ACCESS

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

NT STI & HIV report 2009-2014

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Contents

Executive Summary

This report collates data on the testing for and diagnosis of HIV and other sexually transmissible infections (STIs) from two sexual health clinics in the Northern Territory (NT). Some key findings include:

Chlamydia

- 82% of all patients attending sexual health clinics in 2014 were tested for chlamydia at least once, representing an increase from 2009 particularly among Aboriginal and Torres Strait Islander women (**Figure 3**) and gay and bisexual men (**Figure 4**)
- In 2014, 13% of patients tested for chlamydia at participating sexual health clinics were diagnosed ('positivity'), a relative decrease of 13% from 2009. During that same period, however, chlamydia notifications rose by 41% overall in the NT (**Figure 6**)
- Chlamydia positivity was highest overall among young heterosexuals (19% in 2014) and lowest among female sex workers (3% in 2014; **Figure 10**)
- Clinical guidelines recommend re-testing within three months of a chlamydia diagnosis, which was achieved by only a small proportion of patients (7% in 2013) with no change over time (**Figure 12**)

Gonorrhoea

- 81% of patients attending a clinic in 2014 were tested at least once for gonorrhoea, rising from 2009, particularly among female sex workers and gay and bisexual men (**Figure 16**). During this period, testing uptake remained stable at 79% among Aboriginal and Torres Strait Islander patients (**Figure 15**)
- Although gonorrhoea notifications increased by 17% in the NT from 2009 to 2014, gonorrhoea positivity at sexual health clinics remained generally stable (~3.5% annually; **Figure 18**)
- There were, however, variations in gonorrhoea positivity trends in specific populations, nearly doubling among gay and bisexual men from 6% in 2009 to 11% in 2014 (**Figure 22**) while decreasing slightly among Aboriginal and Torres Strait Islander patients (15% to 14%; **Figure 21**)
- Only a minority of patients diagnosed with gonorrhoea returned within 1-4 months for a re-test (4% in 2013) with no change over time (**Figure 24**)

Trichomonas

- 71% of patients in 2014 were tested for trichomonas, a considerable increase from 2012 (the first year that data on this infection were available). The largest increases were among Aboriginal and Torres Strait Islander men (**Figure 27**) and gay and bisexual men (**Figure 28**)
- Trichomonas positivity was substantially higher in females than males (3% vs 0.5% in 2014) and highest among Aboriginal and Torres Strait Islander females (24% in 2014; **Table 2**)

Infectious syphilis

- 70% of all attending sexual health clinic patients in 2014 were tested for syphilis, which was somewhat lower than testing for chlamydia or gonorrhoea but a significant increase from 2009 particularly among Aboriginal and Torres Strait Islander females (**Figure 32**) and young heterosexuals (**Figure 33**)
- Both notifications for infectious syphilis across the territory and the diagnosis rate at sexual health clinics rose dramatically but the diagnosis rate remained generally low (0.7% in 2014; **Table 4**).

HIV

- 71% of all attending HIV negative patients were tested for HIV in 2014. As with other infections, testing for HIV increased from 2009 to 2014 with the biggest increases among Aboriginal and Torres Strait Islander women (**Figure 37**) and young heterosexuals (**Figure 38**)

Report notes

Guidelines for testing

The NT Sexual Health and Blood Borne Virus Unit "Testing for Sexually Transmitted Infections and Blood Borne Viruses" guidelines, 2014[1], recommend the following:

Group	Recommended tests
All sexual health clinic attendees	Chlamydia, gonorrhoea, trichomonas, HIV and syphilis
Young people aged less than 30 years	Chlamydia, gonorrhoea, trichomonas, HIV and syphilis
Gay, bisexual and other men who have sex with men	Chlamydia, gonorrhoea, trichomonas, HIV and syphilis (annual to quarterly testing, as required)

In response to a syphilis outbreak in part of the NT in 2014, revisions to STI testing encouraged services to offer STI checks including HIV and syphilis to all presenting sexually-active people 34 years and younger. In settings near the heart of the outbreak in the Katherine and East Arnhem regions and also Alice Springs, three-monthly STI screening for people 34 years and younger was recommended[2,3].

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 and population group categories are not mutually exclusive.

Aboriginal	Patients identified as Aboriginal, Torres Strait Islander, or both
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
Female sex worker	Female patients who report selling sex in the 12 months prior to consultation
People who inject drugs (PWID)	Patients who report injecting drugs in the 12 months prior to consultation
Young people	Heterosexual patients aged less than 25 years

[1] NT Government, Department of Health. *SHBBV Unit Testing for Sexually Transmitted Infecitions and Blood Borne Viruses*. 2014
[2] Centre for Disease Control NT. The NT Disease Control Bulletin. Vol.22, No.1, March 2015
[3] NT Department of Health. Surveillance update, February 2016

Overview

Introduction

Sexually transmissible infections (STIs) are a significant source of morbidity in Australian communities[4], which when left untreated can lead to an array of negative health outcomes that include pelvic inflammatory disease, ectopic pregnancy, infertility, low birth weight, and increased susceptibility to HIV infection. Additionally, increasing rates of STIs[5] means that early identification and prompt treatment are crucial to reducing their burden on public health systems. Effective sexual health surveillance data are required for not only monitoring public health but also for assessing the impact of Australia's Third National STI Strategy[1], which includes reducing STI incidence and increasing testing among priority populations. This report collates rates of testing and diagnoses for *Chlamydia trachomatis* ('chlamydia'), *Neisseria gonorrhoeae* ('gonorrhoea'), *Trichomonas vaginalis* ('trichomonas'), and *Treponema pallidum* ('syphilis') as well as testing rates for HIV in sexual health clinics in Australia's Northern Territory (NT) from 2009-2014.

Methods

ACCESS is a national surveillance and monitoring network established in 2007 with an original focus on chlamydia epidemiology. In 2013, the project was expanded through funding from select state health departments to include HIV and other STIs. Today, ACCESS involves over 100 sites spanning four networks of health services and laboratories in all jurisdictions of Australia and plays an increasingly important part in helping services to assess clinical outcomes against local and national guidelines and strategies.

This report includes data from two sexual health clinics in the NT. From each clinic, de-identified demographic, consultation, pathology, diagnosis and treatment data were electronically extracted and have been used to report annual trends from 2009-2014. Because new HIV diagnoses were not recorded in a systematic way, they have not been included in this report. Indicators relating to STI testing, positivity and diagnoses are stratified in this report on the basis of sex and among populations at high risk of STIs, as identified in the current National STI strategy[4] and the NT SHBBV Unit testing and treatment guidelines[6]. These priority populations include: Aboriginal and Torres Strait Islanders (hereafter referred to as Aboriginal people), gay, bisexual and other men who have sex with men (GBM), people who inject drugs, female sex workers, and young heterosexuals (less than 25 years old). Patients have also been stratified on the basis of their recorded home postcode and corresponding remoteness classifications established by the Australian Bureau of Statistics[7] as: very remote/remote, inner/outer regional, and major cities. Wilcoxon rank-sum tests for trend were used to assess temporal trends in indicators at a significance value of $p<0.05$.

In some cases, pathology laboratories servicing participating clinics employed duplex testing for chlamydia and gonorrhoea. 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*.

Results

From 2009 to 2014, a total of 28,268 individual patients attended a participating sexual health clinic in the NT. In 2009, 4,555 individuals attended sexual health clinics, remaining stable overall with 4,464 attending in 2014. From 2009 to 2014, attendance decreased among females by 21%, in particular among Aboriginal

[4] Department of Health. *Third National Sexually Transmissible Infections Strategy 2014-2017*. 2013. Australian Government: Canberra, ACT.
[5] The Kirby Institute. *HIV, Viral Hepatitis and Sexually Transmissible Infections in Australia Annual Surveillance Report 2014*. 2014. The Kirby Institute, UNSW Australia: Sydney NSW.
[6] NT Government, Department of Health. *SHBBV Unit Testing for Sexually Transmitted Infections and Blood Borne Viruses*. 2014
[7] Australian Bureau of Statistics (2010). *1216.0 - Australian Standard Geographical Classification (ASGC),* July 2010. Canberra

females (49% decrease) and female sex workers (37% decrease). Detailed information on clinic attendance can be found in Appendix A.

Chlamydia

From 2009 to 2014, the total number of chlamydia testing episodes (discounting multiple chlamydia tests conducted in the same week) conducted in NT sexual health clinics increased from 4,127 to 4,476 in 2014 (8% relative increase). Among Aboriginal males, the total number of testing episodes increased by 11% from 2009 to 2014, whilst falling by 38% among Aboriginal females. In 2014, 38% of all chlamydia tests at sexual health clinics in the NT were conducted among young people (down from 47% in 2009, 19% relative decrease) while 11% were among GBM (up from 5% in 2009, 120% relative increase).

Chlamydia testing uptake (the proportion of attending patients tested for chlamydia in a year) increased from 76% in 2009 to 83% in 2014 ($p<0.001$). Testing uptake overall was highest each year among female sex workers (86%-95% annually) while the greatest increase in testing uptake was among GBM, rising from 71% in 2009 to 86% in 2014 (21% relative increase, $p<0.001$). Among other priority populations, significant increases were also seen in Aboriginal females (77% in 2009 to 83% in 2014, 8% relative increase, $p=0.02$) and young people (84 to 89%, 6% relative increase, $p<0.001$).

From 2009 to 2014, chlamydia positivity (the proportion of individuals testing positive annually) decreased slightly from 15% to 13% (13% relative decrease, $p<0.001$). In the same period, chlamydia notifications increased by 41% across the NT. Chlamydia positivity remained stable across all priority populations, except for young people, decreasing from 21% in 2009 to 19% in 2014 (10% relative decrease, $p=0.02$) In 2014, chlamydia positivity was highest (20%) among 16-19 year olds, 18% among Aboriginal males and females, and 15% among GBM. By region, positivity among patients from remote and very remote areas was stable from 12% in 2009 to 11% in 2014.

Sexual health testing guidelines recommend that patients diagnosed with chlamydia receive another test for chlamydia within 3 months to detect re-infection[8,9]. At sexual health clinics in the NT, the proportion of patients retested within 1-4 months of a chlamydia diagnosis was low at 5% in 2009 and 7% in 2014 ($p=0.78$)

Gonorrhoea

The total number of gonorrhoea testing episodes in NT sexual health clinics increased from 4,094 in 2009 to 4,416 in 2014 (8% increase). Among Aboriginal males the number of testing episodes increased by 10% from 2009 to 2014 and decreased by 38% among Aboriginal females. In 2014, 36% of gonorrhoea testing episodes were among young people (from 46% in 2009, 10% relative decrease) while 12% were among GBM (from 5% in 2009, 140% relative increase).

Gonorrhoea testing uptake increased from 76% in 2009 to 81% 2014 (7% relative increase, $p<0.001$). Testing uptake was stable among Aboriginal people overall but increased from 75% in 2009 to 84% in 2014 among females (12% relative increase, $p=0.002$). The greatest increase in testing uptake was among GBM (69-85%, 23% relative increase, $p<0.001$), while remaining stable among other priority populations. Overall, gonorrhoea testing uptake was highest among female sex workers (86-95% annually).

[8] Australian Sexual Health Alliance. *Australian STI Management Guidelines for use in Primary Care*. 2014.
[9] 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.

Gonorrhoea positivity at sexual health clinics in the NT remained stable from 3% in 2009 to 4% in 2014 (p=0.3), while notifications in the entire NT during that period increased by 17%. Gonorrhoea positivity in 2014 was highest among Aboriginal people: 15% in males and 13% in females, which were both stable over time. The greatest increase in positivity was among GBM, from 7% in 2009 to 11% in 2014 (59% relative increase, p=0.002). Among young people, gonorrhoea positivity remained stable at around 3% annually; from 2010-2014 there were no infections identified in female sex workers. Gonorrhoea positivity was 6% in people from remote/very remote areas in 2014, 5% in those from major cities and 3% in inner/outer regional areas.

As with chlamydia, sexual health testing guidelines recommend that patients diagnosed with gonorrhoea receive another test within 3 months to detect re-infection and, for gonorrhoea, treatment failure[10,11]. The number and proportion of patients retested within 1- 4 months of a positive gonorrhoea diagnoses was low, at 4% in 2014, with no change over time.

Trichomonas

From 2009 to 2011, details on trichomonas testing were not routinely recorded in patient management systems; trichomonas information is, therefore, presented only from 2012 to 2014. The total number of trichomonas testing episodes at sexual health clinics increased from 2,662 in 2012 to 3,803 in 2014 (43% increase). Among Aboriginal males, the total number of testing episodes increased from 102 in 2012 to 166 in 2014 (63% increase) and decreased from 196 to 161 among Aboriginal females (18% decrease). In 2014, 39% of trichomonas testing episodes were conducted among females (from 50% in 2012, 28% decrease), 30% among young people (from 37% in 2012, 19% decrease) while 11% were among GBM (from 5% in 2012, 120% increase).

An overall increase in trichomonas testing uptake occurred from 2012 to 2014 (54%-77%, 47% relative increase, p<0.001). Among Aboriginal people, uptake increased overall from 48% in 2012 to 61% in 2014 (27% relative increase, p<0.001), but was stable among Aboriginal females. There were also increases in testing across other priority populations including GBM (39%-75%, 92% relative increase, p<0.001). The proportion of tests performed in symptomatic patients decreased overall, from 40% in 2012 to 31% in 2014 (23% relative decrease, p<0.001).

Trichomonas positivity decreased, from 3% in 2012 to 1% in 2014 (p<0.001), whilst NT notifications increased by 41%. Positivity in 2014 was highest among Aboriginal females (24%). It was also highest among patients from remote areas (7%), compared with patients from major cities (1%) or inner/outer regional areas (0.6%). Among young people, trichomonas positivity decreased from 3% in 2012 to 1% in 2014 (54% relative decrease, p=0.01). There were low numbers of trichomonas diagnoses among GBM and female sex workers, and while positivity among those reporting use of injecting drugs was 5% in 2014, this represented only four diagnoses among this group.

Syphilis

The total number of syphilis testing episodes at NT sexual health clinics increased from 2,836 in 2009 to 3,626 in 2014 (28% increase). Testing episodes increased by 49% from 2009 to 2014 among Aboriginal males while decreasing by 26% among females. In 2014, 32% of all syphilis tests were conducted in young

[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.

people (from 30% in 2009, 7% relative increase), while 13% were among GBM (from 8% in 2009, 63% relative increase).

Syphilis testing uptake increased from 56% in 2009 to 70% in 2014 (25% relative increase, p<0.001). Uptake among patients from remote/very remote areas was 62% in 2014 (15% relative increase, p<0.001). The greatest increase in testing uptake was among people aged 20-24 years (30% relative increase, p<0.001). Among priority populations, uptake during this period increased among Aboriginal people (54%-71%, 31% relative increase, p<0.001) and young people (55%-70%, 27% relative increase, p<0.001). Syphilis testing uptake was highest annually among GBM (74% in 2009 to 83% in 2014, 12% relative increase, p<0.001).

There were no infectious syphilis diagnoses made in 2009, increasing to a syphilis diagnosis rate of 0.2% in 2010 and to 0.7% in 2014 (250% relative increase, p<0.001), mimicking the 108% increase in annual notifications across the NT in the same time frame. Diagnosis rates were highest among GBM, increasing from 1.1% in 2010 to 4.7% in 2014 (327% relative increase, p<0.001). While numbers of infectious syphilis diagnoses were low among Aboriginal people, the diagnosis rate increased over time (0.5% in 2009 to 1.3% in 2014, 160% relative increase, p=0.01). There were no diagnoses of infectious syphilis among female sex workers from 2009 to 2014 and the number of diagnoses was very low among people reporting injecting drug use and young people.

HIV

The total number of HIV test episodes increased by 33%, from 2,671 in 2009 to 3,548 in 2014. Among Aboriginal males the number of HIV testing episodes increased by 44% from 2009 to 2014 while decreasing 22% among Aboriginal females. Thirty-three per cent of all HIV tests conducted in 2014 were among young people (relative increase of 35% since 2009) with tests among GBM accounting for 12% of total tests (relative increase of 71% since 2009).

