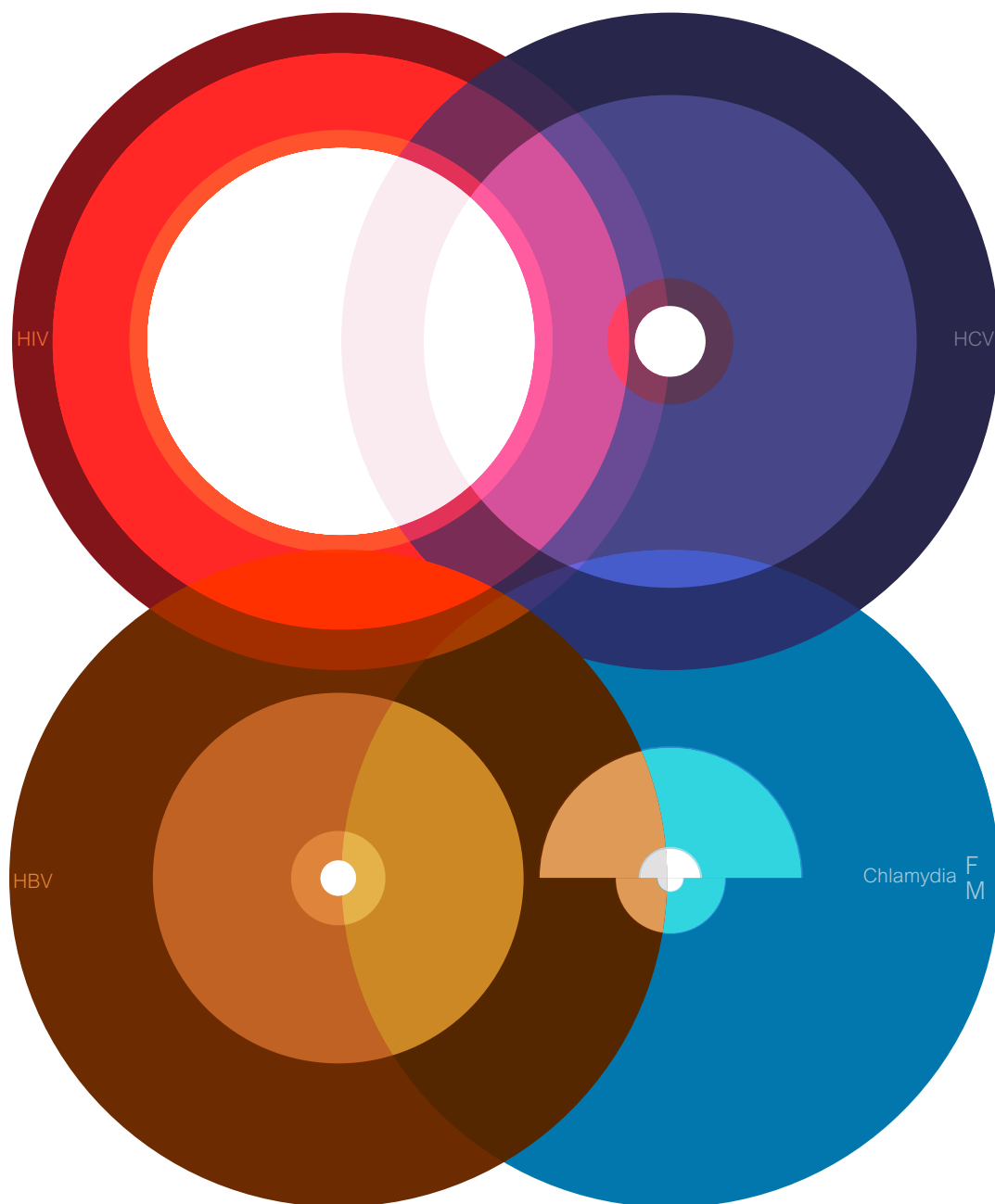


HIV, viral hepatitis and sexually transmissible infections in Australia
Annual Surveillance Report 2015



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in collaboration with

Australian Gonococcal Surveillance Program

Communicable Diseases Network Australia

Centre for Social Research in Health

and collaborating networks in surveillance for HIV, viral hepatitis and sexually transmissible infections





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Preface

This report is the nineteenth annual review of available surveillance data pertaining to the occurrence of HIV, viral hepatitis and sexually transmissible infections in Australia. It is intended to be a reference document for organisations and individuals interested in the occurrence of these infectious diseases in Australia, drawing together relevant data from many sources into a single comprehensive report. The report is available at Internet address <http://www.kirby.unsw.edu.au>. The Australian HIV Public Access Dataset, holding records of cases of HIV infection, diagnosed in Australia by 31 December 2014 and reported by 31 March 2015 is also available through the website <http://www.kirby.unsw.edu.au>.

The main findings of the report are presented as text, supported by figures. The underlying data are available online in tables at <http://www.kirby.unsw.edu.au>. A methodological summary follows the commentary and figures, along with references to other documents and reports which provide further information.

The accompanying report *Bloodborne viral and sexually transmissible infections in Aboriginal and Torres Strait Islander people: Surveillance and Evaluation Report 2015* presents a detailed analysis of the occurrence of bloodborne viral and sexually transmissible infections in a format designed to be accessible for Aboriginal and Torres Strait Islander health services and communities. The report is available at Internet address <http://www.kirby.unsw.edu.au>.

Some of the information regarding risk behaviour which appears in this report is also published, along with further behavioural data, in the report *HIV/AIDS, Hepatitis C and Sexually Transmissible Infections in Australia Annual Report of Trends in Behaviour 2014*, edited by the Centre in Social Research in Health; and the following reports prepared by the Kirby Institute; *Australian NSP Survey 20 Year National Data Report 1995 – 2014 Prevalence of HIV, HCV and injecting and sexual behaviour among NSP attendees 2015*; and the *National Prison Entrants Bloodborne Virus and Risk Behaviour Survey Report 2004, 2007, 2010 and 2013 Prevalence of HIV, HBV, HCV, and risk behaviours among Australian prison entrants*.

Unless specifically stated otherwise, all data provided in the report are to the end of 2014, as reported by 31 March 2015. All data in this report are provisional and subject to future revision.

This report could not have been prepared without the collaboration of a large number of organisations involved in health services throughout Australia. The ongoing contribution of all collaborating organisations, listed in the following section, to national surveillance for HIV, viral hepatitis and sexually transmissible infections is gratefully acknowledged.



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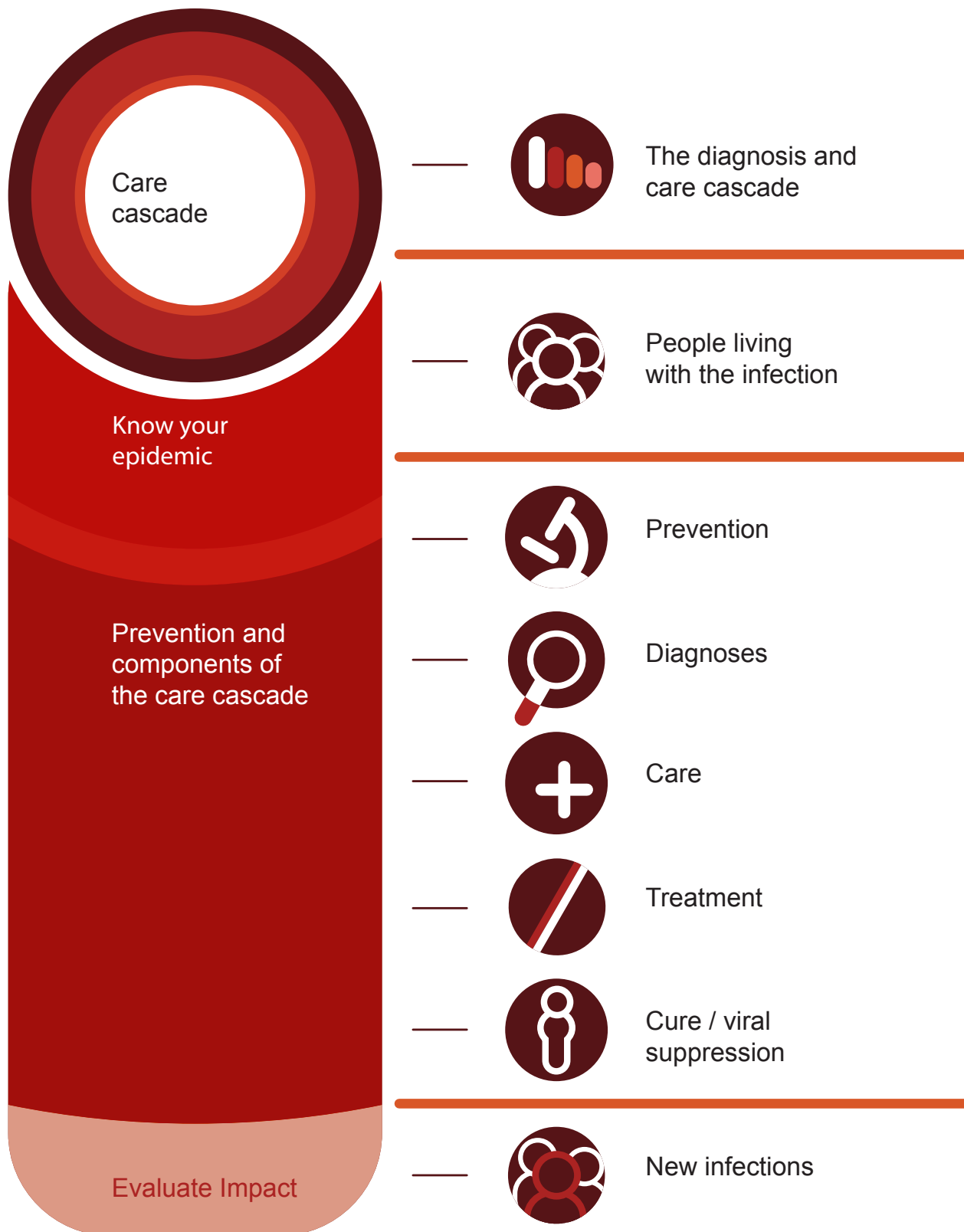


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Structure of the report



Summary

HIV infection

- The number of HIV infections newly diagnosed in Australia has remained stable for the past three years, with 1 081 cases in 2014, 1 028 in 2013 and 1 064 in 2012.
- Based on these newly diagnosed cases, the main route of HIV transmission in Australia continues to be sexual contact between men, which accounted for 70% of the cases in 2014.
- A further 19% of cases were attributed to heterosexual sex, 5% to sexual contact between men and injecting drug use, and 3% to injecting drug use only.
- Among cases attributed to heterosexual sex, 23% were in people born in countries recognised by the UNAIDS as having a national HIV prevalence above 1%, and 16% in people with sexual partners of people born in these countries.
- Based on tests for immune function, over a quarter (28%) of the new HIV diagnoses in 2014 were determined to be late, in that they were in people who were likely to have had their infection for at least four years without being tested.
- The proportion with late diagnosis was highest in people born in South East Asia (42%) and sub-Saharan Africa (38%).
- Based on 33 cases, the rates of HIV diagnosis in 2014 among Aboriginal and Torres Strait Islander people was higher than in the Australian-born non-Indigenous population (5.9 vs 3.7 per 100 000).
- In the most recent five year reporting period (2010 – 14), a greater proportion of HIV diagnoses in the Aboriginal and Torres Strait Islander population were attributed to injecting drug use (16%) or heterosexual sex (20%) compared with the Australian born non-Indigenous population (3% and 13%, respectively) .
- Among 242 women with HIV who have given birth in the five year period 2010 – 2014, the transmission rate to newborns was 1.7%, compared to 32% in the period 1990 – 1994.
- At the end of 2014, an estimated 27 150 people (range 24 630 to 30 310) were living with HIV infection in Australia, of whom an estimated 3 350 (12%) were unaware of their HIV positive status.
- At 0.1%, the prevalence or overall proportion of people in Australia who have HIV is low compared to other high income countries, and countries in the region.
- The HIV prevalence in 2014 was highest among gay men (17%).
- HIV prevalence continues to be very low among people who inject drugs, at 1.7% in 2014 (or under 0.5% if men with a history of male to male sex are excluded), and extremely low among women involved in sex work (no HIV cases detected among 3 559 female sex workers tested).
- Among the estimated 88% of people with HIV in Australia (range 83 to 92%) who were diagnosed at the end of 2014, an estimated 73% (range 70 to 77%) were receiving treatment with antiretroviral therapy, with therapy successfully controlling the infection (“viral suppression”) in 92% (range 84 to 97%). These three figures compare well to the United Nations targets of 90%.

Interpretation: Australia’s HIV epidemic continues to be predominantly in men who have sex with men. Harm reduction strategies to minimise HIV transmission among people who inject drugs have been highly successful and must be sustained. Extremely low rates of maternal transmission have been achieved through comprehensive medical interventions. The incidence of HIV among women involved in sex work is extremely low due to successful promotion of safe sex practices. The HIV diagnosis rate in Aboriginal and Torres Strait Islander people has increased in the past five years and requires a strengthened focus on prevention in this vulnerable population. Overall, initiatives to promote testing and HIV treatment have achieved high levels of uptake, but not yet attained global targets in regards to treatment initiation. These data highlight the need to maintain and strengthen established strategies of health promotion, testing, treatment and risk reduction, but also introduce new technologies as they become available.

Hepatitis C

- The rate of diagnosis of hepatitis C infection in 2014 was 46 per 100 000, representing a continuing decline over the past 10 years, from 61 in 2005.
- In contrast, the rate of hepatitis C diagnosis in the Aboriginal and Torres Strait Islander population increased in 2014, from 119 per 100 000 in 2010 to 164 per 100 000, a rate almost 5 times greater than in the non-Indigenous population (35 per 100 000).
- The prevalence of hepatitis C in people who inject drugs attending needle and syringe programs in 2014 was 54%, a level that has remained stable for 5 years.
- At the end of 2014, an estimated 230 470 people had chronic hepatitis C infection in Australia (range 180 490 to 243 990), of whom 185 740 people had early to moderate fibrosis and 44 730 severe fibrosis or hepatitis C related cirrhosis. The estimated number of people with severe liver disease/hepatitis C related cirrhosis has more than doubled, from 18 580 cases in 2004 to 44 730 in 2014.
- Of 224 people who had a liver transplant in 2014, 81 (36%) had hepatitis C infection.
- An estimated 690 deaths (range 440 – 970) attributable to chronic hepatitis C infection occurred in 2014, an increase of 146% since 2004 where there was an estimated 280 (range 180-370) deaths.
- Among the estimated 75% of people (range 68 to 77%) with chronic hepatitis C infection who were diagnosed by the end of 2014, an estimated 26% (range 22 to 29%) had ever received antiviral therapy, with therapy successfully curing the infection in 55% (range 48 to 62%).
- The proportion of people who injected drugs attending needle and syringe programs in 2014 who said in surveys they had used the same needle as another person in the past month was 15%, a proportion that has remained stable over the past ten years.

Interpretation: The rate of hepatitis C diagnosis has fallen over the past 10 years in Australia, suggesting a reduction in transmission related to injection drug use, which has been the main pathway of infection in Australia. This reduction is likely related to a decrease in the number of people newly initiating injecting. The coverage of needle and syringe programs and increasing number of people receiving opioid substitution therapy (OST) may be potential factors, as OST reduces injecting frequency and injecting risk behaviour. The rate of hepatitis C diagnosis is however increasing among Aboriginal and Torres Strait Islander people, possibly related to higher prevalence of injecting risk behaviours in Aboriginal and Torres Strait Islander people who inject drugs. There has been a substantial increase in the illness and mortality due to hepatitis C, as the population with chronic infection ages. The uptake of treatment for hepatitis C remains very low, with the vast majority not having received curative therapy.

Hepatitis B

- Over the past ten years, the population rate of diagnosis of hepatitis B infection in Australia has declined in younger groups: in those aged 25 – 29 years (from 72 per 100 000 in 2005 to 59 per 100 000 in 2014); 20 – 24 years (58 to 32 per 100 000); and 15 – 19 years (25 to 11 per 100 000).
- There have also been substantial declines in the rate of newly acquired hepatitis B cases (defined as a new infection within the past 2 years) in all age groups, except for those aged 40 years and above. The declines have been greatest in 20 – 24 year olds (by 78%) and 15 – 19 year olds (by 66%).
- At the end of 2014, an estimated 213 300 people were living with chronic hepatitis B infection in Australia (range 175 000 to 253 000), of whom 81 267 (38%) were born in the Asia-Pacific and 19 837 (9.3%) were Aboriginal and Torres Strait Islander peoples.
- An estimated 395 (304 – 640) deaths attributable to chronic hepatitis B infection occurred in 2014.
- In 2014 the estimated hepatitis B prevalence was 3.7% in Aboriginal and Torres Strait Islander peoples; 3.6% in people born in the Asia-Pacific; 3.5% in people born in Sub-Saharan Africa; 4.0% in people who inject drugs; and 3.0% in men who have sex with men. Some of these categories are potentially overlapping.
- Among the estimated 56% of people living in Australia with chronic hepatitis B infection who were diagnosed, an estimated 27% were in care and 10% of those diagnosed had received antiviral therapy.
- The coverage of infant hepatitis B vaccination coverage at 24 months of age was 95% in 2014.

Interpretation: Evidence is emerging that the immunisation programs for hepatitis B are starting to have a benefit, with declining rates of new infection, and most strikingly in the younger age groups that have had the highest level of vaccine coverage. The proportion of people with chronic hepatitis B infection who are in care or on recommended treatment remains low.

Sexually transmissible infections other than HIV

Chlamydia

- Chlamydia was the most frequently reported notifiable condition in Australia at 86,136 diagnoses in 2014; with the majority (78%) of diagnoses among 15 – 29 year olds.
- The rate of chlamydia diagnosis has increased steadily between 2005 and 2011 (from 202 per 100 000 to 363 per 100 000) but since 2011 has remained stable in both males and females.
- Among 15 – 19 year olds there has been a decline in the rate of chlamydia diagnosis by 14% since 2011, from 1 495 per 100 000 in 2011 to 1 284 per 100 000 in 2014.
- The number of chlamydia tests recorded by Medicare increased by 91% from 618 518 in 2008 to 1 178 455 in 2014.
- The rate of diagnosis of chlamydia in the Aboriginal and Torres Strait Islander population was over 3 times that in the non-Indigenous population in 2014.
- By the end of 2014 there were an estimated 256 230 new chlamydia cases in 15 – 29 year olds, an estimated 26% were diagnosed (17% of males, 40% of females), 99% were treated, an estimated 24% (range 20% to 30%) of those diagnosed were re-tested in 1-4 months and of those re-tested an estimated 92% (range 83 to 100%) remained uninfected.

Interpretation: After a decade of steady increases in both testing and diagnoses of chlamydia, there has been a levelling off in the number of diagnoses, and even a small decline in the youngest age group. However the vast majority of infections remain undiagnosed and hence untreated, emphasising the need for testing to be routinely offered to sexually active adolescents, young adults and other populations at risk.

Gonorrhoea

- There were 15 786 cases of gonorrhoea notified in 2014, representing an increased rate in both males (from 62 per 100 000 in 2010 to 99 per 100 000 in 2014), and females (from 30 in 2010 to 38 in 2014).
- The rate of gonorrhoea diagnosis continued to increase in all age groups except the 15 – 19 year age group; where it reached a peak at 166 in 2012 and then declined to 139 in 2014
- The rate of diagnosis of gonorrhoea in the Aboriginal and Torres Strait Islander population was 18 times that in the non-Indigenous population in 2014 (859 vs 49 per 100 000).
- In Aboriginal and Torres Strait Islander people, there were roughly an equal number of gonorrhoea diagnoses among males and females in 2014, indicating predominantly heterosexual transmission, and most (77%) resided in remote or very remote areas.
- In contrast, gonorrhoea diagnoses in non-Indigenous people in 2014 were predominantly in men, suggesting that transmission is primarily related to sex between men, and most (87%) resided in urban settings.

Interpretation: Gonorrhoea in Australia continues to be an infection primarily of men having male to male sex in urban settings, and of young heterosexual Aboriginal people in remote communities. It has been detected more frequently in the past five years, but it is unclear whether transmission has increased. Over the same time frame, most pathology laboratories in Australia have adopted dual testing, whereby if a test for either chlamydia or gonorrhoea is ordered by a clinician, both tests would be automatically performed. The emphasis on testing for chlamydia in young people has therefore led to a substantial rise in the number of tests conducted for gonorrhoea, which may explain the increase in diagnoses.

Syphilis

- The number of cases of infectious syphilis (infections of less than 2 years duration) notified in 2014 was 1 999.
- The rate of diagnosis of infectious syphilis among men has increased in the past ten years, from 5.1 per 100 000 in 2005 to 15.9 per 100 000 in 2014 whereas the rate among women has fluctuated and remained low (1.5 per 100 000 in 2014).
- The rate of diagnosis of infectious syphilis in the Aboriginal and Torres Strait Islander population in 2014 was 4 times higher than the rate in the non-Indigenous population.
- Rates of infectious syphilis notifications among the Aboriginal and Torres Strait Islander population increased from 22 per 100 000 in 2010 to 26 per 100 000 in 2011, declining to 21 per 100 000 in 2013 then increasing to 32 per 100 000 in 2014, due to an outbreak in the northern areas of Queensland, Northern Territory and Western Australia (please see accompanying report - *Bloodborne viral and sexually transmissible infections in Aboriginal and Torres Strait Islander people*).
- Notifications of congenital syphilis declined from 16 in 2005 to 3 in 2009, and then increased to 5 in 2014.
- In Aboriginal and Torres Strait Islander people, there were roughly an equal number of infectious syphilis diagnoses among males and females in 2014, indicating predominantly heterosexual transmission, and about half (46%) resided in remote or very remote areas and 38% in outer regional areas.
- In contrast, infectious diagnoses in non-Indigenous people in 2014 were predominantly in men, suggesting that transmission is primarily related to sex between men, and 91% resided in urban settings.

Interpretation: Syphilis in Australia continues to be an infection primarily of men having male to male sex in urban settings, and of heterosexual Aboriginal people in remote and outer regional areas. Efforts to increase syphilis testing and treatment in men who have sex with men need to be strengthened. The resurgence of infection in young Aboriginal people in remote communities after years of declining rates, bringing with it cases of congenital syphilis, emphasises the need for testing and treatment in this population, particularly in antenatal settings.

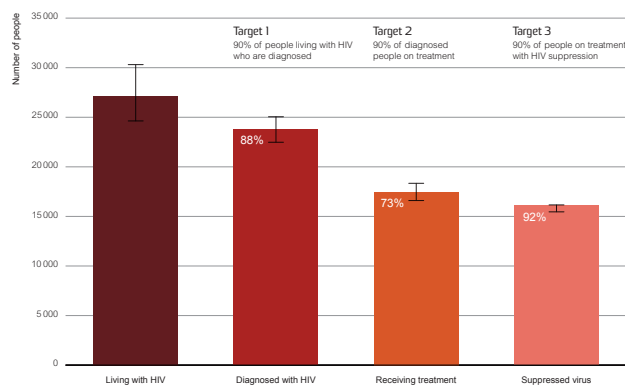
Success in the control of sexually transmissible infections

- Donovanosis, once a regularly diagnosed sexually transmissible infection among remote Aboriginal populations, is now close to elimination, with only two cases detected since 2011.
- Following the introduction of vaccination against human papilloma virus in 2007, high 3-dose coverage has been achieved in females turning 15 years of age (73% in 2014). Indicators of the success of this program include:
 - The dramatic decline of genital warts in young women aged <21 years, with 277 cases presenting to sexual health clinics at first visit in 2007, compared to 23 in 2014; and
 - The halving, from 13.2 to 5.7 per 1 000, in the rate of detection of high grade histological abnormality among young women undergoing cervical screening.

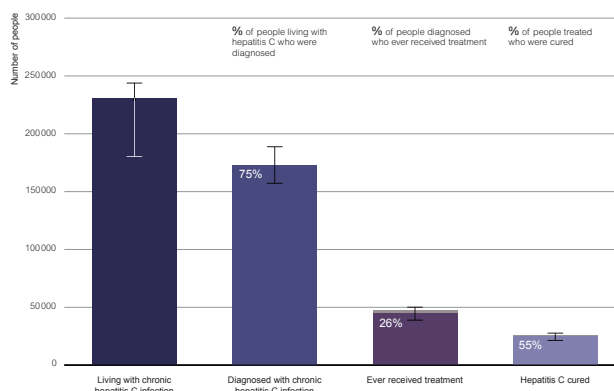
The diagnosis and care cascades

This report includes for the first time a 'diagnosis and care cascade', for hepatitis C, hepatitis B and chlamydia (in 15 – 29 year olds) and for the second time, HIV. The cascades contain estimates used to support the improvement of the delivery of services to people living with these infections across the entire continuum of care — from diagnosis, treatment and cure/attaining viral suppression. Using available data and accounting for uncertainties, the proportions of people in each stage of the cascade in Australia were estimated. Chlamydia was selected from the notifiable sexually transmissible infections (STIs) as it was the most common STI. In future years, cascades for other STIs will be included.

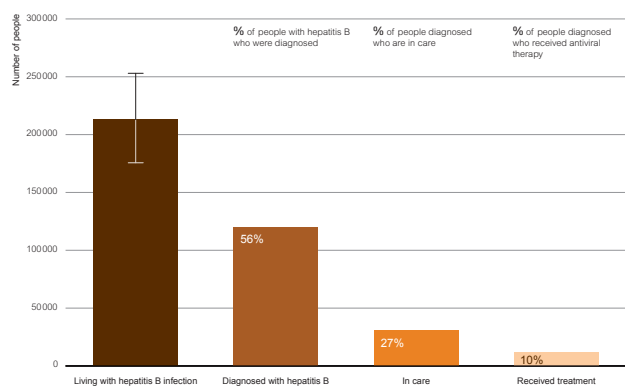
The 2014 HIV diagnosis and care cascade



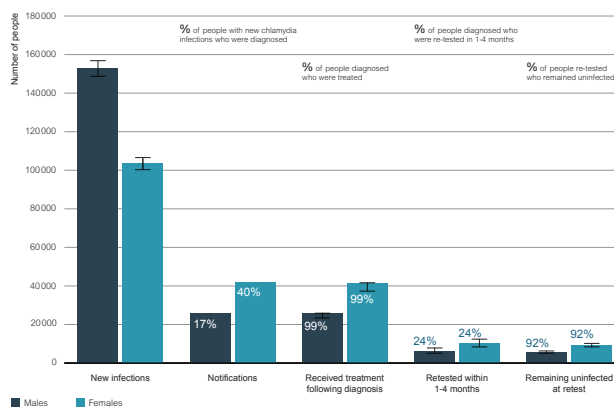
The 2014 hepatitis C diagnosis and care cascade



The 2013 hepatitis B diagnosis and care cascade



The 2014 chlamydia diagnosis and care cascade in 15 – 29 year olds



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Main Findings

HIV

- The number of HIV infections newly diagnosed in Australia has remained stable for the past three years, with 1 081 cases in 2014, 1 028 in 2013, and 1 064 in 2012.
- Based on these newly diagnosed cases, the main route of HIV transmission in Australia continues to be sexual contact between men, which accounted for 70% of the cases in 2014.
- A further 19% of cases were attributed to heterosexual sex, 5% to sexual contact between men or injecting drug use, and 3% to injecting drug use only.
- Among cases attributed to heterosexual sex, 23% were in people born in countries recognised by the UNAIDS as having a national HIV prevalence above 1%, and 16% in people with sexual partners of people born in these countries.
- Based on tests for immune function, over a quarter (28%) of the new HIV diagnoses in 2014 were determined to be late, in that they were in people who were likely to have had their infection for at least four years without being tested.
- The proportion with late diagnosis was highest in people born in South East Asia (42%) and sub-Saharan Africa (38%).
- Based on 33 cases, the rates of HIV diagnosis in 2014 among Aboriginal and Torres Strait Islander people was higher than in the Australian-born non-Indigenous population (5.9 vs 3.7 per 100 000).
- In the most recent five year reporting period (2010 – 14), a greater proportion of HIV diagnoses in the Aboriginal and Torres Strait Islander population were attributed to injecting drug use (16%) or heterosexual sex (20%) compared with the Australian born non-Indigenous population (3% and 13%, respectively).
- Among 242 women with HIV who gave birth in the period 2010 – 2014, the transmission rate to newborns was 1.7%, compared to 32% in the period 1990 – 1994.
- At the end of 2014, an estimated 27 150 (range 24 630 to 30 310) people were living with HIV infection in Australia, of whom an estimated 3 350 (12%) were unaware of their HIV positive status.
- At 0.1%, the prevalence or overall proportion of people in Australia who have HIV is low compared to other high income countries, and countries in the region.
- The HIV prevalence in 2014 was highest among gay men (17%).
- HIV prevalence continues to be very low among people who inject drugs, at 1.7% in 2014 (or under 0.5% if men with a history of male to male sex are excluded), and extremely low among women involved in sex work (no HIV cases detected among 3 559 female sex workers tested).
- Among the estimated 88% of people (range 83 to 92%) with HIV in Australia who were diagnosed by the end of 2014, an estimated 73% (range 70 to 77%) were receiving treatment with antiretroviral therapy, with therapy successfully controlling the infection (“viral suppression”) in 92% (range 84 to 97%). These three figures compare well to the United Nations targets of 90%.

Interpretation:

Australia’s HIV epidemic continues to be predominantly in men who have sex with men. Harm reduction strategies to minimise HIV transmission among people who inject drugs have been highly successful and must be sustained. Extremely low rates of maternal transmission have been achieved through comprehensive medical interventions. The incidence of HIV among women involved in sex work is extremely low due to successful promotion of safe sex practices. The HIV diagnosis rate in Aboriginal and Torres Strait Islander people has increased in the past five years and requires a strengthened focus on prevention in this vulnerable population. Overall, initiatives to promote testing and HIV treatment have achieved high levels of uptake, but not yet attained global targets in regards to treatment initiation. These data highlight the need to maintain and strengthen established strategies of health promotion, testing, treatment and risk reduction, but also introduce new technologies as they become available.

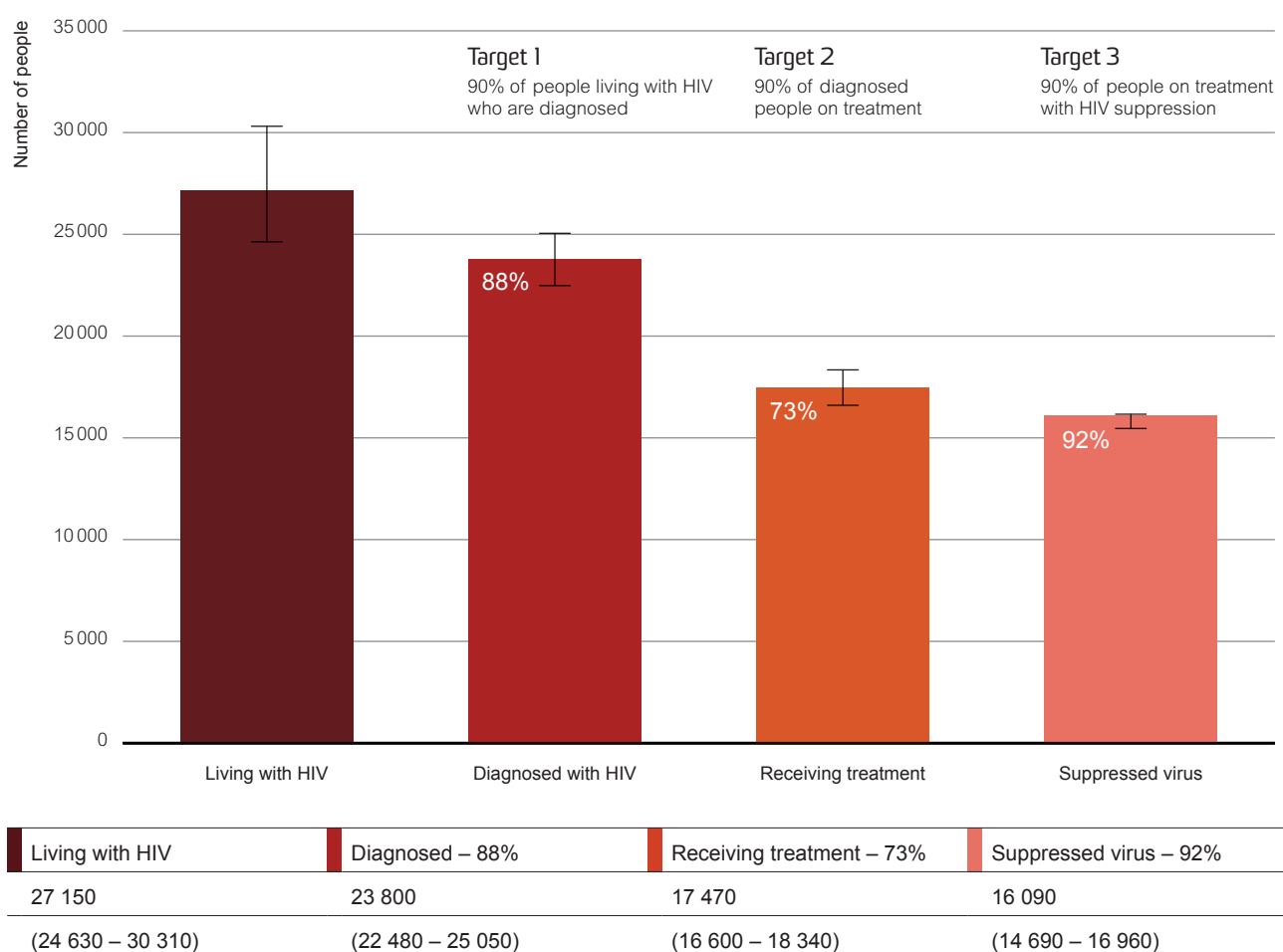
The 2014 HIV diagnosis and care cascade

This report includes the number and proportion of people with HIV who are diagnosed in Australia, receiving antiretroviral treatment, and have undetectable levels of HIV. Known as the ‘HIV diagnosis and care cascade’, these estimates are used to support the improvement of the delivery of services to people with HIV across the entire continuum of care. Using available data and accounting for uncertainties, the proportions of people in each stage of the cascade in Australia were estimated (Figure 1). Methods and the associated uncertainties are described in detail in the Methodological Notes. The approach and presentation was refined from last year based on recommendations from a national stakeholder reference group (see Acknowledgements section).

During 2014, an estimated 27 150 (24 630 – 30 310) people were living with HIV, 23 800 were diagnosed with HIV (22,480 – 25,050), 17 470 (16 600 – 18 340) were on antiretroviral therapy, of whom 16 090 (14 690 – 16 960) had undetectable levels of virus as a result of treatment. This corresponds to 88% (range: 84 to 97) of all people living with HIV being diagnosed with HIV infection, 73% (range: 70 to 77) of people diagnosed on antiretroviral therapy and 92% (range: 88 to 93) of people receiving antiretroviral therapy being viral suppressed. The United Nations targets are “90: 90: 90” (i.e. 90% of all people living with HIV will know their HIV status, 90% of all people diagnosed with HIV will receive sustained antiretroviral treatment, and 90% of all people receiving antiretroviral treatment will have viral suppression), meaning Australia is close to the first target and has reached the third target.

There are some key aspects of care which may influence the estimates of treatment coverage and viral suppression; linkage to care, retention in care and adherence to treatment. Future cascades will aim to include steps for these different care components.

Figure 1 The 2014 HIV diagnosis and care cascade



Source: see Methodological Notes for details



Number of people living with HIV

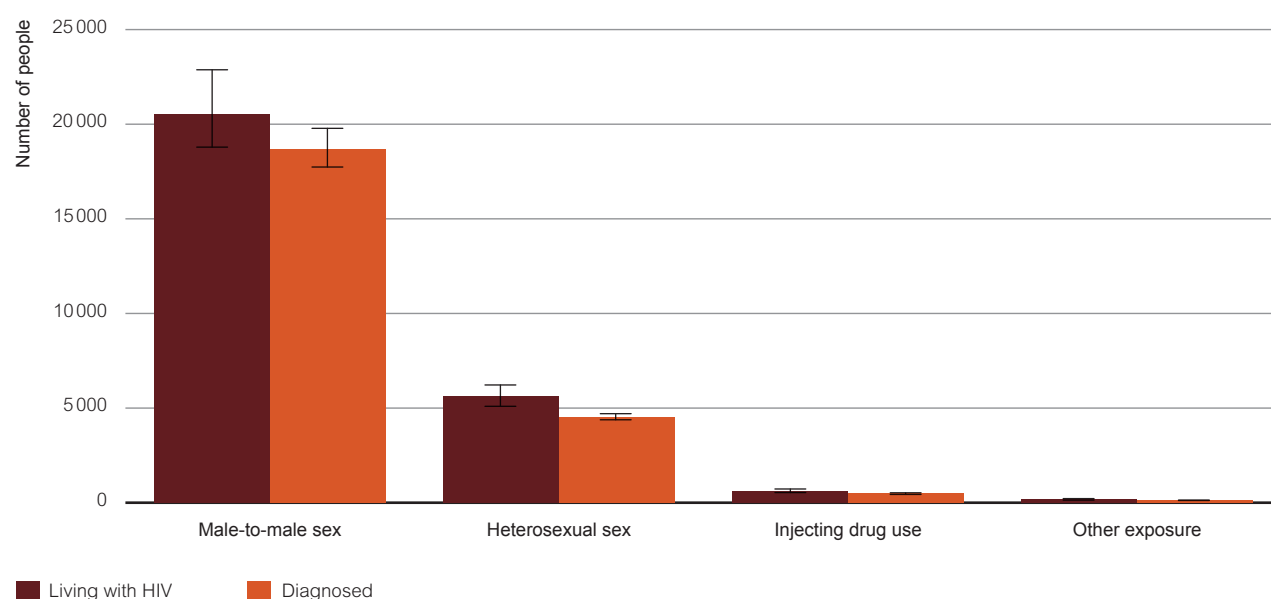
At the end of 2014, there was an estimated 27 150 (24 630 – 30 310) people living with HIV, of which 20 537 (18 797 – 22 892) had an exposure category of male-to-male sex at the time of diagnosis, 5 629 (5 090 – 6 220) heterosexual sex, 595 (529 – 667) injecting drug use and 164 (147 – 182) 'other' exposures (mother-to-child transmission, blood/tissue-recipient, health care setting, haemophilia/coagulation disorder) (Figure 2).

There were an estimated 492 (453 – 537) people living in Australia with HIV infection who identified as Aboriginal and Torres Strait Islander at the time of HIV diagnosis. After adjusting for missing country of birth data, there were 2 559 (2 319 – 2 822) people living with HIV born in South East Asia and 2 126 (1 925 – 2 346) born in sub Saharan Africa.

The CD4 back-calculation method provides an estimate of the number of people who remain undiagnosed with HIV infection. In 2014, there were 3 350 (12%) people living with HIV who were unaware of their infection and remain at risk of passing on their infection during risk events such as having sex without condoms. Among men who have sex with men (MSM) living with HIV, 9% were undiagnosed (range: 4 – 14%), and among non-MSM, 20% were undiagnosed (range: 17 – 23%).

A national bio-behavioural community-based survey of gay men (COUNT) conducted in 2013 – 2014 demonstrated about half of gay men with undiagnosed infections had tested in the previous 6 months¹, similar to levels in the Gay Community Periodic Survey. This highlights the need not only to increase the proportion of gay men who have an HIV test each year, but to increase the frequency of HIV testing among those who have previously tested negative.

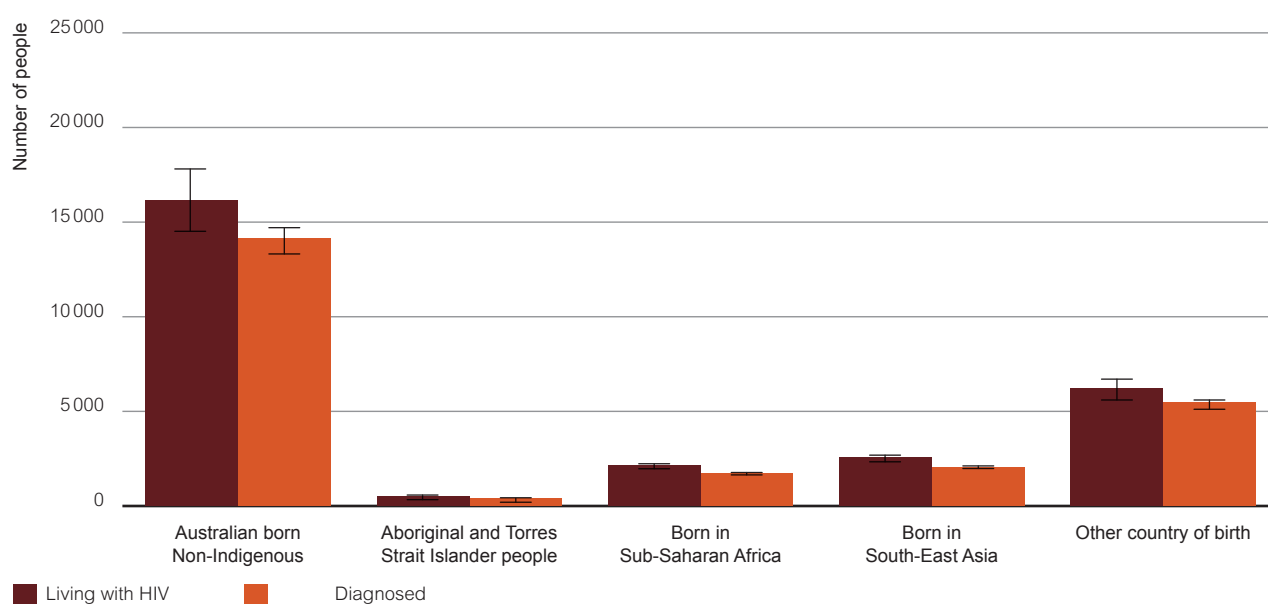
Figure 2 Estimated number of people living with HIV by reported exposure category, Australia, 2014



Exposure category	People living with HIV (range)	Number undiagnosed (range)
Male-to-male sex	20 537 (18 767 – 22 892)	1 848 (850 – 2 896)
Heterosexual sex	5 629 (5 090 – 6 220)	1 126 (964 – 1 303)
Injecting drug use	595 (529 – 667)	119 (94 – 145)
Other	164 (147 – 182)	33 (28 – 39)

Source: see Methodological Notes for details

Figure 3 Estimated number of people living with HIV by country/region of birth, in Australia, 2014



Source: see Methodological Notes for details

Table 1 Estimated number of people living with HIV and HIV prevalence, 2014, Australia

	People living with HIV (range)	Number undiagnosed (range)	HIV prevalence (range)	Population size (>15 years of age)
Demographics				
Australian born non-Indigenous	16 140 (14 540 – 18 137)	1 992 (1 148 – 2 870)	0.13% (0.12-0.15)	12 402 992 ^{1,2}
Aboriginal and Torres Strait Islander people	492 (453 – 537)	99 (90 – 107)	0.11% (0.10-0.11)	468 368 ²
Born in Sub-Saharan Africa	2 126 (1 925 – 2 346)	425 (367 – 490)	0.70% (0.63-0.77)	305 890 ¹
Born in South-East Asia	2 559 (2 319 – 2 822)	512 (442 – 588)	0.30% (0.27-0.33)	845 050 ¹
Other country of birth	6 234 (5 681 – 6 993)	769 (503 – 1 050)	0.12% (0.11-0.14)	5 046 350 ¹
Total	27 150 (24 630 – 30 310)	3 350 (2 100 – 4 670)	0.14% (0.13 – 0.16)	19 068 660¹

1 ABS series 341202 ABS series 32380

2 Sum of sub-populations will not add to the total estimated people living with HIV due to different death rate assumptions for Aboriginal and Torres Strait Islander populations

Source: State and Territory Health authorities, see Methodological Notes for detail



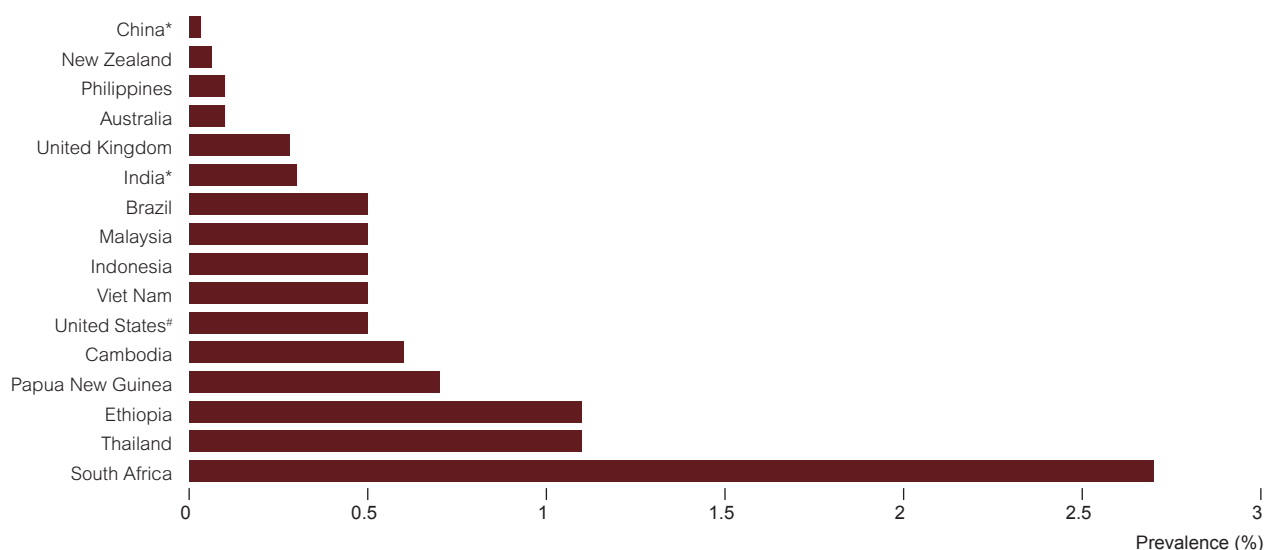
HIV prevalence

In Australia, the estimated HIV prevalence among adults aged 15 years or older was 0.14 (0.13%-0.16%) in 2014 (Table 1). At 0.14%, the prevalence is low compared to other high income countries, and countries in the region (Figure 4). The level of HIV infection in Australia is lower than in the United Kingdom in 2014 (0.3%) and the United States in 2012 (0.5%) (Figure 4). HIV prevalence among Aboriginal and Torres Strait Islander people was estimated to be 0.11% in 2014 (Table 1).

Australia has a concentrated epidemic among men who have sex with men with a prevalence of 14 – 18% among gay men in the past ten years (17% in 2014) (Figure 5). Due to the availability of needle and syringe programs in Australia since 1987, HIV is low among people who inject drugs with a prevalence of 1 – 2% among people attending needle and syringe programs each year (2% in 2014), and <1% if gay and bisexual men are excluded from the sample (0.5% in 2014) (Figure 6, 7).

Each year, over a million blood donations are made to the Australian Red Cross Blood Service. Potential blood donors are interviewed to exclude those whose history might place them at higher risk of having an infectious disease that can be transmitted through blood or blood products. All blood donations are then tested for a range of infections, including HIV. The results of these tests therefore provide an estimate of HIV prevalence in a population that is likely to be at considerably lower risk than the population as a whole. The prevalence of HIV in blood donors has been below 0.003% in new donors and 0.0003% in repeat donors for the past 10 years (Figure 8).

Figure 4 Estimated HIV prevalence in selected countries, 2014

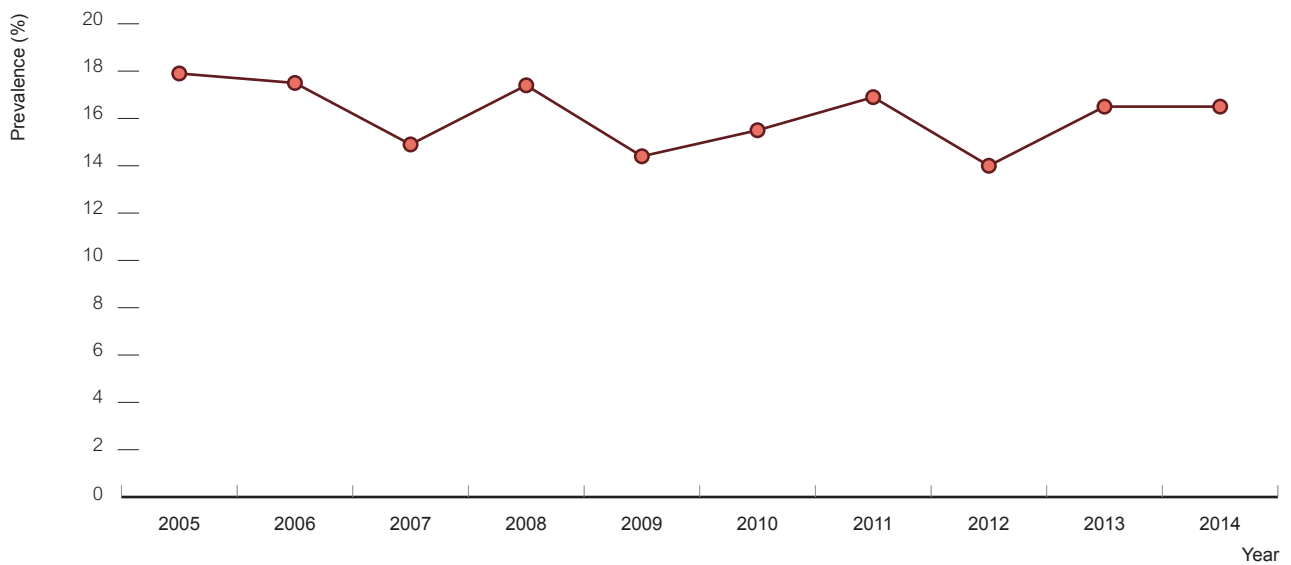


* 2013 prevalence, †2012 prevalence

1 Countries included reflect number of Australian notifications by country of birth and key geographic and political countries in the Australian context

Source: UNAIDS, HIV in the United Kingdom: 2014 Report

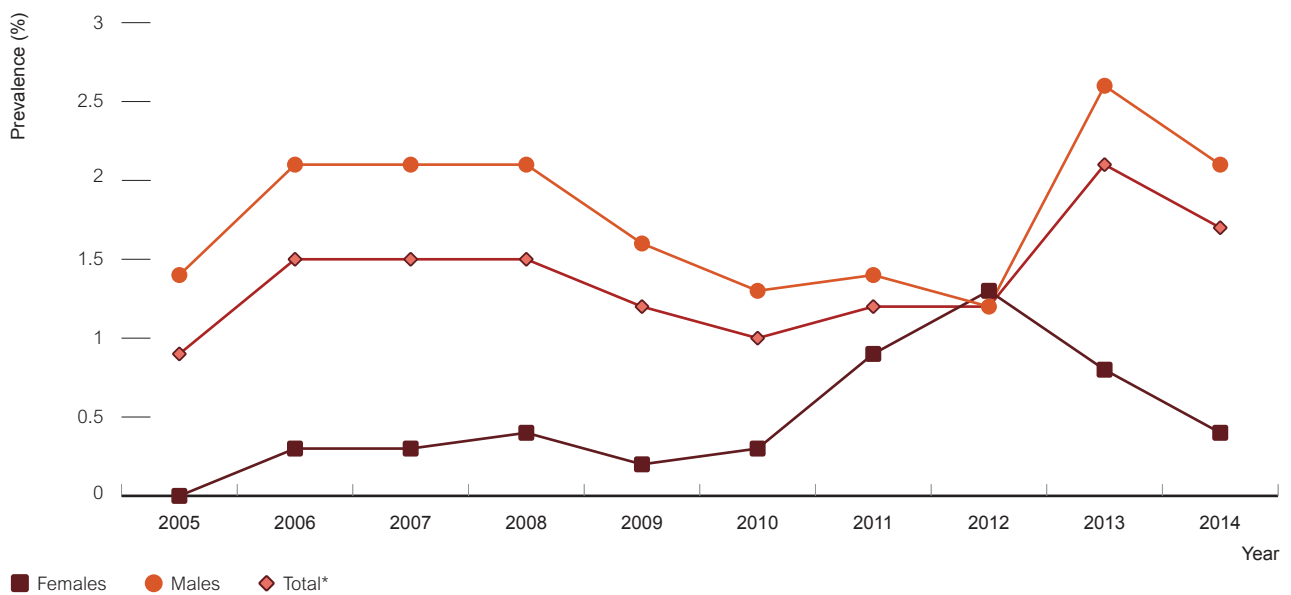
Figure 5 Self-report HIV prevalence among gay men, 2005 – 2014



1 Age standardised by ABS populations and weighted by different recruitment types

Source: Gay Community Periodic Survey, see Methodological Notes for detail

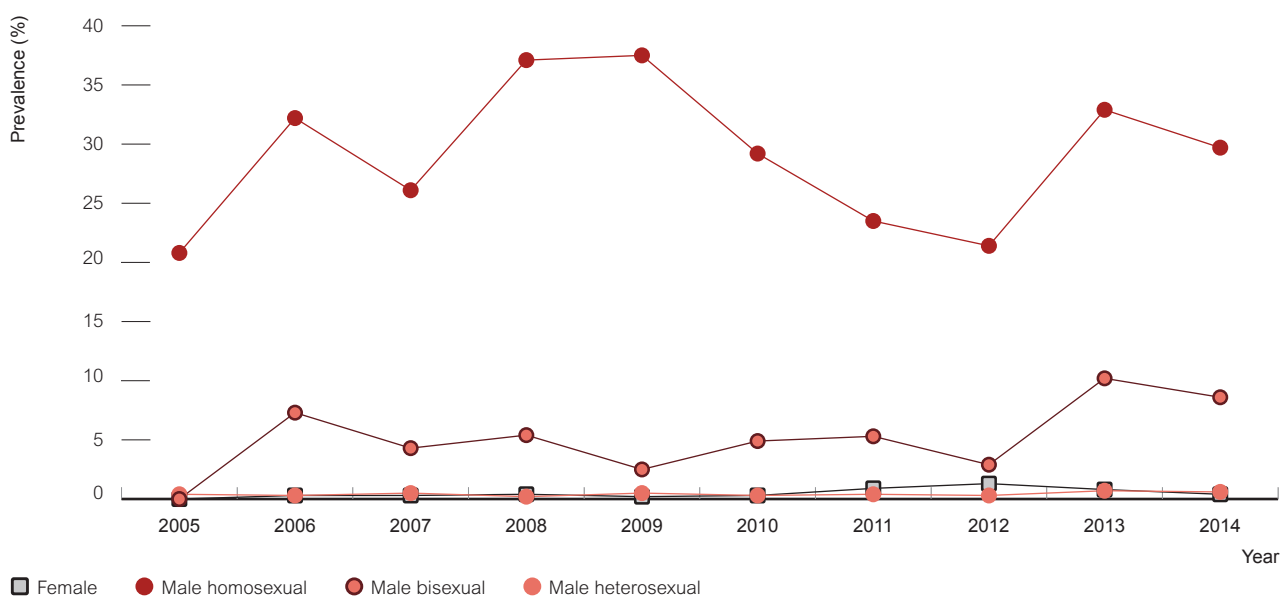
Figure 6 HIV prevalence among people seen at needle and syringe programs, 2005 – 2014, by sex



* Includes transgender

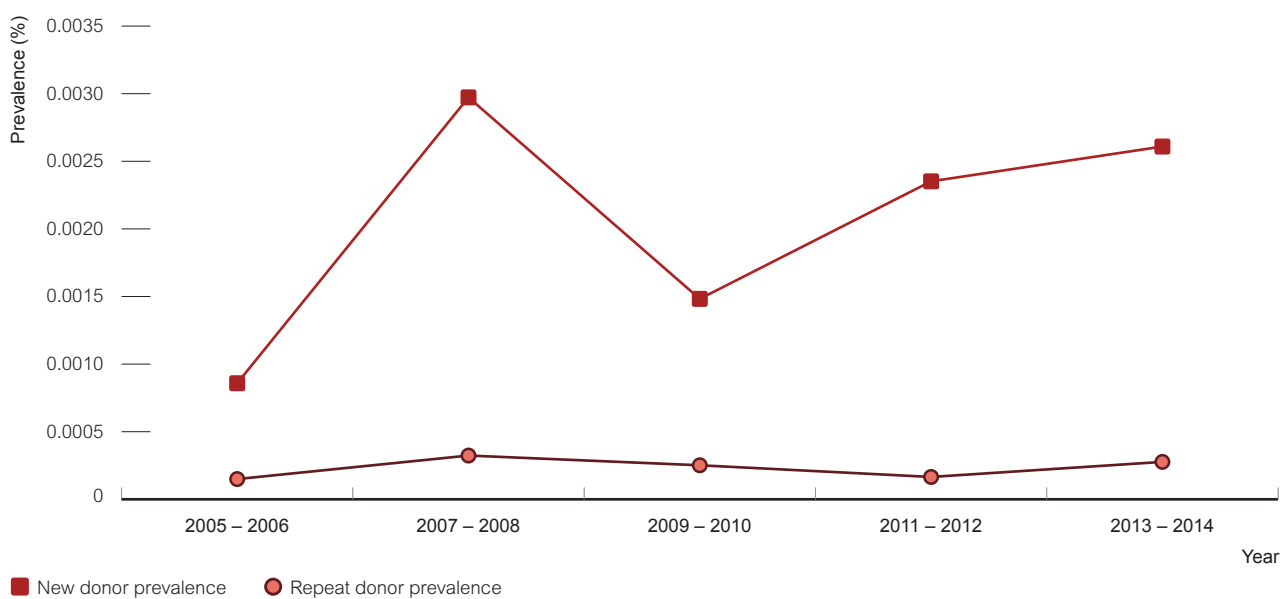
Source: Australian Needle and Syringe Program Survey, see Methodological Notes for detail

Figure 7 HIV prevalence among people seen at needle and syringe programs, 2005 – 2014, by sexual identity



Source: Australian Needle and Syringe Program Survey, see Methodological Notes for detail

Figure 8 HIV prevalence in blood donors, 2005 – 2014, by new and repeat donor status



Source: Australian Red Cross Blood Service, see Methodological Notes for detail

HIV prevention

Primary prevention strategies aim to protect people from acquiring HIV and includes; condom use, use of clean needles and biomedical strategies such as post-exposure prophylaxis (PEP) and pre exposure prophylaxis (PrEP). Testing and treatment are secondary prevention as they prevent transmission to others due to behavioural change, or starting treatment and reducing viral load.

Primary prevention

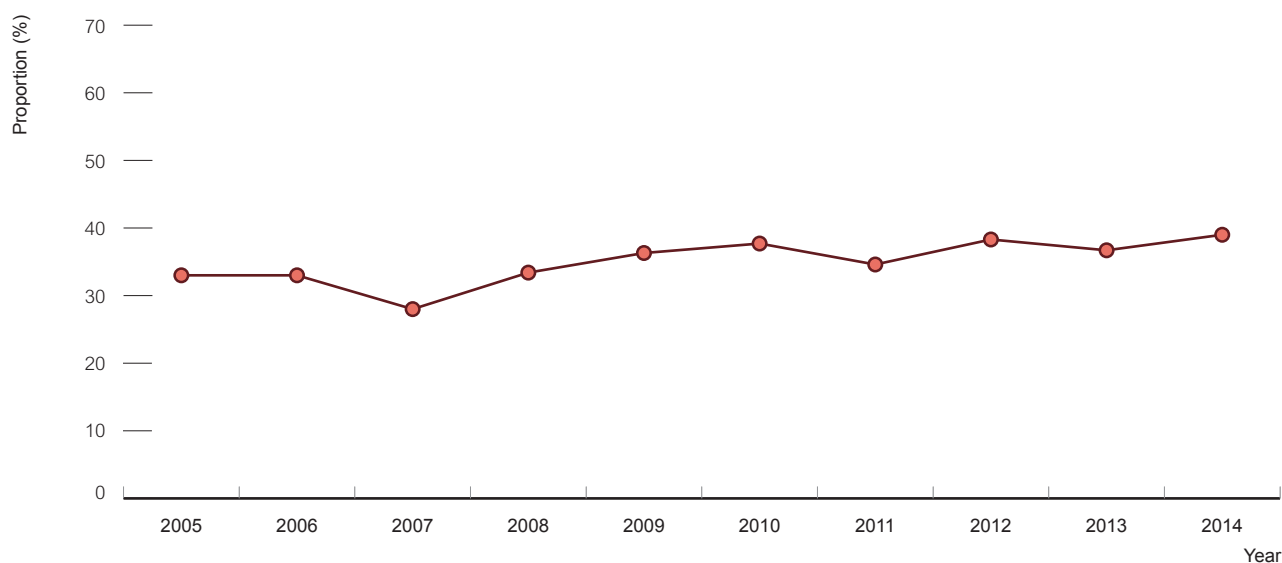
Condom use

According to the Gay Community Periodic Surveys, about a third of gay men with casual partners report condomless anal intercourse in the previous six months. The proportion has increased from 33% to 39% over the past ten years, but remained steady in the past 3 years (Figure 9). Conversely, this means about two-thirds of men with casual partners use condoms or avoid anal sex entirely. Further information regarding sexual risk behaviour appears in the *Annual Report of Trends in Behaviour 2015*, prepared by the Centre for Social Research in Health.

Findings from the Second Australian Study of Health and Relationships (ASHR2), a population-based survey conducted from October to November 2013, indicate about half of heterosexual men (48%) and women (47%) reported always using condoms with casual partners at last sexual intercourse.

The proportion of people attending needle and syringe programs and reporting inconsistent condom use in the last month with non-regular partners has steadily increased from 51% in 2005 to 61% in 2014 (Figure 10).

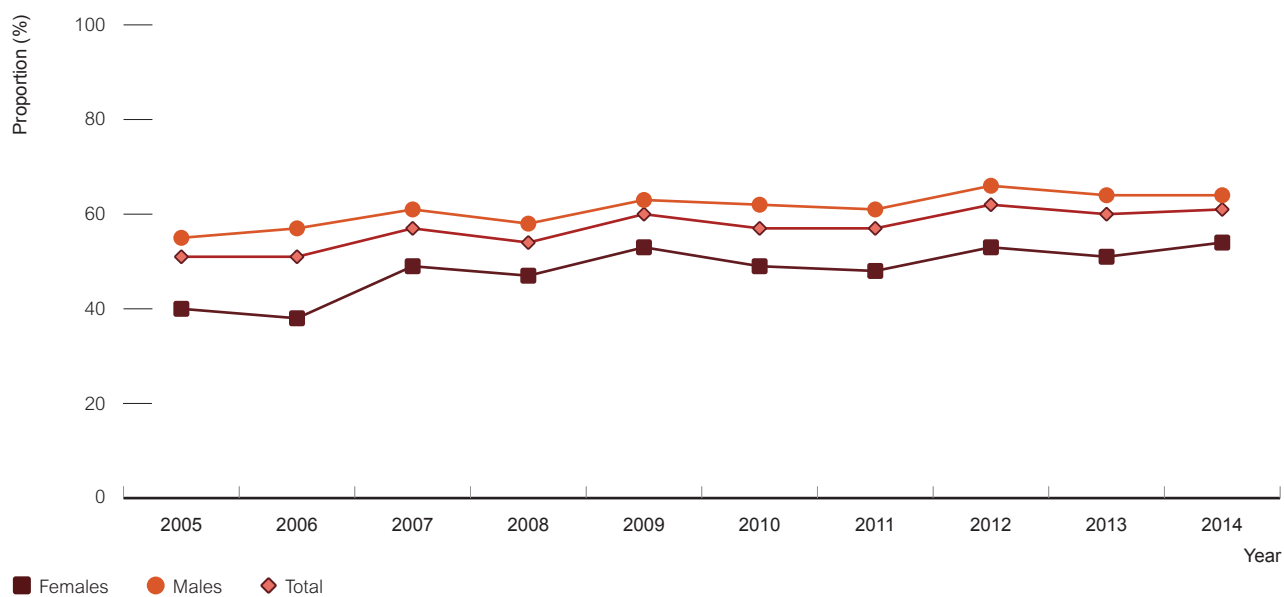
Figure 9 Proportion of gay men with casual partners who reported any condomless anal intercourse in the six months prior to the survey, 2005 – 2014



Source: Gay Community Periodic Surveys, see Methodological Notes for detail



Figure 10 Proportion of people who inject drugs seen at needle and syringe programs, reporting inconsistent condom use in the last month with non-regular partners, 2005 – 2014, by sex



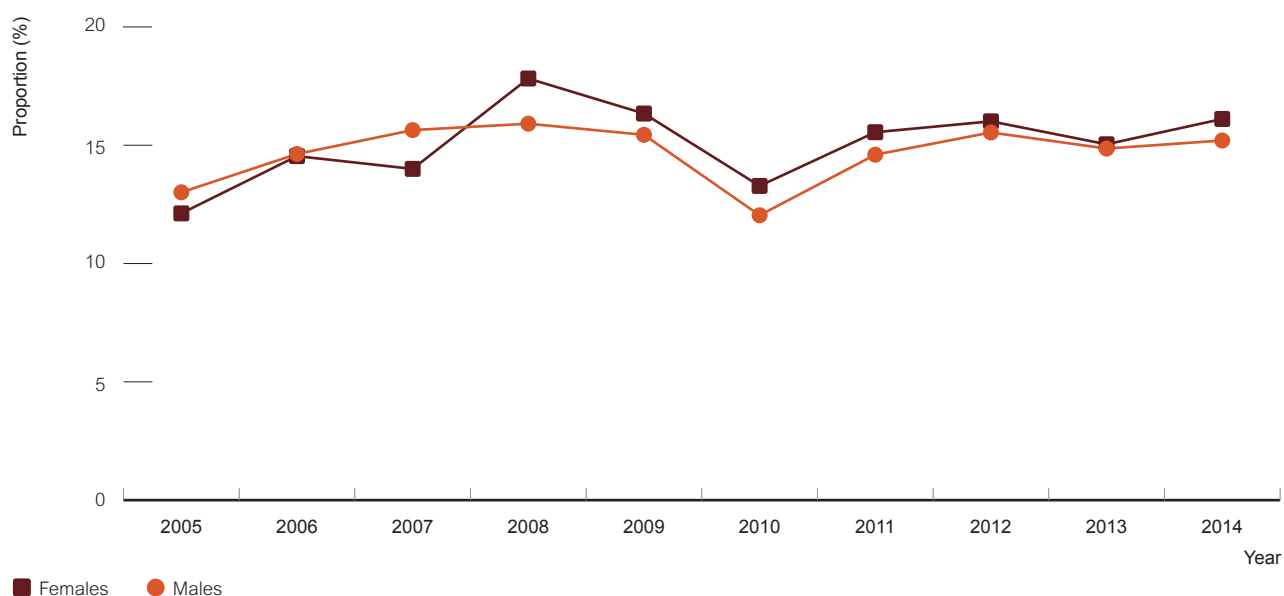
* Includes transgender

Source: Australian Needle and Syringe Program Survey, see Methodological Notes for detail

Use of clean needles and syringes

Each year about 15% of people who inject drugs and attend needle and syringe programs report receptive syringe sharing in the last month, similar in males and females, and this proportion has been stable over the last ten years (Figure 11). Receptive syringe sharing was determined from the question. “How many times in the last month did you reuse a needle and syringe after someone else had used it, including your sex partner (even if it was cleaned)?”.

Figure 11 Proportion of people seen at needle and syringe programs reporting receptive syringe sharing (RSS) in the last month, 2005 – 2014, by sex



Source: Australian Needle and Syringe Program Survey; see Methodological Notes for detail

See Figure 52-53 for further information on injecting behaviours among people attending needle and syringe programs.

Blood screening

Since 1985, all blood donors have been screened for HIV infection to prevent onward transmission. There has been no known case of HIV acquisition through blood transfusion in Australia since the late 1990s.

Pre-exposure prophylaxis (PrEP)

PrEP is the use of antiretroviral treatment by people to reduce their risk of becoming infected with HIV, and thereby potentially reducing the transmission of HIV at the population level. In Australia, PrEP is currently only available through demonstration projects in Melbourne and Sydney, and people can import PrEP from overseas. Systems will be established in the future to monitor the uptake of PrEP.

Secondary prevention

HIV testing

National testing guidelines recommend HIV testing in a number of contexts, including exposure risk, during antenatal care, and for particular at risk populations². Guidelines recommend all sexually active gay men should re-test every 12 months.

Among priority populations considered to be at high risk of HIV infection due to sexual or injecting behaviour, the proportion tested in a year is generally high. In the Gay Community Periodic Surveys, about 60% of non-HIV positive gay male participants report having an HIV test in the 12 months prior to the survey. This proportion has been stable over the last five years (Figure 12). In 2014, about half of people who inject drugs attending needle syringe programs reported having an HIV test in the 12 months prior to the survey (Figure 18).

In Australia, about half of gay men report their last HIV test was at a sexual health service and half at a general practice^{3,4}, whereas for heterosexuals, most STI diagnosis are made in general practice.⁵ Data from these clinical services therefore provide further information about HIV testing patterns.

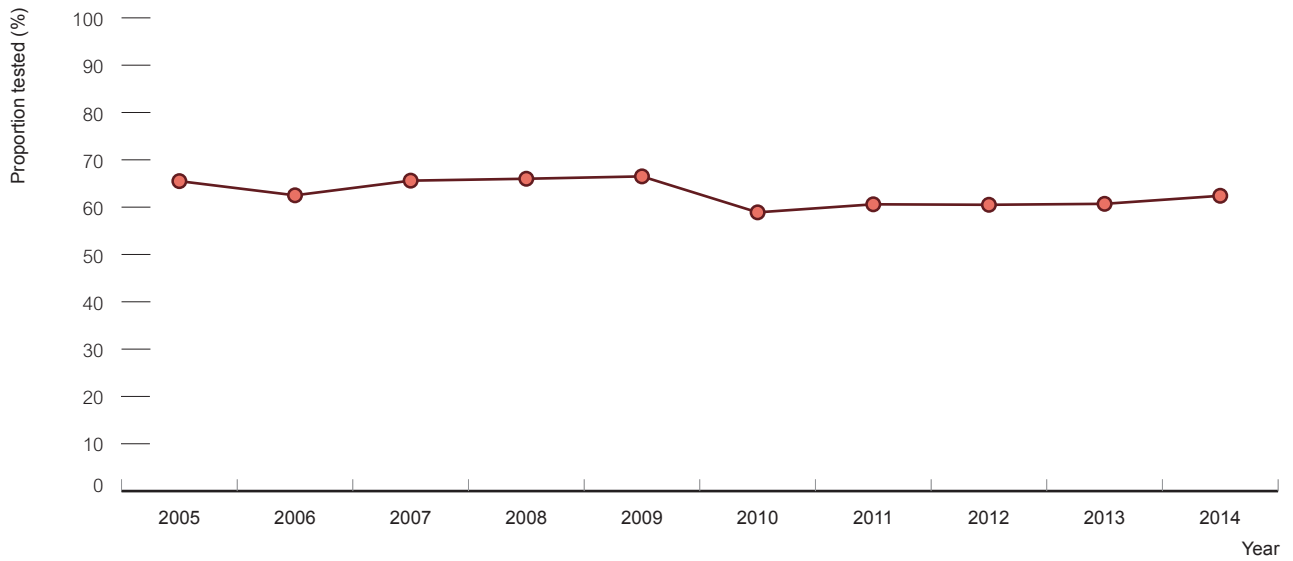
At 46 sentinel sexual health clinics across Australia participating in the ACCESS project (see Methodological notes for further detail), between 2011 and 2014 the total number of HIV tests conducted in gay and bisexual men doubled from 12 565 to 26 030 (Figure 14), the proportion of gay and bisexual men who attended and had a HIV test in a year increased from 80 to 91% (Figure 16) and around 50% of gay and bisexual men tested returned for a re-test in 12 months, and 31% within 6 months (Figure 17). Among other priority populations attending sexual health clinics participating in the ACCESS project, the proportion of female sex workers who had a HIV test in a year has remained over 80% per year since 2011, increasing to 89% in 2014 (Figure 16), and 47% of young heterosexuals attending, and 75% of people attending who were recorded as currently injecting drugs received a HIV test in 2014 (Figure 16).

