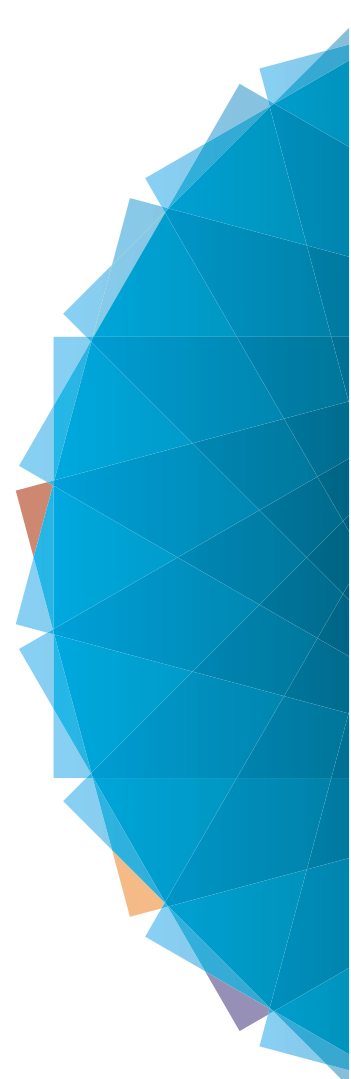


The Australian Collaboration for Coordinated Enhanced Sentinel Surveillance
of Sexually Transmissible Infections and Blood Borne Viruses

NSW STI report 2007 – 2014



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Sexually Transmissible Infections and Blood Borne Viruses

NSW STI report 2007 – 2014

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Executive Summary

This report contains data from 29 sexual health clinics, three general practice clinics with high caseloads of gay and bisexual male patients, and 11 other general practice clinics across New South Wales. Key findings include:

Testing and re-testing

Testing for STIs

- From 2007 to 2014, the proportion of attending patients tested for chlamydia, gonorrhoea and syphilis annually at sexual health clinics increased. Increases were particularly evident among gay, bisexual and other men who have sex with men (GBM), with a 15% increase in annual testing uptake for chlamydia (75% to 90%, $p<0.001$), 17% for gonorrhoea (72% to 89%, $p<0.001$), and 19% for syphilis (70% to 89%, $p<0.001$)
- From 2009 to 2014, testing among GBM also increased at high caseload general practice clinics: 11% increase for chlamydia (29% relatively, 38% to 49%, $p<0.001$), 12% for gonorrhoea (32% relatively, 38% to 50%, $p<0.001$), and 23% for syphilis (58% relatively, 40% to 63%, $p<0.001$)
- In both sexual health and high caseload general practice clinics, STI testing among HIV positive GBM was generally lower than among HIV negative men
- Overall, the highest uptake of STI testing at sexual health clinics was among female sex workers: 89-97% annual uptake for chlamydia and gonorrhoea, and 82-87% for syphilis

Syphilis testing among HIV positive GBM

- The proportion of HIV positive GBM at sexual health clinics tested for syphilis three or more times at the same service in a year (as per guideline recommendations) rose from 6% in 2007 to 23% in 2014 (17% increase, 283% relative increase, $p<0.001$)
- In 2007, 22% of viral load tests among GBM attending sexual health clinics were accompanied by a test for syphilis, which rose to 56% in 2014 (34% increase, 155% relative increase, $p<0.001$)

Re-testing after STI diagnoses

- In 2007, 9% of patients diagnosed with chlamydia at a sexual health clinic returned to the same service within 1-4 months for a re-test, which remained stable over time (10% in 2013)
- At sexual health clinics, re-testing at the same service within 1-4 months increased for gonorrhoea (from 8% in 2007 to 17% in 2013, 9% increase, 113% relative increase, $p<0.001$) while re-testing within 1-7 months of an infectious syphilis diagnosis remained stable (51% in 2013, $p=0.2$)
- STI re-testing after a positive diagnosis was highest overall among GBM and female sex workers attending sexual health clinics, with 19% of GBM and 15% of female sex workers in 2014 returning within the recommended period for a re-test, which compared with 1% of those who reported injecting drug use and 6% of young people

'Full' sexual health screens (chlamydia, gonorrhoea, syphilis, HIV) among GBM

- Overall, the proportion of attending GBM who received a full screen at sexual health clinics increased from 62% in 2007 to 84% in 2014 (22% increase, 35% relative increase, $p<0.001$)
- In high caseload general practice clinics, the proportion of GBM who received a full screen was lower than sexual health clinics, but increased from 17% in 2009 to 25% in 2014 (8% increase, 47% relative increase, $p<0.001$)
- Among high risk GBM, 53% of men who received a full screen at sexual health clinics in the last half of 2013 returned within 1-7 months for a follow-up full screen, compared to 39% in the first half of 2009 (14% increase, 36% relative increase, $p<0.001$)

STI positivity (proportion of tested individuals with a diagnosis)

Chlamydia

- Chlamydia positivity among GBM at sexual health clinics increased from 9% in 2007 to 12% in 2014 (3% increase, 33% relative increase, $p<0.001$)
- By anatomical site, positivity rose from 1% in 2007 to 5% in 2014 for rectal swabs ($p<0.001$) and from 0% to 3% for throat swabs ($p<0.001$) but remained stable for urogenital samples (10% in 2014)
- At sexual health clinics, chlamydia positivity was highest in GBM with HIV (18% in 2014) and lowest in female sex workers and female injecting drug users (9% each in 2014)
- Chlamydia positivity among female sex workers rose 3% from 6% in 2007 to 9% in 2014 ($p=0.009$). This increase in positivity among female sex workers is likely due to the increasing number of pharyngeal diagnoses via duplex chlamydia-gonorrhoea testing, as pharyngeal diagnoses increased among sex workers from 0% of diagnoses in 2007 to 13% in 2014 ($p<0.001$)

Gonorrhoea

- From 2007 to 2014, gonorrhoea positivity (any anatomical site) at sexual health clinics increased from 5% to 12% among HIV negative GBM (7% increase, 140% relative increase, $p<0.001$), and from 7% to 18% among HIV positive GBM (11% increase, 157% increase, $p<0.001$)
- Positivity for pharyngeal gonorrhoea increase from 2% in 2007 to 8% in 2014 ($p<0.001$) and from 2% to 5% for anorectal gonorrhoea ($p<0.001$) while urogenital positivity remained stable (3% in 2014)
- Gonorrhoea positivity increased among female sex workers from 1% in 2007 to 6% in 2014 ($p<0.001$) and from 0% to 5% among females who reported injecting drug use ($p<0.001$)
- In NSW, gonorrhoea notifications increased by 244% from 2007 to 2014 (244%), comparable to the 250% relative increase in gonorrhoea positivity at sexual health clinics.
- Any interpretation of trends in gonorrhoea positivity should consider the use of dual chlamydia-gonorrhoea tests in the past five years, the move from culture-based testing to the more sensitive nucleic acid amplification tests during the observation period, and changes in guidelines in 2010 recommending pharyngeal gonorrhoea testing for GBM

Infectious syphilis diagnoses

- From 2007 to 2014, infectious syphilis among HIV positive men decreased from 10% to 8% (2% decrease, 20% relative decrease, $p=0.01$). Notably, most of this decrease was between 2007 and 2010. Following 2010, the syphilis diagnosis rate rose from 5% to 8% in 2014 (3% increase, 41% relative increase, $p=0.02$). During this period, infectious syphilis diagnoses remained stable (2-3% annually) among HIV negative GBM
- There were few diagnoses of infectious syphilis among other priority populations

Introduction

For several years, diagnoses of sexually transmissible infections (STIs), notably chlamydia, gonorrhoea and syphilis, have increased in Australia and New South Wales (NSW)¹. Untreated STIs can contribute to a range of negative health outcomes, including pelvic inflammatory disease, ectopic pregnancy, infertility, low birth weight, and increase the risk of HIV infection. As such, early identification and prompt treatment are important for reducing the burden of STIs, goals outlined in the 3rd National STI Strategy² and the forthcoming 2016-2020 NSW STI Strategy. Accurate surveillance data are important to inform and evaluate these strategies. While disease notifications are an important population-level source of epidemiological data, they can be biased by testing patterns and are therefore difficult to interpret without data pertaining to the number and types of people being tested. This report collates rates of testing and diagnoses for *Chlamydia trachomatis* ('chlamydia'), *Neisseria gonorrhoeae* ('gonorrhoea'), and *Treponema pallidum* ('syphilis') in sexual health clinics and select general practice clinics in NSW.

Methods

ACCESS is a national surveillance network established in 2007, originally with a focus on establishing enhanced systems to complement existing chlamydia notification data. In 2013, the project was expanded through funding from select state health departments to include other STIs and HIV. Currently, ACCESS involves over 100 sites across four networks of clinics and laboratories in every Australian jurisdiction.

This report includes data from 12 sexual health services representing 29 sexual health clinics across NSW. This report also includes data from three Sydney-based general practice clinics with a large number of gay, bisexual and other men who have sex with men (GBM) patients ('high caseload general practice clinics') and 11 other general practice clinics (nine located in major cities and two in inner regional areas). Patients were uniquely identified within a health service but not between different services. This means that **if a patient attended multiple services they were counted multiple times**.

From each clinic, de-identified consultation, testing, diagnosis and treatment data were electronically extracted, and have been used to report annual trends. Sexual health clinic data were available from 2007-2014, while general practice data were available from 2009-2014. Indicators relating to attendance, STI testing, test positivity and diagnoses are stratified in this report on the basis of priority populations identified in the NSW and national STI strategies: GBM, people who inject drugs, Aboriginal and Torres Strait Islander peoples, female sex workers, and young heterosexuals (16-29 years old). Wilcoxon rank-sum tests for trend were used to assess changes in indicators over time at a significance value of $p < 0.05$.

Increasingly after 2007, pathology laboratories servicing participating clinics routinely employed duplex testing for chlamydia and gonorrhoea³. To account for dual testing, clinics were surveyed for the date that duplex testing was implemented, after which a test for chlamydia was also considered a test for gonorrhoea, and *vice versa*. As it is common practice for laboratories to conduct the second test but only notify a clinic if of positive results, this would artificially inflate positivity by including positive results but excluding other testing. Thus, a request for one test was presumed to have resulted in a test for the other, which contributed to the total number of chlamydia and gonorrhoea tests.

1 The Kirby Institute. *HIV, Viral Hepatitis and Sexually Transmissible Infections in Australia Annual Surveillance Report 2015*. 2015. The Kirby Institute, UNSW Australia: Sydney NSW.

2 Department of Health. *Third National Sexually Transmissible Infections Strategy 2014-2017*. Australian Government: Canberra, ACT, 2013.

3 Donovan B; Dimech W; Ali H; Guy R; Hellard M. Increased testing for *Neisseria gonorrhoeae* with duplex nucleic acid amplification tests in Australia: implications for surveillance. *Sexual Health*. 2015;12(1):48-50.

Results

Chlamydia

Sexual health clinics

The total number of testing episodes (discounting multiple tests in the same week) conducted among GBM at sexual health clinics in NSW increased from 3,322 in 2007 to 10,732 in 2014 (223% increase) and from 6,821 to 9,528 among young people (40% increase). By anatomical site, the largest proportion of all chlamydia tests among priority populations involved collection of urogenital samples, but with variation by population group. Among GBM, 35% of chlamydia tests in 2014 were of urogenital samples, compared with 88% among Aboriginal males and females, 82% among injecting drug users, 41% among female sex workers, and 71% among young people. For GBM, 32% of chlamydia tests were rectal swabs and 33% were throat swabs. For all priority populations there were increases in chlamydia throat swabs, which was likely due to the introduction of duplex chlamydia-gonorrhoea testing.

Testing uptake (the proportion of attending patients tested for chlamydia in a 12 month period) increased over time, rising from 75% of attending GBM in 2007 to 90% in 2014 (15% increase, 20% relative increase, $p<0.001$). The increase in chlamydia testing uptake was greatest among HIV positive GBM, from 42% to 67% (25% increase, 60% relative increase, $p<0.001$). In the same timeframe, uptake also increased among other priority populations, especially male injecting drug users (42% to 61%, 19% increase, 45% relative increase, $p<0.001$), young people (67% to 87%, 20% increase, 30% relative increase, $p<0.001$), and Aboriginal women (59% to 73%, 14% increase, 24% relative increase, $p<0.001$). Overall, chlamydia testing uptake was highest in female sex workers (89-96% annually). Among high risk GBM, 28% of patients were tested for chlamydia three or more times in 2014 (as per guideline recommendations), a 12% increase and 75% relative increase from 16% in 2007 ($p<0.001$).

Chlamydia positivity (the proportion of individuals tested with a positive result) at any anatomical site was highest overall among GBM (12% in 2014) and lowest among female sex workers and male injecting drug users (9% each in 2014). From 2007 to 2014, anorectal chlamydia positivity increased from 1% to 5% (4% increase, 400% relative increase, $p<0.001$), pharyngeal chlamydia from <1% to 3% (3% increase, 300% relative increase, $p<0.001$), while urogenital chlamydia remained stable (11% in 2007, 10% in 2014, $p=0.4$).

Over time, chlamydia positivity increased from 9% among GBM in 2007 to 12% in 2014 (3% increase, 33% relative increase, $p<0.001$), with a 2% increase (22% relative) among HIV negative GBM ($p<0.001$) and a 3% increase (20% relative) among HIV positive men ($p=0.018$). Although the majority of chlamydia infections among GBM were urogenital (61% in 2014), there was an increase from 2007 to 2014 in the proportion that were anorectal (18% to 27%, 9% increase, 50% relative increase, $p<0.001$) and in pharyngeal diagnoses as well (0% to 12%, 12% increase, $p<0.001$).

During the same period, chlamydia positivity increased 3% among female sex workers (9% relative increase, $p<0.001$), noting that diagnoses of pharyngeal chlamydia may have upwardly inflated this indicator. Among all priority populations, the vast majority of chlamydia diagnoses were urogenital, although there was a rising proportion of pharyngeal diagnoses among female sex workers (0% in 2007 to 31% in 2014, $p<0.001$) and anorectal among injecting drug users (9% to 34%, $p<0.001$). Positivity decreased among Aboriginal men (6% decrease, 35% relative decrease, $p<0.001$) and women (5% decrease, 29% relative decrease, $p=0.001$).

In 2014, 65% of chlamydia diagnoses were in asymptomatic patients, which was highest among HIV negative GBM (70%) and lowest among young people (59%). Although annual chlamydia notifications in NSW increased by 82% from 12,574 in 2007 to 22,912 in 2014, positivity at sexual health clinics increased only 22% relatively from 9% in 2007 to 11% in 2014, noting varying degrees of change among priority populations. This difference likely speaks to an increase in diagnoses beyond sexual health clinics and the epidemiology of chlamydia, which is focused more around young people than other priority populations.

General practice clinics

In general practice clinics with high caseloads of GBM, testing uptake for chlamydia rose from 42% in 2009 to 51% in 2014 among HIV negative GBM, a 9% increase (21% relatively, $p<0.001$). During that same period, chlamydia testing uptake increased 18% (67% relatively) among HIV positive men (27% to 45%, $p<0.001$). In other general practice clinics, chlamydia testing uptake was low overall (3-4% of patients annually) but higher among young patients, rising from 7% in 2009 to 9% in 2014 (2% increase, 29% relative increase, $p<0.001$).

Gonorrhoea

Sexual health clinics

The total number of testing episodes for gonorrhoea conducted among GBM at sexual health clinics in NSW increased by 314%, from 4,354 in 2007 to 18,019 in 2014. As with chlamydia, although the majority of gonorrhoea testing was conducted via urogenital samples, 32% and 34% of testing among GBM in 2014 was via rectal and throat swabs, respectively. In female sex workers, 41% of gonorrhoea testing was urogenital, 23% anorectal (down from 39% in 2007) and 36% pharyngeal (up from 18% in 2007).

Testing uptake for gonorrhoea increased 17% (24% relatively) among GBM, from 72% in 2007 to 89% in 2014 ($p<0.001$). The increase in testing uptake was greatest among HIV positive GBM, with a 25% absolute and 76% relative increase from 2007 to 2014. In the same time frame, testing also increased among male patients who reported injecting drug use (26% increase, 45% relative increase, $p<0.001$) and young heterosexuals (29% increase, 52% relative increase, $p<0.001$). As with chlamydia, testing uptake for gonorrhoea was highest overall in female sex workers (89-97% annually). Among high risk GBM, the proportion of men tested three or more times in a year rose from 16% in 2009 to 28% in 2014 (12% increase, 75% relative increase, $p<0.001$).

Gonorrhoea positivity was highest overall for pharyngeal infections (2% in 2007 to 8% in 2014, 6% change, 300% relative change, $p<0.001$). There was also an increase in anorectal positivity from 2% in 2007 to 5% in 2014 (3% increase, 150% relative increase, $p<0.001$). Urogenital gonorrhoea remained stable at around 3% annually ($p=0.8$). Among GBM, gonorrhoea positivity during this period increased from 5% in 2007 to 12% in 2014 (7% increase, 140% relative increase, $p<0.001$), with an 11% increase among HIV positive GBM (157% relative, $p<0.001$). In contrast to chlamydia, the 53% of gonorrhoea diagnoses among GBM in 2014 were pharyngeal, a 27% increase from 26% in 2007 (104% relatively, $p<0.001$). Positivity also increased among female sex workers, from 1% in 2007 to 6% in 2014 ($p<0.001$), from 0% to 5% among female injecting drug users ($p<0.001$), and from 1% to 3% among Aboriginal females ($p=0.001$). The move from culture-based testing to the more sensitive nucleic acid amplification tests during the observation period likely played some part in these proportional changes, which might also explain the significant increase in gonorrhoea notifications during this period (1,419 in 2007 to 4,822 in 2014, 157% increase). Although the increases in pharyngeal gonorrhoea among sexual health clinic attendees were the most striking, it is worth noting that anorectal gonorrhoea also increased dramatically.

General practice clinics

In general practice clinics with high caseloads of GBM, although gonorrhoea testing uptake was highest in HIV negative men, the greatest increase in uptake was in HIV positive GBM patients (27% in 2009 to 46% in 2014, 70% relative increase, $p<0.001$). In other general practice clinics, uptake was low among the general clinic population (2-3% annually) but increased from 5% in 2009 to 8% in 2014 among young people (60% relative increase, $p<0.001$), a likely reflection of dual chlamydia-gonorrhoea testing at some services. As chlamydia testing is the most commonly administered sexual health test among clinic attendees in general practice, linking it to gonorrhoea testing would necessarily increase testing for gonorrhoea.

Syphilis

Sexual health clinics

For syphilis, the [total number of testing episodes](#) among GBM at sexual health clinics increased from 4,329 in 2007 to 17,093 in 2014 (295% increase). Syphilis [testing uptake](#) increased 19% among GBM from 2007 to 2014 (27% relative change), with the greatest increase among GBM with HIV (33% increase, 83% relative increase). From 2007 to 2014, testing uptake for syphilis increased 13% among Aboriginal men (39% relatively), 3% among Aboriginal women (6% relatively), and 23% and 15%, respectively, among male and female injecting drug users (58% and 33% relatively).

Although guidelines for GBM recommend [quarterly syphilis screening](#) as a routine part of HIV management⁴, in recent years many clinics have moved towards biannual HIV monitoring consultations. Although the proportion of HIV positive men tested three or more times annually at the same service rose from 6% in 2007 to 21% in 2012 (15% increase, 250% relative increase, $p<0.001$), from 2012 to 2014 this proportion remained generally stable. It may be that shifting HIV management guidelines are challenging further increases in syphilis testing among this population, with less than a quarter of men in 2014 tested three or more times. It is also notable that only 56% of viral load testing in 2014 was accompanied by a test for syphilis, which may present one opportunity for increased syphilis testing among HIV positive GBM attending sexual health clinics. Among GBM overall, the proportion of patients with three or more syphilis tests per year (as per clinical guidelines) increased from 14% in 2007 to 23% in 2014 (9% increase, 4% relative increase, $p<0.001$).

The [diagnosis rate](#) of infectious syphilis (defined as the proportion of individuals tested with a diagnosis of primary, secondary or early latent syphilis) remained generally stable among GBM (1.9-2.7% annually) but fell from 10.5% in 2007 to 5.1% in 2010 among HIV positive GBM (5.4% decrease, 51% relative decrease, $p=0.002$) before increasing from 5.4% in 2010 to 7.6% in 2014 (2.2% increase, 41% relative increase, $p=0.02$). There were very few diagnoses of infectious syphilis among other priority populations.

In 2014, 61% of diagnoses for infectious syphilis were asymptomatic, which was true for 61% of diagnoses among HIV negative GBM and 63% of HIV positive GBM. There were no significant trends in asymptomatic syphilis diagnoses over time. Although the syphilis diagnosis rate among sexual health attendees remained generally stable from 2007 to 2014, from 2010 to 2014 there was a slight but significant increase in positivity (50% relatively, from 1.0% to 1.5%, $p=0.02$), which mimicked a 75% increase notifications in NSW during the same period (429 to 745). That the increase in positivity was predominantly among HIV positive GBM – for whom there was a 41% relative increase during that period – highlights the epidemiology of infectious syphilis, which disproportionately affects GBM with HIV⁵.

General practice clinics

From 2009 to 2014, syphilis testing among HIV negative GBM attending high caseload general practice clinics increased from 30% to 56% (16% increase, 87% relative increase, $p<0.001$) and from 64% to 77% among HIV positive men (13% increase, 20% relative increase, $p<0.001$). In other general practice clinics, syphilis testing was generally quite low (1-3% annually) but slightly higher among young patients, tripling from 2% in 2009 to 6% in 2014 ($p<0.001$).

Re-testing following a STI diagnosis

Sexual health testing guidelines recommend re-testing within three months of a chlamydia or gonorrhoea diagnosis and re-testing within six months of an infectious syphilis diagnosis^{6,7}. In 2007, 9% of patients diagnosed with chlamydia at a sexual health clinic in NSW returned within 1-4 months for a re-test at the same service, which remained stable over time ($p=0.06$). During the same period, re-testing following a gonorrhoea diagnosis increased from 8% to 17% (11% increase, 113% relative increase, $p<0.001$). Re-testing following a syphilis diagnosis was much higher overall due, at least in part, to the fact that almost all syphilis diagnoses were among high risk and HIV positive GBM, both groups with frequent STI testing generally. In 2013, 51% of patients diagnosed with infectious syphilis were re-tested within 1-7 months with no trend over time ($p=0.2$). It should be noted that some patients were re-tested at other health services, which was not captured by this analysis.

By priority population, GBM and female sex workers had the highest rates of re-testing within recommended timeframes following an STI diagnosis, with 19% of GBM in 2014 and 15% of female sex workers returning within the recommended timeframe. Male and female patients who reported injecting drug use had the lowest rates of STI re-testing, with 1% in 2014 returning within the recommended timeframe.

4 Templeton DJ, Read P, Varma R, Bourne C. Australian sexually transmissible infection and HIV testing guidelines for asymptomatic men who have sex with men 2014: a review of the evidence. *Sexual Health*. 2014;11(3):217-29.