HIV testing uptake increased from 53% in 2009 to 69% in 2014 (25% relative increase, p<0.001). Testing uptake increased among Aboriginal people (51%-68%, 33% relative increase, p<0.001) and GBM (63%-75%, 19% relative increase, p<0.01). The overall highest HIV testing uptake was among female sex workers (73%-76% annually). Because new HIV diagnoses were not recorded in a consistent way by participating services, they are not reported on here.

Conclusions

Rates of testing for chlamydia, gonorrhoea, trichomonas, syphilis and HIV were generally quite high among patients attending sexual health clinics in the NT, but lower than clinics in NSW[12]. Testing uptake for all infections increased significantly from 2009 to 2014, particularly for trichomonas which was added for males to the NT guidelines in 2012[13]. Syphilis testing rates also increased significantly over the time period. Testing rates in 2014, however, did not reflect revised testing recommendations made in response to the syphilis outbreak, particularly among those most affected.

Re-testing following a chlamydia or gonorrhoea diagnosis was very low overall with no signs of improvement over time. Given the high risk of reinfection, particularly for chlamydia, efforts such as active recall, computer prompts, SMS reminders and home collection kits have been used in other settings to

[12] Callander et al. *Australian Collaboration for Coordinated Enhanced Sentinel Surveillance of Sexually Transmissible Infections and Blood Borne Viruses, New South Wales STI Report 2007-2014*. 2015. Sydney, NSW: Kirby Institute.
[13] Sexual health and Blood Borne Virus Unit, CDC. *NT Guidelines for the Management of STIs in the Primary Health Care Setting.* 2012

increase re-testing. It is possible that some people were re-tested in primary care, and these data were not captured in the analysis.

Positivity for both chlamydia and trichomonas declined over time at participating sexual health clinics, while notifications increased across the NT during the same period. There are a number of reasons why test positivity in these services does not reflect trends in notifications. First, the data are from two sexual health clinics based in town centres and does not include data from three sexual health clinics located in more remote areas or the large number of other primary care services in the NT. Second, it may also reflect the declining number of Aboriginal people and young heterosexuals tested at these services. While testing uptake among these groups increased over time, the absolute number of attendees decreased. Declining attendance among both of these groups most at-risk for infection may have contributed to the downward trend in chlamydia and trichomonas positivity. Third, notifications can be influenced by increases in testing and between 2010 and 2013 there was a large sexual health quality improvement initiative underway in the NT ('STRIVE'), which resulted in increased testing. Furthermore, as trichomonas testing was not universally offered in 2012, the decline in positivity could represent a selection bias driven by more symptomatic patients tested in earlier years.

From 2009 to 2014 there were increases in the infectious syphilis diagnosis rate and gonorrhoea positivity at NT sexual health clinics. Although the number of infectious syphilis diagnoses was lower than other STIs, the observed increase in the diagnosis rate, parallel with increasing notifications across the NT, is concerning. As in other Australian jurisdictions, the majority of diagnoses were among GBM but there was also an increase in Aboriginal people, particularly from 2013 to 2014. This may reflect increased detection of cases in response to an ongoing syphilis outbreak in some regions of the NT. While remaining stable overall at NT sexual health clinics, gonorrhoea positivity increased among GBM and was highest in Aboriginal people and those living in remote and very remote communities. Increases in gonorrhoea positivity in GBM have also been observed in NSW sexual health clinics. These increases suggest the need for enhanced prevention strategies, particularly among GBM and Aboriginal men and women.

The observed trends and differences in positivity across infections help highlight particular vulnerabilities and areas of need. There is a much higher prevalence of STIs in Aboriginal people living in remote and very remote areas. Similarly, GBM are at higher risk for syphilis and gonorrhoea than other populations, as is true for chlamydia in young heterosexuals and trichomonas in Aboriginal people.

Section 1: Chlamydia

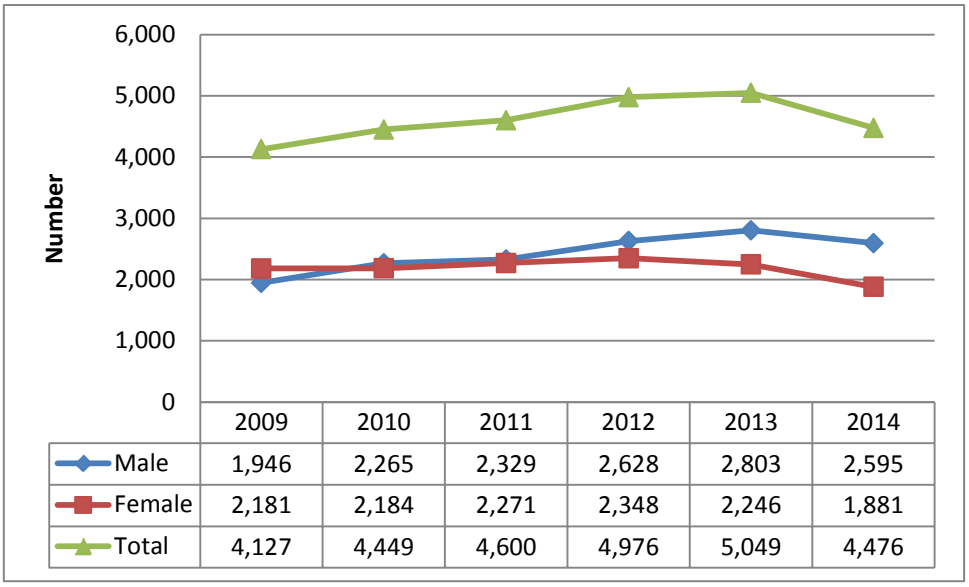
The following section reports on chlamydia testing among patients attending two sexual health clinics in the NT.

a) Chlamydia testing at sexual health clinics

Total chlamydia test episodes reflect the absolute number of chlamydia tests conducted per year, which might include multiple tests for the same patient. Multiple chlamydia tests conducted in the same week, however, were only counted once.

From 2009-2014, the total number of chlamydia test episodes conducted increased overall (8% increase) and in males (33% increase) while decreasing in female patients by 14% (Figure 1).

Figure 1. Total number of chlamydia test episodes conducted at sexual health clinics in the NT, overall and by sex* and year, 2009-2014

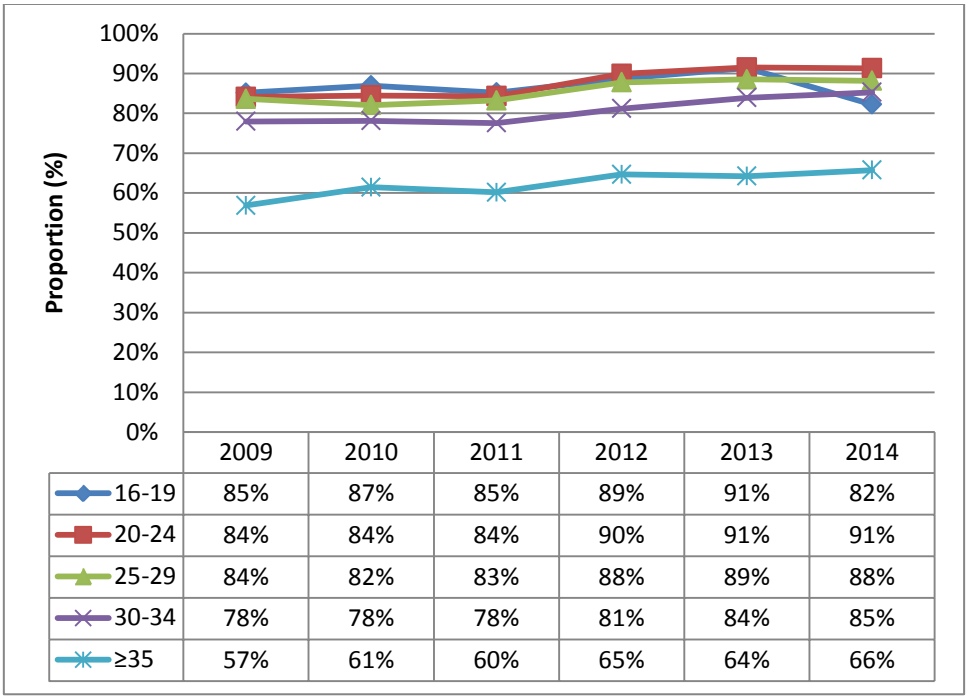


	2009	2010	2011	2012	2013	2014
Male	1,946	2,265	2,329	2,628	2,803	2,595
Female	2,181	2,184	2,271	2,348	2,246	1,881
Total	4,127	4,449	4,600	4,976	5,049	4,476

*Does not include patients of unknown sex

The following graphs report on the proportion of attending patients tested for chlamydia in a year ('testing uptake'). There were significant increases in testing across all age groups ($p<0.001$), except for those aged 16-19 years ($p=0.39$).

Figure 2. Proportion of unique patients* tested for chlamydia, by age group and year, 2009-2014

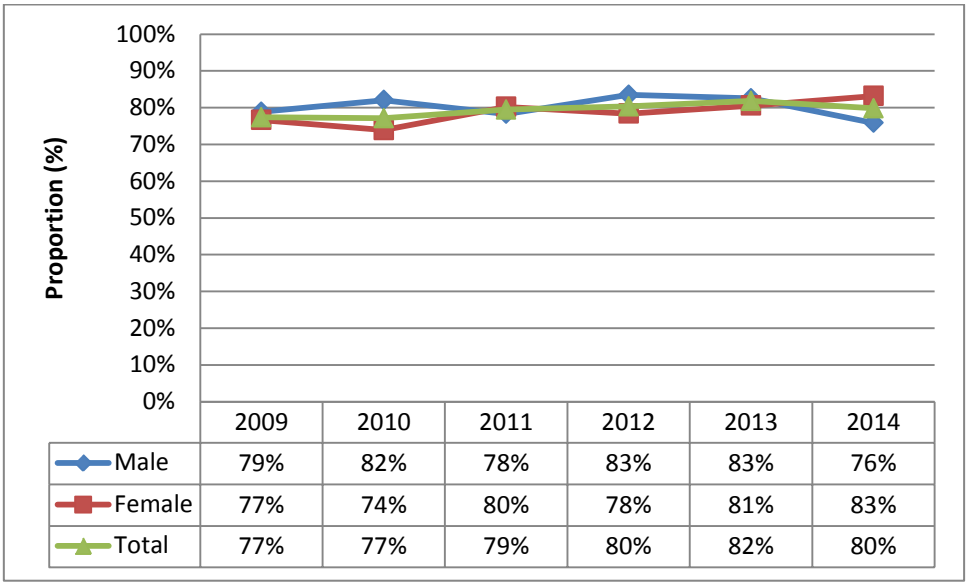


	2009	2010	2011	2012	2013	2014
16-19	85%	87%	85%	89%	91%	82%
20-24	84%	84%	84%	90%	91%	91%
25-29	84%	82%	83%	88%	89%	88%
30-34	78%	78%	78%	81%	84%	85%
≥35	57%	61%	60%	65%	64%	66%

* 'Unique' patients were only identified within each service

Whilst chlamydia testing uptake increased among female Aboriginal people from 2009-2014 (8% relative increase, $p=0.02$), testing rates remained stable overall.

Figure 3. Proportion of unique* Aboriginal people tested for chlamydia, by sex and year, 2009-2014

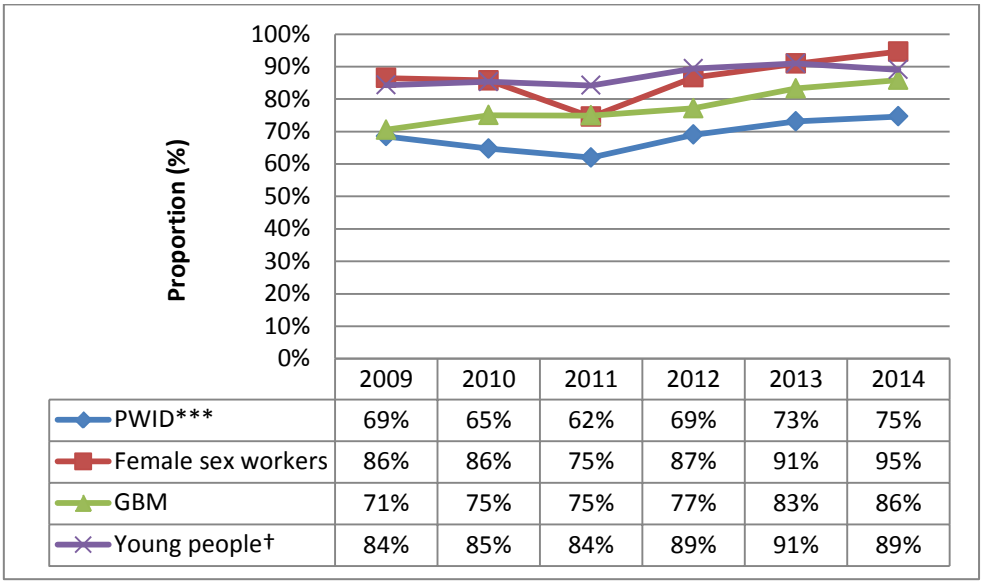


	2009	2010	2011	2012	2013	2014
Male	79%	82%	78%	83%	83%	76%
Female	77%	74%	80%	78%	81%	83%
Total	77%	77%	79%	80%	82%	80%

* 'Unique' patients were only identified within each service

Among other priority populations, the highest chlamydia testing uptake was among female sex workers. For young people, overall chlamydia testing uptake increased relatively by 6% from 84% in 2009 to 89% in 2014 (p=<0.001) The greatest increase in uptake was among GBM (21% relative increase, p<0.001).

Figure 4. Proportion of unique* patients tested for chlamydia, by priority population** and year, 2009-2014

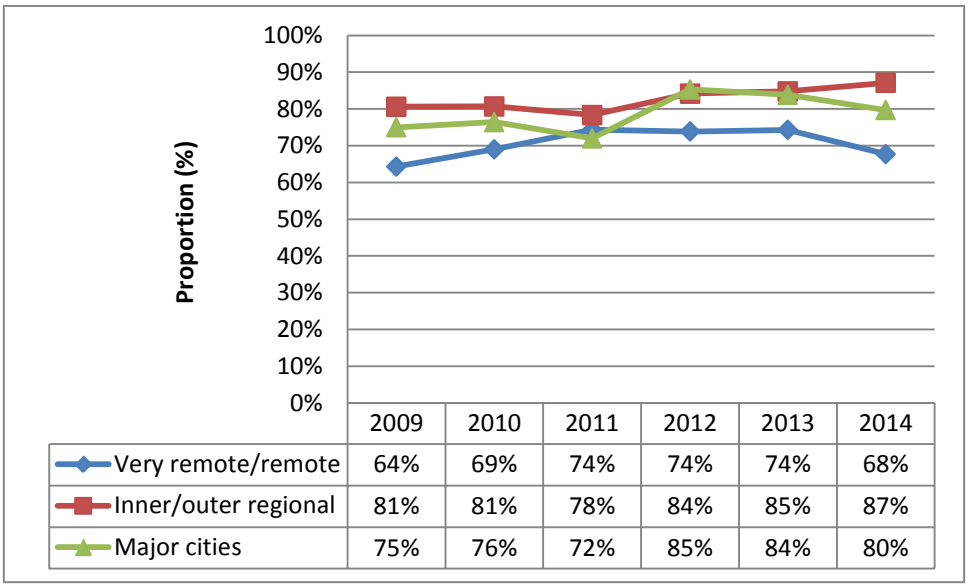


	2009	2010	2011	2012	2013	2014
PWID***	69%	65%	62%	69%	73%	75%
Female sex workers	86%	86%	75%	87%	91%	95%
GBM	71%	75%	75%	77%	83%	86%
Young people†	84%	85%	84%	89%	91%	89%

*'Unique' patients were only identified within each service
**Priority classifications are not mutually exclusive
***People who inject drugs
† Heterosexual patients aged <25 years old

Testing uptake was greatest among patients living in inner and outer regional areas, which had increased relatively by 7% from 2009 to 2014 (p<0.001). An increase in uptake was also seen in patients from remote and very remote areas (6% relative increase, p=0.01).