At 4 selected sentinel general practice clinics (located in New South Wales and Victoria) with a high case load of gay men participating in the ACCESS project, the total number of HIV tests among gay and bisexual men increased from 2 872 in 2011 to 4 080 in 2014 (Figure 13) and 57% of gay and bisexual men who attended had a HIV test in a year in 2014 (Figure 15). It is possible some of these men may have tested elsewhere. The ACCESS system will be enhanced in 2016 to measure this and also to include more clinics.

In addition to laboratory HIV tests, in some states/territories rapid HIV testing services for gay men have opened in recent years.



Figure 12 Proportion of non-HIV-positive men tested for HIV in the 12 months prior to completing the survey, 2005 – 2014



Source: Gay Community Periodic Survey, see Methodological Notes for detail

Figure 13 Number of HIV tests among gay and bisexual men attending high case load general practices, 2011 – 2014

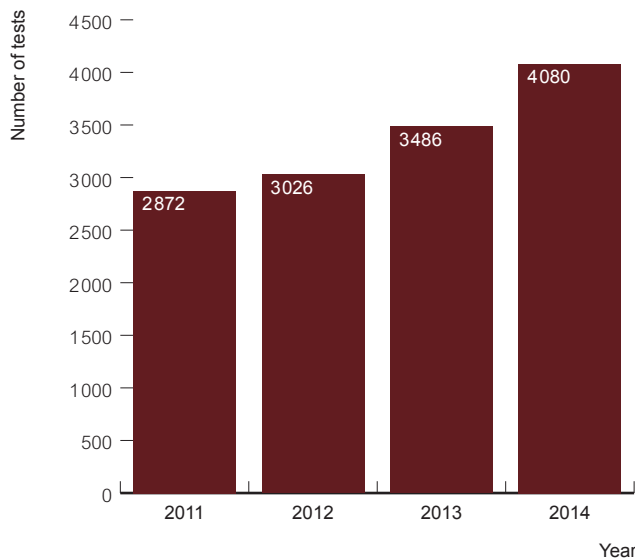
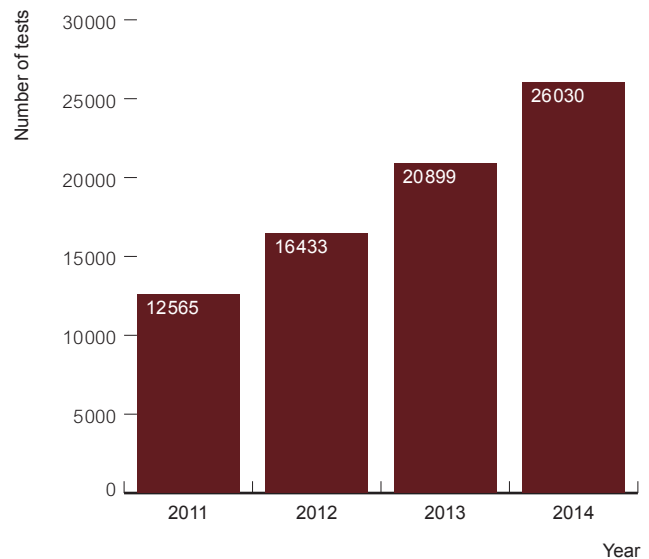
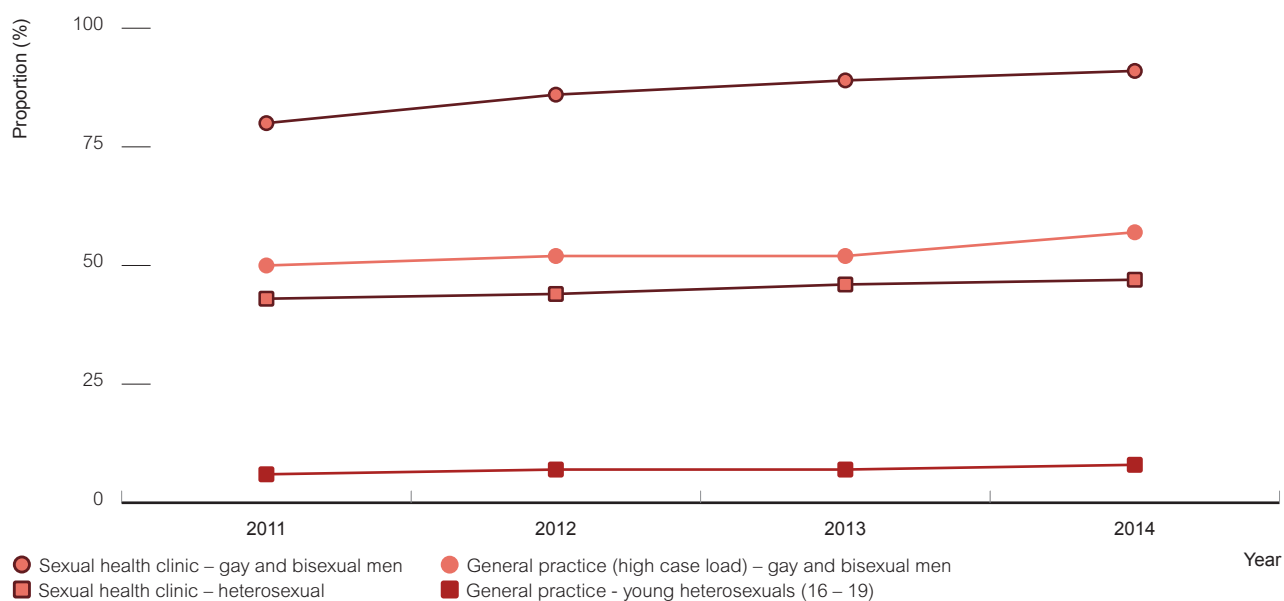


Figure 14 Number of HIV tests among gay and bisexual men attending sexual health clinics, 2011 – 2014



Source: The Australian Collaboration for Coordinated Enhanced Sentinel Surveillance of Sexually Transmitted Infections (STIs) and Blood Borne Viruses (BBVs), see Methodological Notes for detail

Figure 15 Proportion of people attending sexual health clinics and general practice clinics tested for HIV in a year, 2011 – 2014

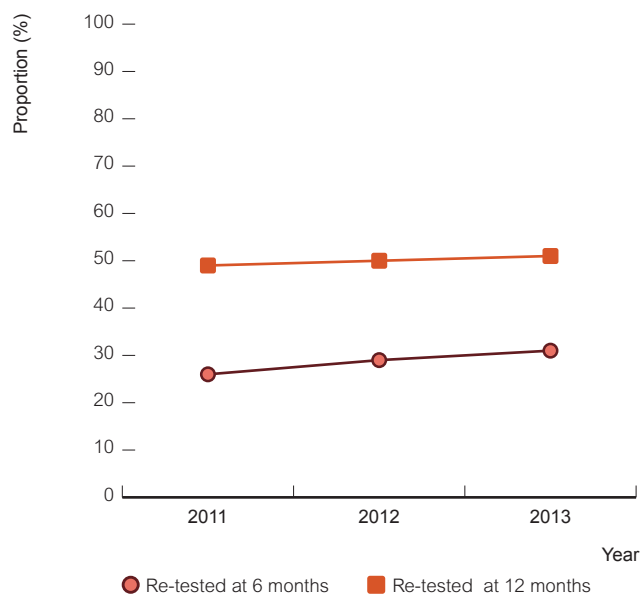


Source: The Australian Collaboration for Coordinated Enhanced Sentinel Surveillance of Sexually Transmitted Infections (STIs) and Blood Borne Viruses (BBVs), see Methodological Notes for detail

Figure 16 Proportion of sexual health clinic attendees tested for HIV in a year, 2011 – 2014



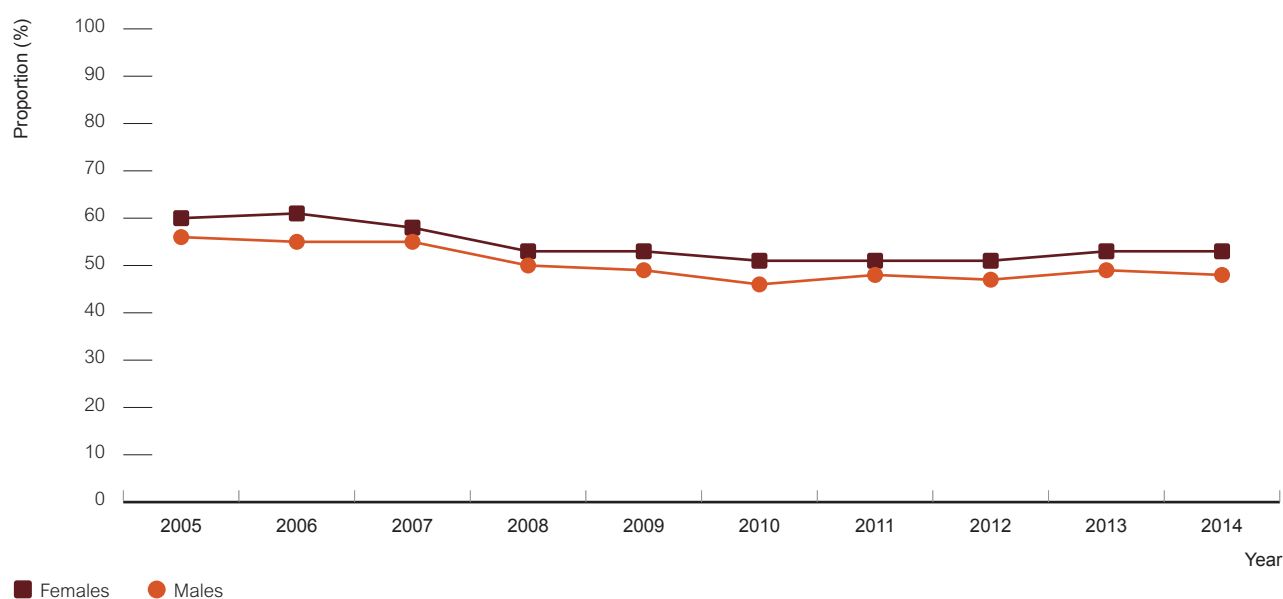
Figure 17 HIV re-testing among gay and bisexual men attending sexual health clinics, 2011 – 2013



Source: The Australian Collaboration for Coordinated Enhanced Sentinel Surveillance of Sexually Transmitted Infections (STIs) and Blood Borne Viruses (BBVs), see Methodological Notes for detail. 2014 data not included to allow time for re-testing in the 2013 cohort.



Figure 18 Proportion of people who inject drugs who attended needle and syringe programs and reported an HIV test in the past 12 months, 2005 – 2014, by sex



Source: Australian Needle and Syringe Program Survey, see Methodological Notes for detail

New HIV diagnoses

This section focuses on people first diagnosed with HIV in Australia. A total of 1 081 cases of HIV infection were newly diagnosed in Australia in 2014, including 33 among people who identified as Aboriginal and Torres Strait Islander. Previous reports have included all diagnosis (first in Australia and first overseas) which means numbers of diagnoses in this report will be lower than reported in previous years.

There were an additional 252 HIV cases previously diagnosed overseas with a confirmatory test conducted in Australia; 30% were from New South Wales, 27% from Victoria and 25% from Queensland (Table 2). These diagnoses are included in estimates of people diagnosed and living with HIV but excluded from further analyses in this section.

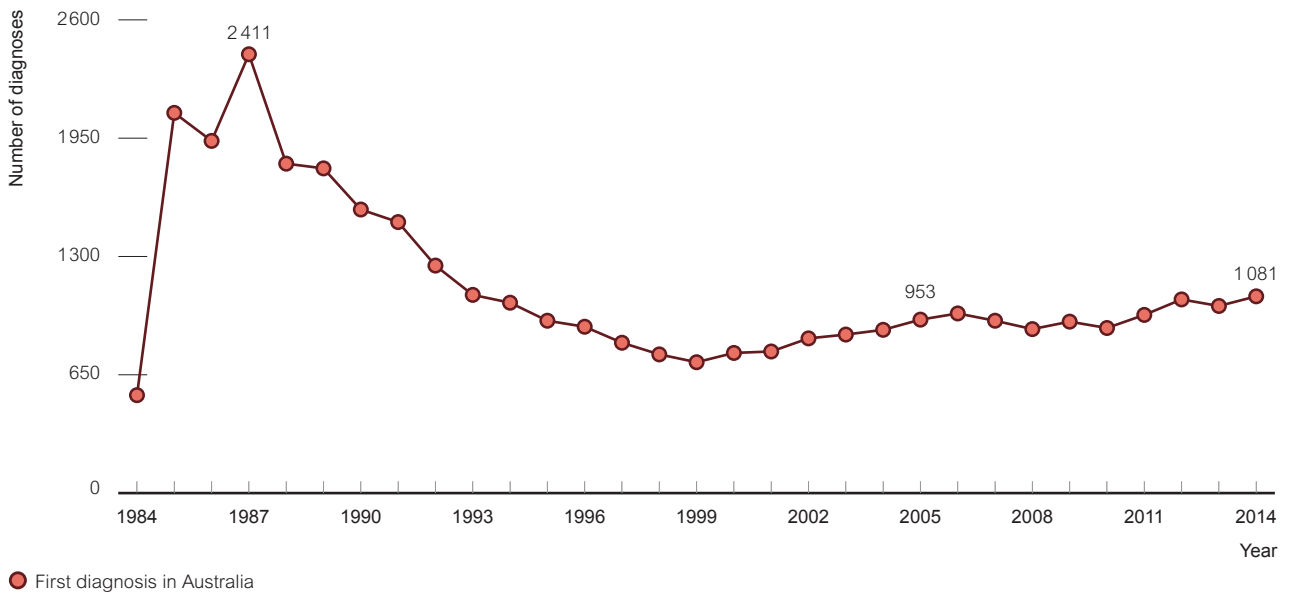
Table 2 Number of new cases of HIV in Australia in 2014, by State/Territory and whether HIV infection was first diagnosed in Australia or overseas

State/Territory	Place of first diagnosis of HIV infection		
	Australia	Overseas	Total cases
Australian Capital Territory	18 (2%)	2 (1%)	20
New South Wales	345 (32%)	76 (30%)	421
Northern Territory	9 (1%)	2 (1%)	11
Queensland	246 (23%)	62 (25%)	308
South Australia	39 (4%)	15 (6%)	54
Tasmania	15 (1%)	1 (<1%)	16
Victoria	302 (28%)	67 (27%)	369
Western Australia	107 (10%)	27 (11%)	134
Total	1 081 (100%)	252 (100%)	1 333

Source: State and Territory Health authorities, see Methodological Notes for detail

The annual number of new HIV diagnoses has gradually increased by 13% over the past 10 years, from 953 diagnoses in 2005 to 1 064 in 2012 and stabilised since then with 1 081 cases of HIV infection newly diagnosed in Australia in 2014 (Figure 19).

Figure 19 Newly diagnosed HIV infections in Australia, 1984 – 2014

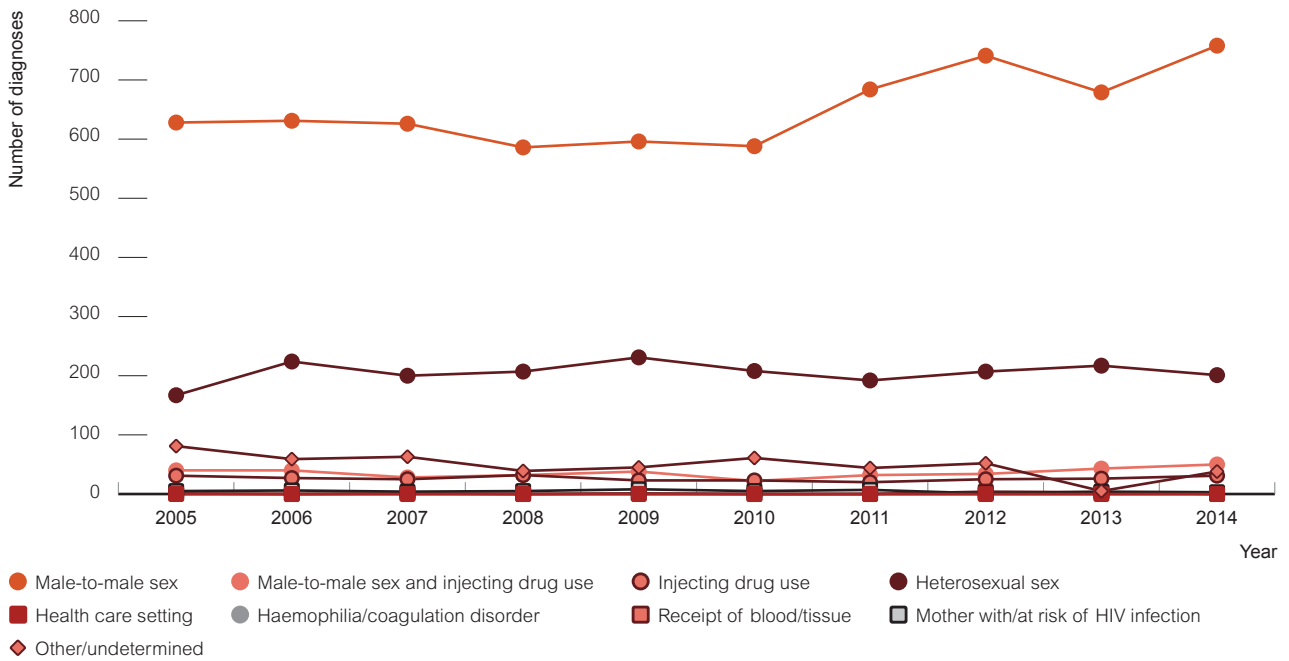


Source: State and Territory health authorities; see Methodological Notes for detail

Transmission of HIV in Australia continues to occur primarily through sexual contact between men (Figure 20, Table 4). In 2014, 70% of new HIV diagnoses occurred among men who have sex with men, 5% due to male-to-male sex and injecting drug use, 19% were attributed to heterosexual sex, and 3% to injecting drug use (Table 4).



Figure 20 Newly diagnosed HIV infections in Australia, 2005 – 2014 by exposure category



Source: State and Territory health authorities, see Methodological Notes for detail

Recent trends in the population rate of newly diagnosed HIV infection have differed across Australia (Figure 21, Table 3). Overall no jurisdiction has observed a long-term decreasing trend.

In Victoria, the rate of HIV diagnosis declined steadily from 5.2 per 100 000 population in 2005 to 4.4 per 100 000 in 2010, and was 5.2 per 100 000 population in 2014. In New South Wales there was a decline between 2005 and 2010 (6.1 per 100 000 to 4.4 per 100 000), increasing to 5.7 per 100 000 in 2012 followed by a decline in 2013 and 2014 (4.7 per 100 000 in 2014). In Queensland, since 2010 the rate of HIV diagnosis remained steady for three years, declined in 2013 and increased in 2014 to 5.3 per 100 000. Rates of HIV diagnosis have increased in Western Australia between 2005 and 2010 (from 3.1 per 100 000 to 4.0 per 100 000) and fluctuated thereafter. Overall diagnoses rates in Western Australia remain at lower levels than the three jurisdictions above.

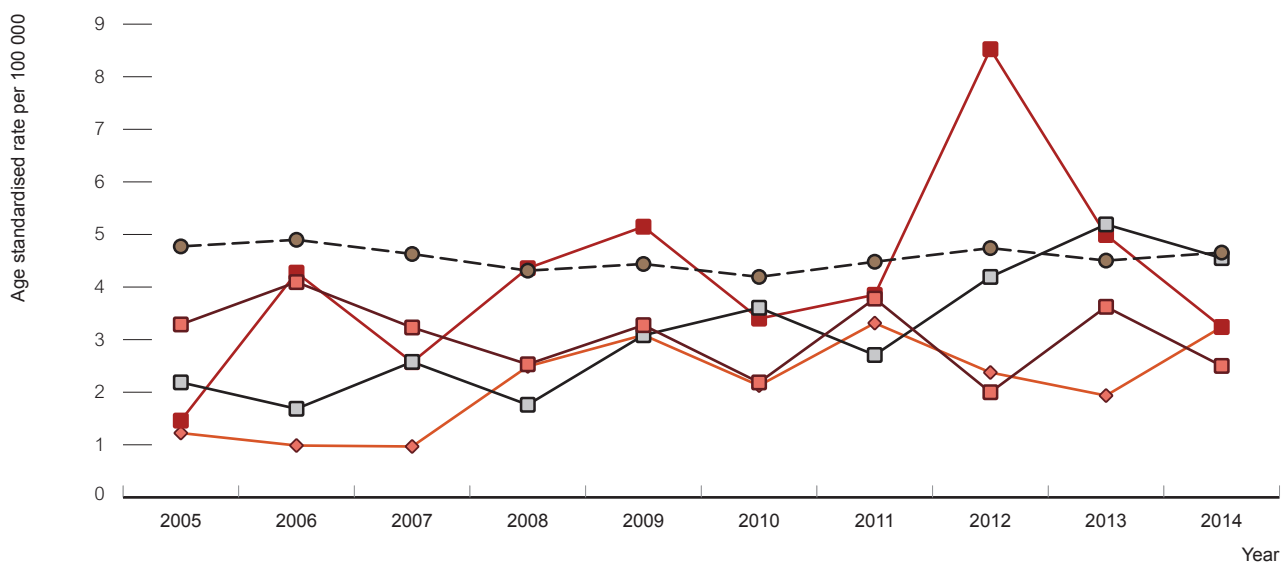
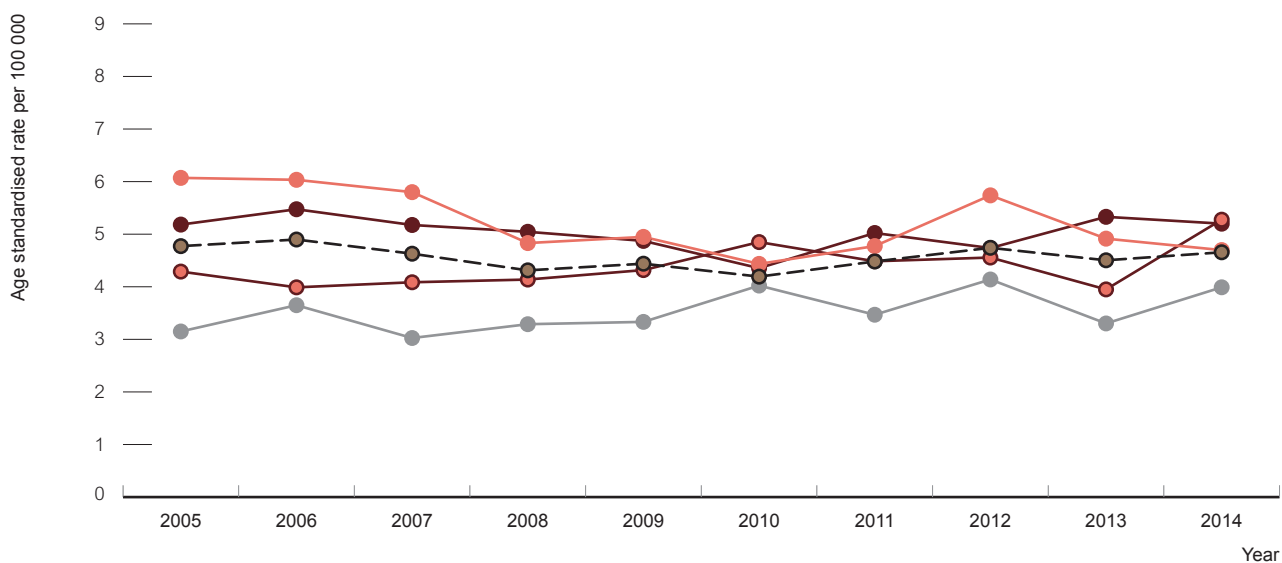
In the Australian Capital Territory, Tasmania and the Northern Territory the number of diagnoses each year are smaller (4 – 21 per year) so trends need to be interpreted with caution. In the Australian Capital Territory in the past ten years, diagnoses rates have increased and reached a similar level to New South Wales in 2014 (4.6 per 100 000 in 2014) and in Tasmania and Northern Territory rates have fluctuated (Table 3, Figure 21).

Table 3 Rate of newly diagnosed HIV, 2005 – 2014, by State/Territory

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
State/Territory										
Australia	4.8	4.9	4.6	4.3	4.4	4.2	4.5	4.7	4.5	4.7
New South Wales	6.1	6.0	5.8	4.8	4.9	4.4	4.8	5.7	4.9	4.7
Queensland	4.3	4.0	4.1	4.1	4.3	4.8	4.5	4.6	3.9	5.3
Victoria	5.2	5.5	5.2	5.0	4.9	4.4	5.0	4.7	5.3	5.2
Western Australia	3.1	3.6	3.0	3.3	3.3	4.0	3.5	4.1	3.3	4.0
South Australia	3.3	4.1	3.2	2.5	3.3	2.2	3.8	2.0	3.6	2.5
Australian Capital Territory	2.2	1.7	2.6	1.8	3.1	3.6	2.7	4.2	5.2	4.6
Northern Territory	1.5	4.3	2.6	4.4	5.1	3.4	3.9	8.5	5.0	3.2
Tasmania	1.2	1.0	1.0	2.5	3.1	2.1	3.3	2.4	1.9	3.2

Source: State and Territory Health authorities; ABS Catalogue 3101051 – 3101058, ABS Standard Population Catalogue 3100DO003_201212; see Methodological Notes for further detail

Figure 21 Newly diagnosed HIV notification rate per 100 000 population, 2005 – 2014, by State/Territory



Source: State and Territory Health authorities; ABS Catalogue 3101051 – 3101058, ABS Standard Population Catalogue 3100DO003_201212; see Methodological Notes for detail

Table 4 Characteristics of cases of newly diagnosed HIV infection by year, where first ever diagnosis was in Australia

Characteristic	Year of HIV diagnosis										
	≤2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total ¹
Total cases	26 286	987	947	901	942	907	979	1 064	1 028	1 081	35 122
Males (%)	92.2	85.9	88.8	87.8	87.3	87.8	89.5	90.1	89.5	90.2	91.3
Median age (years)											
Male	37	38	38	37	37	37	37	36	37	35	34
Female	32	31	32	31	32	31	33	31	34	35	30
Language spoken at home²											
English	1 191	645	728	687	716	678	778	795	526	834	7 578
Other language	103	68	59	55	93	77	83	101	87	115	841
Not reported	556	274	160	159	133	152	118	168	415	132	2 267
Newly acquired n (%)	3 326 (12.7)	308 (31.2)	278 (29.4)	284 (31.5)	300 (31.9)	305 (33.6)	370 (37.8)	394 (37.0)	346 (33.7)	423 (39.1)	6 334 (18.0)
Late and advanced HIV infection status at HIV diagnosis³											
Late HIV diagnosis (%) ⁴	31.2	35.6	31.8	31.6	35.0	35.0	28.9	31.6	32.1	28.4	32.0
Advanced HIV diagnosis (%) ⁴	19.4	21.7	17.8	17.3	20.5	20.0	19.1	17.9	18.5	16.6	18.9
Median CD4+ cell count (cells/μ)	450	410	430	430	407	400	429	430	420	440	430
State/Territory (n)											
Australian Capital Territory	298	6	9	7	11	13	11	17	21	18	411
New South Wales	14 997	397	386	326	338	309	331	406	354	345	18 189
Northern Territory	147	9	6	10	12	5	9	21	13	9	241
Queensland	2 849	157	167	174	182	209	196	208	181	246	4 569
South Australia	993	61	49	39	50	34	57	31	58	39	1 411
Tasmania	117	5	4	11	14	9	15	12	10	15	212
Victoria	5 525	277	263	262	261	236	278	267	307	302	7 978
Western Australia	1 360	75	63	72	74	92	82	102	84	107	2 111
HIV exposure category (%)⁴											
Male-to-male sex	66.6	63.9	66.1	65.0	63.3	64.8	69.9	69.7	66.0	70.1	66.6
Male-to-male sex and injecting drug use	3.4	4.1	3.0	3.6	4.0	2.4	3.3	3.2	4.2	4.6	3.8
Injecting drug use ⁵	3.5	2.7	2.6	3.6	2.4	2.5	2.0	2.3	2.5	2.9	3.3
Heterosexual sex	9.6	22.7	21.1	23.0	24.5	22.9	19.6	19.5	21.1	18.6	12.6
<i>Person from a high prevalence country⁶</i>	0.9	8.0	6.1	9.0	8.7	8.2	4.8	5.0	3.6	4.3	3.3
<i>Partner from a high prevalence country</i>	0.1	<0.1	2.4	1.4	2.2	2.6	2.9	2.3	2.7	3.1	1.3
<i>Partner high risk</i>	3.0	2.7	3.3	3.0	3.1	2.0	3.4	2.9	4.3	2.6	2.4
<i>Not further specified</i>	4.2	10.0	9.2	9.5	10.6	10.1	8.6	9.3	10.5	8.7	9.6
Haemophilia/coagulation disorder	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8
Receipt of blood/tissue	1.0	0.0	0.1	0.0	0.1	0.0	0.0	0.4	0.3	0.0	0.8
Mother with/at risk of HIV infection	0.3	0.6	0.4	0.6	0.9	0.6	0.7	0.1	0.4	0.3	0.3
Other/undetermined	14.0	6.0	6.7	4.3	4.8	6.7	4.5	4.9	5.5	3.5	11.8

1 Not adjusted for multiple reporting

2 Language spoken at home was sought among cases of HIV infection newly diagnosed from 1 January 2004. Total number with language spoken at home in 2004–2014

3 Late HIV diagnosis was defined as newly diagnosed HIV infection with a CD4+ cell count of less than 350 cells/μl, and advanced HIV infection as newly diagnosed infection with a CD4+ cell count of less than 200 cells/μl. Newly acquired cases excluded from late or advanced categorisation.

4 Total percentage for late and advanced diagnoses and median CD4+ cell count at diagnoses for notifications from 2004 onwards

5 Excludes men who have sex with men

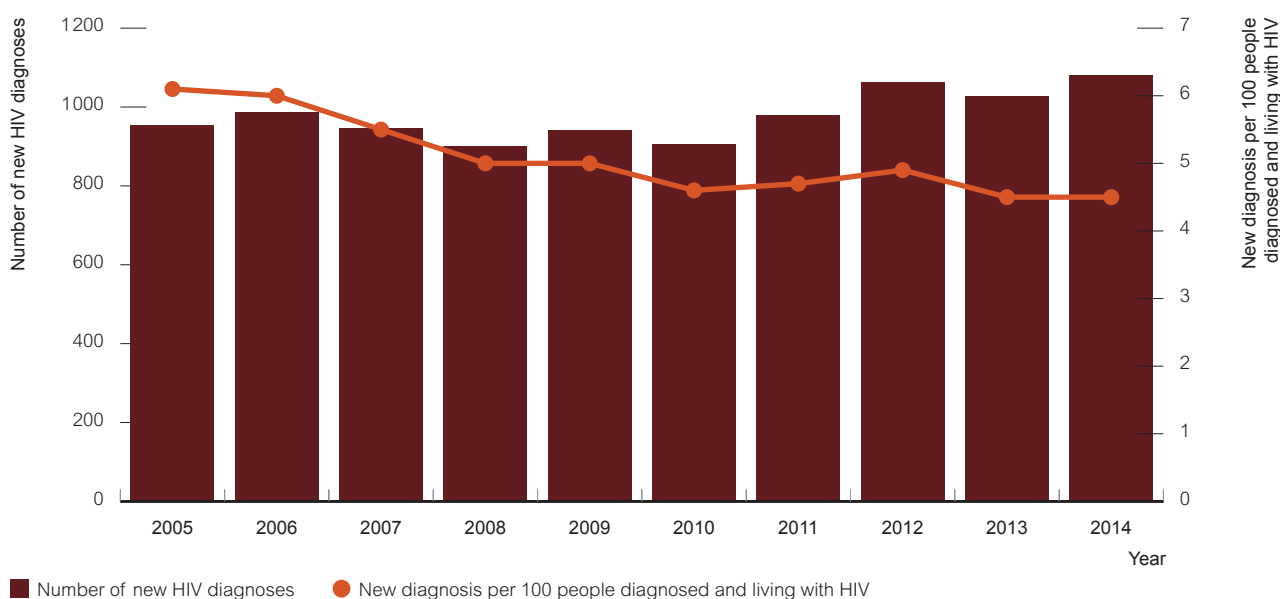
6 High prevalence countries include those with ≥1% estimated prevalence in at least one year of the ten year period 2005 – 2014

Source: State and Territory health authorities

There has been a large increase over the past ten years in both the number of people living with HIV and the proportion taking effective treatments (see HIV care section) that do not cure the infection, but stop it from causing illness and minimise their risk of transmission to sexual partners. For the first time we include an indicator of new HIV notification per 100 people living with HIV who are aware of their infection status (see Methodological Notes for information on how the size of this population was estimated).

Figure 22 shows that the rate of notifications per 100 people diagnosed and living with HIV, has declined by 25% in the past ten years in Australia (from 6.1 to 4.6%). Declining trends were observed in all states and territories except the Northern Territory, Australian Capital Territory and Tasmania where fluctuations are likely to be due to the small number of diagnoses each year. (Figure 23)

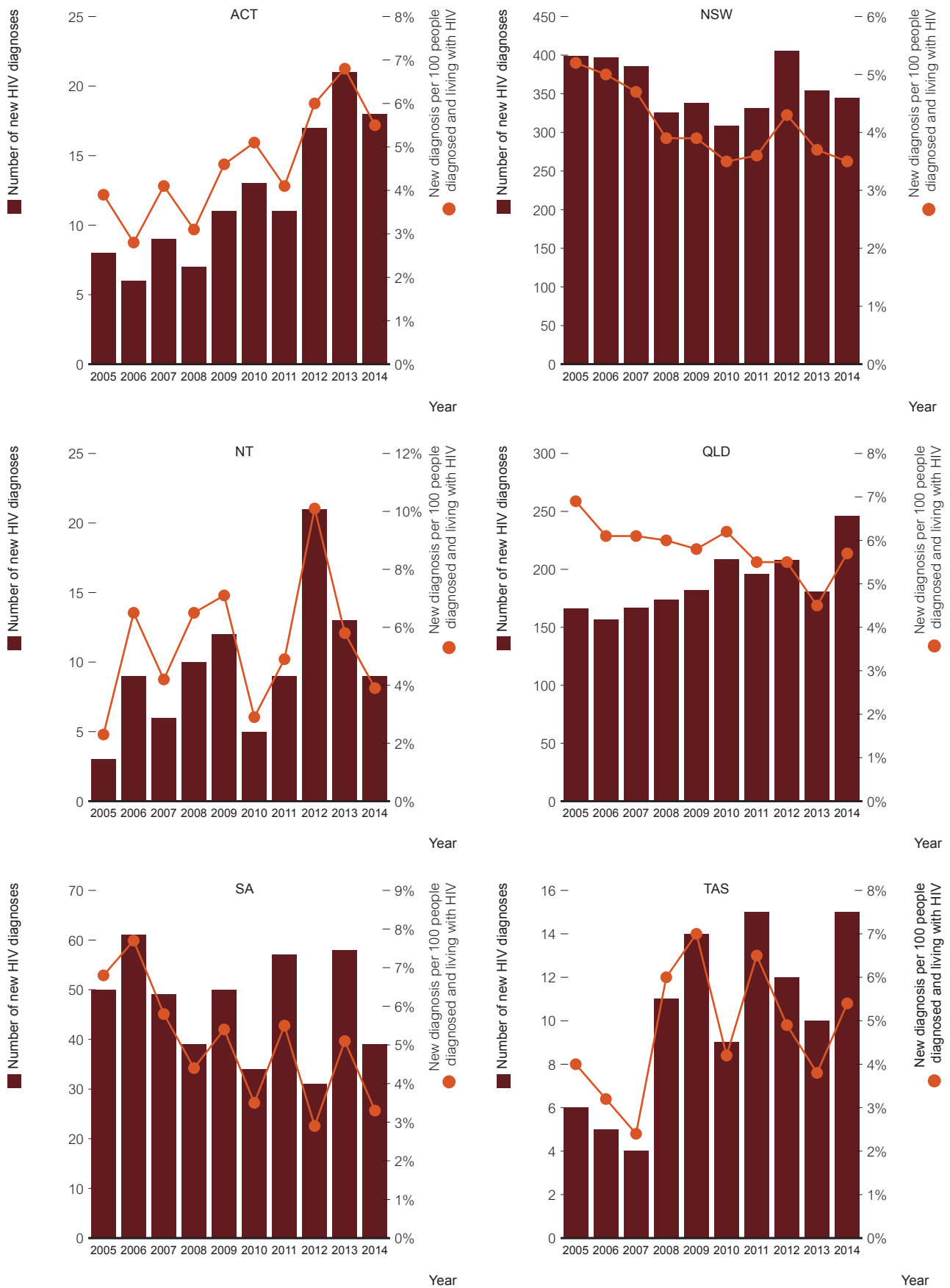
Figure 22 Annual new HIV diagnoses, and as proportion of the cumulative number of people estimated to be diagnosed and living with HIV, 2005 – 2014

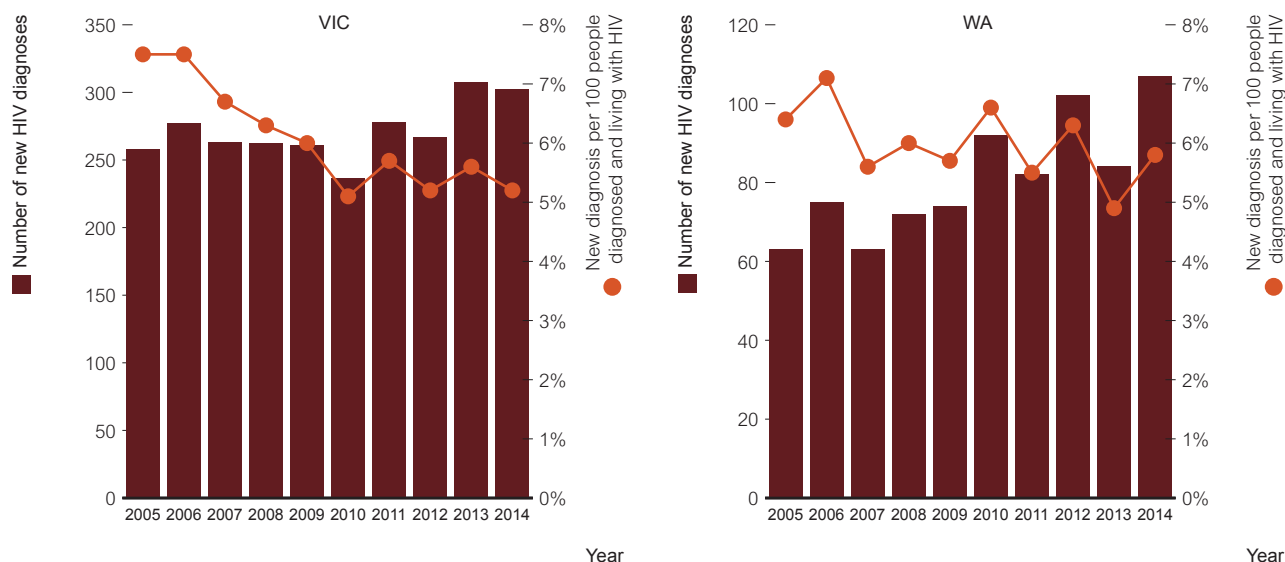


Source: State and Territory Health authorities, see Methodological Notes for detail



Figure 23 Annual new HIV diagnoses, and as proportion of the cumulative number of people estimated to be diagnosed and living with HIV, 2005 – 2014, by State/Territory



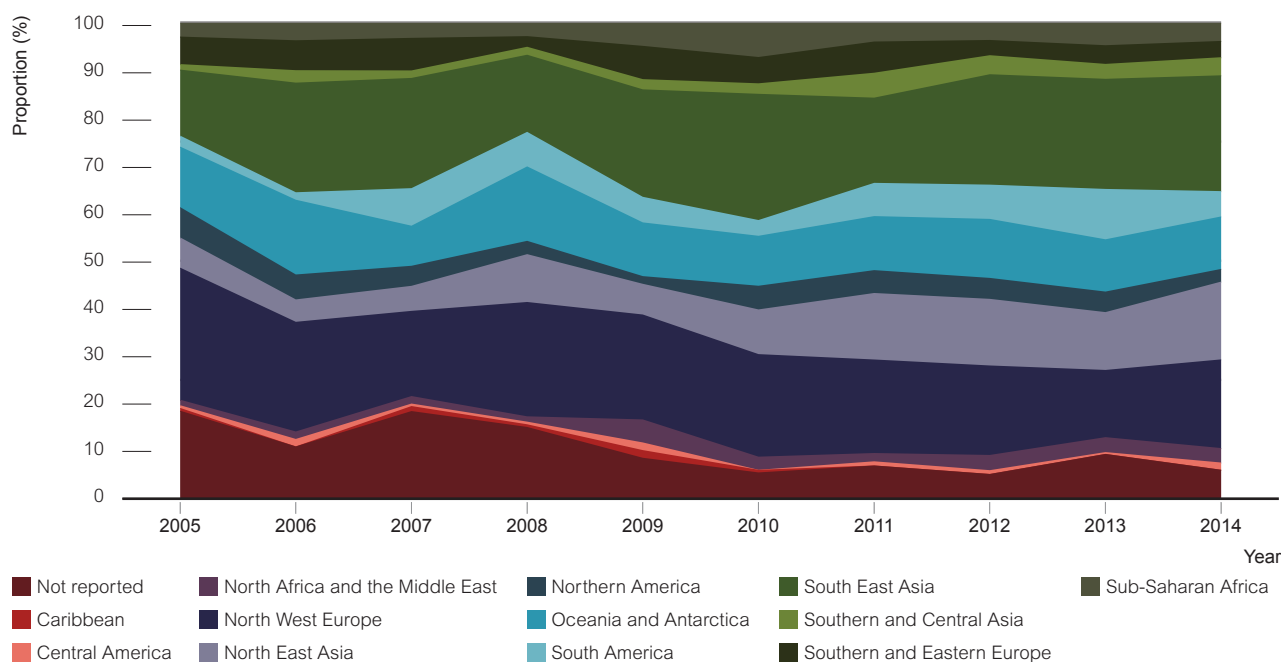


Source: State and Territory Health authorities, see Methodological Notes for detail

Men who have sex with men: The median age of men who have sex with men at HIV diagnosis is stable and was 34 years in 2014. Of the 758 cases of HIV infection newly diagnosed in 2014 for which exposure to HIV was attributed to male-to-male sex, 57 (7.5%) of these also reported sex with women (bisexual). There were an additional 50 men for whom the likely exposure was male-to-male sex and injecting drug use (Figure 20). Over the past ten years a greater proportion of men who have sex with men diagnosed with HIV were born in Asia (South East, North and Southern) making up 15% of notifications in men who have sex with men in 2014, compared to 6% in 2005. Of men who have sex with men born overseas, Asian-born men made up 44% of new diagnoses in 2014, compared to 21% in 2005 (Figure 24).

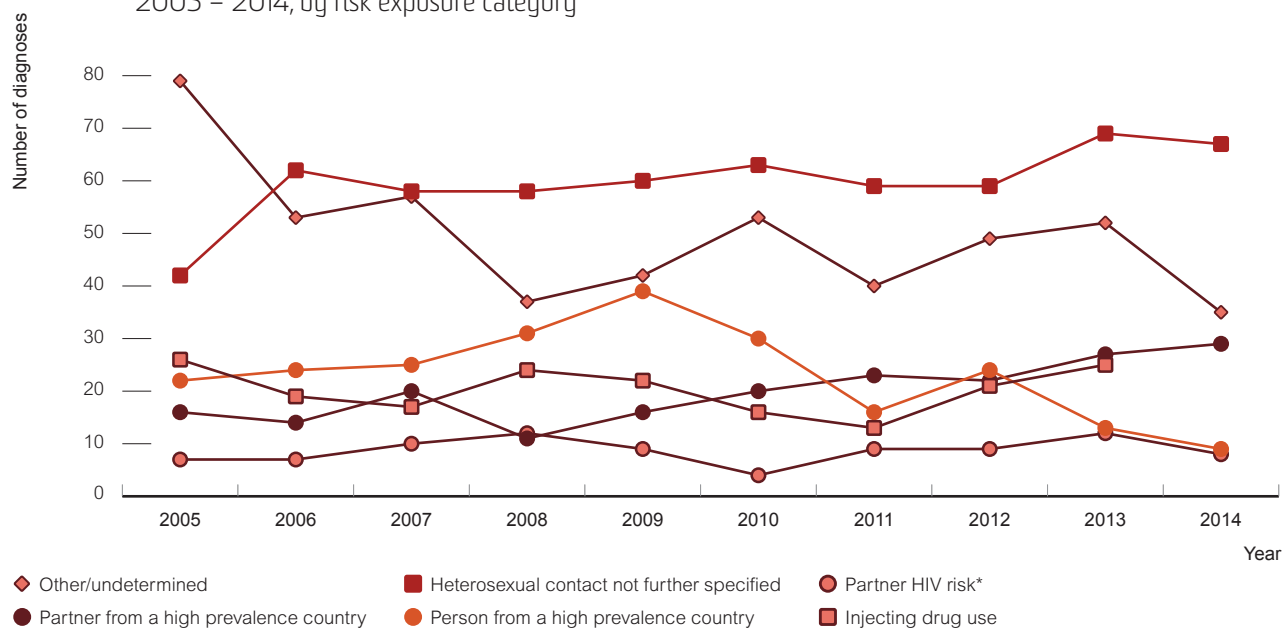


Figure 24 Proportion of diagnoses by country of birth (non-Australian born men), among diagnoses in men reporting male-to-male sex as risk exposure, 2005 – 2014



Source: State and Territory Health authorities

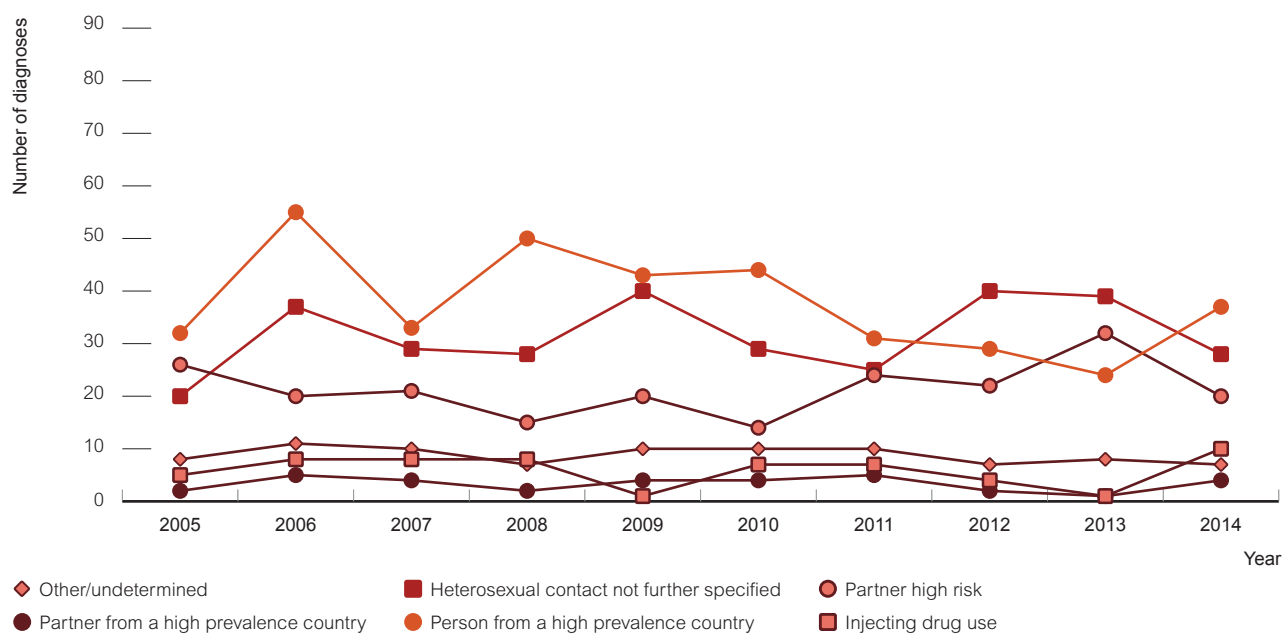
Figure 25 Number of new HIV diagnoses in men (reporting an exposure risk other than male-to-male sex), 2005 – 2014, by risk exposure category



* Includes sex with a person who injects drugs, bisexual male, someone who received blood/tissue, or a person with haemophilia/clotting disorder
Source: State and Territory health authorities

Heterosexuals: Of 201 cases of HIV infection newly diagnosed in 2014 for which exposure to HIV was attributed to heterosexual sex, 39% were in people from high-prevalence countries ($\geq 1\%$ adult HIV prevalence in the last 10 years) or with partners from high prevalence countries. In males for whom exposure to HIV was not attributed to male-to-male sex, the most common exposure category was heterosexual sex not further specified (Figure 25) whereas for women, it was being from or having a partner from a high prevalence country (Figure 26). One in five (20.7%) people newly diagnosed for which exposure to HIV was attributed to heterosexual sex was aged 50 years or above in 2014.

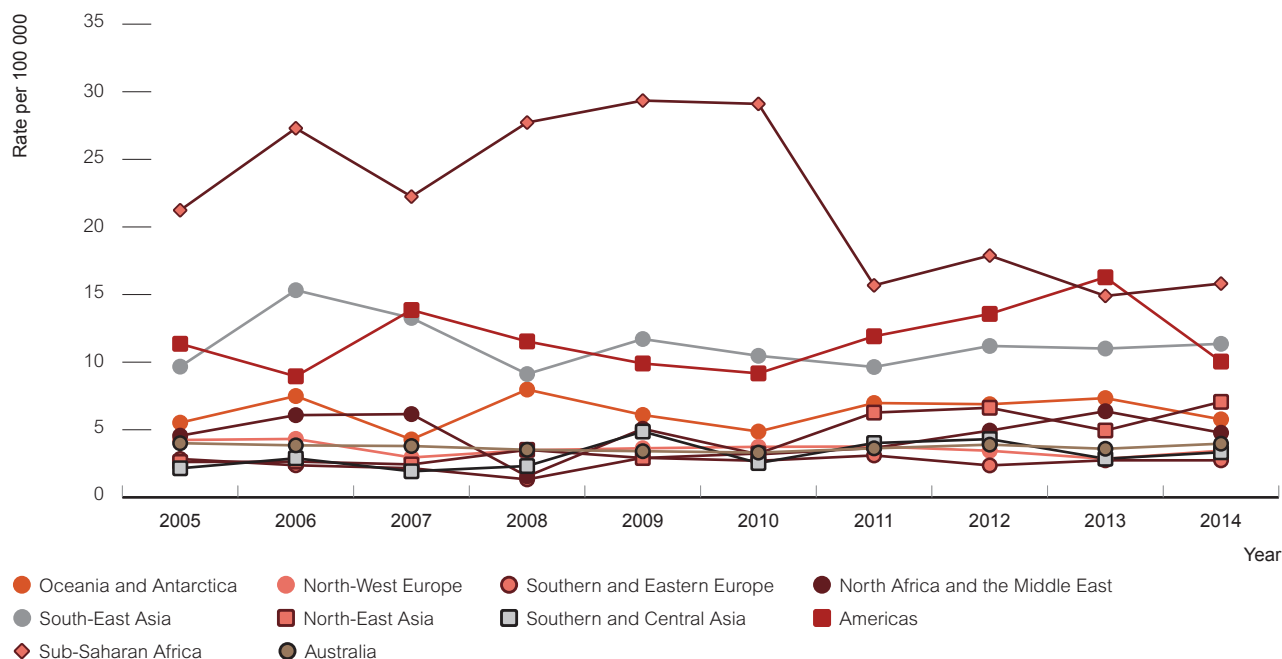
Figure 26 Number of new HIV diagnoses in women, 2005 – 2014, by risk exposure category



Source: State and Territory health authorities

Among Australian born cases, the rate of HIV diagnosis was stable at around 4.0 per 100 000 from 2005 to 2014 (Figure 28). In overseas born populations, the highest HIV diagnoses rates in 2014 were in people born in sub Saharan African (15.8 per 100 000) and South-East Asian (11.4 per 100 000). In the sub Saharan African born population the rate of HIV diagnosis has decreased by 23% since 2005 (from 21.2 to 15.8), fluctuated in the South-East Asian born population (from 9.7 to 11.4) but increased steadily in the North-East Asian population (from 2.6 to 7.1 per 100 000). Rates among people born in the Americas (North and South America) have steady increased over the last five years from 9.2 in 2005 with a peak of 16.3 per 100 000 in 2013, declining to 10.0 per 100 000 in 2014.

Figure 27 HIV diagnosis rate per 100 000 population, 2005 – 2014, by country/region of birth

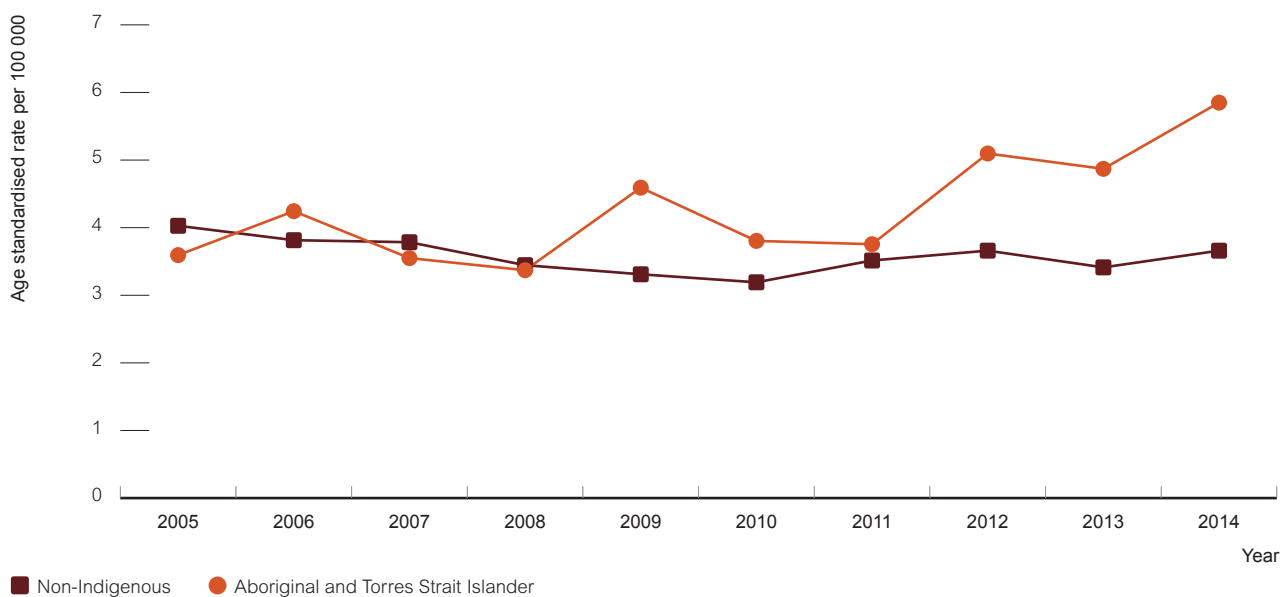


Source: State and Territory health authorities; ABS Catalogues: 3101051 - 3101058; 3100DO003_201212; 1269.0; ABS SuperTable 34120d001_201112_2_2013_12_18



Aboriginal and Torres Strait Islander peoples: When comparing HIV diagnoses rates among the Aboriginal and Torres Strait Islander population and the non-Indigenous, the non-Indigenous population is restricted to those Australian born (Figure 28). Rates of HIV diagnosis among the Aboriginal and Torres Strait Islander population were similar to the Australian-born non-Indigenous population until 2009 when they diverged and in 2014 were greater among the Aboriginal and Torres Strait Islander population (5.9 per 100 000) compared to the Australian-born non-Indigenous population (3.7 per 100 000). The recent trends in the rates of HIV diagnoses in the Aboriginal and Torres Strait Islander population are based on small numbers and may reflect localised occurrences rather than national patterns.

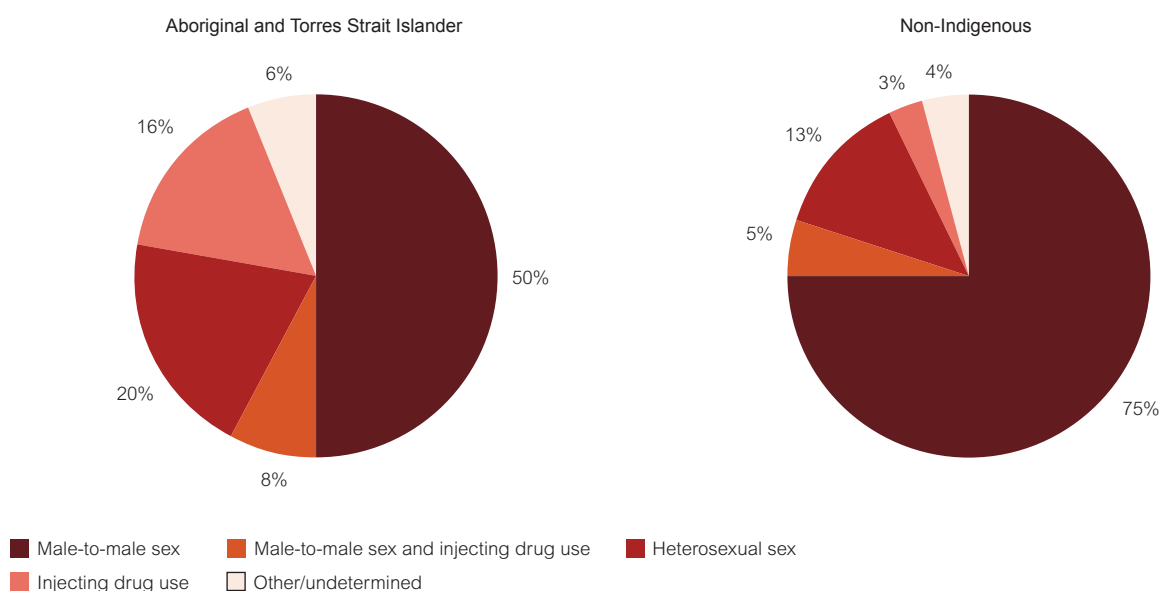
Figure 28 Rate of HIV diagnoses per 100 000 Australian born population, 2005 – 2014, by Aboriginal and Torres Strait Islander status and year



Source: State and Territory health authorities; ABS Catalogues: 3101051 - 3101058; 3100DO003_201212; 32380do001_2011; see Methodological Notes for detail

In the past five years, a greater proportion of HIV diagnoses in the Aboriginal and Torres Strait Islander population were attributed to injecting drug use (16%) or heterosexual sex (20%) compared with the Australian born non-Indigenous population (3% and 13%, respectively) (Figure 29, Table 5).

Figure 29 Newly diagnosed HIV infection and HIV exposure category, 2010 – 2014, by Aboriginal and Torres Strait Islander status



Source: State and Territory health authorities

Table 5 Characteristics of cases of newly diagnosed HIV infection in Aboriginal and Torres Strait Islander peoples, 2005 – 2014.

Characteristic	Year of HIV diagnosis										
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total ¹
Total cases	20	23	19	19	24	22	23	33	26	33	242
Males (%)	85.0	73.9	84.2	79.0	83.3	68.2	73.9	81.8	84.6	75.8	78.9
Median age (years)	33	31	33	36	37	35	33	27	38	34	33
Newly acquired HIV infection n (%) ²	3 (15.0)	7 (30.4)	5 (26.3)	6 (31.6)	7 (29.2)	5 (22.7)	5 (21.7)	10 (30.3)	9 (34.6)	8 (24.4)	65 (26.9)
Late and advanced HIV infection status at HIV diagnosis (%)^{3,4}											
Late HIV diagnosis	21.4	23.5	40.0	33.3	40.9	25.0	36.4	37.5	42.9	30.0	33.5
Advanced HIV diagnosis	14.3	11.8	13.3	20.0	31.8	10.0	31.8	29.2	28.6	20.0	22.0
State/Territory, n											
Australian Capital Territory	0	0	0	0	0	0	0	0	0	0	0
New South Wales	3	9	8	8	9	7	5	11	8	7	75
Northern Territory	0	0	0	1	0	1	2	2	1	1	8
Queensland	9	6	5	2	8	8	8	14	9	14	83
South Australia	0	0	1	4	2	1	1	1	2	0	12
Tasmania	0	0	0	0	1	0	1	0	1	2	5
Victoria	2	2	3	0	1	3	1	5	5	6	28
Western Australia	6	6	2	4	3	2	5	0	0	3	31
HIV exposure category, %											
Male-to-male sex	35.0	47.8	47.4	47.4	41.7	54.6	60.9	69.7	23.1	39.4	47.1
Male-to-male sex and injecting drug use	25.0	4.4	15.8	5.3	12.5	4.6	0.0	6.1	19.2	9.1	9.9
Injecting drug use ⁵	15.0	21.7	15.8	36.8	8.3	18.2	4.4	6.1	23.1	27.3	17.4
Heterosexual sex	25.0	26.1	21.1	10.5	16.7	13.6	26.1	18.2	30.8	15.2	20.3
Mother with/at risk of HIV infection	0.0	0.0	0.0	0.0	0.0	4.6	0.0	0.0	0.0	0.0	0.0
Other/undetermined exposure	0.0	0.0	0.0	0.0	20.8	9.1	4.4	0.0	3.9	9.1	5.0

1 Not adjusted for multiple reporting

2 Newly acquired HIV infection was defined as newly diagnosed infection with a negative or indeterminate HIV antibody test result or a diagnosis of primary HIV infection within one year of HIV diagnosis.

3 Late diagnosis, advanced infection and median CD4+ cell count for HIV diagnoses in 2004 only. Total percentage with late HIV diagnosis and advanced HIV infection, and median CD4+ cell count for diagnoses in 2004–2014 only.

4 Late HIV diagnosis was defined as newly diagnosed HIV infection with a CD4+ cell count of less than 350 cells/μl, and advanced HIV infection as newly diagnosed infection with a CD4+ cell count of less than 200 cells/μl

5 Excludes men who have sex with men

Source: State and Territory health departments

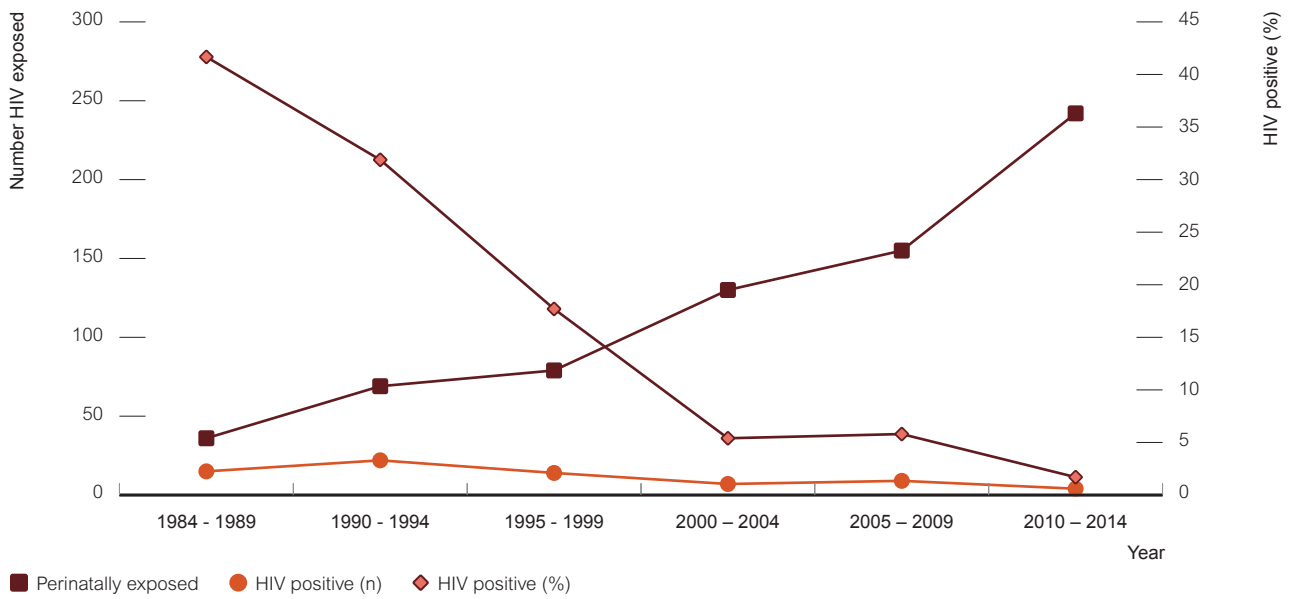
Pregnant women: Since 1984 there have been a total of 711 reported cases of perinatal HIV exposure among children born in Australia. Among 242 women with HIV who gave birth in the five-year period 2010 – 2014, the transmission rate to newborns was 1.7%, compared to 32% in the period 1990 – 1994 (Figures 30 and 31).

This demonstrates the success of effective antiretroviral treatment in the mid 1990s and also use of interventions for minimising mother-to-child transmission (antiretroviral therapy during pregnancy, elective caesarean section and avoidance of breastfeeding). Of the four HIV infections in children since 2010, 2 were born to women diagnosed postnatally.

Alongside the decrease in mother-to-child transmission there was an increasing number of deliveries in women with HIV infection from 54 in 1998 – 1999, to 114 in 2012 – 13. This is likely to reflect more culturally and linguistically diverse (CALD) women migrating to Australia from countries of high HIV prevalence and the availability of assisted reproduction programs. Most of the perinatal HIV exposures occurred in Victoria and New South Wales, where there are the largest populations of people living with HIV from CALD populations.

