

# Changing pattern of sexually transmissible infections and HIV diagnosed in public sexual health services compared with other locations in New South Wales, 2010–14

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**Abstract.** *Background:* In Australia, testing and treatment for HIV and other sexually transmissible infections (STIs) is usually managed in general practice, while publicly funded sexual health clinics (PFSHC) attract people at higher risk for infection. The proportion of HIV and STI diagnoses in New South Wales (NSW) occurring in PFSHC stratified by priority population was investigated. *Methods:* From 2010 to 2014, NSW notification frequencies for chlamydia, gonorrhoea, infectious syphilis, and HIV were compared with the number of diagnoses in PFSHC. The annual proportion of diagnoses at PFSHC was calculated and Wilcoxon rank-sum tests assessed trends. Diagnoses from PFSHC were also organised by priority population, including gay and bisexual men (GBM), people living with HIV, Aboriginal and Torres Strait Islander people, people who use injecting drugs, sex workers and young people. *Results:* The annual proportion of HIV and STIs diagnosed at PFSHC increased (all  $P < 0.001$ ): chlamydia from 12% to 15%, gonorrhoea 23% to 38%, infectious syphilis 21% to 40% and HIV 22% to 30%. Overall, the majority of all infections diagnosed at PFSHC were among GBM, with the proportional distribution of chlamydia increasing from 32% to 46% among GBM ( $P < 0.001$ ) and decreasing among young people (50% to 40%;  $P < 0.001$ ). There were no other significant changes by population or infection at PFSHC. *Conclusions:* Increasing proportions of STI and HIV are being diagnosed at NSW PFSHC, mostly among GBM. PFSHC reorientation to priority populations continues to make a large and increasing contribution to STI and HIV control efforts in NSW.

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## Introduction

In Australia, most sexually transmissible infections (STIs) are managed in general practice clinics,<sup>1,2</sup> but publicly funded sexual health clinics (PFSHC) service groups of people at higher risk of STIs.<sup>3</sup> Publicly funded sexual health clinics often use triage protocols designed to direct services predominantly to people with STI-related symptoms and from priority populations: gay, bisexual and other men who have sex with men (GBM), sex workers, Aboriginal and Torres Strait Islander people, people with HIV, people who inject drugs and young people (those under 30 years of age).<sup>4</sup> Promisingly, access to PFSHC among priority populations appears to have increased, with one study reporting increases in the total number and overall proportion of patients from these groups from 2004 to 2011.<sup>5</sup>

Service delivery in New South Wales (NSW) PFSHC is guided by HIV and STI strategies, which encourage

the optimisation of these services specifically for priority populations, as defined in the State's strategies for these infections.<sup>6,7</sup> In 2009, 25% of combined infectious syphilis, gonorrhoea, chlamydia and HIV cases were diagnosed at NSW PFSHC, with proportions of infectious syphilis higher in inner Sydney clinics and proportions of chlamydia higher in rural locations.<sup>8</sup>

Since 2009, notification rates for HIV and other STIs in NSW have increased significantly.<sup>9</sup> We sought to investigate if and how the proportional distribution of STI and HIV diagnoses between PFSHC and other health services in NSW had changed in recent years, including any changes in diagnoses among priority populations.

## Methods

Two data sources were used for this cross-sectional study, which used a similar method from an earlier study.<sup>8</sup> The first

data source was the NSW *Notifiable Conditions Information Management System* (NCIMS), which contains data about notifiable diseases, including STIs and HIV. Notifications are received by local public health units from pathology laboratories and clinicians, as required under the NSW *Public Health Act 2010*.<sup>10</sup>

The second data source was a sentinel surveillance network, the *Australian Collaboration for Coordinated Enhanced Sentinel Surveillance* (ACCESS), which extracted demographic, behavioural and diagnosis data from patient management systems in 29 PFSHC sites representing each NSW Local Health District (LHD).<sup>11</sup> Data are systematically captured during patient registration and clinical consultations. There are 15 NSW LHDs across three geographic areas – two inner metropolitan Sydney and six outer metropolitan Sydney and seven rural and regional NSW. The STIs in our analysis were gonorrhoea, chlamydia and infectious syphilis (primary, secondary and early latent). In the NCIMS, only a single case was recorded for an individual with an STI detected at different anatomical sites during a single episode of care within 29 days for chlamydia and gonorrhoea and within 89 days for infectious syphilis.<sup>12</sup> These same parameters were also applied to diagnoses captured in ACCESS. Furthermore, cases previously diagnosed before attending a PFSHC and recorded in ACCESS were excluded from further analysis. Previously diagnosed cases were those for which the attendance reason was recorded as ‘referral’ or ‘previous diagnosis’, or if test results or diagnoses were accompanied by similar qualifiers.