Figure 5. Proportion of unique* patients tested for chlamydia, by remoteness classification** and year, 2009-2014



	2009	2010	2011	2012	2013	2014
Very remote/remote	64%	69%	74%	74%	74%	68%
Inner/outer regional	81%	81%	78%	84%	85%	87%
Major cities	75%	76%	72%	85%	84%	80%

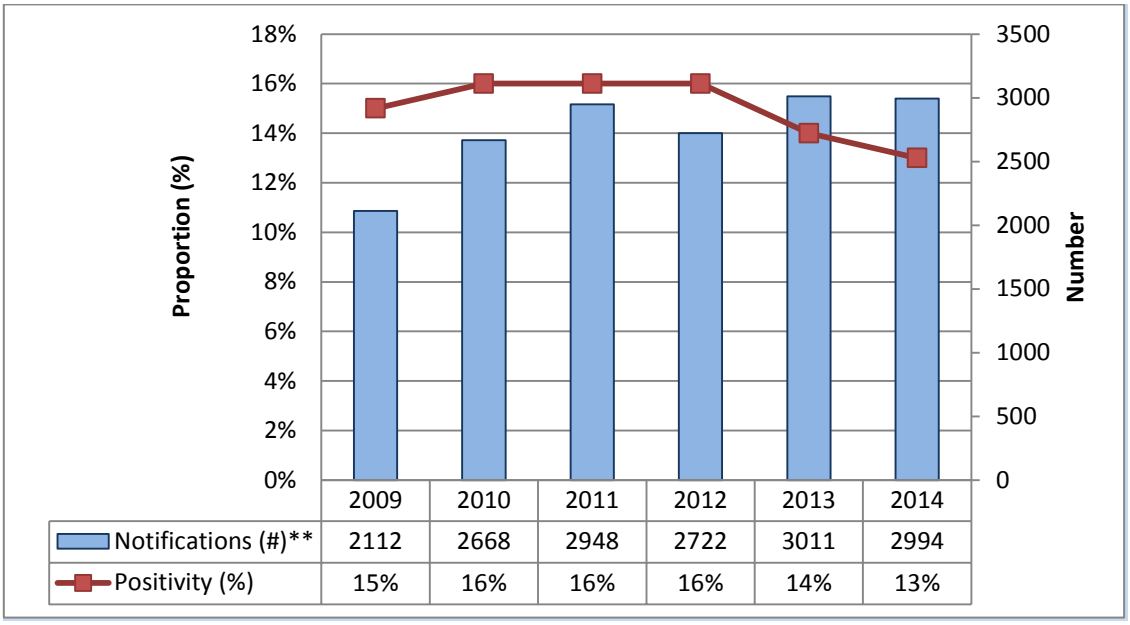
* 'Unique' patients were only identified within each service
** Classification based on patient postcode, using the Australian Standard Geographical Classification – Remoteness Areas

b) Chlamydia positivity

The following section reports on unique chlamydia positivity, which is the proportion of individuals tested each year diagnosed with chlamydia at any anatomical site.

Overall, chlamydia positivity at NT sexual health clinics decreased by 13% relatively from 2009 to 2014 ($p<0.001$), whilst chlamydia notifications increased by 41% across the NT during the same period (Figure 6). Chlamydia positivity was generally similar for males and females, decreasing significantly in females from 2009 to 2014 (13% relative decrease, $p=0.001$) (Figure 7).

Figure 6. Proportion of unique patients* tested for chlamydia with a positive result at sexual health clinics in NT and territory chlamydia notifications, by year, 2009-2014

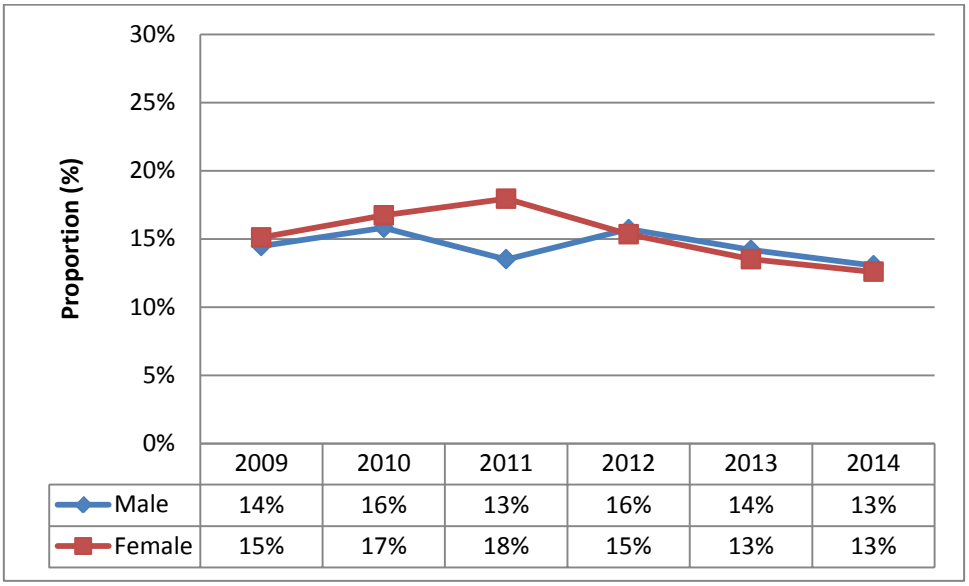


	2009	2010	2011	2012	2013	2014
Notifications (#)**	2112	2668	2948	2722	3011	2994
Positivity (%)	15%	16%	16%	16%	14%	13%

* '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 7. Proportion of unique patients* tested for chlamydia with a positive result at sexual health clinics in NT, by sex and year, 2009-2014

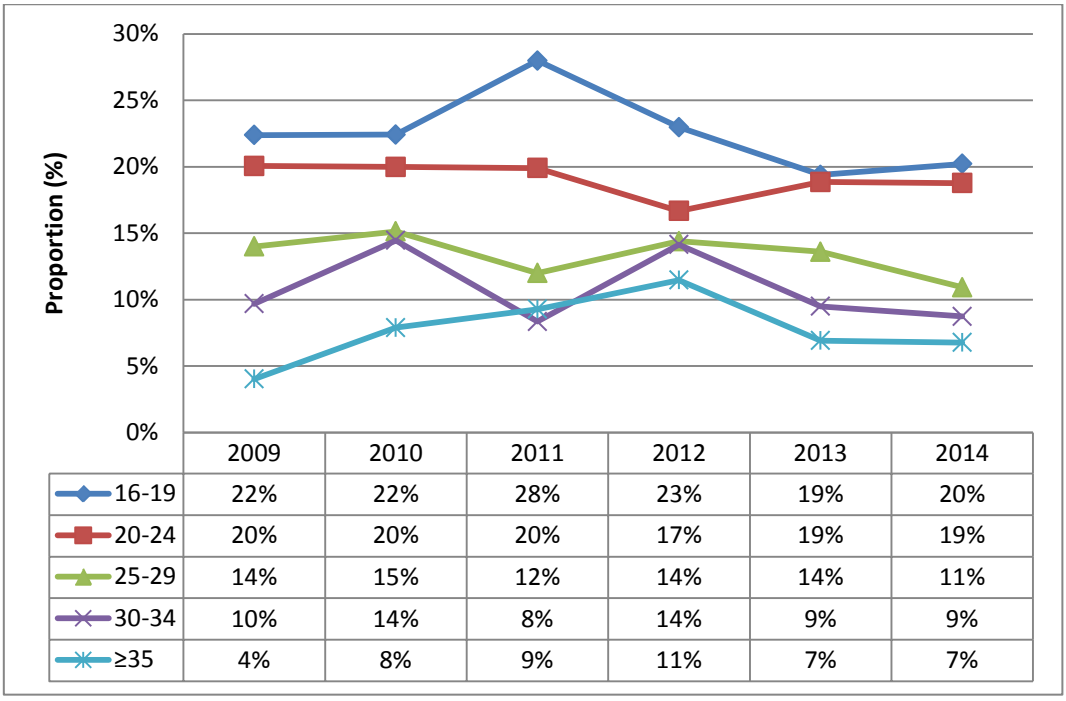


	2009	2010	2011	2012	2013	2014
Male	14%	16%	13%	16%	14%	13%
Female	15%	17%	18%	15%	13%	13%

* 'Unique' patients were only identified within each service
** Does not include patients of unknown sex

By age group, positivity was highest in patients aged 16-19 years (22% in 2009; 20% in 2014), followed by the 20-24 year age group (20% in 2009; 19% in 2014). The greatest change in chlamydia positivity was among patients aged 25-29 years, which fell 21% relatively from 2009 to 2014 (p=0.05).

Figure 8. Proportion of unique* patients tested for chlamydia with a positive result at sexual health clinics in NT, by age group and year, 2009-2014

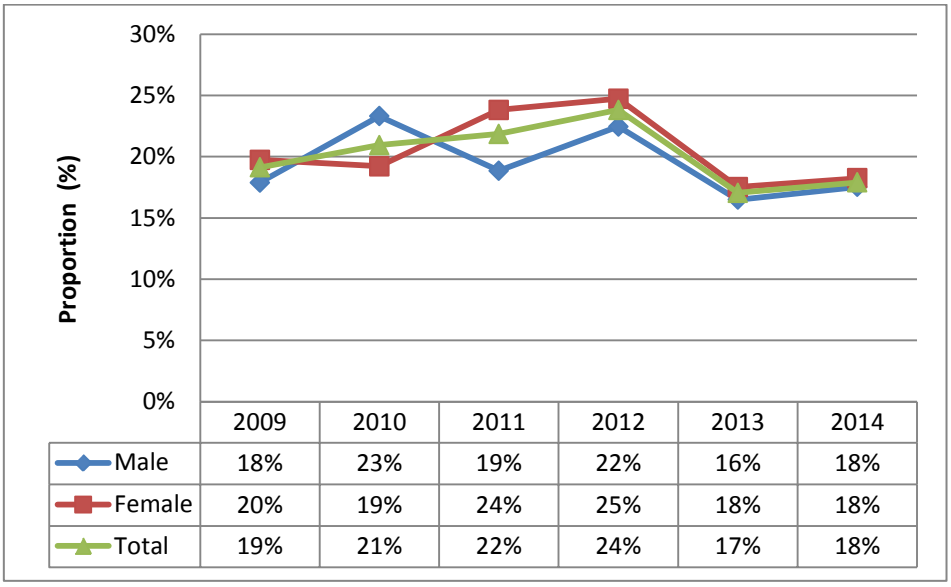


	2009	2010	2011	2012	2013	2014
16-19	22%	22%	28%	23%	19%	20%
20-24	20%	20%	20%	17%	19%	19%
25-29	14%	15%	12%	14%	14%	11%
30-34	10%	14%	8%	14%	9%	9%
≥35	4%	8%	9%	11%	7%	7%

* 'Unique' patients were only identified within each service

Chlamydia positivity among Aboriginal people was stable between 2009 and 2014 (p=0.48, Figure 9). Among young people, chlamydia positivity decreased by 10% (p=0.02) from 2009-2014. Among GBM, chlamydia positivity was stable from 2009 to 2014 (p=0.22) and due to small numbers fluctuated considerably among female sex workers and people reporting injecting drug use (Figure 10).

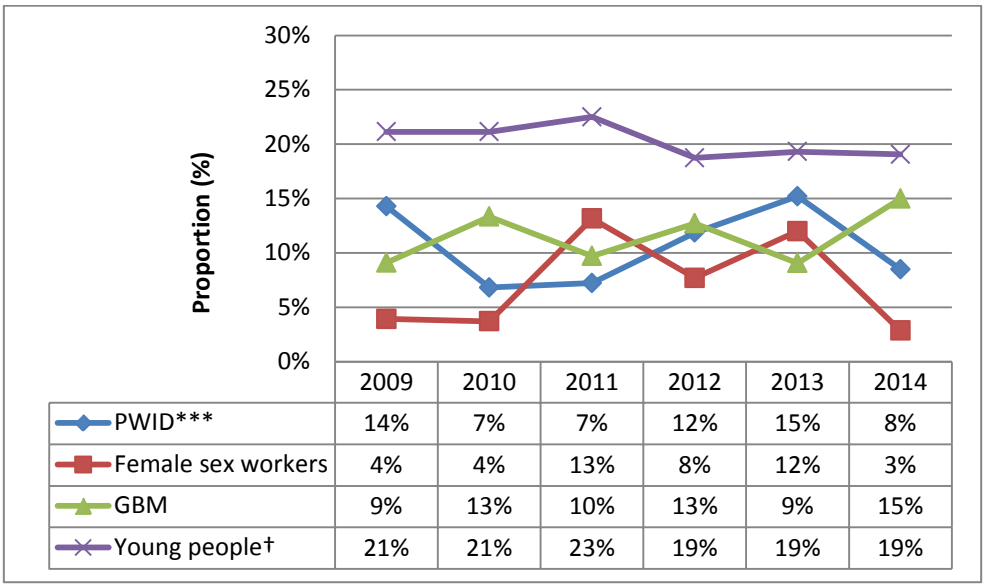
Figure 9. Proportion of unique* Aboriginal people tested for chlamydia with a positive result at sexual health clinics in NT, by sex and year, 2009-2014



	2009	2010	2011	2012	2013	2014
Male	18%	23%	19%	22%	16%	18%
Female	20%	19%	24%	25%	18%	18%
Total	19%	21%	22%	24%	17%	18%

* 'Unique' patients were only identified within each service

Figure 10. Proportion of unique* patients tested for chlamydia with a positive result at sexual health clinics in NT, by priority population** and year, 2009-2014



	2009	2010	2011	2012	2013	2014
PWID***	14%	7%	7%	12%	15%	8%
Female sex workers	4%	4%	13%	8%	12%	3%
GBM	9%	13%	10%	13%	9%	15%
Young people†	21%	21%	23%	19%	19%	19%

* 'Unique' patients were only identified within each service

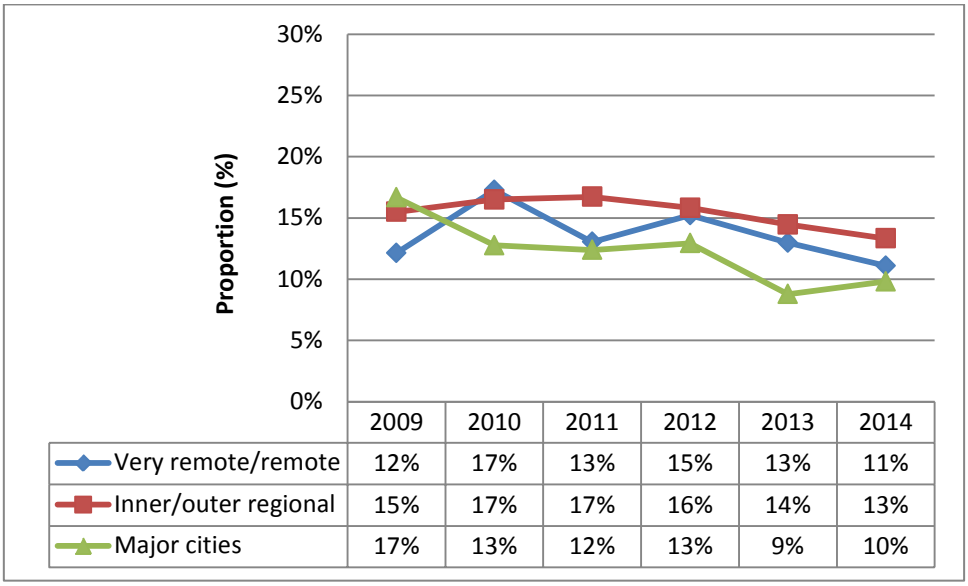
**Priority classifications are not mutually exclusive

***People who inject drugs

†Heterosexual patients aged <25 years old

Patients living in inner and outer regional areas generally had a higher chlamydia positivity than those in other geographical areas, but there was a 13% relative decrease in positivity among patients from in inner and outer regional areas in 2009 to 2014 (p=0.001).