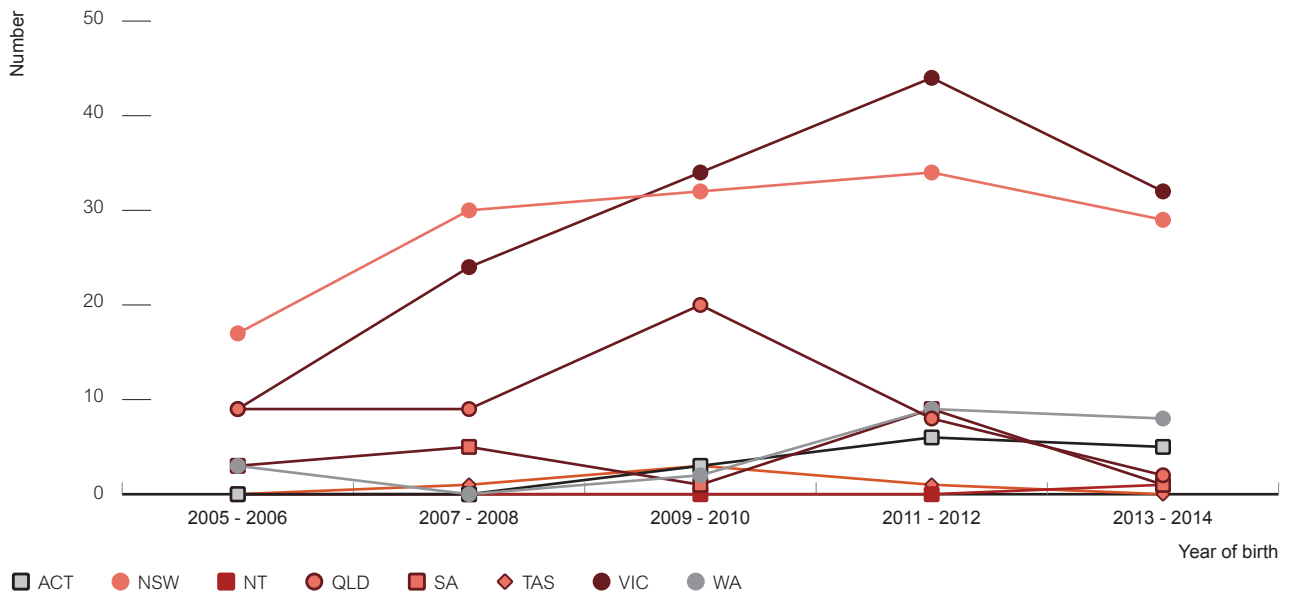


Figure 30 Number of Australian-born children perinatally exposed to HIV and HIV positive, 1984 – 2014, by year of birth



Source: Australian Paediatric Surveillance Unit, see Methodological Notes for detail

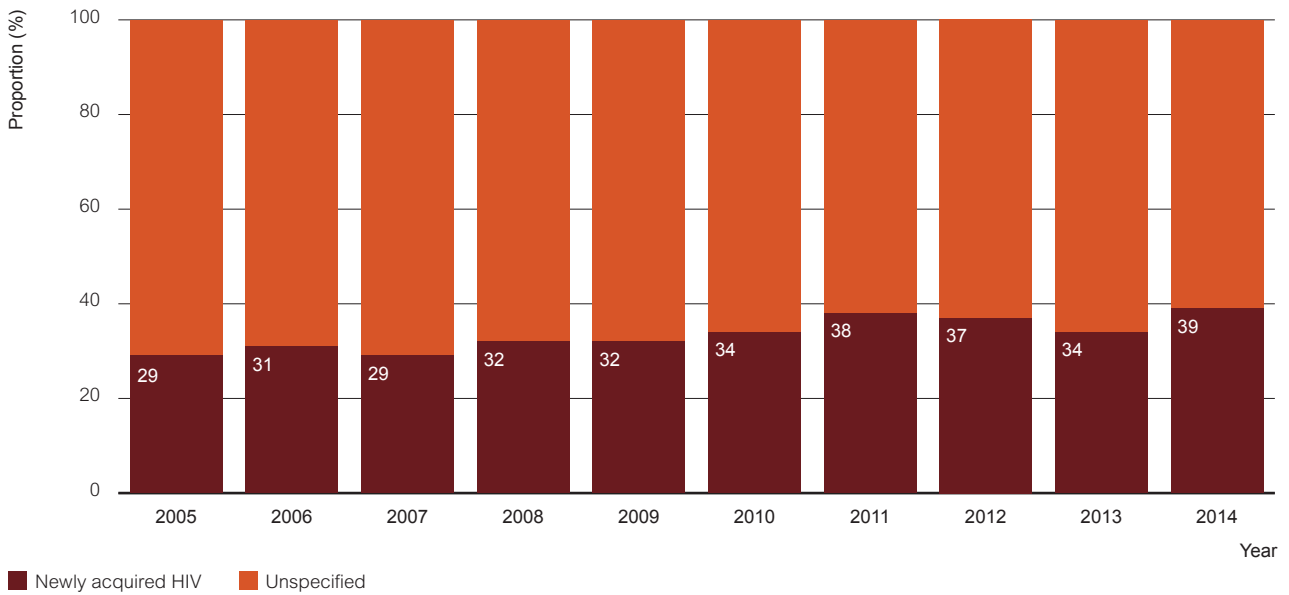
Figure 31 Number of perinatal exposures to HIV among children born in Australia, 2005 – 2014, by State/Territory



Source: Australian Paediatric Surveillance Unit, see Methodological Notes for detail

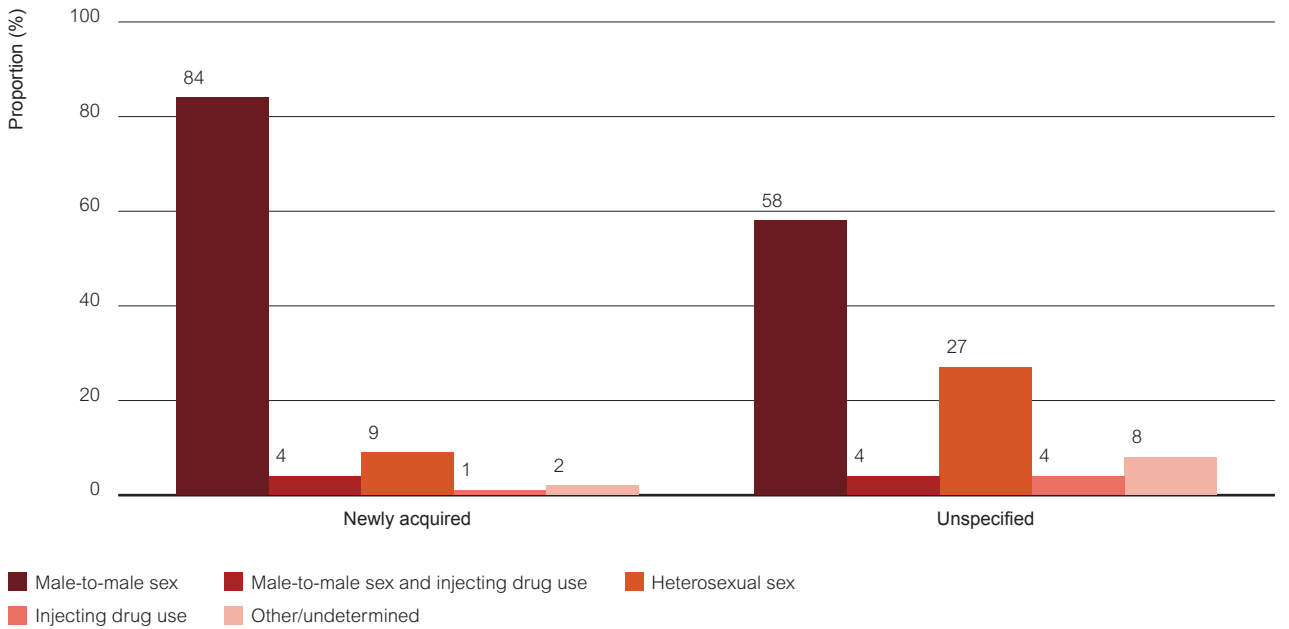
Newly acquired HIV infection: For some newly diagnosed HIV cases, it is possible to determine that they were acquired in the 12 months prior to diagnosis, on the basis of a recent prior negative test or other laboratory and clinical markers. The number of such cases has been increasing over the last 10 years (Table 4), with 423 cases in 2014 and the proportion of all diagnoses that are newly acquired has increased from 29% in 2005 to 39% in 2014 (Figure 32). Trends in the proportion of diagnosed classified as newly acquired need to be interpreted cautiously as they could reflect increases in regular testing allowing determination of recent infection rather than an increase in actual new infections. Men who have sex with men accounted for 84% of diagnoses of newly acquired HIV infection (where there is evidence of infection in the last 12 months) (Figure 33). The rate of newly acquired infection in 2014 by jurisdiction was highest in New South Wales, Victoria and the Australian Capital Territory (Figure 34).

Figure 32 Newly diagnosed HIV infection in Australia, 2005 – 2014, by newly acquired¹ HIV status and year



¹ Newly acquired HIV infection was defined as newly diagnosed infection with a negative or indeterminate HIV antibody test result or a diagnosis of primary HIV infection within one year of HIV diagnosis. Unspecified diagnoses are all diagnoses that do not meet the definition for newly acquired HIV infection.
 Source: State and Territory health authorities, see Methodological Notes for detail

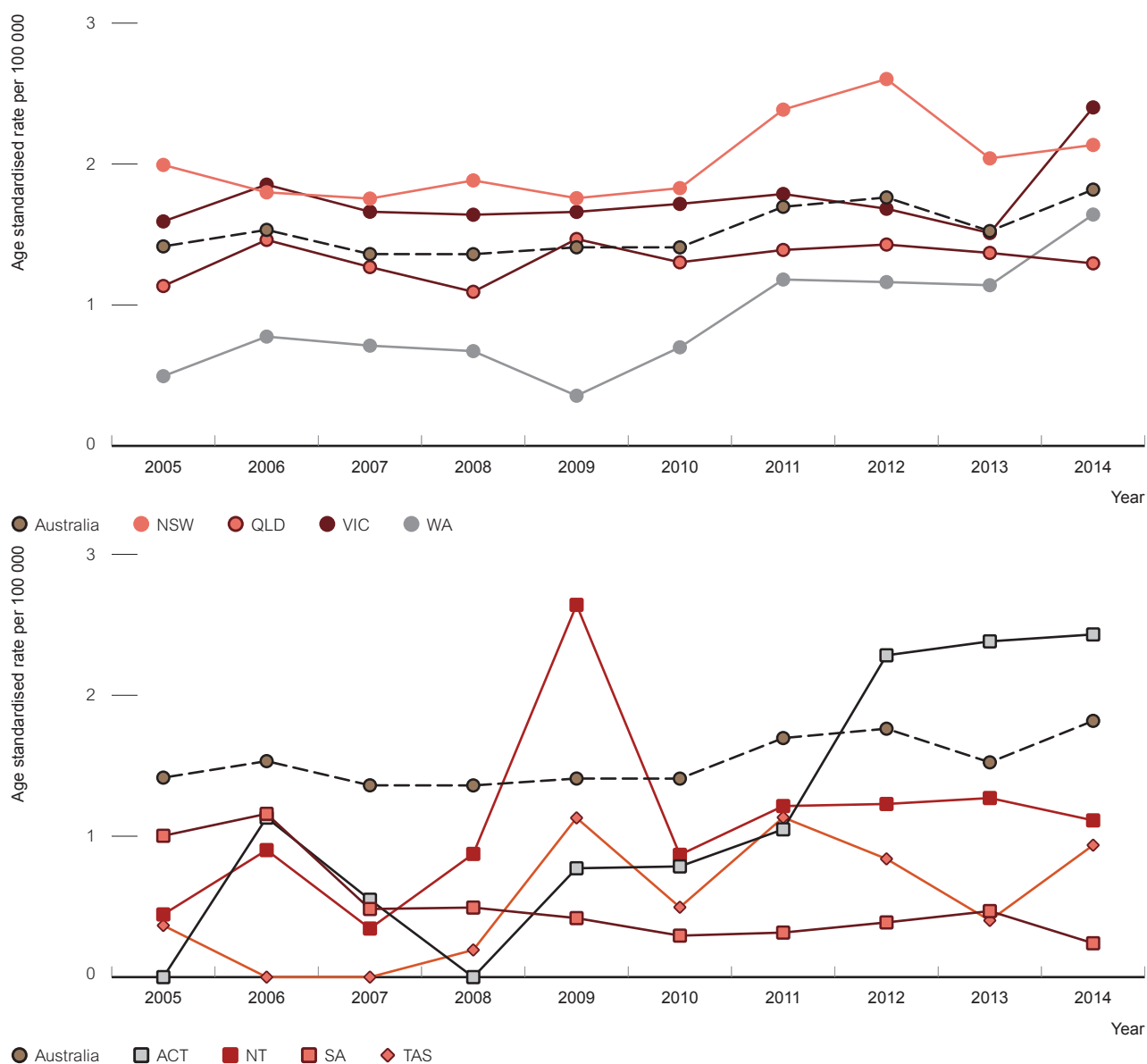
Figure 33 Exposure category of HIV diagnoses classified as newly acquired or unspecified¹ in Australia, 2005 – 2014



¹ Newly acquired HIV infection was defined as newly diagnosed HIV infection with a negative or indeterminate HIV antibody test result, or a diagnosis of primary HIV infection within one year of HIV diagnosis. Unspecified included all other newly diagnosed HIV infection that did not meet the criteria for newly acquired HIV infection.
 Source: State and Territory health authorities



Figure 34 Newly acquired HIV notification rate per 100 000 population, 2005 – 2014, by State/Territory



Source: State and Territory health authorities

The median CD4 count at diagnosis was 440 cells/ μ l in 2014 (compared to 420 in 2013 and 430 in 2012), and in nearly all years higher in males than females (Figure 35). The median CD4 count at diagnosis in 2014 was 465 cells/ μ l in cases due to male-to-male sex but lower (322 cells/ μ l) in diagnoses attributed to heterosexual sex (Figure 36). The median CD4 count fluctuated in diagnoses attributed to injecting drug use due to the smaller number of cases each year. These data suggest no substantial shift in the disease stage at which people are diagnosed despite recent initiatives to increase HIV testing.

Figure 35 Median CD4+ cell count for newly diagnosed HIV infections, 2005 – 2014, by sex¹

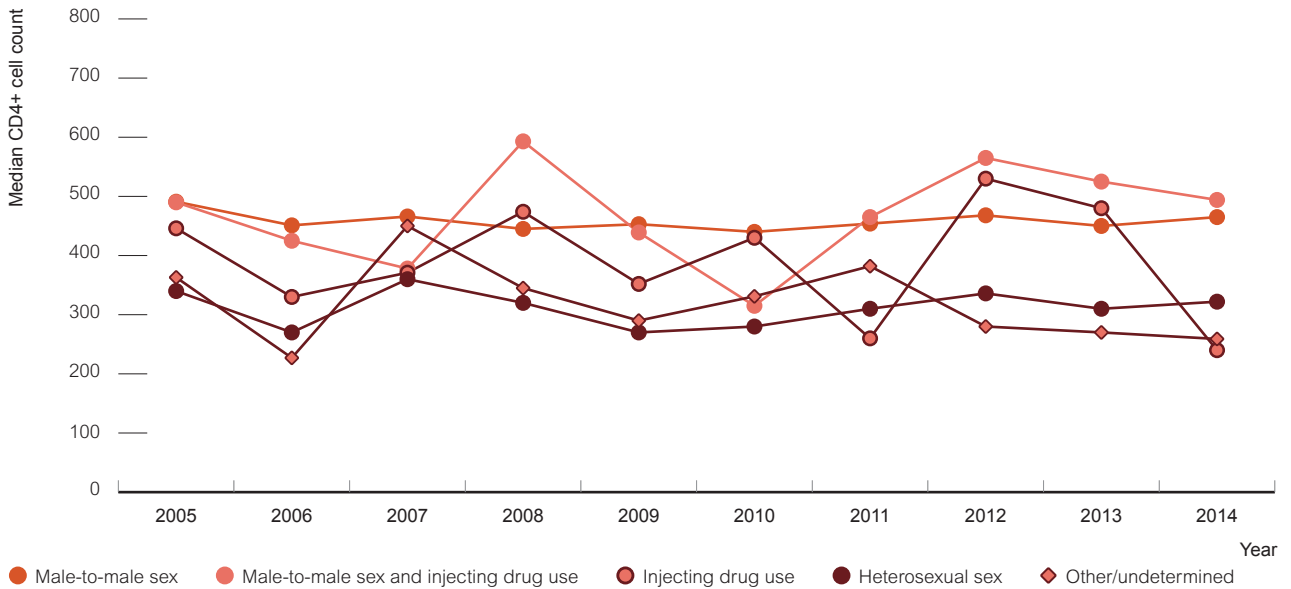


¹ CD4+ cell count within three months of HIV diagnosis

* Includes transgender

Source: State and Territory health authorities

Figure 36 Median CD4+ cell count at diagnosis, 2005 – 2014, by exposure category¹



¹ CD4+ cell count within three months of HIV diagnosis

Source: State and Territory health authorities



Late and advanced HIV diagnoses

An indicator of how long a person has had HIV is the CD4+ cell count per microlitre, which is above 500 in most people without HIV, and declines on average by 50 – 100 per year in people with HIV⁶. The proportion of newly detected HIV cases with a late diagnosis, defined by a CD4+ cell count less than 350 cells/ μ l at diagnosis, has been steady over the last ten years and was 28% in 2014 (Table 4). In 2014, the proportion with late diagnosis was highest in those born in South East Asia (42%) and sub-Saharan Africa (38% in 2014). In Aboriginal and Torres Strait Islander people the proportion with late diagnosis was 30% in 2014, and 34% overall in the past 10 years (Table 6).

Further investigation of late diagnoses in the past five years, showed that among HIV diagnoses attributed to male-to-male sex, late diagnosis was more common (>30%) among men born in South East Asia and sub Saharan Africa, older men (>50 years), men living in inner and outer regional areas and in men reporting bisexual sex (Table 6, Figures 37 and 39). Among cases attributed to heterosexual sex, high levels of late diagnosis was observed across all categories, reaching >55% among people born in South East Asia and those older than 40 years (Table 6, Figures 38 and 40). However it is important to note that in the past five years, most (56%, n=761) late diagnoses were among men who have sex with men and 81% resided in urban areas.

The known trajectory of CD4+ cell count per microlitre and time of arrival among those born overseas can also be used to estimate the proportion of infection acquired before arriving in Australia. Of the late diagnosis (CD4+ cell count less than 350 cells/ μ l) among people born in South East Asia in 2014, 58% arrived in Australia within 5 years, and among those from sub-Saharan Africa, 78% arrived in Australia within 5 years, suggesting most late diagnosis were in people who had acquired HIV before arriving in Australia.

The proportion of newly diagnosed HIV cases with advanced HIV infection, defined by a CD4+ cell count less than 200 cells/ μ l at diagnosis, has been steady over the last ten years among people born in Australia and was 15% in 2014 (Figure 41), highest in those born in South East Asia (25% in 2014). The stable rate of advanced HIV infection highlights the importance of HIV testing among high risk groups. People diagnosed with advanced HIV have a ten-fold increased risk of death in the year following diagnosis compared to those diagnosed promptly.⁷

Table 6 Late HIV diagnoses¹, 2010 – 2014, by key characteristics

Category		Male-to-male sex			Heterosexual sex		
		Number diagnosed ²	Number with late diagnosis	% with late diagnosis	Number diagnosed ²	Number with late diagnosis	% with late diagnosis
Exposure Male-to-male- sex	Male-to-male-sex	2 754	617	22.4%	-	-	-
	Male-to-male-sex and injecting drug use	156	41	26.3%	-	-	-
	Bisexual ³	249	103	41.4%	-	-	-
Exposure heterosexual sex	From high prevalence	-	-	-	223	124	55.6%
	Partner high prevalence	-	-	-	121	50	41.3%
	Partner HIV risk	-	-	-	134	47	35.1%
	Heterosexual contact not further specified	-	-	-	413	223	54.0%
Country/region of birth	Australia	2 096	461	22.0%	350	147	42.0%
	Sub-Saharan Africa	49	16	32.7%	189	99	52.4%
	South East Asia ⁴	383	141	36.8%	132	87	65.9%
	Other	631	143	22.7%	220	111	50.5%
Aboriginal and Torres Strait Islander status	Aboriginal and Torres Strait Islander	67	20	29.9%	26	11	42.3%
	Australian born non-Indigenous	2029	441	21.7%	324	136	42.0%
Age group (years)	<30	971	172	17.7%	205	72	35.1%
	30 – 39	969	207	21.4%	271	136	50.2%
	40 – 49	737	194	26.3%	214	120	56.1%
	50+	482	188	39.0%	201	116	57.7%
Sex	Female	-	-	-	401	186	46.4%
	Male	-	-	-	490	258	52.7%
Place of residence	Major cities	2 763	622	22.5%	677	341	50.4%
	Inner regional	228	84	36.8%	91	46	50.6%
	Outer regional	104	41	39.4%	81	40	49.4%
	Remote and very remote	14	4	28.6%	33	15	45.5%
State/Territory	New South Wales	1 317	281	21.3%	246	121	49.2%
	Victoria	727	179	24.6%	140	81	57.9%
	Queensland	664	181	27.3%	192	89	46.4%
	South Australia	109	41	37.6%	73	37	50.7%
	Western Australia	219	40	18.3%	184	82	44.6%
	Australian Capital Territory	56	10	17.9%	17	9	52.9%
	Tasmania	43	18	41.9%	17	12	70.6%
	Northern Territory	24	11	45.8%	22	13	59.1%



1 Late HIV diagnosis was defined as newly diagnosed HIV infection with a CD4+ cell count of less than 350 cells/µl. Newly acquired HIV notifications excluded from late category.

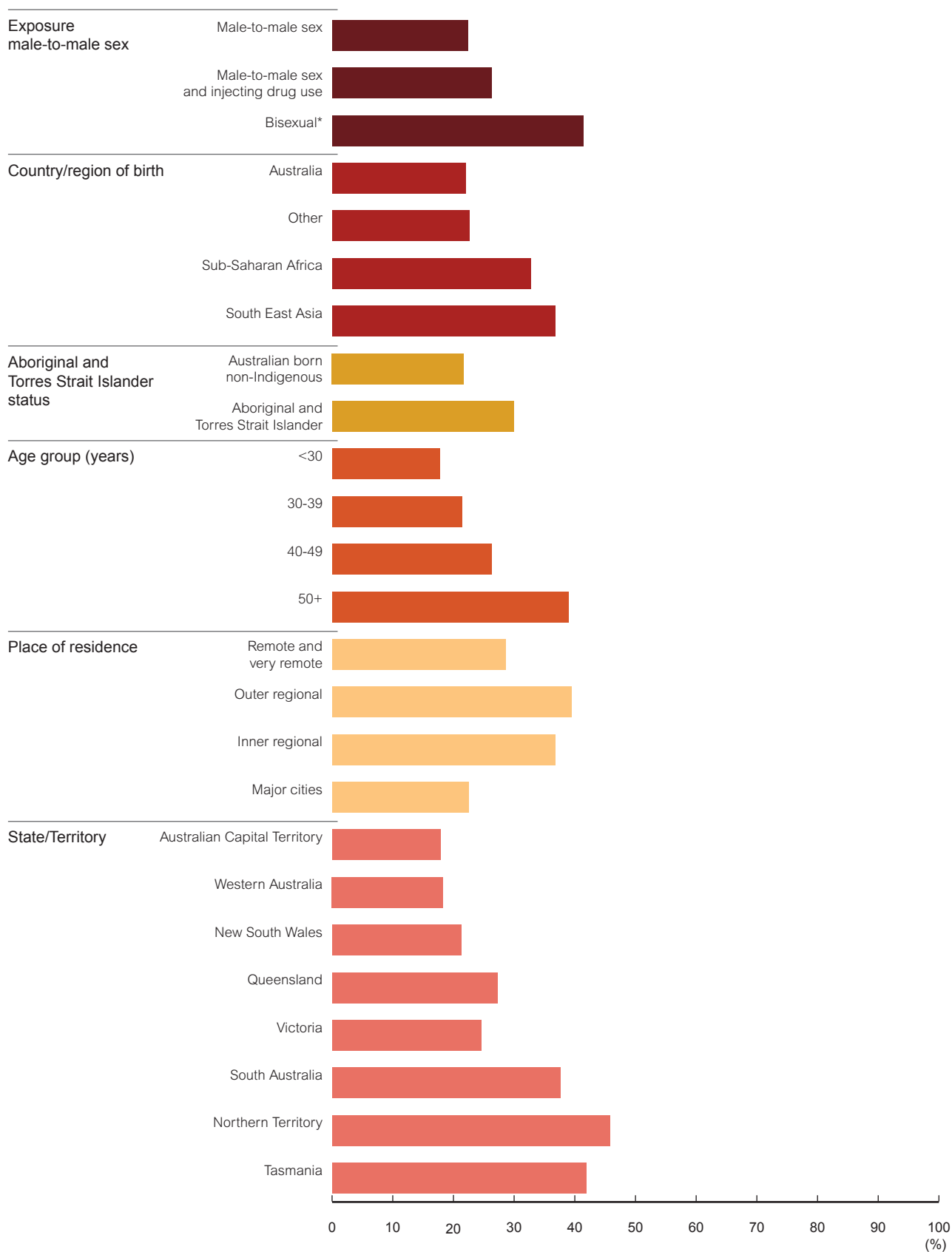
2 Denominator only includes those for whom a CD4+ cell count was available

3 Men who reported male-to-male sex and sex with women

4 Includes ABS regions of birth South East Asia and North East Asia

Source: State and Territory health authorities

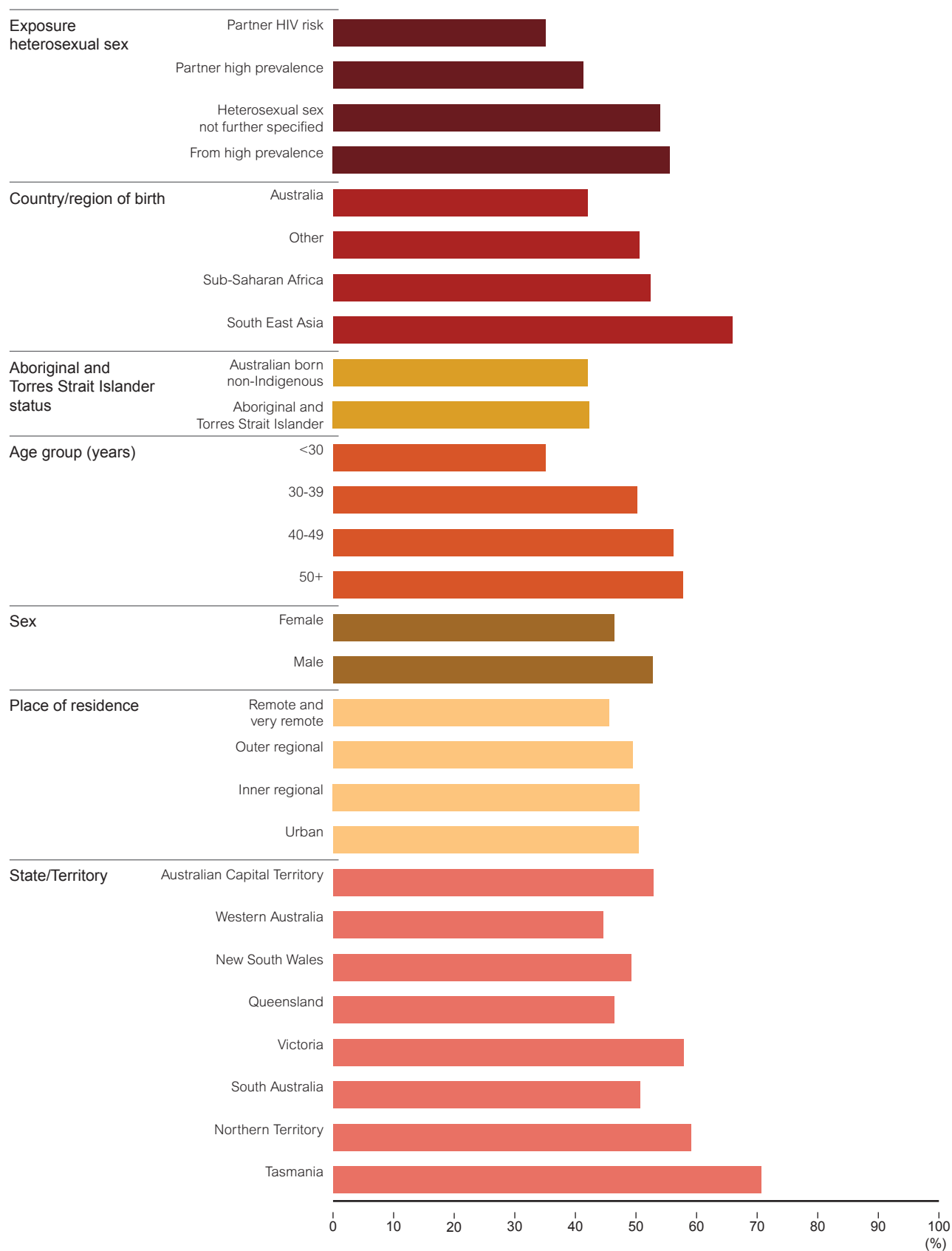
Figure 37 The proportion of late diagnoses in men who reported sex with men as an exposure risk, 2010 – 2014, by sub-category (n=3 159)



* Men who reported male-to-male sex and also sex with women

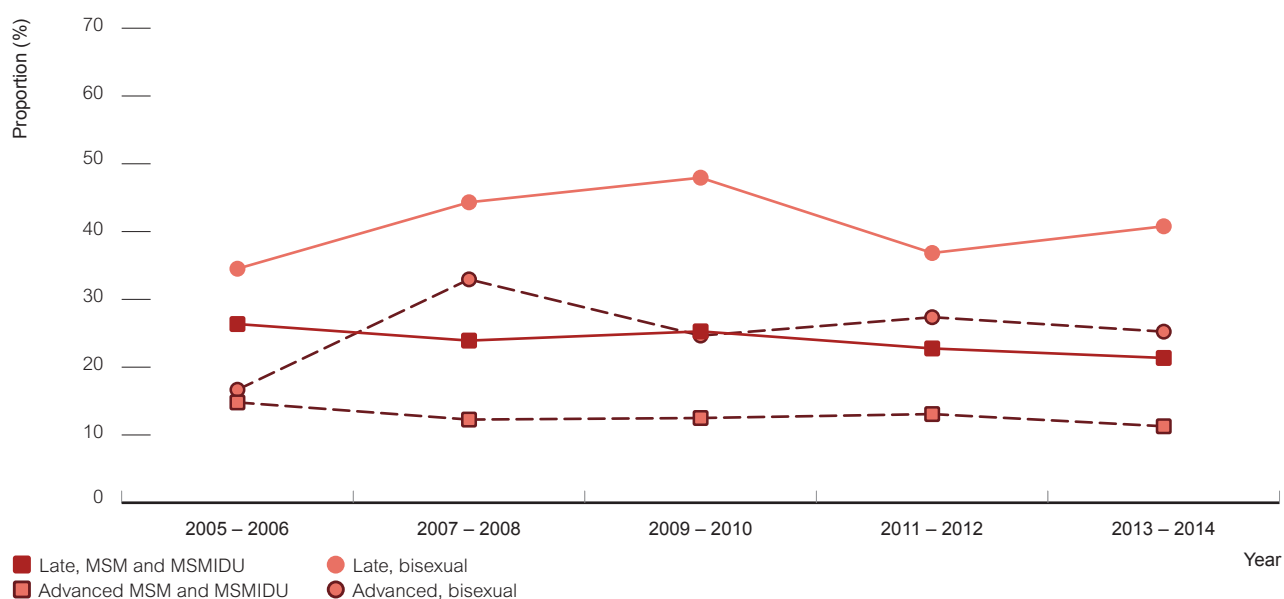
Source: State and Territory health authorities

Figure 38 The proportion of late diagnoses in people who report heterosexual sex as an exposure risk, 2010 – 2014, by sub-category (n=891)



Source: State and Territory health authorities

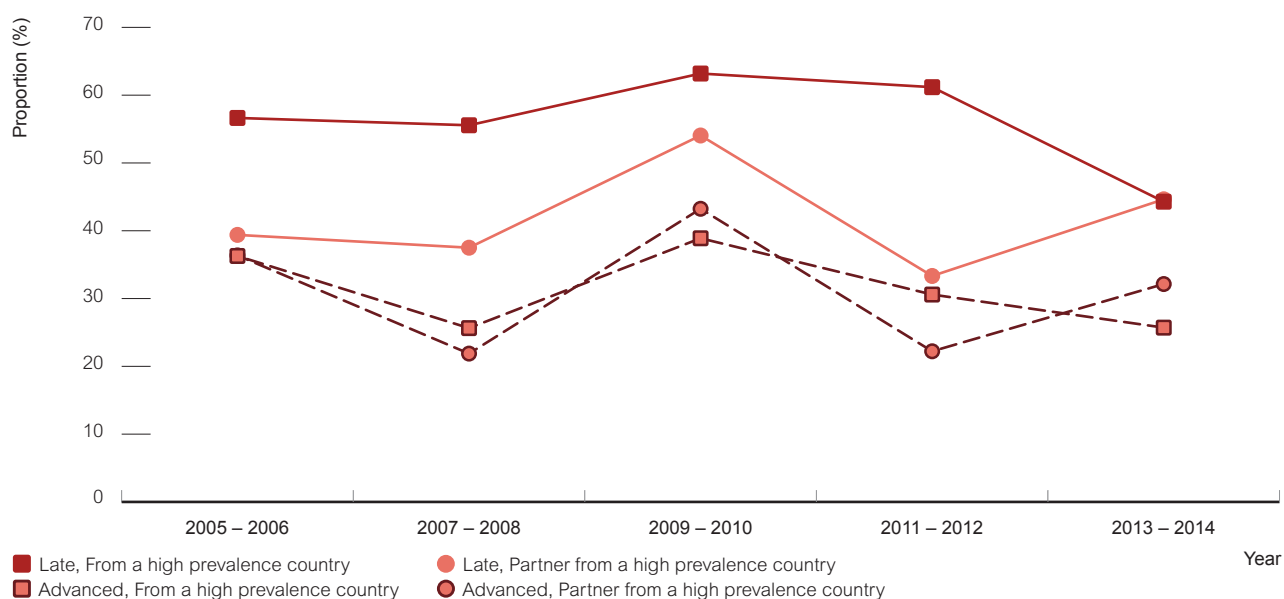
Figure 39 Proportion of late and advanced¹ HIV diagnoses, 2005 – 2014, by exposure category



¹ Late HIV diagnosis was defined as newly diagnosed HIV infection with a CD4+ cell count of less than 350 cells/ μ l, and advanced HIV infection as newly diagnosed infection with a CD4+ cell count of less than 200 cells/ μ l.

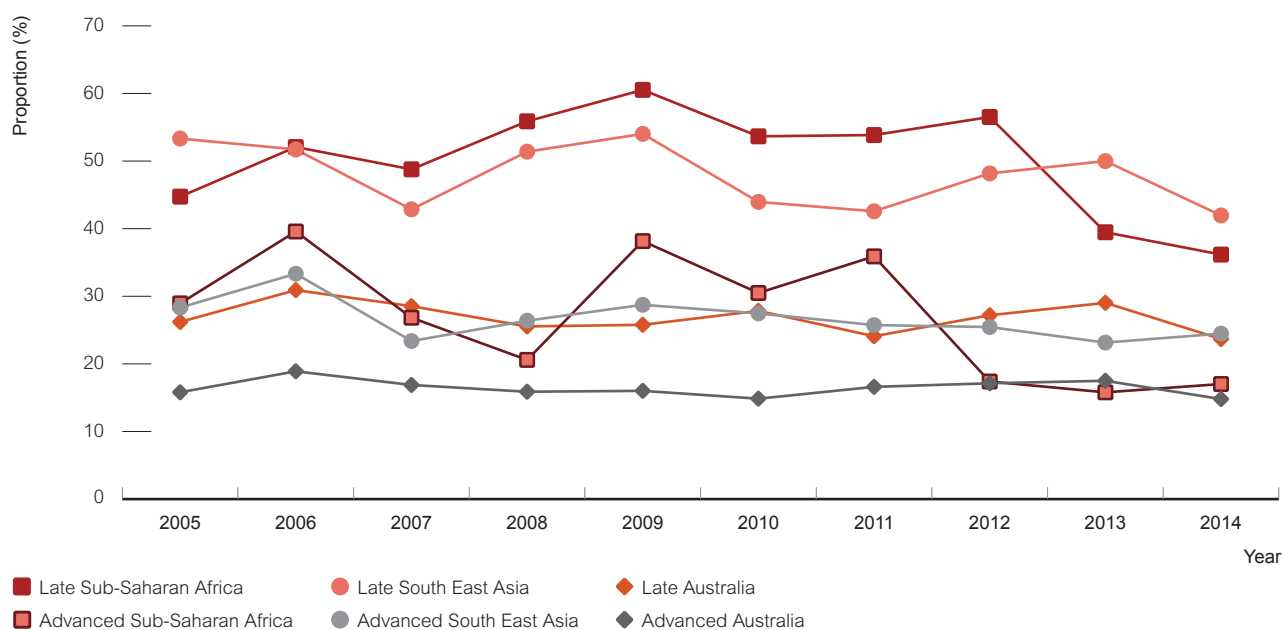
Source: State and Territory health authorities

Figure 40 Proportion of late and advanced diagnoses, 2005 – 2014, by exposure category



Source: State and Territory health authorities

Figure 41 Proportion of late and advanced diagnoses, 2005 - 2014, by select region and country of birth



Source: State and Territory health authorities

HIV care

A total of 23 800 people were living with diagnosed HIV in 2014 and require HIV care, increasing by 52% from the estimate of 15 700 in 2005.

Information from the ‘diagnosis and care cascade’ demonstrated that nationally, an estimated 17 470 (16 600 – 18 340) people received antiretroviral treatment by the end of 2014, which equates to 73% of those diagnosed and living with HIV (range: 70 – 77%) (Figure 1). Of HIV antiretroviral treatments dispensed in 2014 and reimbursed by the Pharmaceutical Benefits Scheme (PBS), efavirenz/tenofovir/emtricitabine (Atripla) was the most commonly prescribed fixed dose combination triple regimen (3 710 persons) followed by rilpivirine/tenofovir/emtricitabine (Eviplera; 2 250 persons). Tenofovir/emtricitabine (Truvada) was the most common dual nucleoside/nucleotide reverse transcriptase inhibitor (N(t)RTI) fixed-dose combination backbone (6 150 persons), followed by abacavir/lamivudine (Kivexa; 3 460 persons). Raltegravir (Isentress) was the most common third agent (3 900 persons) which is generally combined with a fixed dose combination N(t)RTI agent (Table 7).

Information on treatment coverage is also available from other data sources representing specific populations or clinical settings. According to the Gay Community Periodic Surveys, 84% of gay men reported received antiretroviral treatment in 2014 (increasing from 60% in 2005) (Figure 42). Among people attending 46 sexual health clinics participating in the ACCESS project, the proportion receiving antiretroviral treatment in 2014 was 87%, increasing from 80% in 2011 (Figure 42). The 7th Futures Survey of people living with HIV reported 87% of participants were receiving antiretroviral treatment in 2013.⁹

The 7th Futures Survey of people living with HIV provides further information about HIV management and antiretroviral treatment adherence and stigma. Of the 1 058 people living with HIV who completed the survey in October 2011 to April 2012, half (54.9%) reported their HIV management occurs in HIV S100 Prescriber (accredited section 100 Highly Specialised Drug prescribers) or other general practice clinics, 26.8% in hospitals (HIV specialist) and 14.8% in sexual health clinics. Over a third of participants (37.6%) who were currently on antiretroviral treatment reported some difficulty being on treatment. The most common problems that participants experienced were remembering to take the drugs on time (21.3%) and managing the side effects of medication (21.3%).

Just under a third (27.9%) of the participants who are currently using antiretroviral medication had taken a break from these at some point; about a quarter (24.8%) had taken their most recent break in the two years prior to survey and 16.7% in the previous year. Also just under a third (27.6%) of participants had experienced less-favourable treatment at a medical service as a result of having HIV, including 13.0% that had experienced such discrimination in the last two years. The most common forms of discrimination reported were avoidance (43.5%) confidentiality problems (38.7%) and increased infection control (39.1%). It is important to note the 7th Futures Survey reflects the views of people living with HIV in 2011 – 12.



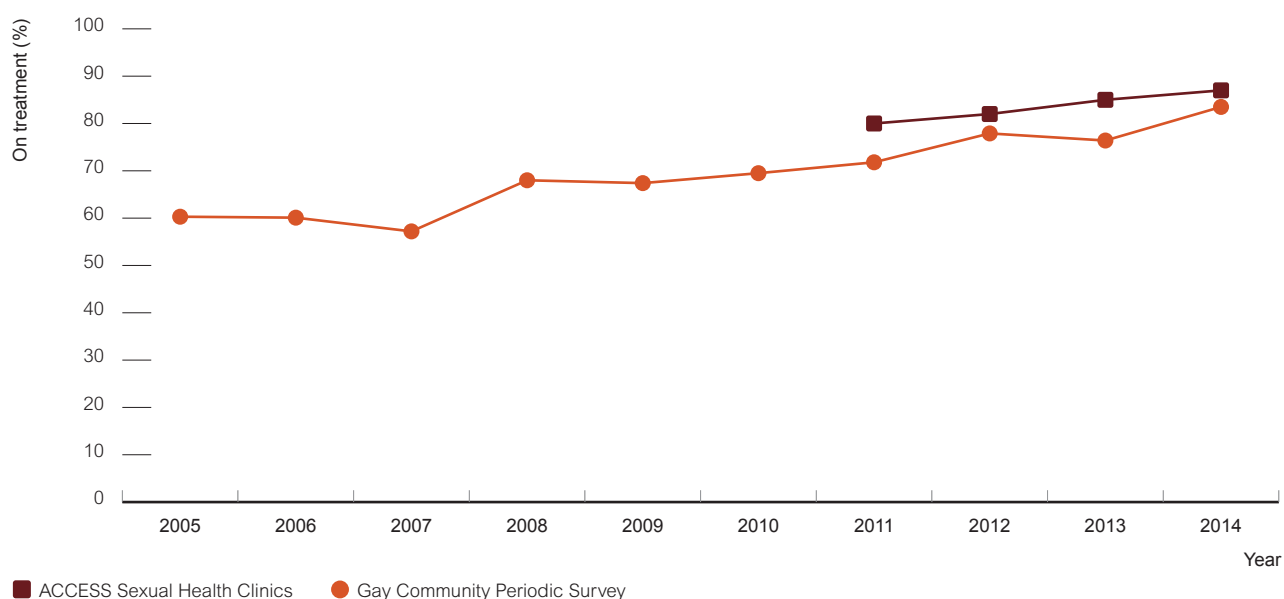
Table 7 Number of people with HIV on antiretroviral treatment, 2014, by type of treatment (class)

Class	Antiretroviral agent	Number of unique patients who received the Antiretroviral agent in 2014
Nucleoside/nucleotide analogue reverse transcriptase inhibitors	abacavir	460
	lamivudine/zidovudine (Combivir)	420
	didanosine	130
	emtricitabine	90
	abacavir/lamivudine (Kivexa)	3 460
	lamivudine	650
	stavudine	60
	tenofovir	760
	abacavir/lamivudine/zidovudine (Trizivir)	100
	emtricitabine/tenofovir (Truvada)	6 150
	zidovudine	70
	Non-Nucleoside analogue reverse transcriptase inhibitors	efavirenz
etravirine		580
nevirapine		2 770
rilpivirine		140
Protease inhibitors	atazanavir	2 790
	darunavir	1 800
	fosamprenavir	120
	indinavir	60
	kaletra	1 030
	nelfinavir	0
	ritonavir	4 010
	saquinavir	60
	tipranavir	60
	Entry inhibitors	enfuvirtide
maraviroc		310
Integrase inhibitors	dolutegravir	1 910
	raltegravir	3 900
Combination class agents	efavirenz/emtricitabine/tenofovir (Atripla)	3 710
	rilpivirine/emtricitabine/tenofovir (Eviplera)	2 250
	elvitegravir/cobicistat/tenofovir/emtricitabine (Stribild)	880
	abacavir/dolutegravir/lamivudine (Triumeq)	0
Total patients		17 480

1 Number of unique patients dispensed drug in 2014

Source: Pharmaceutical Benefits Scheme 10% sample using Pharmdash. See methodological notes for detail.

Figure 42 Proportion of HIV-positive men on antiretroviral treatment in two data sources, 2005 – 2014



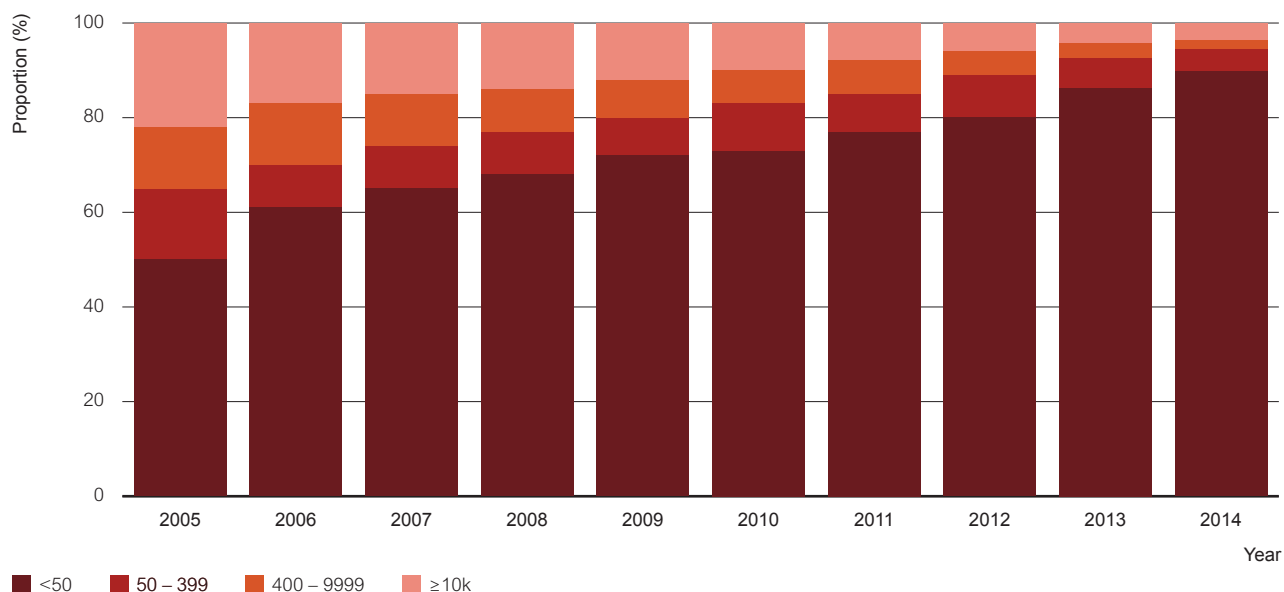
Source: Gay Community Periodic Survey, The Australian Collaboration for Coordinated Enhanced Sentinel Surveillance of Sexually Transmitted Infections (STIs) and Blood Borne Viruses (BBVs); see Methodological Notes for detail

Viral load suppression

HIV viral load represents the amount of HIV virus in a person's blood, with higher levels increasing the chance of HIV transmission during risk exposures. As treatment coverage has increased in Australia, there has been a corresponding increase in the proportion of people with undetectable viral load (<50 copies/ml) observed in a range of data sources. This includes the Australian HIV observational database (AHOD) (an observational cohort study of HIV infected individuals – see Methodological Notes for further detail) from 50% to 90%, data from 46 sexual health clinics across Australia participating in the ACCESS project (42% in 2007 to 81% in 2014) and from 4 primary care clinics with a high case load of gay men in Victoria and New South Wales participating in the ACCESS project (64% in 2009 to 87% in 2014). See Figures 43 – 45 for detail.



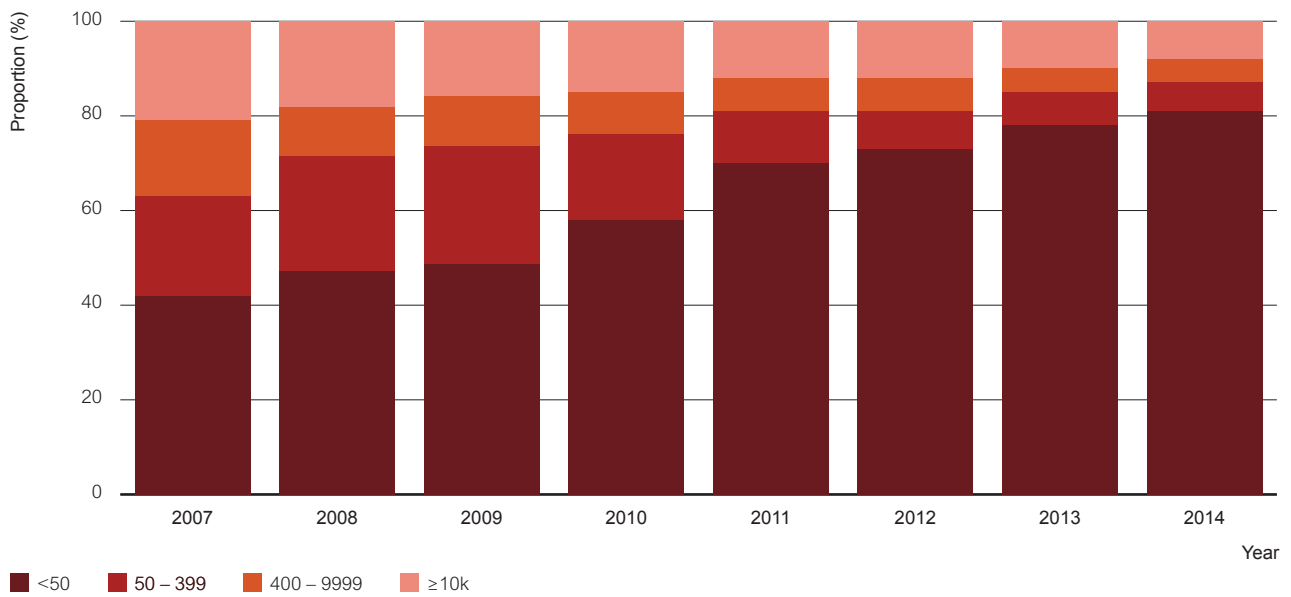
Figure 43 Last HIV viral load among people with HIV enrolled on the Australian HIV Observational Database, 2005 – 2014



* Undetectable viral load equals 50 copies/ml or less

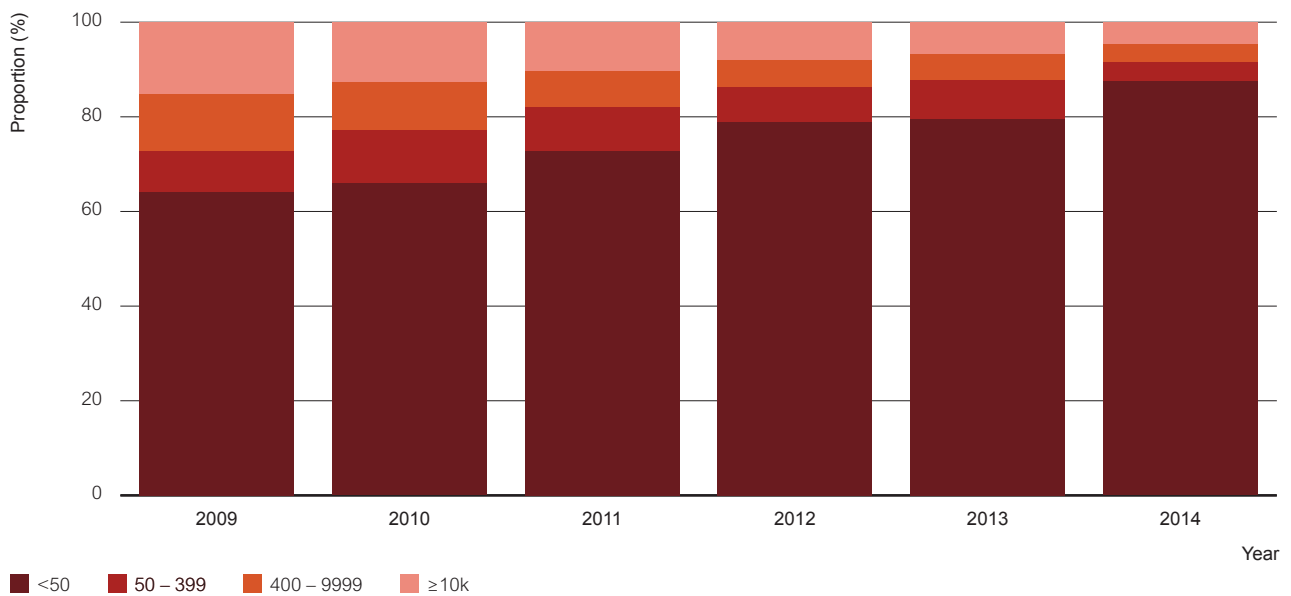
Source: Australian HIV Observational Database, see Methodological Notes for detail

Figure 44 Last viral load in HIV positive patients seen at sexual health clinics, 2007 – 2014



Source: The Australian Collaboration for Coordinated Enhanced Sentinel Surveillance of Sexually Transmitted Infections (STIs) and Blood Borne Viruses (BBVs); see Methodological Notes for detail

Figure 45 Last viral load in HIV positive patients seen at high case load general practice clinics, 2009 – 2014



Source: The Australian Collaboration for Coordinated Enhanced Sentinel Surveillance of Sexually Transmitted Infections (STIs) and Blood Borne Viruses (BBVs); see Methodological Notes for detail

HIV incidence

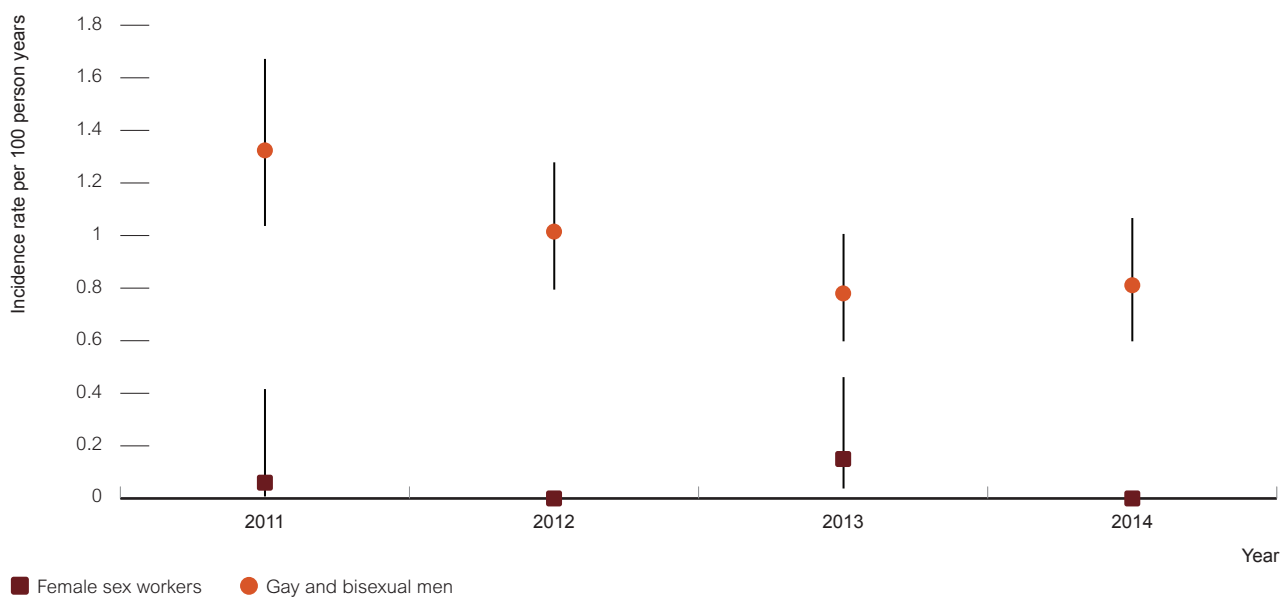
HIV incidence is the best indicator of changes in transmission in a population. HIV incidence is now available from the ACCESS project and is calculated by dividing the number of seroconversions among people undergoing repeat HIV testing at sexual health services by the person's time at risk (determined by the time between repeat HIV tests). Further details about the methods used can be found in the Methodological Notes.

Over a four year study period (2011 – 2014) among gay and bisexual men attending sexual health services (11 145) who had a repeat HIV test, there were 240 seroconversions in 25 000 person years at risk, equating to an overall HIV incidence of 0.96 (95%CI: 0.85-1.09). The HIV incidence was highest in 2011 at 1.32 (95%CI: 1.04-1.69) declining to 1.02 in 2012 (95%CI: 0.80-1.29), 0.78 (95% CI: 0.6-1.0) in 2013 and 0.81 in 2014 (95% CI: 0.61-1.08) in 2014 (Figure 46). It is important to note the confidence intervals between these estimates overlap.

Among female sex workers attending sexual health services who had at least one repeat HIV test (3 044), there were only 2 HIV seroconversions in 3 044 person years at risk, equating to an overall HIV incidence of 0.07 (95%CI: 0.02 – 0.26). The HIV incidence was 0% in both 2012 and 2014 (Figure 46).

These incidence estimates represent populations attending sexual health clinics and may not be generalisable to the broader populations at risk. Next year, the incidence analysis will include data from primary care clinics.

Figure 46 HIV incidence rate per 100 person years in gay and bisexual men and female sex workers attending sexual health clinics, 2011 – 2014



Source: The Australian Collaboration for Coordinated Enhanced Sentinel Surveillance of Sexually Transmitted Infections (STIs) and Blood Borne Viruses (BBVs); see Methodological Notes for detail



Main Findings

Hepatitis C Infection

- **The rate of diagnosis of hepatitis C infection in 2014 was 46 per 100 000, representing a continuing decline over the past 10 years, from 61 in 2005.**
- **In contrast, the rate of hepatitis C diagnosis in the Aboriginal and Torres Strait Islander population increased in 2014, from 119 per 100 000 in 2010 to 164, a rate over 4 times greater than in the non-Indigenous population (35 per 100 000).**
- **The prevalence of hepatitis C in people who inject drugs attending needle syringe programs in 2014 was 54%, a level that has remained stable for 5 years.**
- **At the end of 2014, an estimated 230 470 people had chronic hepatitis C infection in Australia (range: 180 490 to 243 990), of whom 185 740 people had early to moderate fibrosis and 44 730 severe fibrosis or hepatitis C related cirrhosis.**
- **The estimated number of people with severe liver disease/hepatitis C related cirrhosis has more than doubled, from 18 580 cases in 2004 to 44 730 in 2014.**
- **Of 224 people who had a liver transplant in 2014, 81 (36%) had hepatitis C infection.**
- **An estimated 690 (440 – 970) deaths attributable to chronic hepatitis C infection occurred in 2014, an increase of 146% since 2004 where there was an estimated 280 (180 – 370) deaths.**
- **Among the estimated 75% (range 68 to 77%) of people with chronic hepatitis C infection who were diagnosed by the end of 2014, an estimated 26% (range 22 to 29%) had ever received antiviral therapy, with therapy successfully curing the infection in 55% (range 48 to 62%).**
- **The proportion of Australian Needle and Syringe Program Survey participants in 2014 who said they had used the same needle syringe as another person in the past year was 15%, a proportion that has remained stable over the past ten years.**

Interpretation:

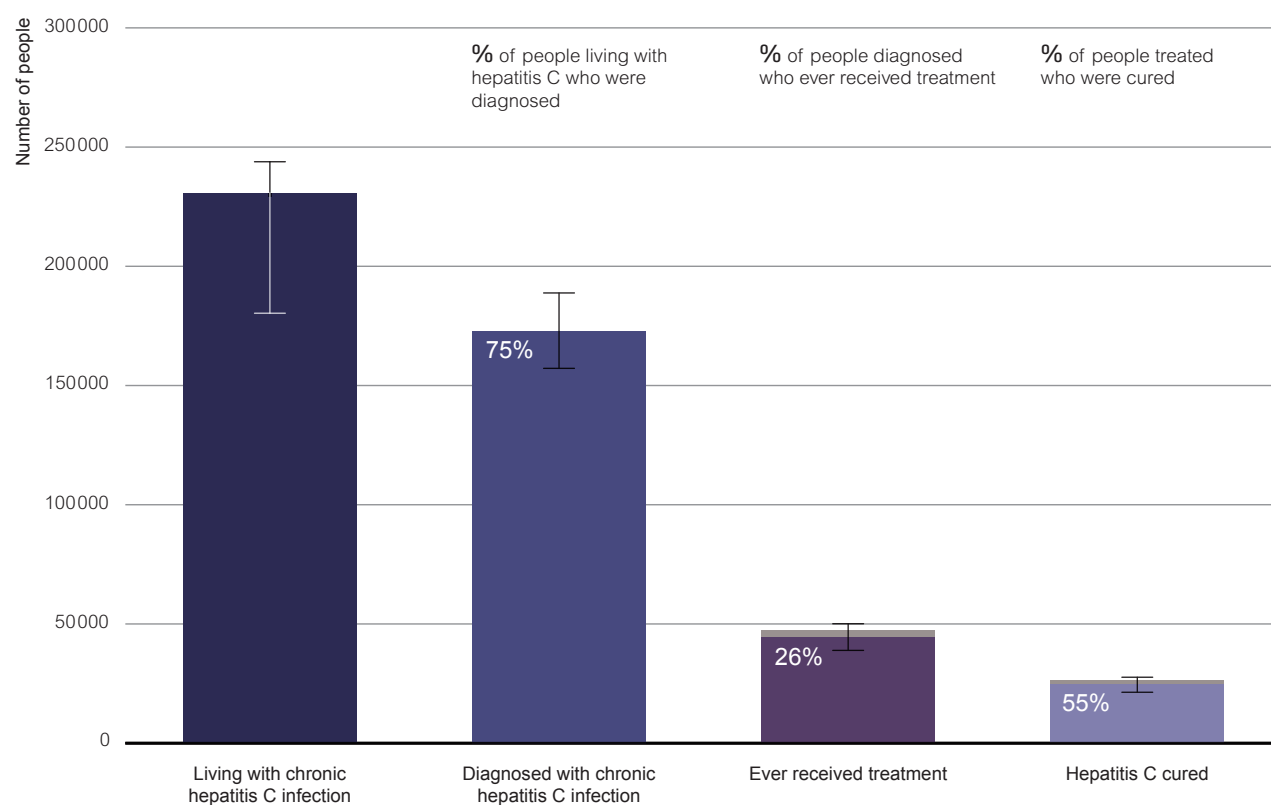
The rate of hepatitis C diagnosis has fallen over the past 10 years in Australia, suggesting a reduction in transmission related to injection drug use, which has been the main pathway of infection in Australia. This reduction is likely related to a decrease in the number of people newly initiating injecting. The coverage of needle syringe programs and increasing number of people receiving opioid substitution therapy (OST) may be potential factors, as OST reduces injecting frequency and injecting risk behaviour. The rate of hepatitis C diagnosis is however increasing among Aboriginal and Torres Strait Islander people, possibly related to higher prevalence of injecting risk behaviours in Aboriginal and Torres Strait Islander people who inject drugs. There has been a substantial increase in the illness and mortality due to hepatitis C, as the population with chronic infection ages. The uptake of treatment for hepatitis C remains very low, with the vast majority not having received curative therapy.

The 2014 hepatitis C diagnosis and care cascade

This report includes the number of people with chronic hepatitis C, the number and proportion who are diagnosed in Australia, and receiving antiviral treatment. Known as the 'Hepatitis C diagnosis and care cascade', these estimates are used to support the improvement of the delivery of services to people with chronic hepatitis C infection across the entire continuum of care—from diagnosis of chronic hepatitis C infection, hepatitis C virus ribonucleic acid testing, initiation of antiviral therapy and cure. Using available data and accounting for uncertainties, the proportions of people in each stage of the cascade in Australia were estimated (Figure 47). Methods and the associated uncertainties are described in detail in the Methodological Notes.

The approach was informed by recommendations from a national stakeholder reference group (see Acknowledgements section). Hepatitis C RNA testing was not included this year due to issues with the current data source and a more accurate data source becoming available next year.

Figure 47 The 2014 hepatitis C diagnosis and care cascade



Cascade stage	Estimate (range)	2014 estimate
Living with chronic hepatitis C infection*	230 470 (180 490 – 243 990)	
Diagnosed with chronic hepatitis C infection	172 932 (157 055 – 188 865)	
Ever received hepatitis C treatment	44 405 (38 811 – 49 999)	2 790
Hepatitis C cured	24 543 (21 426 – 27 659)	1 693

* Excludes those ever cured

Source: National Notifiable Diseases Surveillance System; Center for Disease Analysis; see Methodological Notes for detail



During 2014, an estimated 230 470 (180 490 – 243 990) people were living with chronic hepatitis C, an estimated 172 932 (157 055 – 188 865) were diagnosed with chronic hepatitis C and an estimated 44 405 (38 811 – 49 999) were ever on antiviral therapy. This corresponds to 75% all people with chronic hepatitis C being diagnosed, 26% of people diagnosed ever having been on antiviral therapy and 55% of those treated were cured.

Number of people living with HCV

At the end of 2014, an estimated 230 470 (180 490 – 243 990) people had chronic hepatitis C infection. Of these, 185 740 (138 230 – 203 290) had early to moderate fibrosis (stage F0-2) and 44 730 (28 440 – 63 800) had severe fibrosis and hepatitis C related cirrhosis (stage F3/4). The estimated number of people with severe fibrosis/hepatitis C related cirrhosis has more than doubled since 2004 (18 580 cases) (Figure 48 and Table 9).

An estimated 690 (440 – 970) deaths attributable to chronic hepatitis C infection occurred in 2014, an increase of 146% since 2004 where there was an estimated 280 (180-370) deaths.

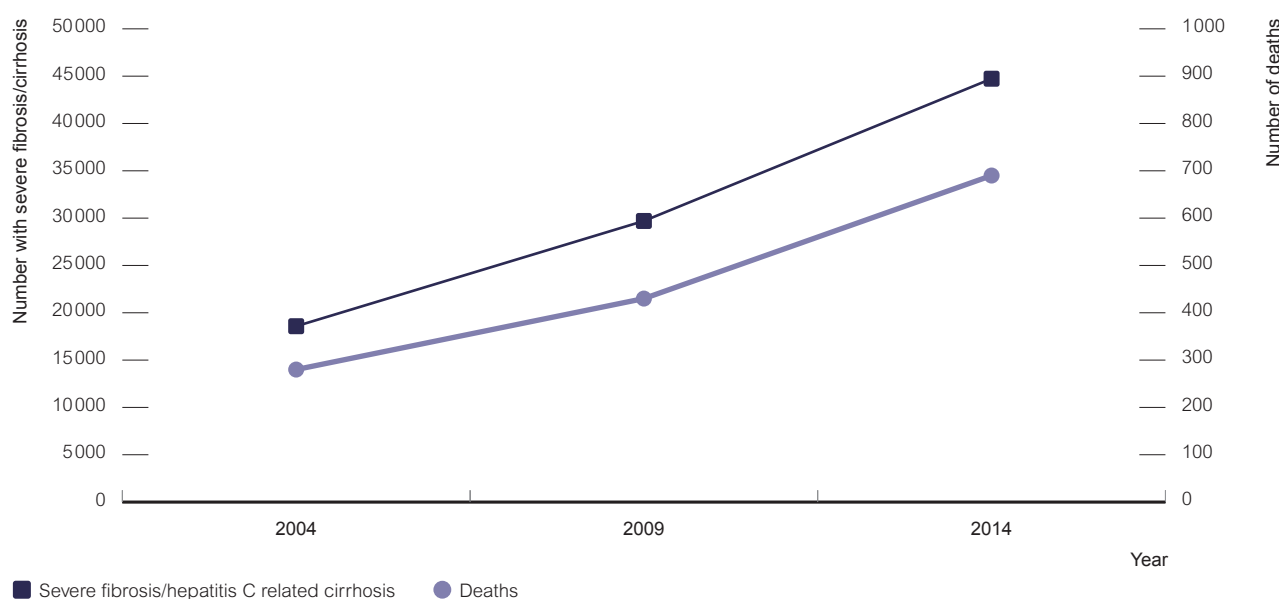
Of the estimated 230 470 people living with chronic hepatitis C infection by the end 2014, the greatest proportion were in New South Wales (35%, 81,940, range: 64 170 – 86 750); Victoria (24%, 55 760, range: 43 670 – 59 030); and Queensland (21%, 47 950, range: 37 550 – 50 760) followed by Western Australia (9%, 20 510, range: 16 060 – 21 710); South Australia (5%, 11 850, range: 9 280 – 12 540); Tasmania (2%, 5 130, range: 4 020 – 5 430); Northern Territory (2%, 3 690, range: 2 890 – 3 910) and the Australian Capital Territory (2%, 3 650, range: 2 860 – 3 860) (Table 8).

Table 8 Estimated number of people living with hepatitis C, 2014, by State and Territory

State/Territory	Chronic hepatitis C infection	Early to moderate fibrosis	Severe fibrosis to hepatitis C related cirrhosis
Australian Capital Territory	3 650 (2 860 – 3 860)	2 940 (2 190 – 3 210)	715 (449 – 1 008)
New South Wales	81 940 (64 170 – 86 750)	66 050 (49 160 – 72 290)	15 901 (10 106 – 22 681)
Northern Territory	3 690 (2 890 – 3 910)	2 970 (2 220 – 3 250)	716 (449 – 1 028)
Queensland	47 950 (37 550 – 50 760)	38 630 (28 750 – 42 280)	9 311 (5 918 – 13 270)
South Australia	11 850 (9 280 – 12 540)	9 550 (7 110 – 10 450)	2 296 (1 463 – 3 270)
Tasmania	5 130 (4 020 – 5 430)	4 140 (3 080 – 4 530)	1 003 (630 – 1 415)
Victoria	55 760 (43 670 – 59 030)	44 940 (33 440 – 49 180)	10 818 (6 880 – 15 435)
Western Australia	20 510 (16 060 – 21 710)	16 520 (12 300 – 18 080)	3 983 (2 532 – 5 670)

Source: Center for Disease Analysis; The Kirby Institute

Figure 48 Estimates of the number of people with severe fibrosis/hepatitis C related cirrhosis, and estimated number of deaths, 2004, 2009, 2014



Source: Center for Disease Analysis; The Kirby Institute; see Methodological Notes for detail

Table 9 Estimated number of people with severe fibrosis/hepatitis C related cirrhosis and estimated number of deaths, 2004, 2009 and 2014

Year	Number of people with severe fibrosis/hepatitis C related cirrhosis (range)	Estimated number of deaths (range)
2004	18 580 (12 650 – 25 850)	280 (180 – 370)
2009	29 700 (19 360 - 42 240)	430 (280 – 600)
2014	44 730 (28 440 – 63 800)	690 (440 – 970)

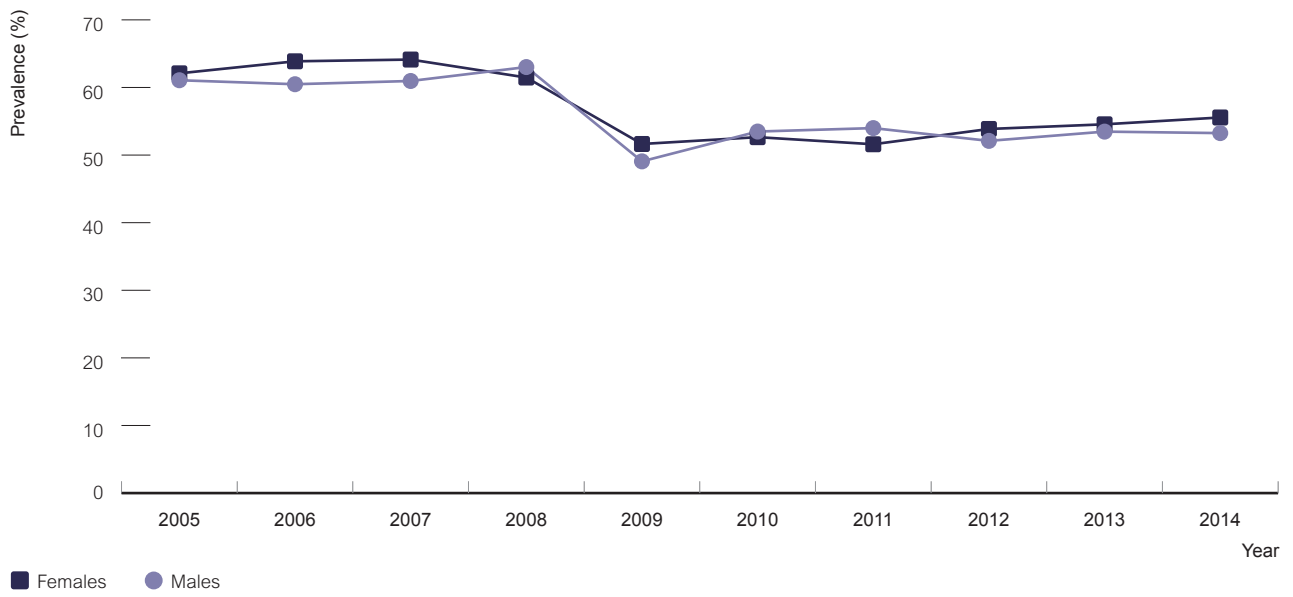


Hepatitis C prevalence

Australia has a concentrated chronic hepatitis C epidemic among key populations; people who inject drugs, prisoners, people from high prevalence countries and HIV positive men who have sex with men.

