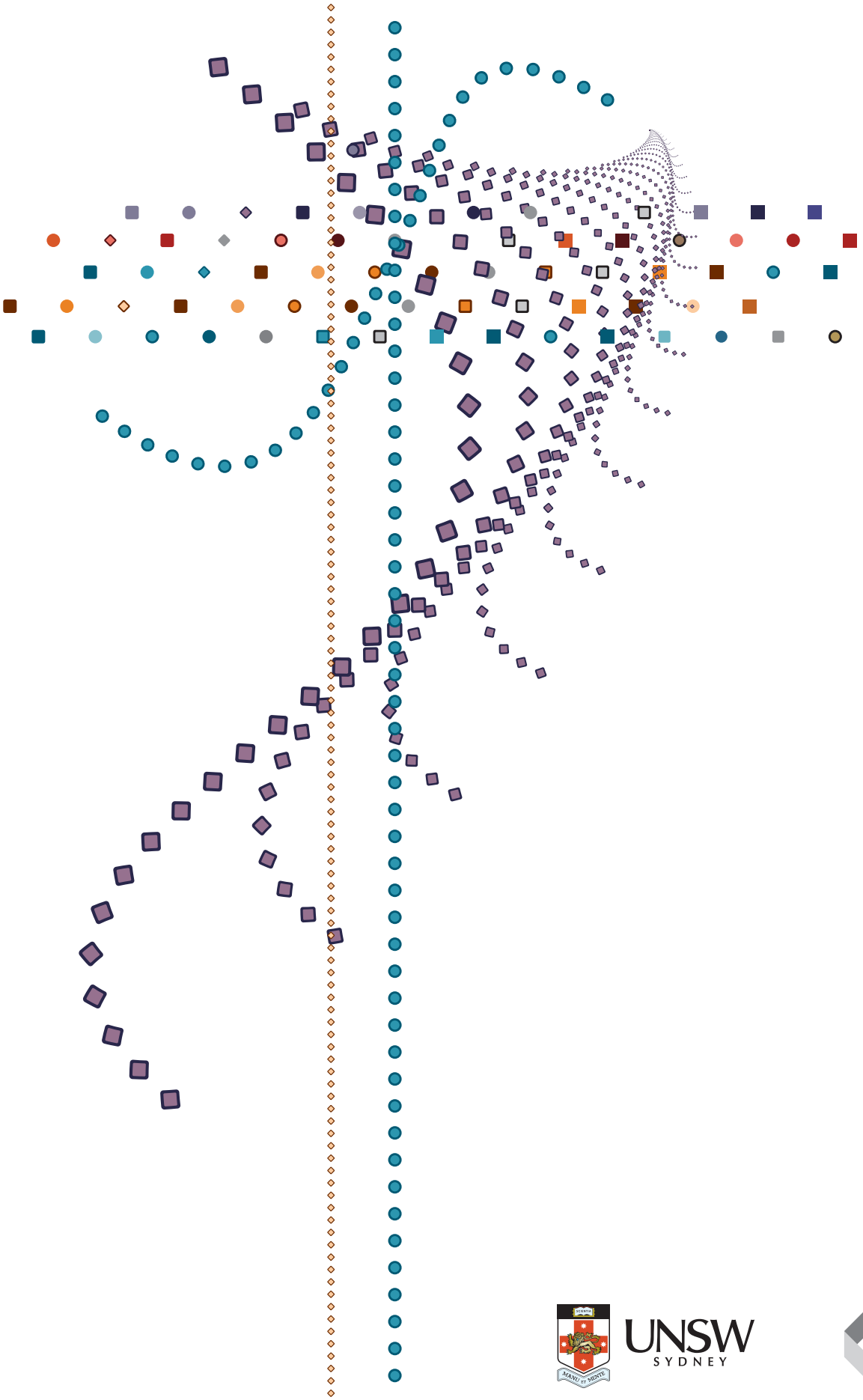
National Blood-borne Viruses and Sexually Transmissible Infections

Surveillance and Monitoring Report, 2017



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National Blood-borne Viruses and Sexually Transmissible Infections Surveillance and Monitoring Report, 2017

The Kirby Institute

in collaboration with

National Blood Borne Viruses and Sexually Transmissible Infection Surveillance Subcommittee of Communicable Diseases Network Australia

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

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Contents

Preface

Welcome to the *National Blood-borne Viruses and Sexually Transmissible Infections Surveillance and Monitoring Report 2017.*

This report provides an annual account of progress against the objectives of Australia's National blood-borne virus (BBV) and sexually transmissible infections (STIs) Strategies.

In June 2014, Australia's federal, state and territory health ministers endorsed five new National Strategies for hepatitis B, hepatitis C, STIs, and human immunodeficiency virus (HIV) together with a National Aboriginal and Torres Strait Islander BBV and STI Strategy.

The *targets* and associated *objectives* of the National Strategies are to improve testing, treatment and uptake of preventative measures for hepatitis B, hepatitis C, STIs and HIV, and to reduce the incidence, morbidity, mortality and personal and social impacts they cause. Each objective has a series of measurable *indicators* for monitoring progress. The five National Strategies cover the period 2014 – 2017.

This report describes the *targets, objectives* and *indicators* of the National Strategies, and the level of progress being made in response. It provides measurement of the effectiveness of our national response and highlights areas requiring attention.

Acknowledgements

National Organisations

- Australasian Sexual Health Alliance, Sydney, NSW
- Australasian Society for HIV, Viral Hepatitis and Sexual Health Medicine, Sydney, NSW
- Australasian Society for Infectious Diseases, Melbourne, VIC
- Australian Federation of AIDS Organisations, Sydney, NSW
- Australian Government Department of Health, Canberra, ACT
- Australian Injecting and Illicit Drug Users League, Canberra, ACT
- Australian Institute of Health and Welfare, Canberra, ACT
- Australian Paediatric Surveillance Unit, Westmead, NSW
- Centre for Social Research in Health, UNSW Australia, Sydney, NSW
- Communicable Diseases Network Australia, Canberra, ACT
- Hepatitis Australia, Canberra, ACT
- National Aboriginal Community Controlled Health Organisation, Canberra, ACT
- National Association of People with HIV Australia, Sydney, NSW
- National Blood Borne Virus and Sexually Transmissible Infections Surveillance Subcommittee (NBBVSTI) of the Communicable Diseases Network of Australia (CDNA)
- National Serology Reference Laboratory, Australia, Fitzroy, VIC
- Scarlet Alliance, Australian Sex Workers Association, Sydney, NSW
- WHO Collaborating Centre for Viral Hepatitis, Victorian Infectious Diseases Reference Laboratory, The Doherty Institute, Melbourne, VIC
- Macfarlane Burnet Institute for Medical Research and Public Health Limited

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- Communicable Diseases Branch, Queensland Department of Health, Queensland Government, Brisbane, QLD
- Disease Surveillance and Investigation Section, SA Health
- Public Health Services, Department of Health and Human Services, Tasmanian Government, Hobart, TAS
- Communicable Disease Epidemiology and Surveillance, Health Protection Branch, Department of Health and Human Services Victoria, State Government of Victoria, Melbourne, VIC
- Communicable Disease Control Directorate, WA Department of Health, Government of Western Australia, Perth, WA

Australian HIV Observational Database

- Coffs Harbour Medical Centre, Coffs Harbour; Holdsworth House Medical Practice, Sydney; Holden Street Clinic, Gosford; Lismore Sexual Health & AIDS Services, Lismore; East Sydney Doctors, Darlinghurst; RPA Sexual Health, Camperdown; Blue Mountains Sexual Health and HIV Clinic, Katoomba; Tamworth Sexual Health Service, Tamworth; St Vincent's Hospital, Darlinghurst; Taylor Square Private Clinic, Darlinghurst; Nepean Sexual Health and HIV Clinic, Penrith; Illawarra Sexual Health Service, Warrawong; Sydney Sexual Health Centre, Sydney; Western Sydney Sexual Health Centre, Parramatta; Albion Street Centre, Surry Hills; Clinic 16 – Royal North Shore Hospital, St Leonards; National Association of People with HIV Australia, Sydney; Sydney School of Public Health, University of Sydney, Sydney; The Kirby Institute, UNSW Sydney, Sydney; NSW
- National Aboriginal Community Controlled Health Organisation, Canberra, ACT
- Communicable Disease Centre, Royal Darwin Hospital, Darwin, NT
- Gold Coast Sexual Health Clinic, Miami; Cairns Sexual Health Service, Cairns; Clinic 87, Sunshine Coast-Wide Bay Health Service District, Nambour; Gladstone Road Medical Centre, Highgate Hill; Sexual Health and HIV Service in Metro North, Brisbane; CaraData, Parkwood; QLD
- O'Brien Street General Practice, Adelaide, SA
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- Department of Clinical Immunology, Royal Perth Hospital, Perth, WA
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Australian Collaboration for Coordinated Enhanced Sentinel Surveillance (ACCESS) of STIs and BBVs

- Canberra Sexual Health Centre, Canberra; ACT
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- Clinic 275, STD Services, Royal Adelaide Hospital, SA
- Hobart Sexual Health Service, Hobart; Launceston Sexual Health Service, Launceston; Devonport Sexual Health Service, Devonport; TAS
- Melbourne Sexual Health Centre, Melbourne; Barwon Reproductive and Sexual Health (BRASH) Clinic, Geelong;
- Fremantle Hospital Sexual Health Clinic, Fremantle; WA

Collaboration of Australian Needle and Syringe Programs

- Directions ACT, Canberra; ACT
- ACON Hunter; First Step Program Port Kembla; Hunter Harm Reduction Services, Newcastle; Kirketon Road Centre and Clinic 180, Kings Cross; Mid North Coast Harm Reduction, Coffs Harbour;; NSW Users and AIDS Association (NUAA), Surry Hills; Northern NSW Harm Reduction, Ballina, Byron Bay, Lismore, , Nimbin, and Tweed Heads; Harm Minimisation Redfern and Canterbury; KRC South, Sutherland; South Court Primary Care NSP, Nepean; Western Sydney HIV/Hepatitis C Prevention Service, Blacktown, Mt Druitt and Parramatta; NSW
- Northern Territory AIDS and Hepatitis C Council, Alice Springs, Darwin and Palmerston; NT
- Sexual Health and Blood Borne Virus Unit, Centre for Disease Control, Northern Territory Department of Health, Northern Territory Government, NT
- Biala Community Alcohol and Drug Services, Brisbane; Cairns ATODS NSP, Cairns; Queensland Injectors Health Network (QuIHN), Brisbane, Gold Coast and Sunshine Coast; Kobi House, Toowoomba; West Moreton Sexual Health Service, Ipswich; Townsville ATODS NSP; QLD
- Drug and Alcohol Services South Australia, Adelaide; Mission Australia Hindmarsh Centre, Hindmarsh; Nunkuwarrin Yunti Community Health Centre, Adelaide; Street Link Youth Health Service, Adelaide; Drug Arm Warradale, Adelaide; Port Adelaide Community Health Service, Port Adelaide; Noarlunga Community Health Service, Adelaide; SA
- Anglicare NSP Service, Hobart and Glenorchy; Clarence Community Health Centre, Clarence; Devonport Community Health Centre, Devonport; Salvation Army Launceston, Launceston; TAS
- Barwon Health Drug and Alcohol Services, Geelong; Health Information Exchange, St Kilda; Health Works, Footscray; Inner Space, Collingwood; North Richmond NSP, North Richmond; Southern Hepatitis/HIV/AIDS Resource and Prevention Service (SHARPS), Melbourne, Frankston: VIC
- WA AIDS Council Mobile Exchange, Perth; Western Australia Substance Users Association (WASUA), Perth and South Coast; Hepatitis WA, Perth: WA.
- St Vincent's Centre for Applied Medical Research (AMR) and NSW State Reference Laboratory for HIV at St Vincent's Hospital, Sydney, NSW

Executive summary

The National Blood-borne Viruses and Sexually Transmissible Infections Surveillance and Monitoring Plan 2014 – 2017 (The Plan) outlines a series of objectives for the five National Strategies (2014 – 2017) focused on prevention and management of hepatitis B, hepatitis C, STIs and HIV and reducing the transmission of infections and their morbidity, mortality and personal and social impacts they cause. The Plan includes targets (Table 1), with sets of measurable indicators, to monitor progress towards these objectives. This report tracks the national response to these targets during 2016 and, where feasible, makes reference to short- (since 2013, the last year of the previous National Strategies) and long-term (generally since 2007) progress. The third year of the current Strategies, 2016, provides many encouraging results, where a number of targets from the Plan are either close to or have been met but also demonstrates areas where further efforts are needed (Table 1).