Figure 11. Proportion of unique* patients tested for chlamydia with a positive result at sexual health clinics in NT, by remoteness classification** and year, 2009-2014



	2009	2010	2011	2012	2013	2014
Very remote/remote	12%	17%	13%	15%	13%	11%
Inner/outer regional	15%	17%	17%	16%	14%	13%
Major cities	17%	13%	12%	13%	9%	10%

* 'Unique' patients were only identified within each service

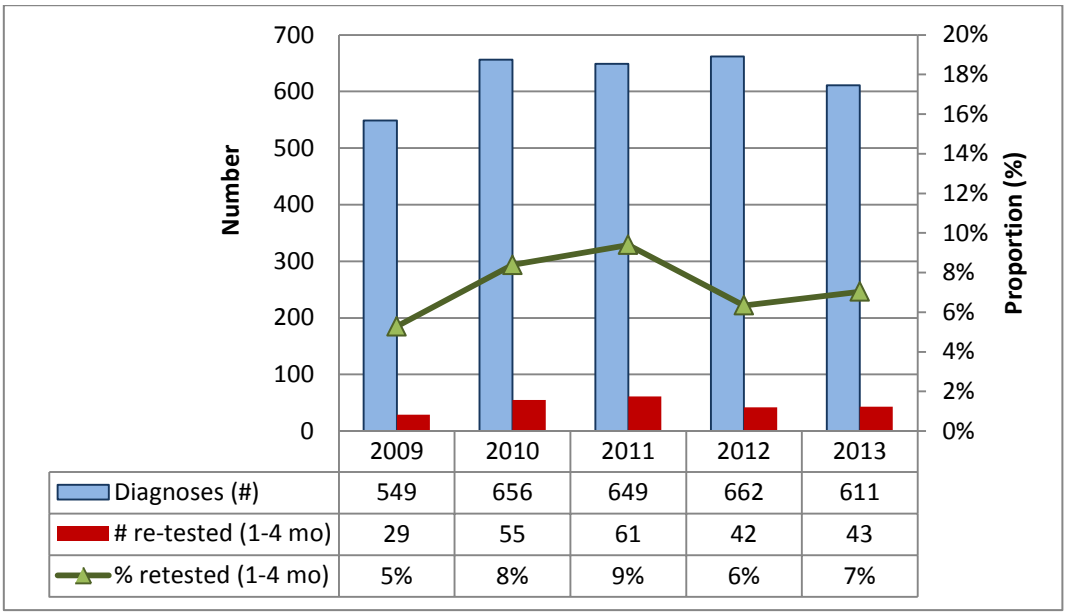
** Classification based on patient postcode, using the Australian Standard Geographical Classification – Remoteness Areas

c) Re-testing following a positive chlamydia diagnosis

The following section reports on re-testing following a positive chlamydia diagnosis. Sexual health testing guidelines recommend that patients diagnosed with chlamydia receive another test for chlamydia within three months to detect re-infection[14,15].

The proportion of patients retested within 1-4 months of a chlamydia diagnosis was low at 5% in 2009 and 7% in 2013 (p=0.78).

Figure 12. Number and proportion of patients re-tested for chlamydia within 1-4 months of a chlamydia diagnosis, by year, 2009-2013*



	2009	2010	2011	2012	2013
Diagnoses (#)	549	656	649	662	611
# re-tested (1-4 mo)	29	55	61	42	43
% retested (1-4 mo)	5%	8%	9%	6%	7%

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

[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.

Section 2: Gonorrhoea

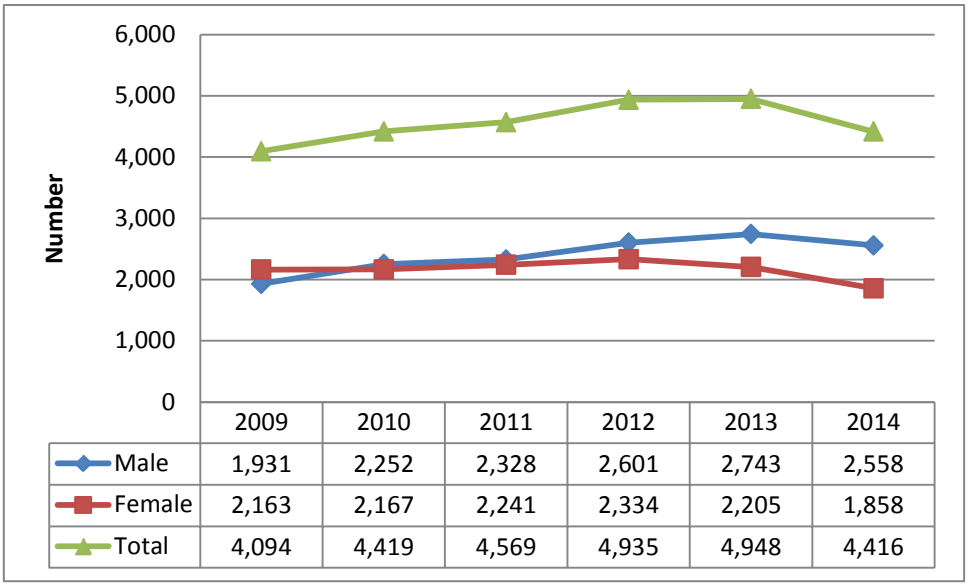
The following section reports on gonorrhoea testing among patients attending two sexual health clinics in the NT.

a) Gonorrhoea testing at sexual health clinics

Total gonorrhoea test episodes reflect the absolute number of gonorrhoea tests conducted per year, which might include multiple tests for the same patient. Multiple gonorrhoea tests conducted in the same week, however, were only counted once.

There was an increase of 8% in the total number of gonorrhoea test episodes over time. The number of test episodes increased by 32% among males and decreased by 14% among females.

Figure 13. Total number of gonorrhoea test episodes conducted at sexual health clinics in the NT, overall and by sex* and year, 2009-2014

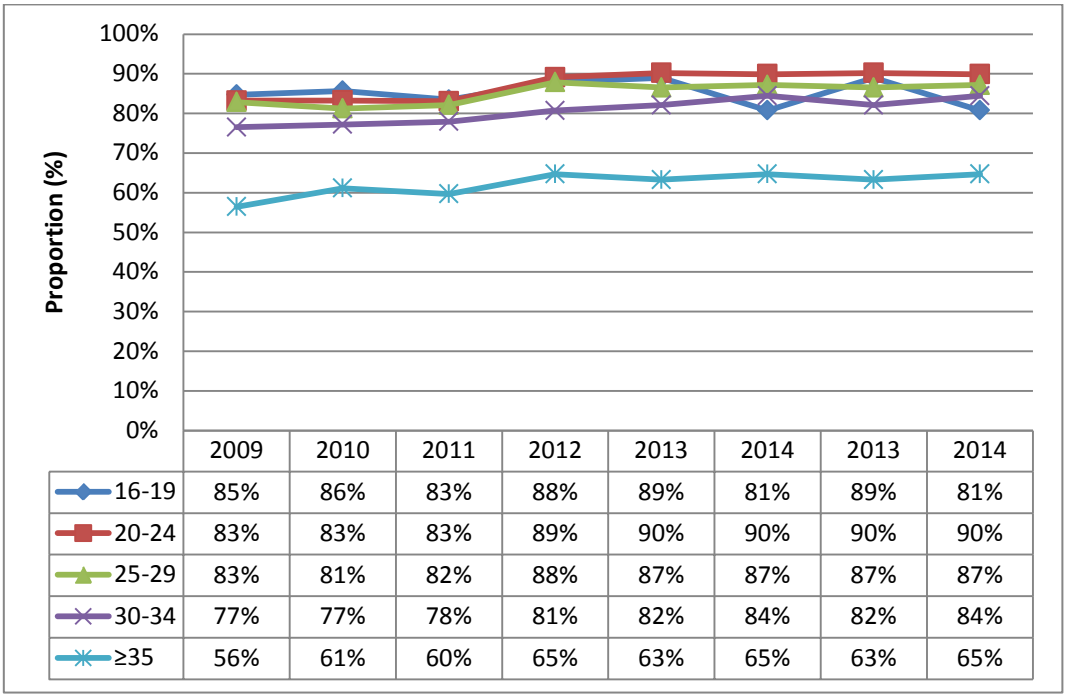


	2009	2010	2011	2012	2013	2014
Male	1,931	2,252	2,328	2,601	2,743	2,558
Female	2,163	2,167	2,241	2,334	2,205	1,858
Total	4,094	4,419	4,569	4,935	4,948	4,416

* Does not include patients of unknown sex

The following graphs report on the proportion of attending patients tested for gonorrhoea in a year ('testing uptake'). The greatest change in gonorrhoea testing uptake was among patients aged 35 years and older, which was lower overall than all other age groups but increased by 16% relatively from 2009 to 2014 ($p<0.001$).

Figure 14. Proportion of unique* patients tested for gonorrhoea, by age group and year, 2009-2014

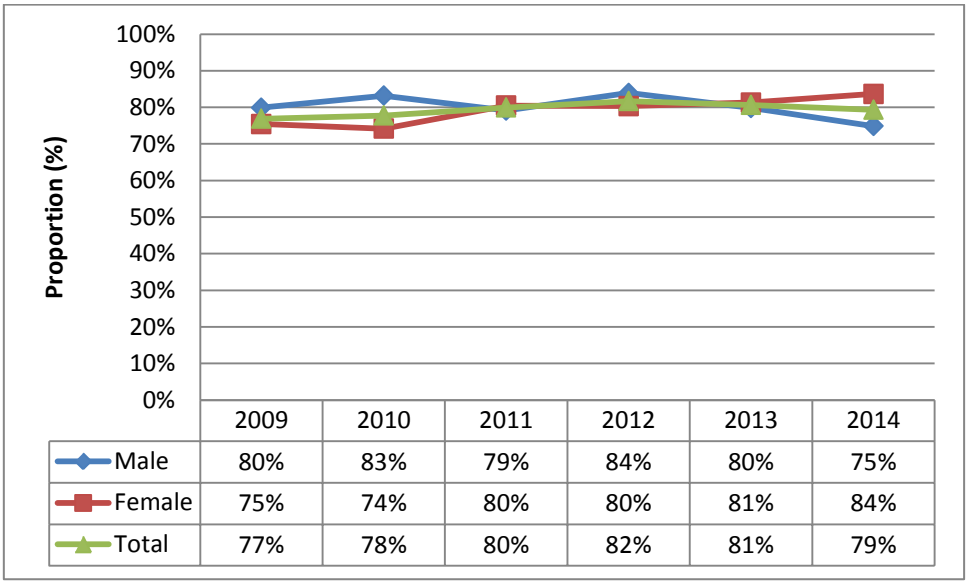


	2009	2010	2011	2012	2013	2014	2013	2014
16-19	85%	86%	83%	88%	89%	81%	89%	81%
20-24	83%	83%	83%	89%	90%	90%	90%	90%
25-29	83%	81%	82%	88%	87%	87%	87%	87%
30-34	77%	77%	78%	81%	82%	84%	82%	84%
≥35	56%	61%	60%	65%	63%	65%	63%	65%

* 'Unique' patients were only identified within each service

Among Aboriginal people, gonorrhoea testing uptake remained stable overall, whilst increasing in Aboriginal females (12% relative increase, p=0.002) (Figure 15). Gonorrhoea testing uptake in young people increased relatively by 5% (p=<0.001). Among other priority populations (Figure 16), the highest gonorrhoea testing uptake was among female sex workers. The greatest increase in testing uptake was among GBM (23% relative increase, p<0.001).

Figure 15. Proportion of unique* Aboriginal people tested for gonorrhoea, by sex and year, 2009-2014



	2009	2010	2011	2012	2013	2014
Male	80%	83%	79%	84%	80%	75%
Female	75%	74%	80%	80%	81%	84%
Total	77%	78%	80%	82%	81%	79%

* 'Unique' patients were only identified within each service

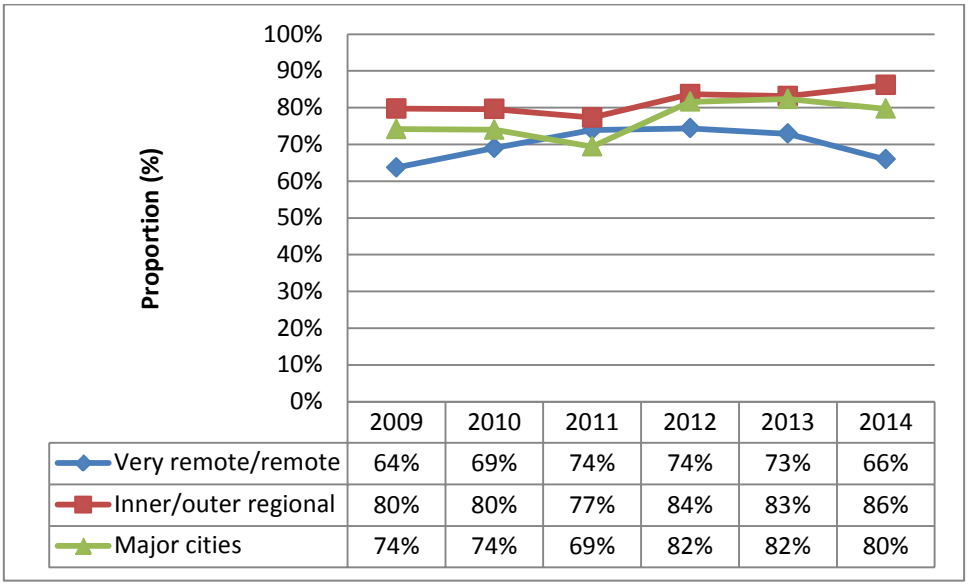
Figure 16. Proportion of unique* patients tested for gonorrhoea, by priority population** and year, 2009-2014

	2009	2010	2011	2012	2013	2014
PWID***	69%	65%	62%	68%	71%	72%
Female sex workers	86%	86%	75%	87%	91%	95%
GBM	69%	74%	76%	77%	82%	85%
Young people†	84%	84%	83%	89%	89%	88%

* 'Unique' patients were only identified within each service
**Priority classifications are not mutually exclusive
***People who inject drugs
†Heterosexual patients aged <25 years old

Testing uptake was highest among patients with an inner/outer regional postcode, with uptake increasing over time (8% relative increase, p<0.001). A significant increase in testing uptake was also seen in patients with a city postcode (relative increase 8%, p=0.04).

Figure 17. Proportion of unique* patients tested for gonorrhoea, by remoteness classification** and year, 2009-2014



	2009	2010	2011	2012	2013	2014
Very remote/remote	64%	69%	74%	74%	73%	66%
Inner/outer regional	80%	80%	77%	84%	83%	86%
Major cities	74%	74%	69%	82%	82%	80%

*'Unique' patients were only identified within each service

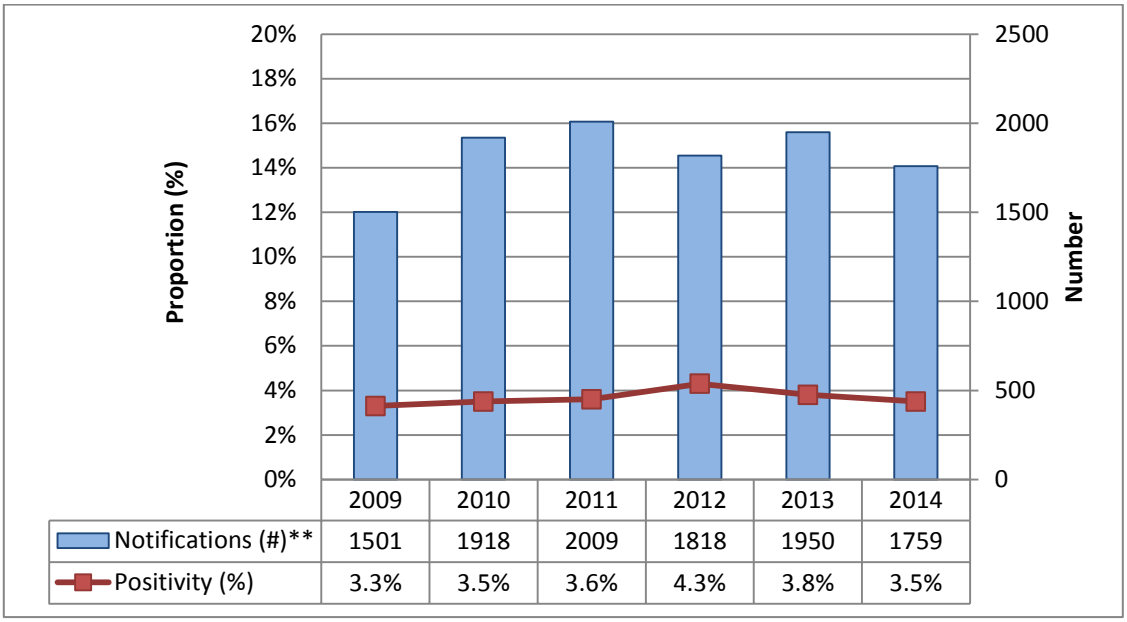
** Classification based on patient postcode, using the Australian Standard Geographical Classification – Remoteness Areas

a) Gonorrhoea positivity

The following section reports on unique gonorrhoea positivity, which is the proportion of individuals tested each year diagnosed with gonorrhoea at any anatomical site.