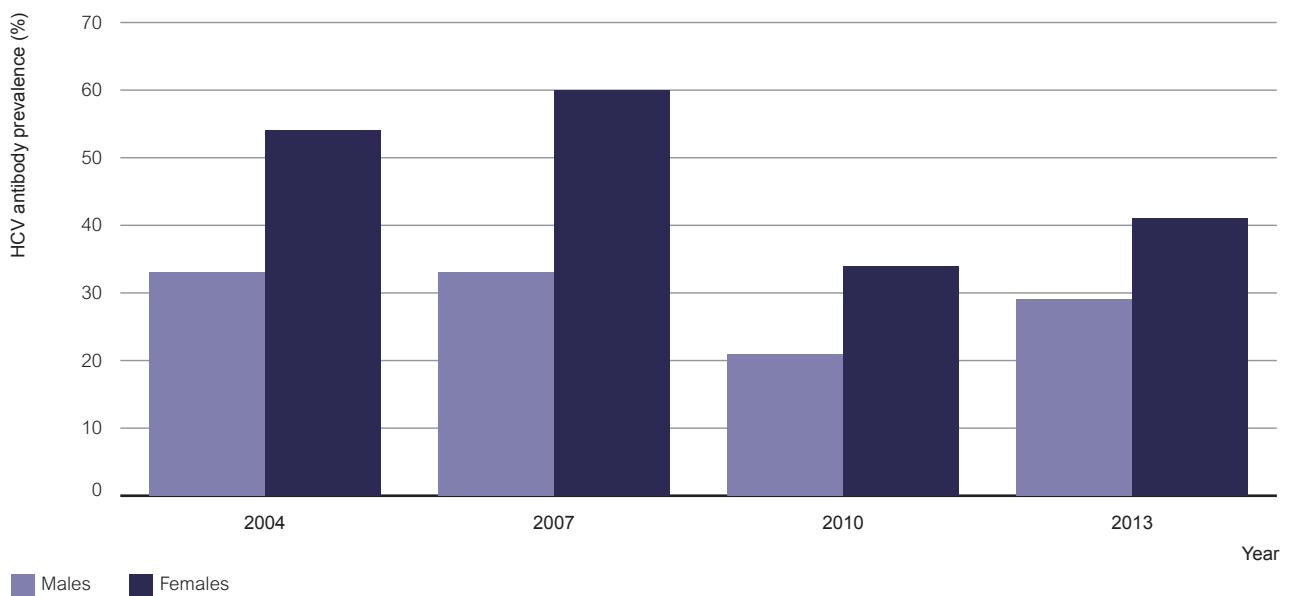
Exposure to hepatitis C infection occurs at high levels among people who inject drugs with a prevalence of 54% among people who inject drugs attending needle and syringe programs (Figure 49). Hepatitis C prevalence decreased among both males and females from around 60% in 2005 to around 50% in 2009 and has remained stable over the period 2009 to 2014. Hepatitis C prevalence is also high among prisoners at 31% according to the National Prison Entrants' Bloodborne Virus Survey (Figure 50). Levels of hepatitis C infection in new blood donors, who undergo a screening interview to exclude those whose history might place them at higher risk of having an infectious disease that can be transmitted through blood or blood products, have been below 0.1% since 2005 and among repeat donors <0.01% (Figure 51).

Figure 49 Hepatitis C prevalence among people seen at needle and syringe programs, 2005 – 2014, by year and sex



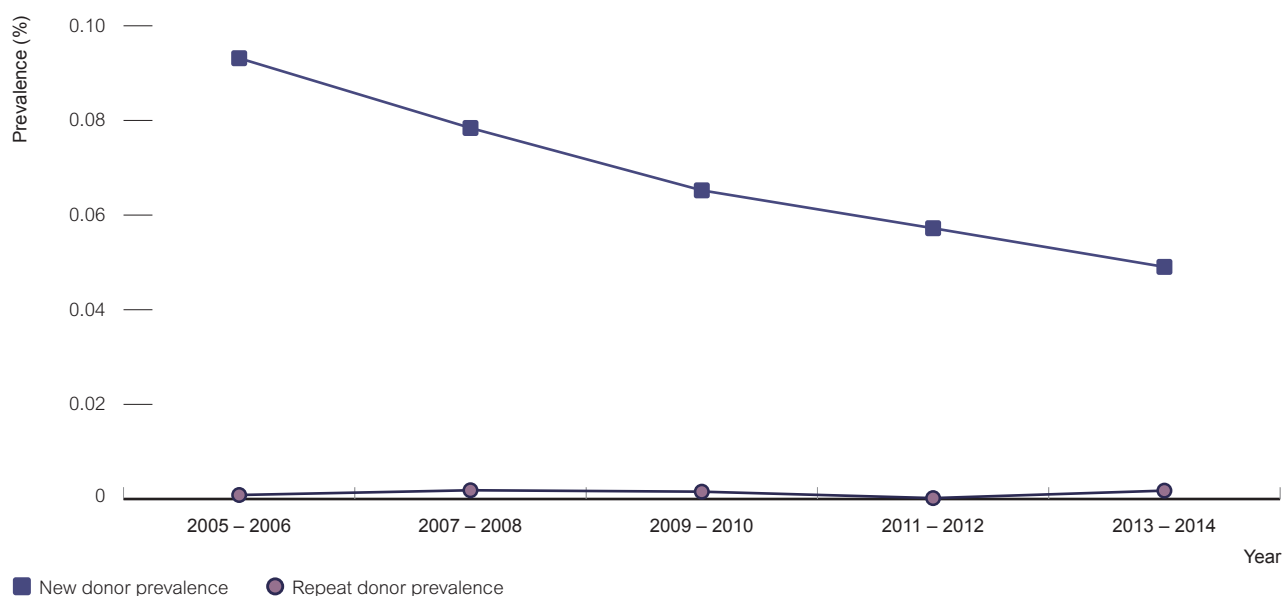
Source: Australian Needle and Syringe Program Survey, see Methodological Notes for detail

Figure 50 Hepatitis C prevalence among prison entrants, 2004, 2007, 2010, 2013



Source: National Prison Entrants' Bloodborne Virus Survey 2004, 2007, 2010, and 2013, see Methodological Notes for detail

Figure 51 Hepatitis C prevalence in blood donors, 2005 – 2014, by new and repeat donor status



Source: Australian Red Cross Blood Service, see Methodological Notes for detail

Hepatitis C prevention

The key prevention strategies to protect people who inject drugs from acquiring hepatitis C infection are use of sterile needles and syringes and opioid substitution therapy⁹. Testing and treatment are secondary prevention strategies in that they prevent transmission to others due to behavioural change after diagnosis or treatment which can cure chronic infection.



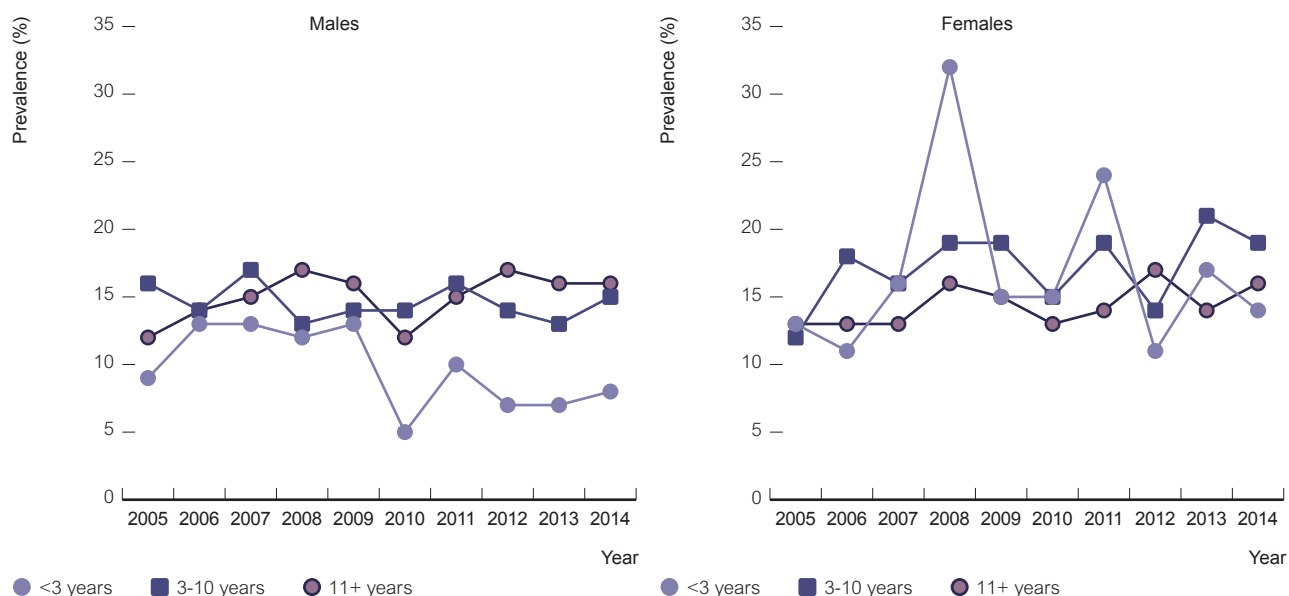
Primary prevention

According to the Australian Needle and Syringe Program Survey, rates of receptive syringe sharing have remained stable over the past ten years at around 15% among people who inject drugs attending needle and syringe programs, similar in males and females (see Figure 11 in HIV section, and Figure 52).

Inferences derived from the Australian Needle and Syringe Program Survey can reasonably be extrapolated to the broader population of needle and syringe program attendees in Australia. However, while consistent with other sources of surveillance data, the extent to which the Survey results can be generalised to the broader Australian population of people who inject drugs cannot be ascertained.

Males who reported recently initiating injecting (<3 years) were less likely to report receptive syringe sharing (8% in 2014), compared to those who initiated injecting 3 – 10 or 11+ years ago (15% and 16% respectively in 2014). The proportion of females recently initiating injecting who reported receptive syringe sharing has fluctuated in the last ten years (14% in 2014), with similar levels to those who reported initiating injecting 3 or more years ago in 2014 (16% of those for whom their first injection was 3 – 10 years ago and 19% for 11+ years ago) (Figure 52).

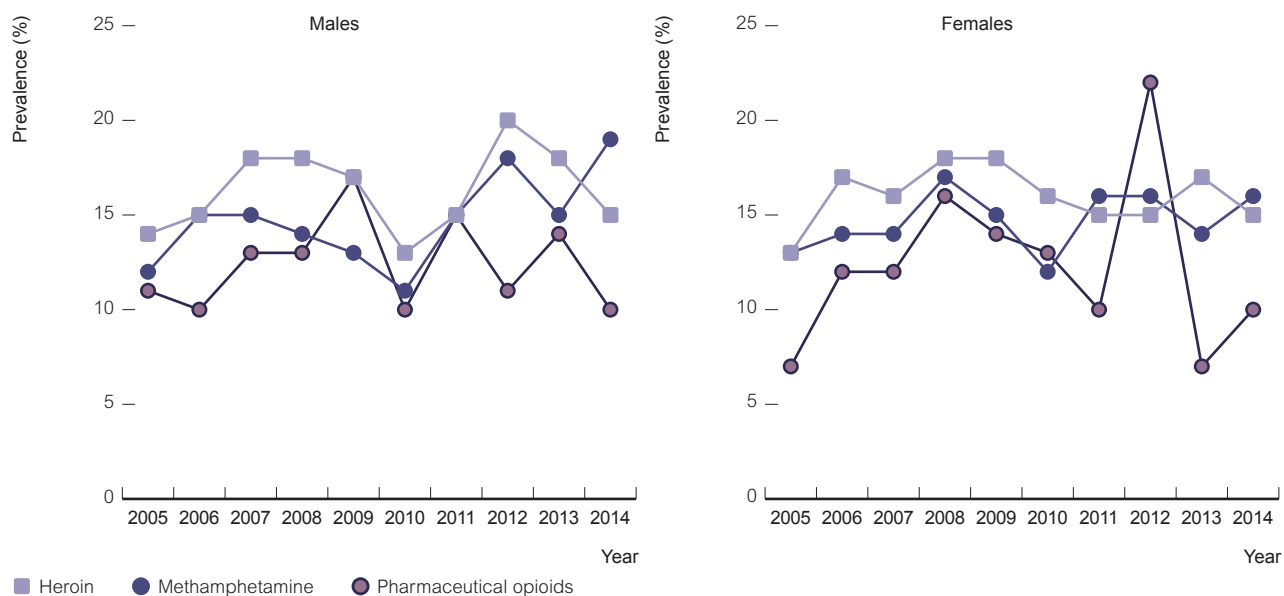
Figure 52 Proportion of people seen by needle and syringe programs reporting receptive syringe sharing (RSS) in the last month, 2005 – 2014, by time since first injection and sex



Source: Australian Needle and Syringe Program Survey, see Methodological Notes for detail

In the past ten years receptive syringe sharing has been most common among people who last injected heroin (Figure 53), however in 2014 people who reported last injecting methamphetamine were more likely to report receptive syringe sharing, with similar patterns between males and females.

Figure 53 Prevalence of receptive syringe sharing (RSS) among people seen at needle and syringe programs, 2005 – 2014, by drug last injected and gender



Source: Australian Needle and Syringe Program Survey

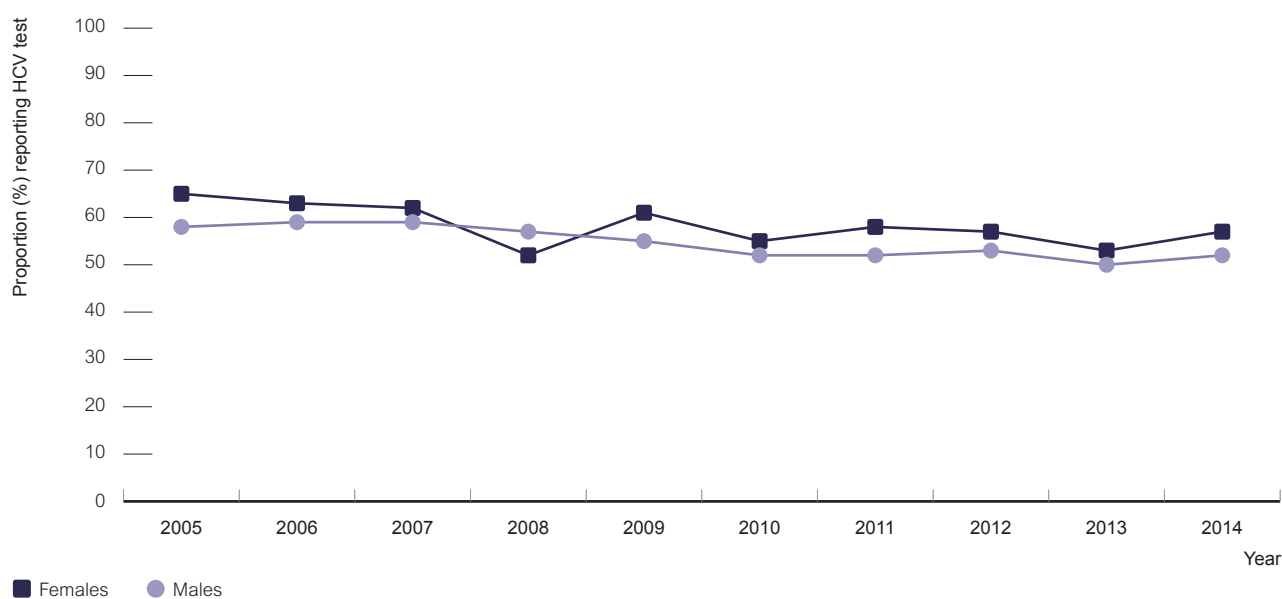
Between 2005 and 2010, the Australian Needle and Syringe Program Survey reported a substantial decline in the proportion of participants recently initiating injection drug use (<3 years), from around 25% in 2005 to around 10% in 2010. Since 2010 the proportion of new initiates has stabilised at 9 – 10%.¹⁰

Secondary prevention

Among priority populations at high risk of hepatitis C infection due to injecting drug use, the proportion who reporting a history of hepatitis C screening is usually high. In 2014, according to the Australian Needle and Syringe Program Survey, 57% of females and 52% of males who inject drugs reported having a hepatitis C antibody test in the 12 months prior to the survey, declining slightly over the last ten years, from 65% and 58% in 2005, respectively (Figure 54).

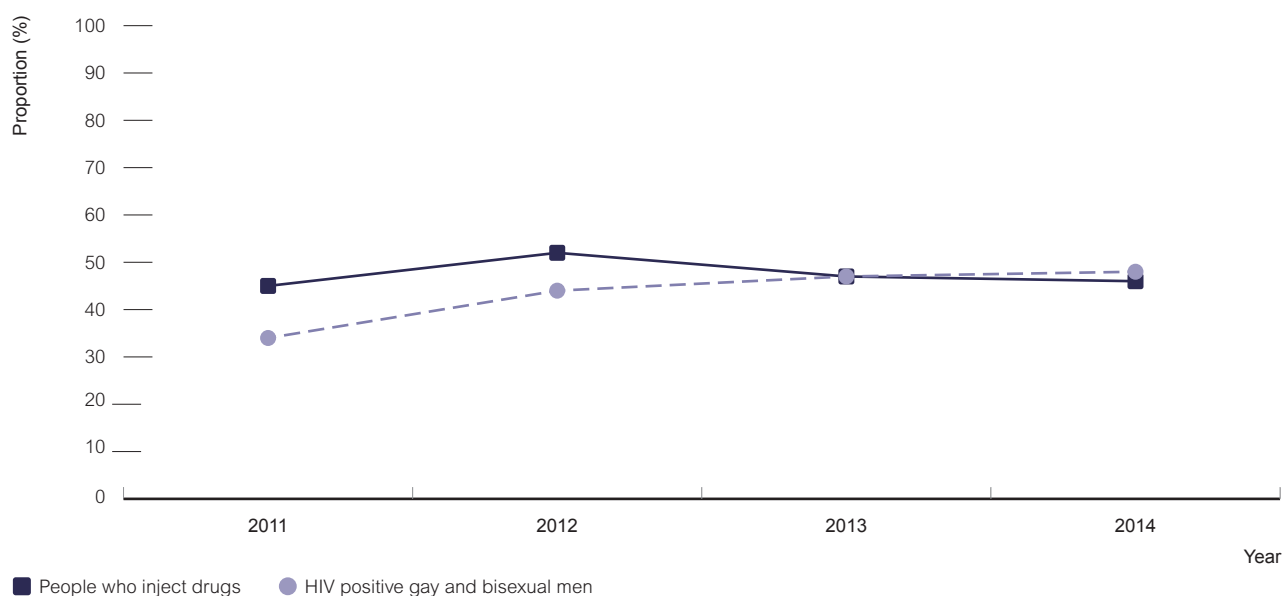
Data from 46 sexual health clinics participating in the ACCESS project show that between 2011 and 2014 45 – 52% of people who currently inject drugs were tested for hepatitis C in the previous year and 48% of gay and bisexual men with HIV infection in 2014, increasing from 34% in 2011 (Figure 55). It is possible some of these men may have tested elsewhere, and the ACCESS system will be enhanced in 2016 to measure this.

Figure 54 Proportion of people who inject drugs seen at needle and syringe programs who reported a hepatitis C antibody test in the past 12 months, 2005 – 2014



Source: Australian Needle and Syringe Program Survey

Figure 55 Proportion of sexual health attendees tested for hepatitis C in a year, 2011 – 2014, by select population and year



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



New hepatitis C diagnoses

This section focuses only people newly diagnosed with hepatitis C in Australia (including people with acute and chronic hepatitis C). A total of 10 621 cases of newly diagnosed hepatitis C infection were reported in Australia in 2014; 877 (8%) occurred among the Aboriginal and Torres Strait Islander population, 3 379 (32%) were among the non-Indigenous population and a further 6 365 (60%) cases for which Indigenous status was not reported (Table 10). In 2014, most cases (66%, 6 976) of newly diagnosed hepatitis C infection were in males, 77% (8 176) were in people aged 30 years and above and 61% (6 457) were diagnosed in people residing in major cities.

Table 10 Characteristics of new hepatitis C diagnoses, 2005 – 2014

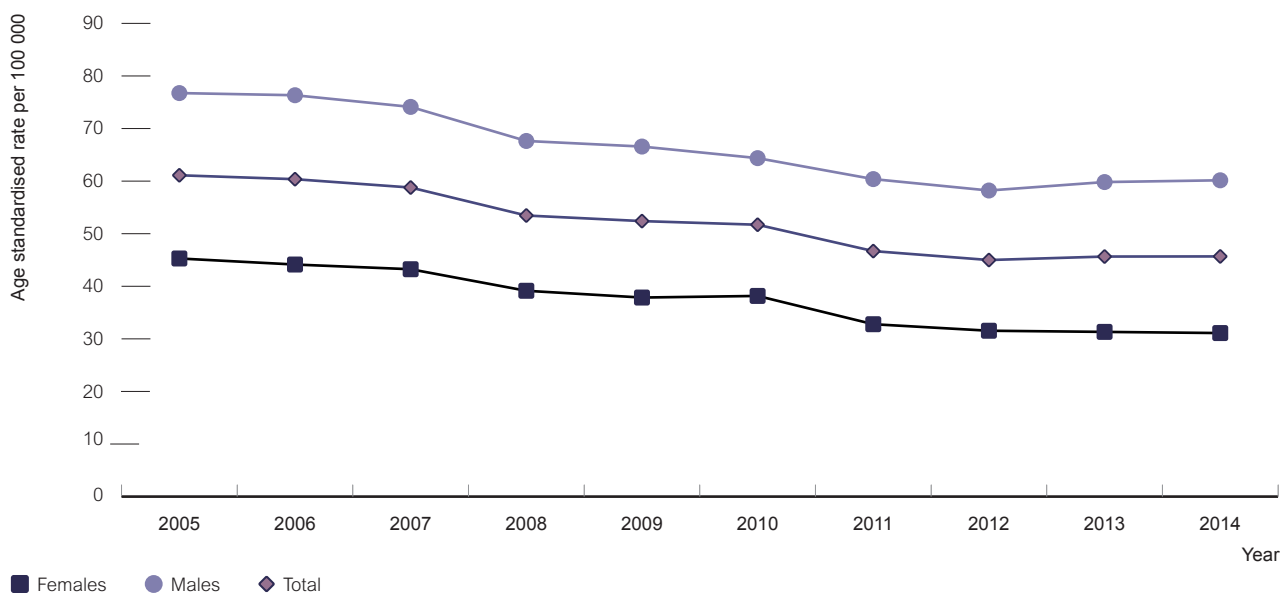
Characteristic	Year of diagnosis									
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Total	12 175	12 196	12 049	11 196	11 223	11 261	10 303	10 116	10 462	10 621
Sex										
Female	4 529	4 473	4 436	4 109	4 067	4 154	3 627	3 547	3 595	3 625
Male	7 612	7 679	7 570	7 056	7 099	6 996	6 634	6 536	6 842	6 976
Missing	34	44	43	31	57	111	42	33	25	20
Age group (years)										
0 – 14	36	56	47	38	47	45	31	32	32	35
15 – 19	385	349	294	296	272	246	241	243	295	226
20 – 29	3 321	3 105	2 890	2 653	2 477	2 442	2 227	2 230	2 197	2 174
30 – 39	3 663	3 474	3 548	3 195	3 155	3 235	2 883	2 801	2 834	2 905
40+	4 765	5 203	5 259	5 013	5 249	5 260	4 904	4 800	5 090	5 271
Missing	5	9	11	1	23	33	17	10	14	10
Aboriginal and Torres Strait Islander status										
Aboriginal and Torres Strait Islander	586	583	600	650	551	646	693	759	800	877
Non-Indigenous	4 684	4 548	4 657	4 525	4 036	3 952	3 665	3 581	3 504	3 379
Not reported	6 905	7 065	6 792	6 021	6 636	6 663	5 945	5 776	6 158	6 365
Newly acquired¹	364	438	389	351	396	382	422	462	402	440
Area of residence										
Major Cities	8 190	8 097	7 897	7 016	7 163	7 129	6 511	6 223	6 574	6 457
Inner Regional	2 276	2 395	2 371	2 422	2 182	2 172	2 043	2 035	2 079	2 343
Outer Regional	1 085	1 120	1 139	1 100	1 003	1 024	1 011	1 111	1 136	1 132
Remote	148	163	186	220	183	185	179	187	179	163
Very Remote	74	50	75	70	67	65	64	81	82	68
Missing	402	371	381	368	625	686	495	479	412	458
State/Territory										
Australian Capital Territory	173	189	202	200	163	223	187	147	184	174
New South Wales	4 197	4 183	4 069	3 583	3 834	3 768	3 334	3 296	3 496	3 543
Northern Territory	259	264	225	212	167	167	208	193	254	180
Queensland	2 647	2 792	2 674	2 574	2 631	2 654	2 412	2 369	2 459	2 646
South Australia	700	667	604	575	544	524	515	511	523	491
Tasmania	240	271	274	348	281	267	229	262	237	223
Victoria	2 939	2 729	2 764	2 379	2 455	2 586	2 348	2 284	2 201	2 229
Western Australia	1 020	1 101	1 237	1 325	1 148	1 072	1 070	1 054	1 108	1 135

¹ Newly acquired hepatitis C is defined as newly diagnosed hepatitis C infection with evidence of acquisition in the 24 months prior to diagnosis (laboratory or clinical evidence). Enhanced surveillance procedures related to hepatitis C vary by state/territory. The total number of cases reported here is likely to be an under-estimation of the true number of newly acquired infections.

Source: Australian National Notifiable Diseases Surveillance System

The rate of diagnosis of hepatitis C infection declined from 61 per 100 000 in 2005 to 46 per 100 000 in 2014, with decreases observed in both males and females (Figure 56).

Figure 56 Hepatitis C notification rate per 100 000, 2005 – 2014, by sex

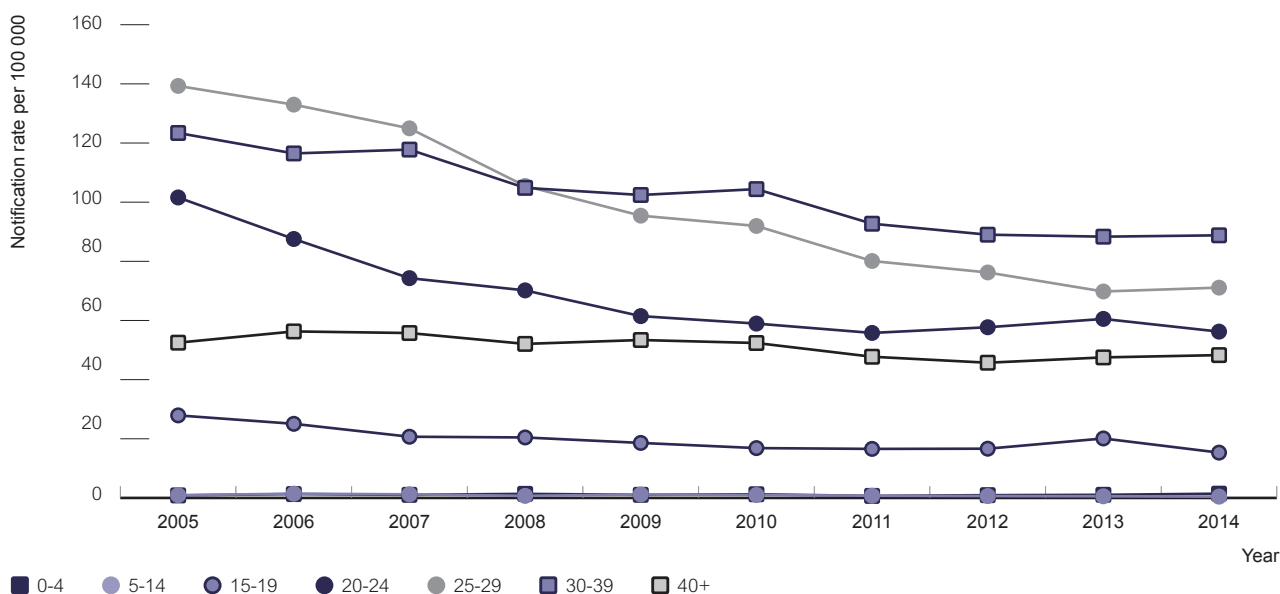


Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058; 3100DO003_201212

In the past ten years, the rate of diagnosis of hepatitis C infection has declined in most age groups, but most markedly in the 25 – 29 year age group (by 49%), and 20 – 24 year age group (44%) (Figure 57), with declines in these age groups observed in both males and females (Figure 58 – 59).

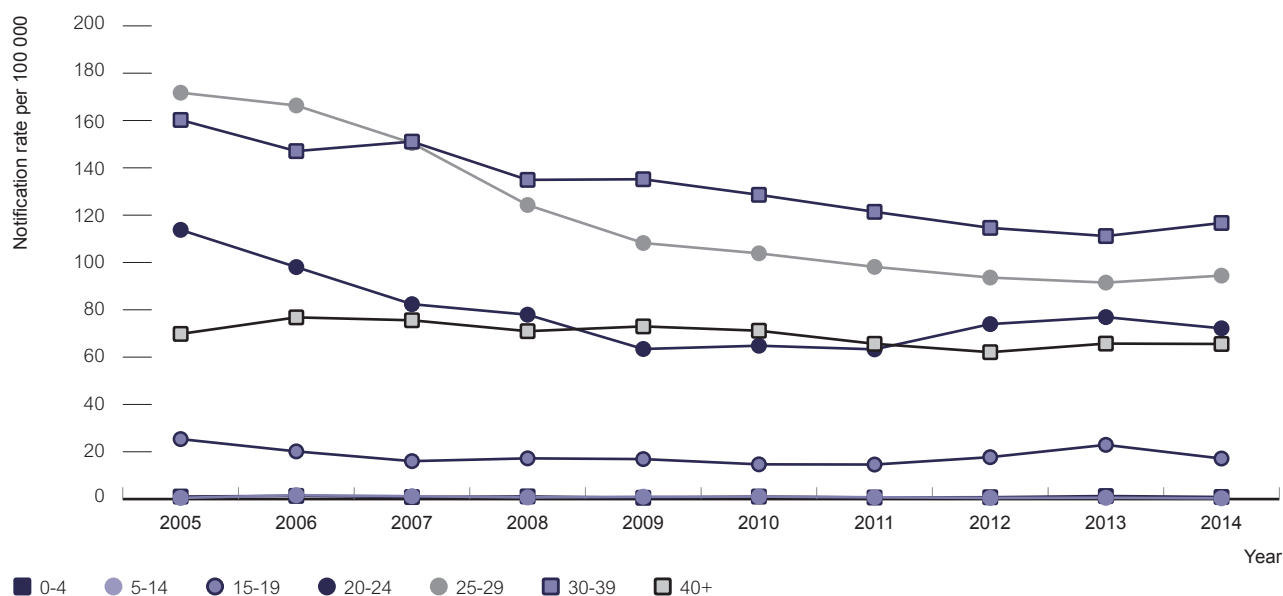


Figure 57 Hepatitis C notification rate per 100 000, 2005 – 2014, by age group



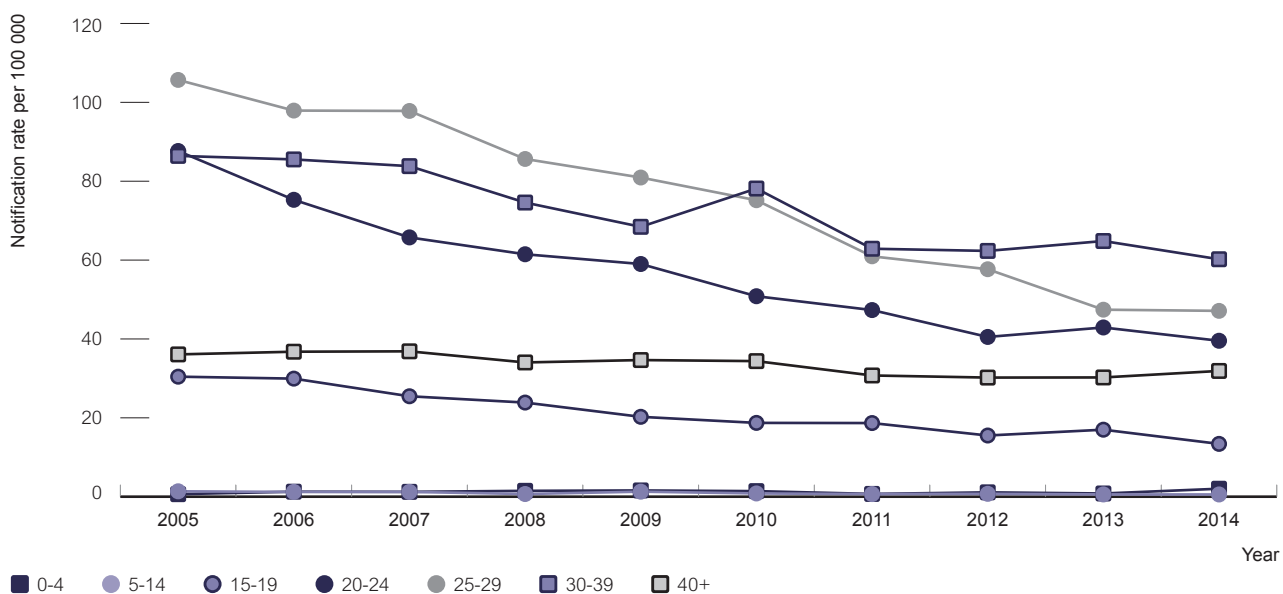
Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogue 3101051 – 31010518

Figure 58 Hepatitis C notification rate per 100 000, 2005 – 2014, by age group, males



Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogue 3101051 – 31010518

Figure 59 Hepatitis C notification rate per 100 000, 2005 – 2014, by age group, females

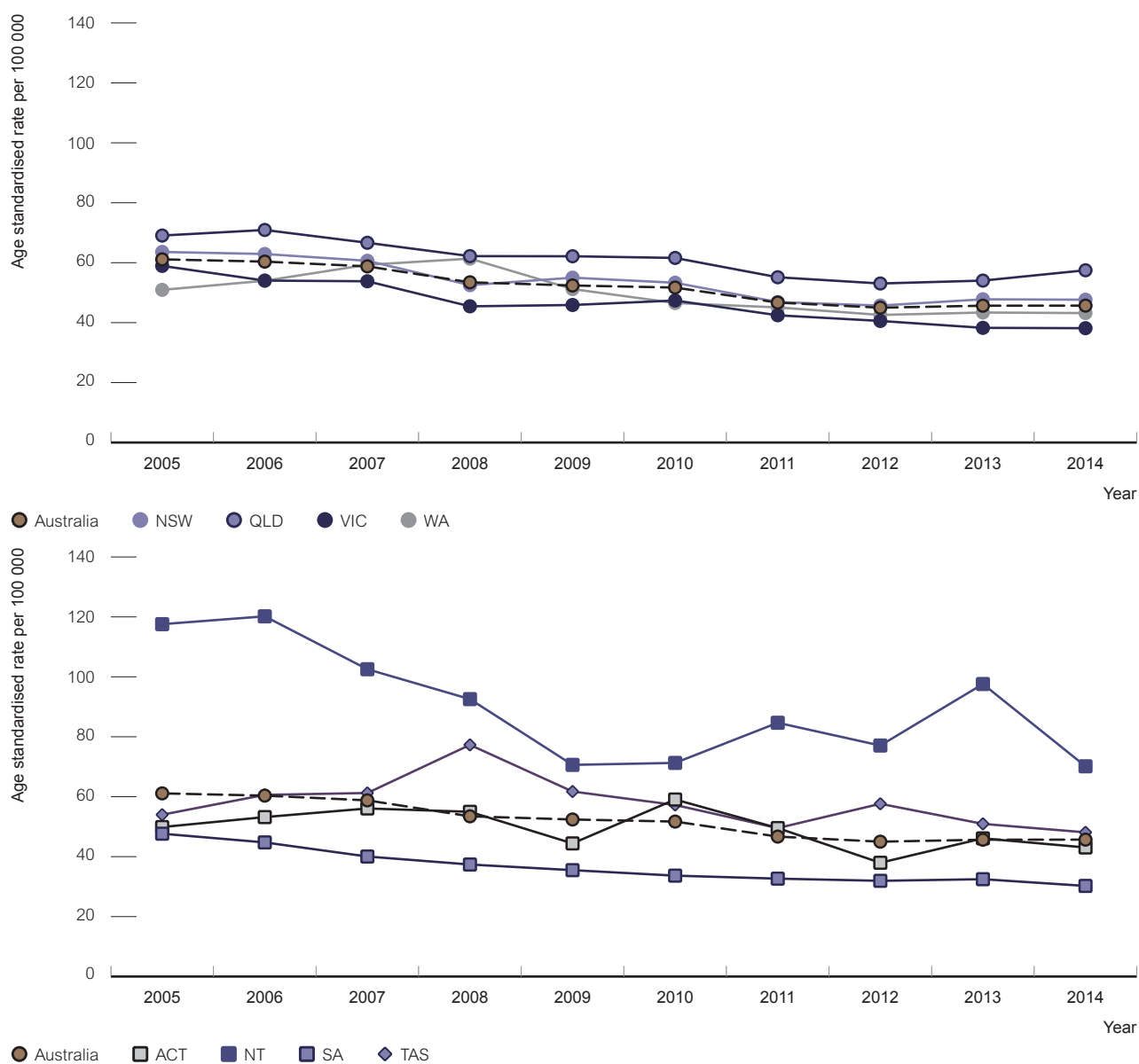


Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogue 3101051 – 31010518

The population rate of newly diagnosed hepatitis C infection in Australia is highest in the Northern Territory (70 per 100 000 in 2014) and Queensland (57 per 100 000 in 2014). Over the past ten years, the rate of hepatitis C diagnosis has declined in all jurisdictions (by 14 to 40%). The greater declines were observed in Northern Territory (40%; from 117 per 100 000 in 2005 to 70 per 100 000 in 2014), South Australia (37%; 48 per 100 000 in 2005 to 30 per 100 000 in 2014) and Victoria (33%; 59 per 100 000 in 2005 to 38 per 100 000 in 2014) (Figure 60, Table 11).

In males and females, the rate of newly diagnosed hepatitis C infection was highest in inner regional, outer regional and remote areas (Figures 61 – 62).

Figure 60 Hepatitis C notification rate per 100 000, 2005 – 2014, by State/Territory



Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058; 3100DO003_201212

Table II Hepatitis C notification rate, 2005 – 2014, by State/Territory

State/Territory	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Australian Capital Territory	49.9	53.2	56.1	55.0	44.4	59.1	49.5	38.0	46.1	43.1
New South Wales	63.6	62.9	60.6	52.5	55.0	53.3	46.9	45.7	47.8	47.7
Northern Territory	117.6	120.2	102.5	92.6	70.6	71.3	84.7	77.1	97.6	70.1
Queensland	69.1	70.9	66.6	62.2	62.1	61.6	55.1	53.1	54.0	57.5
South Australia	47.7	44.7	40.0	37.4	35.5	33.7	32.7	31.9	32.5	30.2
Tasmania	54.0	60.6	61.2	77.3	61.7	57.2	49.5	57.6	50.9	48.1
Victoria	58.9	54.0	53.8	45.4	45.9	47.4	42.5	40.6	38.3	38.1
Western Australia	50.9	54.0	59.3	61.4	51.2	46.5	45.1	42.6	43.4	43.2

Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 – 3101058; 3100DO003_201212

Figure 61 Hepatitis C notification rate per 100 000 population, 2005 – 2014, by region of residence, males

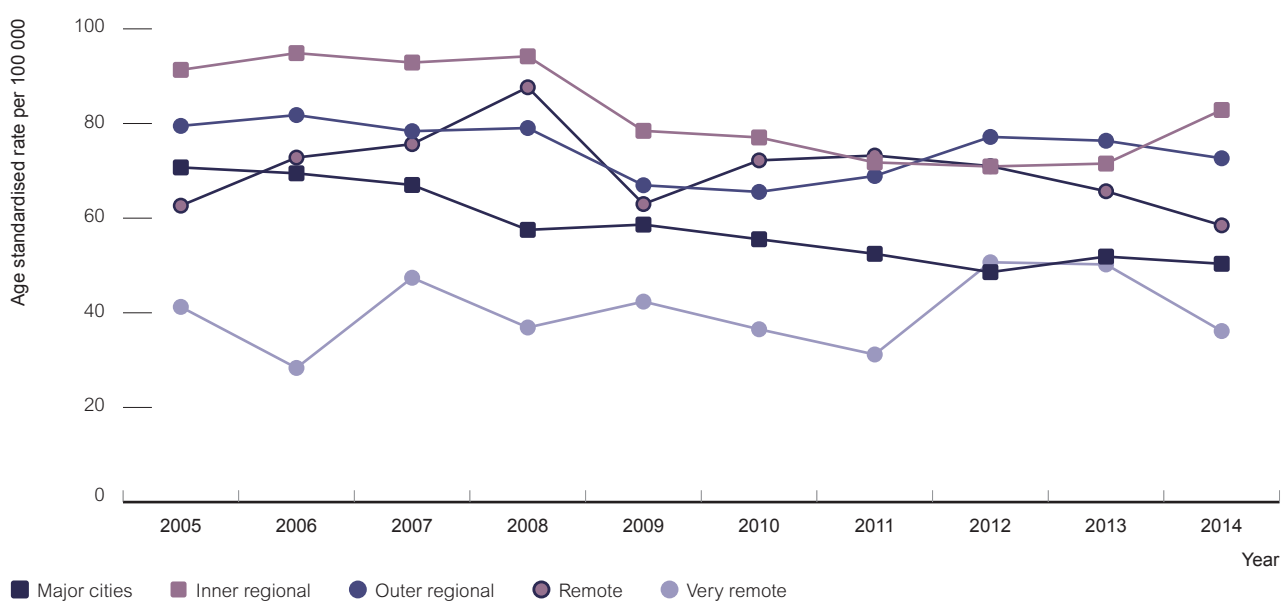
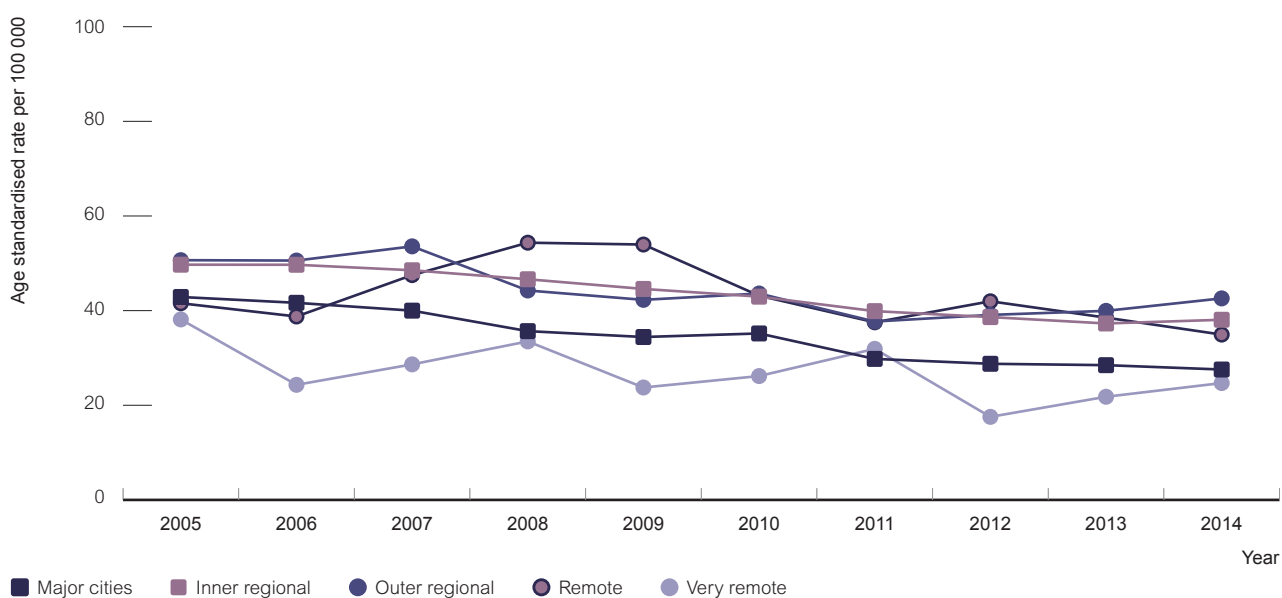


Figure 62 Hepatitis C notification rate per 100 000 population, 2005 – 2014, by region of residence, females

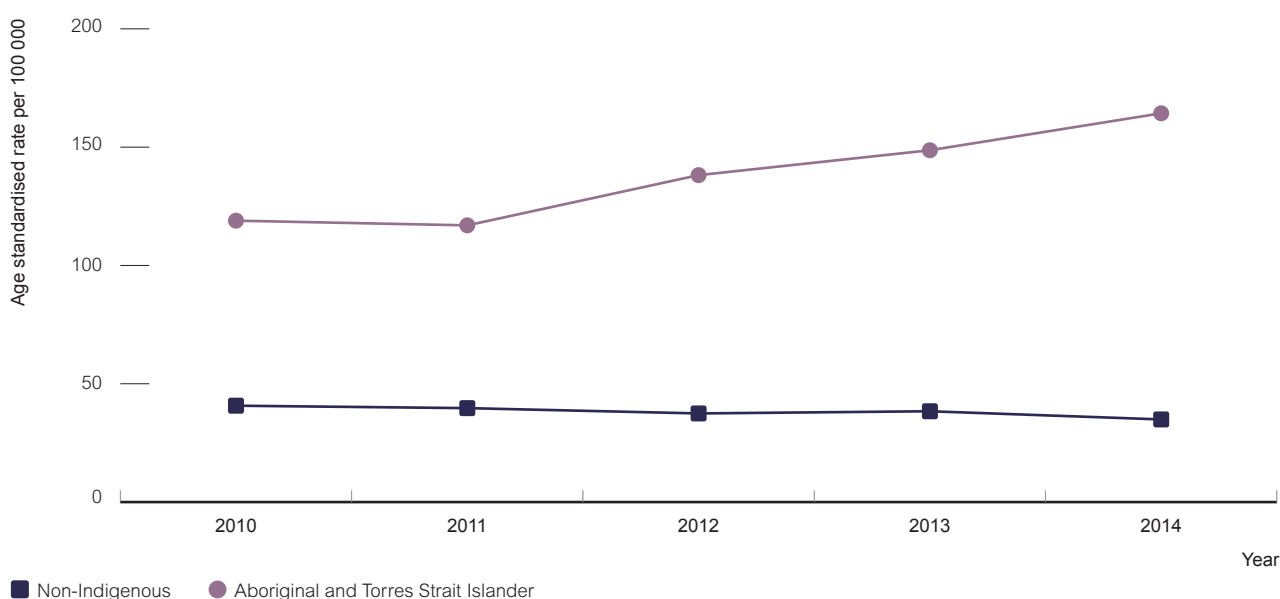


Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058; 3100DO003_201212; 1270055006.CG_POSTCODE_2012_RA_2011; ABS SuperTable 2011 Census

In 2014, rates of hepatitis C diagnosis in 2014 were almost 5 times greater among the Aboriginal and Torres Strait Islander population (164 per 100 000) compared to the non-Indigenous population (35 per 100 000). Rates of hepatitis C diagnosis among the Aboriginal and Torres Strait Islander population has increased from 119 per 100 000 in 2010 to 164 per 100 000 in 2014 (Figure 63). These notification data are from the Northern Territory, South Australia, Tasmania and Western Australia where reporting of Indigenous status is greater than 50% complete.

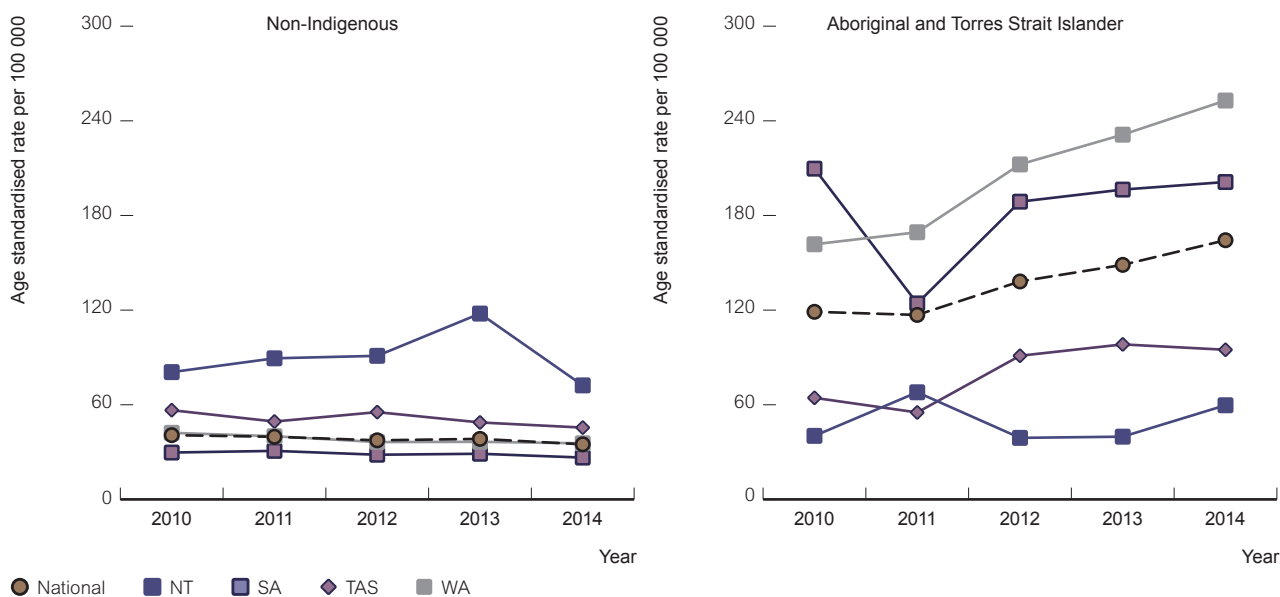
In South Australia, Tasmania and Western Australia, the rate of hepatitis C notification was 2-7 times greater in the Aboriginal and Torres Strait Islander population than in the non-Indigenous population in 2014 and since 2011 has increased in all three jurisdictions (Figure 64). In the Northern Territory, the rate of hepatitis C diagnosis was lower in the Aboriginal and Torres Strait Islander population than the non-Indigenous population in 2014 (60 vs. 72 per 100 000).

Figure 63 Hepatitis C notification rate per 100 000, 2010 – 2014, by Aboriginal and Torres Strait Islander status



Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogue 3101051 - 3101058; 3100DO003_201212; 32380do001_2011

Figure 64 Hepatitis C notification rate per 100 000, 2010 – 2014, by State/Territory and Aboriginal and Torres Strait Islander status



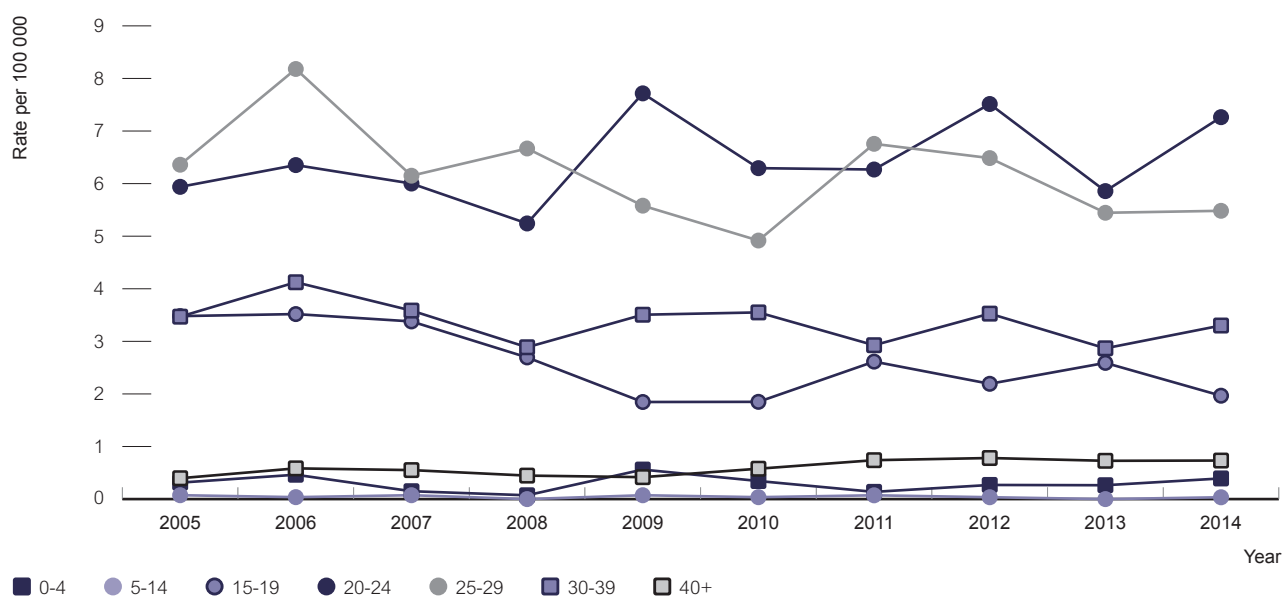
Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058; 3100DO003_201212; 32380do001_2011

Newly acquired hepatitis C

For some newly diagnosed cases, it is possible to determine that they were acquired in the two years prior to diagnosis, on the basis of a prior negative test or clinical evidence. Enhanced surveillance procedures related to hepatitis C vary by state/territory. The total number of cases reported here is likely to be an under-estimation of the true number of newly acquired infections. Reports of newly acquired hepatitis C continue to occur at the highest rate among adults aged 20 – 24 and 25 – 29 years (Figure 65).



Figure 65 Newly acquired hepatitis C notification rate per 100 000, 2005-2014, by year and age group



Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058;

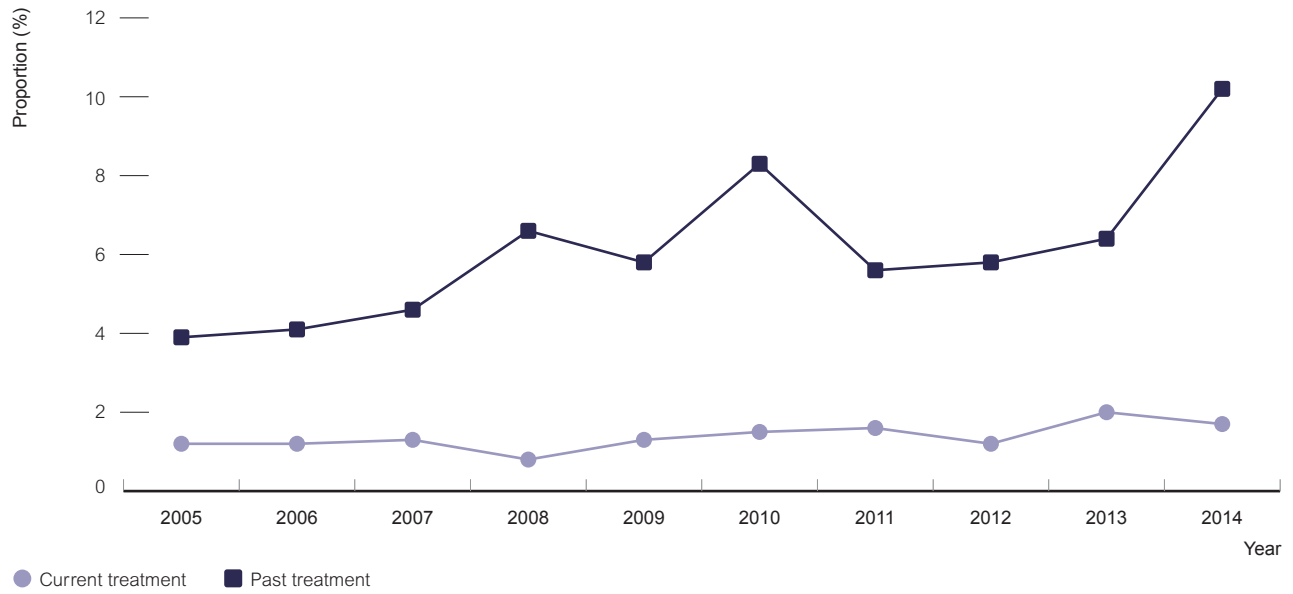
Hepatitis C care

Information from the hepatitis C ‘diagnosis and care cascade’ demonstrated that nationally, an estimated 26% of people diagnosed with chronic hepatitis C have received antiviral treatment by the end of 2014. According to the Australian Needle and Syringe Program Survey, among people who inject drugs with prior exposure to hepatitis C, 10% had a history of hepatitis C treatment and 2% were currently receiving antiviral treatment in 2014 increasing from 3.9% and 1.2%, respectively, in 2005 (Figure 66).

Data from the Pharmaceutical Benefits Scheme (PBS) available since 2013, show steady but low numbers of hepatitis C treatments dispensed in the past 2 years, considering the total population of people living with chronic hepatitis C (230 470 by end of 2014). Of people dispensed hepatitis C antiviral treatments in 2014, 49% received pegylated interferon plus ribavirin and 52% received pegylated interferon plus a protease inhibitor (boceprevir, telaprevir, simeprevir) (Figure 67).

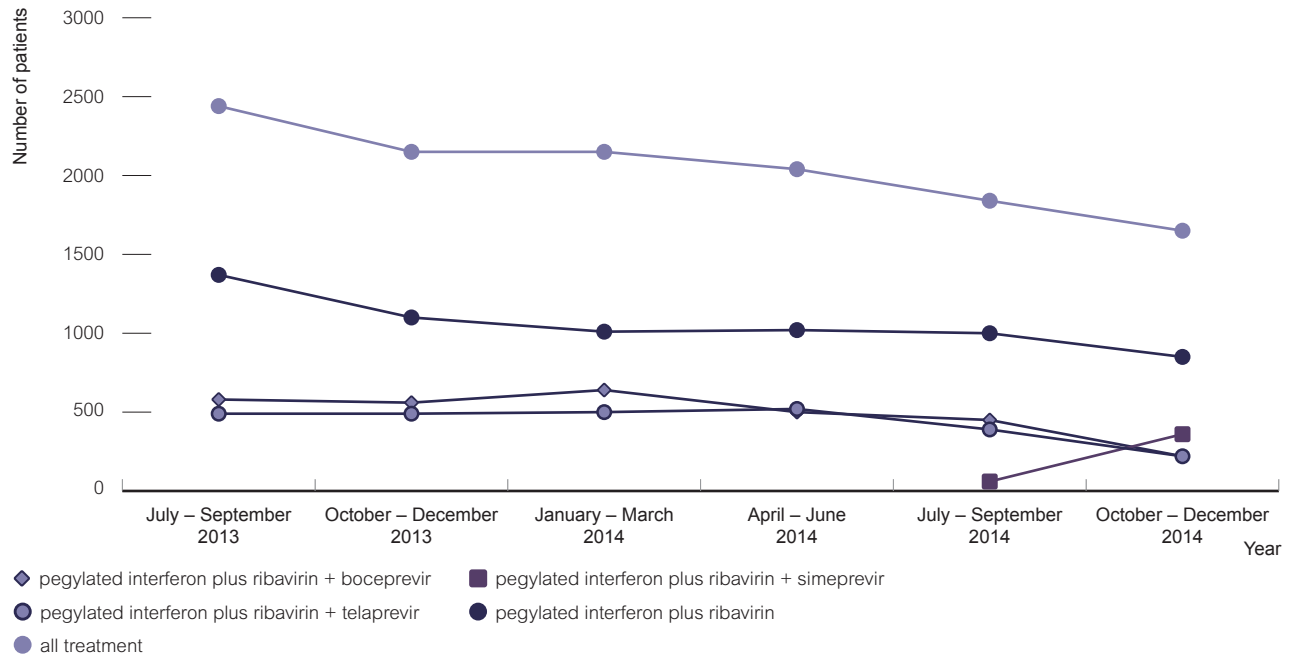
These are very low levels of hepatitis C treatment in Australia, but next year it is anticipated interferon-free direct acting antiviral (DAA) regimens will become widely available, which are highly effective and well tolerated. As a consequence, the number of people receiving hepatitis C antiviral treatment is likely to increase.

Figure 66 Proportion of hepatitis C antibody positive people seen at needle and syringe programs with a history of hepatitis C treatment, 2005 – 2014



Denominator restricted to people with hepatitis C antibody positive serology
 From 2012 current changed to commenced in the last 12 months
 Data source: Australian Needle and Syringe Program Survey

Figure 67 Number of unique patients receiving treatment for hepatitis C, 2013 – 2014, by quarter



Source: Pharmaceutical Benefits Scheme 10% sample using Pharmedash, see Methodological Notes for detail

There is no comprehensive registry of advanced illness related to hepatitis C in Australia. One indicator of the extent of illness caused by hepatitis C is the number of liver transplants due to chronic infection. Of 224 people who had a liver transplant in 2014, 81 (36%) had hepatitis C infection (Table 12).



Table 12 Number (percent) of liver transplants, 1985 – 2014, by year and primary cause of liver disease, and hepatitis status for cases where the primary diagnosis was hepatocellular carcinoma

Diagnosis	1985 – 2004		2005		2006		2007		2008		2009		2010		2011		2012		2013		2014		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Hepatitis B	123	7.3	8	6.1	3	2.3	3	2.5	3	1.9	7	4.8	6	3.1	9	4.6	2	1	8	3.6	10	4.5	182	5.4
Hepatitis C	293	17.4	45	34.1	31	23.8	30	25.2	43	27.7	41	28.1	48	25	55	28.4	67	33.2	67	30.2	51	22.8	771	22.7
Hepatitis B/C/D	15	0.9	2	1.5	2	1.5	2	1.7	5	3.2	1	0.7	3	1.6	3	1.5	1	0.5	5	2.3	2	0.9	41	1.2
Hepatocellular carcinoma	61	3.6	10	7.6	10	7.7	19	16	21	13.5	24	16.4	26	13.5	24	12.4	23	11.4	30	13.5	47	21	295	8.7
Hepatocellular carcinoma Hepatitis B	18	1.1	4	3	3	2.3	6	5	6	3.9	5	3.4	5	2.6	4	2.1	4	2	4	1.8	8	3.6	67	2.0
Hepatocellular carcinoma Hepatitis C	28	1.7	3	2.3	5	3.8	11	9.2	9	5.8	8	5.5	13	6.8	14	7.2	12	5.9	18	8.1	30	13.4	151	4.4
Hepatocellular carcinoma Hepatitis B/C/D	2	0.1	0	0	0	0	0	0	1	0.6	0	0	0	0	0	0	1	0.5	1	0.5	0	0	5	0.1
Hepatitis negative	13	0.8	3	2.3	2	1.5	2	1.7	5	3.2	11	7.5	8	4.2	6	3.1	6	3	7	3.2	9	4	72	2.1
Other	1192	70.8	67	50.8	84	64.6	65	54.6	83	53.5	73	50	109	56.8	103	53.1	109	54	111	50.5	114	50.9	2110	62.1
Total	1684	100	132	100	130	100	119	100	155	100	146	100	192	100	194	100	202	100	221	100	224	100	3399	100

Source: Australian and New Zealand liver Transplant Registry

Hepatitis C incidence

Hepatitis C incidence represents new infections (generally acquired in the past two years) and is the best indicator of changes in transmission in a population.

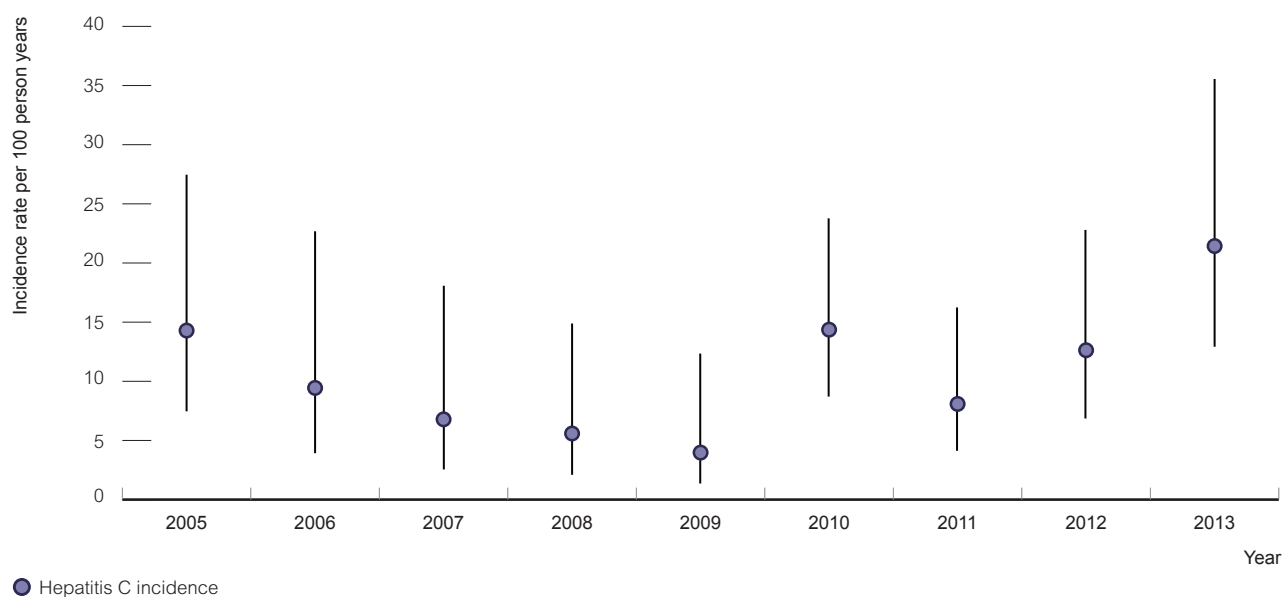
Hepatitis C incidence can be calculated from repeat testing data from the Australian Needle and Syringe Program Survey by dividing the number of seroconversions (negative to positive in 2 years) among people participating in the survey by the persons time at risk (time between repeat hepatitis C test in the survey). Further details about the methods used can be found in Methodological notes.

Over a nine year study period (2005 – 13) among people who inject drugs participating in the Australian Needle and Syringe Program Survey on more than one occasion, there were 74 serconversions, yielding a pooled hepatitis C incidence of 10.8 per 100 person-years (95%CI: 8.6-13.6). Hepatitis C incidence declined from 14.3 (95%CI: 7.4-27.5) in 2005 to 4.0 (95%CI:1.3-12.3) in 2009 and then has remained high in the past three years, between 8.1 (95%CI:4.0-16.2) and 21.4 (95%CI:12.9-35.6). The confidence intervals between these estimates overlap meaning the differences observed are not statistically significant (Figure 68).

It is important to note that incidence generated from repeat participants in the Australian Needle and Syringe Program Survey may not reflect trends in the broader population of people who inject drugs.

Among people who inject drugs seen at the Kirketon Road Centre in Sydney, hepatitis C incidence ranged from 4.9 per 100 person years to 14.0 between 2010 and 2014 (Table 13).

Figure 68 Estimated annual incidence of hepatitis C virus infection among people who inject drugs seen at needle and syringe programs, 2005 – 2013



Source: Australian Needle and Syringe Program Survey, see Methodological Notes for detail

Table 13 Incidence of hepatitis C infection among people who inject drugs seen at the Kirketon Road Centre, Sydney, 2010 – 2014

Year/Age group	Person years at risk	Number newly diagnosed	Incidence per 100 person years
2010			
Less than 20 years	1.4	0	0
20 – 29 years	24.1	4	16.6
30+ years	54.4	2	3.7
Total	79.9	6	7.5
2011			
Less than 20 years	2.7	2	73.0
20 – 29 years	18.8	4	21.3
30+ years	49.8	4	8.0
Total	71.4	10	14.0
2012			
Less than 20 years	0.7	1	136.9
20 – 29 years	17.9	2	11.2
30+ years	42.2	0	0
Total	60.9	3	4.9
2013			
Less than 20 years	0.8	0	0
20 – 29 years	18.7	4	21.4
30+ years	30.0	1	3.3
Total	49.4	5	10.1
2014			
Less than 20 years	1.9	0	0
20 – 29 years	13.0	1	7.7
30+ years	16.2	2	12.4
Total	31.1	3	9.6

Source: Kirketon Road Centre



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Main Findings

Hepatitis B infection

- Over the past ten years, the population rate of diagnosis of hepatitis B infection in Australia has declined in younger age groups: in those aged 25 – 29 years (from 72 per 100 000 in 2005 to 59 per 100 000 in 2014); 20 – 24 year (58 to 32 per 100 000); and 15 – 19 years (25 to 11 per 100 000).
- There have also been substantial declines in the rates of newly acquired hepatitis B cases (defined as a new infection within the past 2 years) in all age groups, except for those aged 40 years and above. The declines have been greatest in 20 – 24 year olds (78%) and 15 – 19 year olds (by 66%).
- At the end of 2014, an estimated 213 300 people were living with chronic hepatitis B infection in Australia (range 175 000 to 253 000), of whom 81 267 (38%) were born in the Asia-Pacific and 19 837 (9.3%) were Aboriginal and Torres Strait Islander peoples.
- An estimated 395 (304 – 640) deaths attributable to chronic hepatitis B infection occurred in 2014.
- In 2014, the estimated hepatitis B prevalence was 3.7% in Aboriginal and Torres Strait Islander peoples; 3.6% in people born in the Asia-Pacific; 3.5% in people born in Sub-Saharan Africa; 4.0% in people who inject drugs; and 3.0% in men who have sex with men. Some of these categories are potentially overlapping.
- Among the estimated 56% of people living in Australia with chronic hepatitis B infection who were diagnosed, an estimated 27% were in care and 10% of those diagnosed had received antiviral therapy.
- The coverage of infant hepatitis B vaccination at 24 months of age was 95% in 2014.

Interpretation:

Evidence is emerging that the immunisation programs for hepatitis B are starting to have a benefit, with declining rates of new infection, and most strikingly in the younger age groups that have had the highest level of vaccine coverage. The proportion of people with chronic hepatitis B infection who are in care or on recommended treatment remains low.