Each of the targets and indicators have a number of data considerations which are outlined in the relevant section and in further detail in the Methodological Notes of the report. Incidence is a difficult indicator to measure, and for a number of indicators notifications have been used as a surrogate, recognising that for most infections, they represent only a proportion of the total cases (e.g. only those cases for which health care was sought, a test conducted and a diagnosis made, followed by a notification to health authorities). Also, annual changes in notifications may represent responses to testing policies and programs, different diagnostic tests, changes in surveillance practices and awareness campaigns rather than true changes in incidence.

One of the four hepatitis B targets (target 1) has been partially met with hepatitis B vaccination coverage rates at 24 months of age at 96%, exceeding the Plan's target of 95%; hepatitis B vaccination coverage at 12 months of age was 94% in 2016. For target 2, there was no change in the proportion of sexual health clinic attendees with documentation of immunity to hepatitis B (vaccinated or immunity from past exposure) (76% in 2013, 75% in 2014, and 76% in 2015 and 2016). Of the estimated 230 034 people living in Australia with chronic hepatitis B in 2016, an estimated 63% had been diagnosed (target 3 = 80%), 17% were in care and 7% were on treatment (target 4 = 15% on treatment).

One of the two hepatitis C targets (target 2 – increase the number of people receiving treatment by 50% each year) has been met. At the start of 2016, there were an estimated 227 306 people living with chronic hepatitis C, and of these, an estimated 32 550 (14%) received treatment in 2016, representing over a 444% increase from the number on treatment the previous year (7 326) (target 2 = annual increase of 50% in treatment). This increase is attributable to the availability of new direct acting antiviral treatment regimens subsidised by the Pharmaceutical Benefits Scheme from March 2016. Target 1, reduce the incidence of hepatitis C by 50% has not been met. Trends in the rate of hepatitis C diagnoses in those aged less than 25 years can be a proxy for the incidence of hepatitis C exposure. Among those aged under 25 years, the rate of notification of hepatitis C declined between 2007 and 2011 but was stable thereafter, including from 2013 – 16.

Two of the five targets of the STI strategy have been met (1 and 2); high HPV vaccination coverage has been achieved for adolescent females, and males reaching 79% and 73%, respectively in 2016 (target = 70%). Target 2 regarding testing coverage in priority populations has been met - first there was an increase in the proportion of 15 – 29 year olds receiving a chlamydia test, from 13% in 2013 to 15% in 2016, and second, there was an increase in the proportion of gay men who had a STI test in the past year, from 68% in 2013 to 73% in 2016. Targets 3 – 5 relating to STI incidence and testing have not yet been met. Between 2013 and 2016 there was an increase in infectious syphilis notification rates (from 7.8 to 14.3 per 100 000 population) and gonorrhoea notification rates (from 65.4 to 100.8 per 100 000 population); and the ratio of chlamydia notifications to Medicare rebated chlamydia tests among 15 – 29 year olds remained stable between 2013 and 2016 at 11% and 10%, respectively, signifying that chlamydia positivity has remained stable. Between 2013 and 2016 the number of congenital syphilis cases has fluctuated between eight (see Table 4 notes for detail) and two, meaning the target of elimination of congenital syphilis has not been met.

Three of the seven HIV targets have been met (3, 4 and 5), including sustaining virtual elimination of HIV among sex workers (HIV incidence amongst female sex workers was 0.07 per 100 person years in 2016); people who inject drugs (HIV prevalence was 1.4% in 2016 or 0.7% if homosexual and bisexual men are excluded); and mother-to-child HIV transmission (zero HIV cases in 2016). In 2016, 70% of HIV diagnoses were among men who have sex with men, and in this population the incidence of HIV remained stable during 2013 – 2016 (0.71 in 2013, 0.81 in 2014, 0.58 in 2015, and 0.85 per 100 person years in 2016, with confidence intervals around estimates overlapping) (target 1). In 2016, 86% of people living with diagnosed HIV were on treatment (target 6 = 90%).

The Fourth National Aboriginal and Torres Strait Islander Blood-borne Viruses and Sexually Transmissible Infections Strategy includes targets for STIs and BBVs, some of which are slightly modified to those specific strategies above. There were four cases of congenital syphilis in Aboriginal and Torres Strait Islander peoples in 2013, three in 2014, two in 2015, and one in 2016 (Target 1); which equates to 62% of all cases reported in Australia since 2013. Overall, notifications rates for all STIs and BBVs in Aboriginal and Torres Strait Islander peoples were higher than the overall Australian rates. Target 2 (reducing the incidence of chlamydia and gonorrhoea notifications) has been met, although rates remain high; the proportion of chlamydia tests yielding a positive result decreased by an absolute 3% (from 17% in 2013 to 14% in 2016, and notification rates of gonorrhoea relatively declined by 17% (from 696.8 per 100 000 population in 2013 to 581.8 per 100 000 population in 2016). Target 2 for infectious syphilis has not been met; with a threefold increase in infectious syphilis notification rates (from 22.4 in 2013 to 78.1 per 100 000 population in 2016). Similarly, target 3 has not been met; the use of receptive injecting equipment among Aboriginal and Torres Strait Islander participants increased from 21% in 2013 to 28% in 2016 (13% in 2013 to 17% in 2016 in non-Indigenous participants). Target 4 related to treatment uptake (for hepatitis C has been met). According to the Australian Needle Syringe Program Survey, among Aboriginal and Torres Strait Islander participants in 2016, 18% reported treatment for hepatitis C in the last 12 months as compared to 2% in 2013. Data on treatment uptake for HIV and hepatitis B among Aboriginal and Torres Strait Islander people were not available at the time of report preparation, but activities are planned to provide this information for future reports.

Detailed results of the 2016 national response against all the Indicators in each Strategy, in addition to the response against the targets described here, are outlined in the report below. Throughout the report the shaded area in figures indicates the years of the current national strategies. Data and methodologies have been updated in the most recent reporting period, and as a consequence some results may vary from the previous reports. See Methodological Notes for details

Table 1 Progress with Surveillance and Monitoring Plan targets

Strategy	Targets	2013 estimate	2014 estimate	2015 estimate	2016 estimate	Meets target in 2016[†]
Hepatitis B	1. Achieve 95% hepatitis B					
	12 months of age	91%	92%	93%	94%	No
	24 months of age	94%	94%	95%	96%	Yes
	2. Increase hepatitis B vaccination coverage of priority populations[i]	76%	75%	76%	76%	No
	3. Increase to 80% the proportion of all people living with chronic hepatitis B who are diagnosed	61%	62%	63%	63%	No
	4. Increase to 15% the proportion of all people living with chronic hepatitis B who are receiving antiviral treatment	5%	6%	7%	7%	No
Hepatitis C	1. Reduce the incidence of new hepatitis C infections by 50% each year	21.4 per 100 person years	8.3 per 100 person years	19.9100 persons years	[ii]*	For 2013 – 2014: Yes (61% decrease) For 2014 – 2015: No (139% increase)
	2. Increase the number of people receiving antiviral treatment by 50% each year	3 540	3 749	7 326	32 550	For 2013 – 2014: No (6% increase) For 2014 – 2015: Yes (95% increase) For 2015 – 2016: Yes (344% increase)

Strategy	Targets	2013 estimate	2014 estimate	2015 estimate	2016 estimate	Meets target in 2016[†]
STI	1. Achieve human papillomavirus (HPV) vaccination coverage of 70%	72% in adolescent females	74% in adolescent females	78% in adolescent females	79% in adolescent females	Yes
		29% in adolescent males	62% in adolescent males	67% in adolescent males	73% in adolescent males	Yes
	2. Increase testing coverage in priority populations					
	a. Chlamydia testing in 15 – 29 year olds	13%	14%	14%	15%	Yes
	b. STI testing in gay men	68%	70%	73%	73%	Yes
	3. Reduce the incidence of chlamydia (15 – 29 year olds)[¥]	11%	10%	10%	10%	No
	4. Reduce the incidence of gonorrhoea	Notification rate of 65.4 per 100 000 population	Notification rate of 68.0 per 100 000 population	Notification rate of 78.9 per 100 000 population	Notification rate of 100.8 per 100 000 population	No
	5. Reduce the incidence of infectious syphilis	Notification rate of 7.8 per 100 000 population	Notification rate of 9.0 per 100 000 population	Notification rate of 11.7 per 100 000 population	Notification rate of 14.3 per 100 000 population	No
	5b. Eliminate congenital syphilis^	8 cases	3 cases	3 cases	2 cases	No^
HIV	1. Reduce sexual transmission of HIV by 50% by 2015[iii]	0.71 per 100 person years in gay and bisexual men	0.81 per 100 person years in gay and bisexual men	0.58 per 100 person years in gay and bisexual men	0.85 per 100 person years in gay and bisexual men	No
	2. Sustain the low general population rates of HIV in Aboriginal and Torres Strait Islander people and communities	Notification rate of 4.5 per 100 000 population	Notification rate of 5.3 per 100 000 population	Notification rate of 6.1 per 100 000 population	Notification rate of 6.4 per 100 000 population	No
	3. Sustain the virtual elimination of HIV among sex workers	0.06 per 100 person years	0.11 per 100 person years	0.00 per 100 person years	0.07 per 100 person years	Yes
	4. Sustain the virtual elimination of HIV among people who inject drugs	2.1% prevalence	1.7% prevalence	1.7% prevalence	1.4% prevalence	Yes
	5. Sustain the virtual elimination of mother-to-child HIV transmission	0 cases	0 cases	2 cases	0 cases	Yes
	6. Increase treatment uptake by people with diagnosed HIV to 90%	79.3% (among people living and diagnosed with HIV)	83% (among people living and diagnosed with HIV)	85% (among people living and diagnosed with HIV)	86% (among people living and diagnosed with HIV)	No
	7. Maintain effective prevention programs targeting sex workers and for people who inject drugs					Indicator not yet identified[iv]

