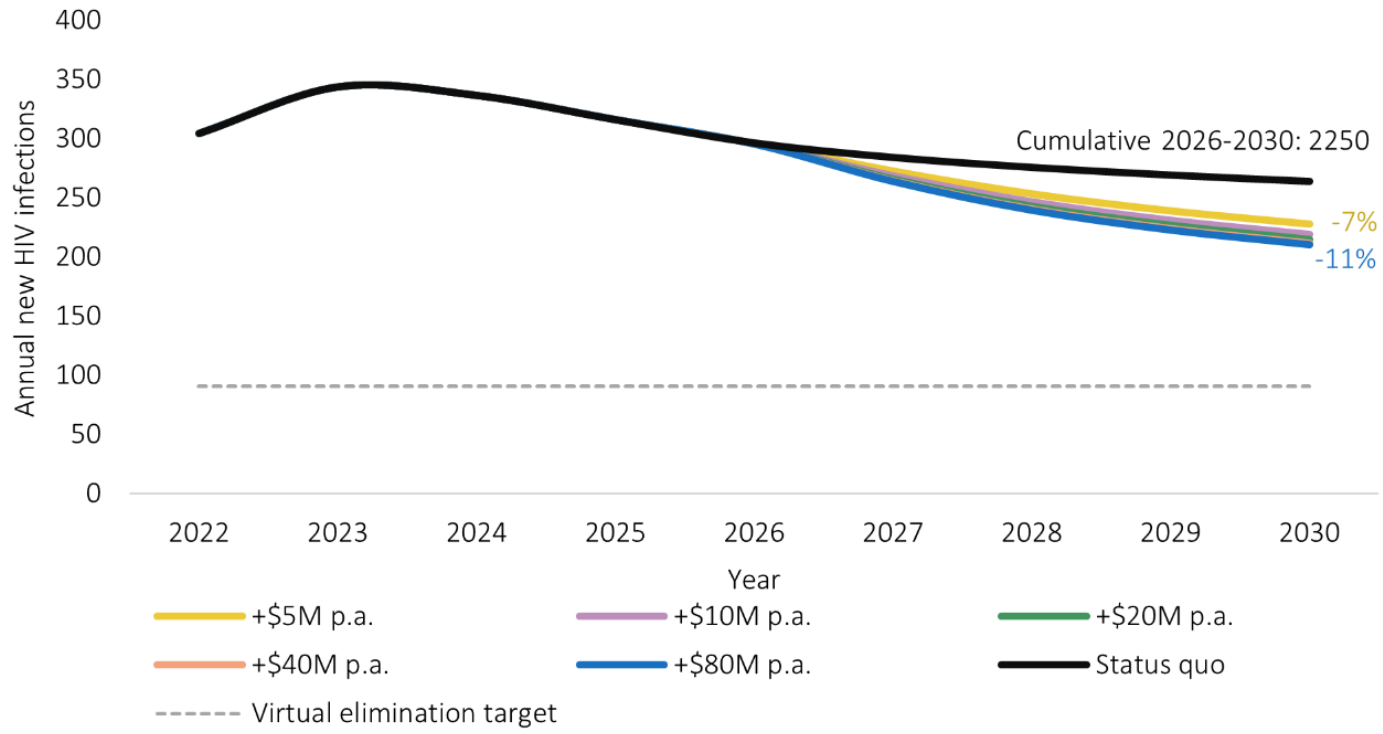
- **Optimised investment:** additional $5-80 million per annum further reduces people living with HIV who are undiagnosed to between 4.0% and 3.4% in 2030

➢ A 49-56% reduction in people living with undiagnosed HIV in 2030 relative to 2023



