Modelling the impact of increased testing for sexually transmitted infections among MSM in Bali, Indonesia

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Background:
Men who have sex with men (MSM) in Bali, Indonesia, have high rates of HIV and other sexually transmitted infections (STIs), including *Neisseria gonorrhoeae* (NG), *Chlamydia trachomatis* (CT), and *Treponema pallidum* (TP). We used mathematical modelling to explore the potential impact of improving HIV pre-exposure prophylaxis (PrEP) uptake and increasing the STI testing rate.

Methods:
An individual-based model was developed to simulate the transmission of NG, CT TP and HIV in the MSM population in Bali. We assumed a best-case scenario where 1) all individuals will be on antiretroviral therapy (ART) after a positive HIV diagnosis and, 2) after a negative HIV test, all will have access to and continue taking PrEP, under increased PrEP uptake scenarios. The model estimated the incidence of STIs under the existing testing rate compared with the provision of PrEP and increased HIV/STI testing.

Results:
The preliminary baseline model produced stable NG, CT, TP and HIV incidence of 102.9 (IQR:92.5-113.9), 165.0 (IQR:159.4-169.7), 3.3 (IQR:3.3-3.4) and 1.2 (IQR:1.2-1.3) per 100 person-years (average over five years), respectively. Assuming PrEP uptake is improved, HIV incidence is reduced by 62% (IQR:61-63%). If, in addition to increased PrEP uptake after testing, 30% more MSM are tested annually, then NG, CT, and HIV incidence is reduced by 31% (IQR:29-33%), 22% (IQR:21-23%) and 70% (IQR:69-71%), respectively. TP incidence increased by 8% (IQR:6-10%) during the first five years but returned to the baseline level by the tenth year.

Conclusion:
Our results suggest that improved PrEP uptake through HIV/STI testing could be effective in reducing HIV incidence among MSM in Bali. Further reductions in HIV, NG and CT incidence can be achieved if the HIV/STI testing rate is also increased. Short-term increases in TP incidence may occur due to an initial increase in the number of susceptible individuals through treatment of early syphilis.

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