Strategy	Targets	2013 estimate	2014 estimate	2015 estimate	2016 estimate	Meets target in 2016†
Aboriginal and Torres Strait Islander	1. Eliminate congenital syphilis	4 cases	3 cases	2 cases	1 case	^No
	2. Reduce the incidence of:					
	chlamydia (positivity in 15 – 29 year olds)	17%	16%	14%	14%	Yes
	gonorrhoea, and	Notification rate of 696.8 per 100 000 population	Notification rate of 556.6 per 100 000 population	Notification rate of 533.4 per 100 000 population	Notification rate of 581.8 per 100 000 population	Yes
	infectious syphilis	Notification rate of 22.4 per 100 000 population	Notification rate of 36.0 per 100 000 population	Notification rate of 64.2 per 100 000 population	Notification rate of 78.1 per 100 000 population	No
	3. Increase the use of sterile injecting equipment for every injecting episode (Indicator used here is receptive needle/syringe sharing) [vi]	21%	22%	24%	28%	No
	4. Increase treatment uptake by people with HIV[vii]	*	*	*	*	*
	hepatitis C[viii], and	Treatment in the last 12 months 2%	Treatment in the last 12 months 1%	Treatment in the last 12 months 3%	Treatment in the last 12 months 18%	Yes
	hepatitis B[vii]	*	*	*	*	*

Incidence rates are provided per 100 person years and notification rates are provided per 100 000 population;

* Data not available;

† Decisions on whether the target has been met are based on

i) meeting the target when the target is specific (e.g. increase to 80% the proportion with hepatitis B who are diagnosed);

ii) a percentage absolute change of ≥2% for proportions (since 2013) when the target is not specific (e.g. increase treatment uptake or increase vaccination coverage); or

iii) a relative change of ≥5% for number/notifications when the target is not specific (e.g. reduce incidence).

¥ Indicator used is proportion of chlamydia tests that yield a positive result in 15 – 29 year age group.

^ We have chosen not to refer to the WHO target for elimination of <50 cases per 100 000 live births as the applicability of the WHO definition to the Australian context is questionable. A more suitable elimination target for congenital syphilis in the Australian context will be outlined in the next set of National Strategies in 2018

[i] Measures the proportion of patients attending sexual health clinics participating in the ACCESS sentinel surveillance project who are vaccinated or have past infection providing immunity against hepatitis B. Data are not available for specific priority populations which may mask differences between populations.

[ii] Hepatitis C incidence estimate among people inject drugs is not available for the most recent year (2016), as insufficient time has passed to provide repeat testing on all participants; this will be presented in the next year's report.

[iii] HIV incidence is reported for gay and bisexual men as HIV continues to be transmitted primarily through sexual contact between men in Australia, which accounted for 70% of notifications in 2016

[iv] HIV prevention among sex workers has been highly successful in Australia and has resulted in HIV incidence rates among the lowest in the world. There is international documentation of the best measures of effective prevention programs,[(1)] and discussions are ongoing as to the most relevant data to report on this target in Australia

[vi] Indicator is receptive needle/syringe sharing

[vii] Data on treatment uptake for HIV and hepatitis B among Aboriginal and Torres Strait Islander peoples were not available at the time of report preparation, but activities are planned to provide this information for future reports

[viii] Only measures people attending Needle and Syringe Programs

Background

In June 2014, the Council of Australian Governments' (COAG) Health Council endorsed a set of five new National Strategies for the prevention and management of hepatitis B, hepatitis C, STIs and HIV, including in Aboriginal and Torres Strait Islander communities.

The five National Strategies are:

1. The Second National Hepatitis B Strategy 2014 – 2017
2. The Fourth National Hepatitis C Strategy 2014 – 2017
3. The Third National Sexually Transmissible Infections Strategy 2014 – 2017
4. The Seventh National HIV Strategy 2014 – 2017
5. The Fourth National Aboriginal and Torres Strait Islander Blood-Borne Viruses and Sexually Transmissible Infections Strategy 2014 – 2017

The National Strategies are endorsed by all Australian Health Ministers and set the direction for a coordinated national response to hepatitis B, hepatitis C, STIs and HIV in the Australian population. The National Strategies provide a framework for action and accountability with objectives to scale up prevention, testing, management, care and support for people living with and at risk of BBV and STI.

The National Blood-borne Viruses and Sexually Transmissible Infections Surveillance and Monitoring Plan 2014 – 2017[(2)] has been developed through the Communicable Diseases Network Australia (CDNA), in consultation with the Blood-borne Viruses and Sexually Transmissible Infections Standing Committee (BBVSS) and endorsed by the Australian Health Protection Principal Committee (AHPPC). A sub-committee of the CDNA, the National BBV and STI Surveillance Sub-Committee (NBBVSTISSC) is responsible for overseeing the Plan and reporting progress to CDNA and BBVSS. The Plan includes targets that provide a specific focus for the efforts made towards achieving nationally agreed objectives. It also outlines a set of measurable indicators for monitoring progress towards reaching these targets and objectives.

The National Blood-borne Viruses and Sexually Transmissible Infections Surveillance and Monitoring Report, 2017 (this report) provides details of the indicators, and reports on how Australia is progressing in controlling BBVs and STIs in terms of risk behaviours, incidence of infection and disease morbidity as well as quality of life, including the personal and social impacts of these infections. The Kirby Institute, UNSW Sydney, has responsibility for producing reports according to the National BBV and STI Surveillance and Monitoring Plan over the life of the National Strategies. This report was produced by the Surveillance, Evaluation and Research Program (SERP) of the Kirby Institute in collaboration with the National Blood Borne Viruses and Sexually Transmissible Infections Surveillance Sub-Committee (NBBVSTISSC) of the Communicable Diseases Network Australia (see Acknowledgements). This is the third report to be released during the 2014 – 2017 National Strategies for BBV and STI. The National BBV and STI Surveillance and Monitoring Plan Steering Committee also oversee this report and provide advice to CDNA on the ongoing priorities for implementation of the National Blood-borne Viruses and Sexually Transmissible Infections Surveillance and Monitoring Plan 2014 – 2017 based on indicator priorities and resource burden of data collection. Further information about national BBV and STI epidemiology can be found in the HIV, viral hepatitis and sexually transmissible infections in Australia: Annual Surveillance Report 2017.[(3)]

Figures

Tables

1. Hepatitis B

Epidemiology overview

At the end of 2016, an estimated 230 034 people were living with chronic hepatitis B infection in Australia. The estimated prevalence of chronic hepatitis B infection among people living in Australia is 0.9%, which is higher than people living in the United Kingdom (<0.5%) but lower than many other countries in South East Asia and the Pacific. The majority of people who are living with chronic hepatitis B in Australia became exposed via mother-to-child transmission at birth (perinatal/vertical transmission) or horizontal transmission through exposure to infected blood, especially from an infected child to an uninfected child during the first five years of life.[4] Hepatitis B can also be transmitted through sexual contact or use of contaminated equipment for injecting. Australia has a concentrated hepatitis B epidemic among key populations; migrants from high prevalence countries, particularly Northeast and Southeast Asia and Sub-Saharan Africa; Aboriginal and Torres Strait Islander peoples; men who have sex with men; and people who inject drugs. Of the estimated 230 034 people living with chronic hepatitis B in Australia at the end of 2016, 89 178 (38.7%) people were born in the Northeast and Southeast Asian countries, 24 287 (10.6%) were Aboriginal and Torres Strait Islander peoples, 13 260 (5.8%) were people who inject drugs (including current and former), 10 371 (4.5%) were men who have sex with men and 8 090 (3.5%) people were born in Sub-Saharan Africa. Further details are provided in the HIV, viral hepatitis and sexually transmissible infections in Australia: Annual Surveillance Report 2017.[3]

Indicator status

Incidence

- The notification rate is used here as a surrogate for incidence (see section 1.1 on data considerations). The notification rate of newly acquired hepatitis B (defined as a new infection within the past 2 years) was 0.7 per 100 000 population in 2016, slightly lower than the rate of 0.8 in 2013. Over the last ten years this represents a decline of 54% from a notification rate of 1.4 per 100 000 population in 2007. The rate of overall notification (newly acquired and unspecified) has also remained stable over the past ten years, 2007 – 2016 (rate between 28 and 33) but declined in those aged less than 25 years by 52%.

Uptake of preventative measures

- The coverage of infant hepatitis B vaccination at 24 months of age was 95.7% in 2016, similar to levels each year since 2010. The coverage at 12 months has increased from 91.3% in 2013 to 94.3% in 2016. The definition of fully vaccinated changed in late 2009, so data are only presented for 2010 onwards.
- Hepatitis B vaccination is also recommended in adult populations at higher risk of infection (priority populations). In 2016, there were 10 517 people attending sexual health clinics participating in the ACCESS (Australian Collaboration for Coordinated Enhanced Sentinel Surveillance) network for whom vaccination documentation or pathology details were available. In 2016, the proportion of 15 – 19 year olds with documented immunity, through vaccination or past infection, was higher than in those aged 55 or older (76% versus 65%). Data are not available for specific priority populations or those not attending sexual health clinics, who may differ from the overall population.

Testing and Treatment

- In 2016, an estimated 63% of people living in Australia with chronic hepatitis B infection had been diagnosed, an estimated 16.8% of those with chronic hepatitis B infection were in care and 7% of those with chronic hepatitis B infection had been receiving antiviral therapy.

Morbidity

- In 2016, 3% (7 of 233) of people who had a liver transplant had hepatitis B infection; compared with 8% (17 of the 219) in 2015, and 5% (9 out of 198) in 2013.

There were an estimated 412 (range 400 to 437) deaths attributable to hepatitis B in 2016, compared to 419 (range 323 to 683) in 2015.

Summary: In the third year of the Second National Hepatitis B Strategy, infant immunisation programs for hepatitis B meet the coverage target of 95% at 24 months of age but not at 12 months of age. The proportion of sexual health clinic attendees with documented evidence of immunity has remained high at 75%, which may represent vaccination or past infection; other priority populations or settings are not currently able to be assessed. Evidence is emerging of benefits of infant immunisation, with declining notification rates in younger age groups (<25 years) compared to ten years prior, who were targeted by the universal vaccination of infants from 2000 (1990 in the Northern Territory) and adolescent catch-up programs from 1998 (with variation by jurisdiction). Maternal screening and vaccination of infants born to mothers with chronic hepatitis B is also likely to have contributed to this decline and a data linkage project is underway to assess this. In 2016, the proportion of all people estimated to be living with hepatitis B who are diagnosed remains below the 80% target and the proportion of people with chronic hepatitis B infection who are in care or on recommended treatment also remains below the target. Overall these data suggest that an expansion of efforts to improve diagnosis and treatment of hepatitis B is required, with ongoing targeted vaccination for priority populations.