5 Jin F, et al. Epidemic syphilis among homosexually active men in Sydney. *MJA*. 2005; 183:179-183.

6 Templeton DJ, Read P, Varma R, Bourne C. Australian sexually transmissible infection and HIV testing guidelines for asymptomatic men who have sex with men 2014: a review of the evidence. *Sexual Health*. 2014;11(3):217-29.

7 Australian Sexual Health Alliance. *Australian STI Management Guidelines for use in Primary Care*. 2014.

'Full' screens among GBM

'Full' sexual health screens were assessed among GBM attending sexual health clinics in NSW. A full screen was defined as a test for chlamydia, gonorrhoea, syphilis, and, among HIV negative patients, HIV. Overall, the proportion of attending GBM who receive a full screen increased from 62% in 2007 to 84% in 2014 ($p<0.001$). Although HIV negative GBM were more likely than HIV positive GBM to receive a full screen (89% vs 52% in 2014, $p<0.001$) the greatest increase between 2007 and 2014 was among HIV positive GBM (23% increase, 79% relative increase, $p<0.001$). In high caseload general practice clinics, uptake of full screens overall was slightly higher among HIV positive GBM (20% in 2009 to 29% in 2014, 45% relative increase, $p<0.001$) than HIV negative men (16% to 22%, 38% relative increase, $p<0.001$).

As per testing guidelines for GBM, the proportion of high risk men who received a full screen and then returned within 1-7 months for a subsequent test increase from 39% in early 2009 to 53% in the last half 2013 (14% increase, 36% relative increase, $p<0.001$). Among men of lower risk profiles, 36% in late 2013 returned within 1-12 months compared with 28% in early 2009 (8% increase, 29% relative increase, $p<0.001$). Although for both groups of men full screens increased, there was still a sizeable proportion not testing at the frequency recommended by clinical guidelines.

Conclusions

At sexual health services and general practices clinics across NSW, testing for chlamydia, gonorrhoea, and syphilis increased from 2007 to 2014. Increases in testing were largely among GBM, with marked improvements in both the uptake and frequency of testing among this population. 'Full' sexual health screen uptake among GBM also increased from 2007 to 2014, with more than half of high risk and over a third of other risk men returning within guideline-driven timeframes for subsequent screens at sexual health clinics. For HIV positive GBM, however, less than 25% of those attending sexual health clinics achieved the quarterly syphilis testing target recommended by guidelines. Among other priority populations testing also increased, but to a lesser extent, while some patients – notably female sex workers – demonstrated consistently high rates of testing annually. There remain, however, large gaps in testing among many patients across sexual health and general practice clinics. Strategies to increase syphilis testing frequency in accordance with guidelines, in particular among HIV positive and negative GBM, should be prioritised.

Most patients diagnosed with chlamydia or gonorrhoea did not return for a re-test at the same clinic within the recommended timeframe. In particular, young people demonstrated the lowest rates of re-testing compared with all other priority populations. While it is important to note that re-testing at other health services was not captured in our analysis, given the risk for reinfection and an increasing number of these infections detected in NSW each year, re-testing remains an important clinical target. Strategies that enhance re-testing – such as SMS reminders or self-collected specimens at home⁸ – should be considered, while methods of assessing testing across multiple services should be implemented.

Interestingly, while trends in test positivity for gonorrhoea and syphilis at sexual health clinics were similar to trends in notifications across the state, the same was not true for chlamydia. These similarities as well as the difference likely speak to the epidemiology of these infections, as well as the types of people who access sexual health clinics. Chlamydia, notably, largely affects young heterosexuals, many of whom are more likely to access testing through their general practitioner. By contrast, gonorrhoea and infectious syphilis more prominently affect GBM, who are more likely to access sexual health clinics for testing⁹. Therefore, while positivity at sexual health clinics for gonorrhoea and infectious syphilis likely reflects broader trends in infection, the same cannot be said of chlamydia.

While diagnoses for chlamydia remained generally stable or increased slightly, the significant increases in gonorrhoea positivity at sexual health clinics and notifications across the state highlight the need for sustained and expanded public health control strategies. Even though changes in testing practices and technologies may have upwardly biased gonorrhoea positivity over time, the rate of increase is worrying: nearly one out of every ten patients tested in 2014 was diagnosed with pharyngeal gonorrhoea. Similarly, although syphilis diagnoses decreased significantly from 2007 to 2010, their creeping rise in recent years – particularly among HIV positive GBM – warrants future monitoring and attention.

8 Smith K et al. Dual intervention to increase chlamydia retesting: a randomized controlled trial in three populations. *American Journal of Preventive Medicine*. 2015;49 (1):1-11.

9 Ali H, et al. Increasing access by priority populations to Australian sexual health clinics. *Sexually Transmitted Diseases*. 2013;40(10):819-21.

Report notes

- The population group categories are not mutually exclusive. For example, a patient could be reported as both a sex worker and of Aboriginal or Torres Strait Islander background.

Overview of indicators and networks

Indicator (per infection)	Sexual health clinic Network	High caseload GP Network	GP Network
Total tests	✓	-	-
Proportion unique patients tested	✓	✓	✓
Test yield	✓	-	-
Positivity/diagnosis rate	✓	-	-
Syphilis testing among GBM with HIV	✓	-	-
Re-testing following a positive test	✓	-	-
'Full' sexual health screening among GBM	✓	✓	-

Population	Sexual health clinics Network	High caseload GP Network	GP Network
Sex	✓	✓	✓
GBM	✓	✓	-
Other priority populations:			
Aboriginal people	✓	-	-
People who inject drugs (PWID)	✓	-	-
Female sex workers	✓	-	-
Young people	✓	-	✓

Definitions

Patient categorisation in the following priority populations relies on patient data collected and recorded as part of clinical encounters. Population estimates may, therefore, underrepresent attendees within the following categories.

Gay, bisexual and other men who have sex with men (GBM)	Male patients who report sex with another man or other men in the 12 months prior to consultation
High risk GBM ¹	Male patients who report more than 5 male sexual partners in the 3 months prior or more than 20 male sexual partners in the 12 months prior to consultation or who had a diagnosis of chlamydia, gonorrhoea or syphilis in the 24 months prior to and including consultation
Female sex worker	Female patients who report selling sex in the 12 months prior to consultation
Aboriginal	Patients who self-identified as Aboriginal, Torres Strait Islander, or both
People who inject drugs (PWID)	Patients who report injecting drugs in the 12 months prior to consultation
Young people	Patients aged 16-29 years at the time of consultation and not identified as GBM

Chlamydia

Sexual Health Clinic Network

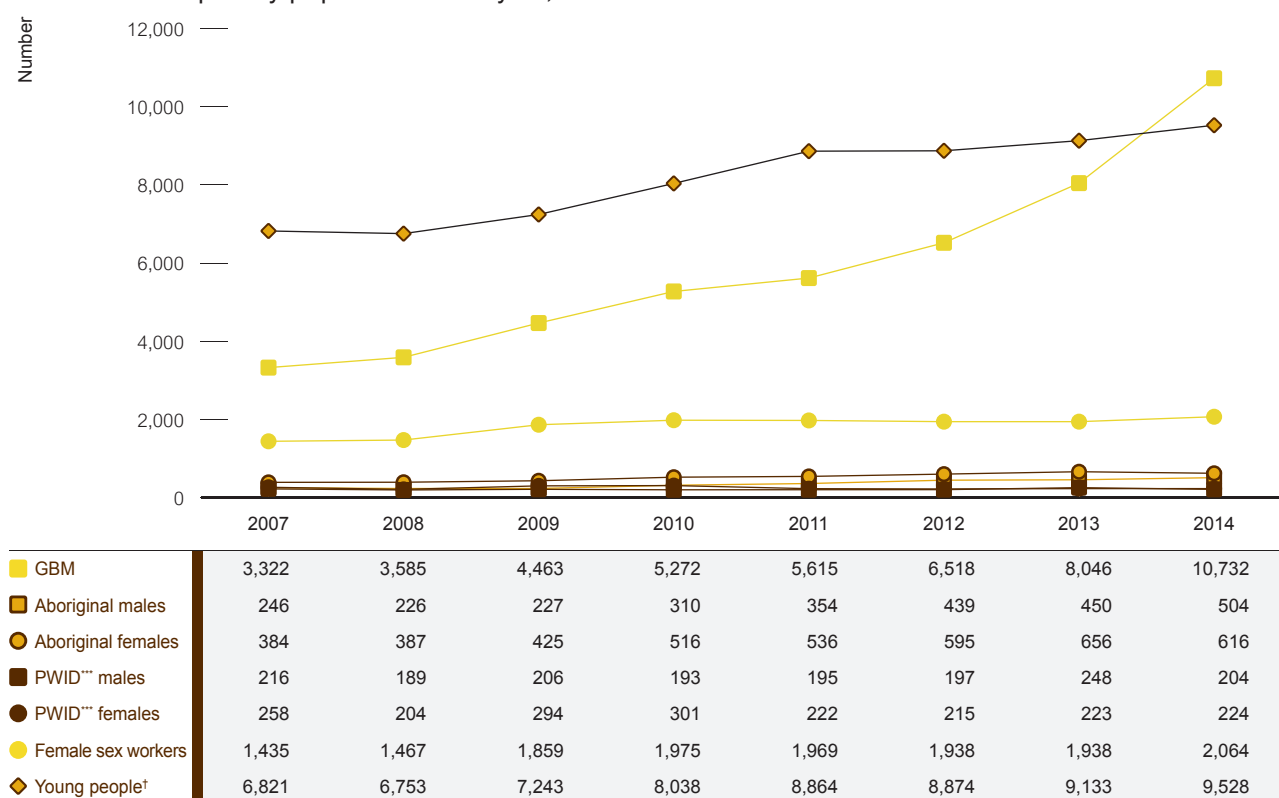
Chlamydia testing

The following section reports on chlamydia testing among patients attending sexual health clinics in NSW. National guidelines^{10,11} recommend chlamydia testing for different populations as follows:

Population group	Testing frequency
Aboriginal and Torres Strait Islanders	Regular/as needed
People who inject drugs	Regular/as needed
Female sex workers	Regular/as needed
Young people (16-29 years old)	Annually
GBM	Annually
HIV positive GBM	Annually
High risk GBM	Quarterly

The number of chlamydia testing episodes more than doubled among GBM from 2007 to 2014 and increased by 40% among female sex workers.

Figure 1 Total number of chlamydia test episodes* conducted at sexual health clinics in NSW, by priority population** and year, 2007-2014



* Any anatomical site

** Priority classifications are not mutually exclusive; categories other than GBM exclude GBM patients

***People who inject drugs

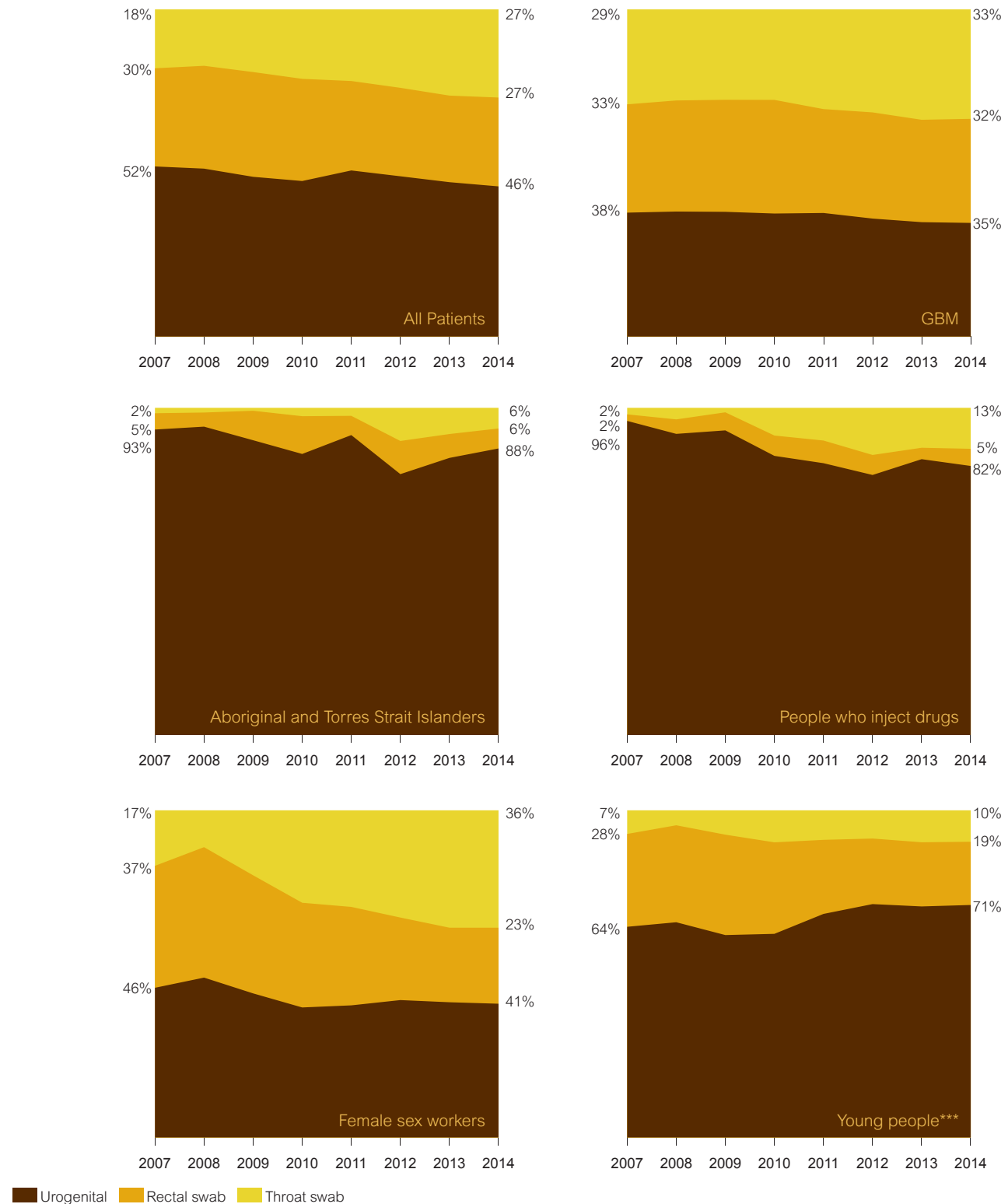
† Patients aged 16-29 years old

10 Australian Sexual Health Alliance. *Australian STI Management Guidelines for use in Primary Care*. 2014.

11 Templeton DJ, Read P, Varma R, Bourne C. Australian sexually transmissible infection and HIV testing guidelines for asymptomatic men who have sex with men 2014: a review of the evidence. *Sexual Health*. 2014;11(3):217-29.

Figure 2 reports on the proportion of total chlamydia tests conducted by anatomical site. Among GBM, samples collected for chlamydia testing were split evenly by anatomical site, whereas for Aboriginal patients and people who inject drugs urogenital samples were mostly collected. There was a 19% increase (112% relatively) from 2007 to 2014 ($p < 0.001$) in throat sample collection for female sex workers due to the introduction of duplex chlamydia-gonorrhoea testing.

Figure 2 Proportional breakdown of tests for chlamydia at sexual health clinics in NSW, by anatomical site*, overall, priority population** and year, 2007-2014



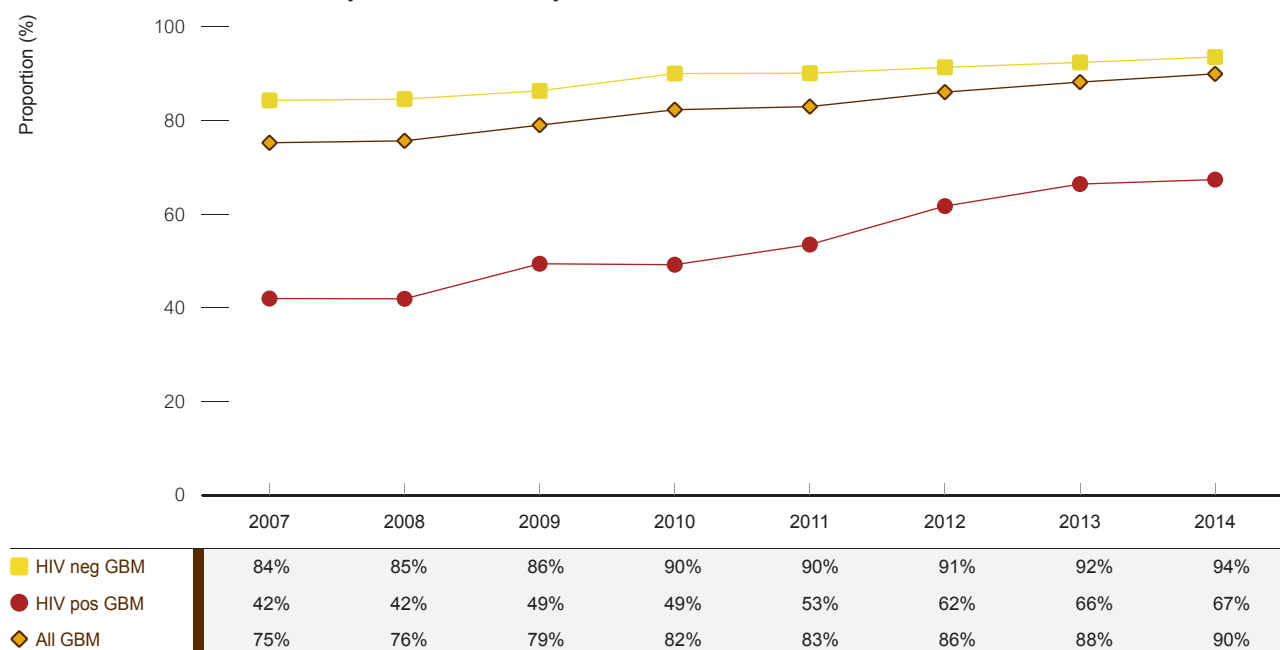
* Excludes tests for which site details were not available and tests of other sites

** Priority classifications are not mutually exclusive; categories other than GBM exclude GBM patients

***Patients aged 16-29 years old

The following graphs report on the proportion of attending patients tested for chlamydia in a year ('testing uptake'). Annually, a higher proportion of HIV negative GBM were tested for chlamydia compared to HIV-positive men (94% vs 67% in 2014) but testing among HIV positive men differed by age: 79% of men 30 years and younger were tested in 2014, compared with 71% of men aged 30-39 years and 49% of men 40 years and older. Testing uptake rose from 2007 to 2014 among HIV negative GBM (10% increase, 12% relative increase, $p<0.001$) and among those with HIV (25% increase, 60% relative increase, $p<0.001$).

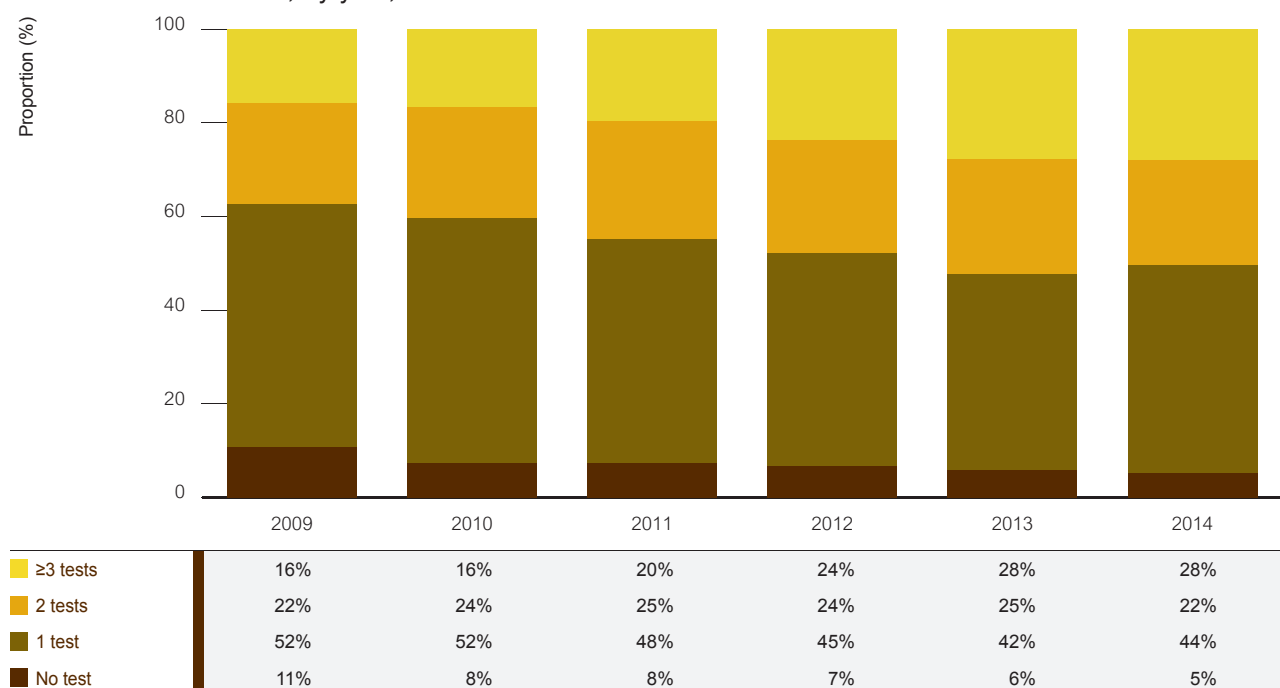
Figure 3 Proportion of unique GBM patients* tested for chlamydia at sexual health clinics in NSW, overall and by HIV status and year, 2007-2014



* 'Unique' patients were only identified within each service

Regarding testing frequency, 28% of high risk GBM were tested the recommended three or more times in 2014, a 12% increase and 75% relative increase from 2009 ($p<0.001$).