Overall, gonorrhoea positivity in sexual health clinics remained stable from 2009 to 2014, with territory notifications increasing by 17% during this period (Figure 18). There was a 29% relative increase in gonorrhoea positivity among male patients from 2009 to 2014 (p=0.04; Figure 19).

Figure 18. Proportion of unique patients* tested for gonorrhoea with a positive result at sexual health clinics in the NT and territory gonorrhoea notifications, by year, 2009-2014

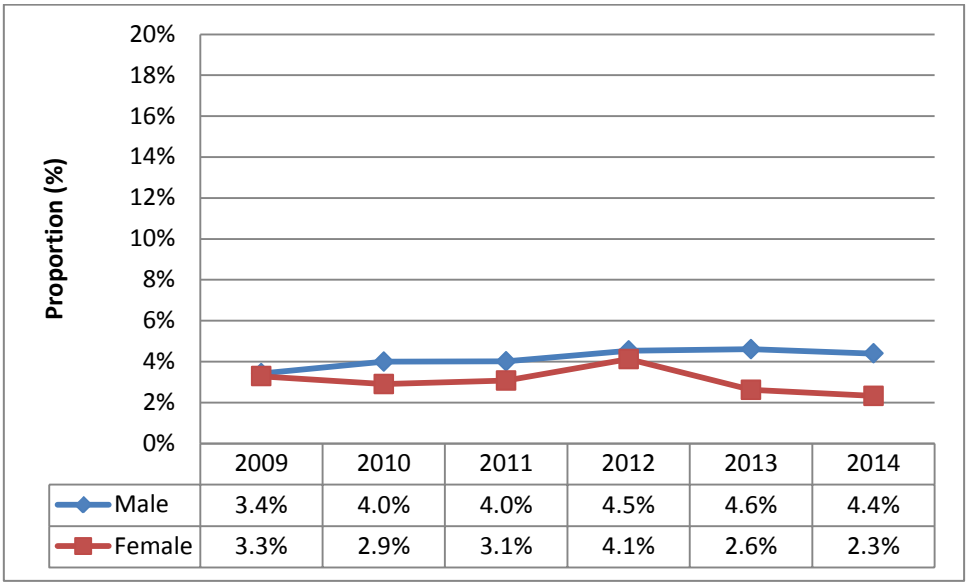


	2009	2010	2011	2012	2013	2014
Notifications (#)**	1501	1918	2009	1818	1950	1759
Positivity (%)	3.3%	3.5%	3.6%	4.3%	3.8%	3.5%

* '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 19. Proportion of unique* patients tested for gonorrhoea with a positive result at sexual health clinics in NT, by sex** and year, 2009-2014



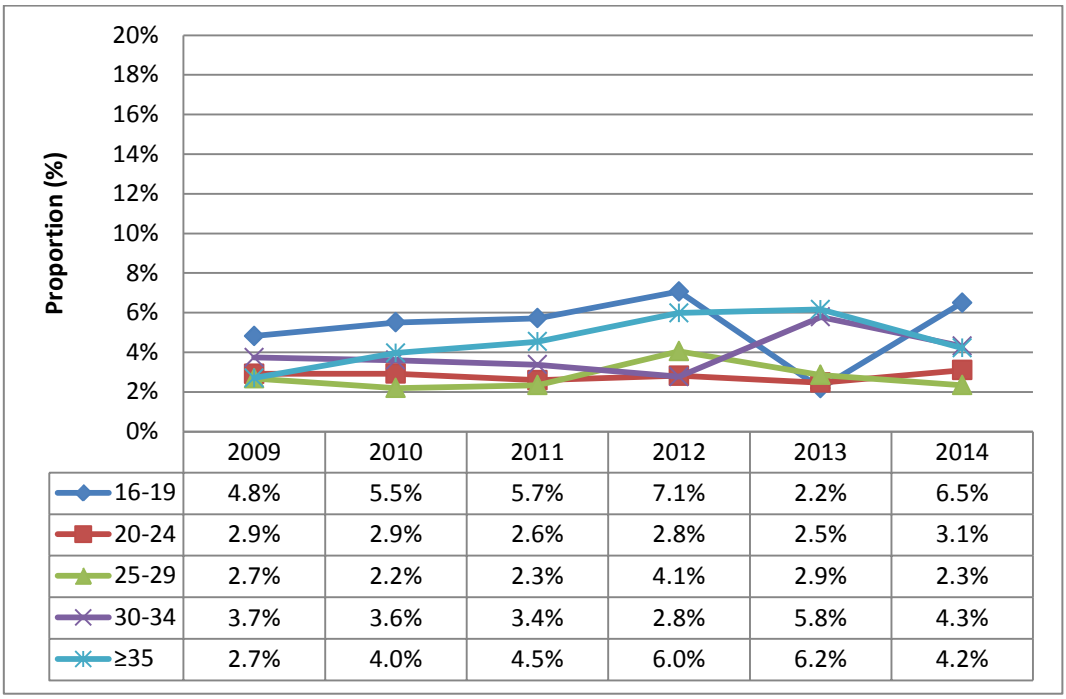
	2009	2010	2011	2012	2013	2014
Male	3.4%	4.0%	4.0%	4.5%	4.6%	4.4%
Female	3.3%	2.9%	3.1%	4.1%	2.6%	2.3%

* 'Unique' patients were only identified within each service

** Does not include patients of unknown sex

The greatest change in gonorrhoea positivity from 2009 to 2014 was among patients aged 35 years and older, increasing by 56% relatively (p=0.02). During this period there was also a 35% relative increase in positivity among patients aged 16-19 years old (p<0.01), who generally had the highest gonorrhoea positivity of any other age group.

Figure 20. Proportion of unique patients* tested for gonorrhoea with a positive result at sexual health clinics in NT, by age group and year, 2009-2014

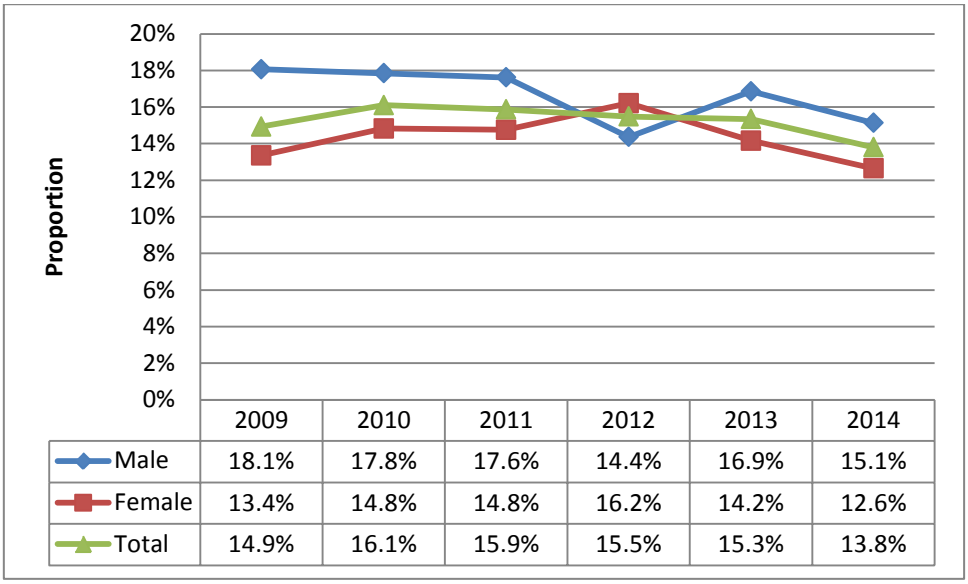


	2009	2010	2011	2012	2013	2014
16-19	4.8%	5.5%	5.7%	7.1%	2.2%	6.5%
20-24	2.9%	2.9%	2.6%	2.8%	2.5%	3.1%
25-29	2.7%	2.2%	2.3%	4.1%	2.9%	2.3%
30-34	3.7%	3.6%	3.4%	2.8%	5.8%	4.3%
≥35	2.7%	4.0%	4.5%	6.0%	6.2%	4.2%

* 'Unique' patients were only identified within each service

Gonorrhoea positivity rates were generally higher in Aboriginal males compared to Aboriginal females,, with positivity 13.8% overall in 2014. Over time, there were no significant changes in positivity rates.

Figure 21. Proportion of unique* Aboriginal people tested for gonorrhoea with a positive result at sexual health clinics in NT, by sex and year, 2009-2014

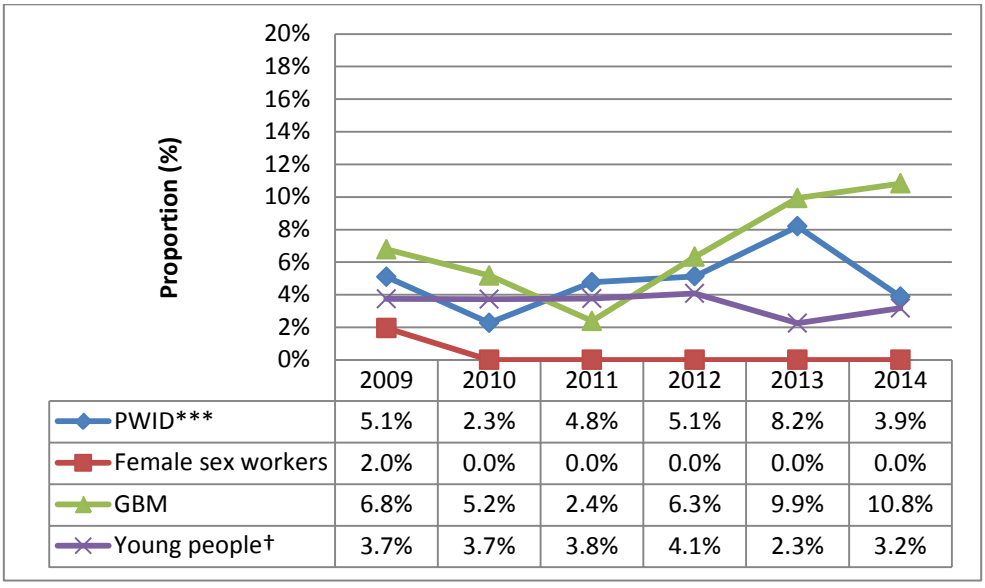


	2009	2010	2011	2012	2013	2014
Male	18.1%	17.8%	17.6%	14.4%	16.9%	15.1%
Female	13.4%	14.8%	14.8%	16.2%	14.2%	12.6%
Total	14.9%	16.1%	15.9%	15.5%	15.3%	13.8%

* 'Unique' patients were only identified within each service

Among other priority populations, total numbers of gonorrhoea diagnoses were very low for injecting drug users and female sex workers. There were no gonorrhoea diagnoses for female sex workers from 2010-2014. Among young people, there were no significant changes in positivity over time, while among GBM, gonorrhoea positivity increased from 6.8% to 10.8% in 2014 (59% relative increase, p=0.002).

Figure 22. Proportion of unique* patients tested for gonorrhoea with a positive result at sexual health clinics in NT, by priority population** and year, 2009-2014

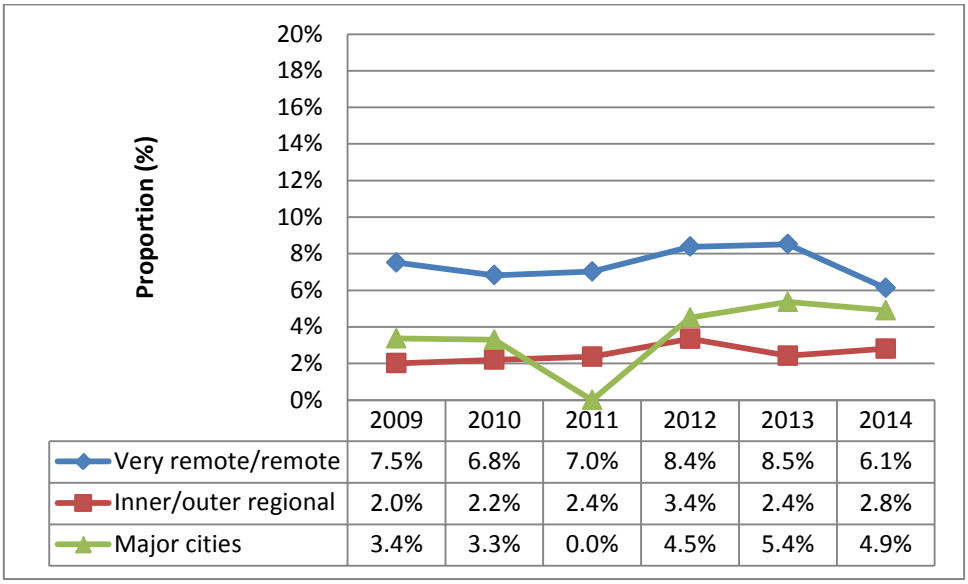


	2009	2010	2011	2012	2013	2014
PWID***	5.1%	2.3%	4.8%	5.1%	8.2%	3.9%
Female sex workers	2.0%	0.0%	0.0%	0.0%	0.0%	0.0%
GBM	6.8%	5.2%	2.4%	6.3%	9.9%	10.8%
Young people†	3.7%	3.7%	3.8%	4.1%	2.3%	3.2%

* 'Unique' patients were only identified within each service
**Priority classifications are not mutually exclusive
***People who inject drugs
†Heterosexual patients aged <25 years old

From 2009 to 2014, gonorrhoea positivity increased by 40% among patients living in inner and outer regional areas (p=0.03) but was higher overall in people living remote and very remote areas (7.5% in 2009 and 6.1% in 2014).

Figure 23. Proportion of unique* patients tested for gonorrhoea with a positive result at sexual health clinics in NT, by remoteness classification** and year, 2009-2014



	2009	2010	2011	2012	2013	2014
Very remote/remote	7.5%	6.8%	7.0%	8.4%	8.5%	6.1%
Inner/outer regional	2.0%	2.2%	2.4%	3.4%	2.4%	2.8%
Major cities	3.4%	3.3%	0.0%	4.5%	5.4%	4.9%

* 'Unique' patients were only identified within each service

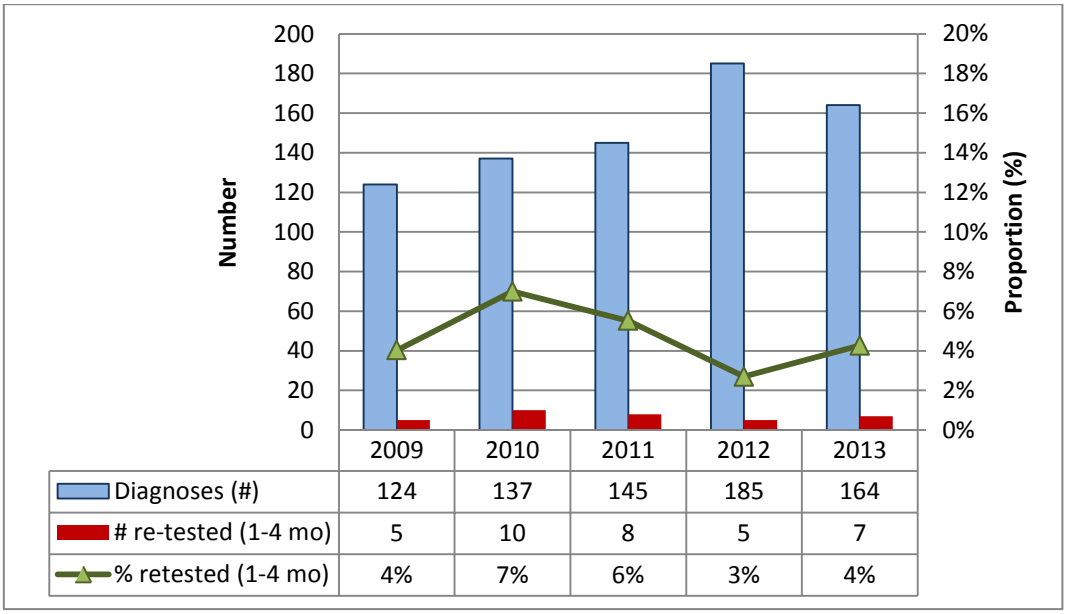
** Classification based on patient postcode, using the Australian Standard Geographical Classification – Remoteness Areas

c) Re-testing following a positive gonorrhoea diagnosis

The following section reports on re-testing following a positive gonorrhoea diagnosis. Sexual health testing guidelines recommend that patients diagnosed with gonorrhoea receive another test within 3 months to detect re-infection[16,17].