Objectives and indicators

The National Hepatitis B Strategy 2014 – 2017 identified six specific objectives, with associated indicators. Progress against these objectives and indicators is outlined in Table 2. Incidence is a difficult indicator to measure, and for a number of indicators notifications have been used as a surrogate, recognising that for most infections, they represent only a proportion of the total cases (e.g. only those cases for which health care was sought, a test conducted and a diagnosis made, followed by a notification to health authorities). Also, annual changes in notifications may represent responses to testing policies and programs, different diagnostic tests, changes in surveillance practices and awareness campaigns rather than true changes in incidence. Some *'additional information'* has been included due to data sources becoming available after the Plan was agreed and is marked accordingly:

Main Findings

Table 2 National Hepatitis B Strategy progress

Theme	Objective		Indicator		2013 estimate	2014 estimate	2015 estimate	2016 estimate
Incidence	1.1	Reduce hepatitis B infections	1.1a	Annual rate of notifications of newly acquired hepatitis B (per 100 000 population)[i]	0.8	0.7	0.6	0.7
Uptake of preventative measures	1.2	Achieve and maintain high levels of hepatitis B vaccination	1.2a	Coverage of hepatitis B vaccination at 12 months of age 24 months of age	91% 94%	92% 94%	93% 95%	94% 96%
			1.2b	*Additional information:* Proportion of population attending STI clinics with evidence of immunity to hepatitis B (vaccinated or with past infection)	76%	75%	76%	76%
Testing	1.3	Increase the proportion of people with chronic hepatitis B who have been diagnosed	1.3a	Estimated proportion of people with chronic hepatitis B who have been diagnosed	61%	62%	63%	63%
			1.3b	Annual rate of notifications of unspecified hepatitis B (per 100 000 population)	29.0	28.1	27.3	27.4
			1.3c	Prevalence of hepatitis B in pregnant women by country of birth and Aboriginal and Torres Strait Islander status [ii]	*	*	*	*
Treatment	1.4	Increase access to appropriate management and care for people with chronic hepatitis	1.4a	Proportion of people with chronic hepatitis B dispensed drugs for hepatitis B infection	5%	6%	7%	7%
			1.4b	*Additional information:* Proportion of people with chronic hepatitis B who received monitoring for chronic hepatitis B	13%	16%	16%	17%
Personal and social Impact	1.5	Reduce burden of disease attributed to chronic hepatitis B	*1.5a*	*Additional information:* Proportion of liver transplant recipients with hepatitis B (including hepatitis B related liver cancers)	5%	7%	8%	3%
	1.6	Eliminate the negative impact of stigma, discrimination, and legal and human rights issues on people's health	1.6a	Stigma indicator being developed[iii]	*	*	*	*
			1.6b	*Additional information:* Proportion of surveyed health care workers who report expressing any stigma or discrimination towards clients living with hepatitis B[iv]	*	*	*	<10%

Notification rates are given out of 100 000 population and to 1 decimal place; percentages (%) are rounded to the nearest whole number;

* Denotes data not available;

i In the absence of appropriate data for incidence, notifications data have been used to provide an indication of changes in infection levels, but should be interpreted with caution;

ii Data currently unavailable but will be included in future reports;

iii Among people who inject drugs and men who have sex with men and people living with HIV and hepatitis C (which may include people living with hepatitis B infection);

iv Indicator being developed and tested by the Centre for Social Research in Health, UNSW , however, at this stage, the indicator has not been implemented with people living with hepatitis B and is currently only collected and reported for health care workers and will be included in the next year report.

1.1 Reduce new hepatitis B infections

1.1a Annual rate of notifications of newly acquired hepatitis B

Indicator definition

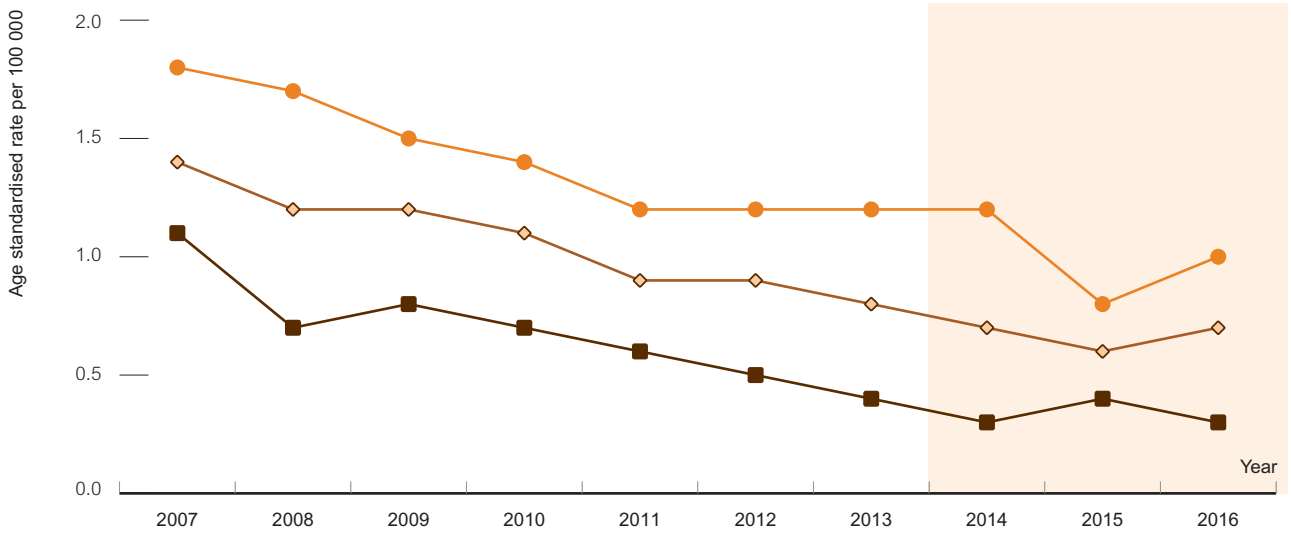
Numerator	Number of newly acquired hepatitis B notifications reported to National Notifiable Diseases Surveillance System (NNDSS)
Denominator	Australian population reported by the ABS

Background: Monitoring the rate of newly acquired (within the last 2 years) hepatitis B infection and understanding who is being infected is important to inform prevention responses, the most effective of which is vaccination (see indicator 1.2). When interpreting information about newly acquired hepatitis B infection it is important to understand the different clinical course in early childhood and adulthood. Infection acquired in childhood usually leads to chronic life-long infection, and rarely acute disease. Infection acquired in adulthood, in contrast, frequently results in symptomatic acute hepatitis followed by clearance of hepatitis B surface antigen (HBsAg) in the majority of patients.

Data source and considerations: Incidence is a difficult indicator to measure, and notifications have been used as a surrogate, recognising that for most infections, they represent only a proportion of the total cases and may be influenced by changes to testing patterns. Australia's estimate of incident hepatitis B infections is based on notifications of newly acquired hepatitis B infection made to the National Notifiable Diseases Surveillance System (NNDSS). Newly acquired hepatitis B infection is defined as infections acquired within the last two years, or that demonstrates clinical evidence suggesting an acute infection. 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. Determination of a case as 'newly acquired' is heavily reliant on public health follow-up, with the method and intensity of follow-up varying by jurisdiction and over time. See Methodological Notes for further details of data considerations.

Results: Between 2013 and 2016, the age-standardised notification rate of newly acquired hepatitis B declined by 13%, from 0.8 to 0.7 per 100 000 population, respectively (Figure 1). In the past ten years, the notification rate of newly acquired hepatitis B has declined by 53.8% from 1.4 per 100 000 population in 2007 to 0.7 per 100 000 population in 2016, with declines in both males and females over this period. The decline was greatest in those aged <29 years: 25 – 29 years (from 4.0 to 0.7 per 100 000), 20 – 24 years (from 2.7 to 0.2 per 100 000), and 15 – 19 years (from 1.2 to 0.1 per 100 000) (Figure 2). The overall notification rate (newly acquired and unspecified) show similar trends, with a 52% reduction in those aged less than 25 years. Understanding changes in hepatitis B notifications rates should be interpreted alongside indicator 1.2, which relates to hepatitis B vaccination coverage. Of note, in the last two years the notification rate of newly acquired hepatitis B in males increased by 25% from 0.8 in 2015 to 1.0 per 100 000 population in 2016 and was nearly three times that of females in 2016 (1.0 vs 0.3 per 100 000 population); the reasons for this increase are unclear and is being further investigated for future reporting.

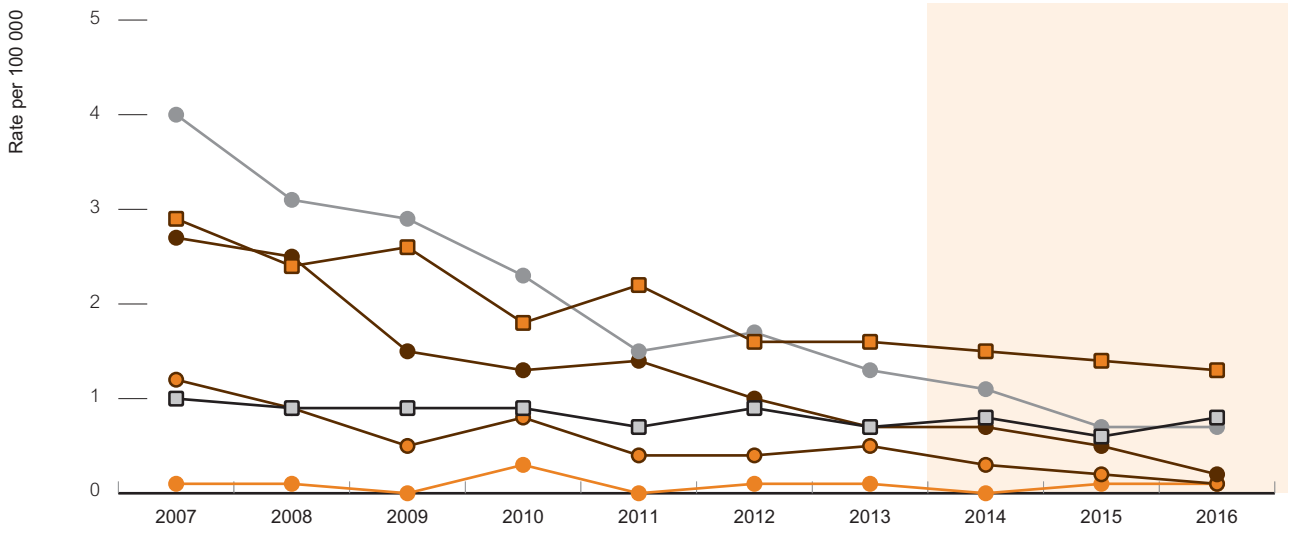
Figure 1 Newly acquired hepatitis B notification rate per 100 000 population, 2007 – 2016, by sex