Figure 4 Number of chlamydia tests annually among high risk* GBM patients at sexual health clinics in NSW, by year, 2009-2014**

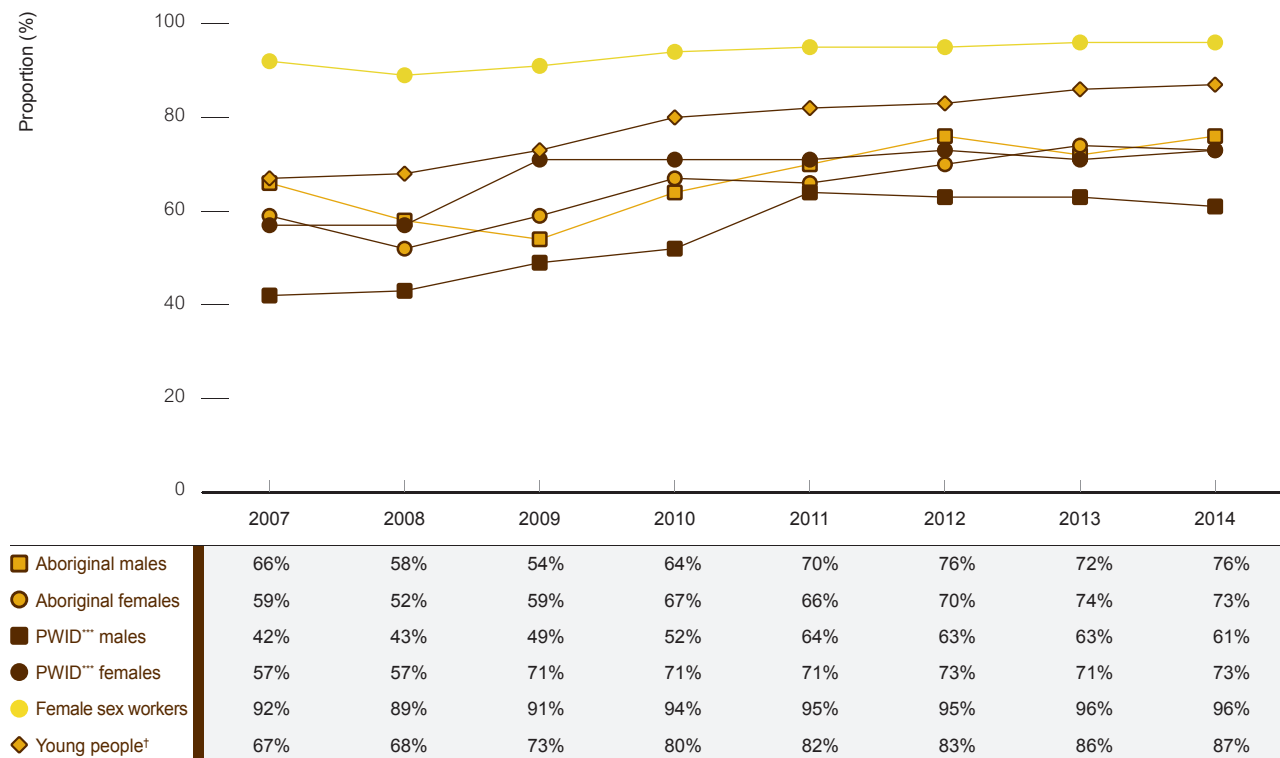


* 'High risk' men are those with >5 partners in the 3 months prior, or >20 partners in the 12 months prior, or a chlamydia, gonorrhoea or syphilis diagnosis in the 24 months prior

** Complete data on partner numbers only available from 2009 onward

In other priority populations, testing uptake was greatest in female sex workers (89-96% per year) and young people (67-87% per year). The greatest increase in chlamydia testing uptake was in male injecting drug users, which increased a 19% increase or 45% relative increase from 2007 to 2014 ($p<0.001$). Testing uptake also increased among young people (20% increase, 30% relative increase, $p<0.001$), female injecting drug users (16% increase, 28% relative increase, $p<0.001$) Aboriginal males (10% increase, 15% relative increase, $p<0.001$) and Aboriginal females (14% increase, 24% relative increase, $p<0.001$).

Figure 5 Proportion of unique patients* tested for chlamydia at sexual health clinics in NSW, by priority population** and year, 2007-2014



* 'Unique' patients were only identified within each service

** Excludes GBM; priority classifications are not mutually exclusive

***People who inject drugs

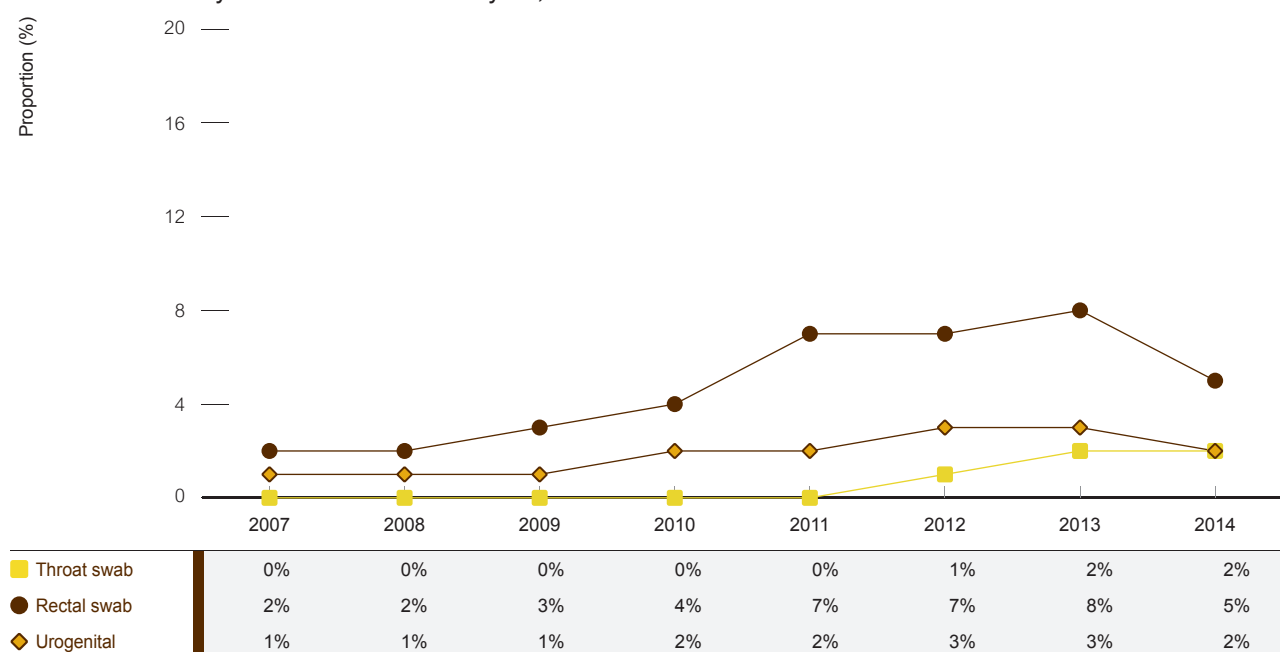
† Patients aged 16-29 years old

Chlamydia test yield and positivity

The following graph reports on **test yield**, which is the proportion of total tests with positive results, discounting multiple tests conducted in the same week. This indicator is relevant for clinical services delivery as it demonstrates the infections detected from all testing conducted.

From 2007 to 2014, chlamydia test yield rose across anatomical sites. Yield for rectal swabs increased 2.7% (142% relatively) during this period ($p < 0.001$) while positive urogenital samples increased 1.8% (300% relatively, $p < 0.001$; Figure 6). The proportion of diagnoses in asymptomatic patients remained relatively stable over the study period, ruling out that the increasing chlamydia positivity observed may be due to an increasing proportion of patients attending with symptoms. Asymptomatic chlamydia diagnoses were, generally, less common among young people, people who inject drugs and Aboriginal patients when compared with female sex workers and GBM (Table 1), reflecting the triage protocols at the clinics. Some clinics will refer asymptomatic patients, save GBM and sex workers, to other services for testing.

Figure 6 Proportion of total tests for chlamydia with a positive result at sexual health clinics in NSW, by anatomical site* and year, 2007-2014



* Excludes tests for which anatomical site details were not available

Table 1 Proportion of chlamydia diagnoses at sexual health clinics in NSW that were asymptomatic*, overall and by priority population** and year, 2007-2014

	Asymptomatic (%)								Trend
	2007	2008	2009	2010	2011	2012	2013	2014	
All patients	65%	65%	56%	59%	61%	62%	63%	65%	p=0.05
HIV negative GBM	58%	75%	81%	75%	66%	72%	64%	70%	p=0.2
HIV positive GBM	70%	48%	46%	62%	50%	70%	58%	64%	p=0.3
Aboriginal males & females	73%	55%	43%	52%	32%	70%	58%	60%	p=0.3
PWID*** male & females	68%	45%	48%	69%	68%	70%	57%	67%	p=0.9
Female sex workers	75%	74%	60%	62%	76%	69%	74%	73%	p=0.1
Young people†	62%	62%	56%	59%	63%	59%	59%	59%	p=0.1

* Excludes patients for whom symptom details were not available

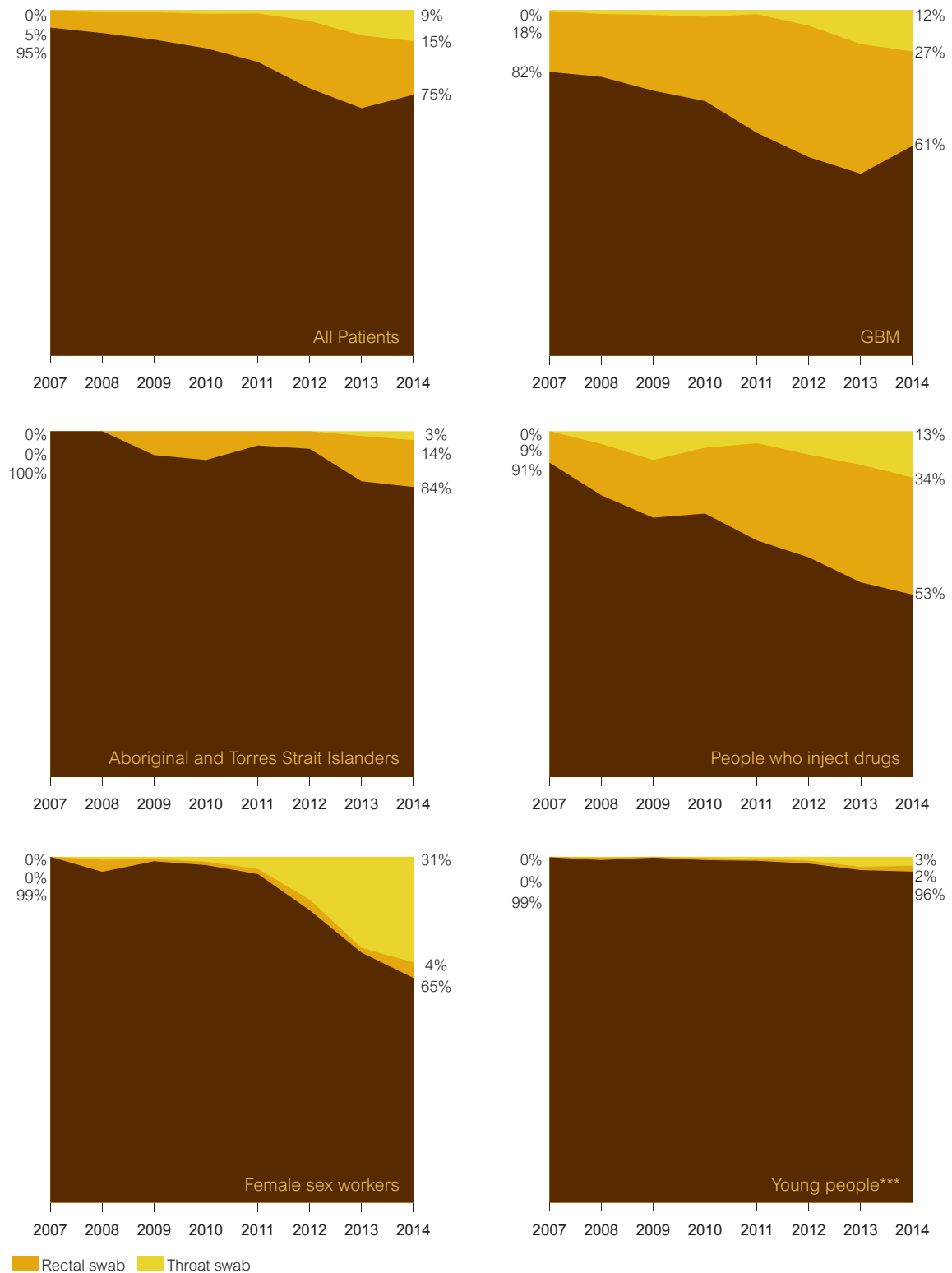
** Priority classifications are not mutually exclusive

*** People who inject drugs

† Patients aged 16-29 years old

Figure 7 outlines the breakdown of chlamydia diagnoses by anatomical site across priority populations. Overall, most chlamydia diagnoses were urogenital (75% in 2014) but that changed over time, declining 20% from 95% in 2007 ($p<0.001$). Among GBM, 61% of chlamydia diagnoses were in 2014 were urogenital, 27% were anorectal, and 12% were pharyngeal. Among female sex workers, there was a significant increase in the proportion of diagnoses that were pharyngeal, rising from 0% in 2007 to 31% in 2014 ($p<0.001$).

Figure 7 Proportional breakdown of chlamydia diagnoses at sexual health clinics in NSW, by anatomical site*, overall, priority population** and year, 2007-2014



* Excludes tests for which site details were not available and tests of other sites

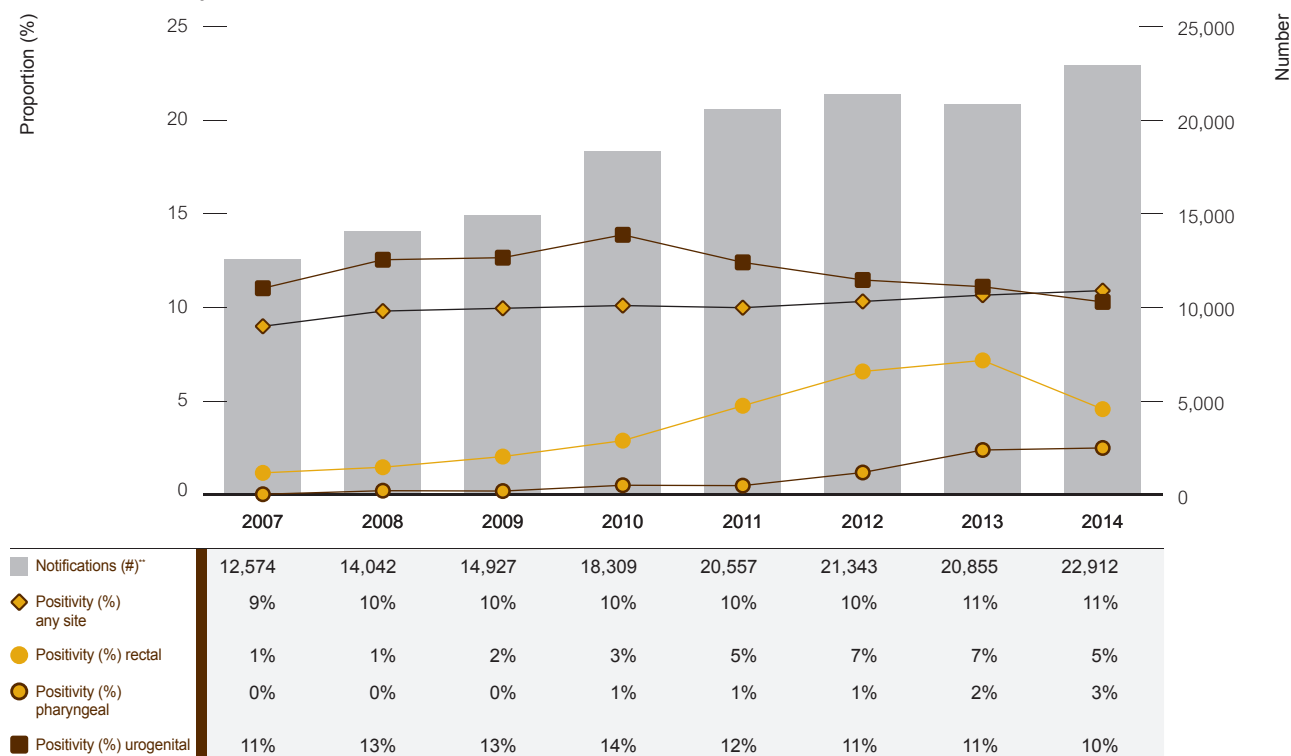
** Priority classifications are not mutually exclusive; categories other than GBM exclude GBM patients

***Patients aged 16-29 years old

The following section reports on unique chlamydia positivity, which is the proportion of individuals tested for chlamydia with a positive result in that year. For patients tested from multiple anatomical sites, a positive result from any sample was counted only once. This indicator is more epidemiologically relevant as it demonstrates the infections detected from each person in a give time period and is not biased by repeat testing.

Overall, positivity at sexual health clinics in NSW increased 2% (22% relatively) from 2007 to 2014 ($p<0.001$) while notifications in the state increased by 82% (Figure 8). The greatest increase in positivity was in anorectal chlamydia, which quadrupled from 2007 to 2014 ($p<0.001$). There was also a sizeable increase in pharyngeal chlamydia and a decline in urogenital diagnoses from 2012 to 2014 (2% decrease, 17% relative decrease, $p=0.001$). Among GBM, positivity increased 2% (22% relatively) among HIV negative patients ($p<0.001$) and 3% (20% relatively) among HIV positive patients ($p<0.001$; Figure 9).

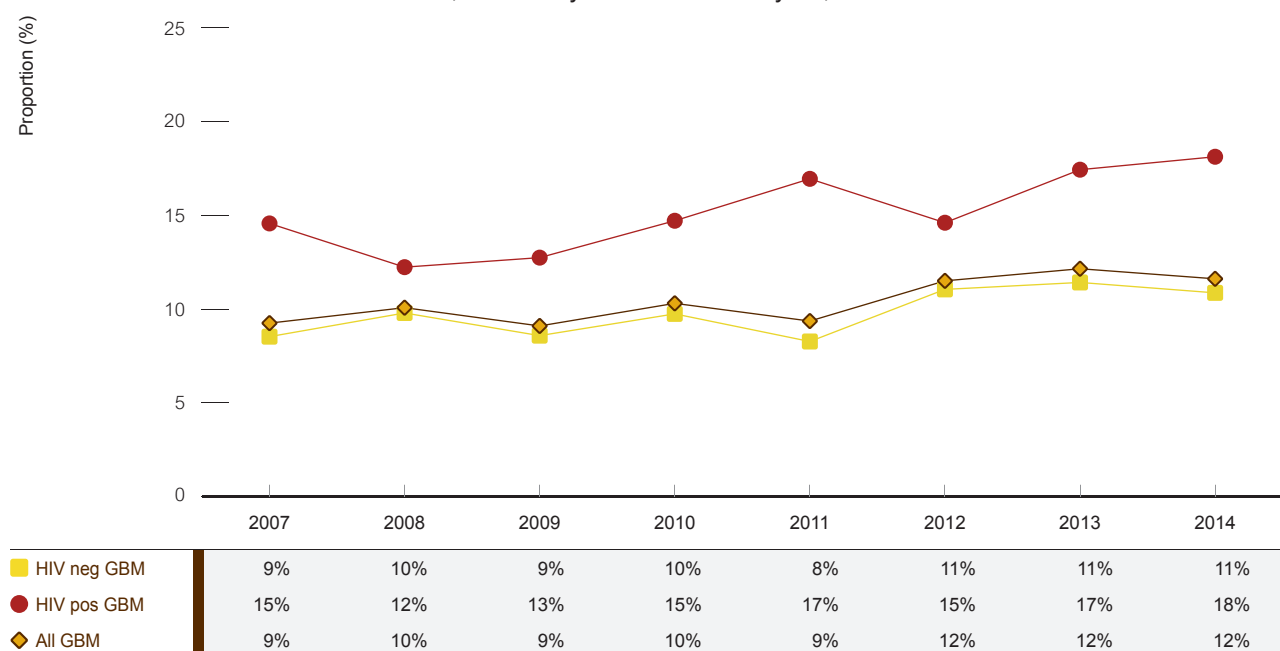
Figure 8 Proportion of unique patients* tested for chlamydia with a positive result at sexual health clinics in NSW and statewide chlamydia notifications, overall and by anatomical site and year, 2007-2014



* 'Unique' patients were only identified within each service

** The Kirby Institute. HIV, viral hepatitis and sexually transmissible infections in Australia. 2015. Sydney, NSW: The Kirby Institute.

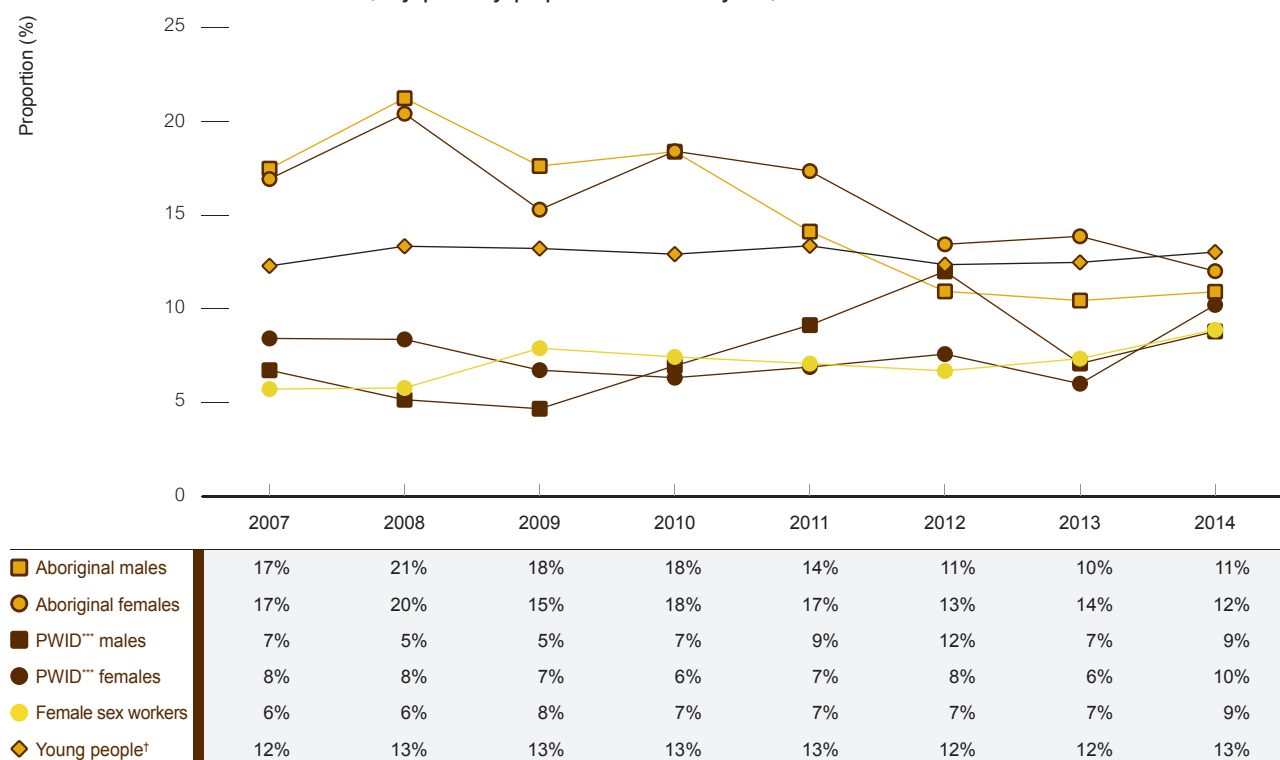
Figure 9 Proportion of unique GBM patients* tested for chlamydia with a positive result at sexual health clinics in NSW, overall by HIV status and year, 2007-2014



* 'Unique' patients were only identified within each service

Chlamydia positivity was generally highest among Aboriginal males and females, although it fell from 2007 to 2014, respectively, 6% (35% relatively, $p < 0.001$) and 5% (29% relatively, $p = 0.001$). Positivity also increased among female sex workers, rising 3% from 2007 to 2014 ($p < 0.001$), due in part to an increasing number of pharyngeal diagnoses.