From 2009 to 2013, the number and proportion of patients retested within 1-4 months of a gonorrhoea were low. Re-testing rates fluctuated from 2009 to 2013 with no trend over time.

Figure 24. Number and proportion of patients re-tested for gonorrhoea within 1-4 months of a gonorrhoea diagnosis, by year, 2009-2013*



	2009	2010	2011	2012	2013
Diagnoses (#)	124	137	145	185	164
# re-tested (1-4 mo)	5	10	8	5	7
% retested (1-4 mo)	4%	7%	6%	3%	4%

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

[16] Australian Sexual Health Alliance. *Australian STI Management Guidelines for use in Primary Care*. 2014.

[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.

Section 3: Trichomonas

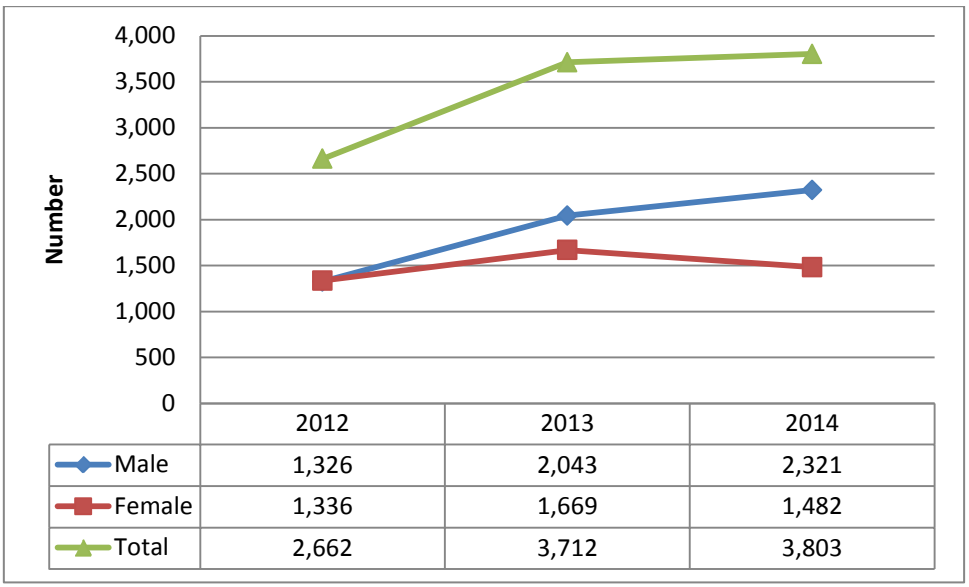
The following section reports on trichomonas testing among patients attending two sexual health clinics in the NT. From 2009 to 2011, details on trichomonas testing were not routinely recorded in patient management systems; trichomonas information is presented from 2012 to 2014.

a) Trichomonas testing at sexual health clinics

Total trichomonas testing episodes reflect the absolute number of trichomonas tests conducted per year, which might include multiple tests for the same patient. Multiple trichomonas tests conducted in the same week, however, were only counted once.

The total number of trichomonas test episodes increased by 43% from 2012 to 2014: 75% in male patients and 25% in females.

Figure 25. Total number of trichomonas test episodes conducted at sexual health clinics in the NT, overall and by sex* and year, 2012-2014

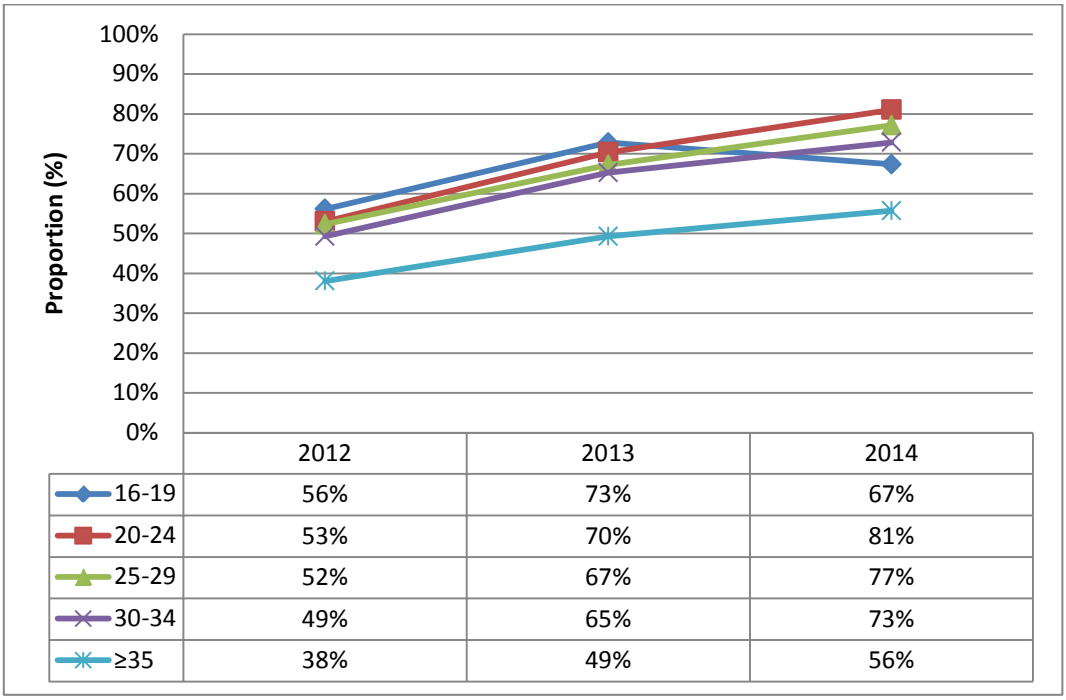


	2012	2013	2014
Male	1,326	2,043	2,321
Female	1,336	1,669	1,482
Total	2,662	3,712	3,803

*Does not include patients of unknown sex

The following graphs report on the proportion of attending patients tested for trichomonas in a year ('testing uptake'). Testing uptake increased significantly across all age groups from 2012 to 2014 (p's<0.001), with the greatest increase among patients aged 20-24 years (53% relative increase, p<0.001).

Figure 26. Proportion of unique* patients who were tested for trichomonas, by age group and year, 2012-2014

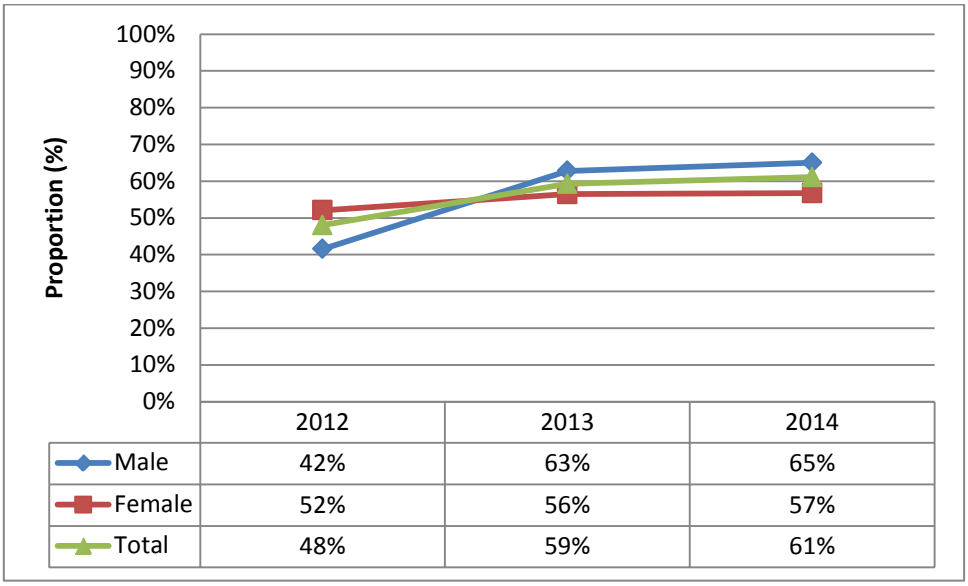


	2012	2013	2014
16-19	56%	73%	67%
20-24	53%	70%	81%
25-29	52%	67%	77%
30-34	49%	65%	73%
≥35	38%	49%	56%

* 'Unique' patients were only identified within each service

From 2012 to 2014, uptake of trichomonas testing increased overall in Aboriginal people (27% relative increase, p<0.001), although not significantly in Aboriginal females, whilst testing in males increased by 55% (p<0.001).

Figure 27. Proportion of unique* Aboriginal people who were tested for trichomonas, by sex and year, 2012-2014

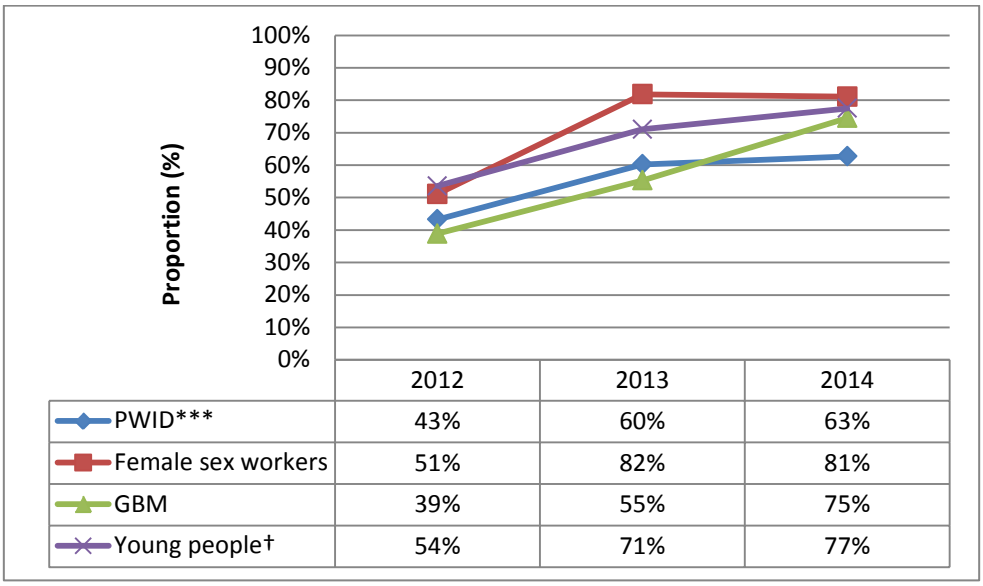


	2012	2013	2014
Male	42%	63%	65%
Female	52%	56%	57%
Total	48%	59%	61%

* 'Unique' patients were only identified within each service

Uptake of trichomonas testing increased among all other priority populations from 2012 to 2014 (p's<0.001), with the greatest increase among GBM (92% relative increase, p<0.001). Testing uptake was highest among female sex workers.

Figure 28. Proportion of unique* patients who were tested for trichomonas, by priority population** and year, 2012-2014

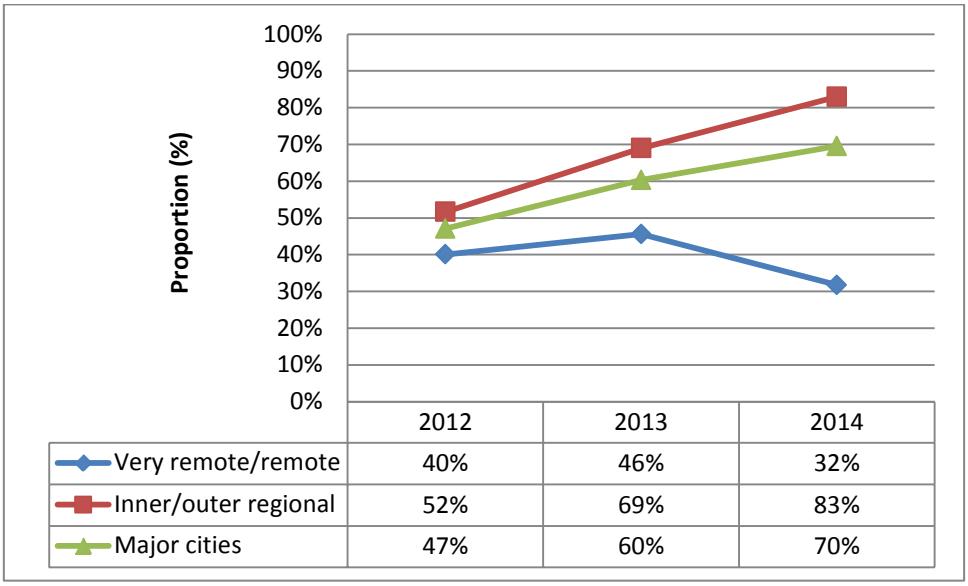


	2012	2013	2014
PWID***	43%	60%	63%
Female sex workers	51%	82%	81%
GBM	39%	55%	75%
Young people†	54%	71%	77%

* 'Unique' patients were only identified within each service
**Priority classifications are not mutually exclusive
***People who inject drugs
†Heterosexual patients aged <25 years old

Although from 2012 to 2014 trichomonas testing uptake increased dramatically among patients living major cities and inner and outer regional areas, it was lower and decreased by 20% relatively among patients living in remote and very remote parts of the territory (p<0.001).

Figure 29. Proportion of unique* patients who were tested for trichomonas, by remoteness classification** and year, 2012-2014



	2012	2013	2014
Very remote/remote	40%	46%	32%
Inner/outer regional	52%	69%	83%
Major cities	47%	60%	70%

* 'Unique' patients were only identified within each service

** Classification based on patient postcode, using the Australian Standard Geographical Classification – Remoteness Areas

The proportion of tests performed in symptomatic patients decreased overall, from 40% in 2012 to 31% in 2014 (23% relative decrease, p<0.001).

Table 1: Proportion of trichomonas tests conducted in patients that were symptomatic*, overall and by sex** and year, 2012-2014

	Symptomatic (%)			
	2012	2013	2014	Trend
Male	37%	32%	31%	p<0.001
Female	43%	33%	32%	p<0.001
Total	40%	33%	31%	p<0.001

*Excludes patients for whom symptom details were not available

**Does not include patients of unknown sex

b) Trichomonas positivity

The following section reports on unique trichomonas positivity, which is the proportion of individuals each year who were diagnosed with trichomonas. Because of small numbers, trichomonas positivity has been presented as a table instead of a graph.

Table 2 details trichomonas notifications in the NT and test positivity at sexual health clinics. Overall, trichomonas positivity fell, from 2.8% in 2012 to 1.4% in 2014 (p<0.001), whilst notifications across the NT increased by 41%. While positivity fell among both male and female patients, the greatest decrease was in men (64% relative decrease, p=0.03). Positivity fell by 34% among Aboriginal people (p=0.03) and among patients living in inner and outer regional areas (63% relative decr4ease, p=0.003). Overall, trichomonas positivity was highest among Aboriginal women (24% in 2014) and lowest among female sex workers (zero diagnoses in 2014).