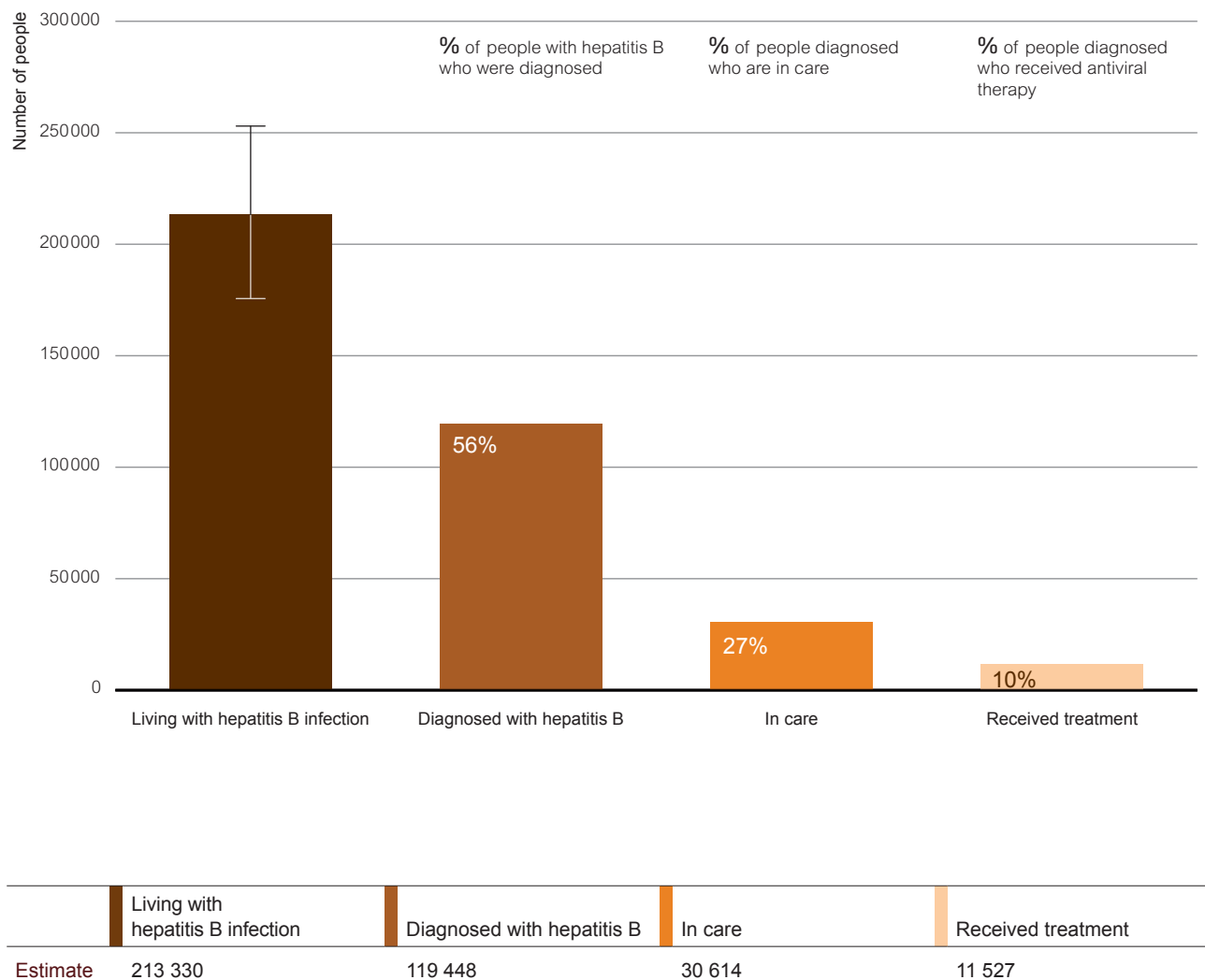
The 2013 hepatitis B diagnosis and care cascade

This report includes the number of people with hepatitis B infection, the number and proportion diagnosed in Australia, and receiving care or antiviral treatment.

Known as the ‘Hepatitis B diagnosis and care cascade’, these estimates are used to support the improvement of the delivery of services to people with hepatitis B infection. Using available data, the proportions of people in each stage of the cascade in Australia were estimated (Figure 69). The hepatitis B cascade focuses on 2013 and the methods are described in detail in the Methodological Notes. The approach was informed by recommendations from a national stakeholder reference group (see Acknowledgements section).

During 2013, an estimated 213 300 (175000 – 253000) people were living with chronic hepatitis B, an estimated 119 448 were diagnosed with hepatitis B, 30 614 were in care (monitored or received antiviral therapy) and 11 527 received antiviral therapy. This corresponds to 56% all people with hepatitis B being diagnosed, 27% of those diagnosed were in care and 10% of people diagnosed received antiviral therapy.

Figure 69 The 2013 hepatitis B diagnosis and care cascade



Source: Victorian Infectious Diseases Reference Laboratory, Doherty Institute



Number of people living with hepatitis B

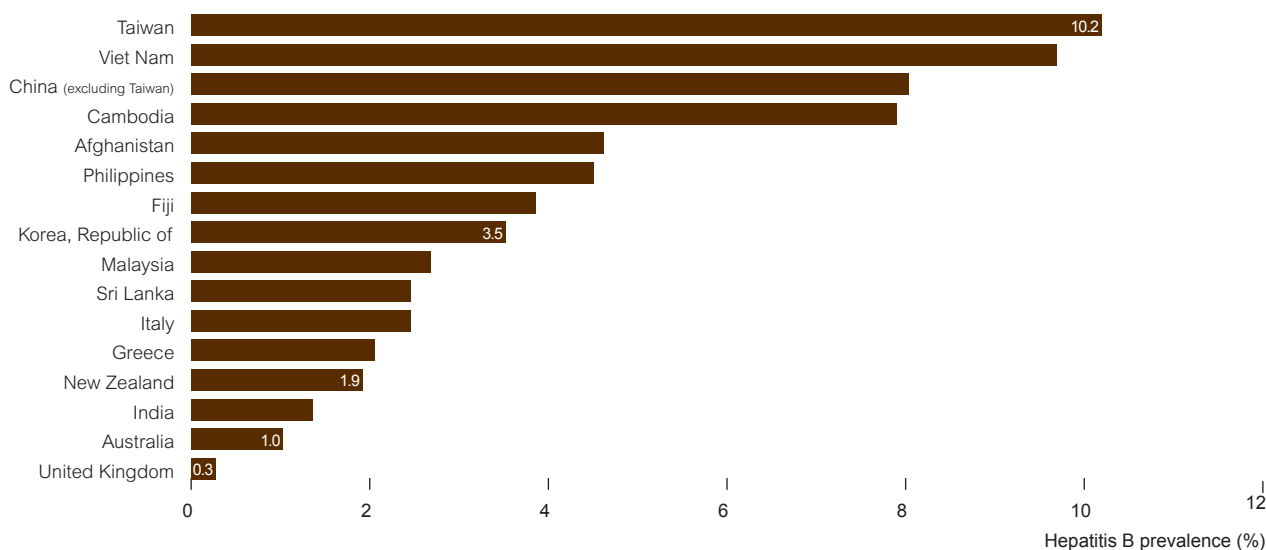
At the end of 2013, there were an estimated 81 267 (38%) people with chronic hepatitis B born in the Asia-Pacific, 19 837 (9.3%) Aboriginal and Torres Strait Islander peoples, 12 158 (6%) people who inject drugs, 9 385 (4%) men who have sex with men and 9 172 (4%) born in Sub-Saharan Africa (Table 14).

People from the Asia-Pacific represent 9.6% of the Australian population and accounted for an estimated 38% of those living with hepatitis B infection in 2013. People from Sub-Saharan Africa represent 1.4% of the Australian population but accounted for an estimated 4% of those living with hepatitis B infection. Aboriginal and Torres Strait Islander peoples represent 3% of the Australian population but account for an estimated 9% of those living with hepatitis B infection.

Hepatitis B prevalence

The estimated prevalence of chronic hepatitis B infection among people born in Australia is 1.0%, which by country of birth is higher than the United Kingdom (0.3%) but lower than many other countries in South East Asia and the Pacific (Figure 70).

Figure 70 Estimated prevalence of chronic hepatitis B infection in Australia, by country of birth



Source: Victorian Infectious Diseases Reference Laboratory, Doherty Institute & Australasian Society for HIV Medicine, 2015 (www.ashm.org.au/hbvmapping)

Australia has a concentrated hepatitis B epidemic among key populations; migrants from high prevalence countries, particularly South East Asia (see Table 14); men who have sex with men; Aboriginal and Torres Strait Islander peoples; and people who inject drugs. Taking the estimated population of these groups in Australia and the estimated people living with hepatitis B (above), gives an estimated prevalence of 3-4% across populations (see Table 14).

Table 14 Estimated number of people living with hepatitis B, proportion undiagnosed and estimated prevalence, Australia, 2014

Population group	Proportion of total	Total hepatitis B infection	Hepatitis B prevalence	Estimated population size**
Overall		213 300 (175 000 – 253 000)		23 625 600
Men who have sex with men	4.4%	9 385	3.0%	312 840
Aboriginal and Torres Strait Islander peoples	9.3%	19 837	3.7%	536 132
Born in Sub-Saharan Africa	4.3%	9172	3.5%	265 852
Born in Asia-Pacific [^]	38.1%	81 267	3.6%	2 289 220
People who inject drugs	5.7%	12 158	4.0%	303 953

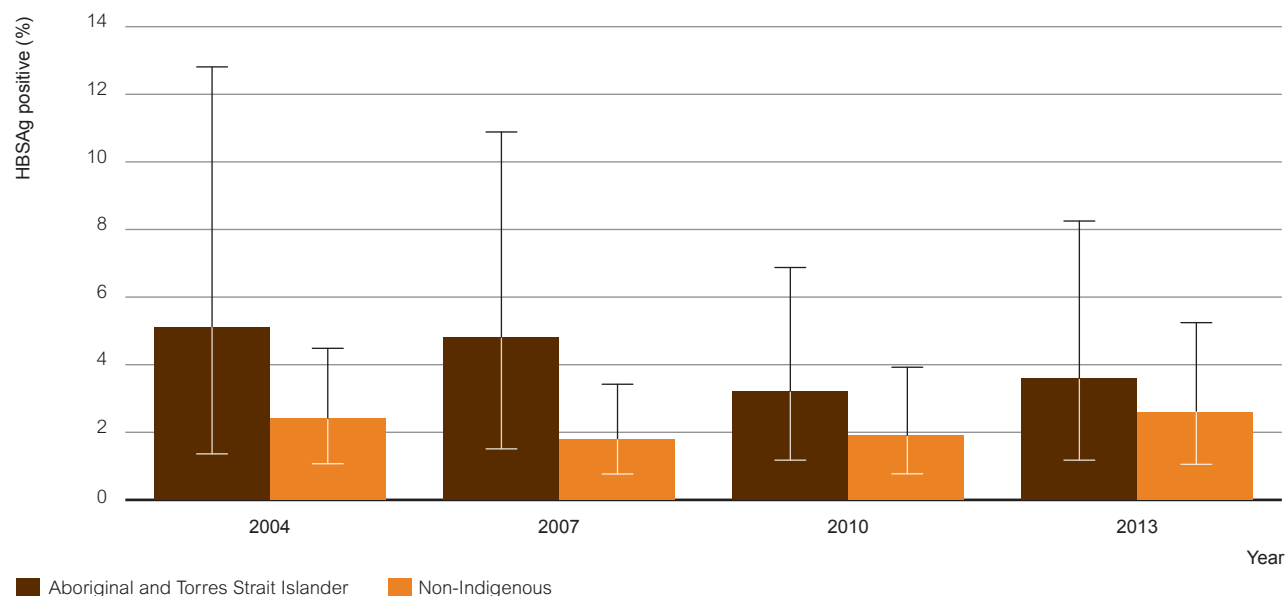
[^]South East Asia according to Census/International Classifications does not include China, which excludes largest population group for overseas born PLWCHB. Asia Pacific grouping has been used instead.

Hepatitis B prevalence is also relatively high among prisoners at 1.1-3.1% according to the National Prison Entrants' Bloodborne Virus Survey which is repeated every 3 years. The survey also showed that the prevalence of hepatitis B infection was close to 1-2 times greater each survey in Aboriginal and Torres Strait Islander peoples than non-Indigenous entrants (3.6% versus 2.6% in 2013 respectively) (Figure 71).

Levels of hepatitis B infection in new blood donors, who undergo a screening interview to exclude those whose history might place them at higher risk of having an infectious disease that can be transmitted through blood or blood products, have been below 0.1% since 2005 and among repeat donors less than 0.01% (Figure 72).

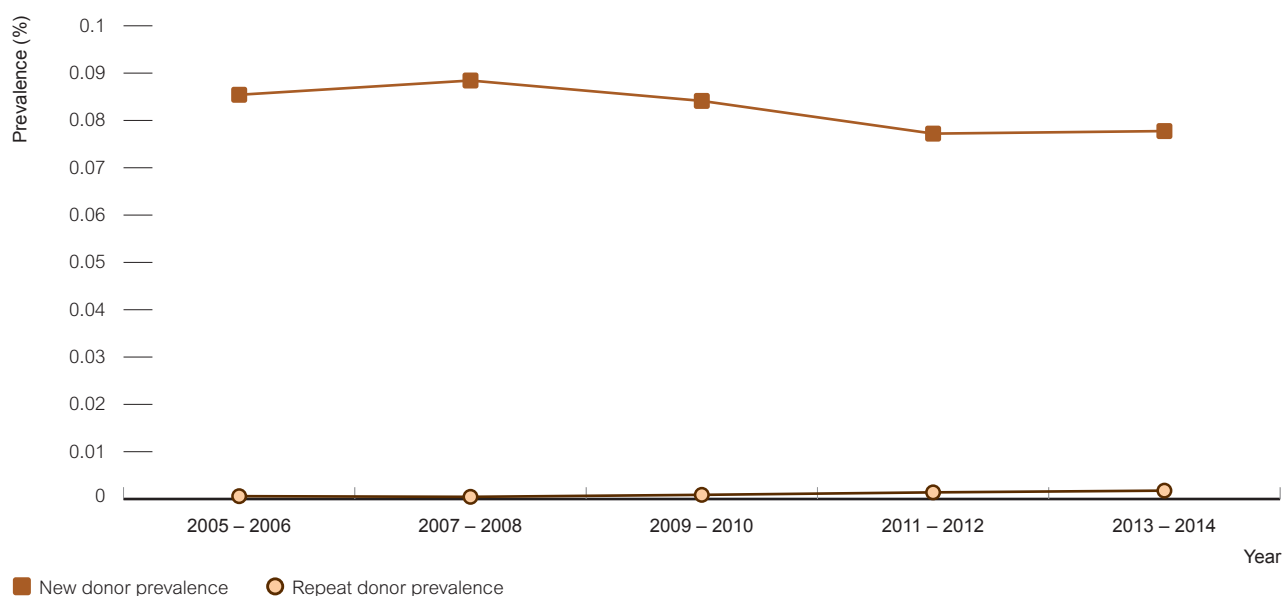


Figure 71 Chronic hepatitis B prevalence among prison entrants, 2004, 2007, 2010 and 2013



Source: National Prison Entrants' Bloodborne Virus Survey 2004, 2007, 2010, and 2013

Figure 72 Hepatitis B prevalence among blood donors, 2005 – 2014, by new and repeat donor status



Source: Australian Red Cross Blood Service

Hepatitis B prevention

Primary prevention strategies to protect people from acquiring hepatitis B infection include; vaccination, use of clean needles and condom use. Testing and treatment are secondary prevention strategies and prevent transmission to others due to behavioural change or starting treatment and reducing viral load.

Primary prevention

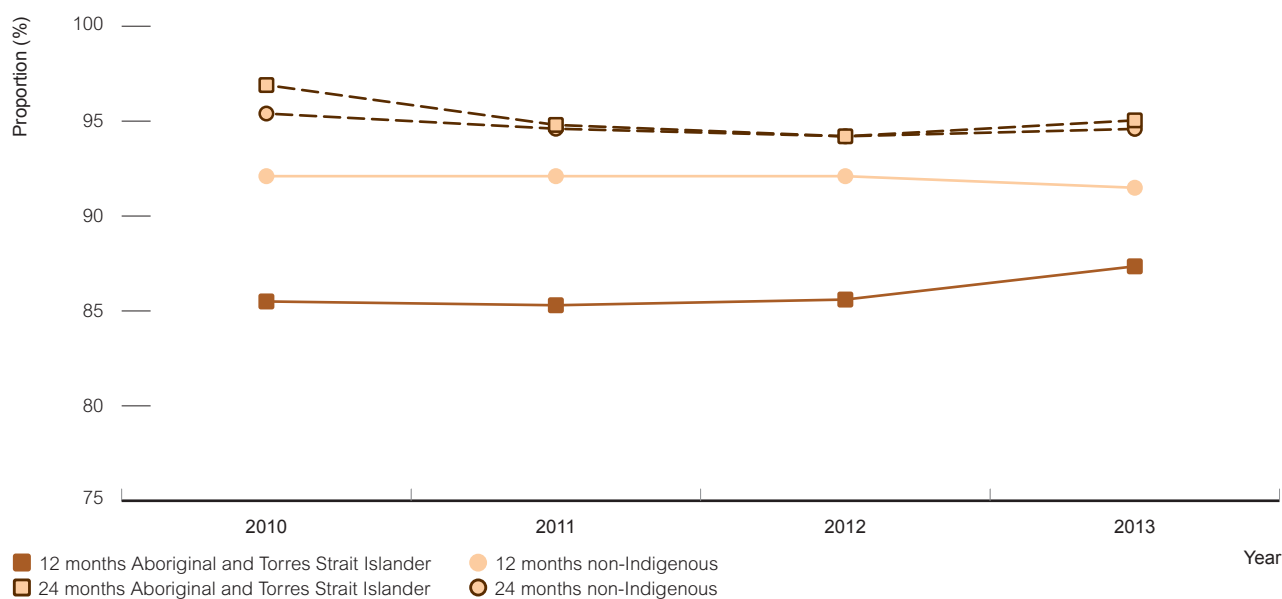
Please see HIV and hepatitis C sections for further information about risk behaviours.

Understanding patterns of hepatitis B infection in Australia, is facilitated by knowledge of the history of hepatitis B immunisation program which is described briefly below.

In 1985, the Northern Territory (NT) introduced hepatitis B screening to all pregnant women and vaccination to infants born to mothers living with chronic infection. In 1990, universal infant vaccination was implemented, and in 1998 a catch-up program targeting 6 – 16 year olds was introduced. In 2000, hepatitis B vaccination of all infants commenced in other states and territories of Australia and the introduction of a universal adolescent (teenagers aged 12 – 15 years) school based hepatitis B vaccination catch-up program commenced in 1998.

Over the period 2010 – 13, hepatitis B vaccination coverage rates for children were high overall, at around 95%. For Aboriginal and Torres Strait Islander children coverage was lower than for non-Indigenous children for the 12 months age group, but there was little or no difference at 24 months of age (Figure 73). The lower rates at 12 months suggest issues around timeliness of completion of the vaccination course in Aboriginal and Torres Strait Islander children, which may lead to increased risk of disease acquisition.

Figure 73 Hepatitis B vaccination coverage estimates at 12 and 24 months, 2010 – 2013, by Aboriginal and Torres Strait Islander status



Source: National Centre for Immunisation Research and Surveillance of Vaccine Preventable Diseases

Secondary prevention

An important strategy for the control of hepatitis B is targeted testing of people at risk. Guidelines recommend hepatitis B testing of people from culturally and linguistically diverse (CALD) communities which include people from the Asia-Pacific and from sub-Saharan Africa (where prevalence in 2014 was close to 4%) and Aboriginal and Torres Strait Islander peoples. Other identified populations include patients undergoing chemotherapy or immunosuppressive therapy and the following unvaccinated people at higher risk of infections:

- Partner and other household and sexual contacts of people who have acute or chronic hepatitis B infection
- People who have ever injected drugs
- Men who have sex with men
- People with multiple sex partners
- People in custodial settings or who have ever been in custodial settings
- People with HIV or hepatitis C, or both
- Patients undergoing dialysis
- Sex workers

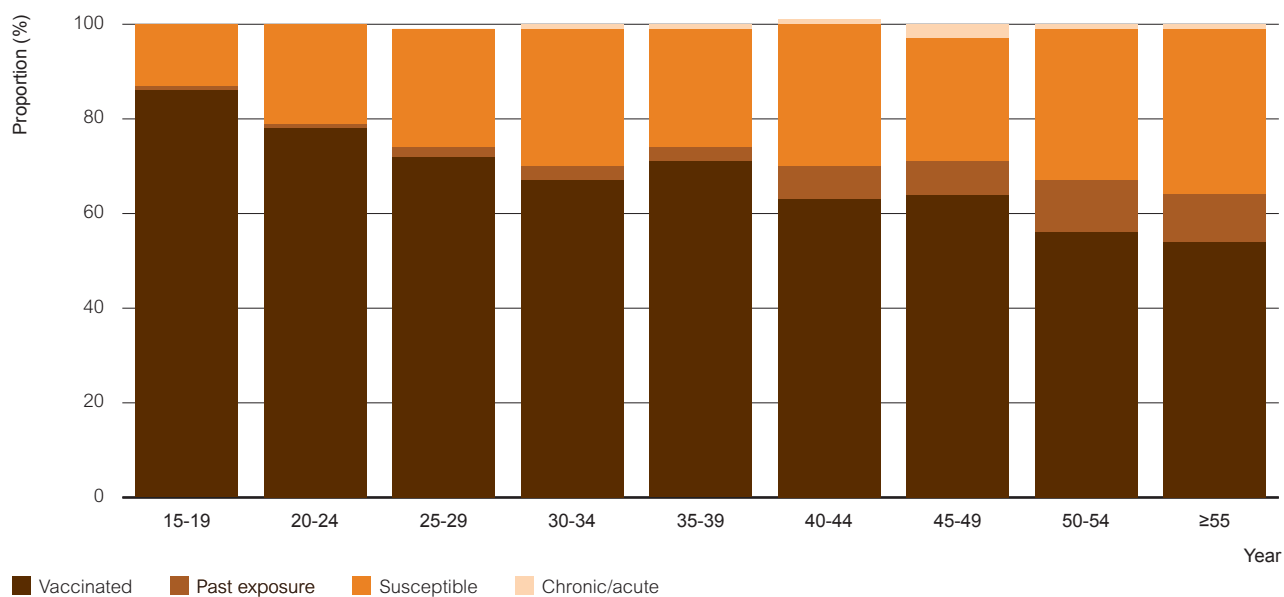
At sexual health clinics in Australia, all patients are asked about past hepatitis B vaccination on their first visit. If no prior vaccination is reported or the patient's vaccination status is uncertain, the clinic policy is to screen high risk patients for hepatitis B infection, and if susceptible, offer vaccination.

Data from 46 sexual health clinics participating in ACCESS project was available for 5 644 Australian-born people attending the clinics in 2014 for whom vaccination documentation or pathology details were available (68% were men who have sex with men, 3% were people who inject drugs, 29% were heterosexuals aged 15 – 29 years, and 3% were Aboriginal and Torres Strait Islander peoples). Overall, 72% had documentation of vaccination and 25% were susceptible and in need of vaccination. The proportion susceptible was <20% in those aged <25 years, increasing by age group to 35% among those aged 55 years and above (Figure 74).

In 2013, 44% of prison entrants tested on entry to Australian prisons by the National Prison Entrants' Bloodborne Virus and Risk Behaviour Survey (NPEBBVS) were classified as being susceptible to hepatitis B based on serology testing (Figure 75).

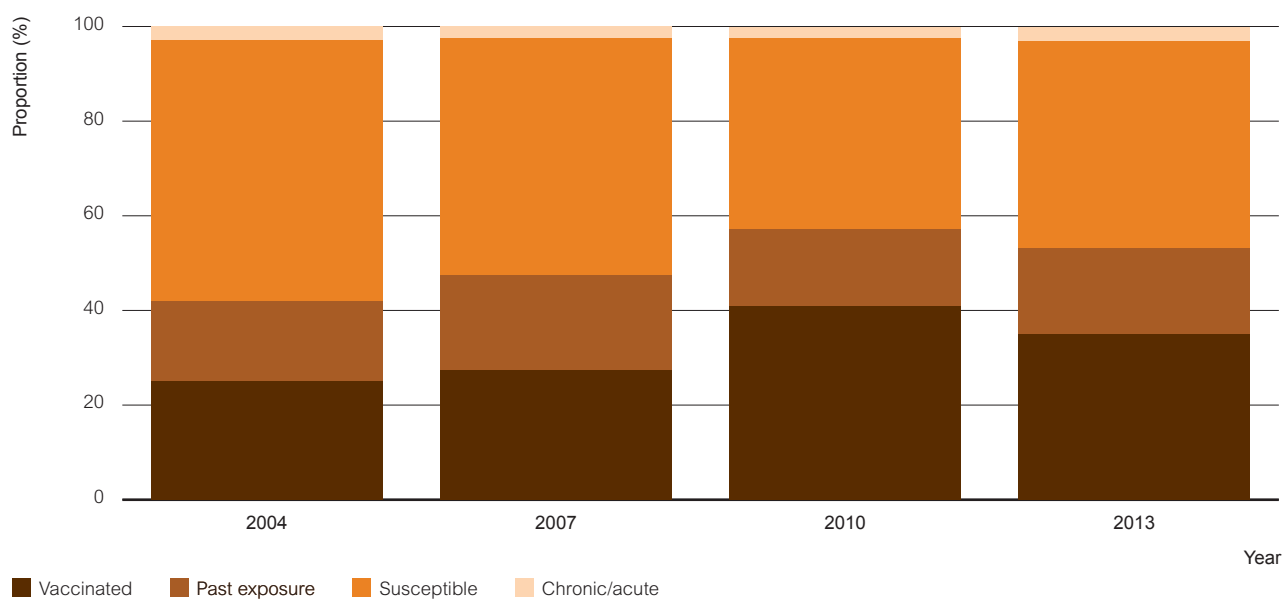


Figure 74 Hepatitis B status among people attending sexual health clinics based on vaccination documentation and serology, 2014, by age group



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

Figure 75 Hepatitis B susceptibility among a sample of incoming Australian prisoners, 2004, 2007, 2010 and 2013



Source: National Prison Entrants' Bloodborne Virus Survey, 2004, 2007, 2010, and 2013

Further details about the classification scheme used are detailed in the Methodological notes. It is also important to note that a negative HBsAb result, as defined by a titre of <10 mIU/mL, does not necessarily indicate the absence of vaccination, as titres decline to below this level in up to 50% of people receiving a full course of vaccination after less than a decade. Protection appears to be maintained for at least two decades after vaccination in healthy individuals who achieved an initial response to vaccine. Therefore, a proportion of the study sample defined serologically as “susceptible” may have been vaccinated.

These data demonstrate that although a highly effective vaccine is now available and has been offered universally for newborns since 2000, many of those born before universal vaccination remain susceptible, and are at risk of exposure, including young adults not reached by adolescent catch-up programs.

New hepatitis B diagnoses

This section focuses on people newly diagnosed with hepatitis B in Australia (including people with newly acquired and unspecified). There were a total of 6 635 notifications of newly diagnosed hepatitis B infection in Australia in 2014; of these, 164 (2%) were among the Aboriginal and Torres Strait Islander population, 2 247 (34%) were among the non-Indigenous population and a further 4 224 (64%) notifications for which Indigenous status was not reported (Table 15). In 2014, just over half (54%, 3 563) of newly diagnosed hepatitis B infections were in males, 73% (4 826) were in people aged 30 years and above and 85% (5 634) were in people residing in major cities.

Table 15 Characteristics of hepatitis B new diagnoses, 2005 – 2014

Characteristic	Year of diagnosis									
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Total	6 349	6 389	6 862	6 374	7 037	6 812	6 539	6 476	6 687	6 635
Sex										
Female	2 692	2 838	3 040	2 883	3 117	3 167	2 923	2 904	2 884	3 041
Male	3 620	3 509	3 768	3 448	3 854	3 578	3 556	3 537	3 770	3 563
Missing	37	42	54	43	66	67	60	35	33	31
Age group (years)										
0 – 14	170	181	157	162	135	123	88	93	89	76
15 – 19	349	298	329	287	314	277	222	209	255	168
20 – 29	1 797	1 844	1 920	1 758	1 908	1 852	1 818	1 728	1 654	1 558
30 – 39	1 720	1 704	1 889	1 780	1 951	1 910	1 802	1 860	1 936	2 013
40+	2 307	2 358	2 559	2 377	2 719	2 642	2 605	2 584	2 753	2 816
Missing	6	4	8	10	10	8	4	2	0	4
Aboriginal and Torres Strait Islander status										
Aboriginal and Torres Strait Islander	353	384	336	302	241	252	233	198	197	164
Non-Indigenous	2 342	2 751	2 948	2 545	2 663	2 253	2 108	2 309	2 310	2 247
Not reported	3 654	3 254	3 578	3 527	4 133	4 307	4 198	3 969	4 180	4 224
Newly acquired¹	248	293	300	261	251	230	188	200	180	175
Area of residence										
Major Cities	5351	5312	5727	5288	5929	5633	5536	5429	5456	5634
Inner Regional	359	375	373	368	397	421	333	377	400	420
Outer Regional	307	281	369	340	307	339	338	397	508	335
Remote	85	119	96	105	99	95	81	82	86	70
Very Remote	127	181	138	121	102	96	99	85	94	64
Missing	120	121	159	152	203	228	152	106	143	112
State/Territory³										
Australian Capital Territory	91	77	68	58	107	97	95	107	111	97
New South Wales	2639	2451	2538	2381	2711	2562	2508	2324	2489	2527
Northern Territory	206	245	244	200	154	162	154	200	326	153
Queensland	952	986	1039	875	1055	1107	885	863	938	1039
South Australia	274	262	327	282	305	284	310	345	294	326
Tasmania	52	53	42	67	85	55	51	71	59	59
Victoria	1737	1690	1945	1871	1973	1937	1969	1970	1847	1800
Western Australia	398	625	659	640	647	608	567	596	623	634

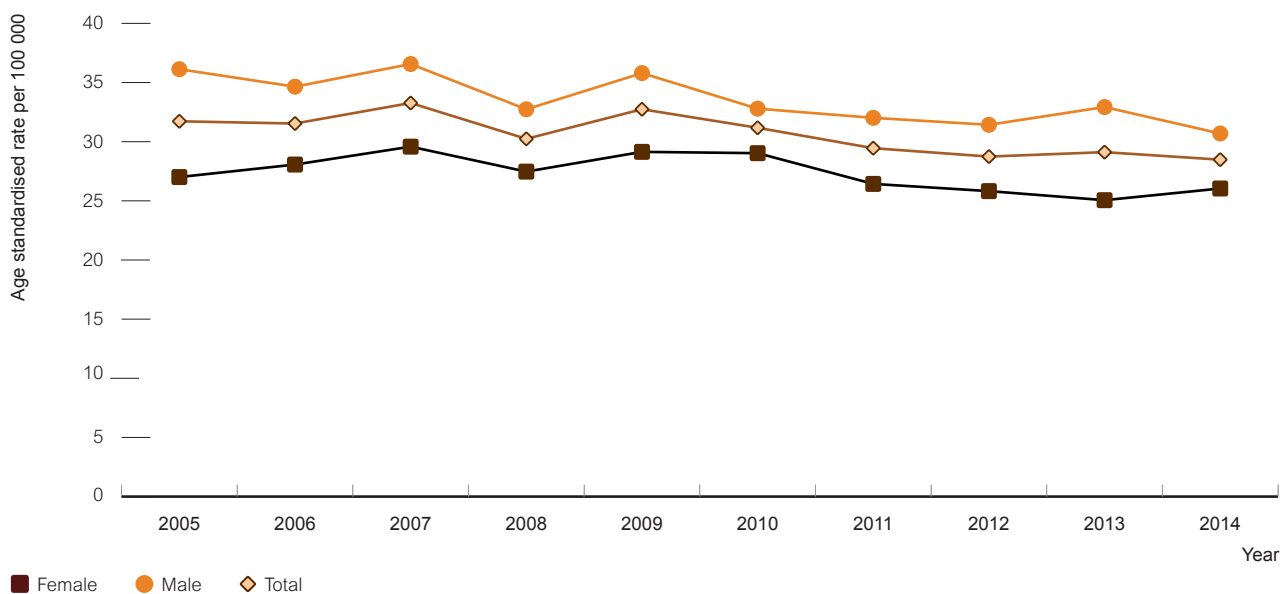


1 Newly acquired hepatitis B is defined as newly diagnosed hepatitis B infection with evidence of acquisition in the 24 months prior to diagnosis (laboratory or clinical evidence). Enhanced surveillance procedures related to hepatitis B vary by state/territory. The total number of cases reported here is likely to be an under-estimation of the true number of newly acquired infections.

Source: Australian National Notifiable Disease Surveillance System

The population rate of diagnosis of hepatitis B infection in Australia has remained steady in the past ten years, with an overall rate of 32 per 100 000 in 2005 and 28 per 100 000 in 2014 (Figure 76).

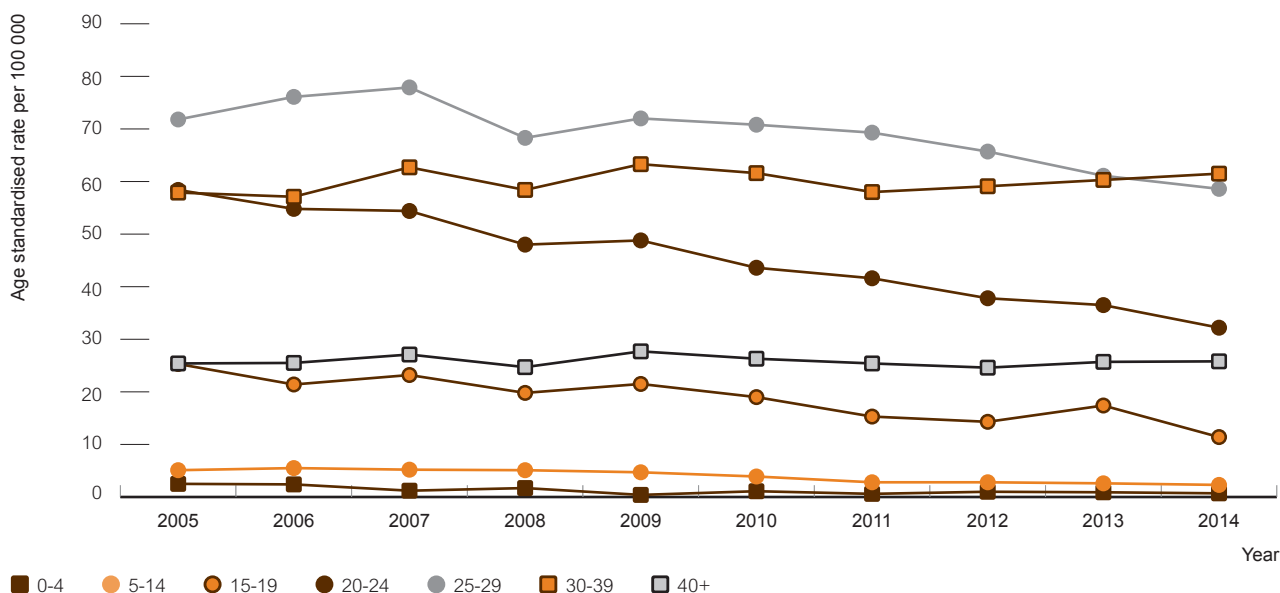
Figure 76 Hepatitis B notification rate per 100 000, 2005 – 2014, by year and sex



Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058; 3100DO003_201212

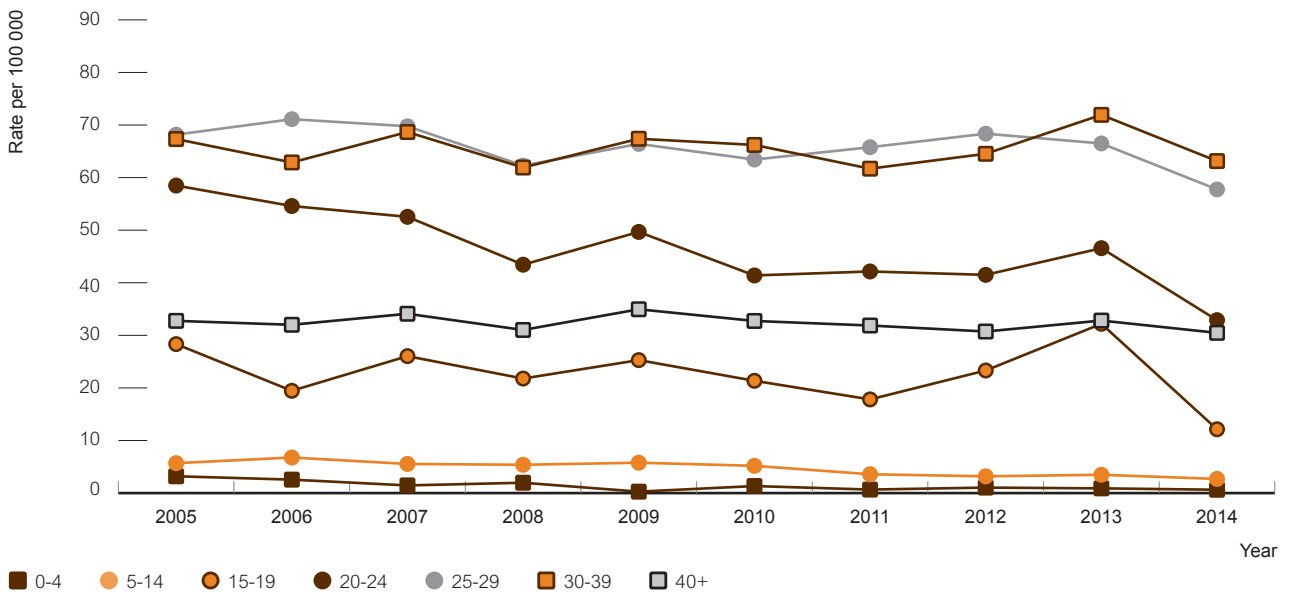
The rate has declined in younger groups aged 25 – 29 years (from 71.8 per 100 000 in 2005 to 58.6 per 100 000 in 2014); 20 – 24 years (58.4 in 2005 to 32.2 in 2014); and 15 – 19 years (25.3 in 2005 to 11.4 in 2014) (Figure 77). Declines in these age groups were seen in both males and females (Figures 78 – 79).

Figure 77 Hepatitis B notification rate per 100 000, 2005 – 2014, by year and age group



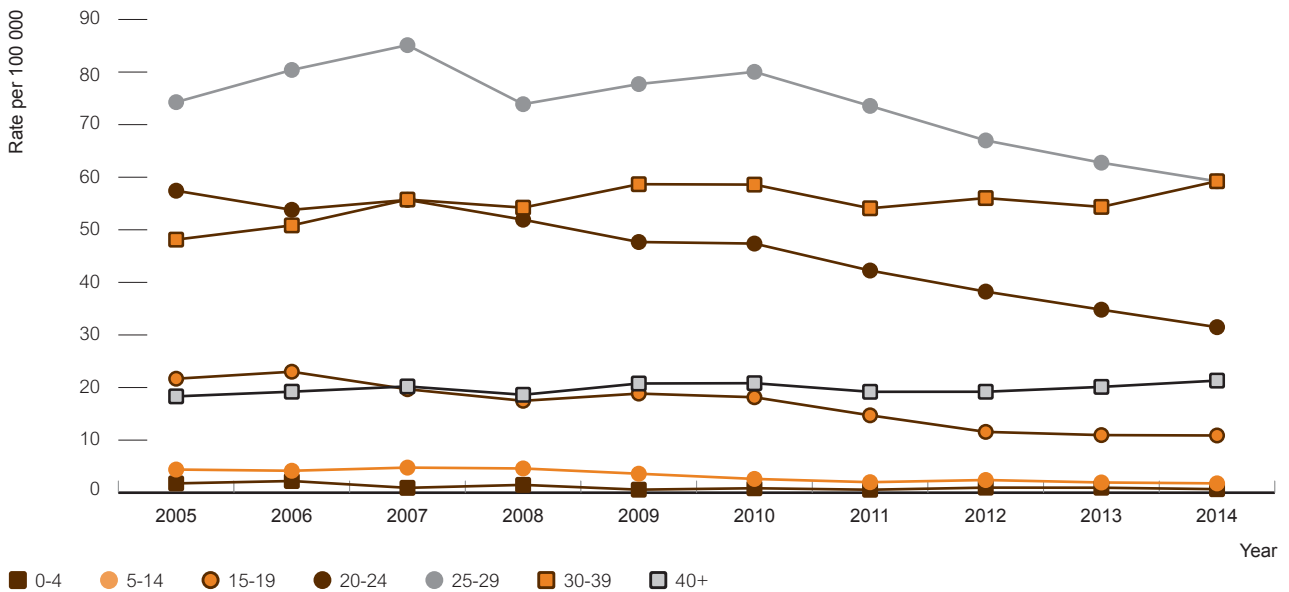
Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058

Figure 78 Hepatitis B notification rate per 100 000, 2005 – 2014, by age group, males



Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058

Figure 79 Hepatitis B notification rate per 100 000, 2005 – 2014, by age group, females

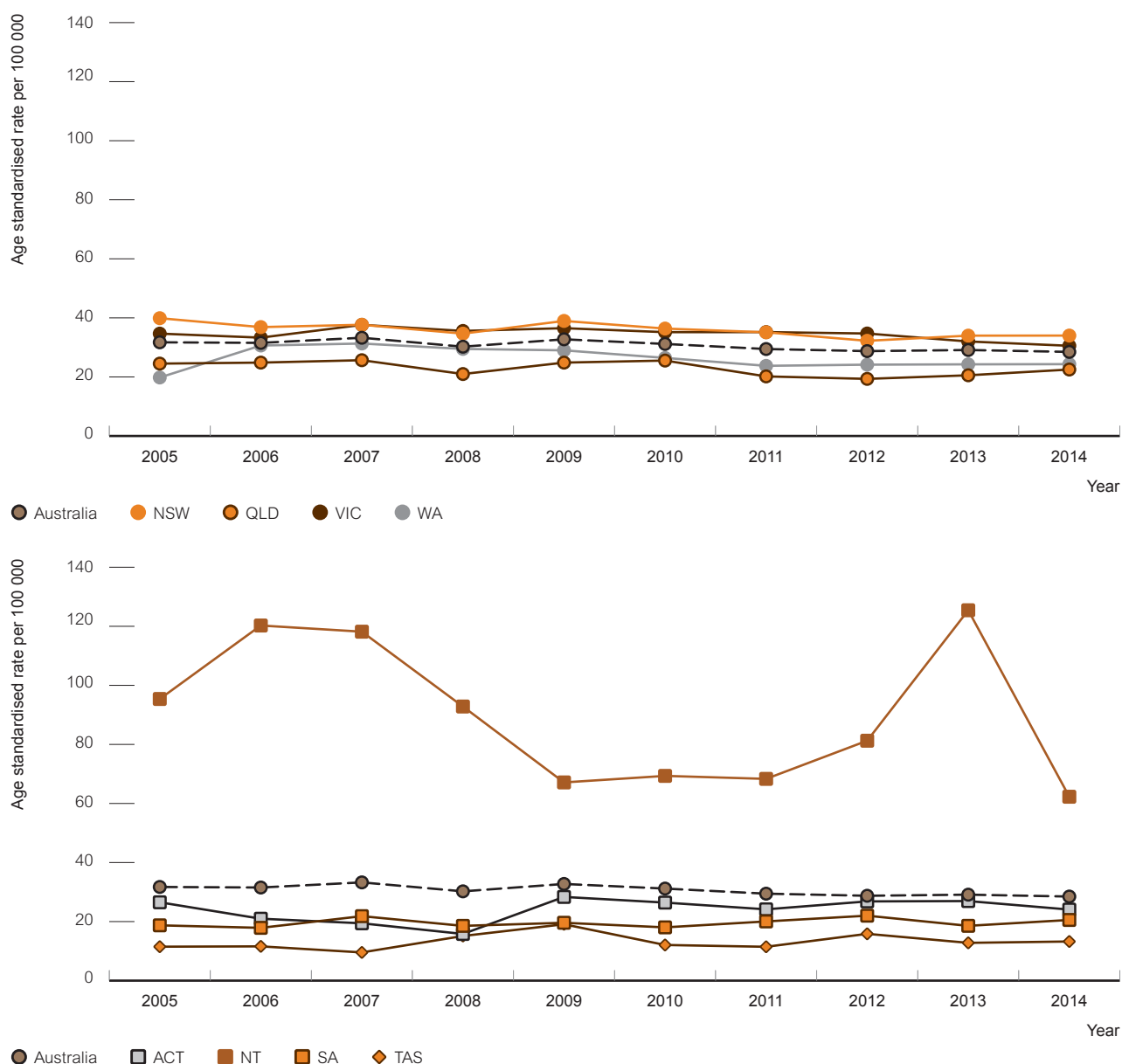


Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058

The population rate of newly diagnosed hepatitis B infection in Australia is highest in the Northern Territory (62 per 100 000 in 2014). Over the past ten years, the rate of hepatitis B diagnosis has fluctuated in most jurisdictions, with a small decline observed in New South Wales (40 in 2005 to 34 in 2014) and Victoria in recent years (35 in 2012 to 31 in 2014) (Figure 80, Table 14).



Figure 80 Hepatitis B notification rate per 100 000, 2005 – 2014, by year and State/Territory



Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058; 3100DO003_201212

Table 16 Age standardised rates of hepatitis B notification per 100 000, 2005 – 2014, by State/Territory

State/Territory	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Australian	32.0	31.0	31.0	30.0	31.0	31.0	30.0	30.0	30.0	30.0
Capital Territory	26.5	21.0	19.4	15.8	28.3	26.4	24.1	26.8	26.9	24.1
New South Wales	39.9	36.9	37.7	34.7	39.0	36.4	35.1	32.2	34.0	34.0
Northern Territory	95.4	120.3	118.2	92.8	67.1	69.3	68.3	81.3	125.4	62.3
Queensland	24.5	24.9	25.7	21.0	24.9	25.5	20.2	19.3	20.6	22.5
South Australia	18.7	17.9	21.8	18.5	19.6	18.0	20.0	22.0	18.6	20.5
Tasmania	11.5	11.6	9.6	15.1	19.1	12.1	11.5	15.8	12.8	13.3
Victoria	34.7	33.3	37.6	35.6	36.5	35.2	35.2	34.7	32.0	30.5
Western Australia	19.8	30.6	31.3	29.5	29.0	26.4	23.8	24.2	24.3	24.3

The rate of hepatitis B diagnosis in 2014 was highest in people residing in urban and very remote areas in 2014. There was a 61% decline in the population rate of newly diagnosed hepatitis B infection in people residing in very remote areas (88 per 100 000 in 2005 to 30 per 100 000 in 2014 in males and 55 to 30 in females) and remote areas (34 per 100 000 in 2005 to 21 per 100 000 in 2014 in males and 28 to 21 in females) (Figures 81 – 82).

Figure 81 Hepatitis B notification rate per 100 000, 2005 – 2014, by region of residence, males

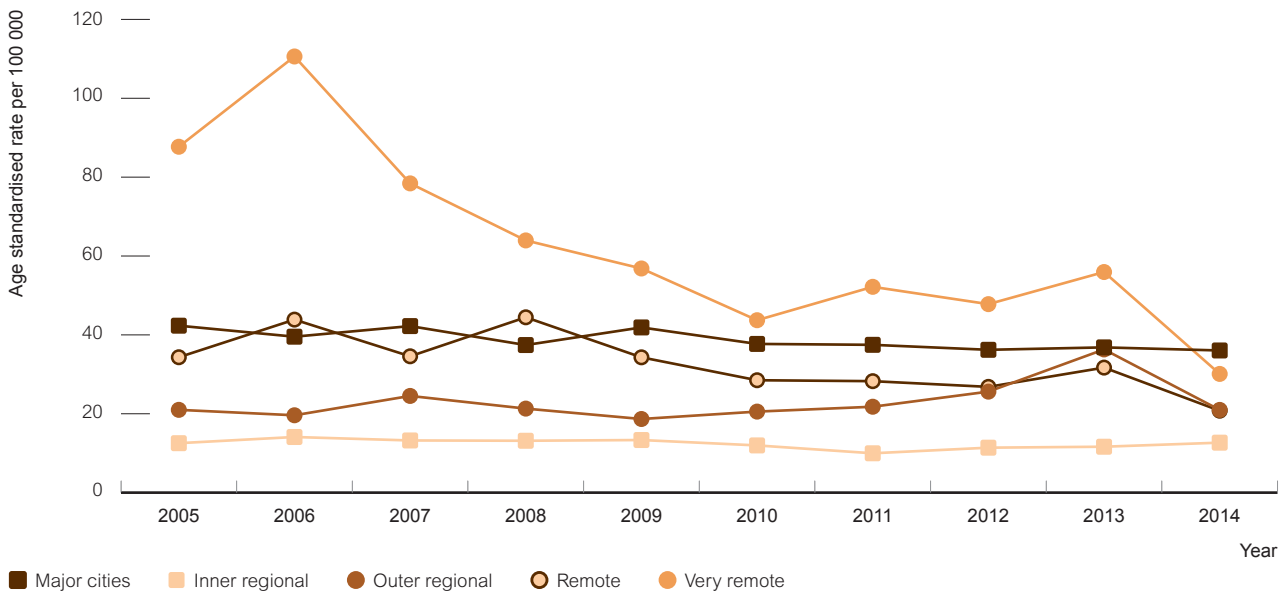
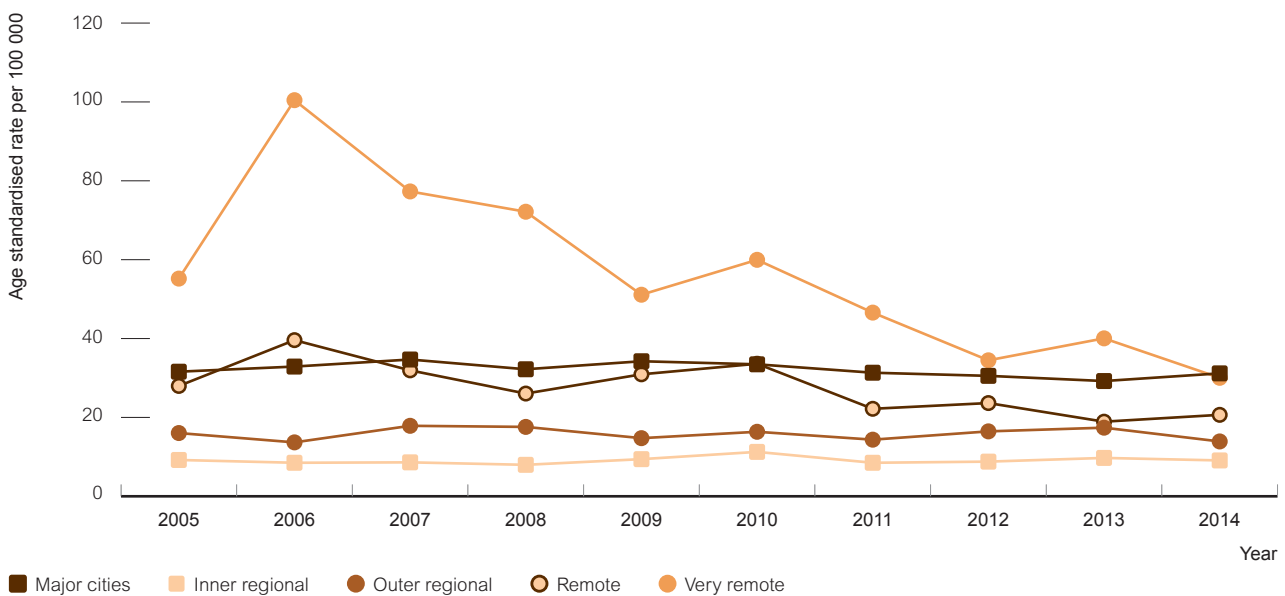


Figure 82 Hepatitis B notification rate per 100 000, 2005 – 2014, by region of residence, females

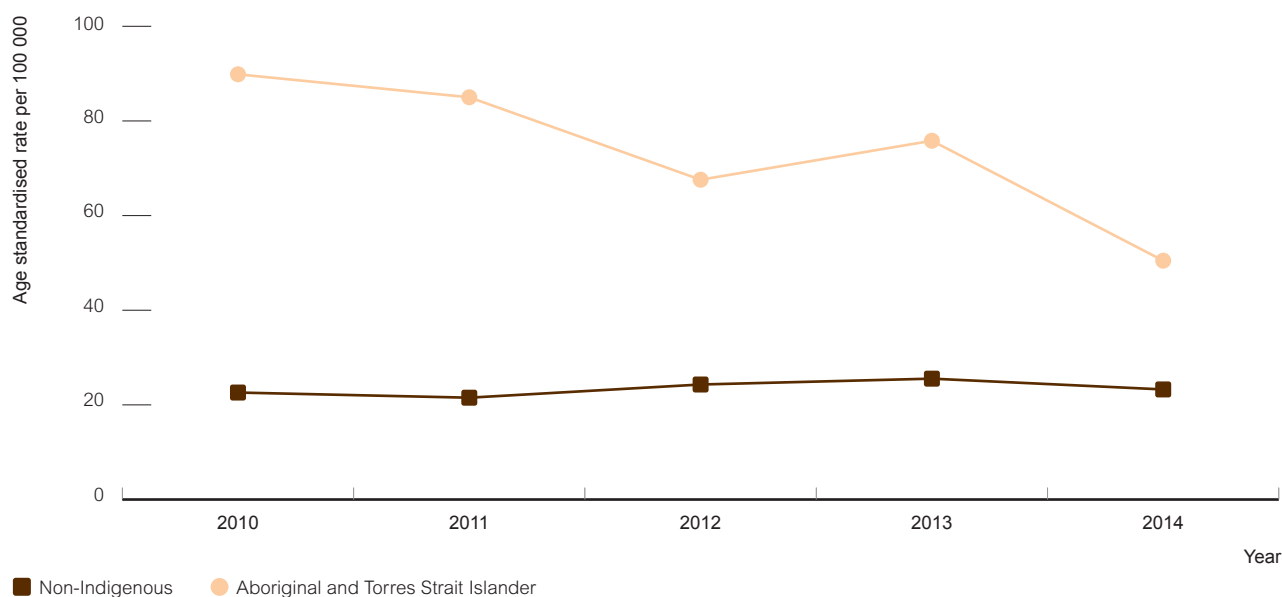


Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058; 3100DO003_201212; 1270055006_CG_POSTCODE_2012_RA_2011; ABS SuperTable 2011 Census

In 2014, the notification rate of newly diagnosed hepatitis B infection for the Aboriginal and Torres Strait Islander population was 2 times higher than the non-Indigenous population (50 per 100 000 versus 23 per 100 000) (Figure 83). In the Aboriginal and Torres Strait Islander population the rate decreased from 90 per 100 000 population in 2010 to 50 per 100 000 population in 2014 compared to the non-Indigenous population where it was stable at 23 per 100 000 in both 2010 and 2014. These data are from the Northern Territory, South Australia, Tasmania, Western Australia and Australian Capital Territory where reporting of Indigenous status is >50% complete over the past 5 years.



Figure 83 Hepatitis B notification rate per 100 000, 2010 – 2014, by State/Territory and Aboriginal and Torres Strait Islander status



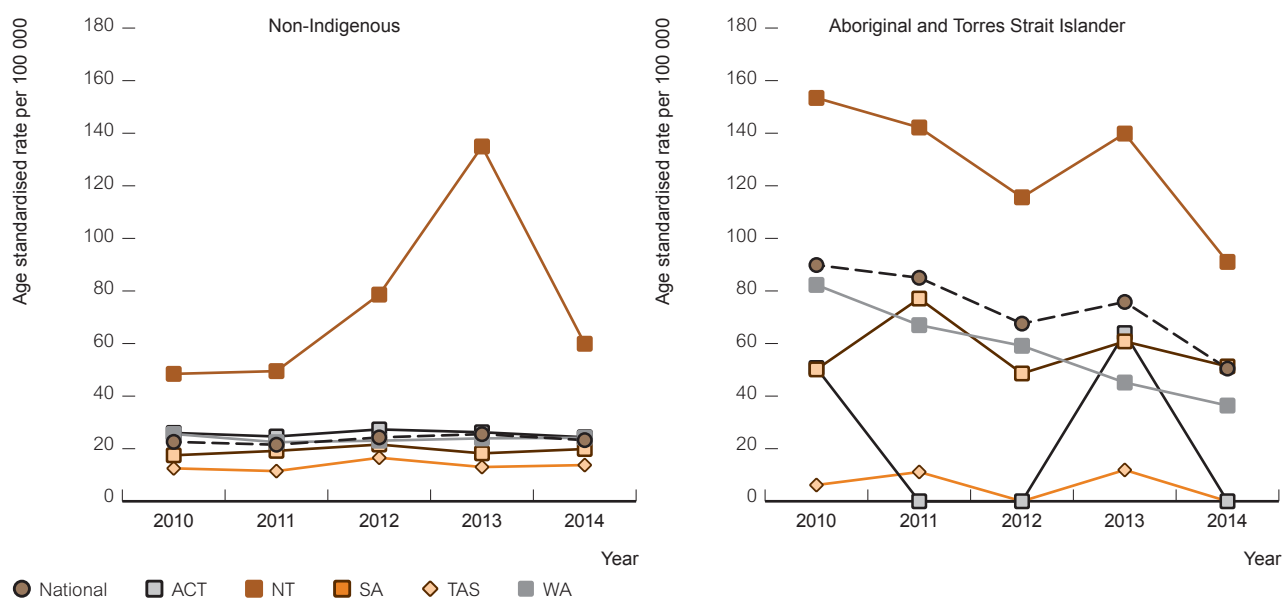
Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058; 3100DO003_201212; 32380do001_2011. Includes jurisdictions (ACT, NT, SA, Tas., WA) in which Aboriginal and Torres Strait Islander status was reported for more than 50% of diagnoses for each year.

By jurisdiction, the rate of hepatitis B diagnosis declined by 56% in Western Australia (82 per 100 000 in 2010 to 36 per 100 000 in 2014) and by 41% in the Aboriginal and Torres Strait Islander population in Northern Territory (153 per 100 000 in 2010 to 91 per 100 000 in 2014) (Figure 84).

The higher rates of newly diagnosed hepatitis B in the Aboriginal and Torres Strait Islander population than the non-Indigenous population could reflect historical transmission primarily perinatal or in early childhood, with some additional transmission through sex and blood contact in adolescence and adulthood. Aboriginal and Torres Strait Islander people also have higher rates of risk factors for adult hepatitis B acquisition, including receptive syringe sharing (refer to the *Bloodborne viral and sexually transmitted transmissible infections in Aboriginal and Torres Strait Islander peoples: Annual Surveillance Report 2015* for further detail).

The discrepancy in diagnoses rates between the Aboriginal and Torres Strait Islander population and the non-Indigenous population may be reduced in the cohort of universal neonatal vaccines (whom are now aged up to 25 years in the Northern Territory, and 15 years elsewhere in the country) and adolescents who received the catch up.

Figure 84 Hepatitis B notification rate per 100 000, 2010 – 2014, by State/Territory and Indigenous status

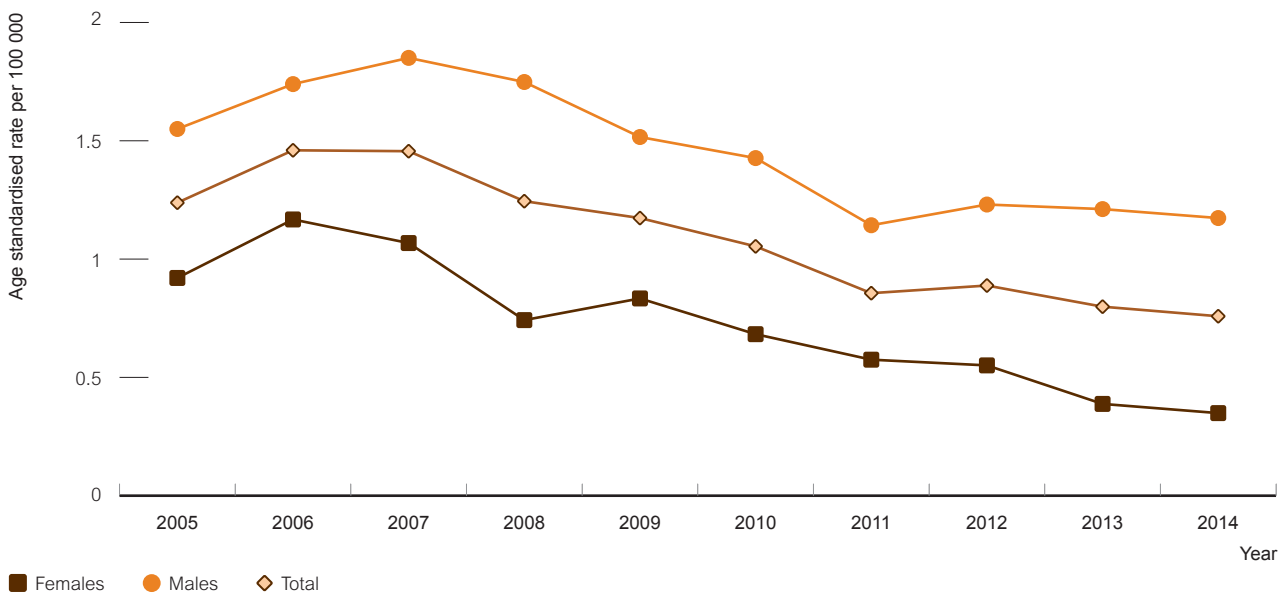


Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058; 3100DO003_201212; 32380do001_2011. Includes jurisdictions (ACT, NT, SA, Tas., WA) in which Aboriginal and Torres Strait Islander status was reported for more than 50% of diagnoses for each year.

Newly acquired hepatitis B

For some newly diagnosed cases, it is possible to determine that they were acquired in the 2 years prior to diagnosis, on the basis of a prior negative test. There has been a decline in the rate of newly acquired hepatitis B cases (acquired in the past 2 years) in the past ten years by 39% from 1.2 per 100 000 in 2005 to 0.8 per 100 000 in 2014. The rate of newly acquired hepatitis B was over 3 times greater in males than females in 2014 (1.2 vs 0.3 per 100,000) with steady decline in both sexes in the past ten years (Figure 85).

Figure 85 Newly acquired hepatitis B notification rate per 100 000, 2005 – 2014, by sex

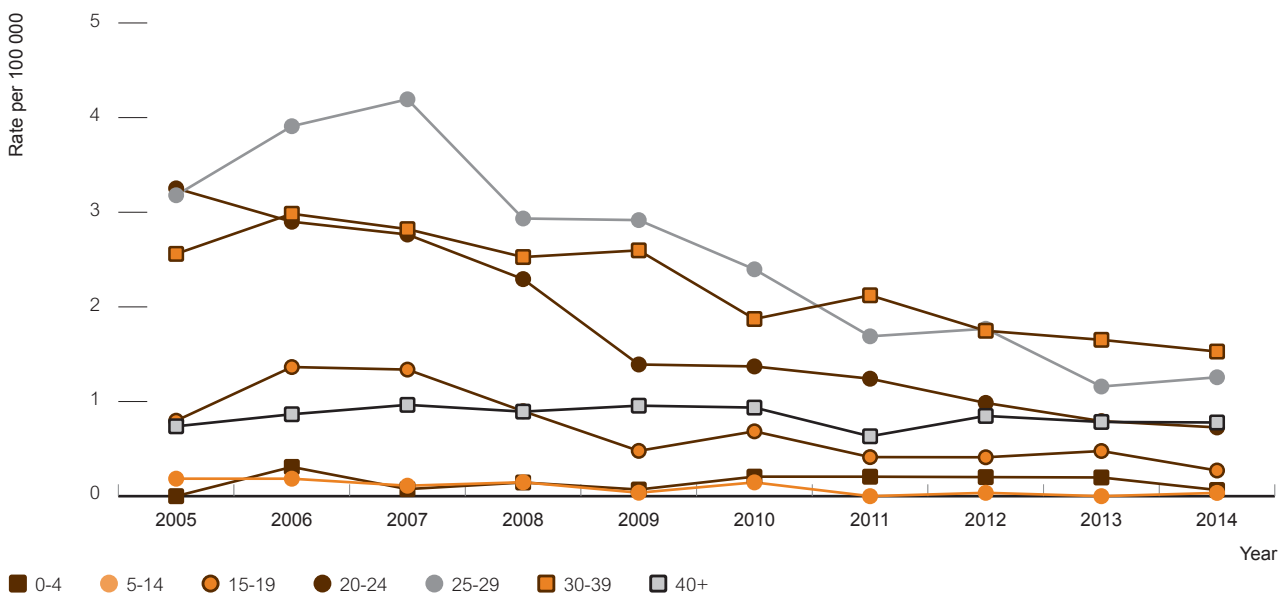


Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058; 3100DO003_201212



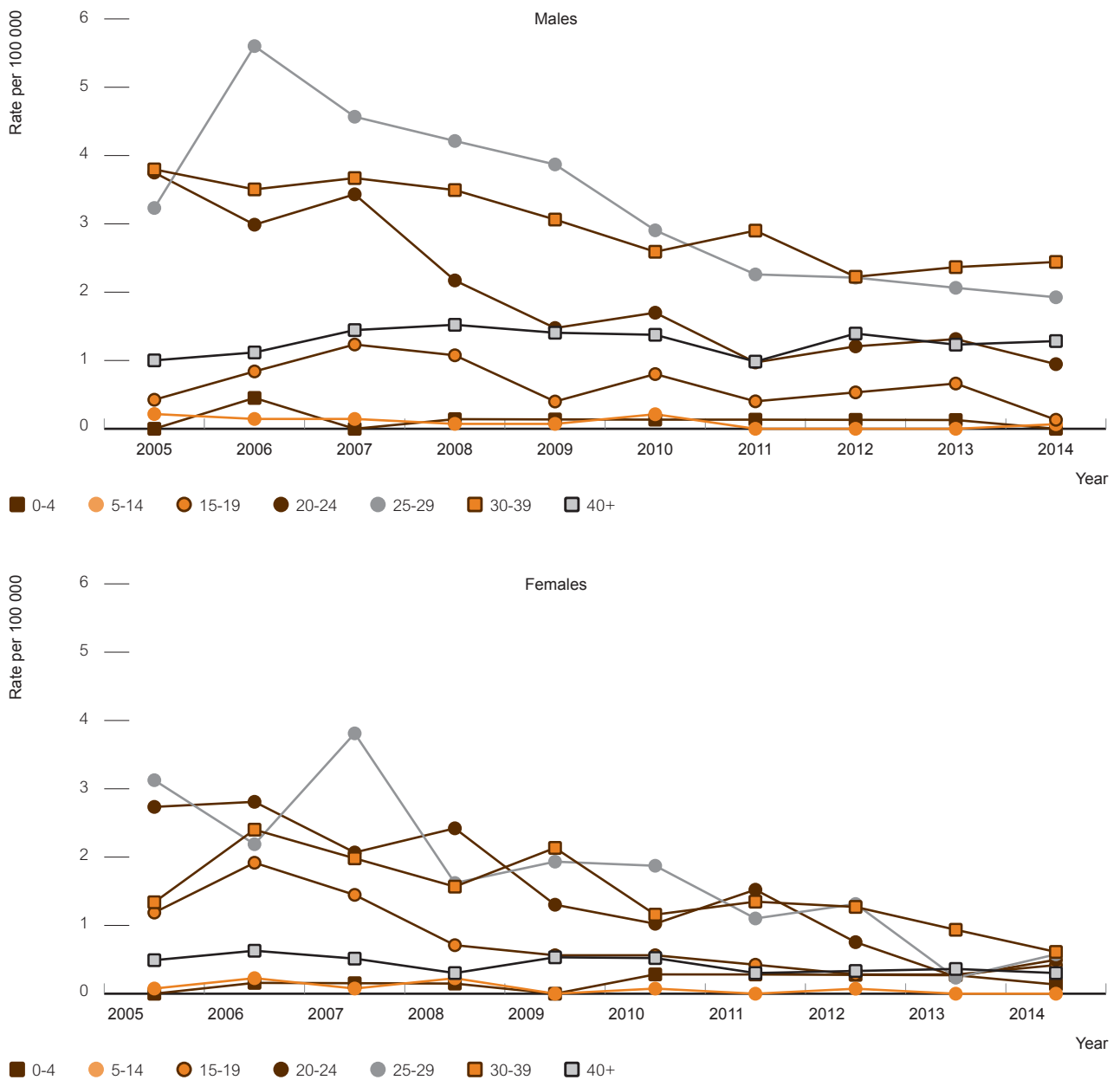
The rate of newly acquired hepatitis B declined in all age groups, except for those aged 40 years and above. The declines were greatest in 15 – 19 year olds (by 66%) and 20 – 24 year olds (78%) (Figure 86) and seen in both males and females (Figure 87).

Figure 86 Newly acquired hepatitis B notification rate per 100 000, 2005 – 2014, by age group



Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058

Figure 87 Newly acquired hepatitis B notification rate per 100 000, 2005 – 2014, by age group and sex



Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058

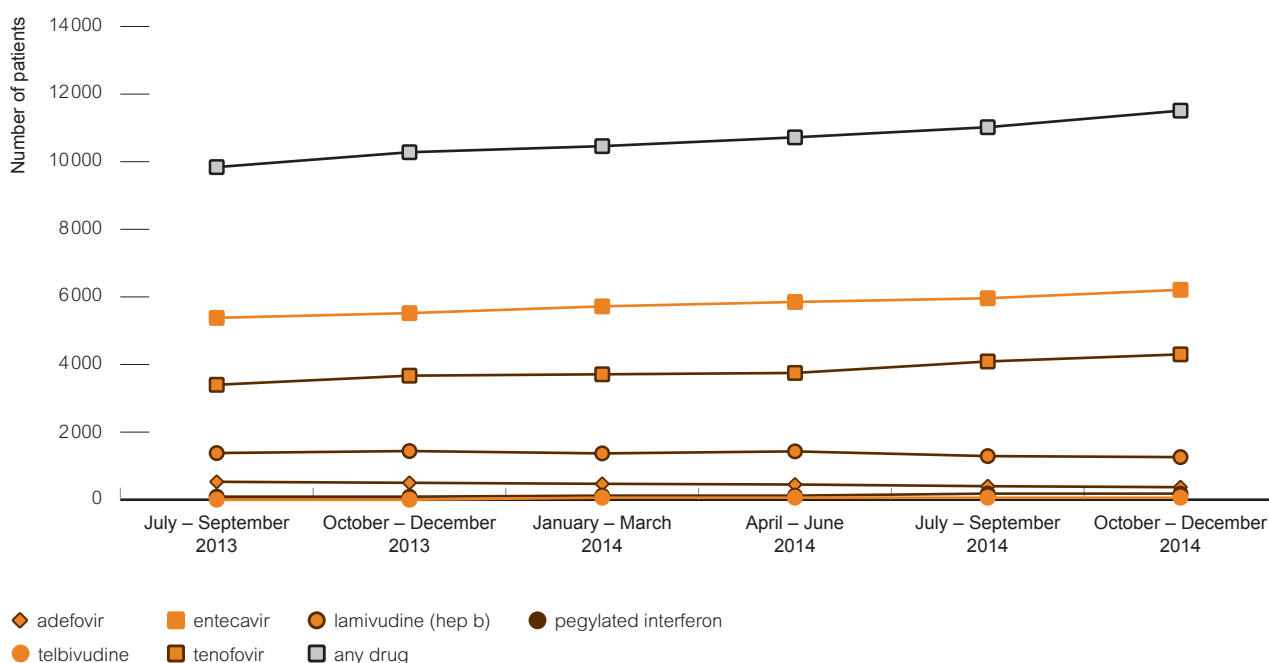
Hepatitis B care

Information from 'diagnosis and care cascade' demonstrated that nationally in 2013 an estimated 26% of people diagnosed with hepatitis B were in care or on treatment and 10% of people diagnosed with hepatitis B had received antiviral treatment.