A sub-analysis of priority populations was undertaken using data extracted from ACCESS, which used self-reported sexual behaviour and drug use practices to classify patients. GBM were defined as men reporting any sexual contact with other men during the study period; this was an exclusive category (i.e. patients identified as GBM were excluded from other classifications). Injecting drug users were those who reported injecting drugs at least once in the 12 months before a diagnosis, which was the same method applied to sex workers. Young patients were those aged under 30 years at the time of diagnosis, and people with HIV were categorised based on clinical history or diagnosis, including self-reported status.

We calculated the (non-exclusive) proportions of patients attending PFSHCs each year identified within these priority populations. Missing data precluded categorisation of some patients – partner gender (3% of patients), Indigenous status (3%), age (<1%), injecting drug use (34%) and sex work (7%) – so these patient details were excluded from the population-specific sub-analysis but were included in the overall analysis.

Three-monthly STI/HIV testing accompanies the prescribing of HIV pre-exposure prophylaxis (PrEP), which became available for GBM during 2015. Therefore, analysis was restricted to each year within the 2010–14 period to avoid distortion of the data.

### Statistical analysis

For each year within the 2010–14 period, the proportions of STI and HIV diagnoses made in PFSHC were calculated by dividing the number of diagnoses identified in PFSHC (via ACCESS) by the total number (via NCIMS). Proportions were

stratified by LHD and geographic locality (inner metropolitan, outer metropolitan and rural and regional) and assessed for time trend using Wilcoxon rank-sum tests. Similarly, using ACCESS data, we calculated the proportional distribution of diagnoses in PFSHC by priority population and zone, assessed for time trends. Statistical significance was set at  $P < 0.05$  and Stata (version 14.1; StataCorp, College Station, TX, USA) was used for all analyses.

Ethical approval for ACCESS was granted by the lead human research ethics committee of St Vincent’s Hospital (08/051). NCIMS data were collated by NSW Health and is available for public use.

### Results

The annual proportion of HIV and all STIs diagnosed in NSW PFSHC increased from 2010 to 2014 (Fig. 1). Chlamydia diagnoses increased from 12% to 15% ( $P < 0.001$ ), gonorrhoea from 23% to 38% ( $P < 0.001$ ), infectious syphilis from 21% to 40% ( $P < 0.001$ ) and HIV from 22% to 30% ( $P < 0.001$ ). Similar trends were observed for inner metropolitan Sydney, where the proportion of chlamydia diagnoses in PFSHC increased from 14% in 2010 to 23% in 2014 ( $P < 0.001$ ), gonorrhoea from 19% to 32% ( $P < 0.001$ ) and infectious syphilis from 20% to 30% ( $P < 0.001$ ). In outer metropolitan areas, the proportion of diagnoses in PFSHC increased for chlamydia (6–8%,  $P < 0.001$ ) and gonorrhoea (7–23%,  $P < 0.001$ ), but remained stable for infectious syphilis (30% and 28%,  $P = 0.6$ ). And in rural and regional areas of the state, chlamydia diagnoses in PFSHC actually decreased from 9% in 2010 to 7% in 2014 ( $P < 0.001$ ), while all other infections remained stable. Interestingly, although the proportion of HIV diagnosed in PFSHC increased across the state, at the local level, these changes were non-significant, most likely due to the comparatively low number of HIV diagnoses each year.

In 2010, 21% of attending patients were identified as GBM, which increased to 27% in 2014 ( $P < 0.001$ ). Among non-GBM patients, the proportion reporting sex work decreased slightly (10% in 2010 to 9% in 2014,  $P < 0.001$ ), as did the proportion reporting injecting drug use (4–3%,  $P < 0.001$ ). Non-GBM young people represented 54% of patients in 2010 and 55% in 2014 ( $P < 0.001$ ).

