

Simulating the effects of PrEP on gonorrhoea incidence in gay and bisexual men in Sydney

Authors: Walker ML¹, Gray RT¹, Regan DG¹

¹*The Kirby Institute, UNSW Sydney, Sydney, Australia*

Background:

The widespread roll-out of Pre-Exposure Prophylaxis (PrEP) for HIV prevention among gay and bisexual men (GBM) is associated with increases in sexual behaviours such as condomless anal intercourse, potentially leading to an increase in the transmission of other sexually transmitted infections (STIs)—despite guidelines recommending PrEP users be screened for STIs every three months.

Methods:

We developed an agent-based, anatomical site-specific model to simulate the transmission of gonorrhoea in a population of 40,000 GBM. The model accounts for several GBM sexual practices, including those related to PrEP use and HIV treatment-as-prevention. Using published data, we calibrated the model to gonorrhoea incidence rates at the urethra, rectum, and pharynx for both HIV-positive and HIV-negative GBM in Sydney in 2010. We then ran a scenario analysis up to 2025 to assess the potential impact of PrEP use on gonorrhoea incidence.

Results:

Our modelled PrEP use scale-up (and 3-monthly STI testing) scenario showed a similar increase in overall gonorrhoea incidence over 2015-2019 compared to both the no-PrEP scenario or the PrEP-without-more-frequent-testing scenario, with gonorrhoea incidence in the HIV-negative population increasing from 12.5 per 100 GBM-years in 2015 to 25 per 100 GBM-years by 2019. Extrapolating to 2025 found only a small difference between the standard and no-PrEP scenarios. In contrast, if three monthly STI testing was not implemented with PrEP roll-out, incidence rates are predicted to rise substantially. More frequent STI testing among PrEP users showed a greater reduction in incidence among HIV-negative GBM but not for HIV-positive GBM.

Conclusions:

Our study indicates that three-monthly STI testing of GBM taking PrEP could mitigate increases in gonorrhoea incidence. Maintaining frequent screening within PrEP users has beneficial flow-on effects to the general HIV-negative GBM population. To reduce STIs in the HIV-positive population will require additional intervention strategies.

Disclosure of Interest Statement:

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The authors declare that they have no conflicts of interest.