Of the hepatitis B antiviral treatments dispensed in 2014, on average 55% of patients received entecavir treatment each quarter, and 36% received tenofovir treatment each quarter (Figure 88).

There is no comprehensive registry of advanced illness related to hepatitis B in Australia. One indicator of the extent of illness caused by hepatitis B is the number of liver transplants due to chronic infection. Of the 224 people who had a liver transplant in 2014, 18 (8%) had hepatitis B infection (Table 12).

Figure 88 Estimated number of people dispensed drugs for hepatitis B infection, by drug type



Excludes tenofovir dispensations for HIV co-infected patients

Source: Pharmaceutical Benefits Scheme 10% sample using Pharmdash

Main Findings

Sexually transmissible infections

other than HIV

Chlamydia

- Chlamydia was the most frequently reported notifiable condition in Australia at 86 136 diagnoses in 2014; with the majority (78%) of diagnoses among 15 – 29 year olds.
- The rate of chlamydia diagnosis has increased steadily between 2005 and 2011 (from 202 per 100 000 to 363 per 100 000) but since 2011 has remained stable in both males and females.
- Among 15 – 19 year olds there has been a decline in the rate of chlamydia diagnosis by 14% since 2011, from 1 495 per 100 000 in 2011 to 1 284 per 100 000 in 2014.
- The number of chlamydia tests recorded by Medicare increased by 91% from 618 518 in 2008 to 1 178 455 in 2014.
- The rate of diagnosis of chlamydia in the Aboriginal and Torres Strait Islander population was over 3 times that in the non-Indigenous population in 2014.
- By the end of 2014 there were an estimated 256 230 new chlamydia cases in 15 – 29 year olds, an estimated 26% were diagnosed (17% of males, 40% of females), 99% were treated, an estimated 24% (range 20% to 30%) of those diagnosed were re-tested in 1-4 months and of those re-tested an estimated 92% (range 83 to 100%) remained uninfected.

Interpretation:

After a decade of steady increases in both testing and diagnoses of chlamydia, there has been a levelling off in the number of diagnoses, and even a small decline in the youngest age group. However the vast majority of infections remain undiagnosed and hence untreated, emphasising the need for testing to be routinely offered to sexually active adolescents, young adults and other populations at risk.

Syphilis

- The number of cases of infectious syphilis (infections of less than 2 years duration) notified in 2014 was 1 999.
- The rate of diagnosis of infectious syphilis among men has increased in the past ten years, from 5.1 per 100 000 in 2005 to 15.9 per 100 000 in 2014 whereas the rate among women has fluctuated and remained low (1.5 per 100 000 in 2014).
- The rate of diagnosis of infectious syphilis in the Aboriginal and Torres Strait Islander population in 2014 was 4 times higher than the rate in the non-Indigenous population.
- Rate of infectious syphilis notifications among the Aboriginal and Torres Strait Islander population increased from 22 per 100 000 in 2010 to 26 per 100 000 in 2011, declining to 21 per 100 000 in 2013 then increasing to 32 per 100 000 in 2014, due to an outbreak in the northern areas of Queensland, Northern Territory and Western Australia (please see accompanying report - *Bloodborne viral and sexually transmissible infections in Aboriginal and Torres Strait Islander people*).
- Notifications of congenital syphilis declined from 16 in 2005 to 3 in 2009, and then increased to 5 in 2014.
- In Aboriginal and Torres Strait Islander people, there were roughly an equal number of infectious syphilis diagnoses among males and females in 2014, indicating predominantly heterosexual transmission, and about half (46%) resided in remote or very remote areas and 38% in outer regional.
- In contrast, infectious syphilis diagnoses in non-Indigenous people in 2014 were predominantly in men, suggesting that transmission is primarily related to sex between men, and 91% resided in urban settings.

Interpretation:

Syphilis in Australia continues to be an infection primarily of men having male to male sex in urban settings, and of heterosexual Aboriginal people in remote and outer regional areas. Efforts to increase syphilis testing and treatment in men who have sex with men need to be strengthened. The resurgence of infection in young Aboriginal people in remote communities after years of declining rates, bringing with it cases of congenital syphilis, emphasises the need for testing and treatment in this population, particularly in antenatal settings

STIs

Gonorrhoea

- There were 15 786 cases of gonorrhoea notified in 2014, representing an increased rate in both males (from 62 per 100 000 in 2010 to 99 per 100 000 in 2014), and females (from 30 in 2010 to 38 in 2014).
- The rate of gonorrhoea diagnosis continued to increase in all age groups except the 15 – 19 year age group; where it reached a peak at 166 in 2012 and then declined to 139 in 2014.
- The rate of diagnosis of gonorrhoea in the Aboriginal and Torres Strait Islander population was 18 times that in the non-Indigenous population in 2014 (859 vs 49 per 100 000).
- In Aboriginal and Torres Strait Islander people, there were roughly an equal number of gonorrhoea diagnoses among males and females in 2014, indicating predominantly heterosexual transmission, and most (77%) resided in remote or very remote areas.
- In contrast, gonorrhoea diagnoses in non-Indigenous people in 2014 were predominantly in men, suggesting that transmission is primarily related to sex between men, and most (87%) resided in urban settings.

Interpretation:

Gonorrhoea in Australia continues to be an infection primarily of men having male to male sex in urban settings, and of heterosexual Aboriginal people in remote communities. It has been detected more frequently in the past five years, but it is unclear whether transmission has increased. Over the same time frame, most pathology laboratories in Australia have adopted dual testing, whereby if a test for either chlamydia or gonorrhoea is ordered by a clinician, both tests would be automatically performed. The emphasis on testing for chlamydia in young people has therefore led to a substantial rise in the number of tests conducted for gonorrhoea, which may explain the increase in diagnoses.

The 2014 chlamydia diagnosis and care cascade

This report includes the number and proportion of people with new chlamydia infections who were diagnosed in Australia, received treatment, were re-tested in 1-4 months and were uninfected at re-test.

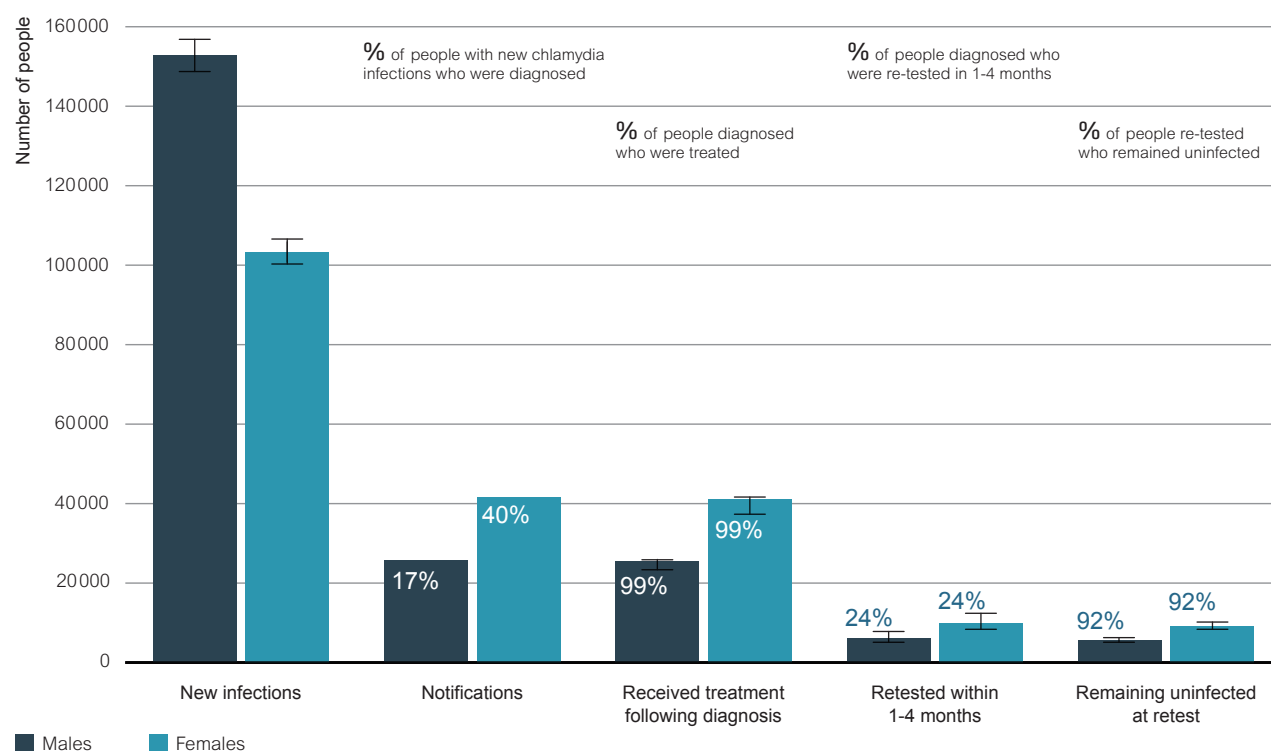
This pathway will be called the 'Chlamydia diagnosis and care cascade', consistent with HIV care cascades, and the estimates will be used to support the improvement of the delivery of services to people diagnosed with chlamydia across the entire continuum of care—from diagnosis of infection, uptake of treatment, and management. Using available data and accounting for uncertainties, the proportions of people in each stage of the cascade in Australia were estimated (Figure 89). Methods and the associated uncertainties are described in detail in the Methodological Notes. The approach was informed by recommendations from a national stakeholder reference group (see acknowledgements section). The cascade focuses on 15 – 29 year olds as guidelines recommended annually testing in this group and most chlamydia notifications occur in this age group. A separate cascade for males and females are presented.

By the end of 2014, there were an estimated 256 230 new cases of chlamydia in 15 – 29 year olds (249 000 – 263 470). These new cases include re-infections. Of these, 67 460 were diagnosed with chlamydia infection, 66 670 (60 710 – 67 460) were treated, an estimated 16 300 (13 490 – 20 230) of those diagnosed were re-tested in 1-4 months and of those re-tested an estimated 15 030 (13 520 – 16 300) remained uninfected.

This corresponds to an estimated 26% of people with new chlamydia infections who were diagnosed, 99% were treated, an estimated 24% of those diagnosed were re-tested in 1-4 months, and of those re-tested an estimated 92% remained uninfected.

The cascade showed there were a higher number of new infections in males than females aged 15 – 29 years in 2014 (152 860 vs 103 370) reflecting infections from both heterosexual males and men who have sex with men, and there are higher rates of re-infections in men who have sex with men¹¹. However a lower proportion of males were estimated to be diagnosed than females (17% vs 40%). A similar proportion of males and females were treated and re-tested. In this cascade the greatest gap in the cascade was therefore at the diagnosis step, highlighting the need to increase the coverage of regular testing in Australia in young people. Also of those re-tested, 92% remained uninfected (or conversely 8% had a repeat positive test), highlighting the importance of partner notification.

Figure 89 The 2014 chlamydia diagnosis and care cascade in 15 – 29 year olds



See Methodological notes for further details

	New infections (range)	Notifications	Received treatment following diagnosis (range)	Retested within 1-4 months (range)	Remaining uninfected at retest
Males	152 860 (148 680 – 157 050)	25 840	25 540 (23 260 – 25 840)	6 240 (5 170 – 7 750)	5 760 (5 180 – 6 240)
Females	103 370 (100 320 – 106 420)	41 620	41 130 (37 450 – 41 620)	10 060 (8 320 – 12 480)	9 270 (8 340 – 10 060)

Prevention

Strategies to prevent STIs include; condom use, testing and treatment and partner notification. Condom use is primary prevention (protects individual), whereas testing, treatment and partner notification are secondary prevention (prevent transmission to others).

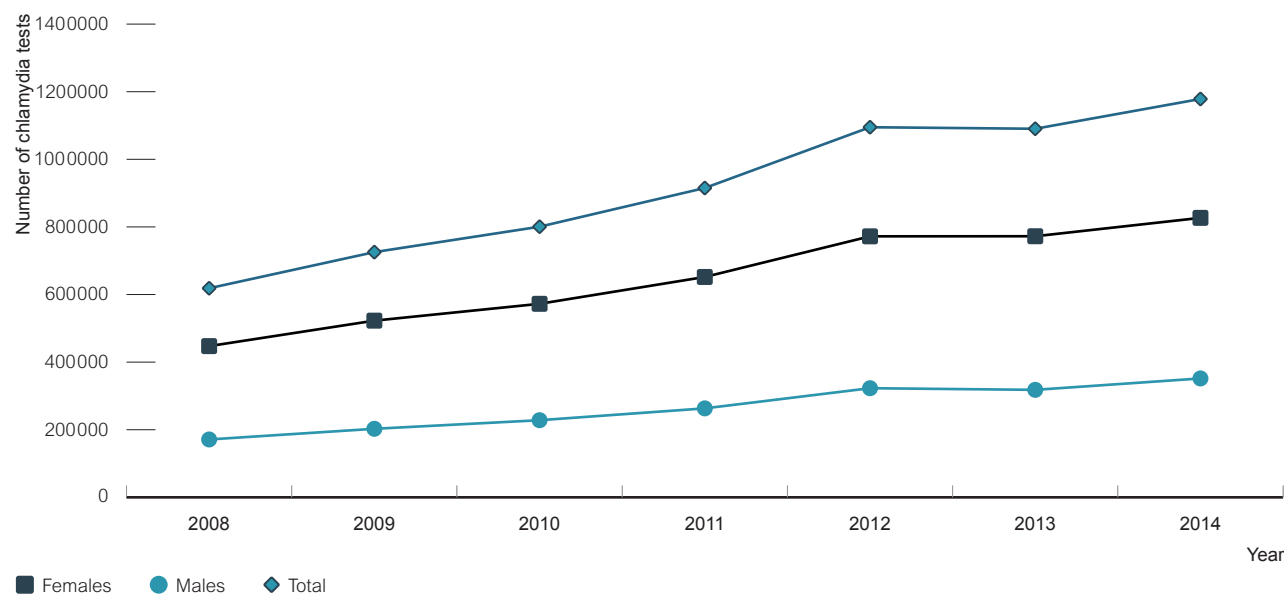
Data on condom use are included in the HIV section.

Testing

National STI testing guidelines recommend regular testing in a number of key populations. Annual comprehensive STI testing is recommended for all sexually active men who have sex with men, increasing to 3 – 6 monthly for men with higher risk behaviour. Testing for HIV, syphilis, hepatitis B and chlamydia are recommended as part of routine antenatal screening. For sexually active people aged <30 years, annual opportunistic chlamydia testing is advised, and testing for gonorrhoea in areas of high prevalence.

The number of Medicare-rebated chlamydia tests in Australia has increased by 85% in the past six years in females, from 447 355 in 2008 to 826 757 in 2014 and in males has increased by 101% from 171 163 in 2008 to 351 698 in 2014. Almost two and a half times more tests were conducted in females than males in the period 2008 – 2014 (Figure 90). Each year, most tests were conducted in 15 – 24 year olds, except for 2014 where more tests were in 25 – 34 year olds (Figure 91). In 2012 chlamydia guidelines changed, recommending annual testing in sexually active people aged <30 years. Previously the upper age limit was 25 years, and the change may be reflected in the increasing testing in 25 – 34 year olds in 2014. It is important to note that these tests capture Medicare-rebated tests, and that testing conducted in government hospital and sexual health services is generally not included.

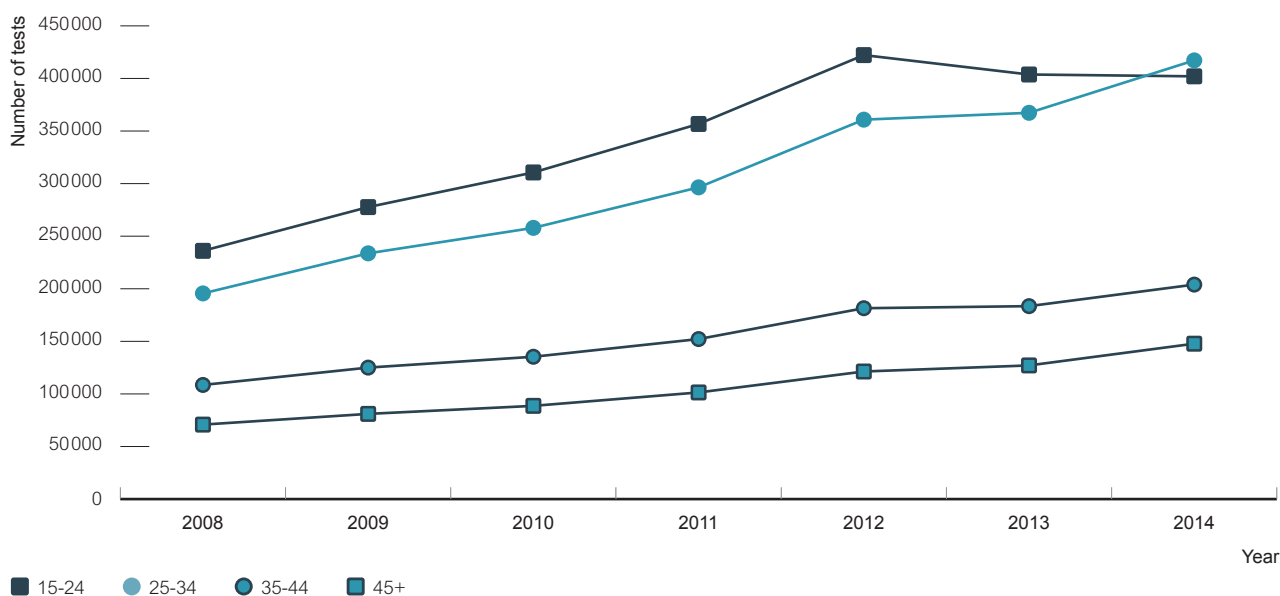
Figure 90 Number of Medicare-rebated chlamydia tests in Australia, 2008 – 2014



Source: Medicare



Figure 91 Number of Medicare-rebated chlamydia tests in Australia, 2008 – 2014, by age group



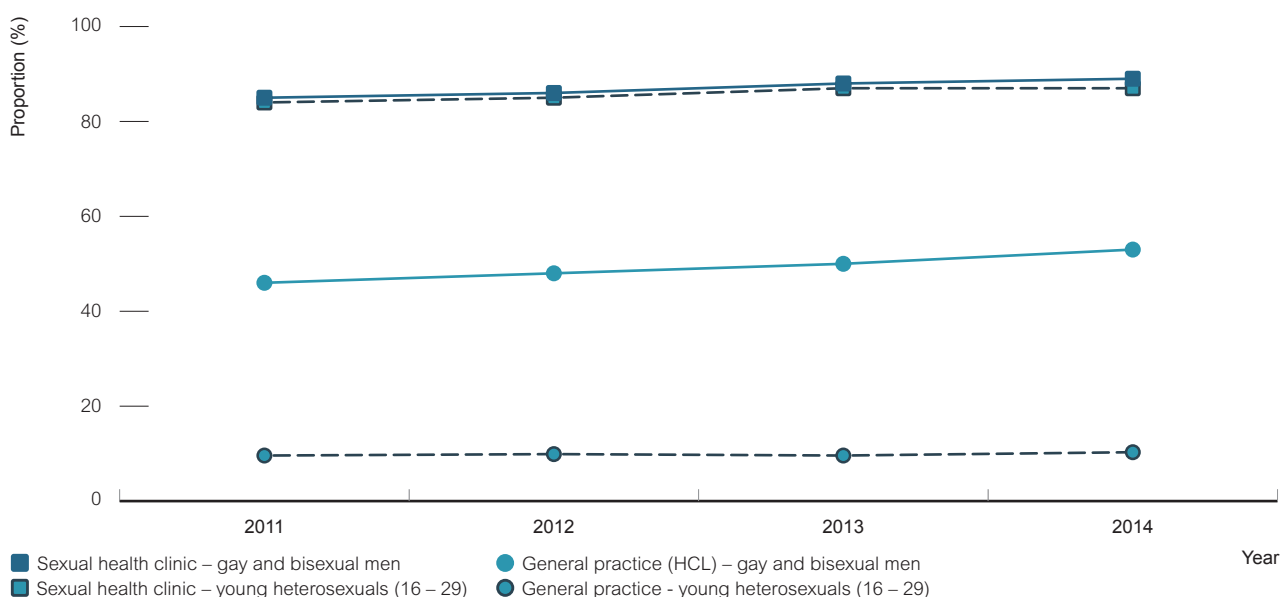
Source: Medicare

At 46 sexual health clinics participating in the ACCESS project (see Methodological notes for further detail); 92 – 94% of HIV-negative gay and bisexual men attending the clinic in a year were tested for chlamydia between 2011 and 2014, 84 – 87% of young heterosexuals aged 16 – 29 years, 78 – 80% of people who inject drugs, and 52 – 60% of gay and bisexual men with HIV infection. Among gay and bisexual men with HIV infection, the proportion tested was higher in men aged <30 years (72 – 81%) (Figures 92 – 97).

A similar pattern was seen for gonorrhoea testing, whereas for syphilis testing, a lower proportion of young heterosexuals aged 16-29 were tested in a year (43%-48%) and a higher proportion of gay and bisexual men with HIV infection (69 – 78%). Syphilis testing is often conducted concurrently with HIV management checks explaining the higher syphilis testing rates in this population (Figures 92 – 97).

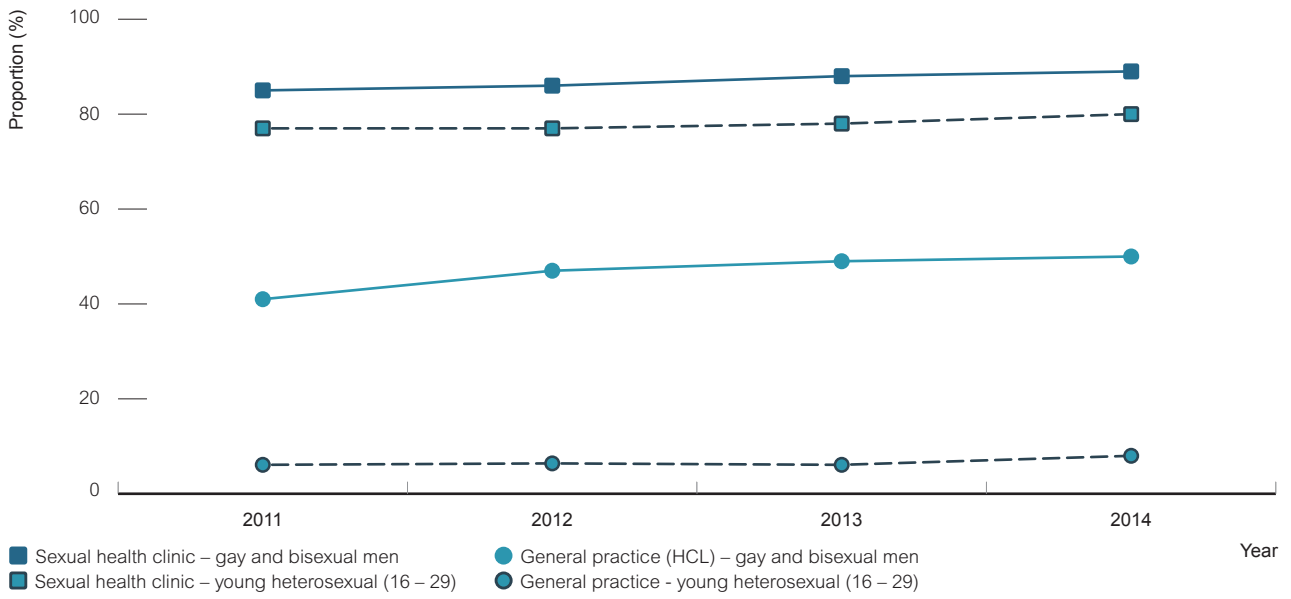
In general practice clinics in 2014, a much lower proportion, of young heterosexuals were tested for chlamydia (10%), gonorrhoea (8%), and syphilis (6%) (Figures 92 – 94).

Figure 92 Proportion of people attending sexual health clinics and general practice clinics tested for chlamydia in a year, 2011 – 2014



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

Figure 93 Proportion of people attending sexual health clinics and general practice clinics tested for gonorrhoea in a year, 2011 – 2014



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

Figure 94 Proportion of people attending sexual health clinics and general practice clinics tested for syphilis in a year, 2011 – 2014



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



Figure 95 Proportion of sexual health clinic attendees tested for chlamydia in a year, by select population, 2011 – 2014

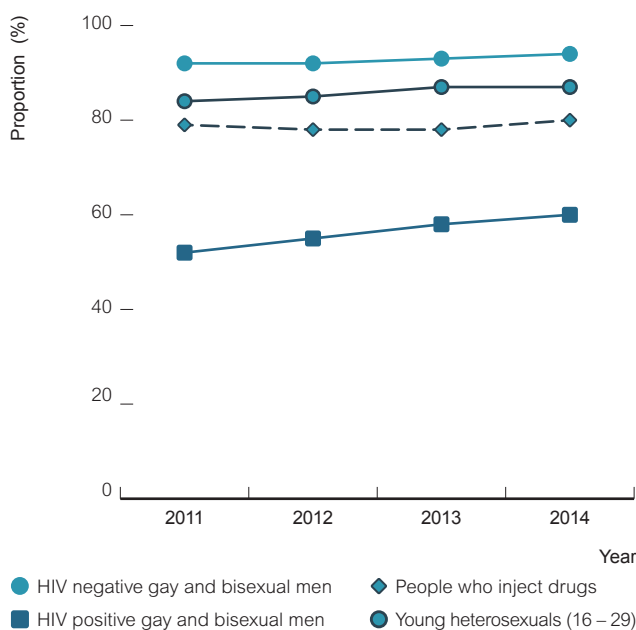


Figure 96 Proportion of sexual health clinic attendees tested for gonorrhoea in a year, by select population, 2011 – 2014

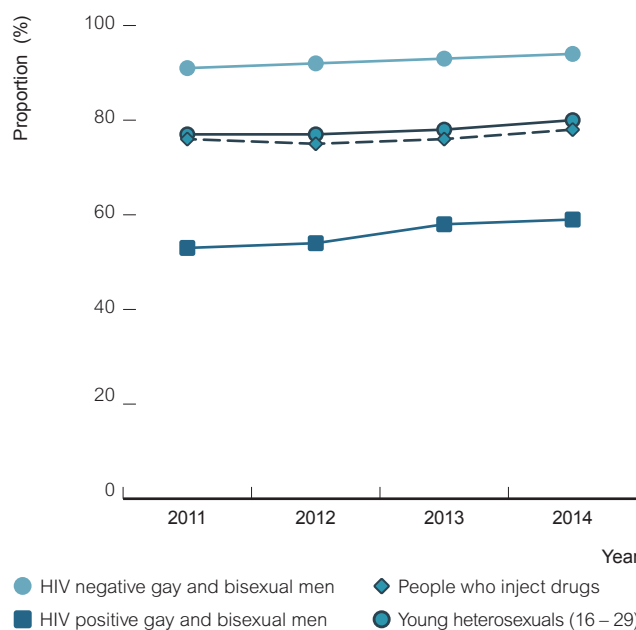
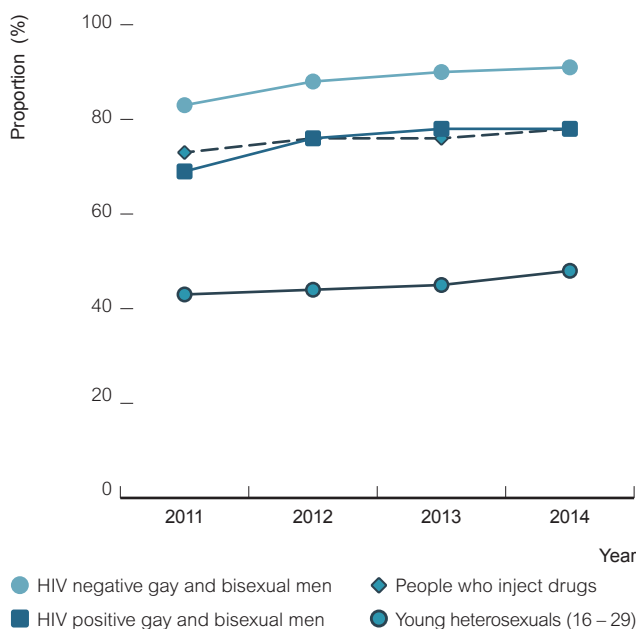


Figure 97 Proportion of sexual health clinic attendees tested for syphilis in a year, by select population, 2011 – 2014



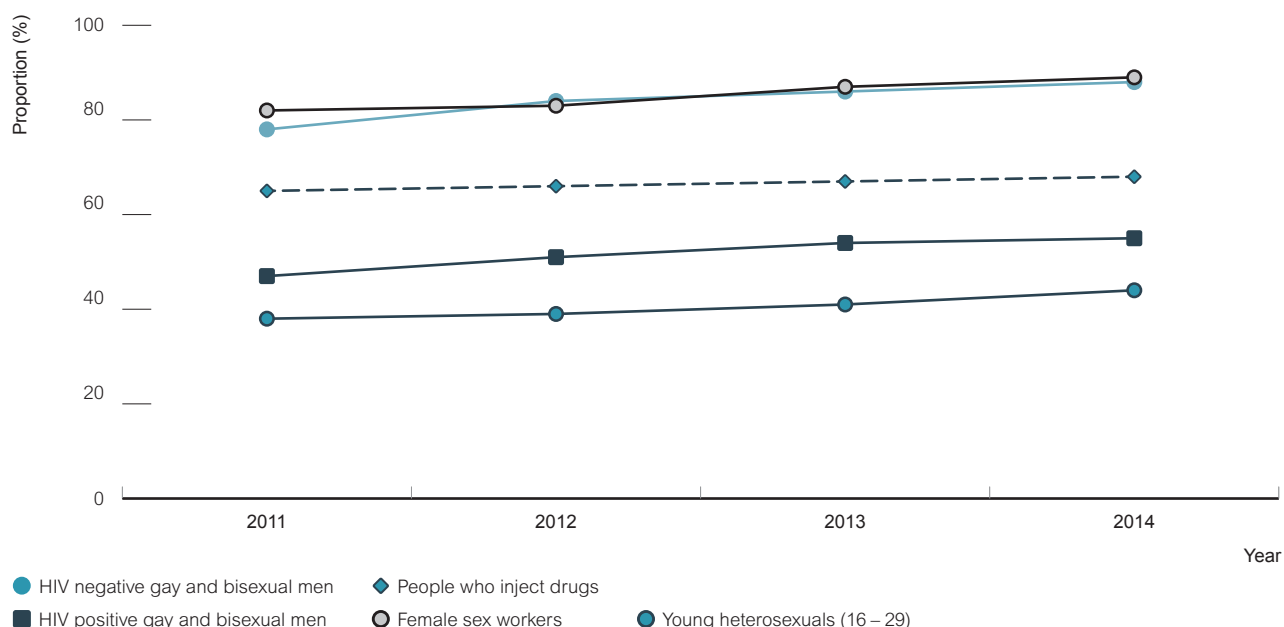
Source: The Australian Collaboration for Coordinated Enhanced Sentinel Surveillance of Sexually Transmitted Infections (STIs) and Blood Borne Viruses (BBVs)

Comprehensive STI testing

Clinical guidelines also recommended comprehensive testing for all STIs and HIV. Data from the sexual health services participating in the ACCESS project show 78 – 88% of HIV-negative gay and bisexual men had tested for four different infections (chlamydia, gonorrhoea, syphilis, and where indicated HIV) in a year but due to the lower chlamydia and gonorrhoea testing rates above, only 47 – 55% of HIV-positive gay and bisexual men had comprehensive testing (Figures 98 – 99).

At 4 general practice clinics with a high case load of gay men (in Victoria and New South Wales) participating in the ACCESS project, the proportion of gay and bisexual men tested for four different infections (chlamydia, gonorrhoea, syphilis, and where indicated HIV) was lower at 27 – 29%. Similar to general practice, the Gay Community Periodic Surveys showed about a third of gay men reported having at least four samples collected for STI testing (anal swab, throat swab, penile swab, urine, blood test) in the 12 month prior to the survey, although the proportion increased over-time from 26% in 2005 to 38% in 2014 (Figure 100). As demonstrated by Holt et al, this increase largely reflects increased collection of anal swabs.¹²

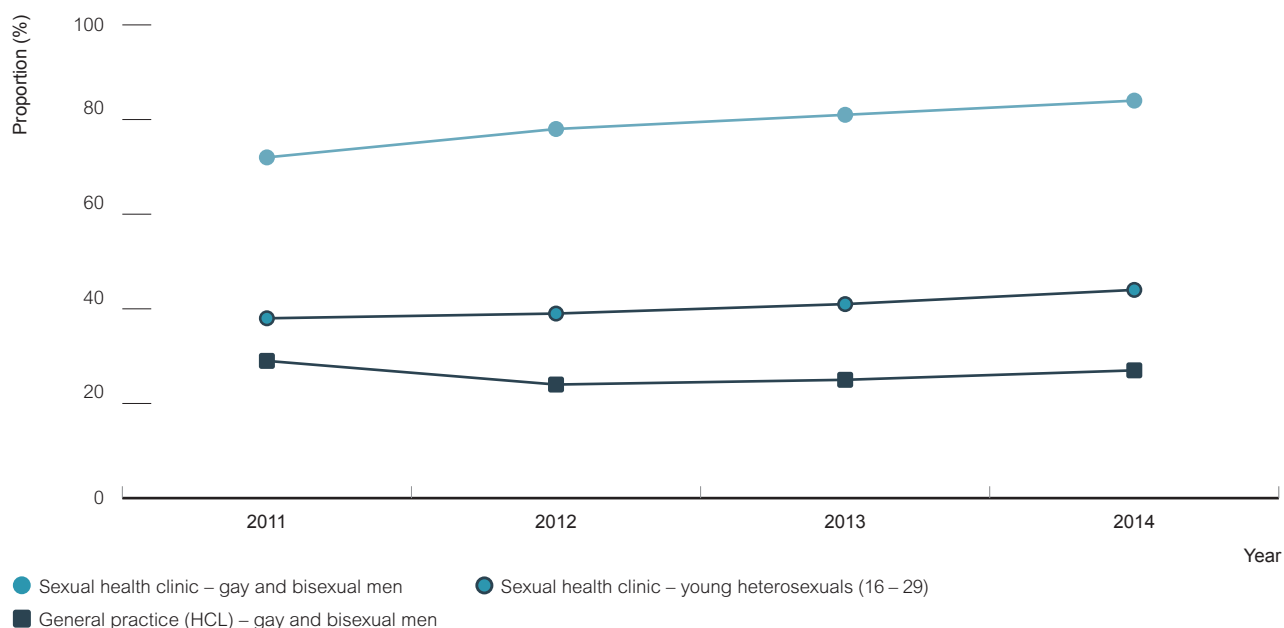
Figure 98 Testing for four different infections (chlamydia, gonorrhoea, syphilis, and where indicated HIV) in a year: sexual health clinic attendees, 2011 – 2014



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

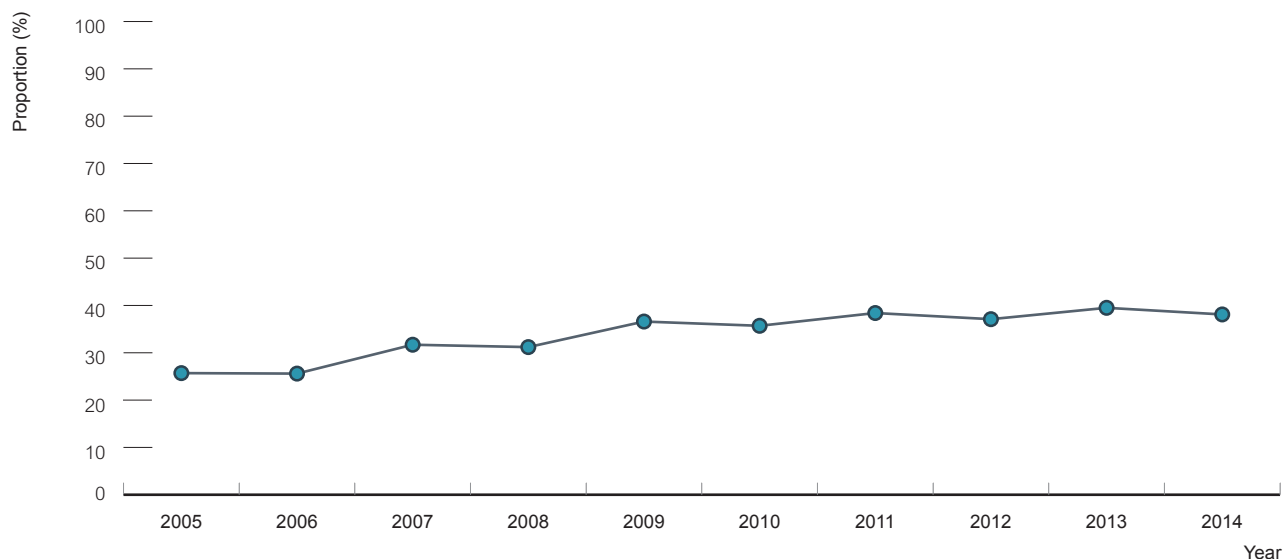


Figure 99 Testing for four different infections (chlamydia, gonorrhoea, syphilis, and where indicated HIV) in a year: sexual health clinic and general practice attendees, 2011 – 2014



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

Figure 100 Gay men who reported having at least four samples collected for STI testing (anal swab, throat swab, penile swab, urine, blood test) in the 12 month prior to the survey: 2005 – 2014

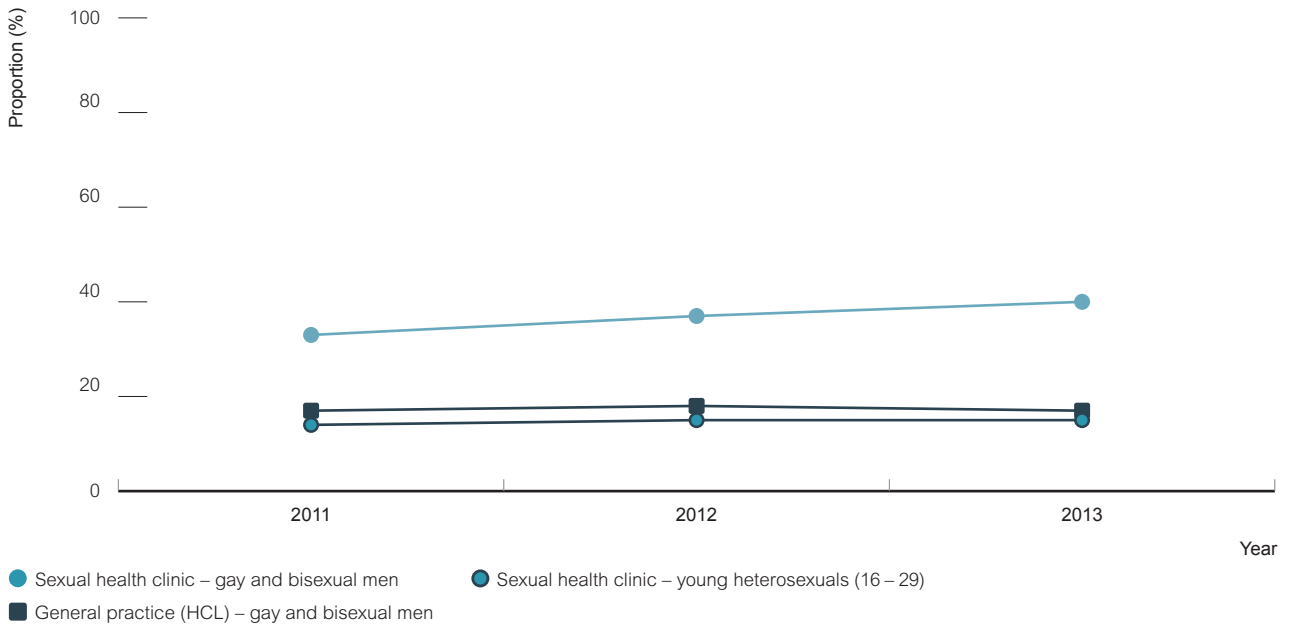


Source: Gay Community Periodic Survey

Repeat testing

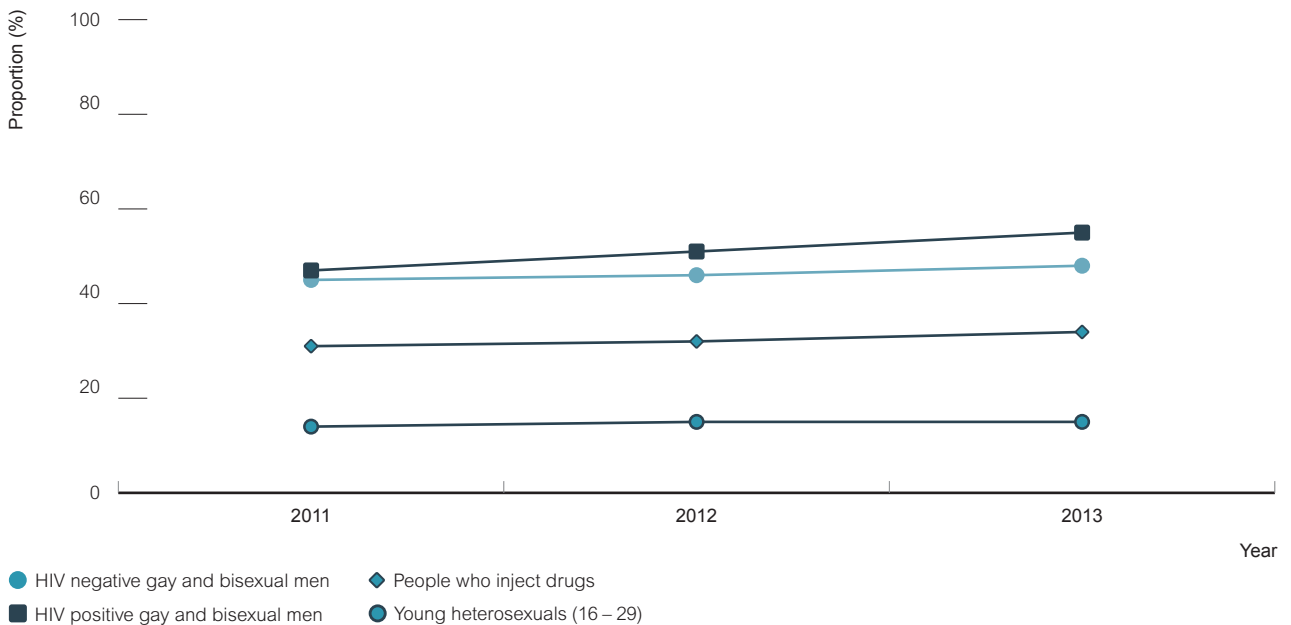
Despite guidelines recommending annual testing for HIV and STIs (every 12 months) for sexually active gay and bisexual men, ACCESS sexual health service data indicate 45 – 48% of HIV-negative gay and bisexual men and 47 – 55% of HIV-positive gay and bisexual men returned for a comprehensive screen at the same clinic in a year (Figure 101). It is possible some of these men may have tested at other clinics and the ACCESS system will be enhanced in 2016 to capture this.

Figure 101 Repeat comprehensive screen (within 13 months) of sexual health clinic and general practice attendees, by select population



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

Figure 102 Repeat comprehensive screen (within 13 months) of sexual health clinic attendees, 2011 – 2013 by select population



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



Chlamydia – new diagnoses

Chlamydia was the most frequently reported notifiable condition in Australia in 2014. There were a total of 86 136 notifications in 2014, 6 641 (8%) were among the Aboriginal and Torres Strait Islander population, 25 365 (29%) were among the non-Indigenous population and Indigenous status was not reported for 54 130 (63%) notifications (Table 17). In 2014, 57% (49 307) of new chlamydia diagnoses were in females, 78% (67 446) were in people aged 15 – 29 years and 68% (58 302) were in people residing in major cities. In 2014, the female-to-male sex ratio in the 15 – 19 year age group was 3:1 whereas it was 1:1 in the 25 – 29 year age group. Age- and sex-specific patterns of diagnosis may have been influenced by differential testing rates.

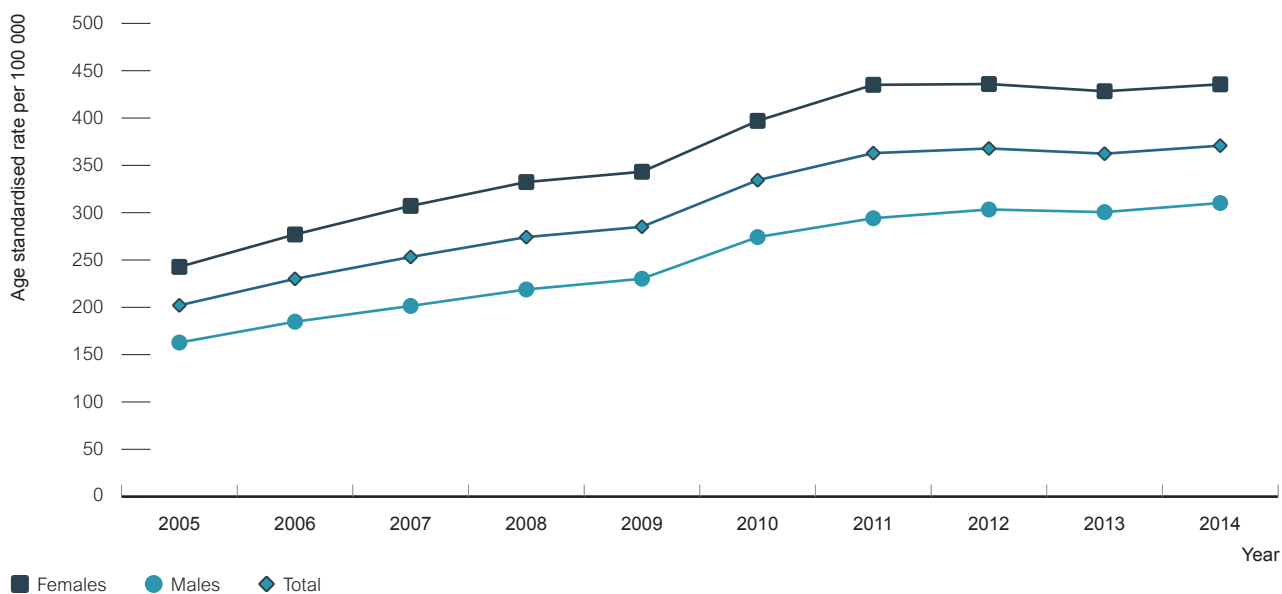
Table 17 Characteristics of new chlamydia diagnoses, 2005 – 2014

Characteristic	Year of diagnosis									
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Total	40 601	46 856	52 755	58 674	62 785	74 379	81 270	83 270	83 100	86 136
Sex										
Female	24 062	27 802	31 442	34 856	36 910	43 145	47 562	48 128	47 876	49 307
Male	16 457	18 959	21 209	23 716	25 774	31 047	33 581	35 036	35 191	36 790
Missing	82	95	104	102	101	187	127	106	33	39
Age group										
0 – 14	468	458	553	575	583	718	735	770	710	677
15 – 19	9 604	11 136	12 917	14 983	16 154	19 959	21 725	21 101	19 683	18 934
20 – 29	22 430	25 839	29 136	31 971	34 426	40 026	44 281	45 400	46 134	48 512
30 – 39	5 688	6 495	6 940	7 414	7 748	8 907	9 385	10 279	10 714	11 588
40+	2 381	2 910	3 178	3 699	3 802	4 692	5 036	5 616	5 833	6 421
Missing	30	18	31	32	72	77	108	104	26	4
Aboriginal and Torres Strait Islander status										
Aboriginal and Torres Strait Islander	3 956	4 839	5 342	5 562	5 302	6 715	7 093	7 006	6 837	6 641
Non-Indigenous	12 645	15 539	18 375	23 507	25 782	30 764	34 250	35 066	25 288	25 365
Not reported	24 000	26 478	29 038	29 605	31 701	36 900	39 927	41 198	50 975	54 130
Area of residence										
Major Cities	26 985	30 407	34 144	38 295	41 758	48 756	53 470	55 564	55 476	58 302
Inner Regional	5 877	6 948	7 818	8 850	9 773	12 029	12 948	13 122	12 462	13 073
Outer Regional	4 320	5 422	6 275	6 770	6 661	8 073	9 163	9 064	9 081	8 835
Remote	1 231	1 434	1 595	1 806	1 681	2 121	2 194	2 242	2 255	2 109
Very Remote	1 468	1 867	2 012	1 967	1 900	2 199	2 024	1 901	2 009	2 075
Missing	720	778	911	986	1 012	1 201	1 471	1 377	1 817	1 742
State/Territory										
Australian Capital Territory	700	819	936	984	960	1 152	1 259	1 288	1 271	1 192
New South Wales	11 017	11 875	12 574	14 042	14 927	18 309	20 557	21 343	20 855	22 912
Northern Territory	1 570	2 094	2 187	2 284	2 112	2 668	2 948	2 722	3 011	2 994
Queensland	9 527	11 797	13 441	15 187	16 675	19 263	18 602	18 864	19 467	20 489
South Australia	2 763	3 204	3 535	3 708	3 850	4 403	5 267	5 067	5 532	5 496
Tasmania	860	997	1 153	1 489	1 460	2 007	1 775	1 781	1 551	1 774
Victoria	8 877	10 047	11 183	12 319	13 971	16 434	19 266	20 460	19 618	19 922
Western Australia	5 287	6 023	7 746	8 661	8 830	10 143	11 596	11 745	11 795	11 357

Source: Australian National Notifiable Disease Surveillance System

The population rate of reported chlamydia diagnoses has increased steadily since 2005, but since 2011 has remained stable in both males and females (Figure 103). The rate of chlamydia diagnosis is higher in females than males (436 per 100 000 versus 310 per 100 000 in 2014).

Figure 103 Chlamydia notification rate per 100 000, 2005 – 2014, by sex

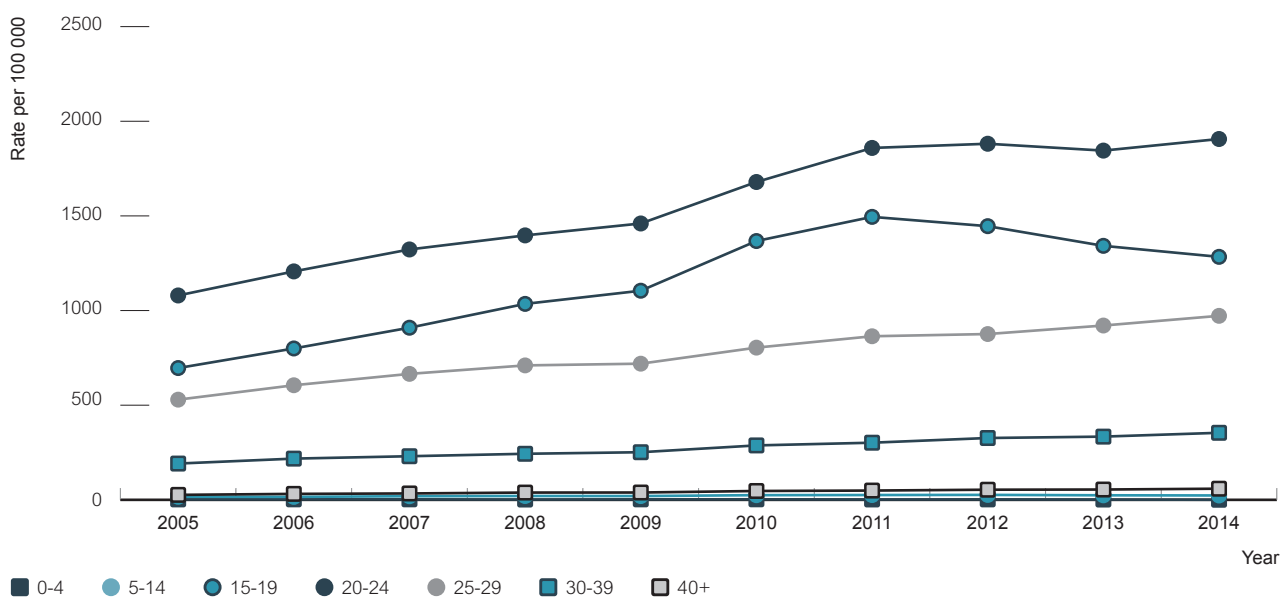


Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058; 3100DO003_201212

The notification trend varies by age groups. In both males and females aged 15 – 19 years, chlamydia notifications rates peaked in 2010 and have declined since then by 14% (from 1 495 per 100 000 in 2010 to 1 284 per 100 000 in 2014), whereas in 25 – 29 year olds notifications rates have continued to increase steadily since 2005 (Figures 104-106).

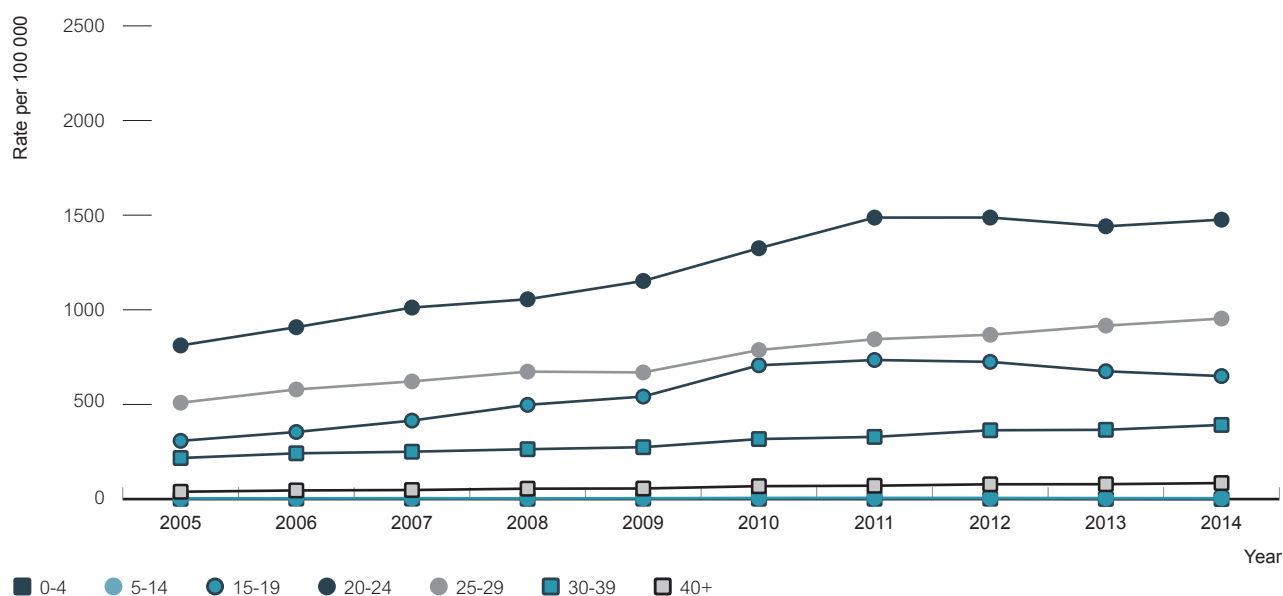


Figure 104 Chlamydia notification rate per 100 000, 2005 – 2014, by age group



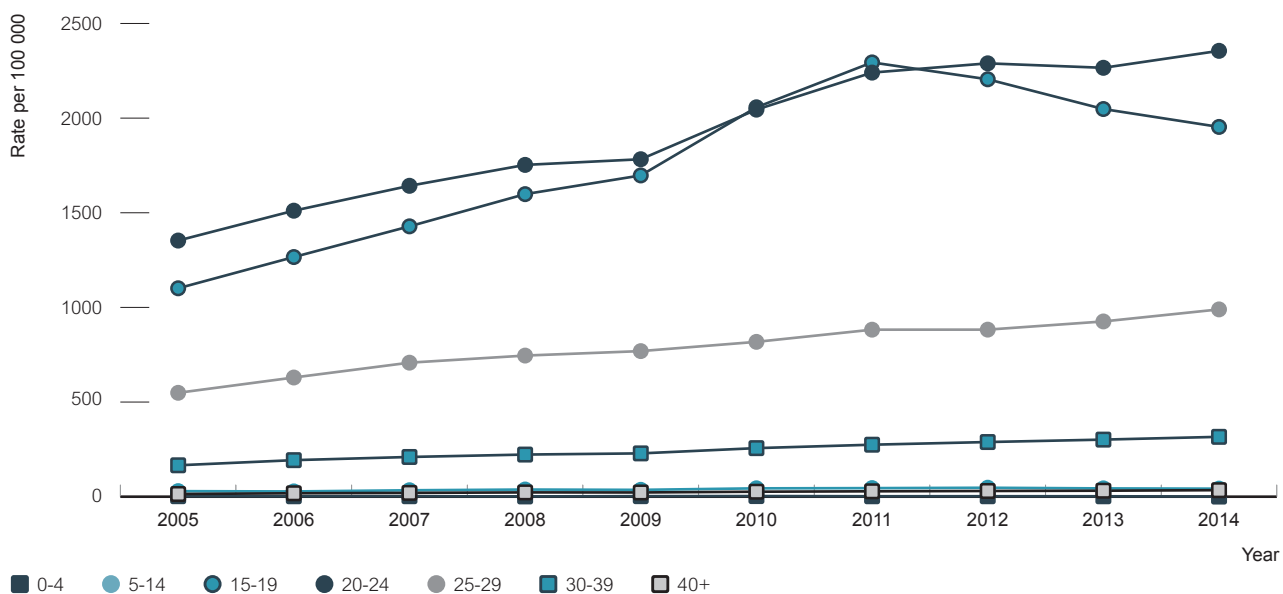
Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058

Figure 105 Chlamydia notification rate per 100 000, 2005 – 2014, by age group, males



Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058

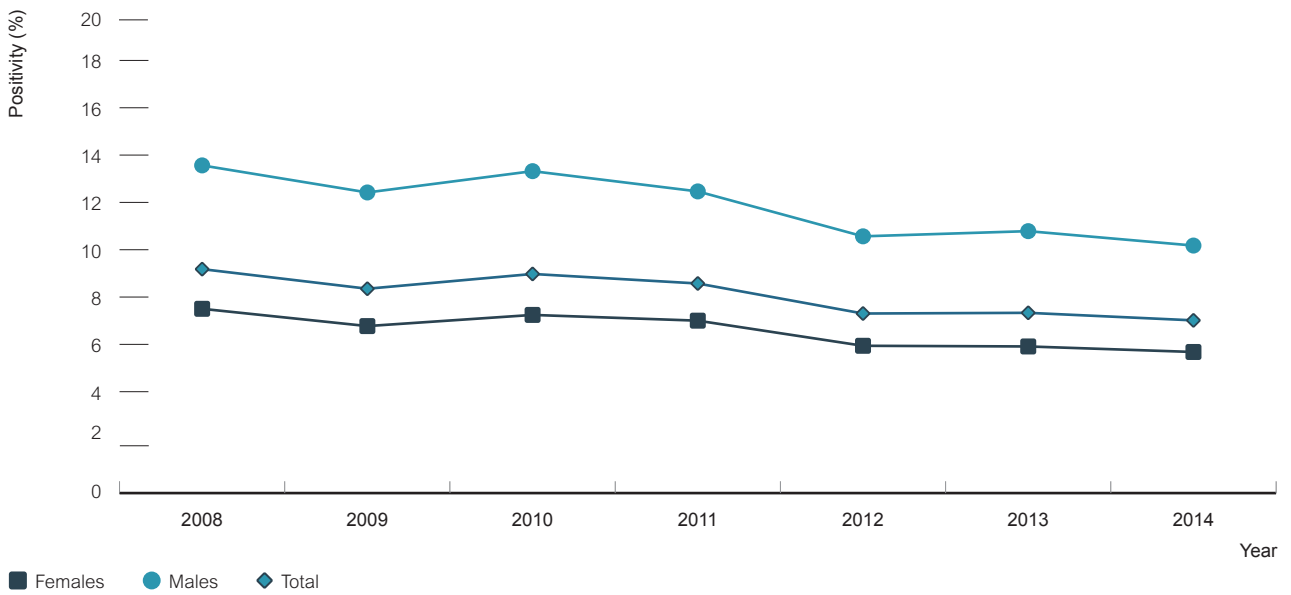
Figure 106 Chlamydia notification rate per 100 000, 2005 – 2014, by age group, females



Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058

Chlamydia positivity results from 2008 to 2014, which take into account Medicare testing patterns, show in 15 – 24 year olds a decline by 19% (from 15.4% to 12.5%) and in 25 – 34 year olds a 24% decline (from 7.8% to 5.9%) (Figure 107 – 108). As noted above these tests capture Medicare-rebated tests, and most testing conducted in government hospital and sexual health services is not included.

Figure 107 Chlamydia positivity, 2008 – 2014, by sex



Source: Medicare, Australian National Notifiable Diseases Surveillance System

Figure 108 Chlamydia positivity, 2008 – 2014, by age group

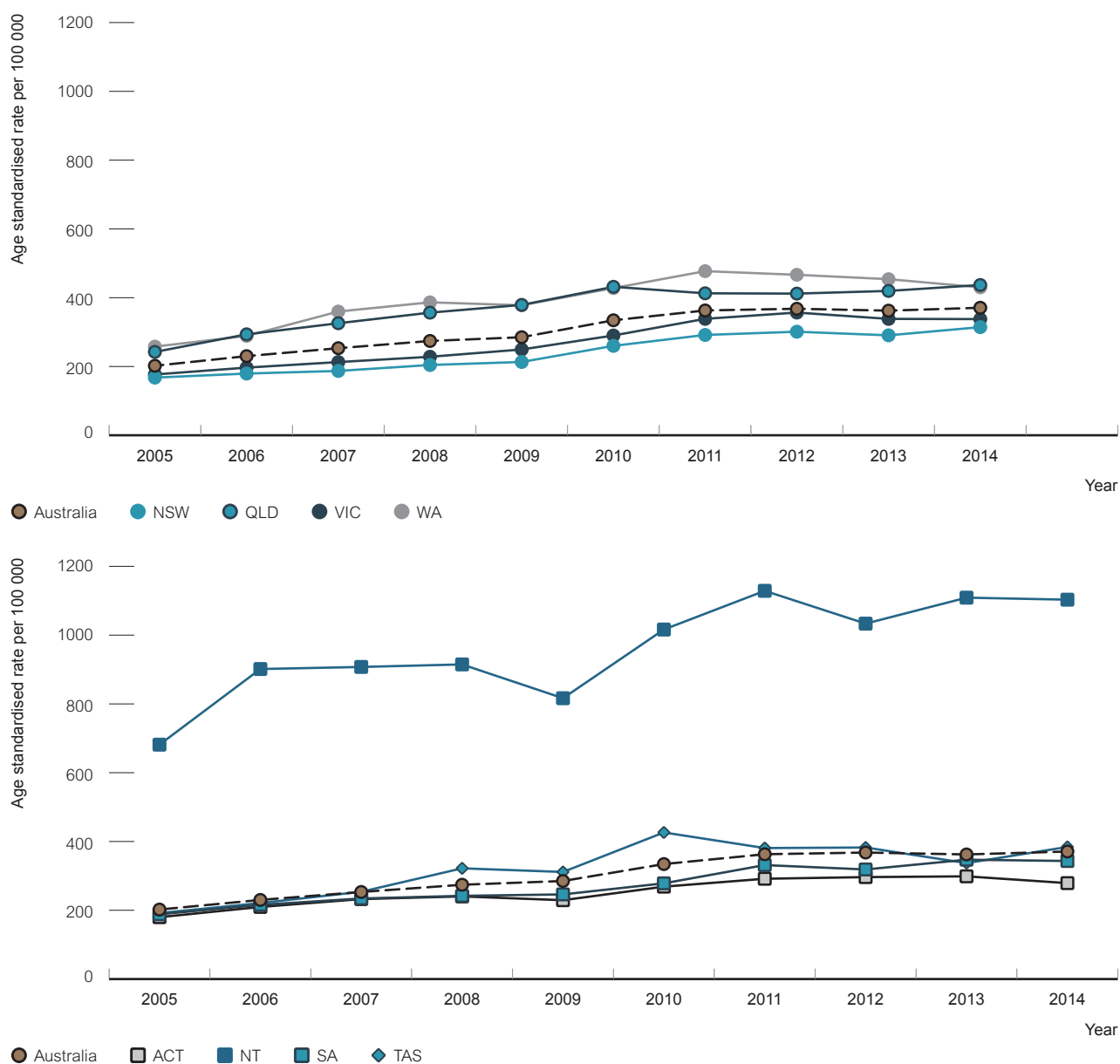


Source: Medicare, Australian National Notifiable Diseases Surveillance System



In all states and territories except for Western Australia the population rate of reported chlamydia diagnoses has increased steadily since 2005, but since 2011 has remained stable (Figure 109). In Western Australia there has been an almost 10% decline in the rate of chlamydia diagnosis since 2011 (Figure 109 and Table 15).

Figure 109 Chlamydia notifications, 2005 – 2014, by State/Territory



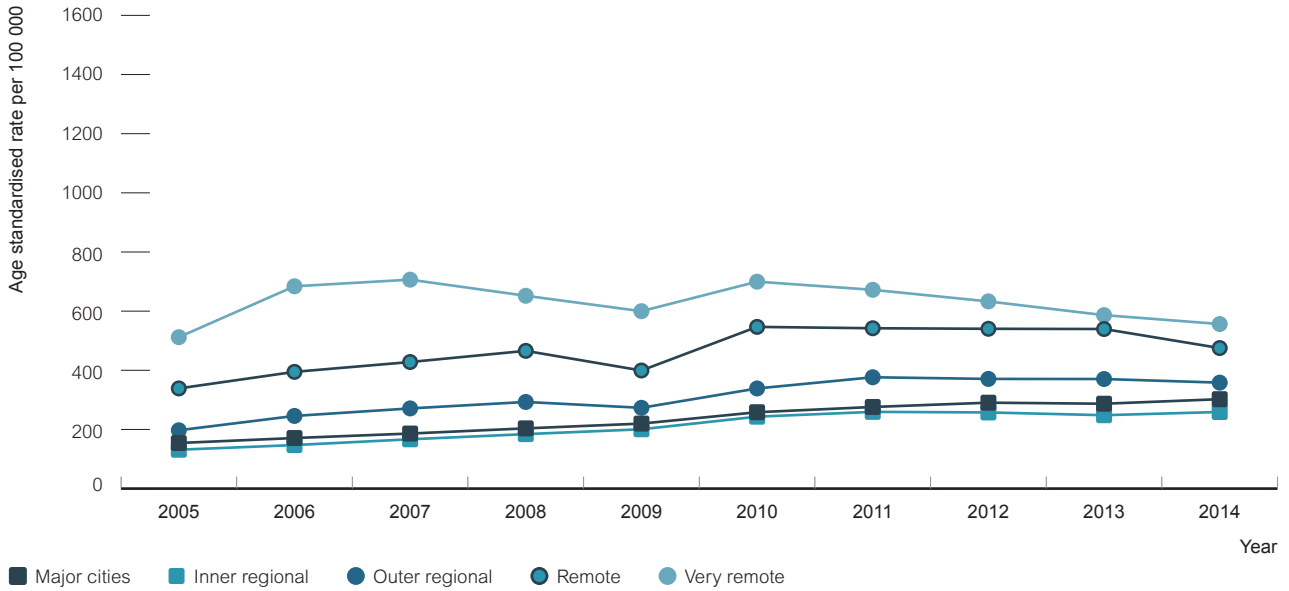
Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058; 3100DO003_201212

Table 18 Age standardised chlamydia notification rates per 100 000, 2005 – 2014, by State/Territory

State/Territory	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Australian Capital Territory	179.9	209.7	232.5	240.3	229.3	268.7	291.6	296.4	298.7	279.0
New South Wales	167.7	179.4	187.1	204.4	213.2	260.0	291.7	301.1	290.6	314.4
Northern Territory	681.5	901.4	907.5	914.8	816.6	1016.3	1128.8	1033.4	1108.9	1103.1
Queensland	242.3	293.5	325.8	356.5	379.0	431.7	412.8	411.9	419.7	436.9
South Australia	188.3	215.8	234.3	241.9	246.1	278.3	331.4	318.7	347.1	343.3
Tasmania	192.0	221.0	253.8	321.9	311.4	426.3	380.9	382.5	337.1	384.1
Victoria	176.8	196.7	212.8	228.2	249.5	290.1	338.6	356.8	338.4	337.8
Western Australia	257.8	288.9	359.8	386.5	377.9	427.9	477.2	466.6	453.9	430.1

Each year the rate of chlamydia diagnosis is highest in males and females residing in remote and very remote areas, followed by regional areas, and major cities (Figures 110 – 111).