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Total	1.4	1.2	1.2	1.1	0.9	0.9	0.8	0.7	0.6	0.7
Male	1.8	1.7	1.5	1.4	1.2	1.2	1.2	1.2	0.8	1.0
Female	1.1	0.7	0.8	0.7	0.6	0.5	0.4	0.3	0.4	0.3

Source: National Notifiable Diseases Surveillance System

Figure 2 Newly acquired hepatitis B notification rate per 100 000 population, 2007 – 2016, by age group



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
0-14	0.1	0.1	0.0	0.3	0.0	0.1	0.1	0.0	0.1	0.1
15-19	1.2	0.9	0.5	0.8	0.4	0.4	0.5	0.3	0.2	0.1
20-24	2.7	2.5	1.5	1.3	1.4	1.0	0.7	0.7	0.5	0.2
25-29	4.0	3.1	2.9	2.3	1.5	1.7	1.3	1.1	0.7	0.7
30-39	2.9	2.4	2.6	1.8	2.2	1.6	1.6	1.5	1.4	1.3
40+	1.0	0.9	0.9	0.9	0.7	0.9	0.7	0.8	0.6	0.8

Source: National Notifiable Diseases Surveillance System

1.2 Achieve and maintain high levels of hepatitis B vaccination

1.2a Coverage of hepatitis B vaccination at 12 and 24 months of age

Indicator definition

Numerator	Number of children in the relevant cohort who have dose 3 by 12 (and 24) months of age recorded on the Australian Childhood Immunisation Register (ACIR)
Denominator	Number of children turning 12 (and 24) months of age in the measurement year on the ACIR

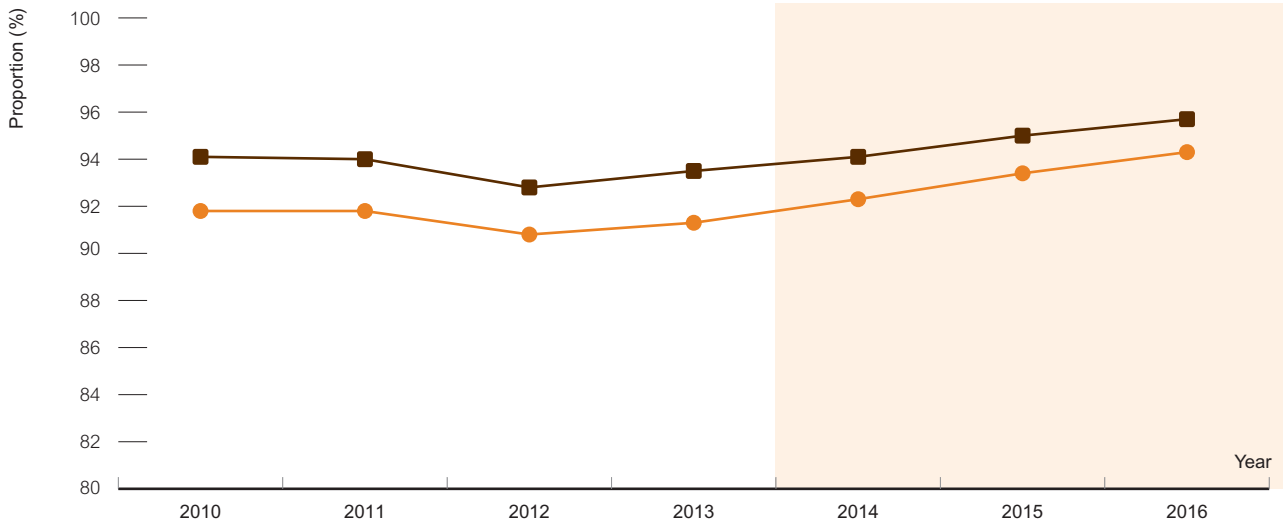
Background: Primary prevention strategies to protect people from acquiring hepatitis B infection include vaccination, use of sterile needles and syringes and ancillary equipment among people who inject drugs, condom use, universal precautions in health care settings, monitoring of pregnant women living with chronic hepatitis B and their babies, and screening of blood donors, reflecting the different modes of transmission. Vaccination is the most effective means of preventing the transmission of hepatitis B. Effective implementation of the vaccination program will provide the most substantial long-term prevention impacts, due to the inverse relationship between age at initial infection and risk of progression to chronic infection. In 1985, the Northern Territory (NT) introduced hepatitis B screening to all pregnant women and vaccination of infants born to mothers living with chronic infection. In 1990, universal infant vaccination was implemented in the NT 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.[5]

Data source and considerations: Hepatitis B vaccine coverage was estimated using data from the National Centre for Immunisation Research of Vaccine Preventable Diseases (NCIRS) surveillance of immunisation coverage and the Australian Childhood Immunisation Register (ACIR). Data are only included from 2010 onwards, as the definition of 'fully vaccinated' changed in late 2009.[6]

Results: Hepatitis B coverage at 24 months has remained reasonably stable since 2010, increasing slightly between 2013 and 2016 at 93.5% and 95.7%, respectively (Figure 3). Over the period 2010 – 16, hepatitis B vaccination coverage at 12 months of age was between 91.3% and 94.3%.

HBV

Figure 3 Hepatitis B vaccination coverage estimates at 12 and 24 months of age, 2010 – 2016



	2010	2011	2012	2013	2014	2015	2016
12 months	91.8%	91.8%	90.8%	91.3%	92.3%	93.4%	94.3%
24 months	94.1%	94.0%	92.8%	93.5%	94.1%	95.0%	95.7%

Source: National Centre for Immunisation Research & Surveillance

1.2b *Hepatitis B vaccination coverage of priority populations (additional information)*

Indicator definition

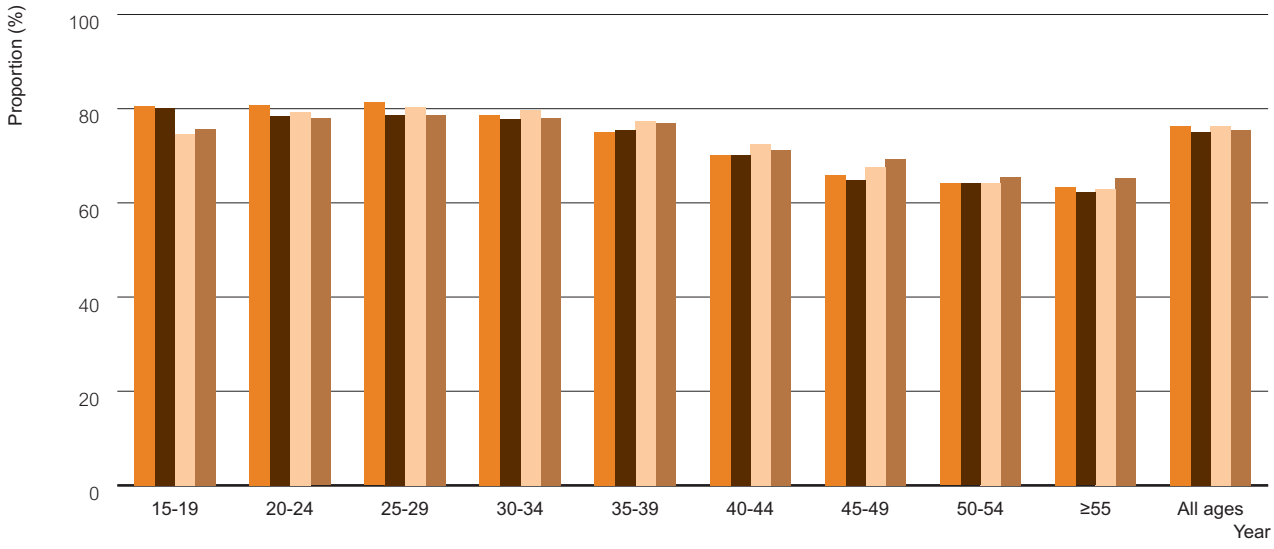
Numerator	Number of sexual health clinic attendees with serological evidence of immunity to hepatitis B.
Denominator	Number of sexual health clinic attendees tested for hepatitis B in a year

Background: Hepatitis B vaccination is not recommended in all adults, but rather priority populations at higher risk of infection, including people from priority culturally and linguistically diverse CALD communities, Aboriginal and Torres Strait Islander peoples, household and sexual contacts of people with hepatitis B, people who inject drugs, men who have sex with men, people with multiple sex partners, people in custodial settings, people living with HIV or hepatitis C or both, persons at occupational risk and 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 national policy is to screen high risk (migrants from hepatitis B endemic countries, Aboriginal and Torres Strait Islander peoples, people who inject drugs men who have sex with men, and sex workers) patients for hepatitis B infection, and if susceptible, offer vaccination.

Data source and considerations: Data from 42 sexual health clinics participating in the ACCESS sentinel surveillance project were used for this indicator. Classification of hepatitis B vaccination and immunity among sexual health service attendees was based on pathology results for tests of hepatitis B surface antigens (HBsAg), core antibodies (anti-HBc), and surface antibodies (anti-HBs); clinical diagnoses of acute or chronic hepatitis B. Patients were only included in this analysis if one or more of these data were available. See Methodological Notes for further detail of the ACCESS sentinel surveillance project. The levels of vaccination coverage in each priority population may vary, and further work is being done to present these data by priority sub-population in future reports. This will provide valuable information to inform targeted vaccination programs for priority populations.

Results: In 2016, 10 517 people attending sexual health clinics had serological evidence confirming immunity to hepatitis B via vaccination or prior exposure; their median age was 31 years, 40% identified themselves as men who have sex with men, 6% as people who inject drugs, 38% as sex workers (3% male and 35% female), and 6% as Aboriginal and Torres Strait Islander peoples. The remaining were heterosexuals aged 15 – 29 years, which is not an identified priority population. The proportion immune to hepatitis B in 2016 was 76 – 79% in those aged between 15 and 39, potentially reflecting the impact of the infant and adolescent vaccination programs, decreasing to 65% among those aged 55 years and above (Figure 4).