Figure 10 Proportion of unique patients* tested for chlamydia with a positive result at sexual health clinics in NSW, by priority population** and year, 2007-2014



* 'Unique' patients were only identified within each service

** Excludes GBM; priority classifications are not mutually exclusive

***People who inject drugs

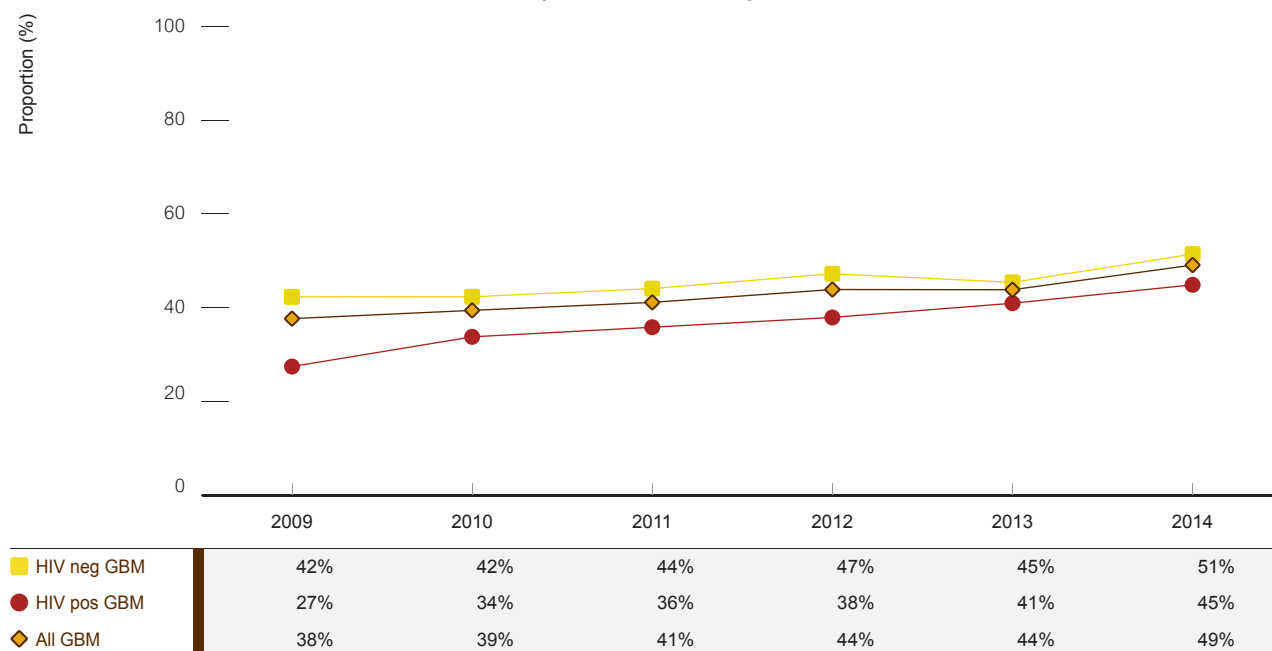
† Patients aged 16-29 years old

Primary Care Clinic Network

Chlamydia testing

The following graph reports on chlamydia testing among individual GBM attending general practice clinics in NSW with high caseloads of GBM patients. From 2009 to 2014, testing for chlamydia among HIV negative GBM increased 9% (21% relatively) and 18% (67% relatively) among HIV positive GBM ($p < 0.001$).

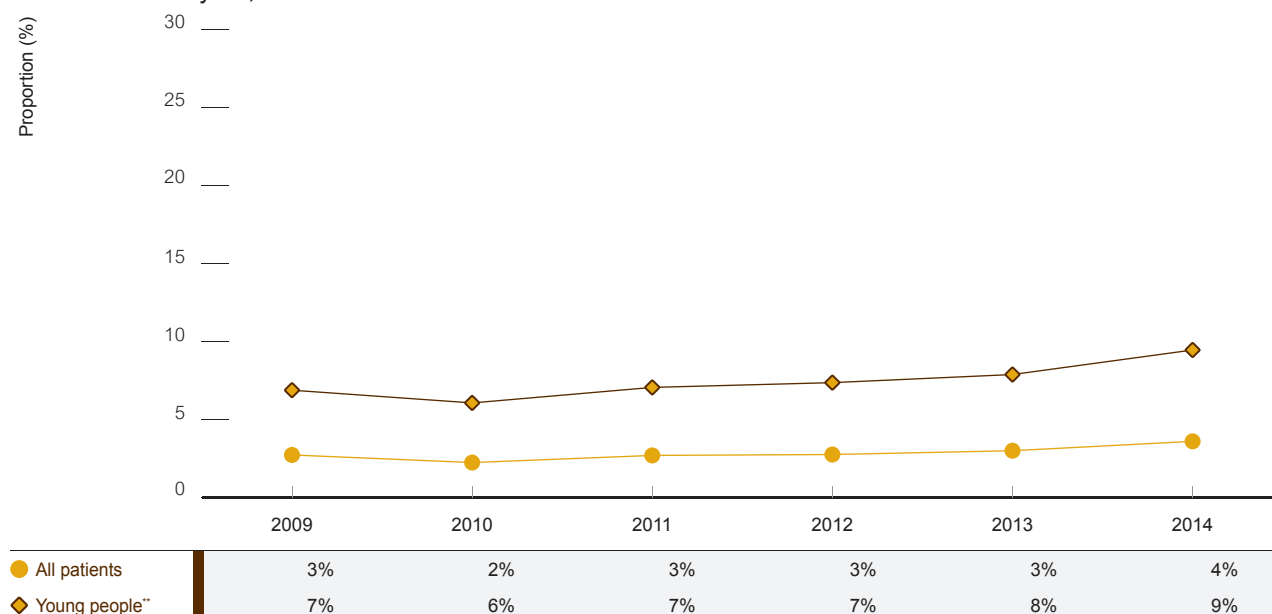
Figure 11 Proportion of unique GBM patients* tested for chlamydia at high caseload general practice clinics in NSW, overall and by HIV status and year, 2009-2014



* 'Unique' patients were only identified within each service

The following graph reports on chlamydia testing among patients attending general practice clinics in NSW without high caseloads of GBM. Overall, testing for chlamydia remained generally stable, while testing among young people increased 2% (29% relatively) from 2009 to 2014 ($p < 0.001$).

Figure 12 Proportion of unique patients* tested for chlamydia at general practice clinics in NSW, by year, 2009-2014



* 'Unique' patients were only identified within each service

** Patients aged 16-29 years old



Chlamydia

Gonorrhoea

Sexual Health Clinic Network

Gonorrhoea testing

The following section reports on gonorrhoea testing among patients attending sexual health clinics in NSW. National guidelines^{12,13} recommend gonorrhoea testing for different populations as follows:

Population group	Testing frequency
Aboriginal and Torres Strait Islanders	Regular/as needed
People who inject drugs	Regular/as needed
Female sex workers	Regular/as needed
Young people (16-29 years old)	As needed
GBM	Annually
HIV positive GBM	Annually
High risk GBM	Quarterly

From 2007 to 2014, the number of gonorrhoea testing episodes among GBM patients increased three-fold. During the same period there was a 68% increase in testing among young people, while testing episodes doubled among Aboriginal males and females, and increased 53% among female sex workers.

Figure 13 Total number of gonorrhoea test episodes* conducted at sexual health clinics in NSW, by priority population** and year, 2007-2014



* Any anatomical site

** Priority classifications are not mutually exclusive; categories other than GBM exclude GBM patients

***People who inject drugs

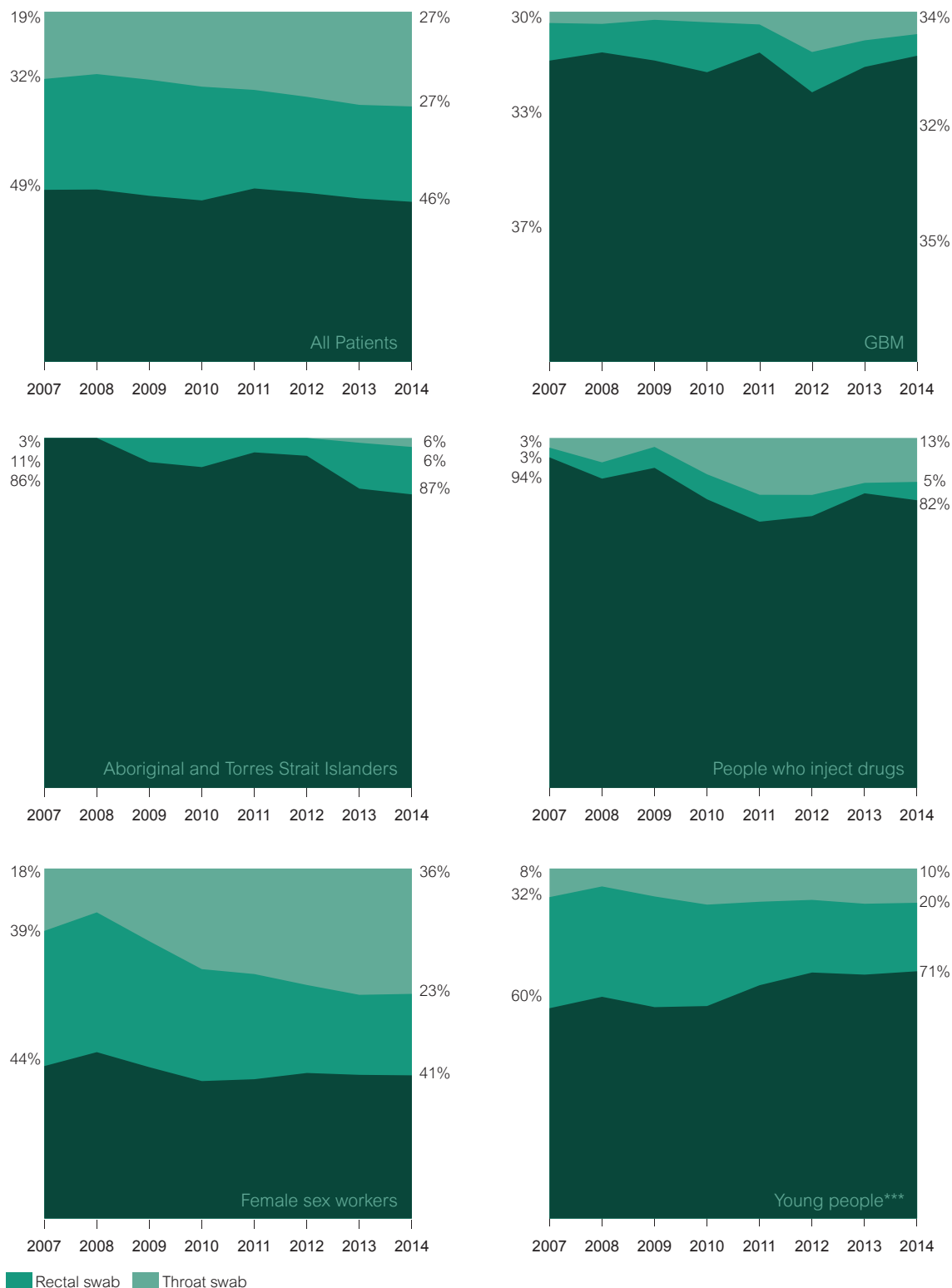
† Patients aged 16-29 years old

12 Australian Sexual Health Alliance. *Australian STI Management Guidelines for use in Primary Care*. 2014.

13 Templeton DJ, Read P, Varma R, Bourne C. Australian sexually transmissible infection and HIV testing guidelines for asymptomatic men who have sex with men 2014: a review of the evidence. *Sexual Health*. 2014;11(3):217-29.

Figure 14 reports on proportion of total tests for gonorrhoea by anatomical site, which – owing to duplex testing – was nearly identical to the proportional breakdowns for chlamydia. Overall, from 2007 to 2014 there was an increase in the collection of throat samples, rising 4% among GBM (13% relatively), 3% among Aboriginals (100% relatively), 10% among people who inject drugs (333% relatively), 18% among female sex workers (100% relatively), and 2% among young people (25% relatively, p 's<0.001).

Figure 14 Proportional breakdown of tests for gonorrhoea at sexual health clinics in NSW, by anatomical site*, overall, priority population** and year, 2007-2014



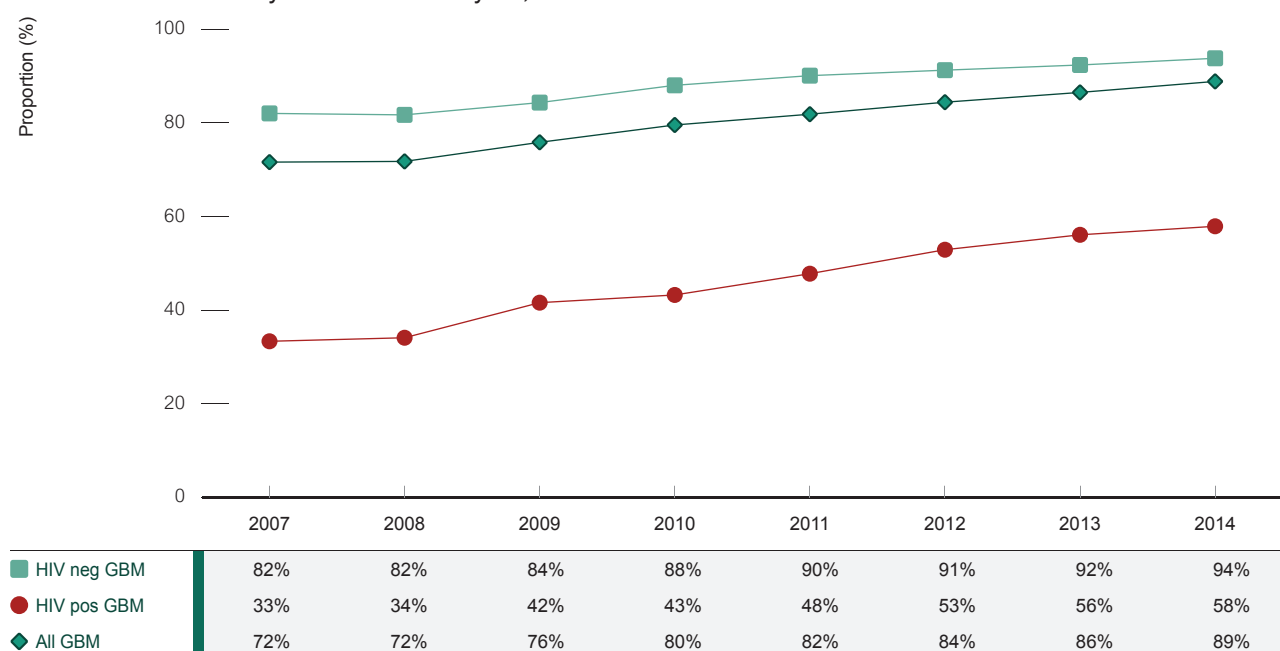
* Excludes tests for which site details were not available and tests of other sites

** Priority classifications are not mutually exclusive; categories other than GBM exclude GBM patients

***Patients aged 16-29 years old

Between 2007 and 2014, gonorrhoea testing uptake increased 12% among HIV negative GBM (15% relatively, $p<0.001$) and 25% among HIV positive men (76% relatively, $p<0.001$; Figure 15). While 58% of HIV positive GBM were tested for gonorrhoea in 2014 overall, there was variation by age; 79% of HIV positive GBM aged 16-30 years, 71% of men aged 30-39 years and 49% of those 40 years and older.

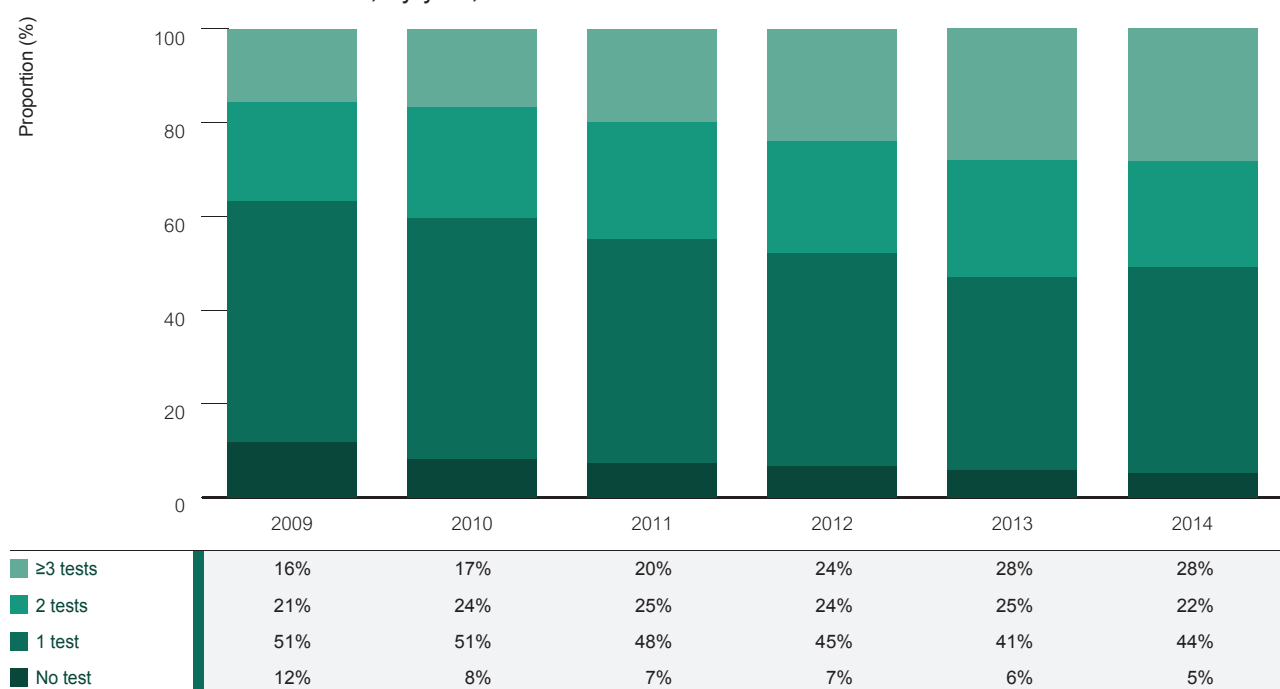
Figure 15 Proportion of unique GBM* tested for gonorrhoea at sexual health clinics in NSW, overall and by HIV status and year, 2007-2014



* 'Unique' patients were only identified within each service

The majority of high risk GBM (95% in 2014) were tested at least once annually for gonorrhoea, and although the proportion tested three or more times per year increased 12% from 2009 to 2014 (75% relatively) it remained below 30% ($p<0.001$).

Figure 16 Number of gonorrhoea tests annually among high risk* GBM patients at sexual health clinics in NSW, by year, 2009-2014**

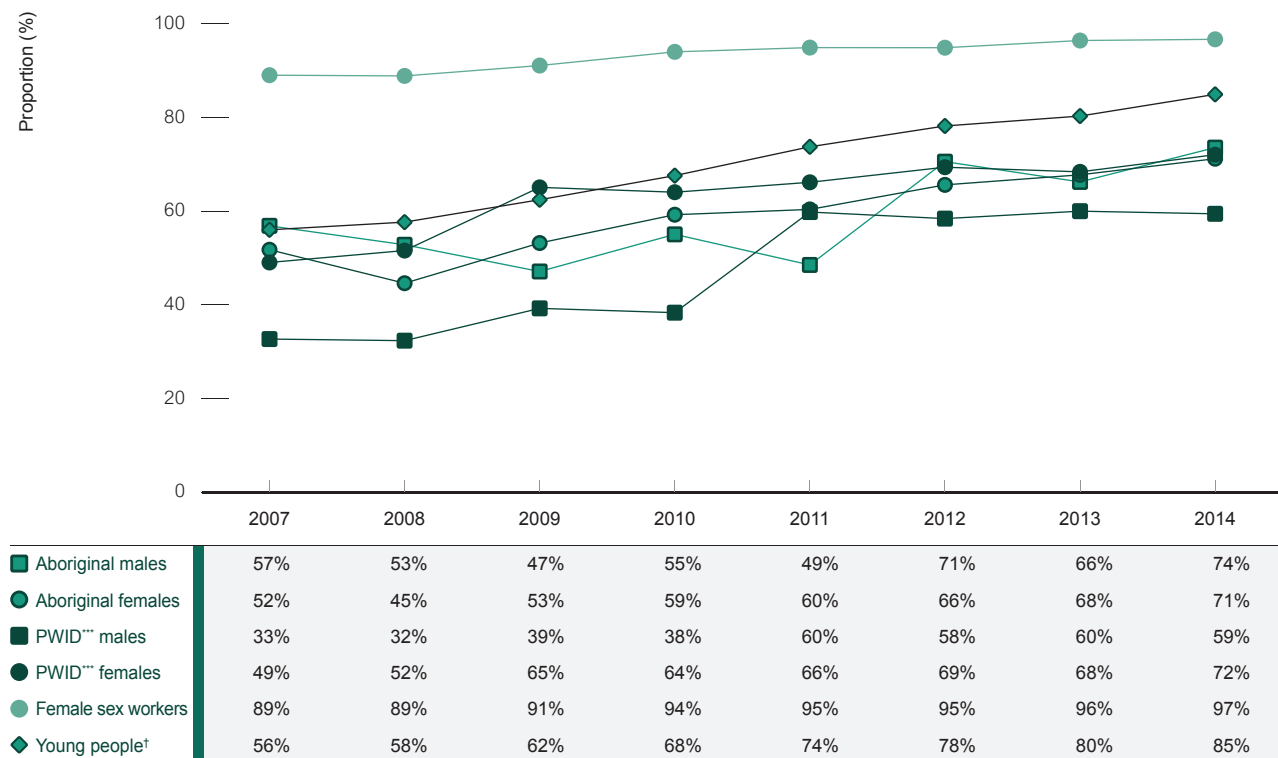


* 'High risk' men are those with >5 partners in the 3 months prior, or >20 partners in the 12 months prior, or a chlamydia, gonorrhoea or syphilis diagnosis in the 24 months prior

** Complete data on partner numbers only available from 2009 onward

As with chlamydia, gonorrhoea testing uptake was high among female sex workers (96% tested in 2014) and young people (85% tested in 2014). The greatest increase in testing uptake from 2007 to 2014 was among male injecting drug users (26% increase, 79% relative increase, $p<0.001$) and young people (29% increase, 52% relative increase, $p<0.001$). From 2007 to 2014, testing uptake also increased in female injecting drug users (23% increase, 47% relatively, $p<0.001$), Aboriginal males (17% increase, 30% relatively, $p<0.001$), Aboriginal females (52% increase, 37% relatively, $p<0.001$), and female sex workers (8% increase, 9% relative increase, $p<0.001$; Figure 17).