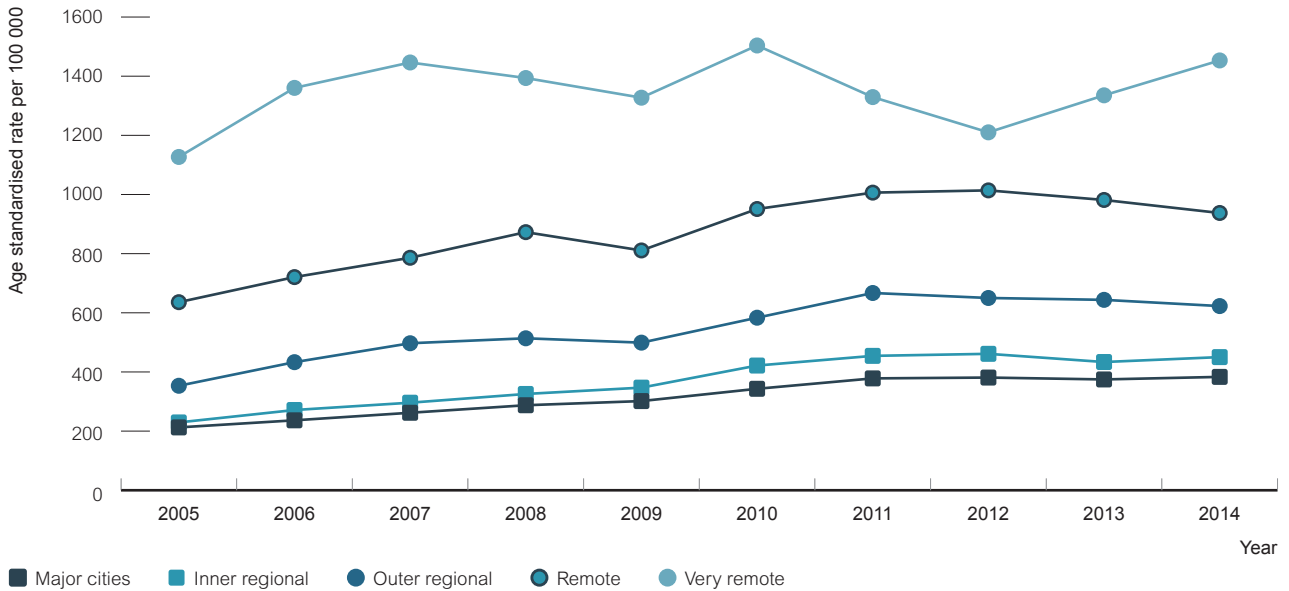
Figure 110 Chlamydia notifications, 2005 – 2014, by region of residence, males



Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058; 3100DO003_201212; 1270055006_CG_POSTCODE_2012_RA_2011; ABS SuperTable 2011 Census



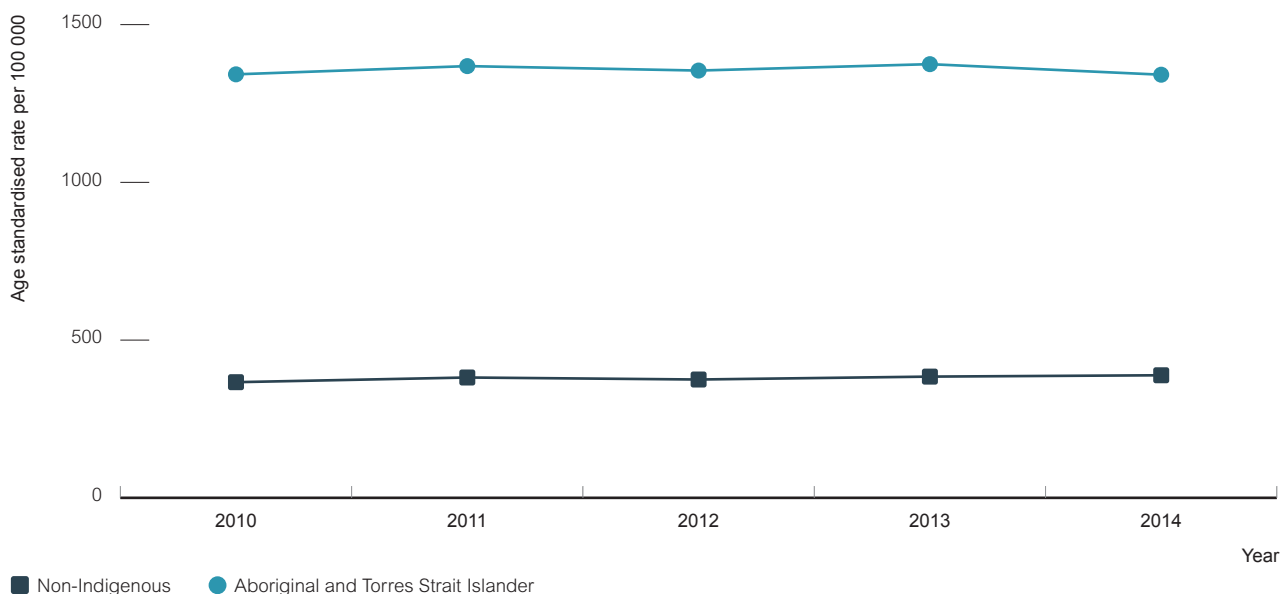
Figure 111 Chlamydia notifications, 2005 – 2014, by region of residence, females



Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058; 3100DO003_201212; 1270055006_CG_POSTCODE_2012_RA_2011; ABS SuperTable 2011 Census

The rate of notification of chlamydia in the Aboriginal and Torres Strait Islander population was stable between 2010 and 2014, at 1 341 per 100 000 (Figure 112). These data are from the Northern Territory, Queensland, South Australia and Western Australia where Aboriginal and Torres Strait Islander status was greater than 50% complete.

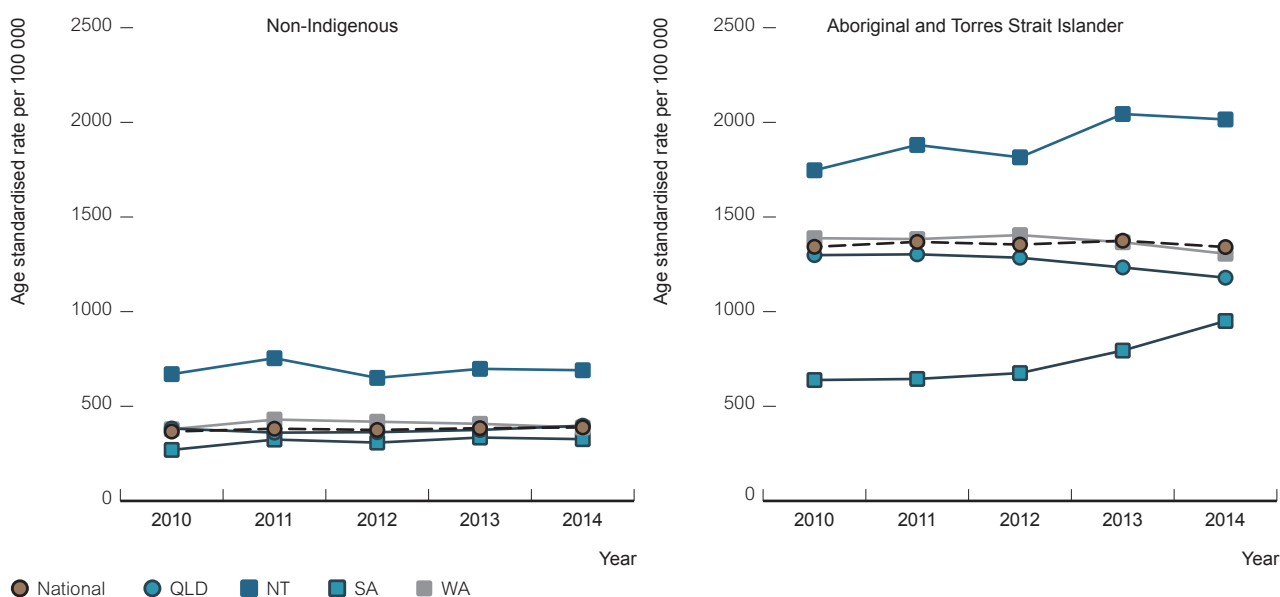
Figure 112 Chlamydia notification rate per 100 000, 2010 – 2014, by Aboriginal and Torres Strait Islander status



Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058; 3100DO003_201212; 32380do001_2011. Includes jurisdictions (NT, QLD, SA, WA) in which Aboriginal and Torres Strait Islander status was reported for more than 50% of diagnoses for each year.

The chlamydia notification rate from 2010 – 2014 in the Aboriginal and Torres Strait Islander population was highest in the Northern Territory (Figure 113). The chlamydia notification rate increased in South Australia by 49% over the five years (from 639 per 100 000 in 2010 to 951 per 100 000 in 2014).

Figure 113 Chlamydia notification rate per 100 000, 2010 – 2014, by Aboriginal and Torres Strait Islander status¹, State/Territory



¹ Includes jurisdictions (NT, QLD, SA, WA) in which Aboriginal and Torres Strait Islander status was reported for more than 50% of diagnoses for each year. Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058; 3100DO003_201212; 32380do001_2011.

Gonorrhoea – new diagnoses

There were a total of 15 786 notifications of gonorrhoea in Australia in 2014; 3 584 (23%) were among the Aboriginal and Torres Strait Islander population, 6 915 (44%) among the non-Indigenous population and Indigenous status was not reported for 5 287 (33%) diagnoses (Table 19). In 2014, 73% (11 508) of new gonorrhoea diagnoses were in males, 57% (9 049) were in people aged 15 – 29 years and 67% (10 504) were in people residing in major cities. In 2014, the male-to-female sex ratio in the 15 – 19 year age group was 1:1 whereas it was 4:1 in the 30 – 39 year age group. Age- and sex-specific patterns of diagnosis may have been influenced by differential testing rates.

Table 19 Characteristics of new gonorrhoea diagnoses, 2005 – 2014

Characteristic	Year of diagnosis									
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Total	7 809	8 650	7 663	7 745	7 955	10 091	12 067	14 211	14 916	15 786
Sex										
Female	2 482	2 762	2 573	2 708	2 605	3 176	3 961	4 447	4 425	4 234
Male	5 312	5 876	5 080	5 028	5 325	6 892	8 069	9 756	10 466	11 508
Missing	15	12	10	9	25	23	37	8	25	44
Age group										
0 – 14	208	178	191	183	141	173	232	265	228	249
15 – 19	1 593	1 537	1 536	1 597	1 525	1 906	2 297	2 430	2 236	2 050
20 – 29	2 949	3 547	3 083	3 149	3 476	4 361	5 043	6 078	6 408	6 999
30 – 39	1 854	2 036	1 657	1 595	1 623	1 985	2 387	2 945	3 307	3 569
40+	1 202	1 349	1 192	1 219	1 173	1 651	2 074	2 473	2 728	2 908
Missing	3	3	4	2	17	15	34	20	9	11
Aboriginal and Torres Strait Islander status										
Aboriginal and Torres Strait Islander	3 533	3 959	3 535	3 522	3 014	3 695	4 559	4 426	4 209	3 584
Non-Indigenous	1 966	2 204	1 925	2 129	2 297	2 964	3 706	4 970	6 410	6 915
Not reported	2 310	2 487	2 203	2 094	2 644	3 432	3 802	4 815	4 297	5 287
Area of residence										
Major Cities	3 495	3 865	3 436	3 502	4 122	5 374	6 315	8 322	9 058	10 504
Inner Regional	357	291	262	270	379	418	541	730	753	781
Outer Regional	1 095	1 138	1 000	1 133	938	1 219	1 784	1 738	1 528	1 411
Remote	943	996	959	1 013	835	1 077	1 182	1 182	1 188	1 018
Very Remote	1 610	2 011	1 760	1 608	1 453	1 664	1 871	1 763	1 611	1 435
Missing	309	349	246	219	228	339	374	476	778	637
State/Territory										
Australian Capital Territory	32	34	46	22	55	53	129	92	114	122
New South Wales	1 522	1 710	1 419	1 347	1 618	2 322	2 864	4 127	4 230	4 882
Northern Territory	1 720	1 850	1 606	1 551	1 501	1 918	2 009	1 818	1 950	1 759
Queensland	1 393	1 558	1 374	1 653	1 549	2 164	2 937	3 070	2 818	2 730
South Australia	407	502	457	486	368	470	440	543	807	736
Tasmania	34	19	37	25	21	21	19	33	71	65
Victoria	1 177	1 316	999	916	1 490	1 748	1 875	2 437	3 004	3 246
Western Australia	1 524	1 661	1 725	1 745	1 353	1 395	1 794	2 091	1 922	2 246

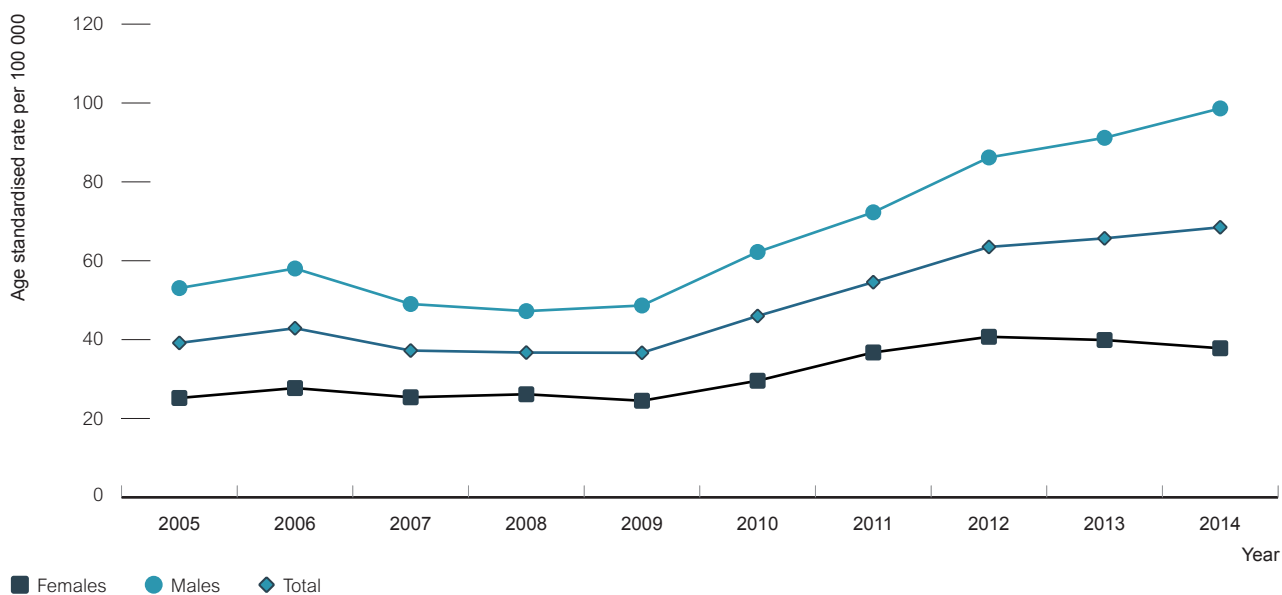
Source: Australian National Notifiable Diseases Surveillance System;



The population rate of diagnosis of gonorrhoea among males and females was relatively stable in 2005 – 2009 at around 51 and 26 per 100 000, respectively, followed by a substantial increase in diagnosis rates among males, from 62 in 2010 to 99 in 2014, and a smaller increase among females, from 30 in 2010 to 38 in 2014 (Figure 114).

In the past five years most laboratories have switched to using dual chlamydia and gonorrhoea tests where if a chlamydia test was ordered, a gonorrhoea test would be conducted automatically. The emphasis on testing for chlamydia in young people has therefore led to a substantial rise in the number of tests conducted for gonorrhoea, which may explain the increase in diagnoses.

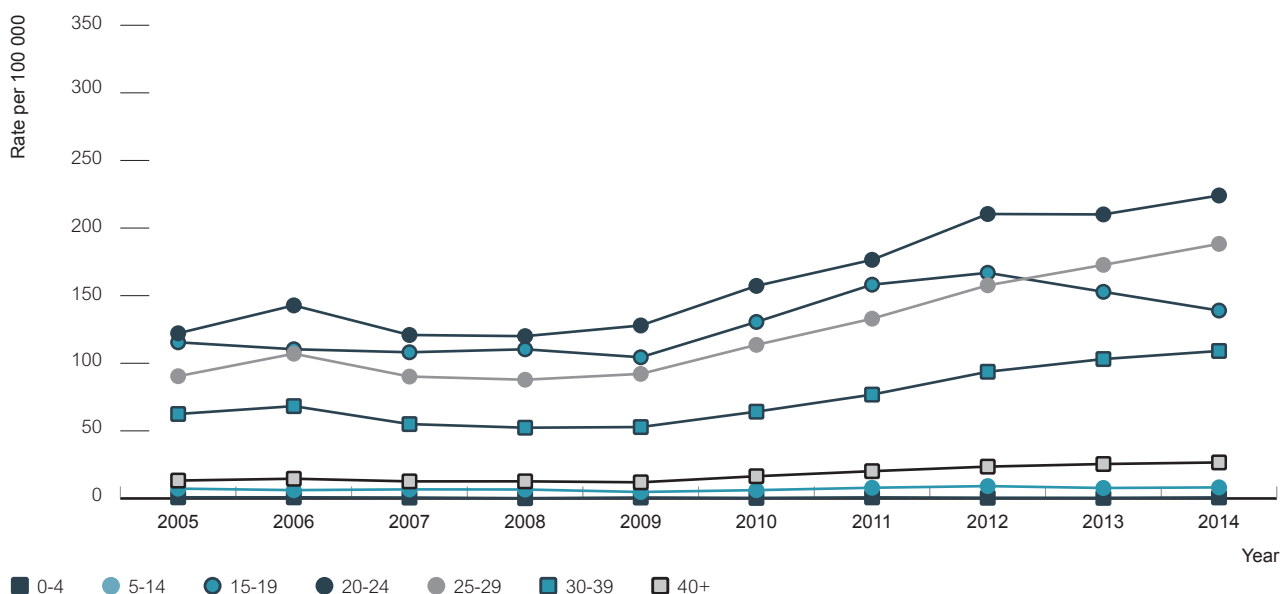
Figure 114 Gonorrhoea notification rate per 100 000 population, 2005 – 2014, by sex



Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058; 3100DO003_201212;

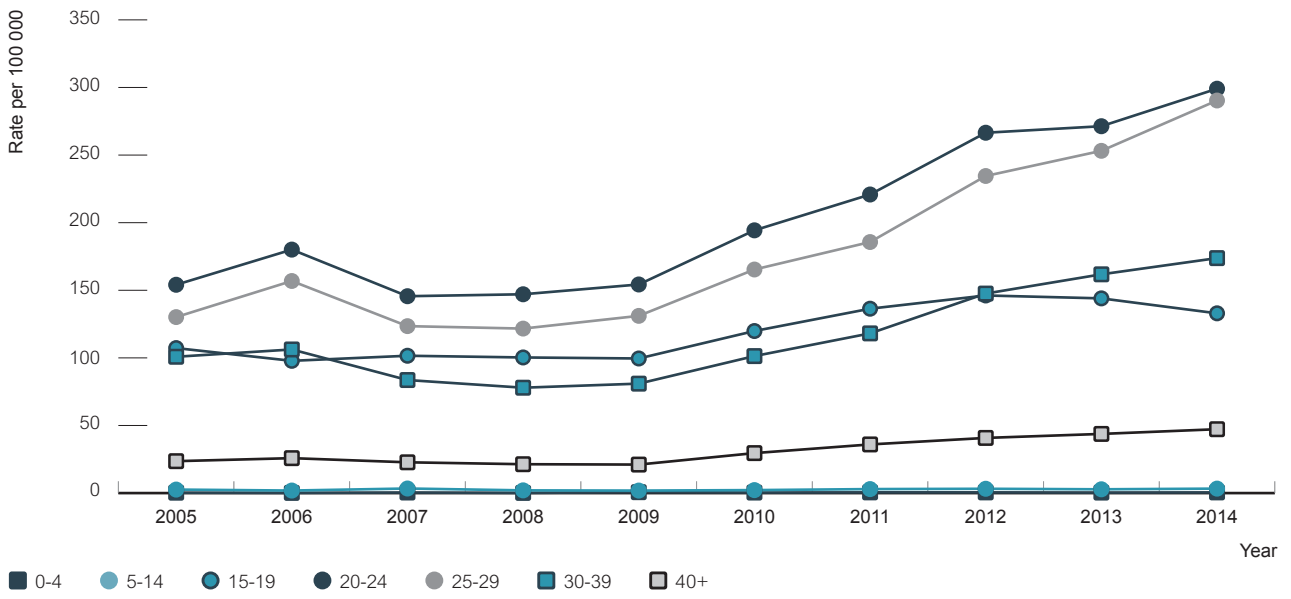
In the past ten years, the rate of gonorrhoea diagnosis continued to increase in all age groups except the 15 – 19 year age group. The rate of gonorrhoea diagnosis in the 15 – 19 year age group reached a peak at 166 in 2012 and then declined to 139 in 2014 (Figure 115), with similar declines in males and females (Figures 116 – 117).

Figure 115 Gonorrhoea notification rate per 100 000, 2005 – 2014, by age group



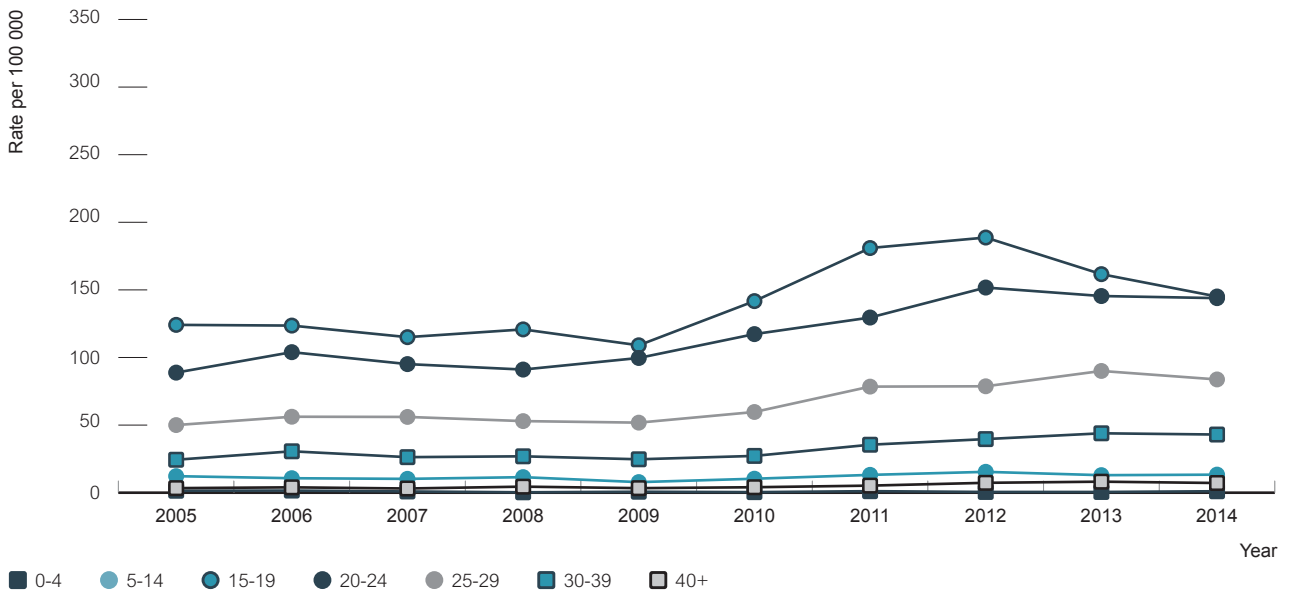
Source: Australian National Notifiable Diseases Surveillance System

Figure 116 Gonorrhoea notification rate per 1000 000, 2005 – 2014, by age group, males



Source: Australian National Notifiable Diseases Surveillance System

Figure 117 Gonorrhoea notification rate per 100 000, 2005 – 2014, by age group, females

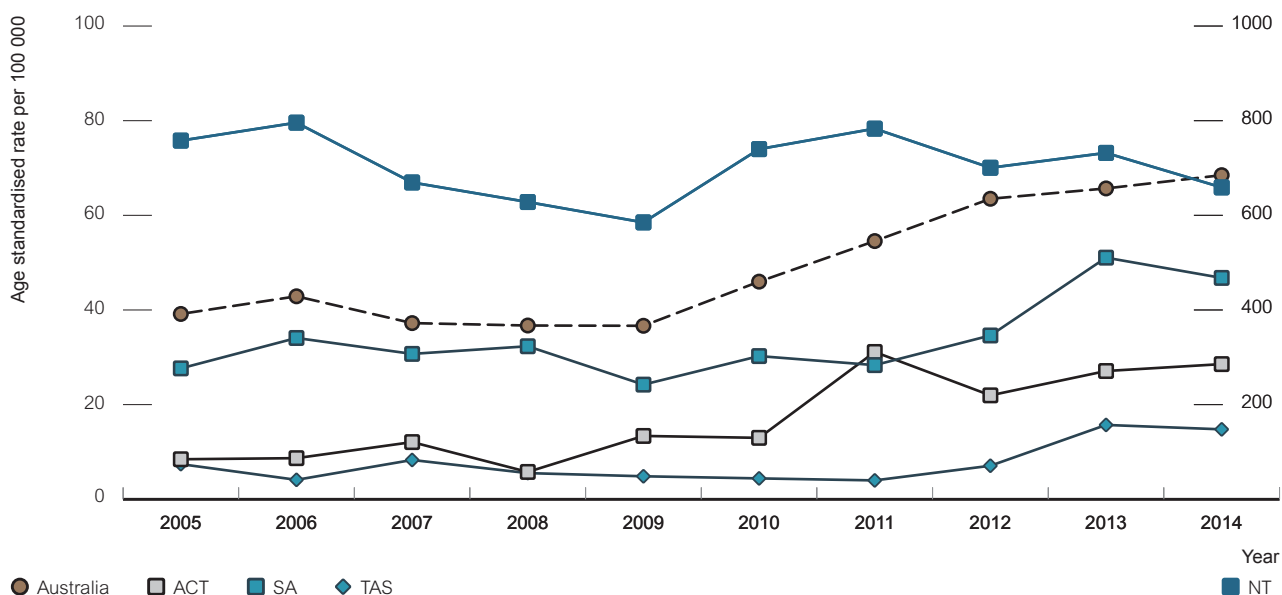
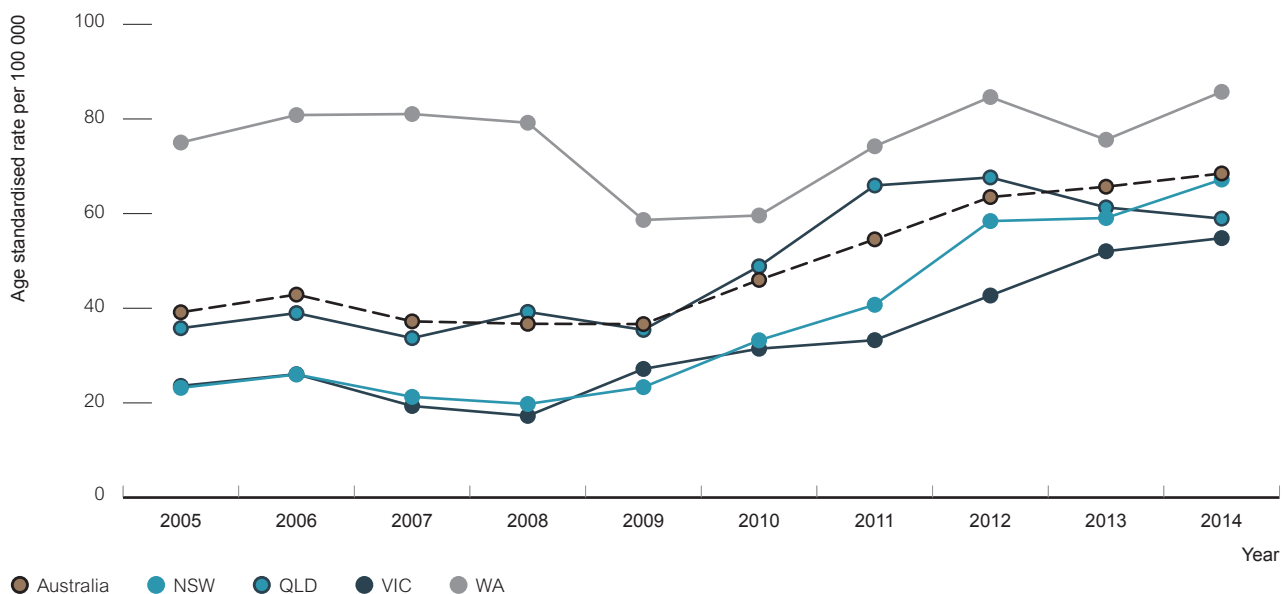


Source: Australian National Notifiable Diseases Surveillance System



The rate of gonorrhoea diagnosis was highest in the Northern Territory in 2014. From 2010 to 2014, the rate of gonorrhoea diagnosis increased by 29-146% across States/Territories, except the Northern Territory where there has been a 14% decline (Figure 118, Table 20).

Figure 118 Gonorrhoea notification rate per 100 000, 2005 – 2014, by year and State/Territory



Source: Australian National Notifiable Diseases Surveillance System

Table 20 Age standardised gonorrhoea notifications rates per 100 000, 2005 – 2014, by State/Territory

State/Territory	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Australian Capital Territory	8.5	8.7	12.1	5.8	13.4	13.0	31.1	22.0	27.1	28.6
New South Wales	23.2	26.0	21.3	19.8	23.3	33.2	40.7	58.4	59.1	67.2
Northern Territory	757.9	795.8	669.4	628.1	585.0	739.9	783.1	700.5	731.9	659.0
Queensland	35.8	39.0	33.7	39.2	35.4	48.9	65.9	67.6	61.3	58.9
South Australia	27.7	34.1	30.7	32.3	24.2	30.3	28.3	34.6	51.1	46.8
Tasmania	7.4	4.1	8.3	5.5	4.9	4.4	4.0	7.1	15.7	14.8
Victoria	23.6	26.1	19.3	17.3	27.2	31.5	33.3	42.7	52.0	54.8
Western Australia	75.0	80.8	81.0	79.2	58.7	59.6	74.2	84.6	75.6	85.7

Source: Australian National Notifiable Diseases Surveillance System

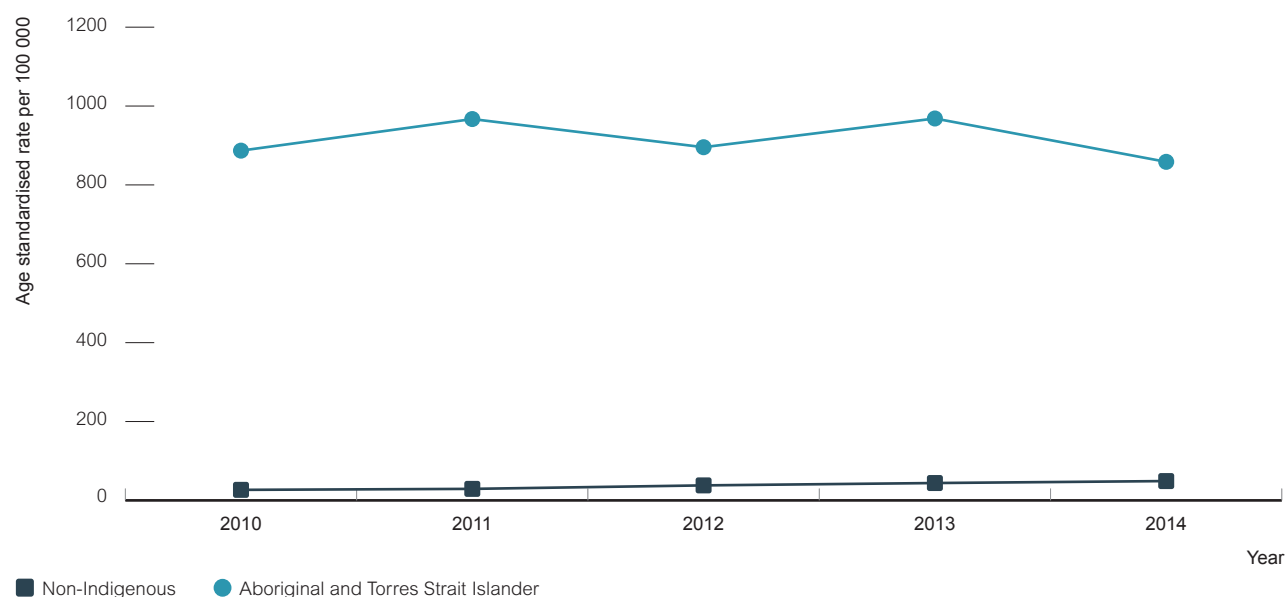
The rate of notification of gonorrhoea in the Aboriginal and Torres Strait Islander population was 887 in 2010, 967 in 2011 and 859 in 2014 (Figure 119).

In the non-Indigenous population, the rate of gonorrhoea notification increased from 22.8 in 2009 to 49.0 in 2014 (Figure 119).

The rate of diagnosis of gonorrhoea in the Aboriginal and Torres Strait Islander population was 18 times that in the non-Indigenous population in 2014 (859 vs 49 per 100 000). These data include jurisdictions (Australian Capital Territory, Northern Territory, South Australia, Tasmania, Victoria, Western Australia) in which Aboriginal and Torres Strait Islander status was reported for more than 50% of diagnoses for each year. (Figure 120).

The male to female ratio of gonorrhoea notifications among the Aboriginal and Torres Strait Islander population in 2014 was 1:1 and 77% of cases resided in remote or very remote areas. In contrast in the non-Indigenous population, the male to female ratio was 4: 1 and 87% resided in urban areas.

Figure 119 Gonorrhoea notification rate per 100 000, 2010 – 2014, by Aboriginal and Torres Strait Islander status

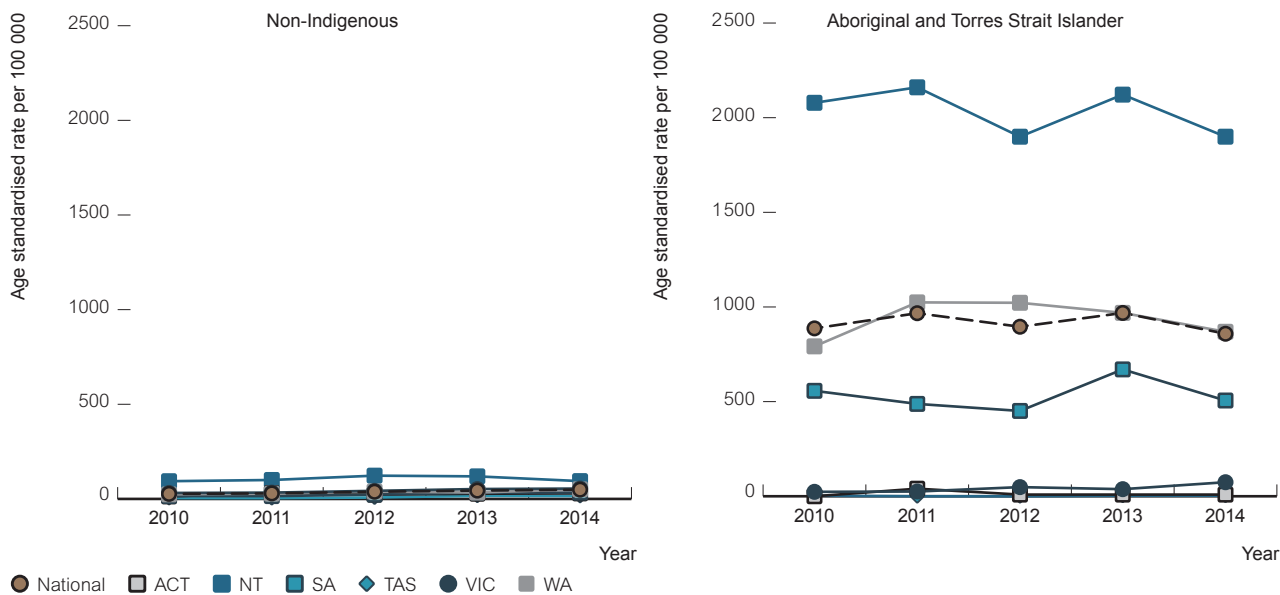


Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058; 3100DO003_201212; 32380do001_2011. Includes jurisdictions (ACT, NT, SA, Tas., Vic., WA) in which Aboriginal and Torres Strait Islander status was reported for more than 50% of diagnoses for each year.



From 2010 – 2014, the gonorrhoea notification rate in the Aboriginal and Torres Strait Islander population was highest in the Northern Territory, followed by Western Australia, then South Australia (Figure 120).

Figure 120 Gonorrhoea notification rate per 100 000, 2010 – 2014, by Aboriginal and Torres Strait Islander status and State/Territory¹

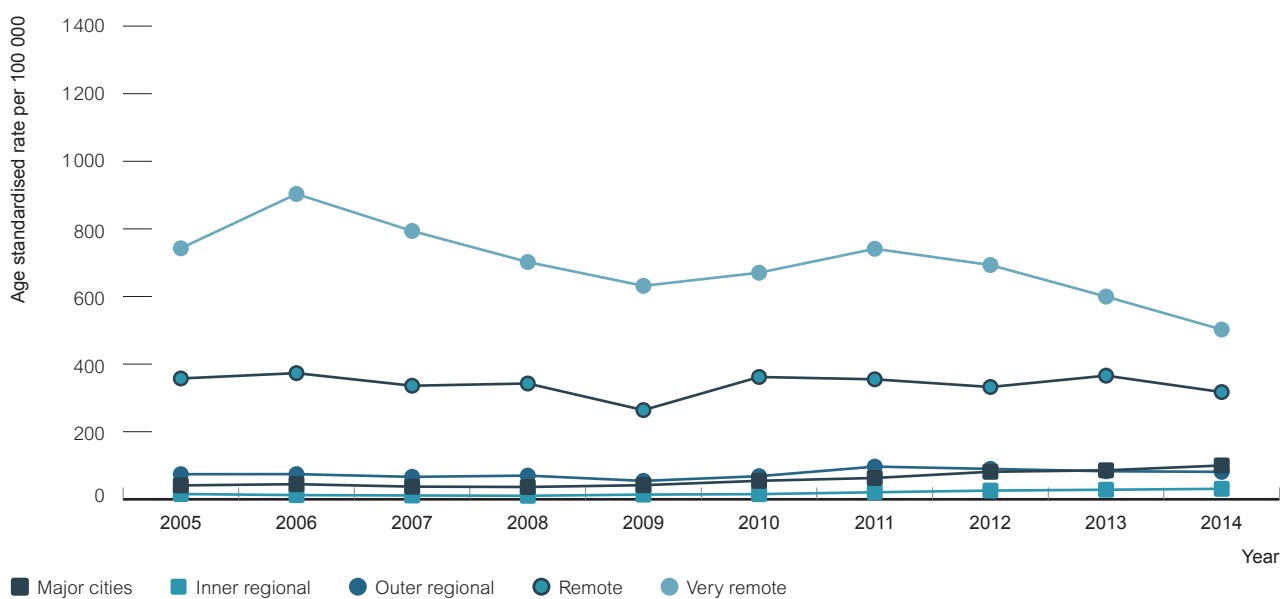


¹ Includes jurisdictions (ACT, NT, SA, Tas., Vic., WA) in which Aboriginal and Torres Strait Islander status was reported for more than 50% of diagnoses for each year.

Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058; 3100DO003_201212; 32380do001_2011.

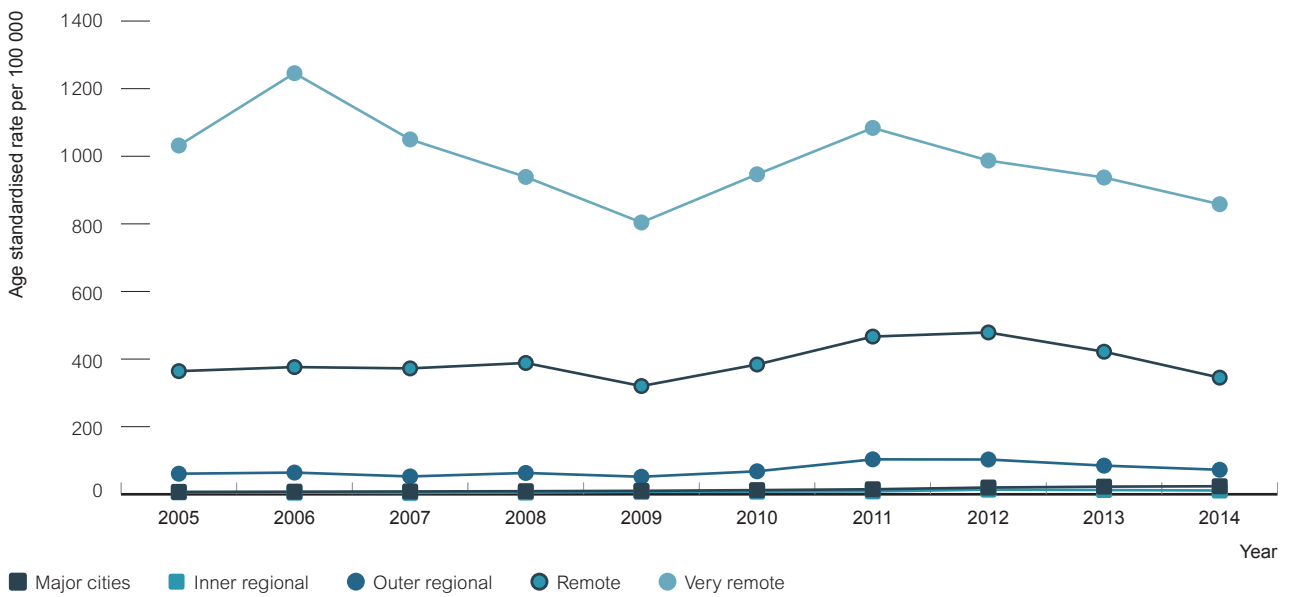
Each year the rate of gonorrhoea diagnosis is highest in males and females residing in remote and very remote areas, followed by outer regional areas, then major cities, and inner regional areas (Figures 121-122).

Figure 121 Gonorrhoea notification rate per 100 000, 2005 – 2014, by region of residence, males



Source: Australian National Notifiable Diseases Surveillance System ABS Catalogues 3101051 - 3101058; 3100DO003_201212; 1270055006_CG_POSTCODE_2012_RA_2011; ABS SuperTable 2011 Census

Figure 122 Gonorrhoea notification rate per 100 000, 2005 – 2014, by region of residence, females

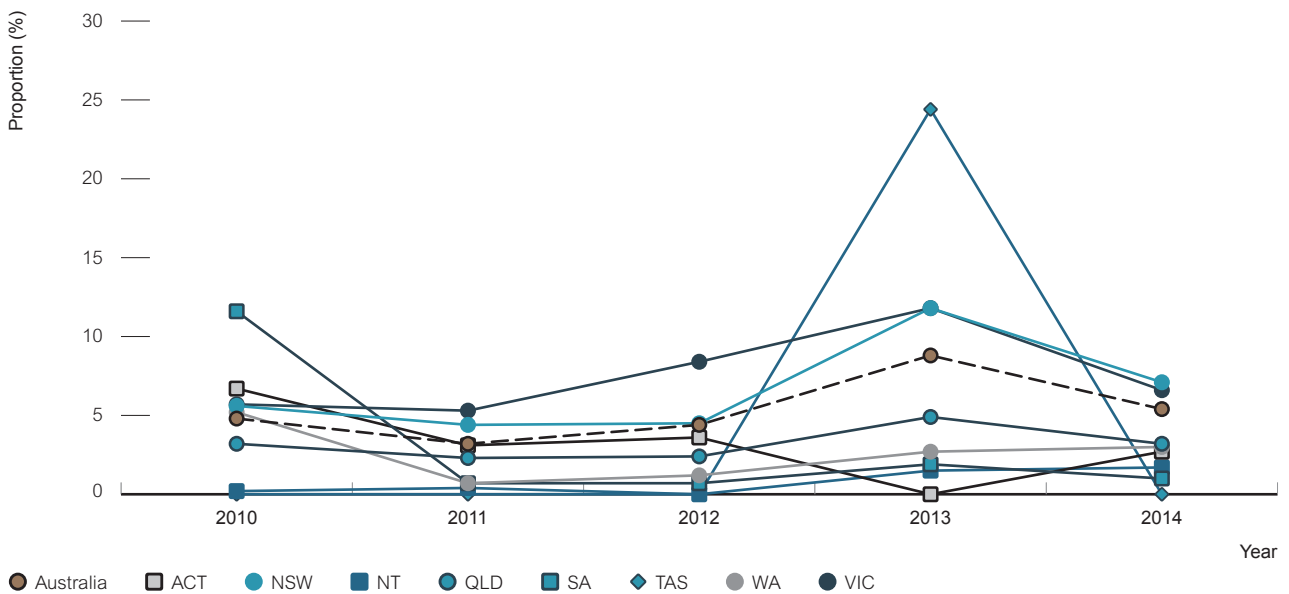


Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058; 3100DO003_201212; 1270055006_CG_POSTCODE_2012_RA_2011; ABS SuperTable 2011 Census

Since 1981, the Australian Gonococcal Surveillance Programme has monitored antimicrobial resistance in clinical isolates of *Neisseria gonorrhoeae* in all states and territories. Nationally, decreased ceftriaxone susceptibility was found in 5.4% of gonococcal isolates in 2014, compared to 8.8% in 2013 (Figure 123). Decreased susceptibility was highest in New South Wales (7.1%) and Victoria (6.6%) in 2014.



Figure 123 Proportion of gonococcal isolates referred to the Australian Gonococcal Surveillance Program with decreased susceptibility to ceftriaxone (MIC 0.06 - 0.125mg/L), Australia, 2010 to 2014, by State/Territory



Source: Australian Gonococcal Surveillance Program¹³

Syphilis – new diagnoses

Infectious syphilis

There were a total of 1 999 infectious syphilis notifications nationally in 2014, with 235 (12%) among the Aboriginal and Torres Strait Islander population, 1 588 (79%) among the non-Indigenous population and a further 176 (9%) cases for which Indigenous status was not reported (Table 21). In 2014, 92% (1 835) of infectious syphilis diagnoses were in males, 32% (637) were in people aged 15 – 29 years and 75% (1 494) were in people residing in major cities.

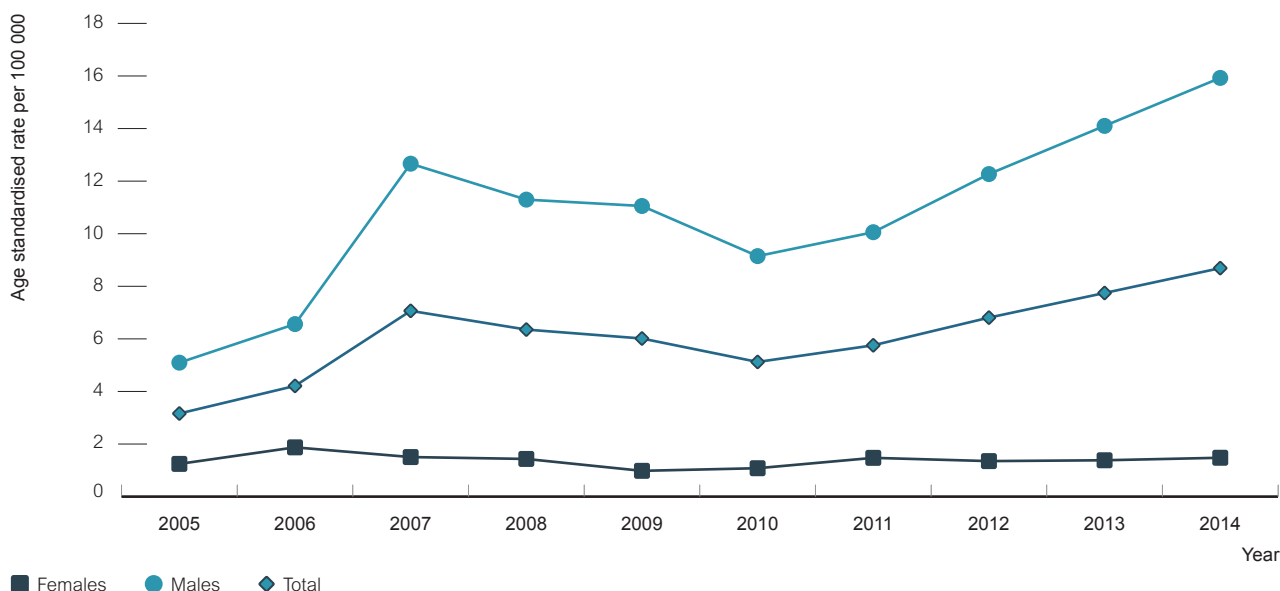
Table 21 Characteristics of new infectious syphilis diagnoses, 2005 – 2014

Characteristic	Year of diagnosis									
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Total	628	851	1 451	1 328	1 288	1 117	1 265	1 528	1 757	1 999
Sex										
Female	123	186	152	149	105	117	159	148	153	164
Male	505	663	1 298	1 179	1 179	993	1 103	1 378	1 602	1 835
Missing	0	2	1	0	4	7	3	2	2	0
Age group										
0 – 14	2	14	7	8	3	0	9	6	9	11
15 – 19	58	91	63	71	39	44	90	69	75	97
20 – 29	176	205	306	332	325	294	332	390	440	540
30 – 39	205	246	446	405	366	312	321	390	490	544
40+	187	293	628	512	551	462	510	672	743	807
Missing	0	2	1	0	4	5	3	1	0	0
Aboriginal and Torres Strait Islander status										
Aboriginal and Torres Strait Islander	178	234	200	181	117	143	195	171	154	235
Non-Indigenous	421	587	1 175	1 102	1 114	918	1 020	1 251	1 462	1 588
Not reported	29	30	76	45	57	56	50	106	141	176
Area of residence										
Major Cities	384	543	1 111	1 007	1 049	843	955	1 196	1 280	1 494
Inner Regional	47	38	71	60	78	48	74	93	131	101
Outer Regional	67	37	56	83	60	96	61	74	78	132
Remote	40	65	29	47	25	41	51	41	35	55
Very Remote	65	120	112	90	42	49	76	46	46	55
Missing	25	48	72	41	34	40	48	78	187	162
State/Territory										
Australian Capital Territory	4	2	9	4	11	13	10	14	11	18
New South Wales	234	205	473	424	531	429	419	522	593	745
Northern Territory	94	146	122	83	37	44	30	14	23	71
Queensland	144	177	260	199	192	228	338	386	336	393
South Australia	11	42	49	46	37	22	18	45	41	29
Tasmania	6	4	9	8	10	6	6	13	21	14
Victoria	116	232	428	382	389	295	324	456	647	636
Western Australia	19	43	101	182	81	80	120	78	85	93

Source: Australian National Notifiable Disease Surveillance System

The rate of diagnosis of infectious syphilis among men increased from 5.1 per 100 000 in 2005 to 12.7 per 100 000 population in 2007 and increased again from 9.1 in 2010 to 15.9 in 2014 whereas the rate among women remained stable between 1.0-1.9 per 100 000 population (Figure 124).

Figure 124 Infectious syphilis notification rate per 100 000, 2005 – 2014, by year and sex



Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058; 3100DO003_201212

Data from the ACCESS sentinel surveillance system of sexual health services show that of infectious syphilis diagnoses in males in 2014, 89% (722) were in men who have sex with men. The infectious syphilis positivity was 4 times higher in men who have sex with men with HIV infection than HIV-negative men (8% vs 2%) (Figures 125-126).



Figure 125 Infectious syphilis diagnoses among HIV positive and HIV negative gay and bisexual men attending sexual health clinics, 2011 – 2014

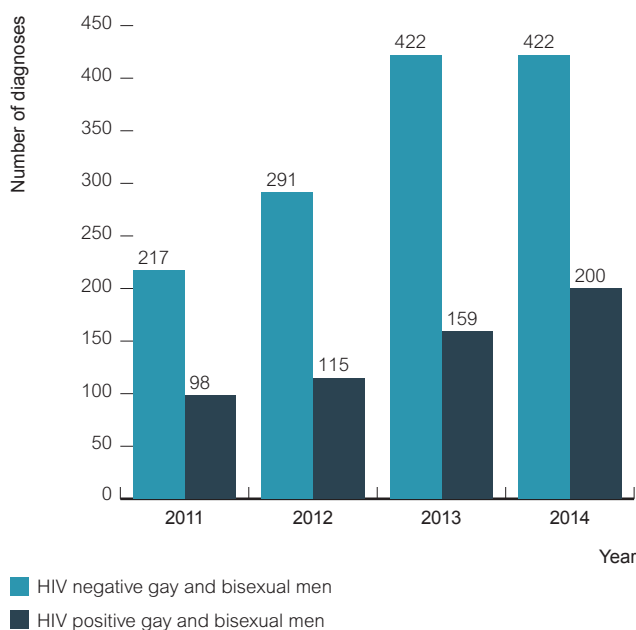
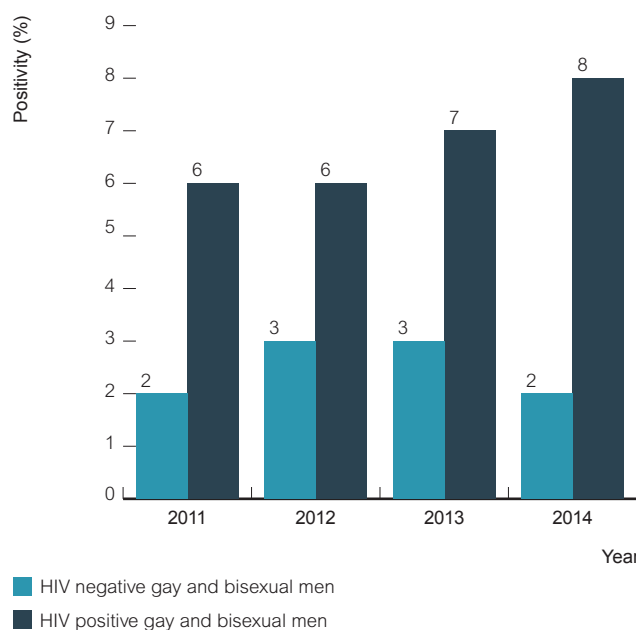


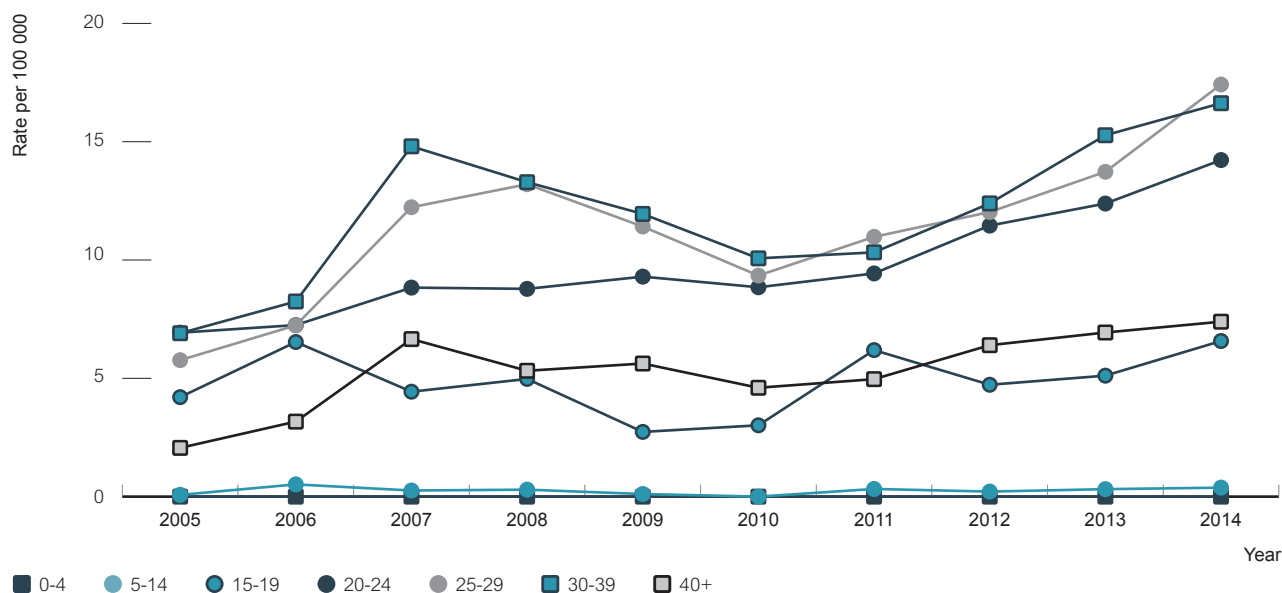
Figure 126 The infectious syphilis positivity among HIV positive and HIV negative gay and bisexual men attending sexual health clinics, 2011 – 2014



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

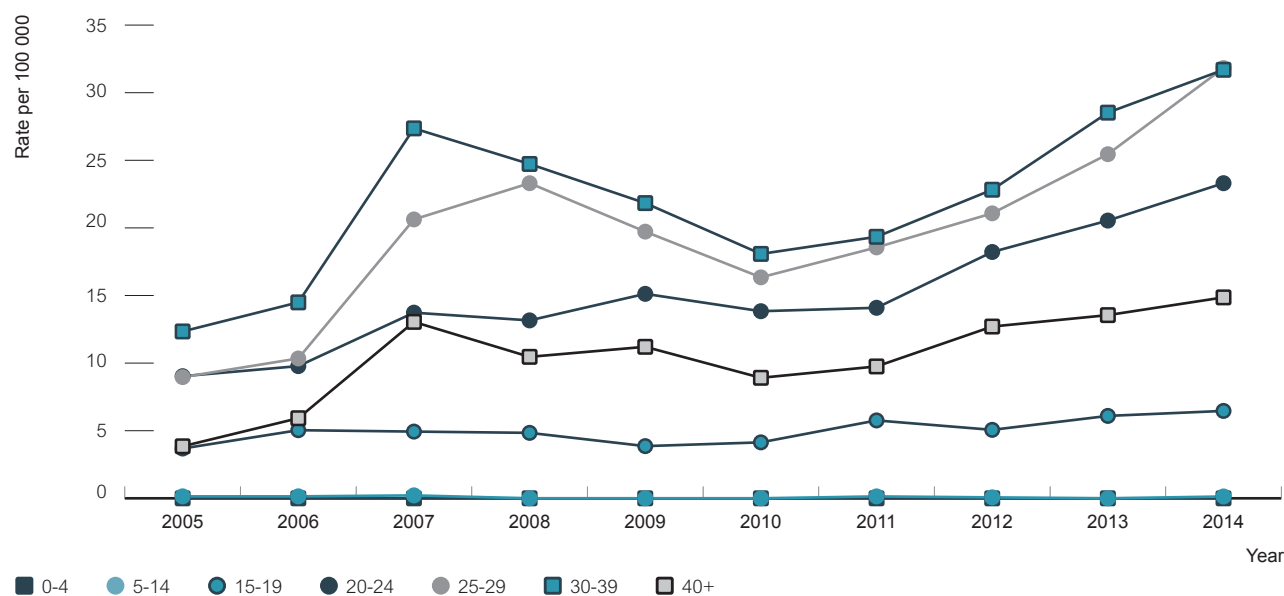
The rate of diagnosis of infectious syphilis was highest in the 25 – 29, 30 – 39 and in the 20 – 24 year age groups (Figure 127). In these age groups, the rate of infectious syphilis diagnosis increased by 86%, 65% and 61% respectively, since 2010. In 2014 rates of infectious syphilis among males were highest in people aged 25 – 29 and 30 – 39 (32 per 100 000), and among females in people aged 15 – 19 (7 per 100 000) (Figures 128 – 129).

Figure 127 Infectious syphilis notifications, 2005 – 2014, by age group



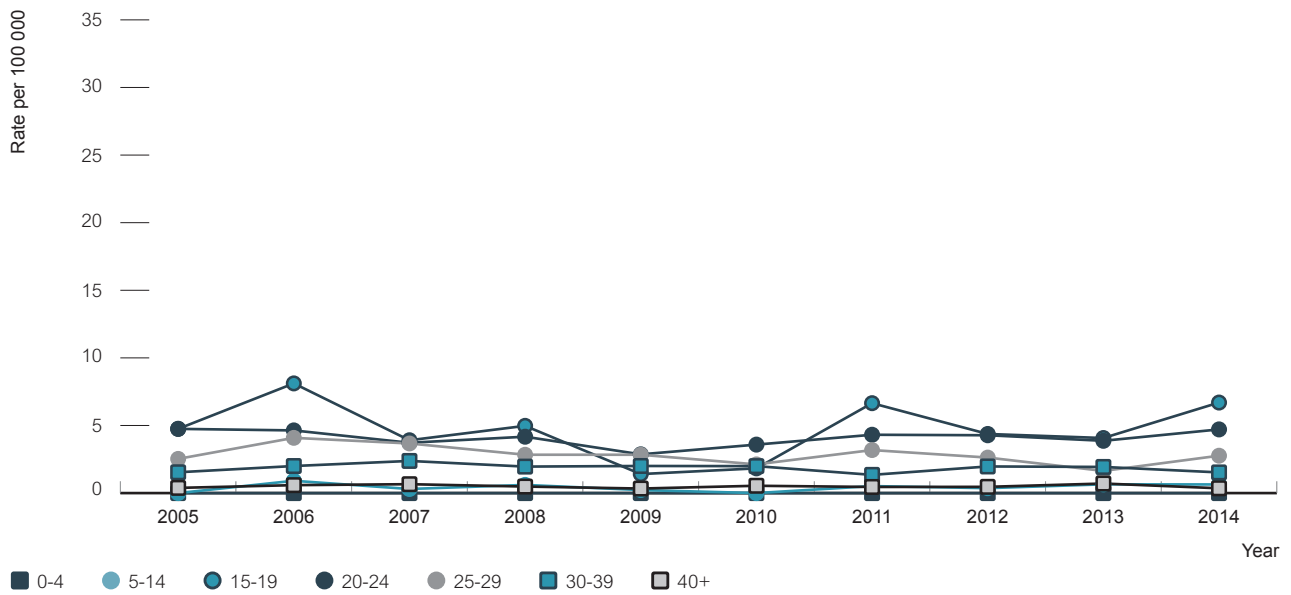
Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058

Figure 128 Infectious syphilis notification rate per 100 000, 2005 – 2014, by age group, males



Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058

Figure 129 Infectious syphilis notification rate per 100 000, 2005 – 2014, by age group, females



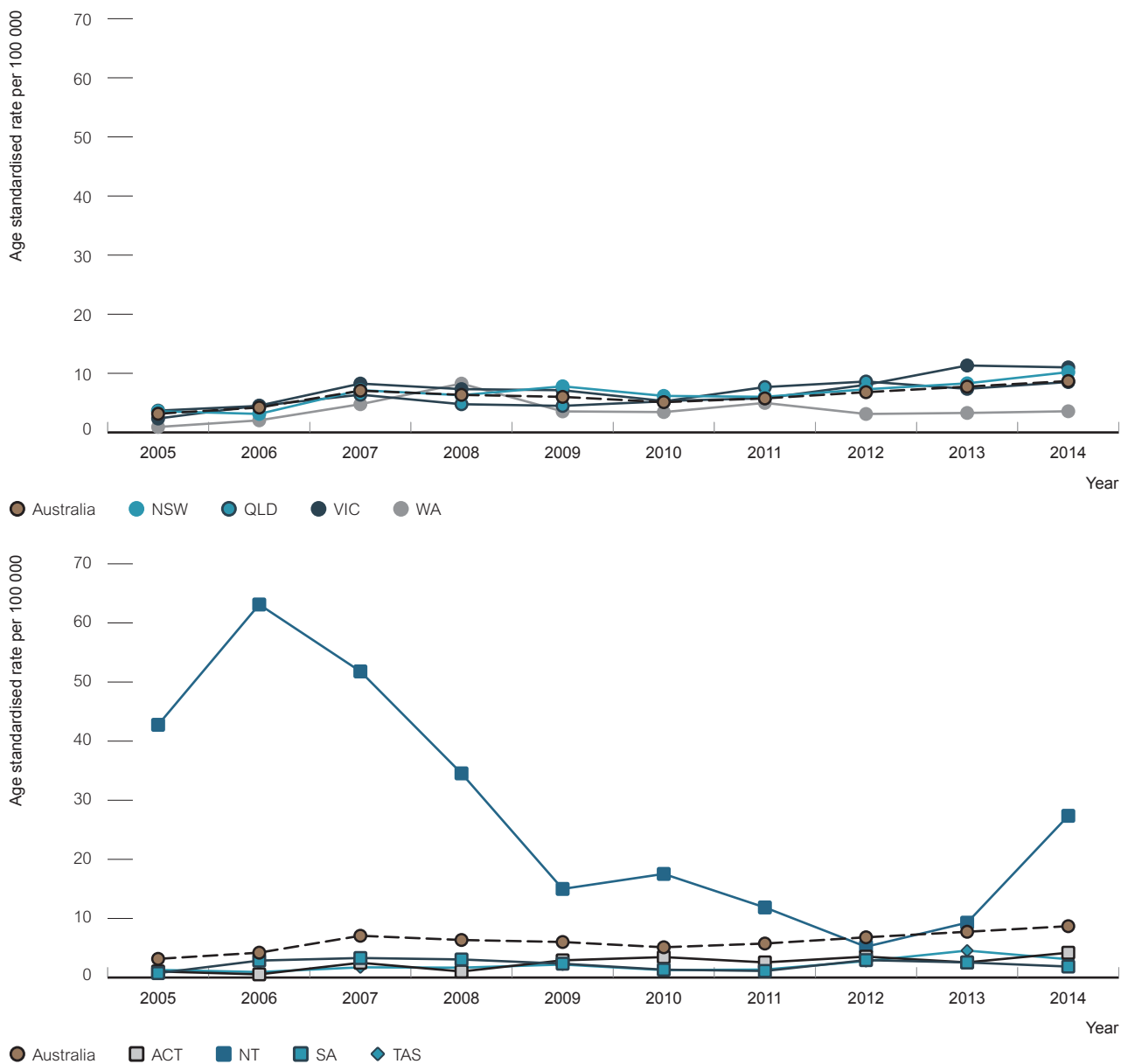
Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058

Over the past five years, New South Wales, Queensland and Victoria recorded increasing rates of diagnosis of infectious syphilis whereas rates were stable or declining in Western Australia and in the Northern Territory (Figure 130, Table 17). In the non-Indigenous population, rates were highest in Victoria (11 per 100 000) and New South Wales (10 per 100 000).



In the ten year period 2005 – 2014, rates of infectious syphilis in both males and females have been highest among people living in very remote areas (Figure 133 and 134).

Figure 130 Infectious syphilis notification rate per 100 000, 2005 – 2014, by State/Territory



Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058; 3100DO003_201212

Table 22 Age standardised syphilis notification rates per 100 000, 2005 – 2014, by State/Territory

State/Territory	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Australian Capital Territory	1.0	0.5	2.5	1.0	2.9	3.5	2.6	3.5	2.6	4.2
New South Wales	3.6	3.1	7.1	6.3	7.8	6.2	6.0	7.3	8.3	10.2
Northern Territory	42.8	63.1	51.8	34.5	15.0	17.5	11.9	5.2	9.3	27.4
Queensland	3.7	4.5	6.4	4.8	4.5	5.3	7.7	8.6	7.4	8.5
South Australia	0.7	2.9	3.3	3.1	2.3	1.3	1.1	2.9	2.6	1.9
Tasmania	1.3	0.9	1.7	1.7	2.2	1.3	1.4	2.8	4.6	3.1
Victoria	2.4	4.5	8.3	7.3	7.1	5.3	5.8	8.1	11.3	11.0
Western Australia	0.9	2.0	4.8	8.3	3.6	3.4	5.0	3.1	3.3	3.6

Source: Australian National Notifiable Diseases Surveillance System

The rate of diagnosis of infectious syphilis in the Aboriginal and Torres Strait Islander population was 4 times that in the non-Indigenous population in 2014 (32 vs 8 per 100 000).

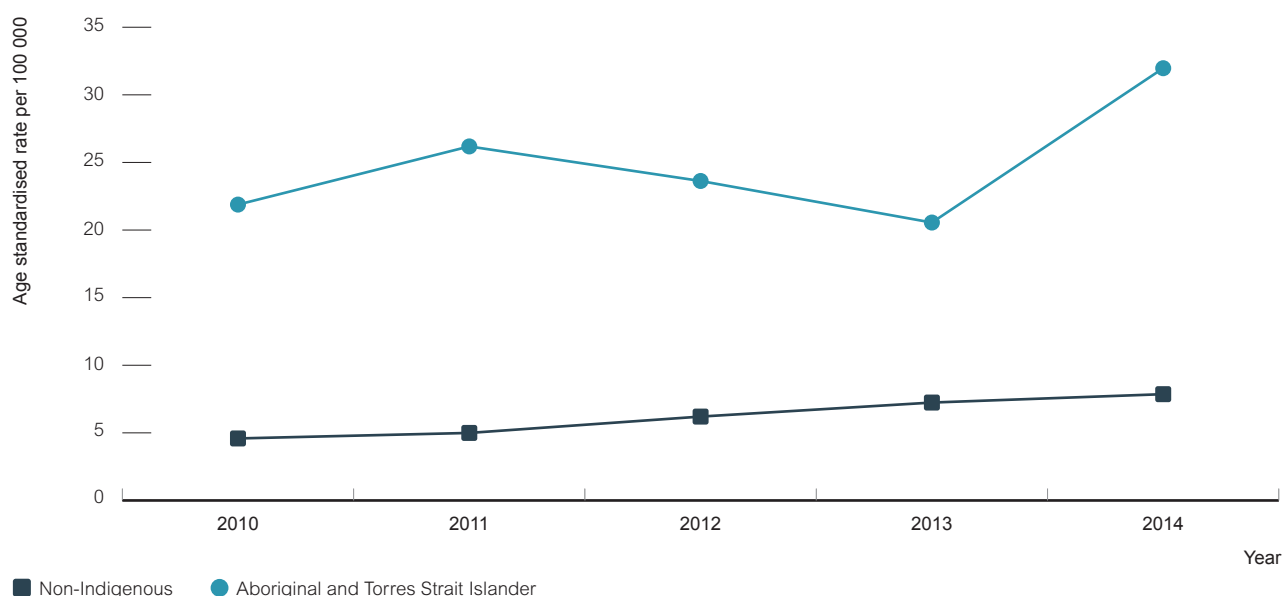
The rate of notification of infectious syphilis in the Aboriginal and Torres Strait Islander population increased from 22 in 2010 to 26 per 100 000 in 2011 and then declined to 21 in 2013 and increased again to 32 per 100 000 in 2014 (Figure 131). In 2014, the notification rate of infectious syphilis among Aboriginal and Torres Strait Islander peoples were highest in the Northern Territory (66 per 100 000) and Western Australia (66 per 100 000) (Figure 132).

Coinciding with these peaks in infectious syphilis notifications, there have been peaks in cases of congenital syphilis (Figure 135), with 100% (5 cases) in Aboriginal and Torres Strait Islander peoples in 2014.

The male to female ratio of infectious syphilis notifications among the Aboriginal and Torres Strait Islander population in 2014 was 1.1:1, 46% resided in remote/very remote areas, 38% in outer regional areas and 31% were aged 15 – 19 years. In contrast in non-Indigenous population, the male to female ratio was 33:1, 91% resided in urban settings and 99% were aged >20 years.