Figure 4 Proportion of people attending sexual health clinics with immunity to hepatitis B[1], based on serology, 2013 – 2016, by age group[2]



	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	≥55	All ages
2013	80.5%	80.7%	81.3%	78.6%	75.0%	70.1%	65.9%	64.1%	63.4%	76.4%
2014	80.1%	78.5%	78.7%	77.8%	75.4%	70.1%	64.8%	64.1%	62.2%	75.1%
2015	74.6%	79.3%	80.4%	79.7%	77.4%	72.5%	67.7%	64.2%	62.9%	76.4%
2016	75.6%	77.9%	78.6%	78.0%	77.0%	71.3%	69.4%	65.5%	65.2%	75.5%

1 Vaccinated or immunity from past exposure
2 Data from 42 sexual health clinics across Australia

Source: ACCESS: The Australian Collaboration for Coordinated Enhanced Sentinel Surveillance of Sexually Transmissible Infections and Blood-borne Viruses

1.3 Increase the proportion of people with chronic hepatitis B who have been diagnosed

1.3a Estimated proportion of people with chronic hepatitis B who have been diagnosed

Indicator definition

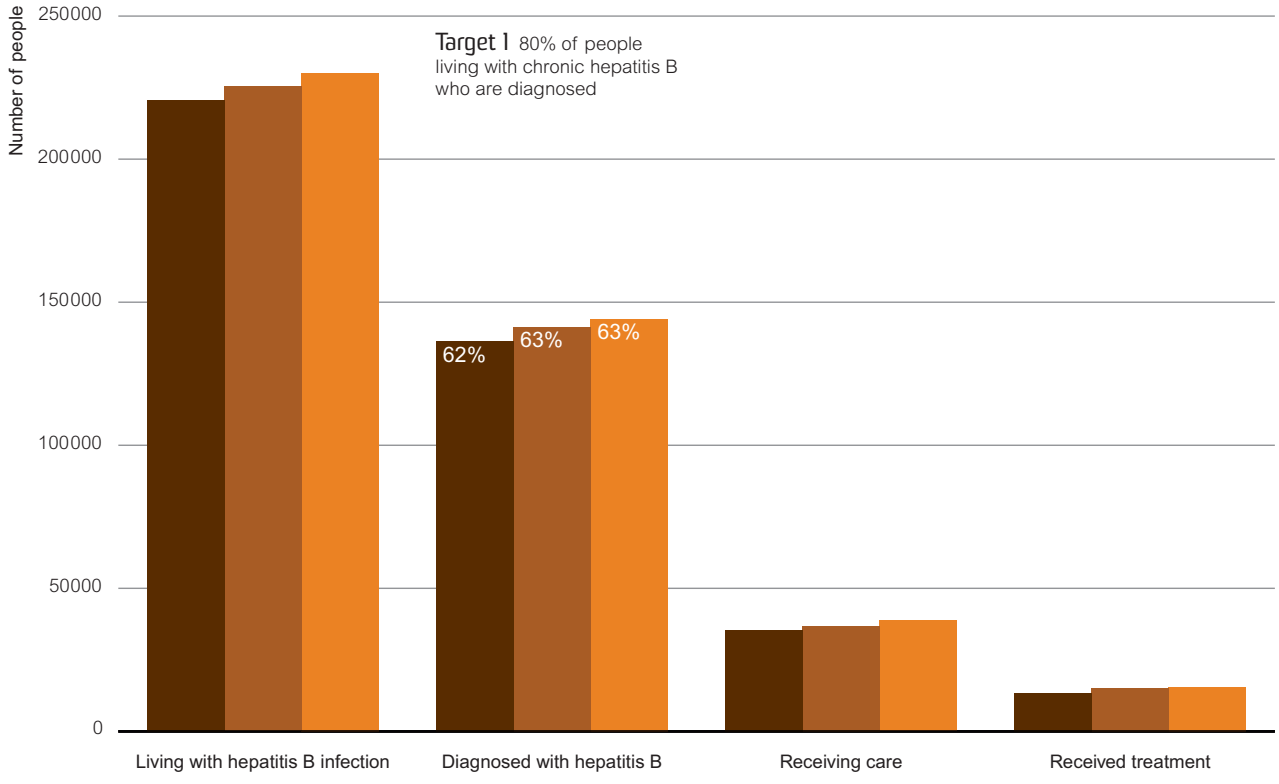
Numerator	Cumulative number of hepatitis B notifications reported to NNDSS from 1971 – 2016
Denominator	Modelled total number of people who have ever had chronic hepatitis B in Australia

Background: Of the estimated 230 034 people with chronic hepatitis B in Australia, over 85 803 (37%) remain unaware of their infection status. Late diagnosis of hepatitis B infection has a significant impact on mortality and morbidity. Therefore, it is important to increase the proportion of people with chronic hepatitis B who have been diagnosed.

Data source and considerations: 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 – 2016 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. See Methodological Notes for further detail.

Results: During 2016, an estimated 230 034 people were living with chronic hepatitis B and an estimated 144 231 (63%) were diagnosed with hepatitis B (Figure 5).

Figure 5 The hepatitis B diagnosis and care cascade, 2014 – 2016



	Living with hepatitis B infection	Diagnosed with hepatitis B	Receiving care	Received treatment
2014	220 584	136 541	35 482	13 555
2015	225 384	141 316	36 957	15 059
2016	230 034	144 231	38 731	15 577

Source: WHO Collaborating Centre for Viral Hepatitis, VIDRL, Doherty Institute. See Methodological Notes for detail

1.3b Annual rate of notifications of unspecified hepatitis B

Indicator definition

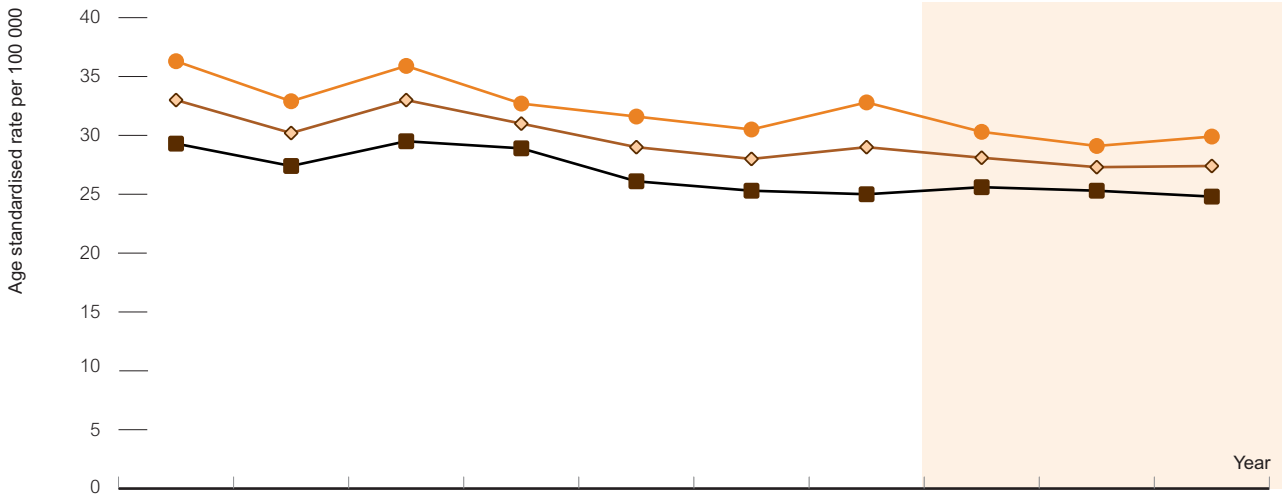
Numerator	Number of notifications of unspecified hepatitis B reported to NNDSS
Denominator	Australian population reported by the ABS

Background: In Australia, hepatitis B infections are reported as newly acquired or unspecified. Unspecified hepatitis B requires detection of HBsAg in a patient with no prior evidence of HBV who does not meet criteria for newly acquired infection. Unspecified infection can provide an indication of the burden of diagnosed chronic hepatitis B in a population, and can be used to complement serosurveys.

Data source and considerations: Hepatitis B is notified as 'unspecified', where the infection was acquired more than 24 months prior to diagnosis or the period of infection is unspecified. The annual rate of notifications of unspecified hepatitis B was calculated using data from the NNDSS. See Methodological Notes for further details of data considerations.

Results: The notification rate of unspecified hepatitis B in Australia has decreased by 5% from 29.0 per 100 000 population in 2013 (6481 cases) to 27.4 per 100 000 population in 2016 (6401 cases) (Figure 6). Long-term the notification rate has decreased by 17% from 33.0 per 100 000 population in 2007. Notification rates among males remained slightly higher than among females in 2016, at 29.9 per 100 000 population for males and 24.8 per 100 000 population for females. Of note, if indicator 1.3a (increase to 80% the proportion of all people living with chronic hepatitis B who are diagnosed) is met, a short-term increase in unspecified hepatitis B notifications will be seen.

Figure 6 Unspecified hepatitis B rate of notification per 100 000 population, 2007 – 2016, by sex



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Total	33.0	30.2	33.0	31.0	29.0	28.0	29.0	28.1	27.3	27.4
Males	36.3	32.9	35.9	32.7	31.6	30.5	32.8	30.3	29.1	29.9
Females	29.3	27.4	29.5	28.9	26.1	25.3	25.0	25.6	25.3	24.8

Source: National Notifiable Diseases Surveillance System

1.3c Prevalence of hepatitis B in pregnant women by country of birth and Aboriginal and Torres Strait Islander status

Indicator definition

Numerator	Number of hepatitis B notifications in women recorded as giving birth during the specified time period
Denominator	Number of women recorded as giving birth during the specified time period

Background: Transmission of hepatitis B virus from mother to infant during the perinatal period represents one of the most efficient modes of hepatitis B transmission and often leads to severe long-term sequelae.[7] Without interventions (hepatitis B vaccination and immune globulin), infants born to mothers positive for hepatitis B surface antigen (HBsAg) and hepatitis B envelope antigen (HBeAg) have a 70% – 90% chance of acquiring perinatal HBV infection, and 85% – 90% of infected infants will become chronic hepatitis B carriers.[8, 9] Prenatal screening of all pregnant women identifies women who are HBsAg-positive, resulting in treatment of their newborns with hepatitis B immune globulin (HBIG) and hepatitis B vaccine, which is 85% – 95% effective in preventing the progression to chronic carriers.[10] Routine antenatal screening of pregnant women for hepatitis B surface antigen (HBsAg) is recommended in Australia to enable appropriate management to prevent newborn infants developing chronic hepatitis B infection. It also enables appropriate follow-up and management of mothers who have chronic hepatitis B infection, identification of the hepatitis B immune status of other household members, and protection of those who are susceptible to hepatitis B infection.[11] Finally, as there is a very high coverage of hepatitis B antenatal screening in Australia, the findings can provide a measure of prevalence, and indicate the long-term effectiveness of infant vaccination programs in cohorts of women who would have been eligible for the infant vaccine.

Data source and considerations: To determine the long-term effectiveness of the infant hepatitis B vaccination programs, a number of datasets will be linked including perinatal, NNDSS data, and the immunisation register. Linkages will be conducted separately in each state and territory. Data will then be used to determine the antenatal prevalence of chronic hepatitis B infection by year of birth, region, Aboriginal and Torres Strait Islander status, hepatitis B immunisation status, and where possible, country of birth. Data are unavailable this year, but will be included in future reporting.