Table 2. NT notifications* and trichomonas diagnoses at sexual health clinics in the NT, by sex, age group, Aboriginal status, priority population**, remoteness classification*** and year, 2009-2014

	Year n (%)				
	2012	2013	2014	Relative change	p-value
Notifications (#)	2482	2972	3508	+41%	--
Positivity at sexual health clinics	67 (2.8%)	48 (1.5%)	44 (1.4%)	-50%	<0.001
Sex					
Female	54 (4.6%)	40 (3.0%)	37 (3.0%)	-35%	0.04
Male	13 (1.1%)	8 (0.5%)	7 (0.4%)	-64%	0.03
Age group (years)					
16-19	12 (4.2%)	9 (2.7%)	5 (2.2%)	-48%	0.2
20-24	11 (1.6%)	8 (0.9%)	10 (1.0%)	-38%	0.39
25-29	9 (1.5%)	6 (0.7%)	7 (0.7%)	-53%	0.16
30-34	3 (1.0%)	7 (1.6%)	3 (0.7%)	-30%	0.62
≥ 35	28 (5.9%)	16 (2.5%)	19 (3.1%)	-47%	0.03
Aboriginal people					
Female	46 (24.5%)	34 (21.7%)	28 (23.7%)	-3%	0.83
Male	5 (5.4%)	3 (2.1%)	2 (1.5%)	-61%	0.14
Overall	51 (18.1%)	37 (12.5%)	30 (12.0%)	-34%	0.03
Priority population					
PWID†	1 (1.4%)	1 (1.0%)	4 (4.5%)	+221%	0.19
Female sex workers	--	1 (2.2%)	--	--	--
GBM	--	--	2 (0.7%)	--	--
Young people‡	27 (2.8%)	19 (1.6%)	15 (1.3%)	-67%	0.01
Remoteness					
Very remote/remote	31 (7.9%)	16 (3.8%)	21 (7.4%)	-6%	0.53
Inner/outer regional	29 (1.6%)	25 (1.0%)	16 (0.6%)	-63%	0.003
Major cities	--	--	1 (1.1%)	--	--

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

**Priority classifications are not mutually exclusive

*** Classification based on patient postcode, using the Australian Standard Geographical Classification – Remoteness Areas

†People who inject drugs

‡Heterosexual patients aged <25 years

Section 4: Infectious syphilis

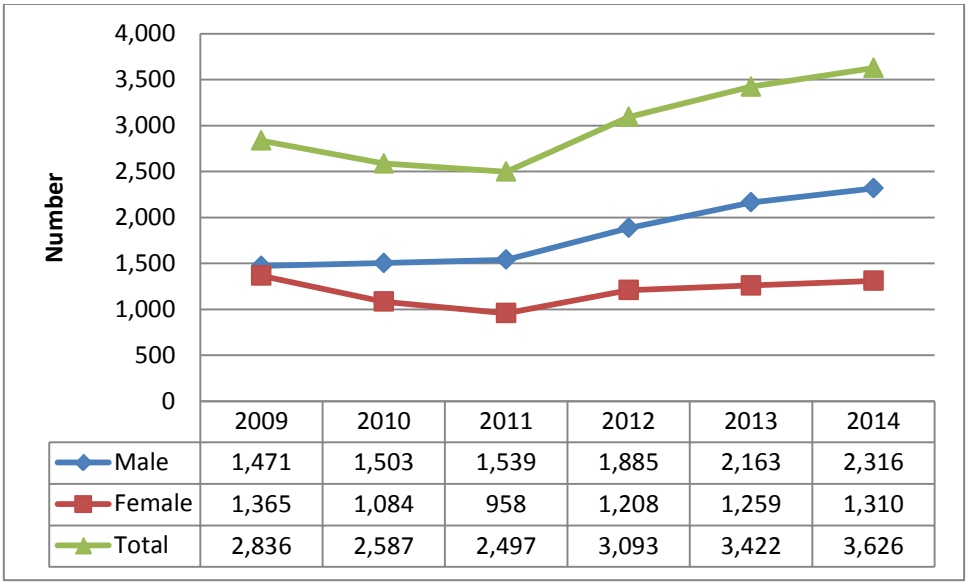
The following section reports on syphilis testing among patients attending two sexual health clinics in the NT.

a) Syphilis testing at sexual health clinics

Total syphilis test episodes reflect the absolute number of syphilis tests conducted per year, which might include multiple tests for the same patient. Multiple syphilis tests conducted in the same week, however, were only counted once.

There was an increase of 28% in the number of syphilis test episodes between 2009 and 2014, with a 57% increase in males and a slight 4% decrease in females.

Figure 30. Total number of syphilis test episodes conducted sexual health clinics in the NT, overall and by sex* and year, 2009-2014

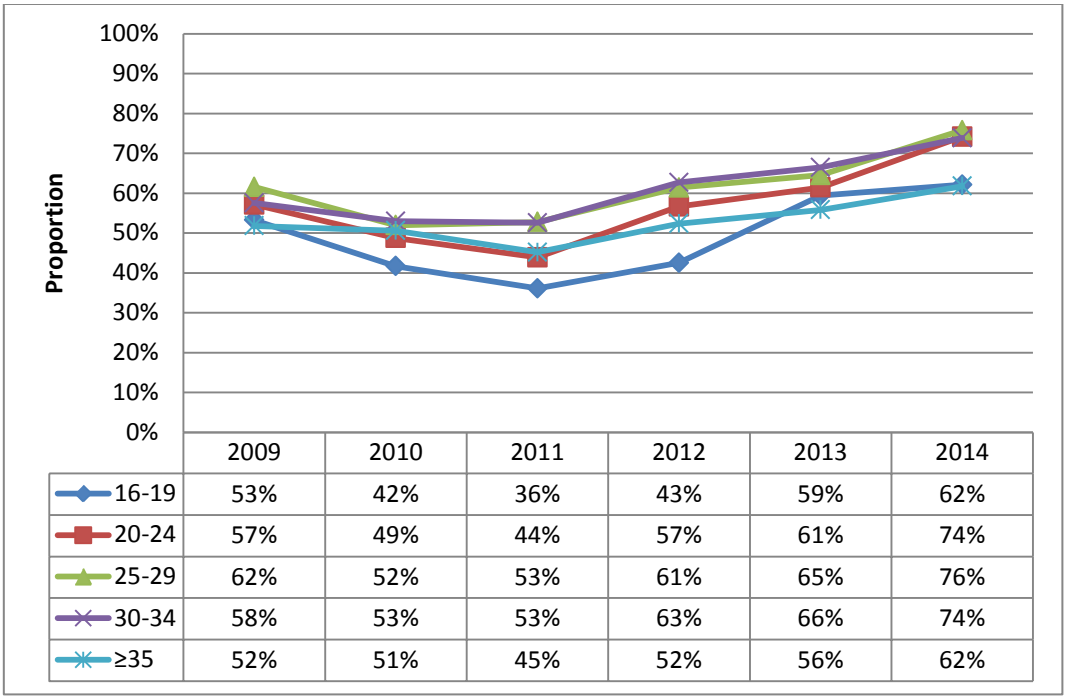


	2009	2010	2011	2012	2013	2014
Male	1,471	1,503	1,539	1,885	2,163	2,316
Female	1,365	1,084	958	1,208	1,259	1,310
Total	2,836	2,587	2,497	3,093	3,422	3,626

* Does not include patients of unknown sex

The following graphs report on the proportion of attending patients tested for syphilis in a year ('testing uptake'). After declining from 2009 to 2011, syphilis testing uptake increased steadily across age groups from 2011 to 2014. The greatest increase in testing uptake was among people aged 20-24 years (30% relative increase, p<0.001).

Figure 31. Proportion of unique patients* tested for syphilis, by age group and year, 2009-2014

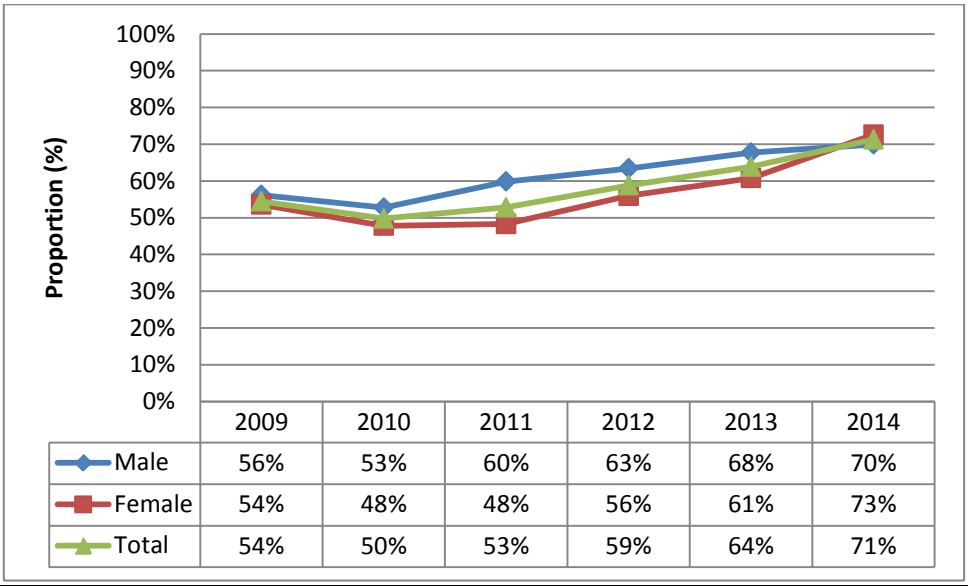


	2009	2010	2011	2012	2013	2014
16-19	53%	42%	36%	43%	59%	62%
20-24	57%	49%	44%	57%	61%	74%
25-29	62%	52%	53%	61%	65%	76%
30-34	58%	53%	53%	63%	66%	74%
≥35	52%	51%	45%	52%	56%	62%

* 'Unique' patients were only identified within each service

Among Aboriginal people, syphilis testing uptake increased overall (31% relative increase, p<0.001), in both males and females (25% and 35% relative increases, respectively, p's<0.001).

Figure 32. Proportion of unique* Aboriginal people tested for syphilis, by sex and year, 2009-2014



	2009	2010	2011	2012	2013	2014
Male	56%	53%	60%	63%	68%	70%
Female	54%	48%	48%	56%	61%	73%
Total	54%	50%	53%	59%	64%	71%

* ‘Unique’ patients were only identified within each service

Among other priority populations, the greatest increase in syphilis testing uptake from 2009 to 2014 was among young people, with a relative increase of 27% (p<0.001). Uptake also increased among GBM (12% relative increase, p<0.001), while remaining stable for patients reporting injecting drug use and female sex workers.

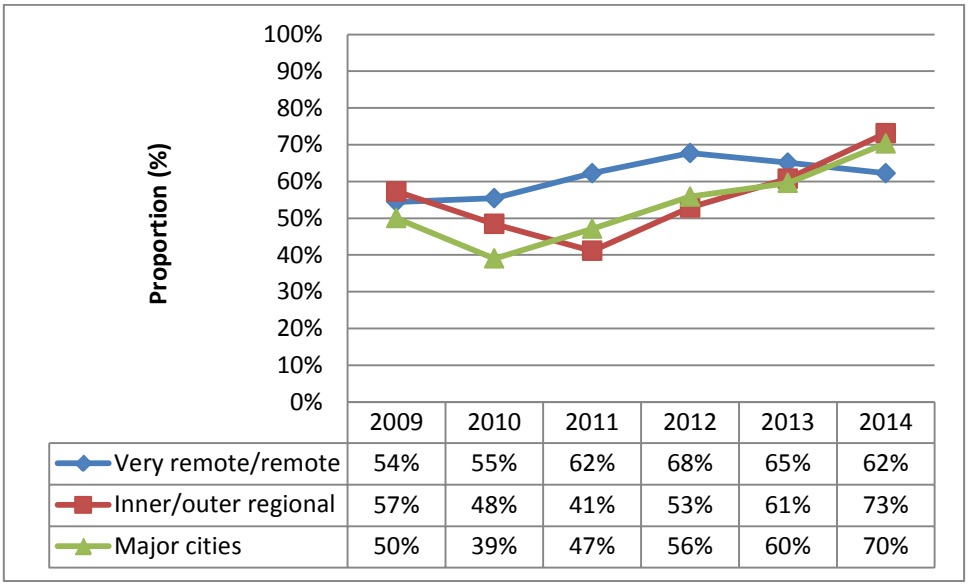
Figure 33. Proportion of unique* patients tested for syphilis by other priority populations** and year, 2009-2014

	2009	2010	2011	2012	2013	2014
PWID***	72%	64%	57%	64%	65%	70%
Female sex workers	73%	62%	41%	60%	80%	76%
GBM	74%	71%	68%	78%	77%	83%
Young people†	55%	46%	40%	51%	60%	70%

* ‘Unique’ patients were only identified within each service
**Priority classifications are not mutually exclusive
***People who inject drugs
†Heterosexual patients aged <25 years old

The greatest change in syphilis testing uptake from 2009 to 2014 was among patients from major cities, increase 40% during this period (p<0.001). There were also significant increases among patients from regional areas (28% relative increase, p<0.001) and those from remote and very remote parts of the NT (15% relative increase, p<0.001).

Figure 34. Proportion of unique* patients tested for syphilis, by remoteness classification** and year, 2009-2014



	2009	2010	2011	2012	2013	2014
Very remote/remote	54%	55%	62%	68%	65%	62%
Inner/outer regional	57%	48%	41%	53%	61%	73%
Major cities	50%	39%	47%	56%	60%	70%

* 'Unique' patients were only identified within each service

** Australian Standard Geographical Classification – Remoteness Areas

In 2014 an outbreak of syphilis, affecting mainly young people aged less than 25 years, started in Central Australia before extending into other areas of the NT.[18] Given the important role of syphilis testing in reducing onward transmission, factors associated with receiving at least one syphilis test from 2012 to 2014 were assessed. The findings of this analysis are outlined in Table 3. During this period, 61% of young people aged 16-24 years who attended a participating ACCESS sexual health clinic received at least one test for syphilis. In a multiple logistic regression, the following factors were independently associated with an increased likelihood of being tested for syphilis: being older, male, gay or bisexual, or a female sex worker. Interestingly, neither injecting drug use nor Indigenous status predicted a greater likelihood of testing, even though rates of infectious syphilis are typically higher among these populations than those who do not inject or are identified as non-Indigenous. It is also interesting that testing rates were so much higher among female sex workers than non-sex workers attending these clinics even though there were no cases of syphilis diagnosed among sex working women from 2009 to 2014 (Table 4). This analysis highlights some slight gaps in testing, attention to which may be of particular importance in combatting the NT's syphilis outbreak.

Table 3: Characteristics associated with syphilis testing among young people attending sexual health clinics in the NT, 2012-2014

	Tested	Univariate		Multivariate*		
Variable	n (%)	OR	p	aOR	95%CI	p
Age						
16-21 yrs	1467 (56)	[ref]		[ref]		
22-24 yrs	1673 (66)	1.48	<0.001	1.33	1.17-1.52	<0.001
Sex						
Male	5527 (68)	[ref]		[ref]		
Female	3384 (55)	0.47	<0.001	0.51	0.45-0.58	<0.001
Indigenous status						
Non-Indigenous	7958 (62)	[ref]				
Indigenous	961 (64)	0.96	0.68			
Home neighbourhood						
Urban/regional	6438 (62)	[ref]		[ref]		
Remote/very remote	1825 (65)	0.58	0.07	0.59	0.33-1.06	0.07
Gay and bisexual men						
No	4670 (66)	[ref]		[ref]		
Yes	856 (80)	7.9	<0.001	5.15	2.60-10.23	<0.001
Female sex worker						
No	8820 (62)	[ref]		[ref]		
Yes	99 (72)	3.27	0.03	3.88	1.31-11.44	0.01
Injecting drug use						
No	8594 (62)	[ref]		[ref]		
Yes	319 (65)	1.76	0.05	1.43	0.78 - 2.6	0.24

OR=odds ratio; aOR=adjusted odds ratio; CI=confidence interval

*Only variables demonstrating significance of p<0.1 were included in the multivariate analysis

[18] NT Department of Health. Syphilis Outbreak Update Alert. March 2016

b) Syphilis diagnosis rates

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

Table 4 provides an overview of syphilis notifications across the NT and the syphilis diagnosis rate in NT sexual health clinics. Overall, the number of patients diagnosed with infectious syphilis at sexual health clinics in the NT was lower than other STIs. There were no recorded diagnoses in 2009. From 2010 to 2014, the infectious syphilis diagnosis rate increased by 250% relatively (p<0.001) but remained generally under 1% each year. Annually, the majority of diagnoses were among GBM and injecting drug users.