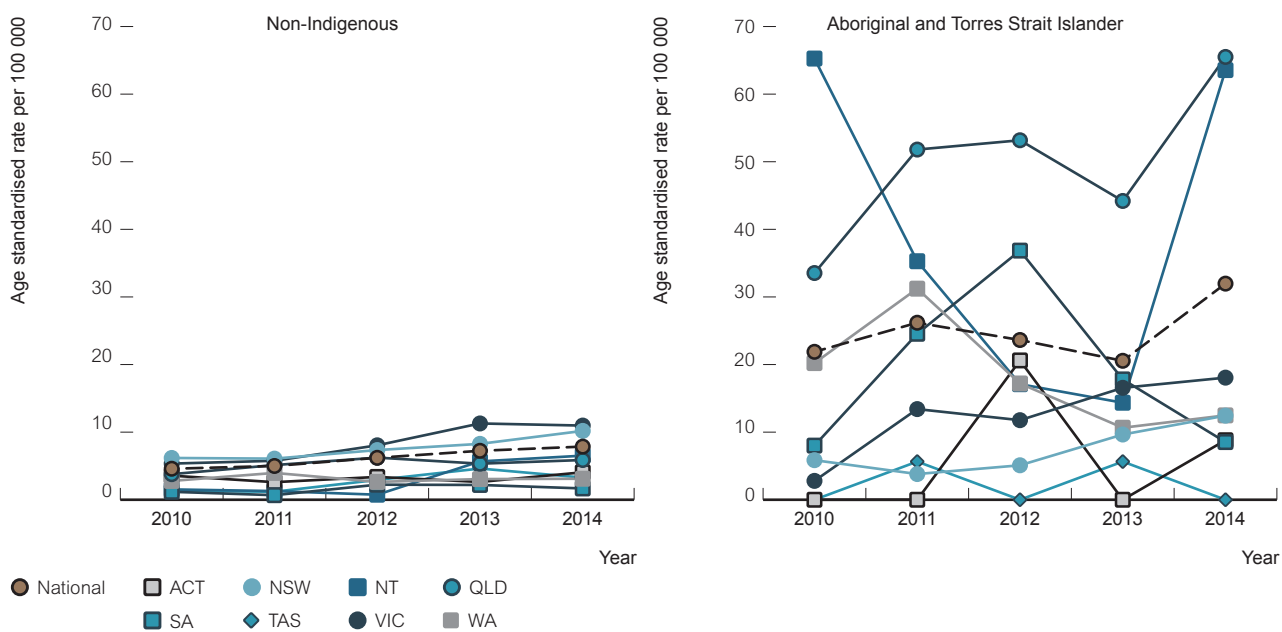


Figure 131 Infectious syphilis notification rate per 100 000, 2010 – 2014, by Aboriginal and Torres Strait Islander status



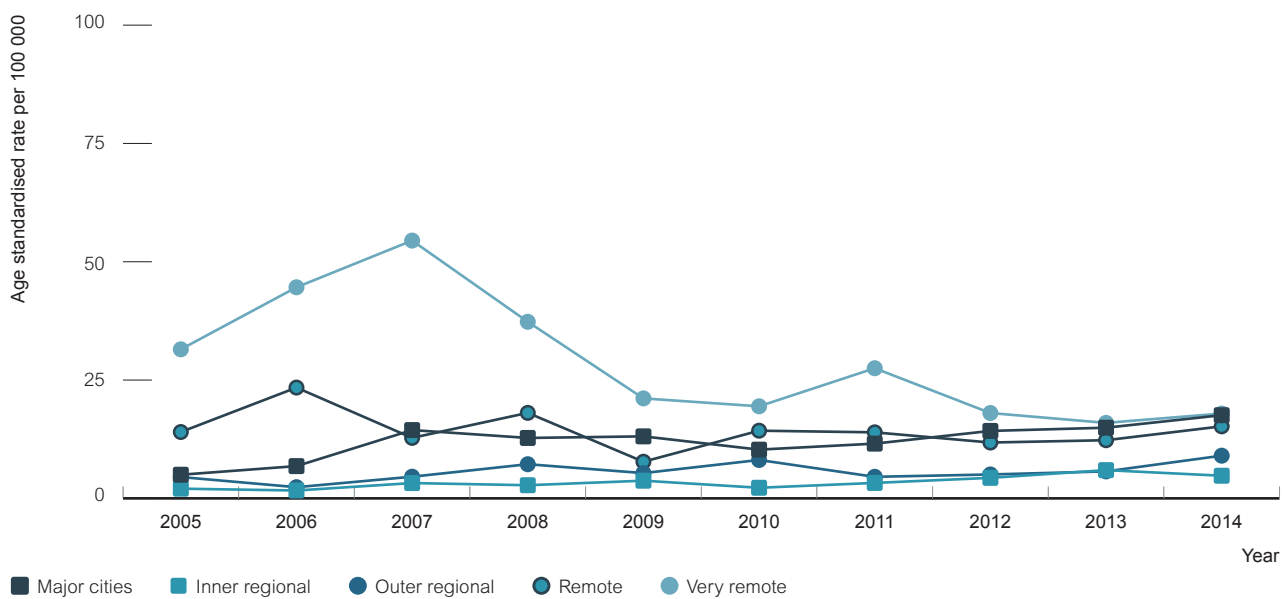
Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058; 3100DO003_201212; 32380do001_2011

Figure 132 Infectious syphilis notification rate per 100 000, 2010 – 2014, State/Territory and Aboriginal and Torres Strait Islander status



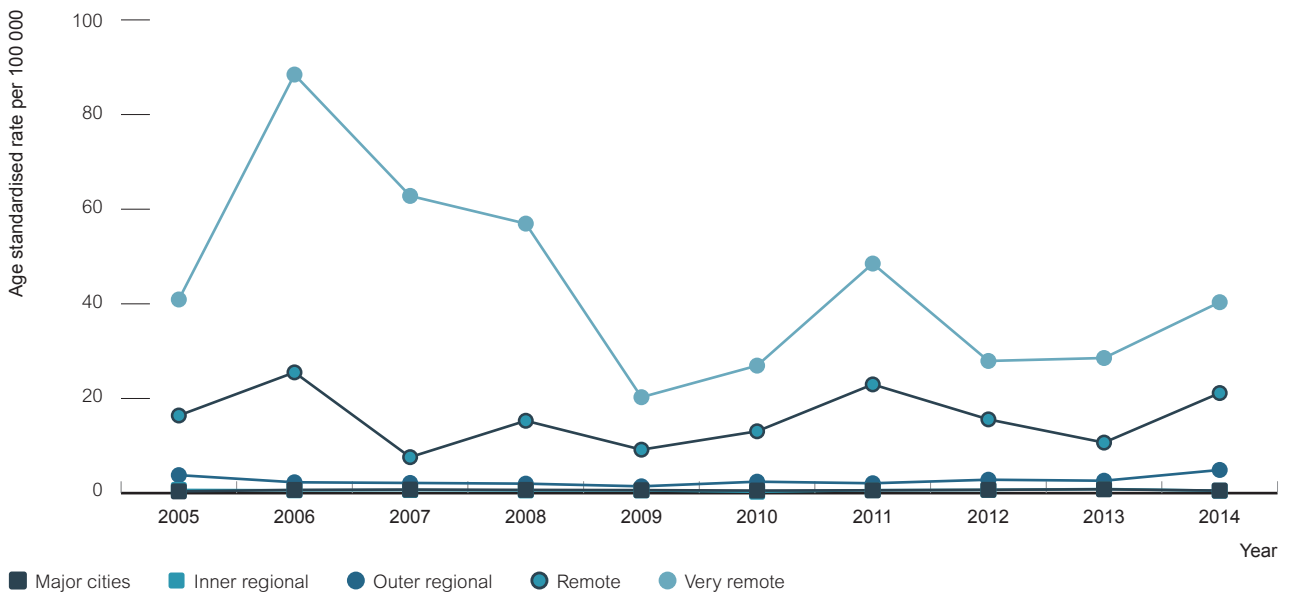
Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058; 3100DO003_201212; 32380do001_2011

Figure 133 Infectious syphilis notifications, 2005 – 2014, by region of residence, males



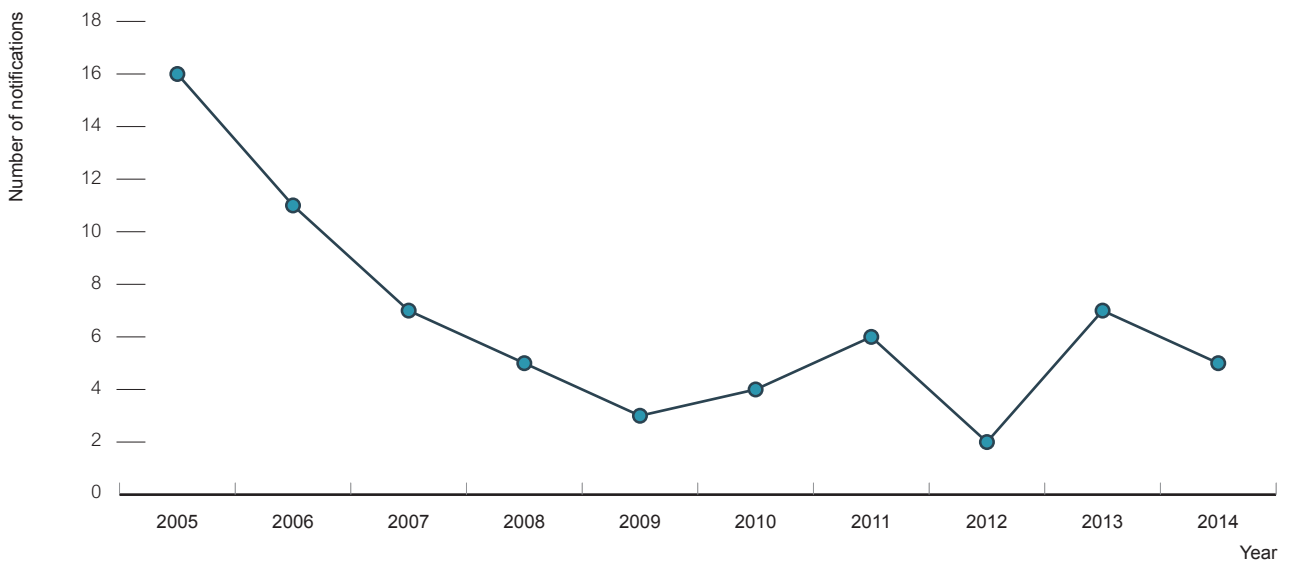
Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058; 3100DO003_201212; 1270055006_CG_POSTCODE_2012_RA_2011; ABS SuperTable 2011 Census

Figure 134 Infectious syphilis notifications, 2005 – 2014, by region of residence, females



Source: Australian National Notifiable Diseases Surveillance System; ABS Catalogues 3101051 - 3101058; 3100DO003_201212; 1270055006_CG_POSTCODE_2012_RA_2011; ABS SuperTable 2011 Census

Figure 135 Congenital syphilis cases per year, 2005 – 2014



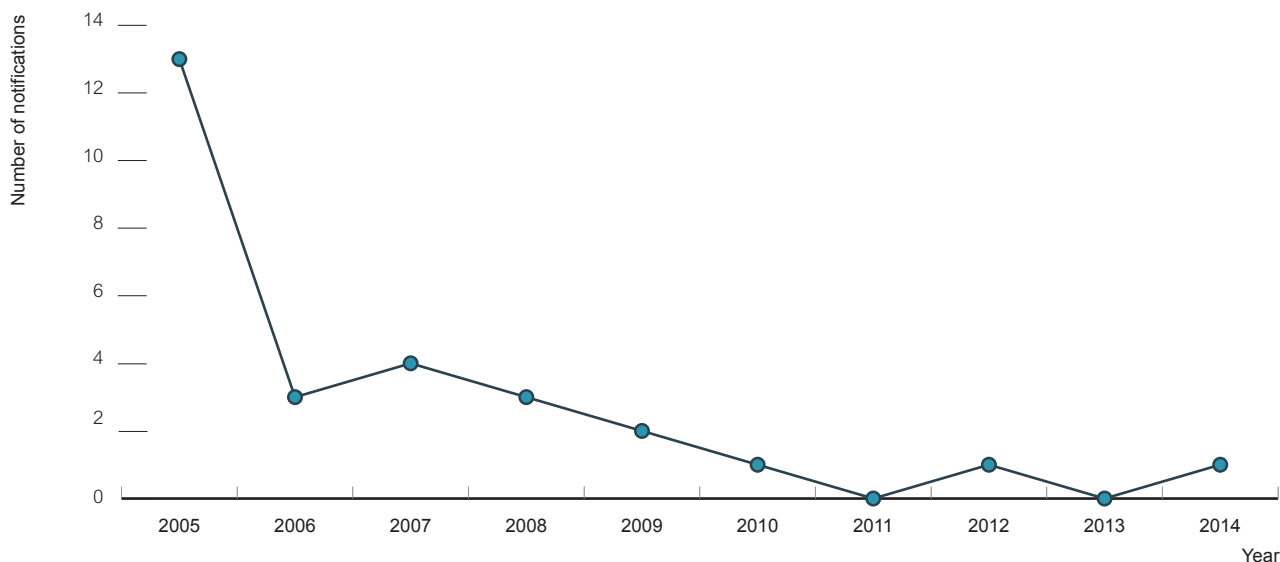
Source: Australian National Notifiable Diseases Surveillance System



Donovanosis

The elimination of donovanosis from Australia is on track, with only two cases detected since 2011 (Figure 136).

Figure 136 Donovanosis notifications 2005 – 2014, by year

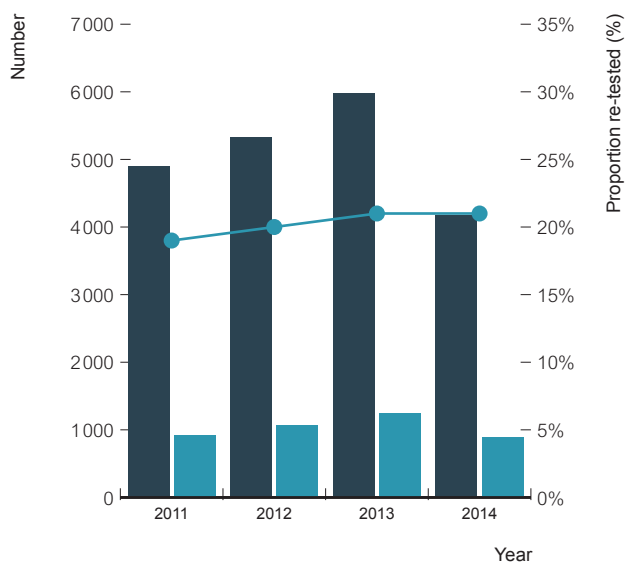


Source: Australian National Notifiable Diseases Surveillance System

STI care

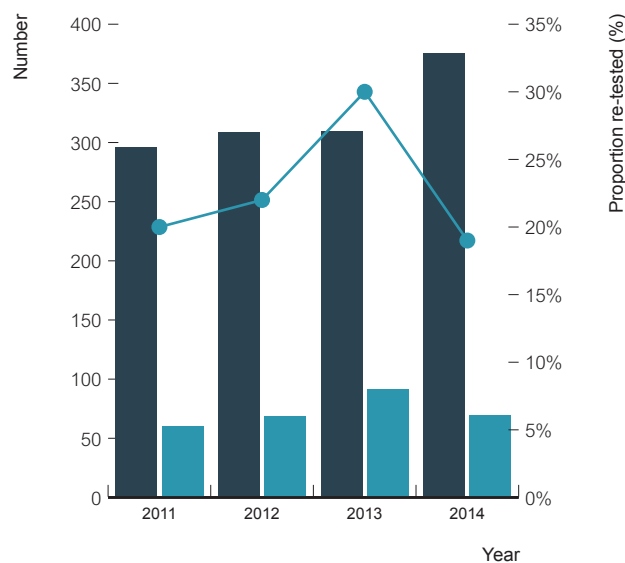
Clinical data from the ACCESS study shows gaps in management of STIs. At the 46 sexual health clinics participating in the ACCESS project, around 20% of people diagnosed with chlamydia were re-tested in 1-4 months, with similar levels at the 20 general practice clinics participating in the ACCESS project (Figures 137 and 138).

Figure 137 Chlamydia re-testing at sexual health clinics, 2011 – 2014



■ # of diagnoses
■ # re-tested in 1-4 mo ● % re-tested in 1-4 months

Figure 138 Chlamydia re-testing at general practice clinics, 2011 – 2014



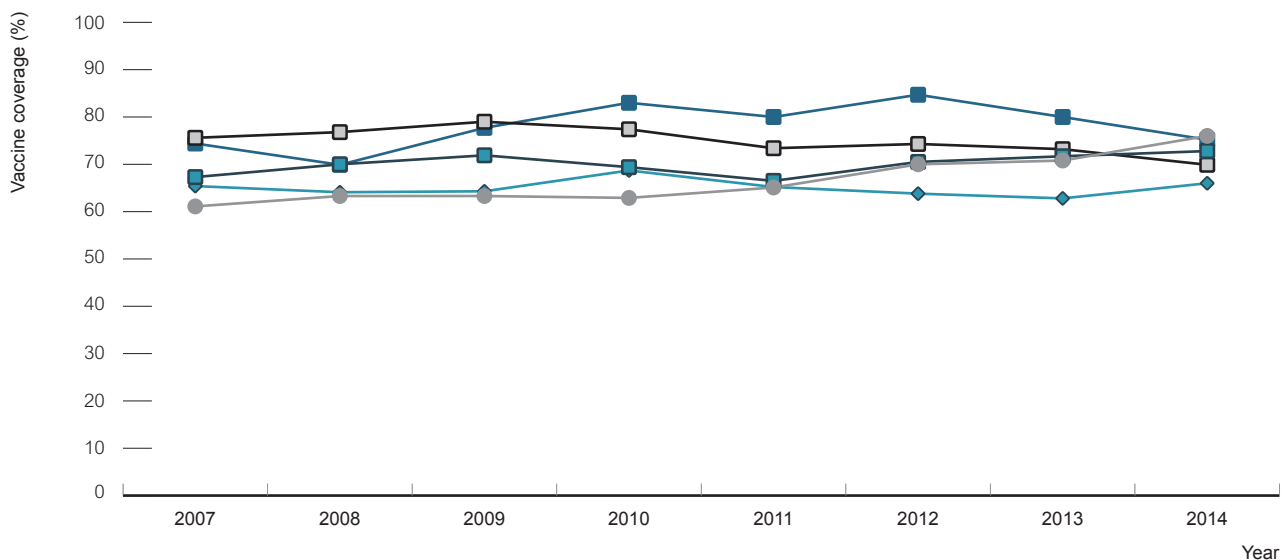
■ # of diagnoses
■ # re-tested in 1-4 mo ● % re-tested in 1-4 months

1 In 2014, initial positive results are only included till the end of August, to allow for time for re-testing

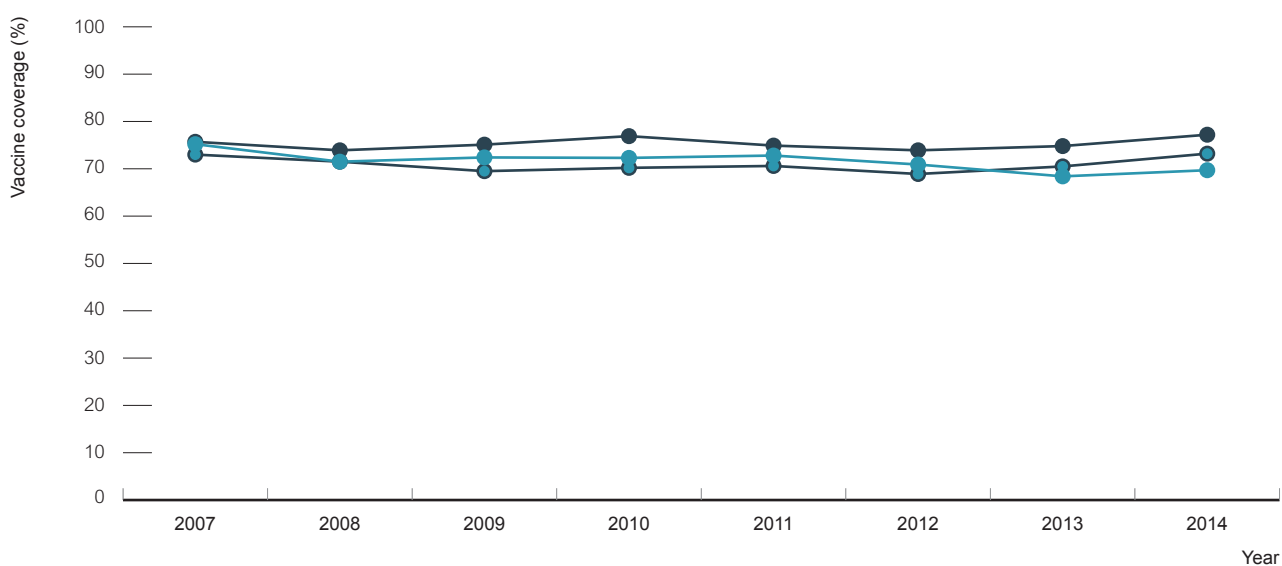
Human papillomavirus infection

Following the introduction of vaccination against human papilloma virus (HPV) in 2007, high vaccination 3-dose coverage has been achieved in females turning 15 years of age (73% in 2014) and boys in 2014 (Figures 139 and 140).

Figure 139 Three dose HPV vaccination coverage for all females turning 15 years of age, 2007 – 2014, by State/Territory



Legend: ACT (grey square), NT (dark blue square), SA (teal square), TAS (light blue diamond), WA (grey circle)

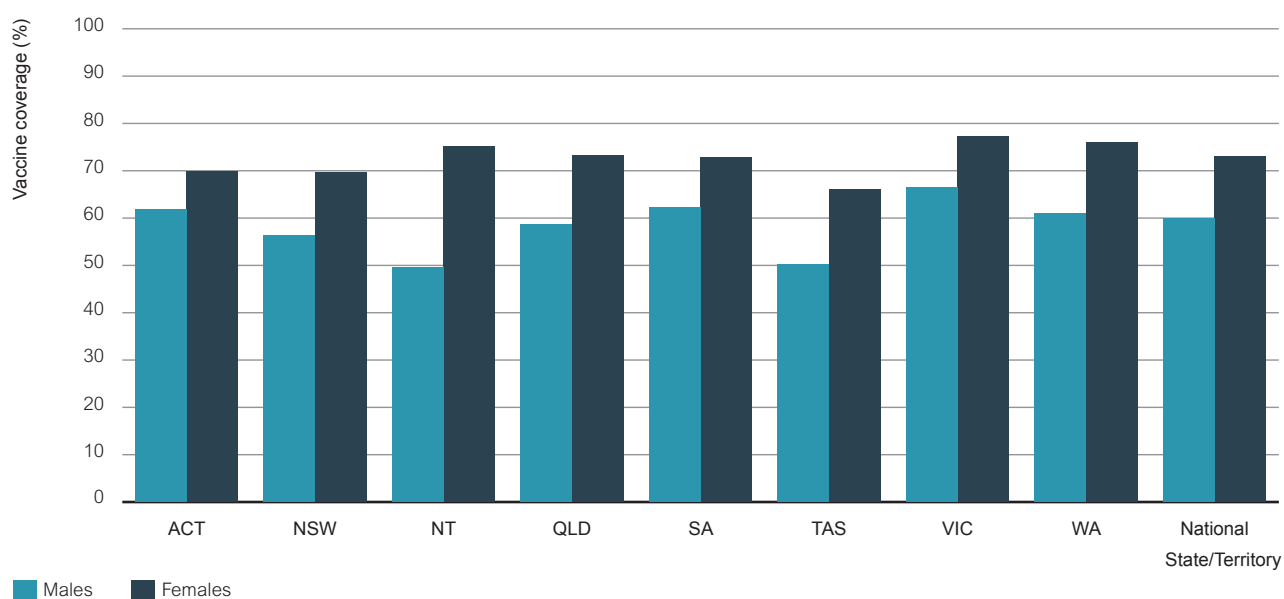


Legend: NSW (light blue circle), QLD (teal circle), VIC (dark blue circle)

Source: National HPV Vaccination Program Register



Figure 140 Three dose HPV vaccination coverage for all males and females turning 15 years of age, 2014



Source: National HPV Vaccination Program Register

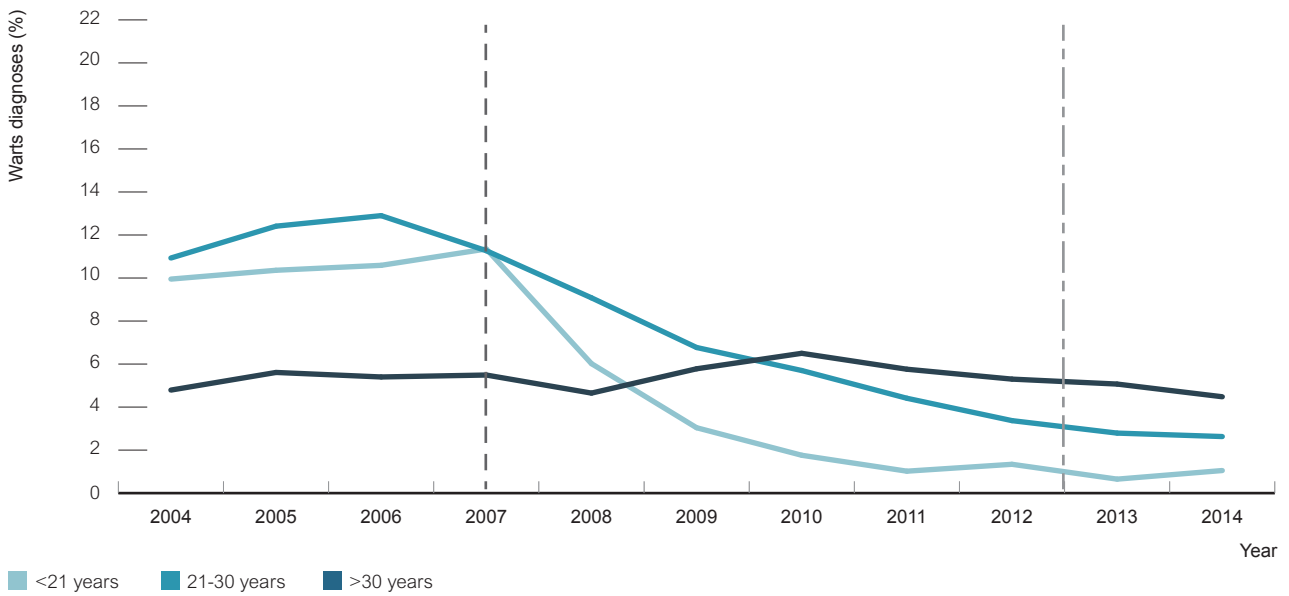
The Genital Warts Surveillance Network is a national sentinel surveillance system for genital warts. The aim of the network is to determine the population effects of the national HPV vaccination program by monitoring the proportion of patients diagnosed with genital warts in various populations (see Methodological Notes).

Information available from 46 sexual health clinics included in the Genital Warts Surveillance Network indicates that among Australian born women, aged 21 years or younger and thus eligible for free HPV vaccine, 11.4% were diagnosed with genital warts in 2007; declining to 1.1% in 2014 (Figure 141). Among Australian born women, aged 21 – 30 years, some of whom were eligible for free HPV vaccine, 11.3% were diagnosed with genital warts in 2007; declining to 2.6% in 2014 (Figure 141). The proportion of women aged >30 years diagnosed with genital warts was unchanged.

Among Australian born heterosexual men, aged 21 years or younger, 11.6% were diagnosed with genital warts in 2007, declining to 1.1% in 2013 (Figure 142); and among heterosexual men aged 21 – 30 years, 18.5% were diagnosed in 2007, declining to 5.6% in 2014 (Figure 142).

The proportion of diagnosed Australian born homosexual and bisexual men has not declined to the extent observed in the heterosexual population (Figure 143). The gradual decline is largely explained by the increasing denominator as asymptomatic men are attracted to the clinics for screening (74% increase between 2004 and 2014).

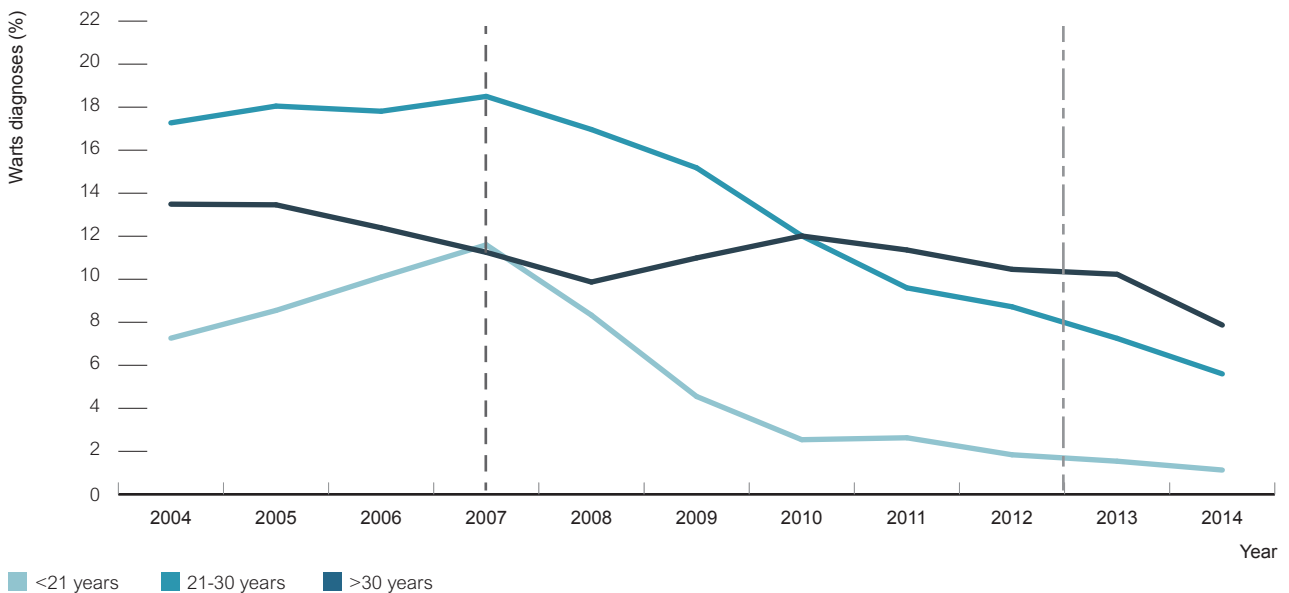
Figure 141 Proportion of Australian born women diagnosed with genital warts at first visit at sexual health clinics, 2004 – 2014, by age group



* The first dotted line represents the start of the national HPV vaccination program for women in mid-2007 and the second dotted line represents the start of the national HPV vaccination program for men in 2013

Source: Genital Warts Surveillance Network

Figure 142 Proportion of Australian born heterosexual men diagnosed with genital warts at first visit at sexual health clinics, 2004 – 2014, by age group

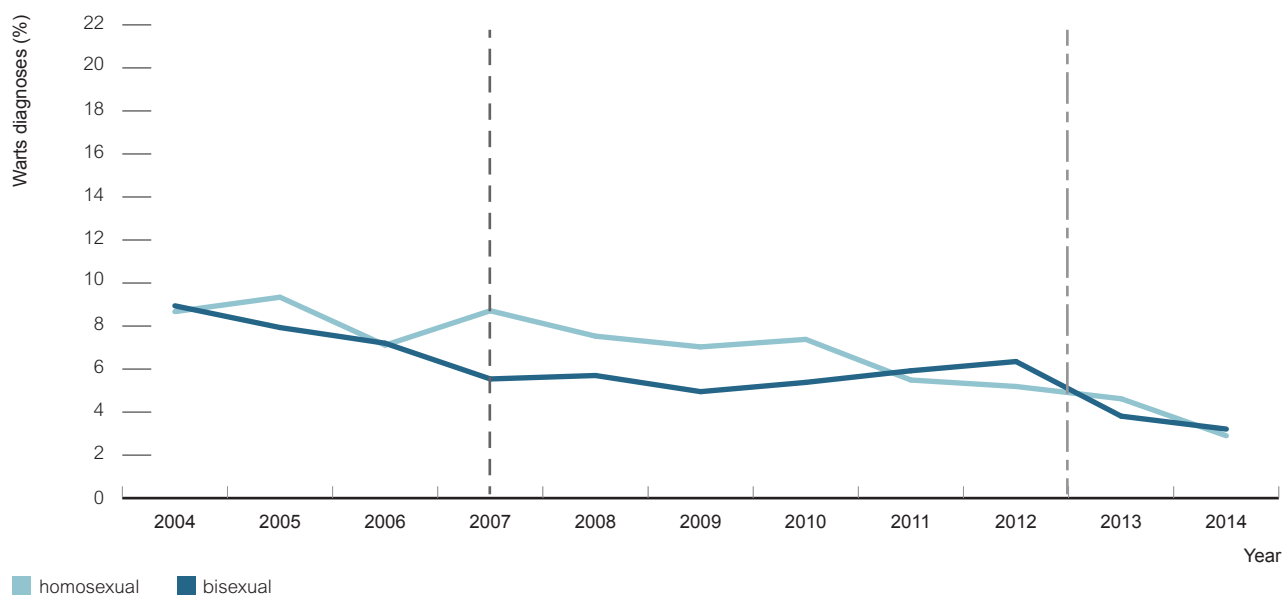


* The first dotted line represents the start of the national HPV vaccination program for women in mid-2007 and the second dotted line represents the start of the national HPV vaccination program for men in 2013

Source: Genital Warts Surveillance Network



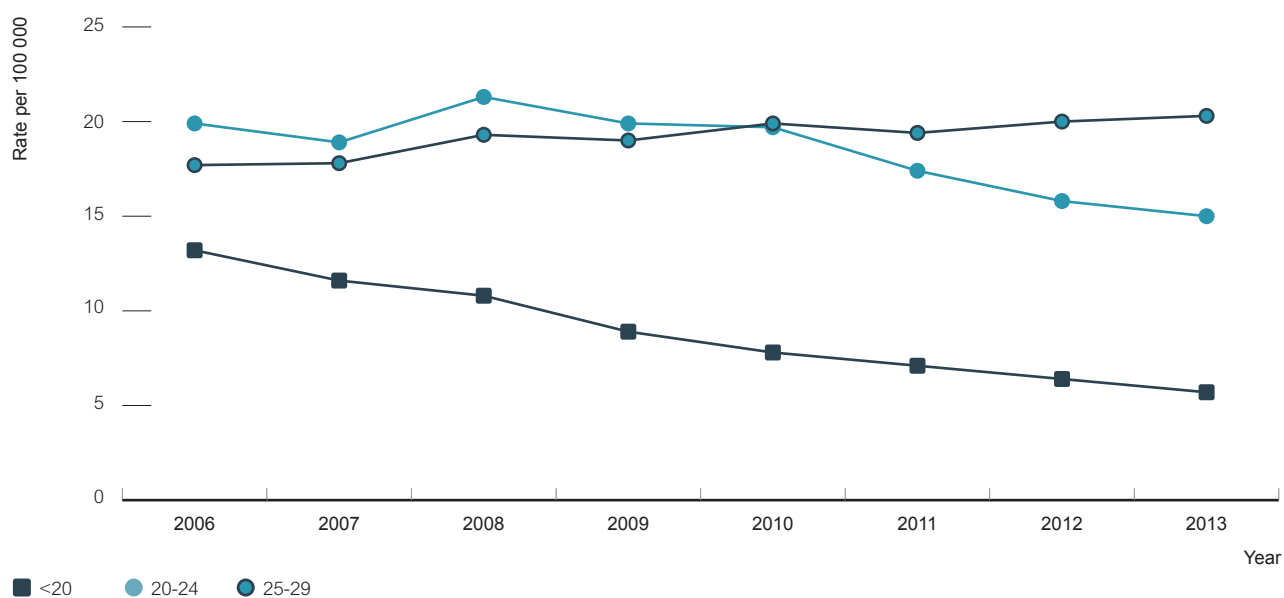
Figure 143 Proportion of Australian born homosexual or bisexual men diagnosed with genital warts at first visit at sexual health clinics, 2004 – 2014, by year



Source: Genital Warts Surveillance Network

According to the Australian Institute of Health and Welfare 'Cervical Screening in Australia 2012 – 2013' from 2006 to 2013 the rate of high-grade abnormality detected by histology per 1 000 screened in <20 year olds, halved from 13.2 to 5.7 (Figure 144).

Figure 144 Women with high-grade abnormality detected by histology, per 1 000 screened 2006 – 2013



Source: Australian Institute of Health and Welfare 'Cervical Screening in Australia 2012 – 2013'



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Methodological notes

The National HIV Registry

National surveillance for newly diagnosed HIV infection

HIV infection is a notifiable disease in each State/Territory health jurisdiction in Australia. All new HIV diagnoses are reported by doctors and laboratories to State/Territory health authorities. Information sought on the notification form includes; name code (based on the first two letters of the family name and the first two letters of the given name), sex, date of birth, post code, country of birth, Aboriginal and Torres Strait Islander status, date of HIV diagnosis, CD4+ cell count at diagnosis, source of exposure to HIV and evidence of newly acquired HIV infection (see below). If the person is born overseas, language spoken at home and date of arrival in Australia are also collected. These data are then forwarded to the Kirby Institute for collation and analysis. The database where HIV diagnoses are stored is referred to as the 'National HIV registry.'

Information on country of birth has been reported by all jurisdictions since 2002 and language spoken at home has been reported by New South Wales, Victoria and Queensland since 2004 and by all jurisdictions since 2008.

In New South Wales, information on cases of newly diagnosed HIV infection was sought only from the diagnosing doctor prior to 2008. From 2008, information was also sought from the doctors to whom the person with HIV infection was referred, and follow-up was carried out for cases for which the information sought at HIV notification was incomplete. These new procedures resulted in more complete information on new HIV diagnoses and reassignment of cases found to have been newly diagnosed in earlier years.

The procedures used for national HIV surveillance of newly diagnosed HIV infection are available at: <http://kirby.unsw.edu.au/>.

Newly acquired HIV infection

Newly acquired HIV infection is defined as newly diagnosed infection with evidence of a negative or indeterminate HIV antibody test or a diagnosis of primary HIV infection (seroconversion illness) within 12 months of HIV diagnosis. Information on the date of the last negative or indeterminate test or date of onset of primary HIV infection has been routinely sought from each State/Territory health jurisdiction since 1991.

Late and advanced HIV diagnosis

Advanced HIV diagnosis is defined as newly diagnosed HIV infection with a CD4+ cell count of less than 200 cells/ μ l, and late HIV diagnosis was defined as newly diagnosed HIV infection with a CD4+ cell count of less than 350 cells/ μ l.

Rates of HIV diagnosis

Notification rates were calculated using population denominators obtained from the Australian Bureau of Statistics (ABS) by state, year, sex and age (ABS series 3101051 – 3101058) and were standardised using ABS Standard Population Catalogue 3100DO003_201212. Population denominators by country/region of birth were based on the standard Australian Classification of Countries (ABS series 1269.0) with proportion of population by region of birth and year ascertained from ABS SuperTable data. Population denominators by year, sex, age and state for Aboriginal and Torres Strait Islanders were obtained from ABS catalogue 32380do001_2011. ABS regional population denominators by age, sex, indigenous status and state were obtained from ABS 2011 census data using remoteness according to postcode as assigned by ABS catalogue 1270055006_CG_POSTCODE_2012_RA_2011. The proportion of the population by remoteness was held constant over the range of data presented and used to evaluate remoteness populations by year using ABS population data matched by state, age, sex and Aboriginal and Torres Strait Islander status.

Rates of HIV in Aboriginal and Torres Strait Islander populations were compared to Australian born non-Indigenous populations unless otherwise stated.

Australian Paediatric Surveillance Unit

Cases of perinatal exposure to HIV were reported to the national HIV surveillance centre by paediatricians, through the Australian Paediatric Surveillance Unit (APSU) (<http://www.apsu.org.au>), and through assessment of perinatal exposure in children born to women with diagnosed HIV infection. Diagnoses of HIV infection in women and their exposed children were notified through national HIV surveillance procedures. Further details are given in McDonald et al (1997) ¹⁴ and McDonald et al (2009) ¹⁵.

Australian National Notifiable Diseases Surveillance System

The National Notifiable Diseases Surveillance System (NNDSS) (<http://www.health.gov.au/internet/main/publishing.nsf/content/cda-surveil-nndss-nndssintro.htm>) was established in 1990 under the auspices of the Communicable Diseases Network Australia. NNDSS co-ordinates the national surveillance of more than 50 communicable diseases or disease groups. Under this scheme, notifications are made to the States or Territory health authority under the provisions of the public health legislation in their jurisdiction. Computerised, de-identified unit records of notifications are supplied to the Australian Government Department of Health on a daily basis, for collation, analysis and publication on the Internet, (updated daily), and in the quarterly journal *Communicable Diseases Intelligence*.

Notification data provided include a unique record reference number, state or territory identifier, disease code, date of onset, date of notification to the relevant health authority, sex, age, Aboriginal and Torres Strait Islander status and postcode of residence.

Viral hepatitis

New diagnoses of hepatitis B and C were notifiable conditions in all State/Territory health jurisdictions in Australia. Cases were notified by the diagnosing laboratory, medical practitioner, hospital or a combination of these sources, through State/Territory health authorities, to the National Notifiable Diseases Surveillance System (NNDSS). Population rates of diagnosis of viral hepatitis were calculated for each State/Territory using yearly population estimates, provided by the Australian Bureau of Statistics.

Hepatitis B infection and hepatitis C infection was classified as newly acquired if evidence was available of acquisition in the 24 months prior to diagnosis (Communicable Diseases Network Australia 2004). Diagnoses of newly acquired hepatitis B infection was notifiable in all health jurisdictions. Diagnoses of newly acquired hepatitis C infection were recorded in all health jurisdictions other than Queensland.

Sexually transmissible infections

Diagnoses of specific sexually transmissible infections were notified by State/Territory health authorities to the National Notifiable Disease Surveillance System (NNDSS), maintained by the Australian Government Department of Health. Chlamydia was notifiable in all health jurisdictions except New South Wales prior to 1998; chlamydia was made notifiable in New South Wales in 1998. Gonorrhoea was a notifiable condition in all health jurisdictions and infectious syphilis became notifiable in all jurisdictions in 2004. In most health jurisdictions, diagnoses of sexually transmissible infections were notified by the diagnosing laboratory, the medical practitioner, hospital or a combination of these sources (see Table below).

Table: Source of notification of specific sexually transmissible infections to the National Notifiable Diseases Surveillance System by State/Territory

	Australian Capital Territory	New South Wales	Northern Territory	Queensland	South Australia	Tasmania	Victoria	Western Australia
Diagnosis								
Gonorrhoea	Doctor Laboratory Hospital	Laboratory	Doctor Laboratory	Doctor Laboratory Hospital	Doctor Laboratory	Doctor Laboratory Hospital	Doctor Laboratory	Doctor
Infectious Syphilis	Doctor Laboratory Hospital	Doctor Laboratory Hospital	Doctor Laboratory	Doctor Laboratory Hospital	Doctor Laboratory	Doctor Laboratory Hospital	Doctor Laboratory	Doctor
Chlamydia	Doctor Laboratory Hospital	Laboratory	Doctor Laboratory	Doctor Laboratory Hospital	Doctor Laboratory	Laboratory	Doctor Laboratory	Doctor
Donovanosis	Not notifiable	Laboratory	Doctor Laboratory	Doctor Laboratory Hospital	Doctor Laboratory	Laboratory	Doctor Laboratory	Doctor Laboratory

Respective rates of notification for chlamydia, gonorrhoea and infectious syphilis were calculated using analogous procedures to those described above for HIV notifications (see HIV new diagnoses methodology).

Number of notifications of congenital syphilis and donovanosis were obtained from the NNDSS.

Diagnosis and care cascades

HIV diagnosis and care cascade

Estimating the number of people with diagnosed infection

The number of people living with diagnosed HIV infection (PLDHIV) was estimated using annual notifications, removal of duplicates, estimated mortality rates, and overseas migration rates.

HIV notifications data were provided from the National HIV registry. Potential duplicate records were removed using methods previously used by Nakhaee F, Black D, Wand et al¹⁶. The number of deaths up to 2003 were estimated based on results from a linkage study conducted between Australia's National Death Index and the National HIV Registry for cases to the end of 2003¹⁶. The number of deaths after 2003 were estimated using annual mortality rates from the Australian HIV Observational Database (AHOD)¹⁷. Between 2004 and 2014, similar annual mortality rates were estimated for the AHOD cohort regardless of whether people were retained, lost or returned to follow up. We used the annual overall mortality rate from AHOD as the best estimate and the 95% confidence interval as a range in our calculations for the number of PLDHIV.

We estimated overall overseas migration rate for PLDHIV using data from the Australian Bureau of Statistics (ABS) data on the annual number of people in the overall population who permanently leave Australia (provided by the ABS series 340102) and the estimated resident population (ABS series 310104). Due to the requirement for ongoing care and treatment (which is not subsidised in many countries) we assumed a range in the annual overseas migration rate between zero and the overall rate of permanent departure with a best estimate in the middle.

The overall estimate of the number of PLDHIV in Australia each year was obtained by adding the number of unique notifications to the previous year's estimate and subtracting the number of deaths and permanent overseas migrants using the mortality and migration rates.

State and territory and sub-population estimates

Estimates for the number of PLHIV and PLDHIV for each state and territory, mode of exposure, region of birth, and Aboriginal and Torres Strait Islander status assumed the proportions of duplicates, overseas migration rate, and HIV mortality rate for each population equal the values for the overall population. Mortality rates were adjusted for the Indigenous and non-Indigenous Australian born population to reflect higher overall mortality in Aboriginal and Torres Strait Islanders as reported by the ABS (<http://www.abs.gov.au/ausstats/abs@.nsf/mf/3302.0>).

The resident population in each state was estimated using ABS estimates for interstate arrivals and departures (series 3101016). We assumed PLDHIV move between states at the same rate as the overall population as the provision of care and treatment is maintained across jurisdictions.

Estimating the number of people living with HIV

To estimate the overall number of people living with HIV (PLHIV), both diagnosed and undiagnosed, we used a back projection method to estimate the proportion of men who have sex with men (MSM) and non-MSM PLHIV who are undiagnosed¹⁸.

A weighted average for the overall population of PLHIV who are undiagnosed was calculated by multiplying the proportion of MSM and non-MSM undiagnosed by the proportion of all diagnoses attributed to male homosexual contact and other exposure. The overall prevalence of HIV in Australia was then estimated by inflating the calculated number of people living with diagnosed infection by the estimated level of undiagnosed infection.

Estimating antiretroviral treatment coverage

The number of people receiving antiretroviral treatment (ART) was estimated using a 10% sample of the Pharmaceutical Benefits Scheme (PBS) patient level script claims data provided by the company Prospecion. This is a randomised patient level, de-identified PBS script claims data set from 2006-present. Currently the data set has 170 million script claims and 3 million patients. It includes all PBS listed drugs with HIV indications. The overall total number of people receiving ART was taken as the number of unique patients in the PBS data set who filled in at least one script in the 12 months prior to the end of December 2014 multiplied by 10. Given the size of the sample we assumed a negligible range in this estimate.

Estimating levels of virological suppression

We define virological suppression as less than 400 viral copies per ml. The proportion of people on ART with viral suppression was taken to be the proportion of people recorded in the Australian HIV Observational Database (AHOD) who had less than 400 copies per ml at their last viral load test. Uncertainty bounds were taken to be the proportion of people recorded in AHOD who had less than 1 000 copies per ml and 50 copies per ml at their last viral load test. We estimate the number of PLHIV on ART with viral suppression by multiplying this proportion and range by estimated the number of people receiving ART.

Hepatitis C diagnosis and care cascade

Number of people living with hepatitis C

This estimate was derived using a difference equation mathematical model produced collaboratively between the Center for Disease Analysis and the Kirby Institute. The model uses estimates of the number of people who had injected drugs in Australia over the last three decades, the pattern of injecting drug use and estimates of hepatitis C incidence among people who inject drugs derived from cohort studies, to determine hepatitis C incidence as a result of injecting drug use. These estimates of HCV incidence due to injecting drug use were then adjusted in accordance with epidemiological data to allow for hepatitis C infections through other transmission routes, including nosocomial infection in migrants. Estimates of the number of people experiencing long term sequelae of chronic hepatitis C infection were then obtained from the estimated pattern of hepatitis C incidence using rates of progression derived from cohort studies. Estimates of the numbers of people living with chronic hepatitis C infection in 2014 were adjusted to allow for mortality related to hepatitis C infection, injecting drug use and unrelated to hepatitis C infection or injecting. Further information about the methods can be obtained by contacting the Center for Disease Analysis <http://www.centerforda.com/>

Number of people diagnosed and living with chronic hepatitis C infection

All hepatitis C notifications from 1991 to 2014 were totalled. The total hepatitis C notification numbers was adjusted for spontaneous hepatitis C clearance, mortality and hepatitis C cure. The proportion with spontaneous hepatitis C clearance was estimated at 20%. The proportion with mortality among people with a hepatitis C notification in New South Wales (1993 – 2012) was extrapolated to the total number of hepatitis C notifications in Australia. The estimated number of individuals with cure of hepatitis was deducted from the number of total hepatitis C notifications.

Number of people who have ever received HCV treatment

The numbers of hepatitis C treatment prescriptions dispensed to public patients, reported by the Pharmaceutical Benefits Scheme (PBS) were used for this estimate. The numbers of hepatitis C treatment dispensed were adjusted for multiple counting considering the duration of treatment for each regimen, and treatment compliance rate. For genotype-specific regimens, a distribution of 50% genotype 1 and 50% genotypes 2/3 was assumed. For estimates in 2013 and 2014, data from longitudinal tracking of a 10% random sample of PBS prescriptions were used.

Number of people who have ever achieved treatment-induced hepatitis C cure

The estimated number of people receiving hepatitis C treatment in each year was multiplied by the proportion with sustained virological response (SVR) reported in the literature (regimen-specific). Australian data on the proportion with SVR were prioritized, if available. A distribution of 50% genotype 1 and 50% genotypes 2/3 among people receiving hepatitis C treatment was assumed.

The hepatitis B diagnosis and care cascade

Cascade estimates were developed by the Epidemiology Unit, Victorian Infectious Diseases Reference Laboratory, Doherty Institute.

Diagnosis

The proportion of people living with chronic hepatitis B who have been diagnosed was estimated using model-derived estimates of the total number of people who have ever had chronic hepatitis B in Australia as the denominator and the cumulative number of notifications of hepatitis B from 1971 – 2013 as the numerator. Mortality is not included in this aspect of the analysis, and therefore the proportion derived represents those ever having lived with chronic hepatitis B who have ever been diagnosed.

Monitoring

The number of people who received monitoring for chronic hepatitis B in 2013 was determined using Department of Human Services data regarding rebate for an annual hepatitis B viral load test, which is recommended for all people living with chronic hepatitis B. This item is specific to people living with chronic hepatitis B who are not receiving treatment, and is limited to one test per year.

Treatment

The number of people receiving treatment for chronic hepatitis B in 2013 was derived using pharmaceutical dispensing data from the Department of Human Services Australia regarding the number of individuals receiving a treatment indicated for hepatitis B virus infection (adefovir, entecavir, lamivudine, telbivudine, tenofovir, and pegylated interferon). Patient-level estimates were provided, allowing removal of those receiving tenofovir for the treatment of HIV and to avoid duplication of people receiving combination therapy.

Detailed methodology and source references can be found in the published paper which described the derivation of these estimates¹⁹ and in the 2nd National Report of the Hepatitis B Mapping Project (www.ashm.org.au/hbvmapping).

A combined estimate of people in care for chronic hepatitis B was derived by combining the number who received monitoring while not on treatment and those on treatment. Each of these estimates are expressed as a proportion of the total number living with chronic hepatitis B as derived using the prevalence methodology outlined above.

Number of people living with hepatitis B

Estimates of the number of people living with hepatitis B virus infection in Australia were developed by the Epidemiology Unit, Victorian Infectious Diseases Reference Laboratory, Doherty Institute. These estimates were derived from two sources:

The overall prevalence of chronic hepatitis B was determined using a deterministic compartmental mathematical model of hepatitis B virus infection in the Australian population from 1951 – 2050. The model was parameterised using a wide range of data sources including the Australian Bureau of Statistics, existing mathematical models, surveillance notifications, epidemiological research and clinical studies. Important factors such as migration, attributable and all-cause mortality, the ageing of the population, the variable natural history of chronic hepatitis B infection and the impact of vaccination were all incorporated. Model construction included sensitivity analyses around critical parameters such as the force of infection (FoI) and migration estimates. Model outcomes have been validated using a range of external data, particularly national and Victorian serosurvey results. These were not used to parameterise the model to allow independent comparison with modelled outcomes. The plausible range around estimates of hepatitis B prevalence was generated using the range of uncertainty inherent in original prevalence estimates applied in the Census-based methodology described above, with the range in estimated attributable deaths derived by adopting low and high mortality estimates directly in the model.

The proportion of people living with chronic hepatitis B in each population group and the relative prevalence in each was determined using the Census method, attributing prevalence of chronic hepatitis B by country of birth, Aboriginal and Torres Strait Islander status, and other risk status applied to Australian population data provided in the 2011 Census. The estimated prevalence in these groups was derived as a proportion of the total Census population as estimated in 2011, and then applied of the estimated number of people living with chronic hepatitis B in 2014 derived using the mathematical model as outlined above. Detailed methodology and sources, including individual seroprevalence estimates and population figures, can be obtained from the published paper ²⁰.

HBV prevalence

The estimated prevalence of chronic hepatitis B according to country of birth was derived from combining multiple published sources into an average point estimate. The estimates used comprised two Australian antenatal seroprevalence studies^{21,22}; a study of hepatitis B prevalence in migrants to the United States²³; and the most recent global seroprevalence study conducted as part of the Global Burden of Disease Project²⁴. The Australian prevalence figure was obtained from local modeled estimates²⁰.

The chlamydia diagnosis and care cascade

Notifications

Number of chlamydia notifications for 15 – 29 year old males and females in Australia was obtained directly from the National Notifiable Diseases Surveillance System (NNDSS).

Estimating new infections

New *Chlamydia trachomatis* infections were estimated using the modelling approach of Ali et al. ²⁵. This method uses a Bayesian statistical approach to calibrate model parameters to the notifications data from NNDSS, the number of tests for *Chlamydia trachomatis* obtained by Medicare (item numbers 69316, 69317, and 69319), and annual population estimates for each sex and age group published by the Australian Bureau of Statistics (ABS) over 2001 – 2014. Model outcomes were validated through comparison against *Chlamydia* prevalence among 16 – 29 year olds measured in 2011 by the Australian Chlamydia Control Effectiveness Pilot (ACCEPT).

The Ali et al. model outputs 95% credible intervals for the annual number of incident chlamydia cases in 15 – 19, 20 – 24, and 25 – 29 year old males and females. We summed the incident chlamydia cases for each age group to estimate the number of new infections. The range corresponds to the lower and upper bound of the credible intervals with the midpoint corresponding to our best estimate.

Estimating treatment, retesting, and number remaining uninfected

We estimated chlamydia treatment following diagnosis, retesting after treatment, and the number negative at retesting using multiple sources describing chlamydia infection and care across urban, regional, and remote areas and a number of service contexts.

From the NNDSS notifications data 69%, 25%, and 5% of diagnoses in 15 – 29 year olds occur across urban, regional, and remote areas respectively. Based on the Bourne et al. study in 2013, 14% of these diagnoses occurred in sexual health clinics ²⁶. We divided the remainder of diagnoses into those made in general practice (81%) and other contexts (5%) using data from the first Australian Study of Health and Relationships data published in 2003 ²⁷.

Treatment following diagnosis

Based on data from New South Wales sexual health clinics almost all people diagnosed with chlamydia in urban and regional areas were treated (ranging from 99-100% of those diagnosed) in 2013²⁸. In New South Wales remote areas the percentage diagnosed is a little lower at 96% ²⁸. The Foster et al. study in 2014 produced a lower estimate for remote areas in the Northern Territory of 85% ²⁹. Based on this data we assumed 90% of those diagnoses in remote areas are treated. Taking a weighted average by multiplying the notifications breakdown across regions by the estimated percentage treated, we estimate 98.8% of people diagnosed with chlamydia were treated in 2014. We assumed a range from 90% (corresponding to the percentage treated in remote areas) to 100%. Assuming the same treatment proportion and range for males and females and multiplying by the number of notifications we estimated the number of 15 – 29 year old males and females who received treatment after diagnosis.

Retesting after treatment

From the Australian Collaboration for Coordinated Enhanced Sentinel Surveillance of STIs and BBVs (ACCESS), see methods below, 17 – 22% of 15 – 29 year olds diagnosed with chlamydia in national urban and regional sexual health clinics were retested for Chlamydia trachomatis infection 1-4 months after treatment. In urban and regional general practice the retesting rate is higher ranging from 20 to 29%. For remote areas ACCESS data was unavailable, so we used results from the STRIVE randomised community trial which reported 20% of 15 – 29 year olds diagnosed with chlamydia retested 1-4 months after treatment. Taking a weighted average by multiplying the notifications breakdown across regions by the diagnoses breakdown across contexts we estimate 24.2% of people diagnosed with chlamydia are retested after treatment. We assumed a range from 20% (corresponding to the percentage retested in remote areas) to 30%. Assuming the same retesting proportion and range for males and females and multiplying by the number of notifications we estimated the number of 15 – 29 year old males and females who retested for chlamydia after treatment.

Number remaining uninfected at retesting

From ACCESS (see below), 22 – 23% of 15 – 29 year olds retested for chlamydia in national urban and regional sexual health clinics test positive for Chlamydia trachomatis at their retest. In urban and regional general practice the positivity rate is much lower ranging from 4% to 11%. For remote areas ACCESS data was unavailable, so we used results from the STRIVE study which reported 5% of 15 – 29 year olds who retested for chlamydia were positive. Taking a weighted average by multiplying the notifications breakdown across regions by the diagnoses breakdown across contexts we estimate 7.8% of people were positive at their retest overall. This means 92.2% of 15 – 29 year olds remained uninfected at retesting. We assumed a relative range of $\pm 10\%$ in the proportion negative at retest. Assuming the same uninfected at retest proportion and range for males and females and multiplying by the number of people who retested within 1-4 months we estimated the number of 15 – 29 year old males and females who remain uninfected at retest.

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

Briefly, the ACCESS Project is a national sexual health surveillance network using routinely collected de-identified demographic, testing, diagnosis and treatment data from health services and laboratories across Australia to monitor the sexual health of high risk population groups including gay and bisexual men, injecting drug users, Aboriginal and Torres Strait Islander people, sex workers, and young people. The ACCESS project has been described in more detail elsewhere³⁰. The project is managed collaboratively between the Kirby Institute, Burnet Institute and the National Reference Laboratory. In total, ACCESS collects data from over 110 health services, pharmacies and laboratories.

ACCESS data were used for the following indicators:

- The proportion of people attending high case load general practice clinics and/or sexual health clinics tested for HIV, BBV and STI and where relevant re-tested.
- The result of the last viral load amongst HIV-positive patients seen at high case load general practice clinics and/or sexual health clinics
- HIV incidence was estimated using methodology similar to that used by Iversen et al³¹. HIV incidence was calculated based on an observed positive HIV test in patients with more than one HIV test with the first test result being negative. Patients were at-risk between first negative HIV test and the later of last ever negative HIV test or seroconversion (the midpoint between last negative HIV-test and first positive HIV-test). For any calendar year, at-risk time commenced from the later of 1 January for that year and first ever negative HIV test if in that year until the earlier of seroconversion date, last ever negative HIV test if not HIV-positive and 31-December for that year. HIV incidence and confidence intervals were calculated using the person years method.
- Hepatitis B susceptibility in people attending sexual health clinics, with patients without past exposure, vaccination of chronic/acute disease categorised as susceptible. Classification of hepatitis B vaccination and susceptibility among sexual health service attendees drew upon pathology results for tests of hepatitis B surface antigens (HBsAg), core antibodies (HBcAb), and surface antibodies (HBsAb). The table below provides an overview of how these tests were used to organise patient status. Classification also drew upon clinical diagnoses of acute or chronic hepatitis B. Finally, vaccination status as recorded in a patient's file was also used to classify vaccination and susceptibility. Patients were only included in this analysis if one or more of these data were available and if they were identified as Australian-born.

Table: Classification of patient status by Hepatitis B marker

	Hepatitis B marker		
	HBsAg	HBcAb	HBsAb
Vaccinated	Neg	Neg	Pos
Past exposure	Neg	Pos	Neg
Susceptible*	Neg	(Neg)	(Neg)
Infected	Pos	Pos	Neg

*In some cases a negative HBsAg tests was used as the sole test for HBV susceptibility among patients reporting no previous vaccination

- The distribution of infectious syphilis diagnoses among HIV-positive and HIV-negative gay and bisexual men.
- Proportion of diagnoses of genital warts at first visit to sexual health clinics.

The Australian Gonococcal Surveillance Program (AGSP)

The AGSP is a collaborative project involving gonococcal reference laboratories in each State/Territory and is coordinated by the New South Wales Gonococcal Reference Laboratory at the Prince of Wales Hospital, Sydney. The primary objective of the program is to monitor antibiotic susceptibility of isolates of *Neisseria gonorrhoea*, to assist in the effective treatment of gonorrhoea. Information on sex and site of isolation of gonococcal strains was also collected (AGSP 2014). The proportion of gonococcal referred isolates with decreased susceptibility to ceftriaxone (MIC 0.06 – 0.125mg/L) were obtained from the AGSP.

The Australian HIV Observational Database (AHOD)

The Australian HIV Observational Database (AHOD) is a collaborative study, recording observational data on the natural history of HIV infection and its treatment. The primary objective of AHOD is to monitor the pattern of antiretroviral treatment use by demographic factors and markers of HIV infection stage. Other objectives are to monitor how often people with HIV infection change antiretroviral treatments and the reasons for treatment change. Methodology associated with AHOD has been described in detail elsewhere³².

Information is collected from hospitals, general practitioner sites and sexual health centres throughout Australia. Participating sites contribute data biannually from established computerised patient management systems. Core variables from these patient management systems are transferred electronically to the Kirby Institute, where the data are collated and analysed. By March 2014, 31 participating clinical sites enrolled over 3 900 people into AHOD.

AHOD data were used for the following indicators:

- The result of the last viral load test amongst HIV-positive patients.

Australian Institute of Health and Welfare 'Cervical Screening Australia 2012 – 2013'

The National Cervical Screening Program (NCSP) aims to reduce cases of cervical cancer, as well as associated illness and death, through an organised approach to cervical screening aimed at identifying and treating high-grade abnormalities before potential development of cervical cancer.

This Cervical Screening Australia 2012 – 2013 is the latest in the Cervical screening in Australia series, which is published annually to provide regular monitoring of NCSP participation and performance.

The rate of high grade abnormalities detected by histology in cervical screening was obtained from the Australian Institute of Health and Welfare 'Cervical Screening Australia 2012 – 2013'³³ (<http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=60129550872>).

The Australian Needle and Syringe Program Survey

Briefly, the ANSPS is conducted annually over a 1-2 week in October at more than 50 needle and syringe programs (NSP) to provide serial point prevalence estimates of HIV and hepatitis C and to monitor injecting behaviour among people who inject drugs (PWID). All clients attending needle and syringe program (NSP) sites during one week in 2009 (51 sites), 2010 (53 sites), 2011 (53 sites), 2012 (52 sites) and 2013 (50 sites) were asked to complete a brief, self-administered questionnaire and to provide a finger prick blood spot sample for HIV and hepatitis C antibody testing. The ANSPS methodology has been described in detail elsewhere³⁴.

ANSPS data were used for the following indicators:

- Proportion of respondents reporting inconsistent condom use in the last month with non-regular sex partners.
- Proportion reporting receptive syringe sharing. Receptive syringe sharing was determined from the question. *“How many times in the last month did you reuse a needle and syringe after someone else had used it, including your sex partner (even if it was cleaned)?”*
- The proportion of people who inject drugs reporting a HIV test in the past 12 months.
- Hepatitis C prevalence among survey respondents.
- Proportion of self-reported testing for hepatitis C in the last 12 months.
- Proportion of people seen at NSPs reporting current or past hepatitis C treatment.
- Incidence of hepatitis C infection was monitored among ANSPS respondents. Incidence of hepatitis C infection was calculated among people who were retested following a negative test for hepatitis C antibody when first assessed at the Centre. Repeat hepatitis C antibody testing was carried out, based on the assessment of risk behaviour for hepatitis C infection. The timing of hepatitis C seroconversion was estimated as the mid-point between the last negative test and the first positive test. Indeterminate hepatitis C antibody tests were considered to be negative in the analysis.

The Australian and New Zealand Liver Transplant Registry (ANZLTR)

ANZLTR is a network of liver transplant centres in Australia and New Zealand which has collected information on the characteristics of people undergoing liver transplantation. People undergoing liver transplantation have been routinely tested for hepatitis B infection and for hepatitis C infection since antibody testing became available in 1990. Information was sought on the primary and secondary causes of liver disease including the results of tests for hepatitis B virus and hepatitis C virus. The information was forwarded to the Liver Transplant Registry located at Princess Alexandra Hospital in Brisbane. The number of liver transplants by primary cause of liver disease and hepatitis status where the primary diagnosis was hepatocellular carcinoma was obtained from the ANZLTR.

The Australian Red Cross Blood Service

Estimated prevalence of HIV, HBV and HCV infection in blood donors was obtained from the Australian Red Cross Blood Service. All blood donations in Australia have been screened for HIV-1 antibodies since May 1985, for HIV-2 antibodies since April 1992 and for hepatitis C antibody from 1990. Prior to donation, all donors are required to sign a declaration that they do not have a history of any specified factors associated with a higher risk of HIV infection and other bloodborne infections. In all State/Territory health jurisdictions, detailed information is routinely sought on donors found to have antibody to HIV-1, HIV-2 or hepatitis C, and reports are routinely forwarded to the Kirby Institute.

The Australian Study of Health and Relationships 2 (ASHR2)

The ASHR2 is led by Professor Juliet Richters, Professor Chris Russel, Dr Richard de Visser, Professor Judy Simpson and Professor Andrew Grulich, and the methodology has been described in detail elsewhere³⁵. Briefly, this was a telephone random survey of 20 000 people drawn from the Australian population from October 2013 to November 2013 to survey sexual and reproductive health. The proportion of heterosexual participants reporting recent condom use was obtained from the Australian Study of Health and Relationships (ASHR2)^{35, 36}.

The Gay Community Periodic Survey (GCPS)

The Gay Community Periodic Surveys are conducted annually using time and location convenience samples of men at gay community venues and events in capital cities (Sydney, Melbourne, Brisbane, Adelaide, Perth and Canberra). The report is prepared Centre for Social Research in Health, UNSW Australia. The methodology associated with the Gay Community Periodic Surveys has been described in detail elsewhere³⁷.

Data from the Gay Community Periodic Surveys was used for the following indicators:

- Proportion of men reporting having at least four samples (anal swab, throat swab, penile swab, urine, blood test) collected for STI testing in the prior 12 months.
- Prevalence of gay men with casual partners reporting condomless anal intercourse in the prior 6 months.
- HIV prevalence in gay men using self-reported HIV-positive status.
- The proportion of non-HIV positive gay men having had self-reported test for HIV within the last 12 months.
- Self-reported use of antiretroviral therapy for the treatment of HIV infection.

The Kirketon Road Centre

Incidence of hepatitis C infection was monitored among people with a history of injecting drug use attending the Kirketon Road Centre, a primary care clinic in central Sydney. Incidence of hepatitis C infection was calculated among people who were retested following a negative test for hepatitis C antibody when first assessed at the Centre. Repeat hepatitis C antibody testing was carried out, based on the assessment of risk behaviour for hepatitis C infection. The timing of hepatitis C seroconversion was estimated as the mid-point between the last negative test and the first positive test. Indeterminate hepatitis C antibody tests were considered to be negative in the analysis.

Medicare

Medicare is delivered by the Australian Government Department of Human Services and provides high quality national health programs and services. Publicly available Medicare online data on number of tests for *Chlamydia trachomatis* as identified by item numbers 69316, 69317 and 69319 were obtained by sex, age, state and quarter (http://medicarestatistics.humanservices.gov.au/statistics/mbs_item.jsp#info).

National Centre for Immunisation Research of Vaccine Preventable Diseases (NCIRS)

NCIRS' primary function is to perform research aimed at reducing the incidence of vaccine preventable diseases and improving vaccine uptake, in children and adults, including surveillance. Hepatitis B vaccine coverage was estimated using data from the NCIRS surveillance of immunisation coverage and the Australian Childhood Immunisation Register.

National Human Papillomavirus Vaccination Program Register (NHVPR)

The NHPVR was established in early 2008 to support the National HPV Vaccination Program, and is fully funded by the Commonwealth Government. The NHVPR monitors and evaluates the HPV vaccination program through the registration of immunisation providers, the creation of individual consumer immunisation records, mailing of completion statements and reminder letters, and the generation of statistical reports on the National HPV Vaccination Program (<http://www.hpvregister.org.au/>). Percentage of HPV vaccine coverage in males and females turning 15 years of age was obtained from the NHVPR.

National Prison Entrants' Bloodborne Virus Survey (NEPBBVS)

The NEPBBVS is a consecutive cross-sectional sample of prison entrants over a two week period. While previous iterations of the survey collected data in parallel over a two week period in October (the same time as the community NSP survey), the 2013 survey timing varied between jurisdictions. Participants were 793 of the 1,235 (64%) prisoners entering Australian correctional centres who were offered the survey. The 2013 NPEBBVS reports the findings for the 793 participants for whom sufficient pathology and questionnaire data were available. NPEBBVS methodology has been described in detail elsewhere³⁸.

NEPBBVS data were used for the following indicators:

- Hepatitis C prevalence among prison entrants.
- Hepatitis B susceptibility in incoming prisoners.

Pharmdash

Data on dispensed prescriptions for a Pharmaceutical Benefits Scheme (PBS) 10% sample is updated every quarter and supplied to a number of approved users or clients including Prospecion which provides a dashboard interface (Pharmdash) for querying the PBS 10% sample (see <http://www.pbs.gov.au/info/industry/useful-resources/sources/>). The 10% sample of the PBS is a randomised patient level, de-identified PBS script claims data set from 2006-present. Currently the data set has 170 million script claims and 3 million patients. It includes all PBS listed drugs with HIV indications.

Pharmdash data were used for the following indicators:

- The number of people receiving antiretroviral treatment (ART). The overall total number of people receiving ART was taken as the number of unique patients in the PBS data set who filled in at least one script in the 12 months prior to the end of December 2014 multiplied by 10. Given the size of the sample we assumed a negligible range in this estimate.
- Total number of patients receiving treatment for HIV per year. The overall total number of people receiving ART was taken as the number of unique patients in the PBS data set who filled in at least one script in the 12 months prior to the end of December 2014 multiplied by 10. Similarly estimates of patient numbers dispensed individual antiretroviral drug types were developed.
- Total number of patients receiving treatment for hepatitis B per quarter. Hepatitis B related dispensations for tenofovir excluded any patients with prior or concomitant HIV treatment dispensations and hence may exclude some HIV-HBV co-infected patients.
- Total number of patients receiving treatment for hepatitis C per quarter.

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