During the study period, the majority of infections diagnosed at PFSHC were among GBM (>85% HIV and infectious

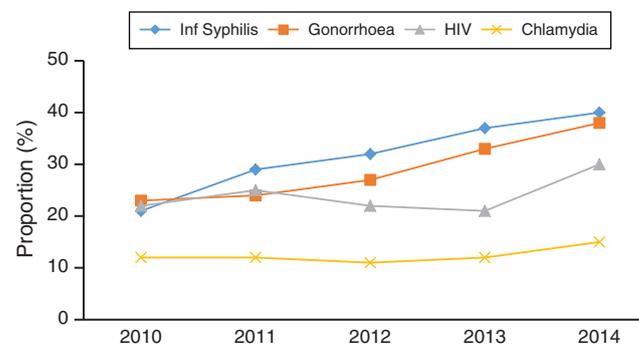


Fig. 1. Proportion (%) of sexually transmissible infections (STIs) and HIV diagnosed in NSW publicly funded sexual health clinics, by year, 2010–14.

**Table 1. Number and proportion\* of chlamydia, gonorrhoea and infectious syphilis cases diagnosed in NSW publicly funded sexual health clinics, by priority population and year, 2010–14**

\*Categories [excluding gay and bisexual men (GBM)] are non-exclusive; column totals may exceed 100%

Year	2010 <i>n</i> (%)	2011 <i>n</i> (%)	2012 <i>n</i> (%)	2013 <i>n</i> (%)	2014 <i>n</i> (%)
<b>Chlamydia</b>					
HIV-negative GBM	433 (24.4)	414 (19.8)	632 (28.0)	838 (33.4)	1126 (36.2)
HIV-positive GBM	69 (3.9)	104 (5.0)	110 (4.9)	162 (6.5)	237 (7.6)
Aboriginal & Torres Strait Islanders	114 (6.4)	127 (6.1)	119 (5.3)	137 (5.5)	137 (4.4)
Sex worker	140 (7.9)	145 (6.9)	138 (6.1)	140 (5.6)	211 (6.8)
People who inject drugs	48 (2.7)	59 (2.8)	67 (3.0)	69 (2.7)	86 (2.8)
Young people	946 (53.4)	1213 (57.9)	1413 (62.5)	1171 (46.6)	1293 (41.5)
Total ( <i>n</i> )	1773	2095	2259	2511	3112
<b>Gonorrhoea</b>					
HIV-negative GBM	337 (61.6)	377 (53.0)	635 (56.8)	892 (63.2)	1235 (67.9)
HIV-positive GBM	46 (8.4)	63 (8.9)	96 (8.6)	157 (11.1)	190 (10.5)
Aboriginal & Torres Strait Islanders	16 (2.9)	17 (2.4)	31 (2.8)	35 (2.5)	38 (2.1)
Sex worker	27 (4.9)	56 (7.9)	99 (8.9)	108 (7.7)	125 (6.9)
People who inject drugs	20 (3.7)	25 (3.5)	37 (3.3)	52 (3.7)	60 (3.3)
Young people	78 (14.3)	115 (16.2)	159 (14.2)	165 (11.7)	178 (9.8)
Total ( <i>n</i> )	547	711	1117	1411	1818
<b>Infectious syphilis</b>					
HIV-negative GBM	72 (66.7)	91 (62.8)	111 (65.3)	157 (63.1)	210 (66.2)
HIV-positive GBM	26 (24.1)	35 (24.1)	42 (24.7)	70 (28.1)	83 (26.2)
Aboriginal & Torres Strait Islanders	1 (0.9)	3 (2.1)	6 (3.5)	4 (1.6)	6 (1.9)
Sex worker	3 (2.8)	2 (1.4)	2 (1.2)	2 (0.8)	2 (0.6)
People who inject drugs	6 (5.6)	12 (8.3)	4 (2.4)	15 (6.0)	14 (4.4)
Young people	4 (3.7)	11 (7.6)	6 (3.5)	11 (4.4)	8 (2.5)
Total ( <i>n</i> )	108	145	170	249	317
<b>HIV</b>					
GBM	59 (88.1)	70 (85.4)	88 (95.7)	67 (90.5)	92 (92.0)
Aboriginal & Torres Strait Islanders	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (1.0)
Sex worker	2 (3.0)	2 (2.4)	1 (1.1)	1 (1.4)	1 (1.0)
People who inject drugs	4 (6.0)	1 (1.2)	1 (1.1)	3 (4.1)	6 (6.0)
Young people	4 (6.0)	3 (3.7)	5 (5.4)	4 (5.4)	4 (4.0)
Total ( <i>n</i> )	67	82	92	74	100

syphilis and >60% gonorrhoea), with the proportional distribution of chlamydia increasing among this population from 32% to 46% ( $P < 0.001$ ), while decreasing among young people (50–40%;  $P < 0.001$ ; Table 1). There were no other significant changes by population at PFSHC.