Figure 17 Proportion of attending unique patients* tested for gonorrhoea at sexual health clinics in NSW, by priority population** and year, 2007-2014



* 'Unique' patients were only identified within each service

** Excludes GBM; priority classifications are not mutually exclusive

***People who inject drugs

† Patients aged 16-29 years old

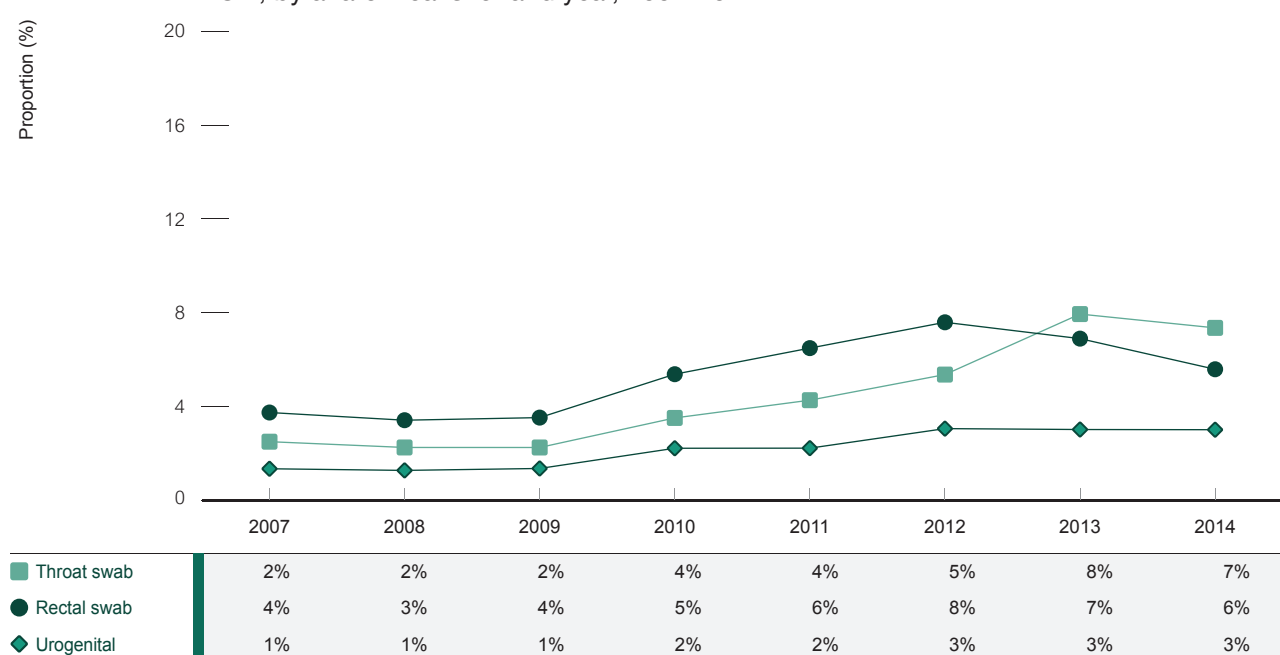
Gonorrhoea test yield and positivity

The following graphs report on test yield, which is the proportion of total tests with positive results, discounting multiple tests conducted in the same week.

Some laboratories changed testing techniques during this period from culture-based testing to nucleic acid amplification tests (NAAT). Given that NAATs are more sensitive than culture testing at detecting gonorrhoea, it is possible that the positivity trends depicted in these graphs are upwardly biased.

From 2007 to 2014, gonorrhoea test yield increased by 250% relatively for throat swabs, 50% for rectal swabs, and 200% for urogenital samples (p 's<0.001; Figure 18). In 2014, 65% of gonorrhoea diagnoses overall were in asymptomatic patients, which was true for 70% of diagnoses among HIV negative GBM and 67% among HIV positive GBM (Table 2). Although there was a trend identified in the presentation of symptomatic patients at sexual health clinics, it was non-linear with the proportion of diagnoses that were asymptomatic falling in 2009-2011 before climbing again in 2012-2014. Therefore, while symptomatic presentations may have contributed to changes over time, it does not seem as though the changes in positivity observed for gonorrhoea infection are the result of an increasing proportion of symptomatic presentations.

Figure 18 Proportion of total tests for gonorrhoea with a positive result at sexual health clinics in NSW, by anatomical site* and year, 2007-2014



* Excludes tests for which site details were not available

Table 2 Proportion of gonorrhoea diagnoses at sexual health clinics in NSW that were asymptomatic*, overall and by priority population** and year, 2007-2014

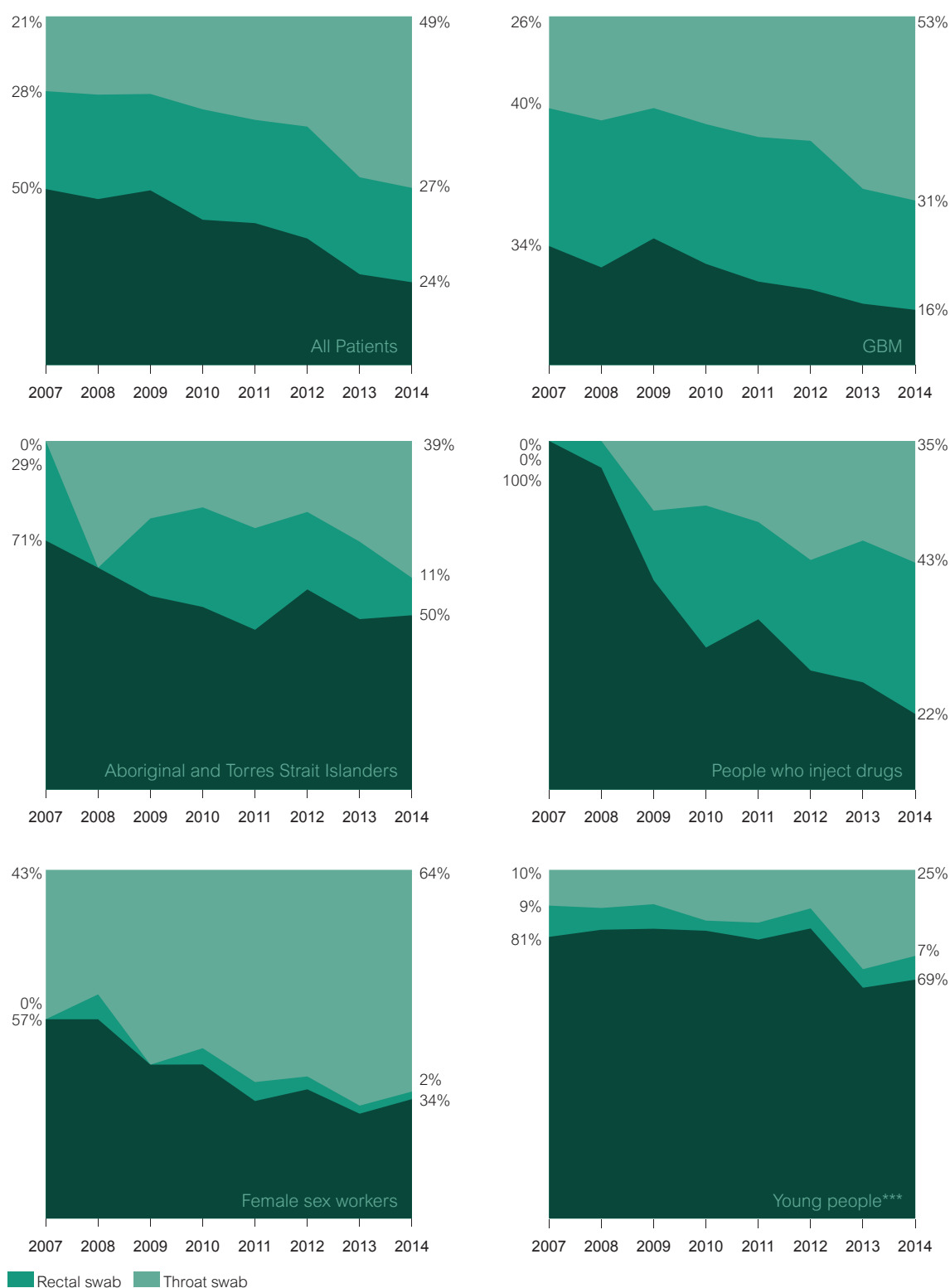
	2007	2008	2009	2010	2011	2012	Asymptomatic		
							2013	2014	Trend
All patients	60%	60%	46%	44%	51%	53%	62%	65%	$p<0.001$
HIV negative GBM	69%	72%	48%	49%	55%	58%	68%	70%	$p<0.001$
HIV positive GBM	54%	51%	66%	45%	55%	60%	67%	67%	$p<0.001$

* Excludes patients for whom symptom details were not available

** Because of the small number of diagnoses, stratifications by priority populations other than GBM have been excluded

By anatomical site, 24% of all gonorrhoea diagnoses at sexual health clinics in 2014 were urogenital (a 26% decrease from 50% in 2007, $p < 0.001$). Among female sex workers, 64% of all gonorrhoea diagnoses in 2014 were pharyngeal up from 43% in 2007 (21% increase, 33% relative increase, $p < 0.001$). And among GBM, 31% of diagnoses in 2014 were anorectal, 53% were pharyngeal, and 16% were urogenital.

Figure 19 Proportional breakdown of gonorrhoea diagnoses at sexual health clinics in NSW, by anatomical site*, overall, priority population** and year, 2007-2014



* Excludes tests for which site details were not available and tests of other sites

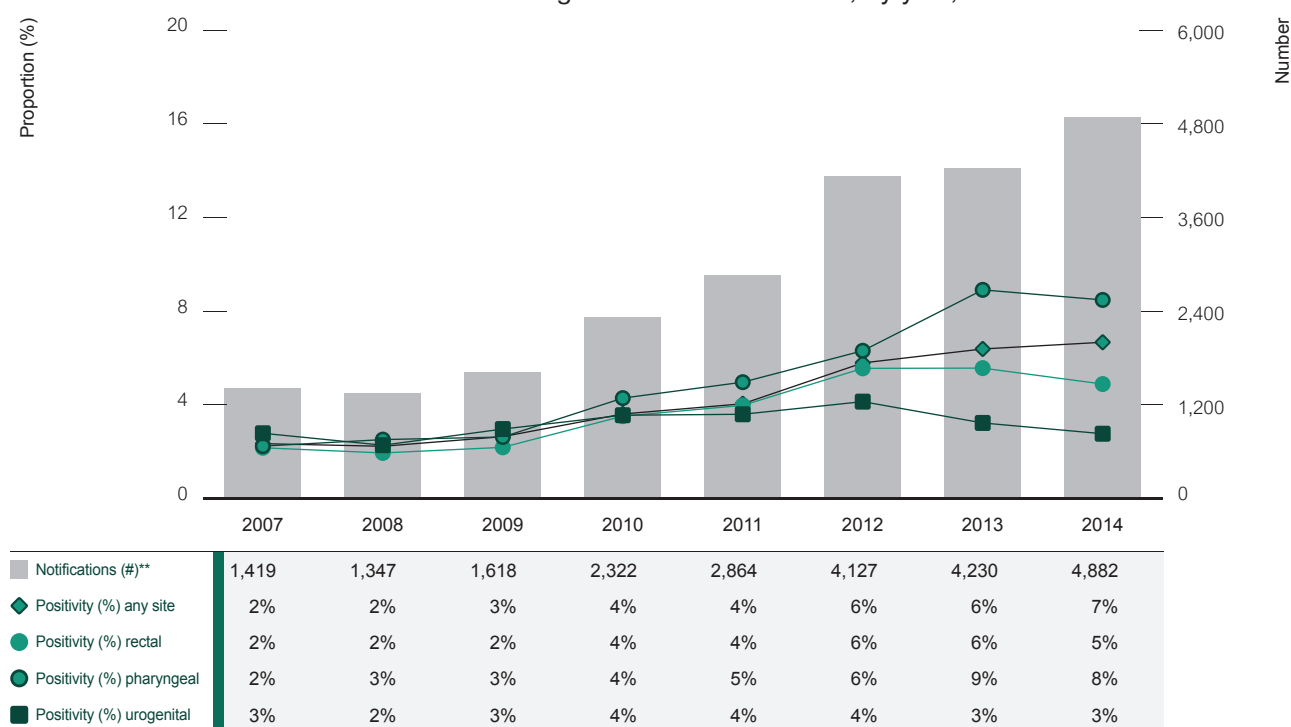
** Priority classifications are not mutually exclusive; categories other than GBM exclude GBM patients

***Patients aged 16-29 years old

The following graphs report on unique gonorrhoea positivity, which is the annual proportion of individual (unique) patients tested for gonorrhoea with a positive result. This method of calculating positivity discounts multiple tests and/or positives in each year period.

In NSW, gonorrhoea notifications increased by 244% from 2007 to 2014, parallel to the 250% relative increase in gonorrhoea positivity at sexual health clinics ($p < 0.001$; Figure 20). This association suggests that testing for gonorrhoea at sexual health clinics may reflect infections within the broader community. The greatest increase in positivity was for pharyngeal gonorrhoea, which increased 6% from 2007 to 2014 (300% relative increase, $p < 0.001$). Anorectal gonorrhoea also increased during this period (3% increase, 150% relative increase, $p < 0.001$) while positivity for urogenital gonorrhoea remained stable ($p = 0.1$).

Figure 20 Proportion of unique patients* tested for gonorrhoea with a positive result at sexual health clinics in NSW and statewide gonorrhoea notifications, by year, 2007-2014

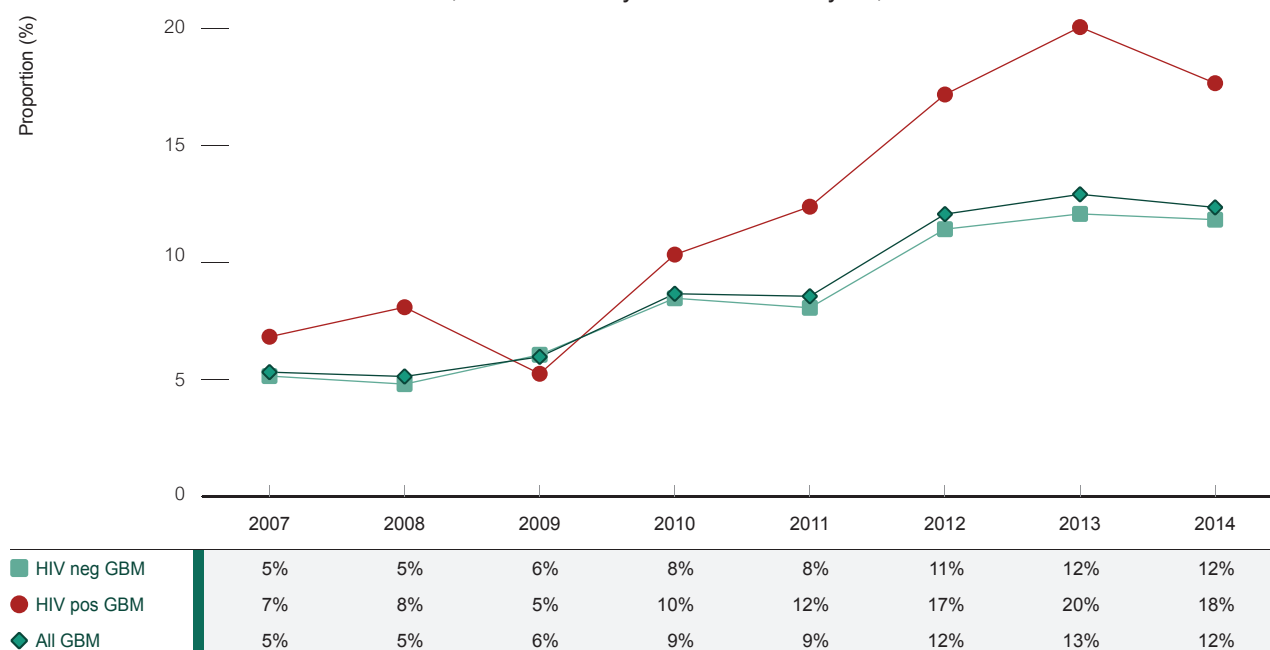


* 'Unique' patients were only identified within each service

** The Kirby Institute. HIV, viral hepatitis and sexually transmissible infections in Australia. 2015. Sydney, NSW: The Kirby Institute.

Among GBM, gonorrhoea positivity increased, relatively, by 140% between 2007 and 2014: 140% relative increase among HIV negative men and 157% among HIV positive men (p 's<0.001; Figure 21).

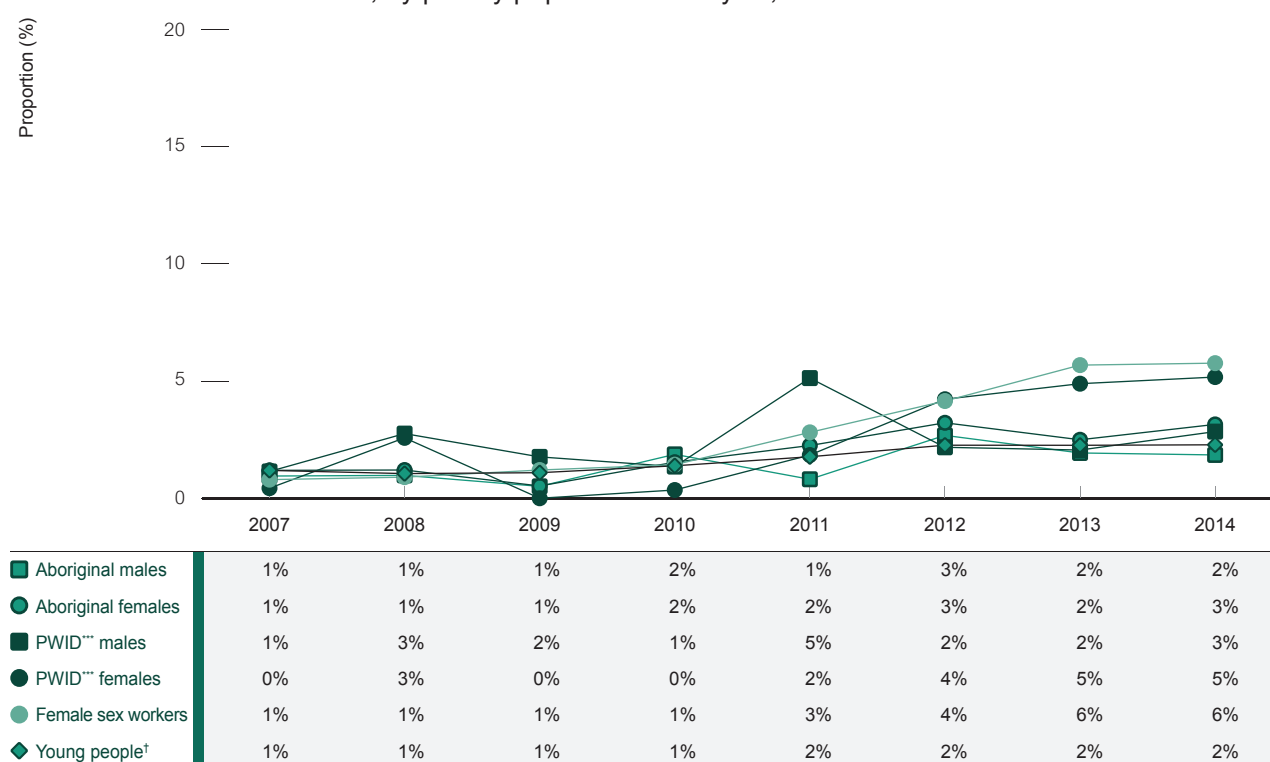
Figure 21 Proportion of unique GBM patients* tested for gonorrhoea with a positive result at sexual health clinics in NSW, overall and by HIV status and year, 2007-2014



* 'Unique' patients were only identified within each service

While significantly lower than positivity among GBM, positivity among other populations was highest generally among female sex workers by 2014. Positivity tripled among Aboriginal females ($p=0.001$), gonorrhoea infections went from zero in 2007 to 12 detected in 2014 among female injecting drug users ($p<0.001$), and positivity among female sex workers increased 1% to 6% ($p<0.001$). It is worth noting that among female sex workers, 61% of gonorrhoea diagnoses in 2014 were pharyngeal, up from 40% in 2007.

Figure 22 Proportion of unique patients* tested for gonorrhoea with a positive result at sexual health clinics in NSW, by priority population** and year, 2007-2014



* 'Unique' patients were only identified within each service

** Excludes GBM; priority classifications are not mutually exclusive

***People who inject drugs

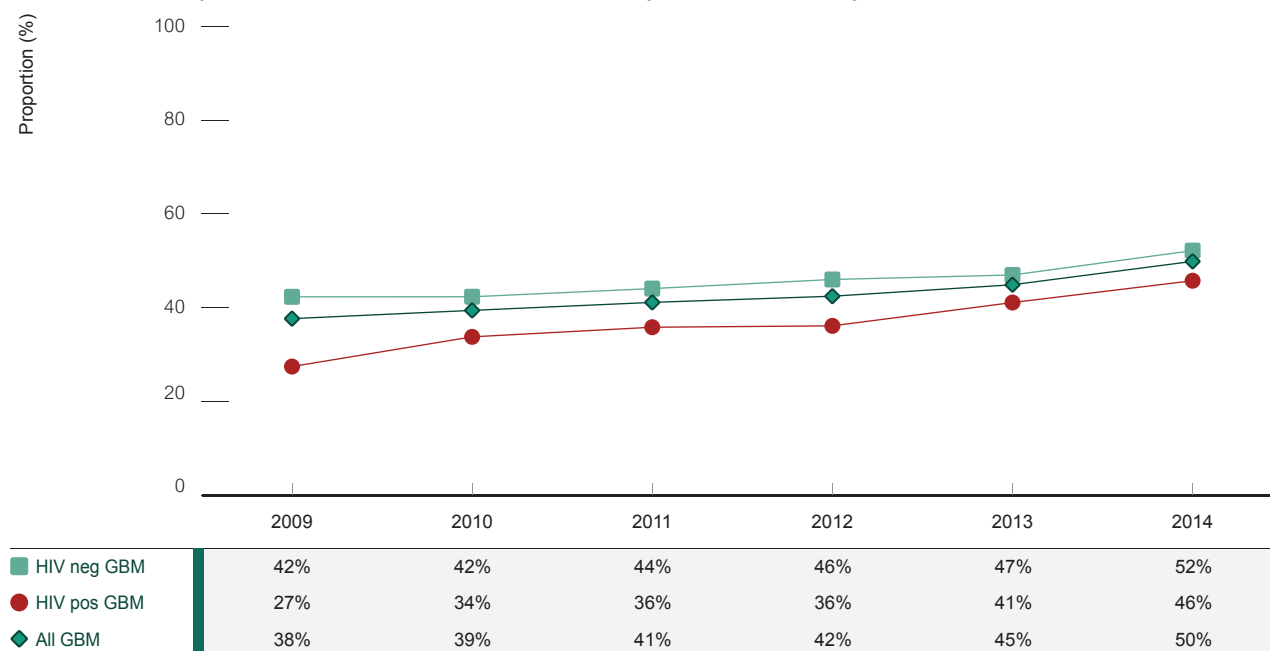
† Patients aged 16-29 years old

Primary Care Clinic Network

Gonorrhoea testing

The following graph reports on gonorrhoea testing among individual GBM attending general practice clinics in NSW with high caseloads of GBM patients. From 2009 to 2014, testing for gonorrhoea among HIV negative GBM increased 10% (24% relatively) and 19% (70% relatively) among HIV positive men ($p < 0.001$).