1.4 Increase access to appropriate management and care for people with chronic hepatitis B

1.4a Proportion of people with chronic hepatitis B dispensed drugs for hepatitis B infection

Indicator definition

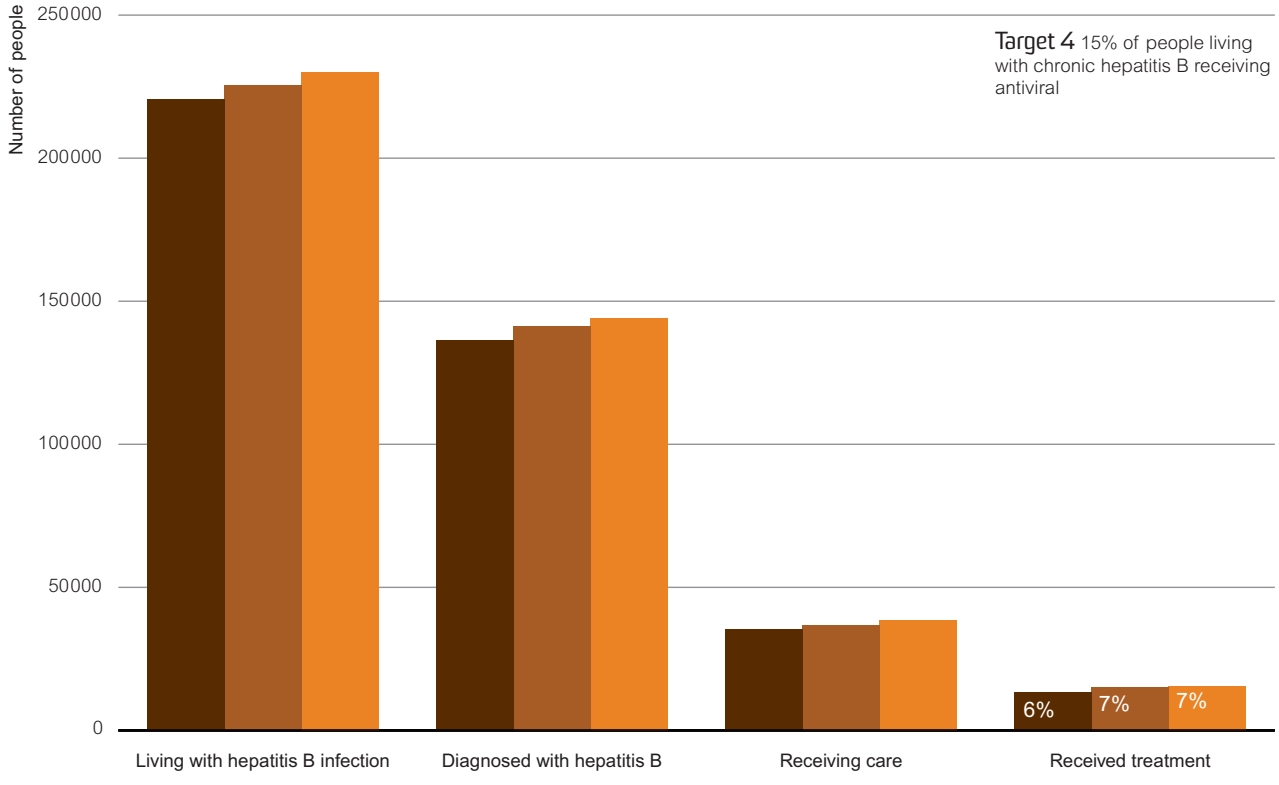
Numerator	Number of people dispensed drugs for chronic hepatitis B infection
Denominator	Modelled estimate of the number of people living with chronic hepatitis B

Background: Increasing access to antiviral treatment will prevent deaths due to advanced liver disease, and help address the rising burden of hepatitis B related liver cancer. It is important to note that not all people with hepatitis B will benefit from treatment. Treatment initiation depends on disease stage, with chronic infection and liver damage indicating treatment should be considered. The current national target for chronic hepatitis B treatment is 15% of all people living with chronic hepatitis B.[12, 13]

Data source and considerations: The number of people receiving treatment for chronic hepatitis B in 2014 – 2016 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). See Methodological Notes for further detail.

Results: In 2016, nationally, an estimated 7% of all people living with hepatitis B received antiviral treatment (Figure 7) as compared to 5% in 2013 (not shown in the cascade below). The changes in proportions equate to over 5000 more people on treatment in two years.

Figure 7 The hepatitis B diagnosis and care cascade, 2014 – 2016



	Living with hepatitis B infection	Diagnosed with hepatitis B	Receiving care	Received treatment
2014	220 584	136 541	35 482	13 555
2015	225 384	141 315	36 957	15 059
2016	230 034	144 231	38 731	15 577

Source: WHO Collaborating Centre for Viral Hepatitis, VIDRL, Doherty Institute. See Methodological Notes for detail

1.4b *Proportion of people with chronic hepatitis B who received monitoring for chronic hepatitis B (additional information)*

Indicator definition

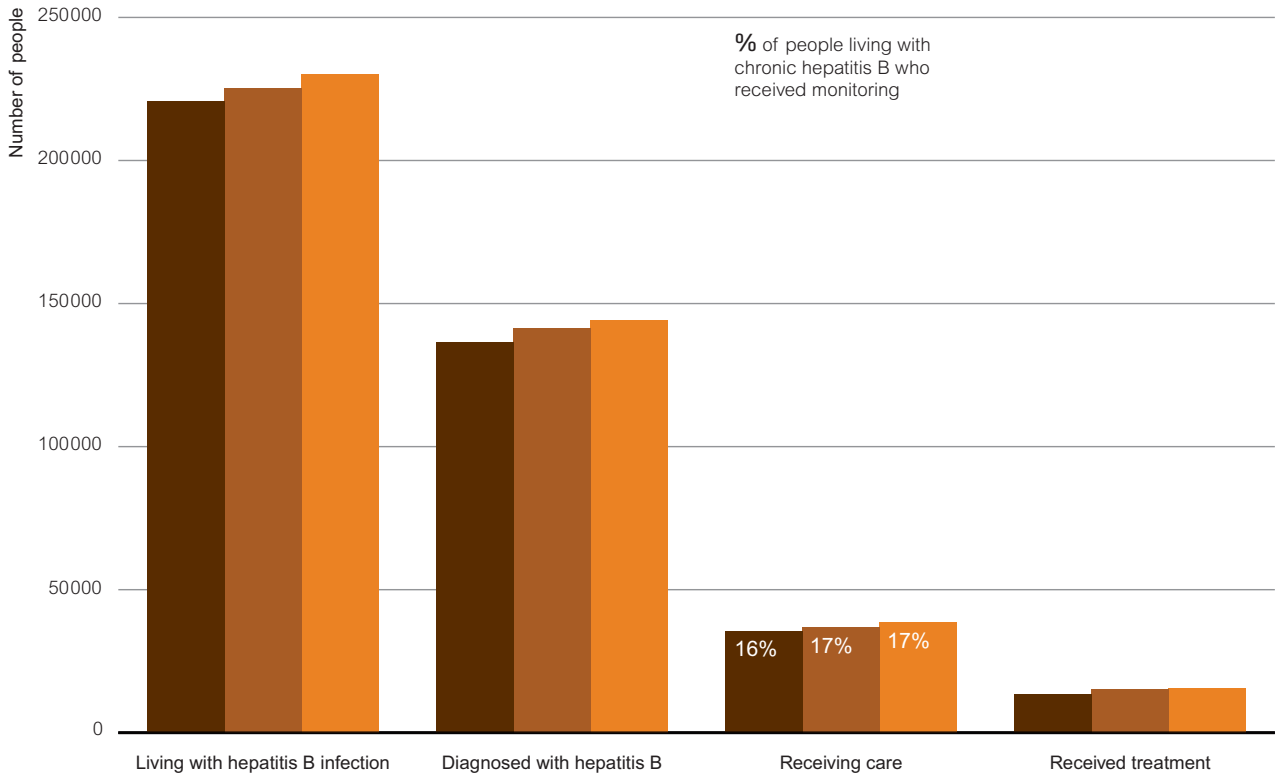
Numerator	Number of people with chronic hepatitis B infection in care
Denominator	Modelled estimate of the number of people living with chronic hepatitis B

Background: All people living with chronic hepatitis B require regular monitoring to determine their clinical status which informs treatment recommendations.[12] In people not on treatment, hepatitis B DNA viral load testing is an important component of monitoring disease progression.[14] Monitoring of viral load in people on treatment is important to provide information on success and required duration of antiviral therapy.[15]

Data source and considerations: The number of people who received monitoring for chronic hepatitis B in 2016 was determined using Department of Human Services data regarding rebate for an annual hepatitis B viral load test. See Methodological Notes for further detail.

Results: In 2016, nationally 38 731 people received either antiviral therapy or a yearly viral load test. This represents an estimated 17% of people living with chronic hepatitis B in care or on treatment (Figure 8), compared with 13% in 2013.

Figure 8 The hepatitis B diagnosis and care cascade, 2014 – 2016



	Living with hepatitis B infection	Diagnosed with hepatitis B	Receiving care	Received treatment
2014	220 584	136 541	35 482	13 555
2015	225 384	141 316	36 957	15 059
2016	230 034	144 231	38 731	15 577

Source: WHO Collaborating Centre for Viral Hepatitis, VIDRL, Doherty Institute. See Methodological Notes for detail

1.5 Reduce burden of disease attributed to chronic hepatitis B

1.5a Indicator being developed

The burden of disease caused by the hepatitis B virus includes liver cirrhosis, cancer and liver transplants. Mathematical modelling will be conducted in the future to provide an indicator on disease progression and deaths. In the meantime, one indicator of the extent of illness caused by hepatitis B is the number of liver transplants due to chronic hepatitis B infection.

1.5b *Proportion of liver transplant recipients with hepatitis B (including hepatitis B related liver cancers) (additional information)*

Indicator definition

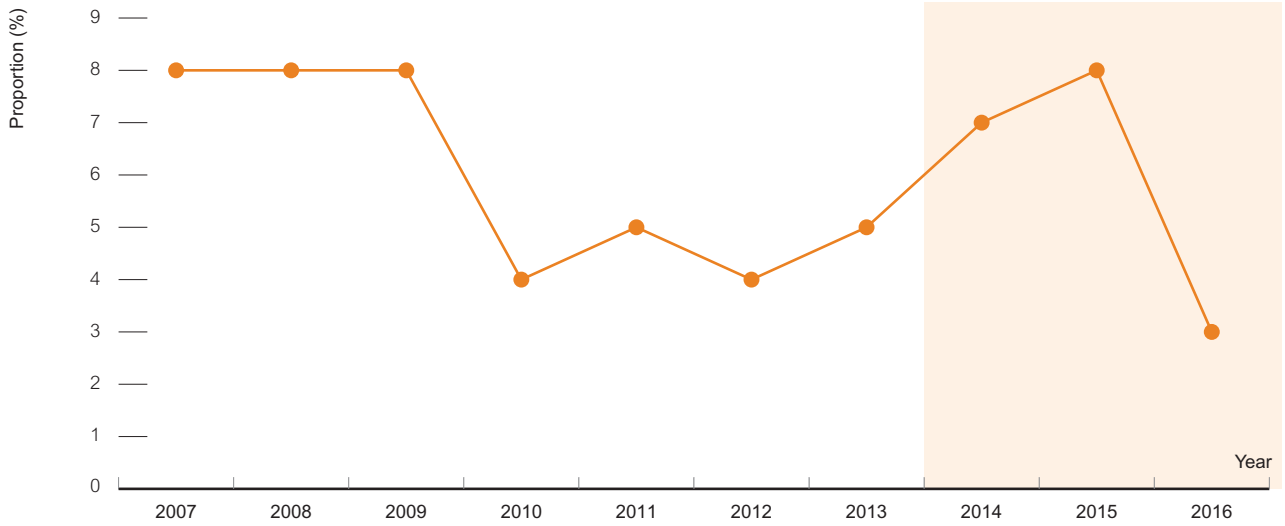
Numerator	Number of liver transplant recipients with chronic hepatitis B related diseases, including hepatocellular cancers
Denominator	Total number of liver transplants in a year

Background: The burden of disease caused by hepatitis B virus includes liver cirrhosis, hepatocellular cancer and potential need for transplant. Currently, 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.