## Discussion

Publicly funded sexual health clinics continue to diagnose a growing proportion of HIV and other STIs in NSW. The overall proportion of infections diagnosed at PFSHC increased by nearly 25% relative to 2009, with infectious syphilis diagnoses representing the largest relative increase of 60%.<sup>8</sup> Inner metropolitan Sydney clinics recorded the largest increase in the proportion of STIs and HIV diagnosed at PFSHC compared with other parts of NSW, and most infections diagnosed at PFSHC were among GBM.

Our finding that NSW PFSHC not only diagnose a sizeable proportion of infections but also predominantly among priority populations echoes findings from other Australian jurisdictions. In 2014, 41% of infectious syphilis (predominately GBM), 34% of gonorrhoea (predominately in heterosexuals overall

and predominantly GBM amongst men) and 36% of HIV (GBM) were diagnosed in similar services in South Australia.<sup>13</sup> Also in 2014, Western Australia reported 20% of gonorrhoea and 49% of infectious syphilis – again most prominently in GBM – was diagnosed in sexual health and family planning clinics.<sup>14</sup> And in Victoria, 21% of HIV diagnoses between 2008 and 2015 occurred in PFSHC (Victorian Department of Health and Human Services, unpubl. data).

Gonorrhoea, syphilis and HIV are known to disproportionately affect GBM who report high rates of sexual partner change and increasing condomless sex,<sup>9</sup> so ensuring PFSHC attract GBM enables these men to receive timely access to testing, care and treatment for STIs and HIV. Promisingly, the increased proportion of diagnoses that took place in inner Sydney PFSHC – localities that have the greatest density of GBM anywhere in Australia – suggests appropriate service delivery to this important priority population.<sup>15</sup>

New South Wales STI and HIV strategies guide community sexual health promotion efforts to encourage STI and HIV testing among priority populations.<sup>6,7</sup> Further, PFSHC and state-wide sexual health information services are encouraged to use triage protocols to direct non-priority patients to general

practice. Shifting patients away from PFSHC enables improved access to care for those most in need. Metropolitan services can do this more easily than rural and regional services where more diverse groups are seen because service options are fewer and further away.

Our study demonstrates this change in proportional distribution of chlamydia diagnoses in PFSHC. However, the increased proportion of chlamydia in GBM may also come from more frequent testing at several anatomical sites or an increased incidence when compared with young people.

Also, although this study predates the introduction of HIV pre-exposure prophylaxis,<sup>16,17</sup> which is indicated for GBM diagnosed with bacterial STI and having condomless anal sex, it demonstrates the key role PFSHC have implementing this new HIV prevention method for GBM alongside STI diagnoses and risk assessment.

Our study has some limitations. First, these data may not reflect the true epidemiology of STI/HIV in NSW. Notifications are influenced by testing practices, so more accessible services with high testing and retesting among high-risk populations are likely to detect more infections and possibly have higher positivity rates. Second, duplication of diagnoses cannot be completely excluded. Third, diagnoses in PFSHC for people who are not NSW residents may have been included in the analysis if local addresses were provided during service registration.

While the majority of notifiable STIs and HIV in NSW continue to be made in primary care settings, clinical education and support to these settings remain essential components of STI and HIV programs. However, PFSHC are making a large and increasing contribution to STI and HIV detection and treatment efforts, particularly among GBM.

### Conflicts of interest

The authors declare no conflicts of interest.