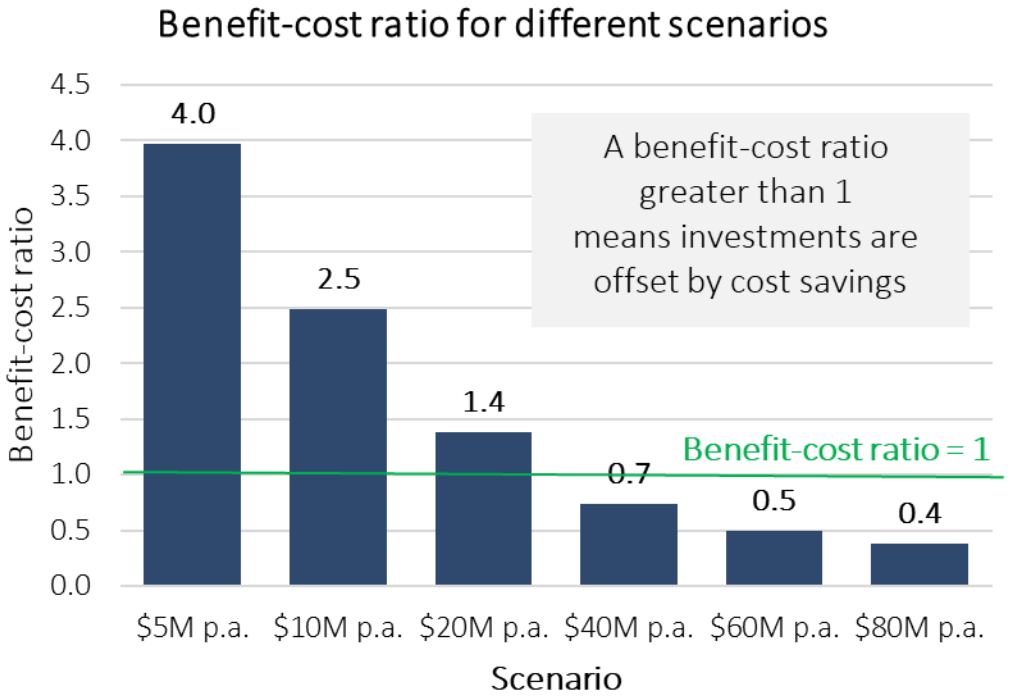
# Impact on new infections

- **Status quo:** cumulative 1,390 new HIV infections from 2026-2030.
- **Optimised investment:** additional $5-80 million per annum in testing could avert 100 to 160 new HIV infections (7-11%) over 2026-2030 through treatment-as-prevention benefits



# Return-on-investment

- Additional investment up to $20 million per annum could be offset by savings in healthcare costs
- Optimised investment of $5-20 million per annum over 2026-2030 could save $90-126 million in healthcare costs over 2026-2040
- Benefit-cost ratios of 4.0 to 1.4.
- For every $1 spent on testing, up to $4 saved in HIV management costs.
- With annual additional investment of $40 million or more the return on investment is less than one



# Limitations

- **Data limitations**: Epidemiological and programmatic inputs rely heavily on survey data that have varying degrees and types of biases and may not be representative of the whole population.
- **Costs:** represent a mix of commonwealth and jurisdictional costs. Also do not include demand generation if required.
- **Geographical heterogeneity and equity**: Not captured in the (national) model but localised service needs and equity should be considered in decision-making.
- **Additional testing options**: The model does not include some testing options, such as antenatal screening, hospital-based testing, testing through Aboriginal Medical Services and Aboriginal Community-Controlled Health Services, and immigration screening.
- **Additional benefits**: The model only considers the benefits for HIV, but there may be benefits if combined with testing for other sexually transmitted infections or blood-borne viruses.
- **Maximum coverage of interventions:** Great uncertainty in what is feasible, and assume they could be scaled up in one year.
- **Migration**: A large number of HIV notifications in Australia continue to be among people born overseas. It was assumed that migration returned to average pre-COVID levels by 2025.

# Summary

- Additional investment in HIV testing coupled with current efforts could halve the number of people with undiagnosed HIV by 2030
- A corresponding 7-11% reduction in new HIV infections (treatment-as-prevention)
- Up to an additional $20 million per annum investment in HIV testing could be offset by healthcare costs averted
- The model first prioritized scaling up:
  - HIV self-testing among priority populations
  - Other testing options for gay, bisexual and other men who have sex with men (direct-to-pathology telehealth, community-based testing, sexual health clinics);
  - Rapid HIV testing through needle and syringe programs; and
  - Opt-out testing in selected hospital emergency departments.

# Acknowledgements


- This study was funded by the Australian Government Department of Health, Disability and Ageing through Health Equity Matters
- The authors would like to acknowledge and thank the advisory group for their generous contributions and input on defining the scope of the model, providing data, and interpreting results.

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# Data

- **Population sizes and migration patterns:** Australian Bureau of Statistics, and priority population sizes were derived from national surveys and reports.
- **HIV prevalence, risk and protective behaviours**:
  - GBQ+ Community Periodic Surveys,
  - National Illicit Drug Reporting System (IDRS) reports,
  - Australian Needle Syringe Program Survey National Data reports, and the
  - Migrant Blood-Borne Virus and Sexual Health Survey (MiBSS).
- **Recent programmatic data:** including HIV testing coverage and service access patterns, were obtained for different population groups from program data, evaluation reports and the HIV Annual Surveillance Report 2023 and 2024.
- **Cost data:** mostly taken from Williams et al.*, adapted to our service definitions

*Williams, et al. (2021). Economic evaluation of alternative testing regimes and settings to detect undiagnosed HIV in Australia. *BMC health services research*, *21*(1), 30.