Table 4: Territory notifications* and diagnoses of infectious syphilis at sexual health clinics in the NT, by sex, age group, Aboriginal status, priority population**, remoteness classification*** and year, 2009-2014

	Year n (%)						Relative change	p-value
	2009	2010	2011	2012	2013	2014		
Notifications (#)	37	44	30	14	23	71	+108%	--
Positivity at sexual health clinics	0.0%	4 (0.2%)	4 (0.2%)	2 (0.1%)	14 (0.5%)	22 (0.7%)	+250%	<0.001
Sex								
Female	0 (0)	0 (0)	1 (0.1)	1 (0.1)	1 (0.1)	2 (0.2)	+100%	0.07
Male	0 (0)	4 (0.3)	3 (0.2)	1 (0.1)	13 (0.7)	20 (1)	+233%	<0.001
Age group (years)								
16-19	0 (0)	0 (0)	(0)	0 (0)	(0)	3 (1.4)	--	--
20-24	0 (0)	0 (0)	2 (0.3)	0 (0)	3 (0.4)	0 (0)	-100%	0.58
25-29	0 (0)	2 (0.3)	0 (0)	1 (0.1)	2 (0.3)	8 (0.9)	+200%	0.01
30-34	0 (0)	1 (0.4)	1 (0.3)	0 (0)	0 (0)	0 (0)	-100%	0.24
≥35	0 (0)	1 (0.2)	1 (0.2)	1 (0.2)	9 (1.3)	11 (1.6)	+700%	<0.001
Aboriginal people								
Female	0 (0)	0 (0)	1 (0.5)	0 (0)	1 (0.6)	2 (1.3)	+160%	0.05
Male	0 (0)	0 (0)	0 (0)	1 (0.7)	1 (0.7)	2 (1.4)	+100%	0.06
Total	0 (0)	0 (0)	1 (0.3)	1 (0.3)	2 (0.6)	4 (1.4)	+160%	0.01
Priority population								
PWID†	0 (0)	0 (0)	1 (1.3)	0 (0)	2 (1.8)	2 (2.0)	+54%	0.06
Female sex workers	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	--	--
GBM	0 (0)	2 (1.1)	2 (1.1)	0 (0)	11 (4.0)	16 (4.7)	+327%	<0.001
Young people‡	0 (0)	0 (0)	0 (0)	(0)	1 (0.1)	2 (0.2)	+100%	0.03
Remoteness								
Very remote/remote	0 (0)	1 (0.2)	2 (0.3)	0 (0)	1 (0.2)	3 (0.5)	+150%	0.15
Inner/outer regional	0 (0)	3 (0.2)	2 (0.1)	2 (0.1)	11 (0.5)	16 (0.7)	+250%	<0.001
Major cities	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	--	--

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

**Priority classifications are not mutually exclusive

*** Classification based on patient postcode, using the Australian Standard Geographical Classification – Remoteness Areas

†People who inject drugs

‡Heterosexual patients aged <25 years

Section 5: HIV

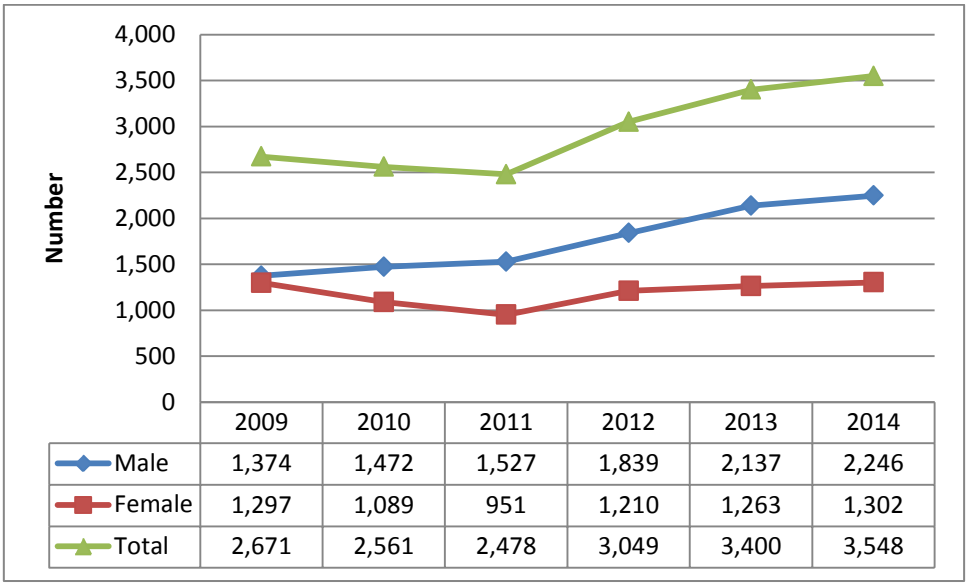
The following section reports on HIV testing among patients attending two sexual health clinics in NT.

a) HIV testing at sexual health clinics

HIV test episodes reflect the absolute number of HIV tests conducted per year, which might include multiple tests for the same patient. Multiple HIV tests conducted in the same week, however, were only counted once.

Overall, the number of HIV test episodes increased by 33% between 2009 and 2014, with a 63% increase among male patients and no increase among female patients.

Figure 35. Total number of HIV test episodes conducted at sexual health clinics in the NT, overall and by sex* and year, 2009-2014

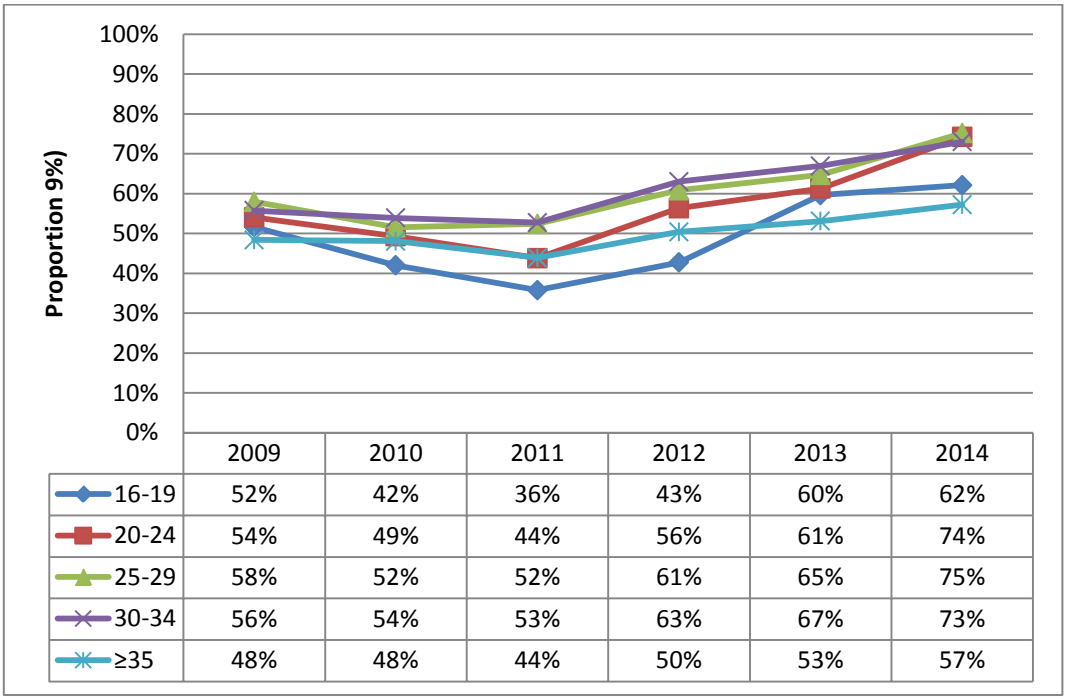


	2009	2010	2011	2012	2013	2014
Male	1,374	1,472	1,527	1,839	2,137	2,246
Female	1,297	1,089	951	1,210	1,263	1,302
Total	2,671	2,561	2,478	3,049	3,400	3,548

* Does not include patients of unknown sex

The following graphs report on the proportion of attending patients tested for HIV in a year ('testing uptake'). The greatest increase in HIV testing uptake between 2009 and 2014 was among patients aged 20-24 years, which rose 37% relatively during this period (p<0.001). Testing uptake also increased among patients aged 30-34 years, by 30% relatively from 2009 to 2014 (p<0.001).

Figure 36. Proportion of unique* patients tested for HIV at sexual health clinics in the NT, by age group and year, 2009-2014

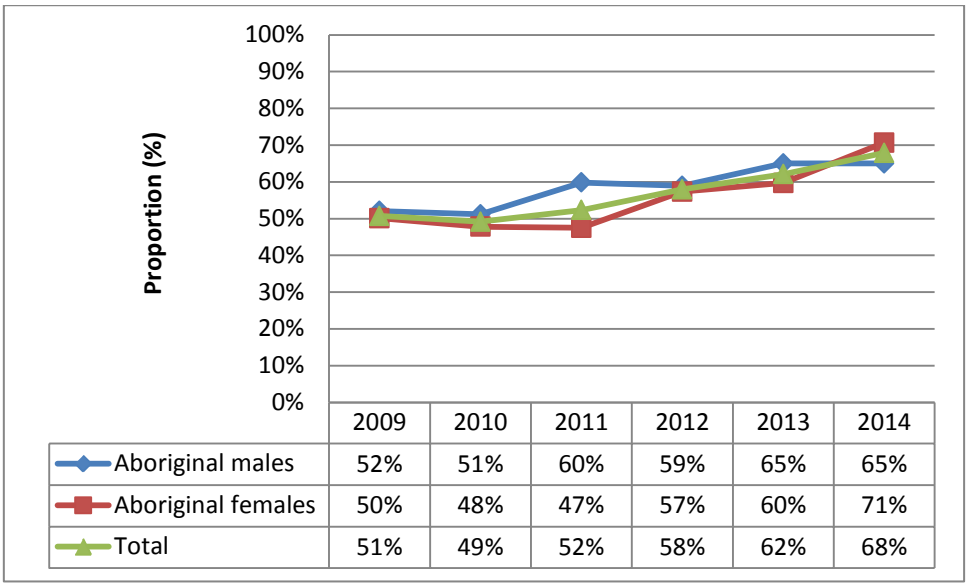


	2009	2010	2011	2012	2013	2014
16-19	52%	42%	36%	43%	60%	62%
20-24	54%	49%	44%	56%	61%	74%
25-29	58%	52%	52%	61%	65%	75%
30-34	56%	54%	53%	63%	67%	73%
≥35	48%	48%	44%	50%	53%	57%

* 'Unique' patients were only identified within each service

From 2009 to 2014, HIV testing uptake increased among Aboriginal people with respective relative increases of 25% and 42% for males and females (p's<0.001).

Figure 37. Proportion of unique* Aboriginal people tested for HIV at sexual health clinics in the NT, by sex and year, 2009-2014



	2009	2010	2011	2012	2013	2014
Aboriginal males	52%	51%	60%	59%	65%	65%
Aboriginal females	50%	48%	47%	57%	60%	71%
Total	51%	49%	52%	58%	62%	68%

* 'Unique' patients were only identified within each service

Among other priority populations, HIV testing uptake increased among young people (35% relative increase, p=<0.00) and GBM by (19% relative increase, p<0.001). There were no significant changes over time among people who inject drugs or female sex workers.

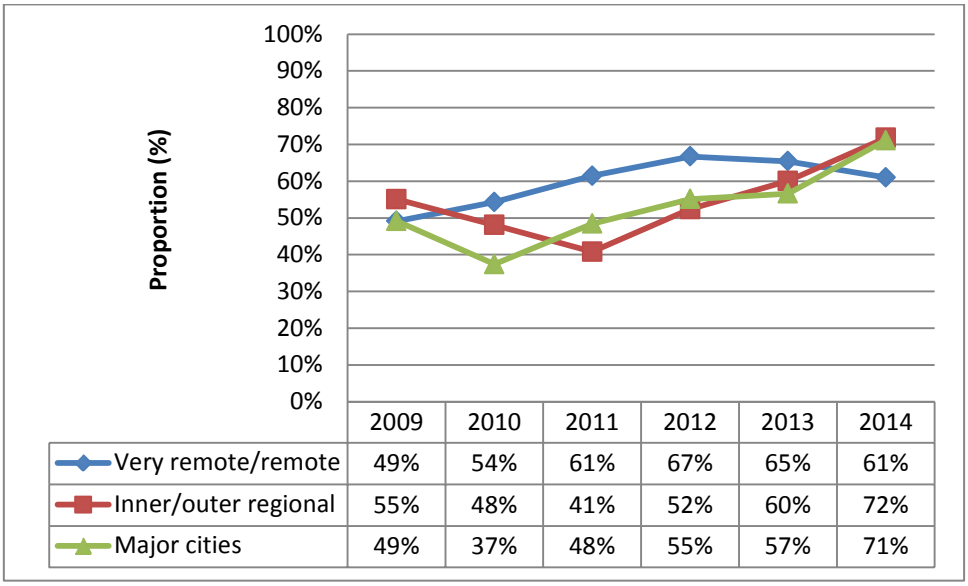
Figure 38. Proportion of unique patients* tested for HIV at sexual health clinics in the NT, by priority population** and year, 2009-2014

	2009	2010	2011	2012	2013	2014
PWID***	67%	60%	57%	59%	65%	61%
Female sex workers	73%	63%	41%	58%	80%	76%
GBM	63%	60%	62%	66%	68%	75%
Young people†	52%	46%	40%	51%	60%	70%

* 'Unique' patients were only identified within each service
**Priority classifications are not mutually exclusive
***People who inject drugs

Among patients living in major cities, there was a 45% relative increase in HIV testing uptake from 2009 to 2014 (p<0.001). Uptake also increased by 31% relatively among patients in regional areas period and by 24% among patients living in remote and very remote parts of the territory (p's<0.001).

Figure 39. Proportion of unique patients* tested for HIV at sexual health clinics in the NT, by remoteness classification** and year, 2009-2014



	2009	2010	2011	2012	2013	2014
Very remote/remote	49%	54%	61%	67%	65%	61%
Inner/outer regional	55%	48%	41%	52%	60%	72%
Major cities	49%	37%	48%	55%	57%	71%

* 'Unique' patients were only identified within each service

** Classification based on patient postcode, using the Australian Standard Geographical Classification – Remoteness Areas

Appendix A: Attendance

This table represent the number of unique patients who attended a service at least once in a year. 'Unique' means a patient was only counted once per time period, so multiple visits in a year would only be counted as one patient. Each clinic generates a patient identifier, which can uniquely identify patients within a service but not between clinics. This means that if a patient attended multiple services they would be counted twice.

Table 5. Number of unique* patients seen at sexual health clinics by sex, age group, Aboriginal status, priority population**, remoteness classification*** and year, 2009-2014

	Year						
	2009	2010	2011	2012	2013	2014	Relative change
Sex							
Males	2,245	2,498	2,561	2,672	2,806	2,644	+18%
Females	2,310	2,313	2,383	2,246	2,130	1,820	-21%
Total	4,555	4,811	4,944	4,918	4,936	4,464	-2%
Age (years)							
16-19	661	636	629	515	463	343	-48%
20-24	1,197	1,274	1,347	1,315	1,258	1,185	-1%
25-29	991	1,120	1,092	1,179	1,254	1,225	+24%
30-34	490	540	571	627	653	604	+23%
35+	1,180	1,196	1,255	1,240	1,283	1,101	-7%
Aboriginal people							
Males	194	256	244	224	223	203	+5%
Females	407	391	379	361	278	208	-49%
Total	601	647	623	585	501	411	-32%
Priority populations							
PWID†	143	136	135	172	171	143	--
Female sex workers	59	63	51	45	55	37	-37%
Young people‡	1,853	1,913	1,990	1,829	1,691	1,476	-20%
GBM	234	260	275	306	358	404	+73%
Remoteness††							
Very remote/remote	961	956	1,001	979	934	892	-7%
Inner/outer regional	3,116	3,425	3,437	3,425	3,483	3,103	--
Major cities	120	123	157	136	136	128	+7%

* 'Unique' patients were only identified within each service

**Priority classifications are not mutually exclusive

*** Classification based on patient postcode, using the Australian Standard Geographical Classification – Remoteness Areas

†People who inject drugs

‡Heterosexual patients aged <25 years old

Appendix B: 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 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.

Figure 1: ACCESS networks

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 C: Indicator definitions

Indicator	Definition	Numerator	Denominator
Number tests	Total number of tests conducted, discounting multiple tests within one week	N/A	N/A
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
Test positivity / diagnosis rate	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