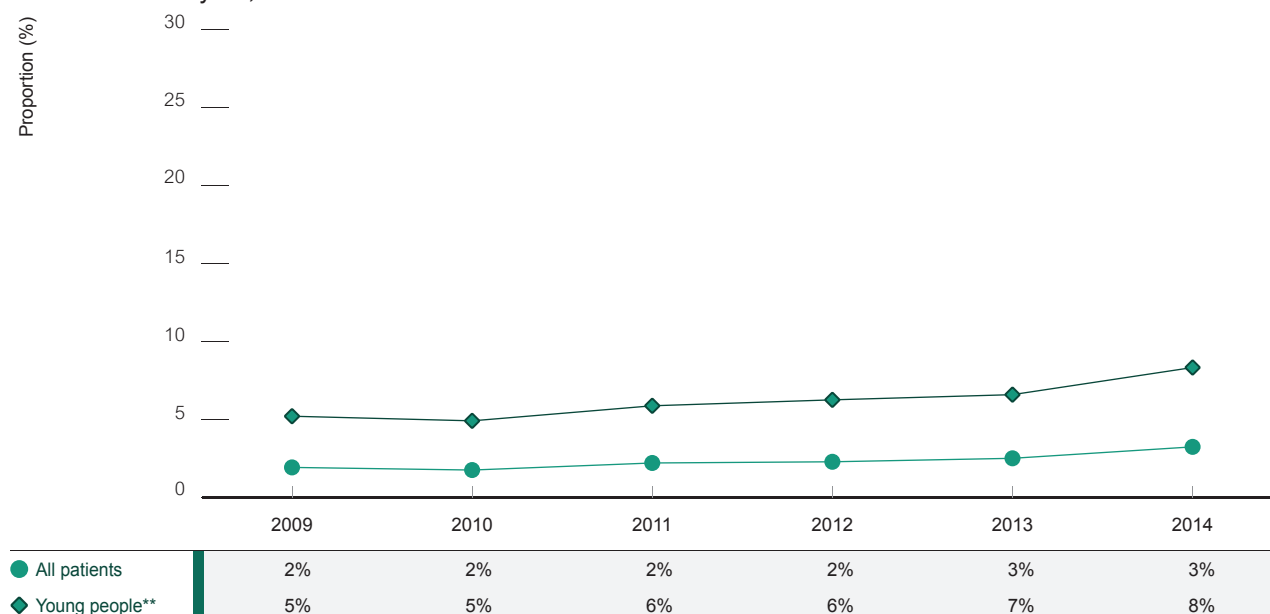
Figure 23 Proportion of unique GBM patients* tested for gonorrhoea at high caseload general practice clinics in NSW, overall and by HIV status and year, 2009-2014



* 'Unique' patients were only identified within each service

Figure 24 reports on gonorrhoea testing among patients attending other general practice clinics in NSW. From 2009 to 2014, gonorrhoea testing among young people increased 3% (60% relatively, $p < 0.001$) while remaining stable among the general clinic population.

Figure 24 Proportion of unique patients* tested for gonorrhoea at general practice clinics in NSW, by year, 2009-2014



* 'Unique' patients were only identified within each service

** Patients aged 16-29 years old



Gonorrhoea

Infectious syphilis

Sexual Health Clinic Network

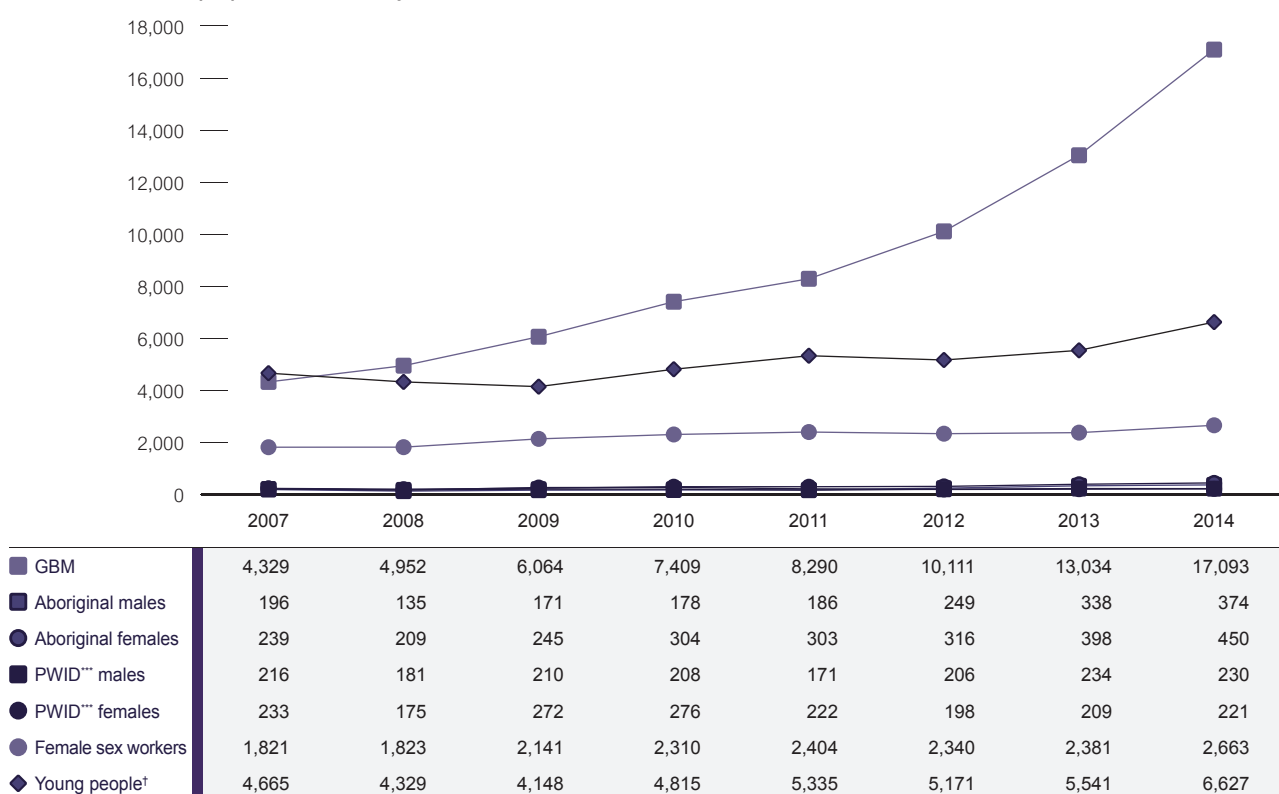
Syphilis testing

The following section reports on syphilis testing among patients attending sexual health clinics in NSW. Clinical guidelines^{14,15} recommend the following testing frequency for at-risk groups:

Population group	Testing frequency
Aboriginal and Torres Strait Islanders	Regular/as needed
People who inject drugs	Regular/as needed
Female sex workers	Regular/as needed
Young people (16-29 years old)	As needed
GBM	Annually
HIV positive GBM	Quarterly
High risk GBM	Quarterly

From 2007, the total number of syphilis tests conducted among GBM increased by 295% to 2014, by 91% among Aboriginal males, 88% among Aboriginal females, and 46% among female sex workers.

Figure 25 Total number of syphilis tests conducted in sexual health clinics in NSW, by priority population* and year, 2007-2014



* Priority classifications are not mutually exclusive; categories other than GBM exclude GBM patients

** People who inject drugs

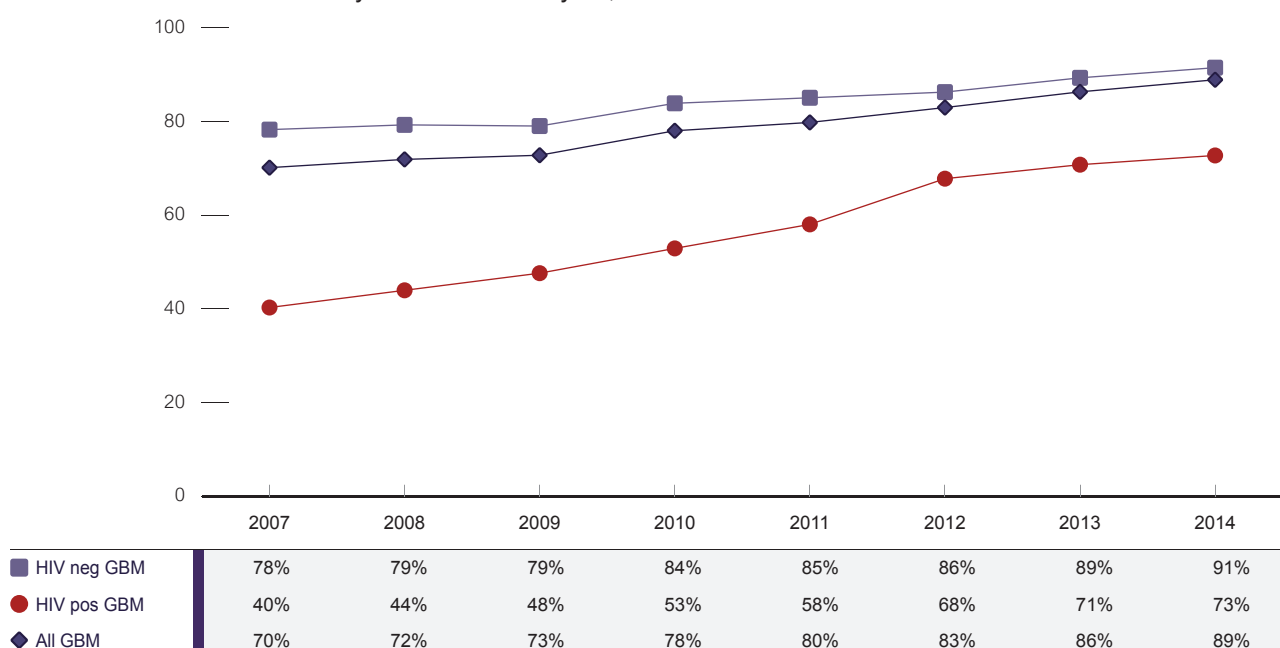
***Patients aged 16-29 years old

14 Australian Sexual Health Alliance. *Australian STI Management Guidelines for use in Primary Care*. 2014.

15 Templeton DJ, Read P, Varma R, Bourne C. Australian sexually transmissible infection and HIV testing guidelines for asymptomatic men who have sex with men 2014: a review of the evidence. *Sexual Health*. 2014;11(3):217-29.

The following graphs report on the proportion of patients tested for syphilis in a year. Testing for syphilis increased 13% (17% relatively) from 2007 to 2014 among HIV negative GBM ($p<0.001$) and 33% among HIV positive GBM (83% relatively, $p<0.001$).

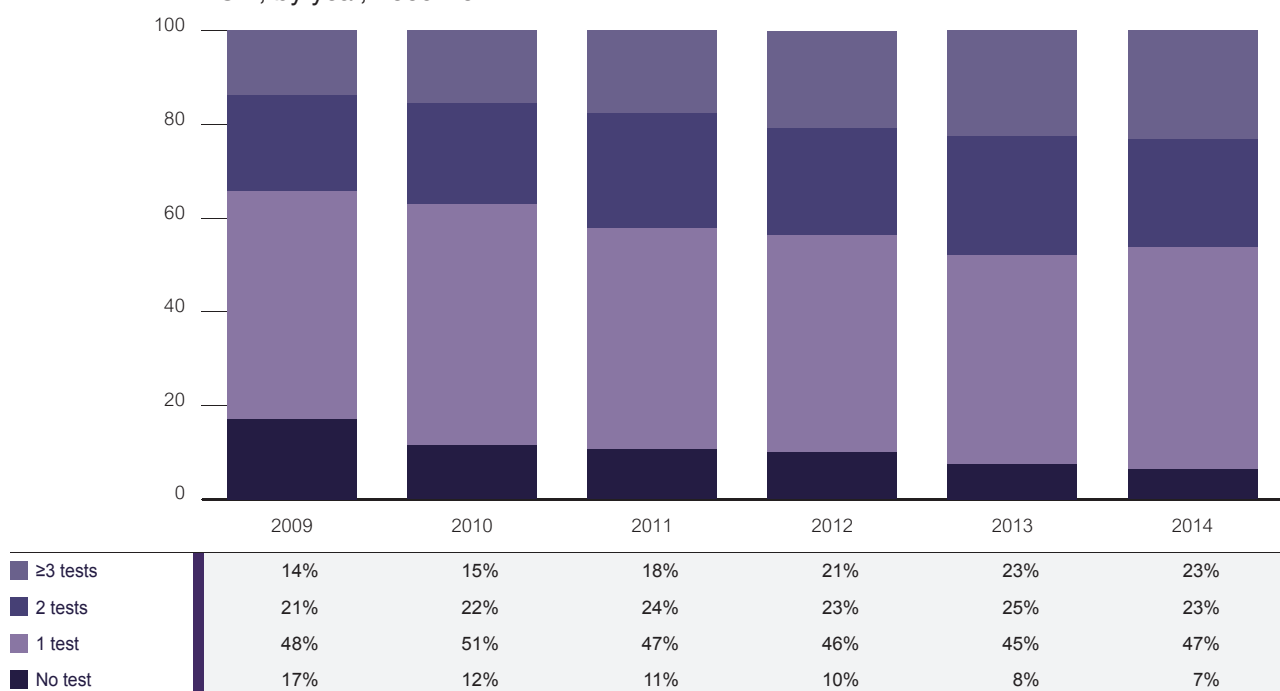
Figure 26 Proportion of unique GBM patients* tested for syphilis at sexual health clinics in NSW, overall and by HIV status and year, 2007-2014



* 'Unique' patients were only identified within each service

Annually, the proportion of high risk GBM tested three or more times increased from 14% in 2009 to 23% in 2014 (9% increase, 64% relative increase, $p<0.001$) while the proportion of men untested for syphilis fell from 17% to 7% in the same period (10% decrease, 59% relative decrease, $p<0.001$).

Figure 27 Number of syphilis tests annually among high risk* GBM patients at sexual health clinics in NSW, by year, 2009-2014**

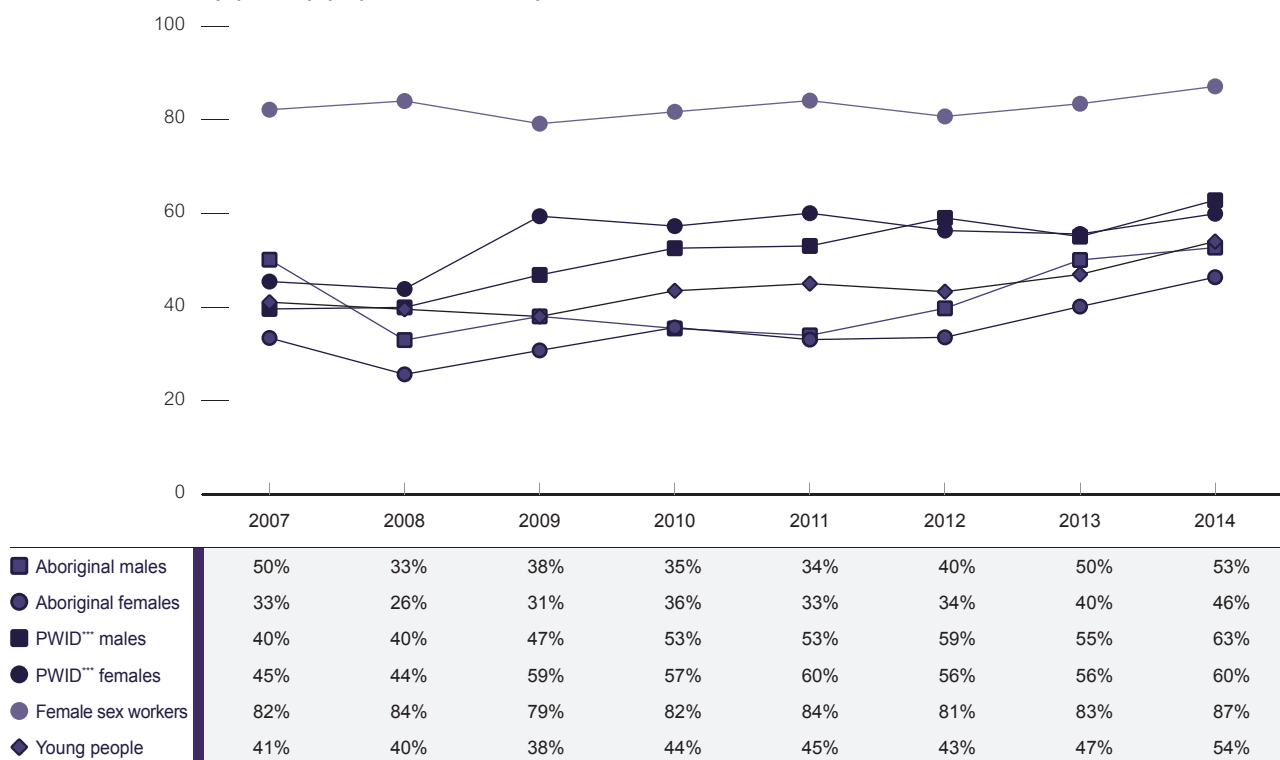


* 'High risk' men are those with >5 partners in the 3 months prior, or >20 partners in the 12 months prior, or a chlamydia, gonorrhoea or syphilis diagnosis in the 24 months prior

** Complete data on partner numbers only available from 2009 onward

Syphilis testing uptake increased among other priority populations as well, rising 23% from 2007 to 2014 among male injecting drug users (58% relatively, $p<0.001$), 13% among Aboriginal females (39% relatively, $p<0.001$), 15% among female injecting drug users (33% relatively, $p<0.001$), and 13% among young people (32% relatively, $p<0.001$). Testing among female sex workers was comparatively high and stable over time.

Figure 28 Proportion of attending unique patients* tested for syphilis at sexual health clinics in NSW, by priority population** and year, 2007-2014



* 'Unique' patients were only identified within each service

** Excludes GBM; priority classifications are not mutually exclusive

***People who inject drugs

† Patients aged 16-29 years old

Syphilis testing among GBM with HIV

Guidelines for the sexual health of GBM with HIV recommend quarterly syphilis testing as a standard part of HIV management¹⁶.

The proportion of HIV positive GBM tested three or more times for syphilis increased 17% (283% relatively) from 2007 to 2014, from 6% to 23% (283% relatively, $p<0.001$; Figure 29). The proportion of testing episodes that included both syphilis and viral load testing also increased, rising from 22% in 2007 to 56% in 2014 ($p<0.001$; Figure 30).

Figure 29 Number of annual syphilis tests among HIV positive GBM patients at sexual health clinics in NSW, by year, 2007-2014

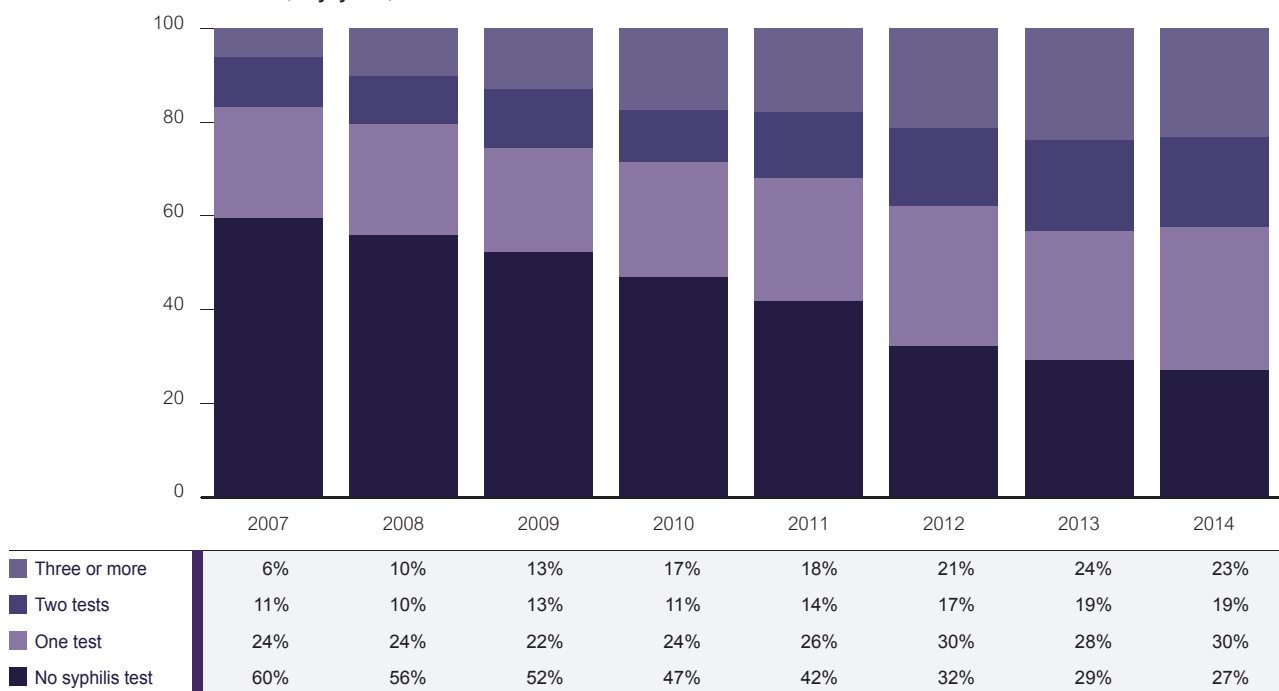
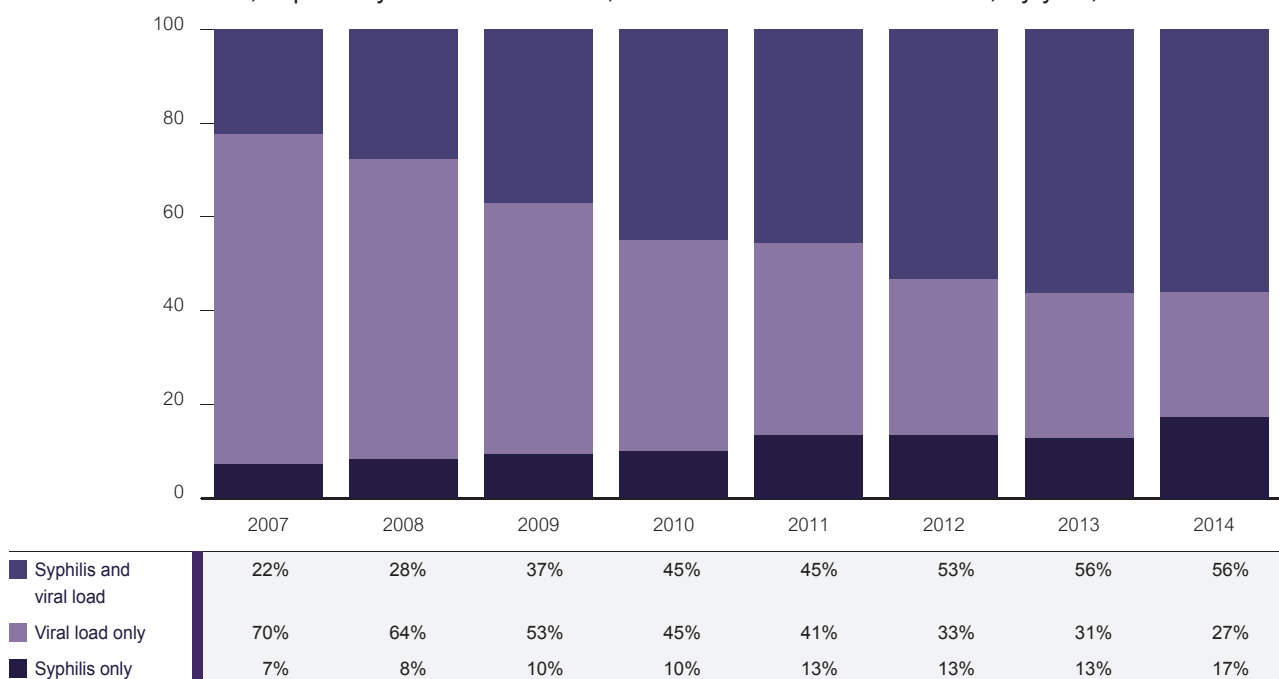


Figure 30 Proportion testing events among HIV positive GBM that included a test for syphilis or viral load, separately or in combination, at sexual health clinics in NSW, by year, 2007-2014



16 Templeton DJ, Read P, Varma R, Bourne C. Australian sexually transmissible infection and HIV testing guidelines for asymptomatic men who have sex with men 2014: a review of the evidence. *Sexual Health*. 2014;11(3):217-29.