### References

- 1 Grulich AE, de Visser RO, Badcock PB, Smith AMA, Richters J, Rissel C, Simpson JM. Knowledge about and experience of sexually transmissible infections in a representative sample of adults: the Second Australian Study of Health and Relationships. *Sex Health* 2014; 11(5): 481–94. doi:10.1071/SH14121
- 2 Santella AJ, Pollack A, Harrison C, Sawleshwarkar SN, Britt HC, Hillman RJ. Management rates of sexually transmissible infections by Australian general practitioners, 2000–2012. *Sex Health* 2014; 11(1): 52–7. doi:10.1071/SH13179
- 3 Ali H, Donovan B, Fairley CK, Ryder N, McNulty A, Chen MY, Marshall L, O'Connor CC, Dickson B, Grulich AE, Hellard ME, Kaldor JM, Guy RJ. Are Australian sexual health clinics attracting priority populations? *Sex Health* 2013; 10(5): 456–9. doi:10.1071/SH13066
- 4 Knight V, Ryder N, Guy R, Lu H, Wand H, McNulty A. New Xpress sexually transmissible infection screening clinic improves patient journey and clinic capacity at a large sexual health clinic. *Sex Transm Dis* 2013; 40(1): 75–80. doi:10.1097/OLQ.0b013e3182793700
- 5 Ali H, Donovan B, Fairley CK, Chen MY, O'Connor CC, Grulich AE, McNulty , Ryder N, Hellard ME, Guy RJ. Increasing access by priority populations to Australian sexual health clinics. *Sex Transm Dis* 2013; 40(10): 819–21. doi:10.1097/OLQ.0000000000000015
- 6 Centre for Population Health. NSW Sexually Transmissible Infections Strategy 2006–2009. Sydney: NSW Ministry of Health; 2006.
- 7 Centre for Population Health. NSW HIV strategy 2012–2015. Sydney: NSW Ministry of Health; 2012.
- 8 Bourne C, Allen D, Brown K, Davies SC, McNulty A, Smith DE, O'Connor CC, Couldwell D, Jackson E, Bolton M, Rodgers C, Konecny P, Smith DJ, Parker A. What proportion of sexually transmissible infections and HIV are diagnosed in New South Wales' public sexual health services compared with other services? *Sex Health* 2013; 10(2): 119–23. doi:10.1071/SH12020
- 9 The Kirby Institute. HIV, viral hepatitis and sexually transmissible infections in Australia. Annual Surveillance Report. Sydney: The Kirby Institute, UNSW; 2016.
- 10 NSW Government. Public Health Act 2010 No 127. Sydney: NSW Government; 2012. Available online at: <https://www.legislation.nsw.gov.au/#/view/act/2010/127/full> [verified 4 June 2018].
- 11 Guy RJ, Kong F, Goller J, Franklin N, Bergeri I, Dimech W, Reilly N, Sullivan E, Ward J, Kaldor JM, Hellard M, Donovan B. A new national Chlamydia Sentinel Surveillance System in Australia: evaluation of the first stage of implementation. *Commun Dis Intell Q Rep* 2010; 34(3): 319–28.
- 12 Australian Government Department of Health. Australian National Notifiable Diseases and Case definitions. Canberra: Australian Government Department of Health; 2017. Available online at: <http://www.health.gov.au/internet/main/publishing.nsf/Content/cdnacasedefinitions.htm> [verified 04/06/2018]
- 13 Communicable Diseases Control Branch. Surveillance of sexually transmitted infections and blood-borne viruses in South Australia, 2014. Adelaide: Government of South Australian; 2015.
- 14 Communicable Disease Control Directorate. The epidemiology of notifiable sexually transmitted infections and blood-borne viruses in Western Australia 2014. Perth: Department of Health, Western Australia; 2015.
- 15 Australian Bureau of Statistics, 2012. 'Same-sex couple families' in Reflecting a Nation: Stories from the 2011 Census, 2012–2013, cat. No. 2071.0, Canberra: ABS; 2014 Available online at: <http://www.abs.gov.au/socialtrends> [verified 4 June 2018].
- 16 McCormack S, Dunn DT, Desai M, Dolling DI, Gafos M, Gilson R, Sullivan AK, Clarke A, Reeves I, Schembri G, Mackie N, Bowman C, Lacey CJ, Apea V, Brady M, Fox J, Taylor S, Antonucci S, Khoo SH, Rooney J, Nardone A, Fisher M, McOwan A, Phillips AN, Johnson AM, Gazzard B, Gill ON. Pre-exposure prophylaxis to prevent the acquisition of HIV-1 infection (PROUD): effectiveness results from the pilot phase of a pragmatic open-label randomised trial. *Lancet* 2016; 387(10013): 53–60. doi:10.1016/S0140-6736(15)00056-2
- 17 Kojima N, Davey DJ, Klausner JD. Pre-exposure prophylaxis for HIV infection and new sexually transmitted infections among men who have sex with men. *AIDS* 2016; 30(14): 2251–2. doi:10.1097/QAD.0000000000001185