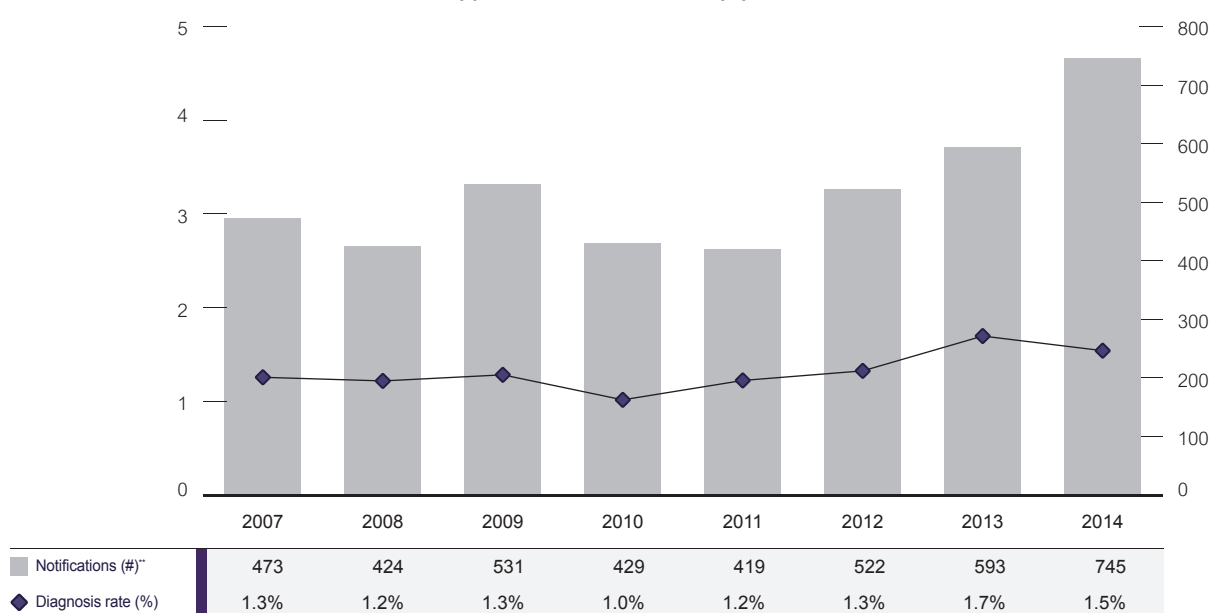
Syphilis test yield and diagnosis rate

Infectious syphilis was categorised using clinical diagnoses for either primary, secondary or early latent (less than two years) syphilis. The syphilis diagnosis rate was calculated as the proportion of individuals tested each year with a diagnosis for infectious syphilis.

The syphilis diagnosis rate at sexual health clinics remained generally stable from 2007 to 2014 compared to notifications in NSW, which increased by 58% during that period ($p < 0.001$; Figure 31). By priority population, however, increases among HIV positive GBM in particular suggest that notifications may be driven largely by infections among these men (Figure 32).

In 2014, 61% of syphilis diagnoses were the result of asymptomatic testing, which was similar among both HIV negative and positive patients (Table 3). Annually, 45-69% of infectious syphilis diagnoses were the result of asymptomatic testing with no trend identified.

Figure 31 Proportion of unique patients* tested for syphilis with a diagnosis at sexual health clinics in NSW and statewide syphilis notifications, by year, 2007-2014



* 'Unique' patients were only identified within each service

** The Kirby Institute. HIV, viral hepatitis and sexually transmissible infections in Australia. 2015. Sydney, NSW: The Kirby Institute.

Table 3 Proportion of infectious syphilis diagnoses at sexual health clinics in NSW that were asymptomatic*, overall and by priority population** and year, 2007-2014

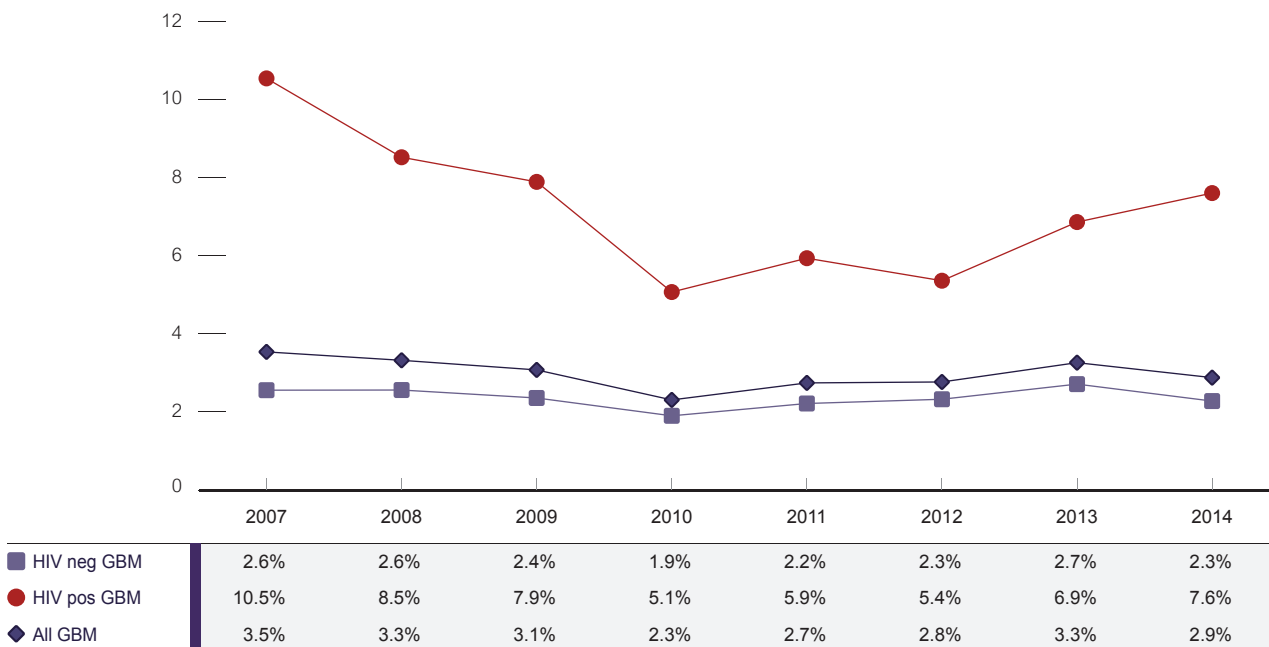
	Asymptomatic (%)								Trend
	2007	2008	2009	2010	2011	2012	2013	2014	
All patients	64%	69%	45%	50%	56%	45%	53%	61%	p=0.1
HIV negative GBM	66%	74%	44%	51%	53%	44%	54%	61%	p=0.2
HIV positive GBM	47%	67%	51%	43%	60%	47%	56%	63%	p=0.3

* Excludes patients for whom symptom details were not available

** Because of the small number of diagnoses, stratifications of priority populations other than GBM have been excluded

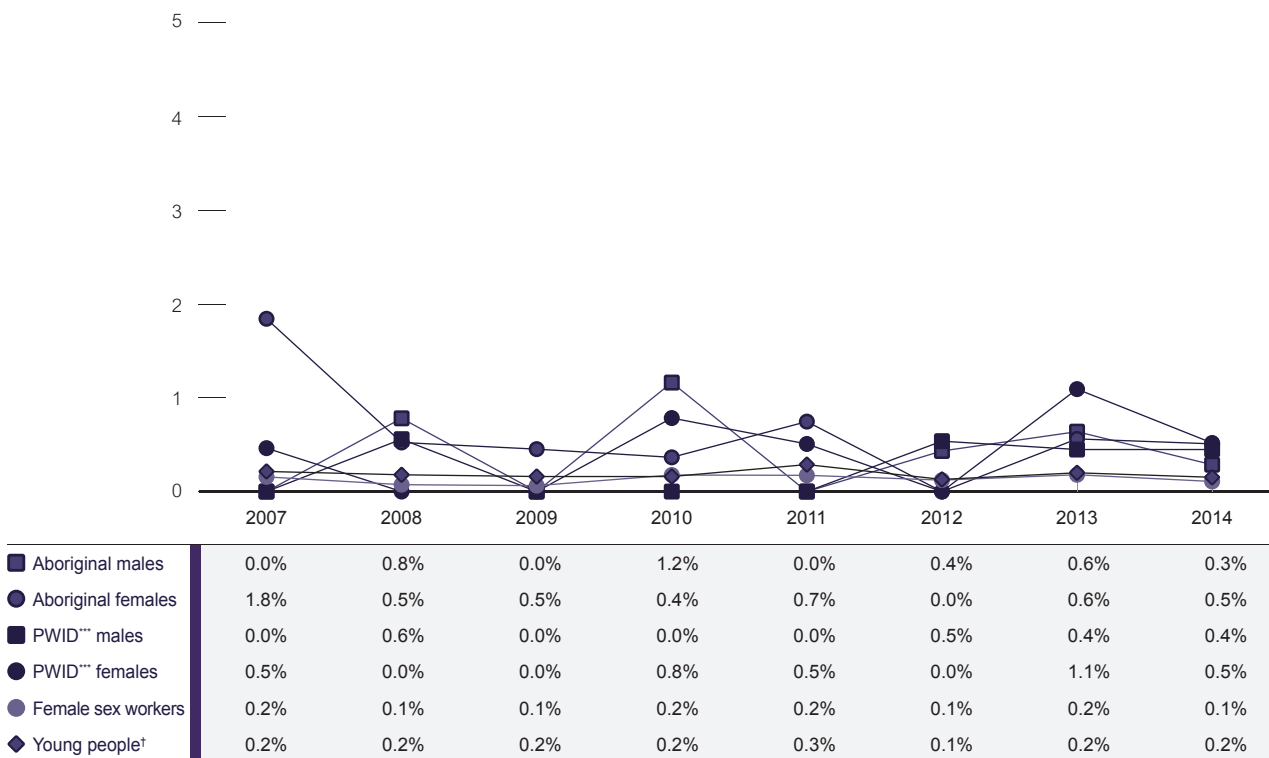
From 2007 to 2014, the rate of syphilis diagnoses remained stable among HIV negative GBM, fluctuating between 1.9 and 2.7% each year. Among HIV positive men, however, there was a significant decline in the syphilis diagnosis rate from 2007 to 2010 (5.4% decrease, 51% relative decrease, $p=0.002$) followed by a 2.2% increase in the last three years, from 2012 to 2014 (41% relative increase, $p=0.02$; Figure 32). There were very few diagnoses among priority populations other than GBM (Figure 33).

Figure 32 Proportion of unique GBM patients* tested for syphilis with a diagnosis for infectious syphilis at sexual health clinics in NSW, overall and by HIV status and year, 2007-2014



* 'Unique' patients were only identified within each service

Figure 33 Proportion of unique patients* tested for syphilis with a diagnosis for infectious syphilis at sexual health clinics in NSW, by priority population** and year, 2007-2014



* 'Unique' patients were only identified within each service

** Excludes GBM; priority classifications are not mutually exclusive

***People who inject drugs

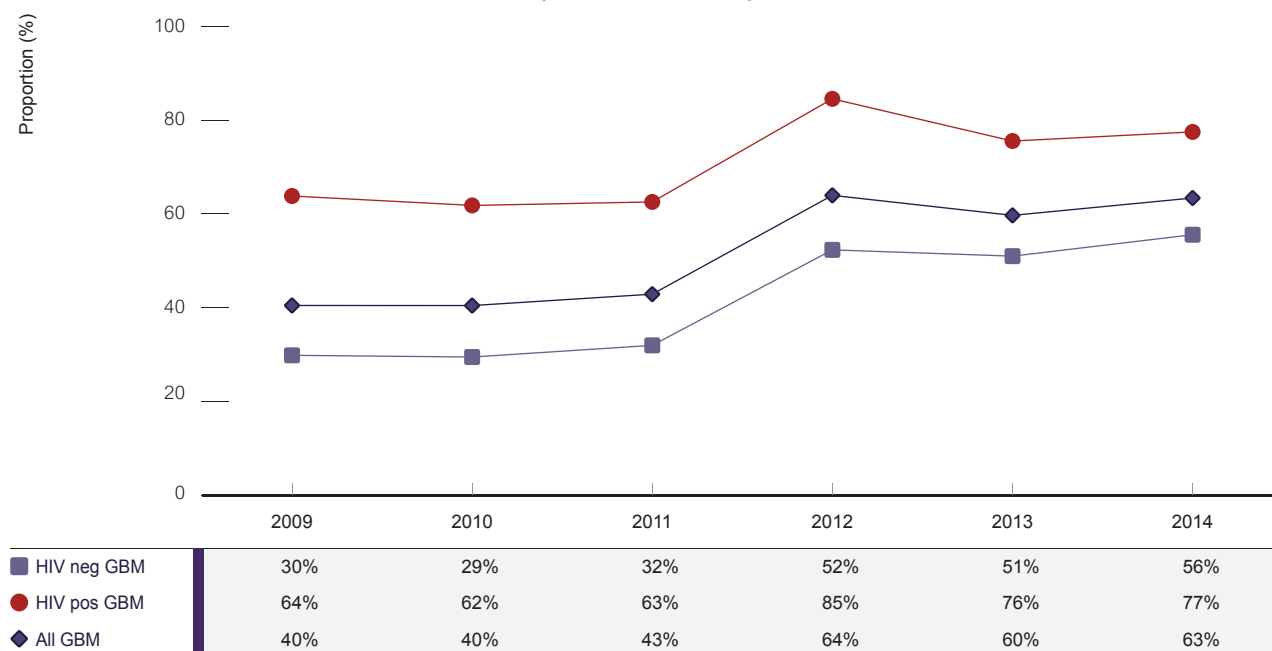
† Patients aged 16-29 years old

Primary Care Clinic Network

Syphilis testing

The following graph reports on syphilis testing among individual GBM attending high caseload general practice clinics in NSW. From 2009 to 2014, testing for syphilis increased 26% (87% relatively) among HIV negative GBM and 13% (20% relatively) among HIV positive GBM ($p < 0.001$).

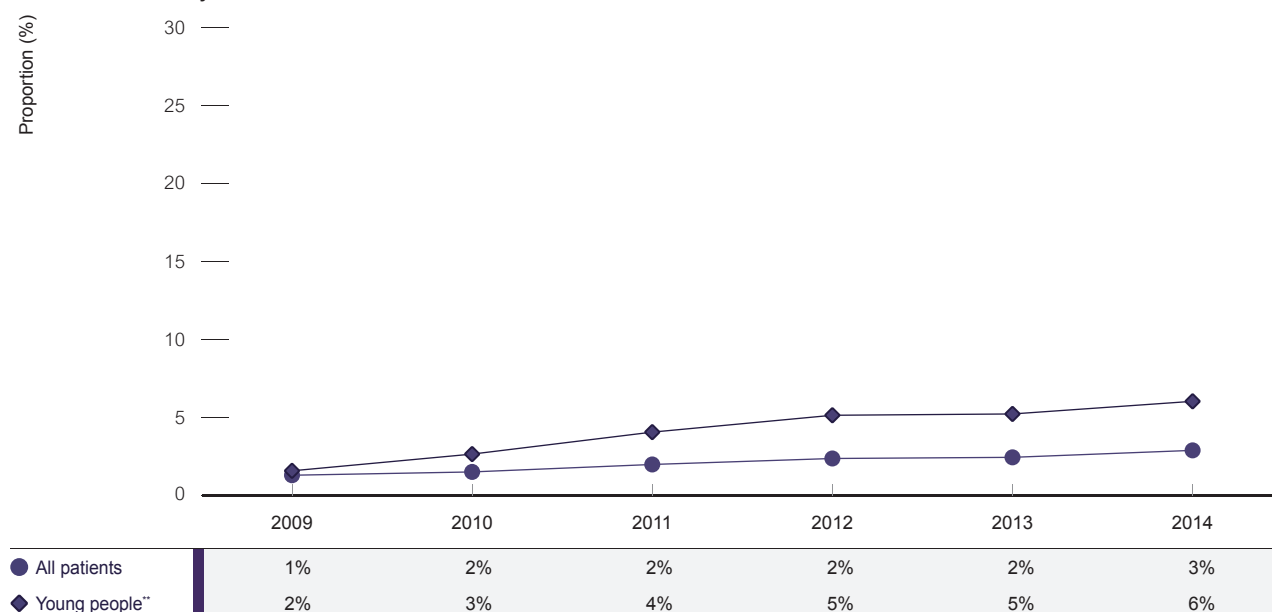
Figure 34 Proportion of unique GBM patients* tested for syphilis at high caseload general practice clinics in NSW, overall and by HIV status and year, 2009-2014



* 'Unique' patients were only identified within each service

Figure 35 reports on syphilis testing among patients attending other general practice clinics in NSW. Although syphilis testing was generally uncommon in these services, it tripled from 2009 to 2014 among young people and also the general clinic population ($p < 0.001$).

Figure 35 Proportion of unique patients* tested for syphilis at general practice clinics in NSW, by year, 2009-2014



* 'Unique' patients were only identified within each service

** Patients aged 16-29 years old

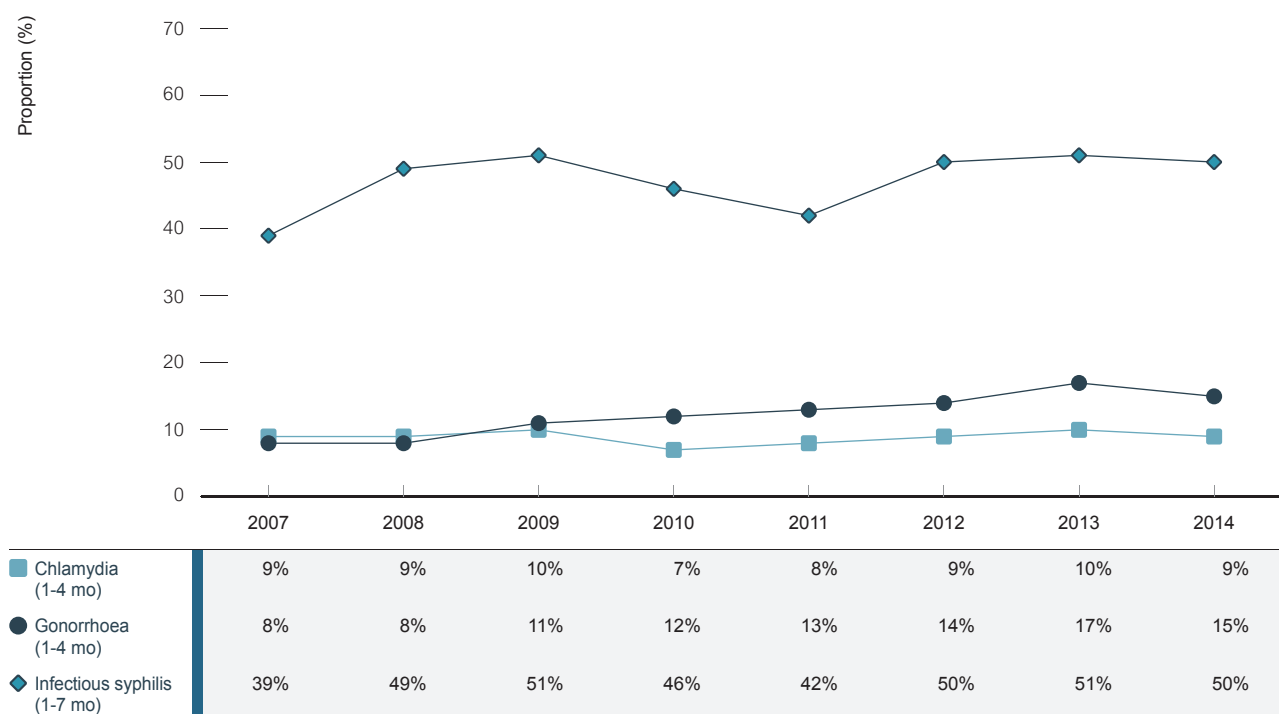
Re-testing following a STI diagnosis

The following section reports on re-testing at the same clinic following a STI diagnosis at sexual health clinics in NSW. Clinical guidelines^{17,18} recommend STI re-testing as follows:

Diagnosis	Re-test timeframe
Chlamydia	3 months
Gonorrhoea	3 months
Infectious syphilis	6 months

From 2007 to 2013, re-testing within 1-4 months of a chlamydia diagnosis was generally stable. Following a gonorrhoea diagnosis, the proportion of patients re-tested within 1-4 months increased 9% from 2007 to 2013 (113% relative increase, $p < 0.001$). Syphilis re-testing was highest by far, with 51% of patients diagnosed with infectious syphilis returning within 1-7 months for a re-test and no trend over time.

Figure 36 Proportion of patients re-tested* within 1-4 months of a diagnosis for chlamydia or gonorrhoea and 1-7 months of a diagnosis for infectious syphilis, by infection and year, 2007-2013**



* Does not include patients who were re-tested at another service

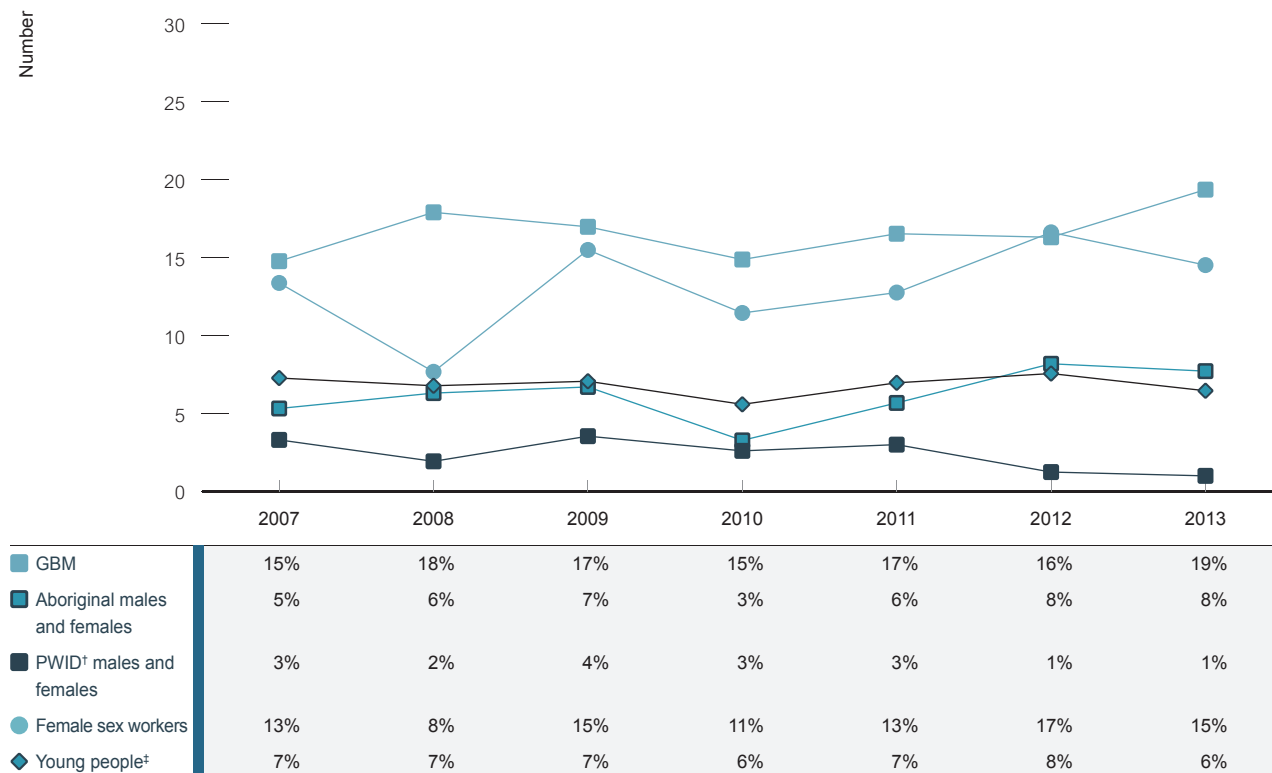
** Given the timeframe, data from 2014 are excluded from this analysis

17 Templeton DJ, Read P, Varma R, Bourne C. Australian sexually transmissible infection and HIV testing guidelines for asymptomatic men who have sex with men 2014: a review of the evidence. *Sexual Health*. 2014;11(3):217-29.

18 Australian Sexual Health Alliance. *Australian STI Management Guidelines for use in Primary Care*. 2014.

By priority population, re-testing following an STI diagnosis was highest overall among GBM and lowest among patients who reported injecting drug use. There were no trends in re-testing rates across population groups.

Figure 37 Proportion of patients re-tested* following a diagnosis for chlamydia, gonorrhoea or syphilis, by priority population** and year, 2007-2013***



* Does not include patients who were re-tested at another service; 1-4 months re-testing for chlamydia/gonorrhoea, 1-7 months for syphilis

** Priority classifications are not mutually exclusive; categories other than GBM exclude GBM patients

*** Given the timeframe, data from 2014 are excluded from this analysis

† People who inject drugs

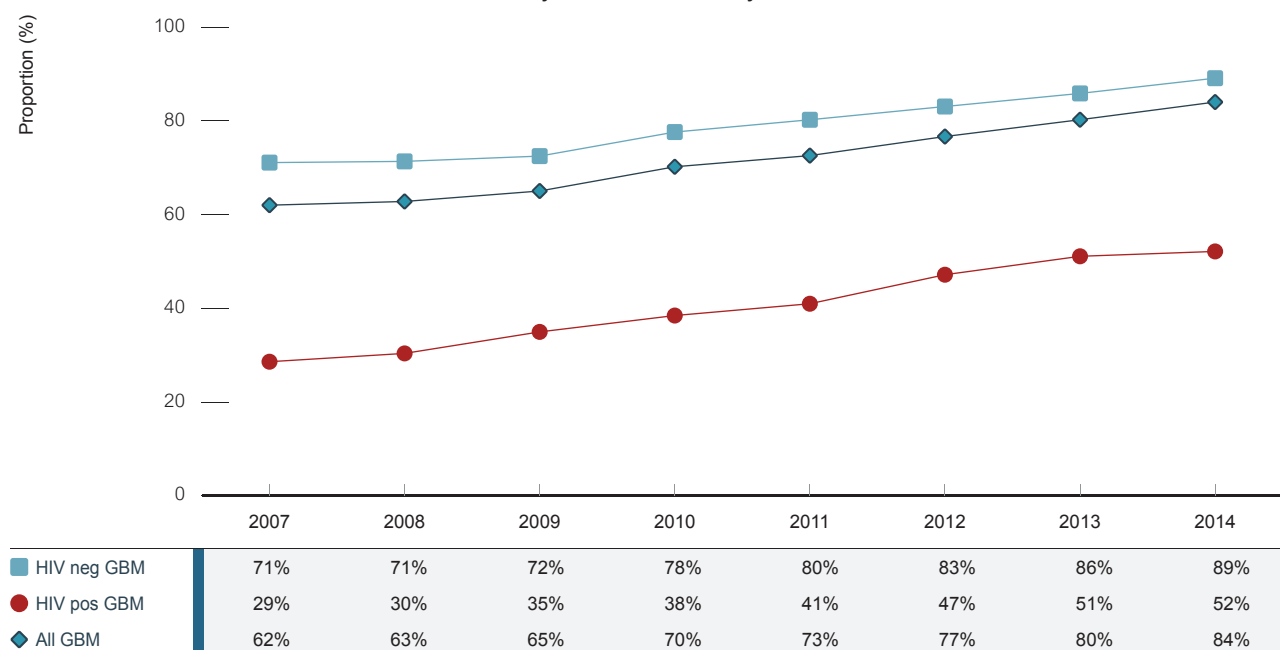
‡ Patients aged 16-29 years old

'Full' sexual health screening among GBM

The following section reports on 'full' sexual health screenings among GBM attending sexual health clinics and high caseload general practice clinics in NSW. A full sexual health screen is defined as at least one test each for chlamydia, gonorrhoea, and syphilis. Among HIV negative patients a 'full' screen also included an HIV antibody test.

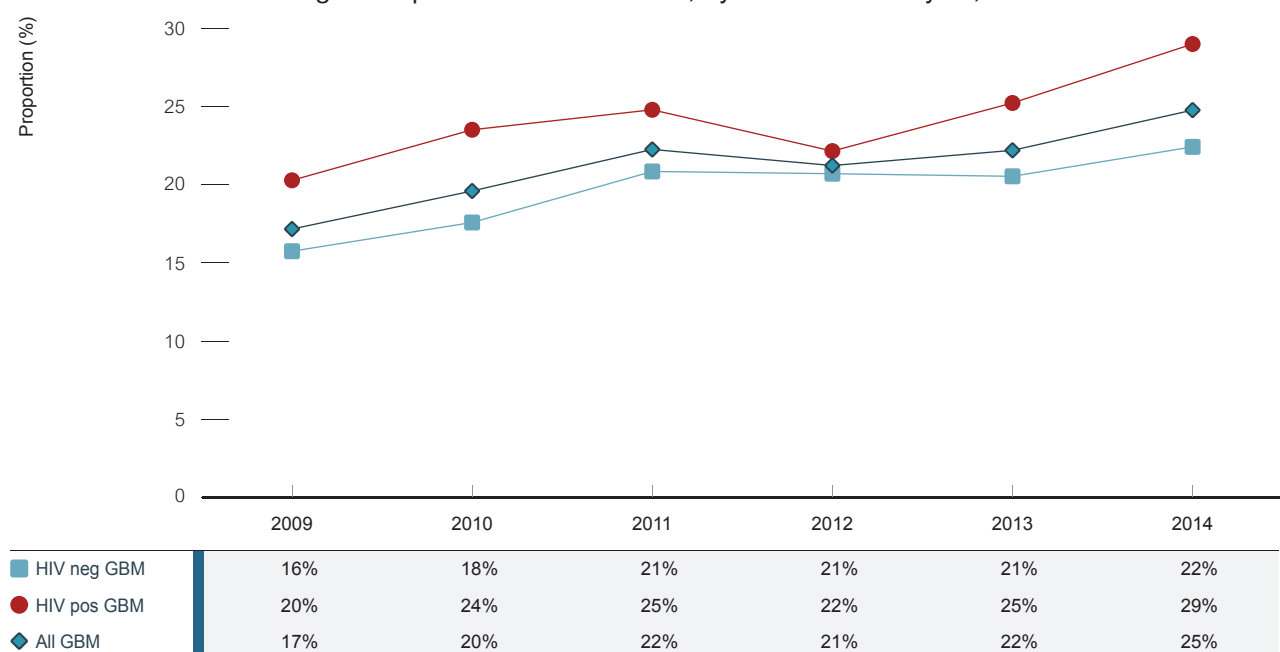
From 2007 to 2014, the proportion of GBM who had a full screen increased: 18% increase (25% relatively) among HIV negative men and 23% increase (79% relatively) among HIV positive men ($p < 0.001$; Figure 38). Full screen uptake was lower overall among GBM attending general practice clinics with a high caseload of GBM, increasing 6% (38% relatively) from 2009 to 2014 among HIV negative men and 9% (45% relatively) among HIV positive men ($p < 0.001$; Figure 39).

Figure 38 Proportion of attending GBM patients receiving a full sexual health screen* at sexual health clinics in NSW, overall and by HIV status and year, 2007-2014



* Test for chlamydia, gonorrhoea, syphilis and, among HIV negative patients, HIV

Figure 39 Proportion of attending GBM patients receiving a full sexual health screen* at high caseload general practice clinics in NSW, by HIV status and year, 2009-2014**

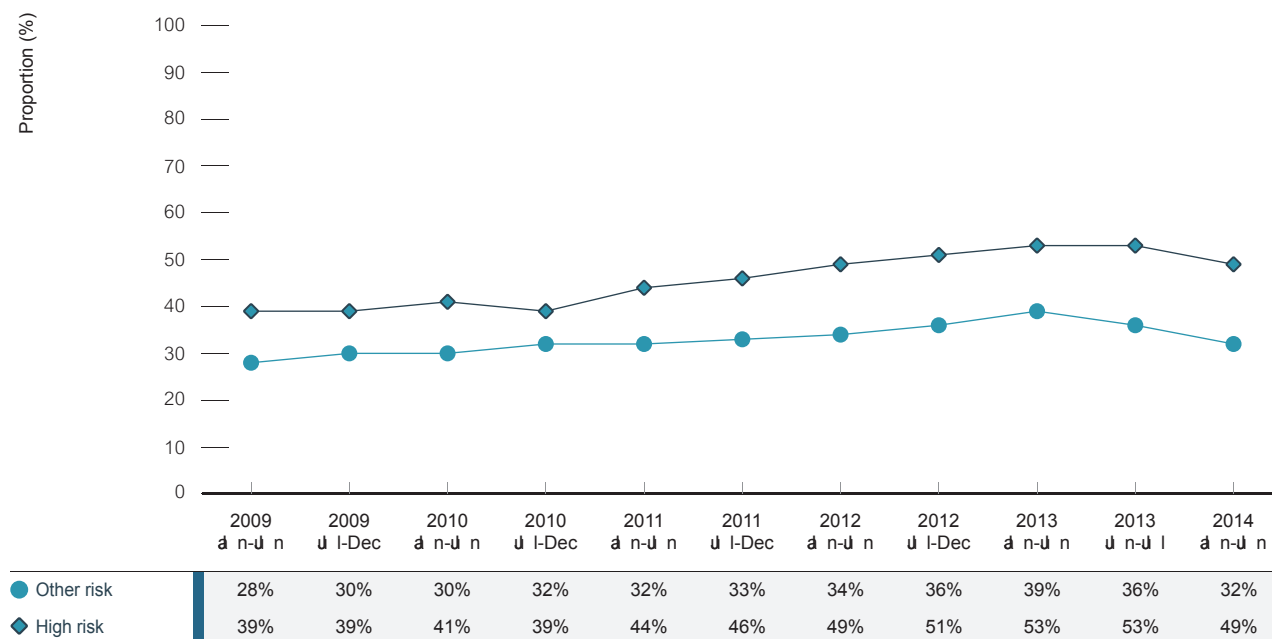


* Test for chlamydia, gonorrhoea, syphilis and, as necessary, HIV

Sexual health testing guidelines for GBM recommend annual full sexual health screening for sexually active men and 3-6 monthly screening for men deemed to be at 'high risk' of infection. Figure 40 reports on the proportion of high and lower risk GBM who returned in either 1-7 month or 1-13 months on the basis of risk classification.

Repeat sexual health screening increased for both high and lower risk GBM. From the first half of 2009 to the end of 2013, the proportion of high risk GBM who returned within 1-7 months for a subsequent full screen increased 14% (36% relatively, $p<0.001$), while the proportion of other risk men who returned within 1-13 months increased 8%, 29% relatively ($p<0.001$).

Figure 40 Repeat full sexual health screens* among high risk (1-7 month re-test period) and other risk (1-13 month re-test period) GBM attending sexual health clinics in NSW, by risk category** and year, 2009-2013***



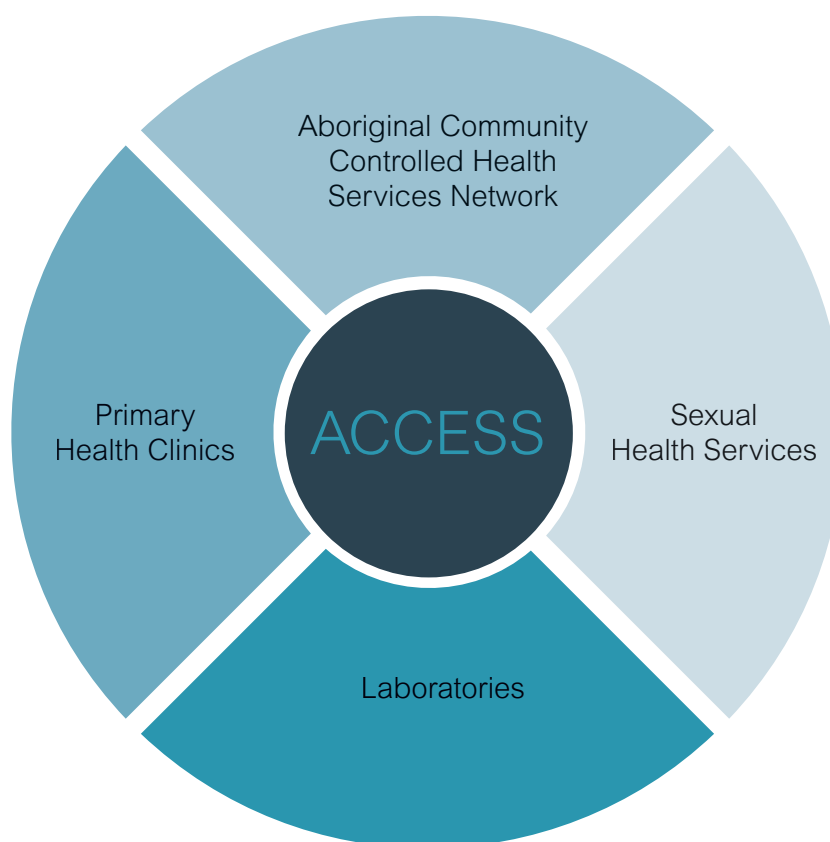
* Test for chlamydia, gonorrhoea, syphilis and, as necessary, HIV

** 'High risk' men are those with >5 partners in the 3 months prior, or >20 partners in the 12 months prior, or a chlamydia, gonorrhoea or syphilis diagnosis in the 24 months prior

***Complete data on partner numbers only available from 2009 onward ; given the timeframes, data from late 2014 have been excluded from this analysis

Appendix 1: ACCESS Methods

The Australian Collaboration for Coordinated Enhanced Sentinel Surveillance of STIs and BBVs (ACCESS) is a national sentinel surveillance system originally established in 2007. At inception, the purpose of the ACCESS study (previous name: Australian Collaboration for Chlamydia Enhanced Sentinel Surveillance) was to monitor trends in testing and positivity rates of chlamydia infection. This original model was funded by the Commonwealth Department of Health through the Chlamydia Targeted Grants Program from 2007 to 2010.



In 2013, the ACCESS study was expanded to include:

- a) additional sites,
- b) all sexually transmissible infections (i.e., HIV, gonorrhoea and syphilis), and,
- c) additional behavioural, testing, diagnoses and treatment variables.

The expansion was designed and implemented in extensive consultation with the services participating in ACCESS. The expanded model is currently funded by the health departments of **NSW, VIC, ACT** and **NT**.

The expanded model of the ACCESS study is a collaboration between the Kirby Institute, the Burnet Institute and the National Reference Laboratory and includes three clinical networks (sexual health clinic network, primary health care network, Aboriginal community controlled health services network) and a laboratory network (Figure 1). In addition the primary health care network has a sub-network of general practices which see high-case load of patients with HIV.

An overall coordinating committee provides guidance and advice on the direction of the study and comprises of ACCESS investigators, the network steering group chairs and representatives from funding states. In addition, each network has a steering committee, which includes representations from the sentinel sites included in the network and overlooks the development, conduct and progress of the network. Each network has its own coordinator to oversee the operation of that network and ACCESS has two overall coordinators (one at the Kirby Institute and one at the Burnet Institute) who lead and compile the four networks. Each network has separate ethics and governance approvals from all relevant local human research ethics committees and research governance offices. The ethics approval directs the functioning of each network.

ACCESS collates routinely collected data from the sentinel sites and works closely with individual sites and the patient management system developers to electronically extract the data from the sites and share with the respective network. All data shared and collated by ACCESS is de-identified and is always shared in a secured manner (protected by passwords or encryption). Once received, data is collated, cleaned and analysed. All data is stored in a password protected server and only the relevant network investigators have access to the data. The data is reported through a number of different avenues, including annual reports to the funding states and reports to participating sites.

Appendix 2: Indicator definitions

Indicator	Definition	Numerator	Denominator
Number tests	Total number of tests conducted, discounting multiple tests within one week	N/A	N/A
Proportion of tests by anatomical site	Total number of tests per anatomical site represented as a proportion of total tests, discounting tests of unknown or 'other' anatomical sites	Total number of tests for an infection at an anatomical site (rectum, throat/pharynx, urogenital)	Total number of tests for an infection
Testing uptake	Proportion of unique patients (per year) tested for an infection	Number of unique patients seen at a clinic who had a test for an infection	Number of unique patients seen
Number of tests among high risk¹ GBM	Proportion of high risk GBM tested 0, 1, 2 or ≥3 times for an infection in a year	Number of high risk GBM tested 0, 1, 2 or ≥3 times for an infection in a year	Number of high risk GMB patient seen
Syphilis testing among HIV positive GBM	Proportion of HIV positive GBM tested 0, 1, 2 or ≥3 times for syphilis in a year	Number of HIV positive GBM tested 0, 1, 2 or ≥3 times for syphilis in a year	Number of HIV positive GBM patient seen
Syphilis and viral load testing	Proportion of viral load and syphilis tests conducted independently or in combination	Number of: Viral load tests Syphilis tests Syphilis and viral load tests	Total number of syphilis and viral load tests
Test yield	Proportion of total tests with positive results or diagnoses	Total number of positive results or diagnoses per year	Total number of tests per year
Test positivity	Proportion of unique patients tested with a positive result or diagnosis	Number of individuals (unique) with a positive result or diagnosis per year	Number of individuals (unique) tested per year
Chlamydia and gonorrhoea re-testing	Proportion of patients who were re-tested 1-4 months of a chlamydia or gonorrhoea diagnosis	Number of patients re-tested within 1-4 months of initial chlamydia or gonorrhoea diagnosis	Number of patients with a chlamydia or gonorrhoea diagnosis
Syphilis re-testing	Proportion of patients who were re-tested 1-7 months of an infectious syphilis diagnosis	Number of patients re-tested within 1-7 months of initial infectious syphilis diagnosis	Number of patients diagnosed with infectious syphilis
Proportion receiving a 'full' sexual health screen	Proportion of unique GBM receiving a test for chlamydia, gonorrhoea, syphilis and, among HIV negative patients, HIV	Number of unique patients seen at clinic who had at least one test for chlamydia, gonorrhoea, syphilis and, if applicable, HIV within one-month	Number of unique GBM patients seen at clinic
Repeat 'full' sexual health screens among GBM	Proportion of high risk GBM receiving a 'full' sexual health screen within 1-7 months of an initial screen	Number of high risk GBM receiving a second 'full screen' within 1- 7 months of an initial screen	Total number of high risk GBM receiving an initial 'full' sexual health screen
	Proportion of other risk GBM receiving a 'full' sexual health screen within 1-12 months of an initial screen	Number of other risk GBM receiving a second 'full screen' within 1-12 months of an initial screen	Total number of other risk GBM receiving an initial 'full' sexual health screen

1 'High risk' defined in accordance with guidelines from the STI in Gay Men's Action Group, see: Templeton DJ, Read P, Varma R, Bourne C. Australian sexually transmissible infection and HIV testing guidelines for asymptomatic men who have sex with men 2014: a review of the evidence. Sexual Health. 2014;11(3):217-29.