Data source and considerations: The Australian and New Zealand Liver Transplant Registry (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.

Result: In 2016, 7 of 233 (3%) people who had a liver transplant (including cases of hepatitis B related liver cancers) had hepatitis B infection, compared with 9 of 198 (5%) in 2013. Over the past ten years, this proportion has fluctuated between 4% and 8% (Figure 9). Caution should be taken in interpreting these data, as the numbers are small and changes will be influenced by liver donor supply and overall transplant rates.

Figure 9 Proportion of liver transplant recipients with hepatitis B, 2007 – 2016*



Liver transplant recipients (%)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
●	8%	8%	8%	4%	5%	4%	5%	7%	8%	3%
Liver transplant recipients (n)										
	9	9	12	7	8	7	9	13	17	7

*Note: Caution should be taken in interpreting these data, as the numbers are small and changes will be influenced by liver donor supply and overall transplant rates

Source: The Australian and New Zealand Liver Transplant Registry

1.6 Eliminate the negative impact of stigma, discrimination, and legal and human rights issues on people's health

Stigma is recognised as being a critical barrier to effective responses to blood-borne viruses and sexually transmissible infections. Among affected communities, stigma is associated with mental health issues, social isolation, and can discourage people from accessing essential health care and medical treatment, including testing, treatment uptake and adherence to medications. This can have adverse implications for public health initiatives that target prevention and management of infection. Therefore, monitoring of the experiences of stigma and discrimination by affected communities is essential to assess the achievement of this goal.

The Centre for Social Research in Health received funding from the Australian Government Department of Health to develop an indicator of stigma among priority groups identified by the five national strategies addressing blood-borne viruses and sexually transmissible infections; people living with HIV, men who have sex with men, people who inject drugs, people living with hepatitis C and health care workers.

1.6a Proportion of people experiencing any stigma or discrimination in relation to their hepatitis B status in the last 12 months: Indicator being developed

At this stage, this indicator has not been implemented among people living with hepatitis B. In the upcoming phase of the stigma indicator project, a qualitative study will be conducted within the Chinese community to scope key issues of relevance to this group. This approach will establish networks to facilitate the conduct of survey research in future project phases. Future phases of the project will also measure the expression of stigma towards people living with hepatitis B in a survey of the general population.

1.6b *Proportion of health care workers expressing stigma or discrimination towards clients living with hepatitis B (additional information)*

A mirrored stigma indicator has been implemented with health care workers to identify their expression of stigma towards clients living with hepatitis B.

Indicator definition

Numerator	Proportion of surveyed health care workers who report expressing any stigma or discrimination towards clients living with hepatitis B
Denominator	Total number of health care workers surveyed

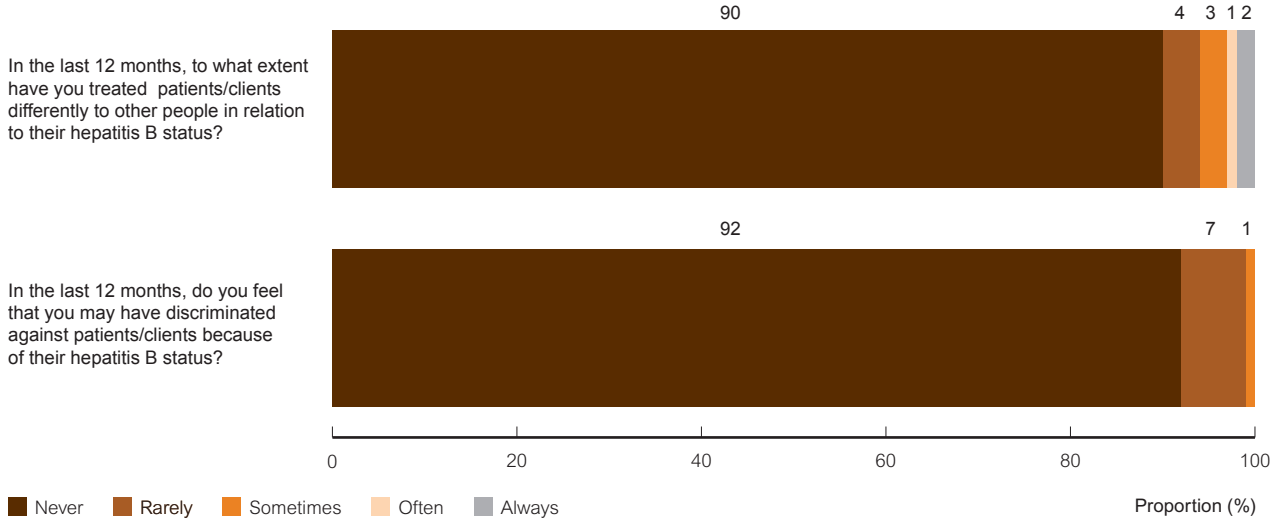
Background: See Section 1.6.

Data source and considerations: The Centre for Social Research in Health developed an indicator of expressed stigma that could be used with health care workers in relation to key attributes related to the national strategies. A single question was selected to indicate expressed stigma in relation to hepatitis B status: "In the last 12 months, to what extent have you treated patients/clients differently to other people in relation to their hepatitis B status?" The wording of this question was subsequently revised to clarify that the indicator referred to discriminatory behaviour: "In the last 12 months, do you feel that you may have discriminated against patients/clients because of their hepatitis B status?" Data are presented for both the initial and the revised question.

An online survey was developed for health care workers. Participants were recruited through the Australasian Society for HIV, Viral Hepatitis and Sexual Health Medicine (ASHM). It must be noted that this sample is not representative, and is likely to show an underrepresentation of stigma expressed by health care workers more generally.

Result: In the 2016 online survey (N=338), less than 10% of health care workers reported discriminating against clients or treating them differently because of their hepatitis B status in the last 12 months.

Figure 10 Proportion of health care workers expressing stigma or discrimination towards clients living with hepatitis B in the last 12 months



Source: The Centre for Social Research in Health

2. Hepatitis C

Epidemiology overview

At the start of 2016, an estimated 227 306 people were living with chronic hepatitis C, reducing to an estimated 199 412 at the end of 2016. In Australia, most hepatitis C transmission occurs through unsterile injecting drug use practices, with hepatitis C antibody prevalence of 51% among people who inject drugs attending needle and syringe programs in Australia. Further details are provided in the HIV, viral hepatitis and sexually transmissible infections in Australia: Annual Surveillance Report 2017.[3] According to the National Strategy, priority populations include people living with hepatitis C, people from Aboriginal and Torres Strait Islander backgrounds, culturally and linguistically diverse backgrounds, young injectors and/or new initiates to injecting, older people, sex workers and people in custodial settings.

Indicator status

Incidence

- Incidence of hepatitis C, based on repeat testing of samples from participants in the Australian Needle and Syringe Program Survey (ANSPS), declined annually between 2007 and 2009, and has remained high since, fluctuating between 8.1 and 21.4 per 100 person-years (Figure 11). Caution should be taken in interpretation of these trends due to: i) the small number of seroconversions per year, and ii) as confidence intervals overlap, meaning the differences observed each year are not statistically significant. Data for the most recent year (2016) are not available due to the method used to calculate incidence (see Methodological Notes for details). As the primary route of transmission of hepatitis C is sharing contaminated injecting equipment, and injecting drug use typically starts in late adolescence or early adulthood,[16] trends in the rate of diagnoses in those under 25 years can also be a proxy for the incidence of hepatitis C exposure. Among those aged under 25 years, the rate of notification of hepatitis C declined between 2007 and 2011 but was stable thereafter, including from 2013 – 16

Uptake of preventive measures

- The per capita number of needles and syringes distributed annually increased between 2013 and 2016 from 2.8 to 3.1 per capita, respectively, among the population aged 15 – 64 years. This equates to ~50 million needles and syringes distributed in 2016, an increase of 28% from 2.4 per capita in 2007 when ~34 million needles and syringes were distributed.
- The proportion of people who inject drugs attending needle and syringe programs who reported using a new needle and syringe for every injection in the past month was 71% in 2016 and 75% in 2013, with the proportion relatively stable since 2007 (72%).
- In 2016, the proportion of people who inject drugs attending needle and syringe programs who reported re-using another person's used needle and syringe (receptive syringe sharing) in the previous month increased to 19% compared to 15% in 2013.

Treatment

- Of the estimated 227 306, people living with chronic hepatitis C at the start of 2016, 32 550 (14%) received hepatitis C treatment during the year, compared to 7 326 (3%) in 2015 and 3 540 (2%) in 2013.

Morbidity

- At the end of 2016, the estimated number of people with severe fibrosis/hepatitis C related cirrhosis was 36 772, a 13% decrease from the 42 150 cases in 2013. However there has been a 33% relative increase, from the 27 620 cases observed in 2007.
- There were an estimated 605 deaths attributable to chronic hepatitis C infection in 2016, a 16% decrease since 2013 when there were 724 deaths; however there has been a 37% relative increase since 2007 when there were an estimated 439 deaths.
- Around a third (31%) of people who had a liver transplant in 2016 (73 of 233) had hepatitis C infection, compared to 39% (77 of 198) in 2013.

Summary: Based on repeat testing of people who inject drugs attending needle and syringe programs, the hepatitis C incidence rate was 19.9 (12.2 – 32.5) per 100 person years in 2015 compared to 21.4 in 2013. The notification rate in young people (suggestive of incidence) has been stable since 2011. In 2016, use of new needles and syringes was high at 71%, however receptive syringe sharing increased from 15% in 2013 to 19% in 2016. In 2016, 14% of people with chronic hepatitis C infection were estimated to have received hepatitis C treatment due to the availability of new direct acting antivirals (DAAs) through the Australian Pharmaceutical Benefits Scheme (PBS) from March 2016 onwards.

At the end of 2016, more than 53 696 people living with chronic hepatitis C infection and those who have been cured of infection but still experience hepatitis-C related morbidity had severe fibrosis or cirrhosis, which is a relative 20% more than 44 434 severe fibrosis and hepatitis C related cirrhosis cases in 2013. The number of people receiving liver transplants due to chronic hepatitis C-related hepatocellular carcinoma has decreased from 39% in 2013 to 31% in 2016.

Objectives and indicators

The National Hepatitis C Strategy 2014 – 2017 identified five specific objectives, with associated indicators (Table 3). Progress against these objectives and indicators is outlined in Table 3. Some *'additional information'* has been included due to data sources becoming available after the Plan was agreed and is marked accordingly

Main Findings

Table 3 National Hepatitis C Strategy progress

Theme	Objective	Indicator		2013	2014	2015	2016
Incidence	2.1 Reduce the incidence of hepatitis C infections	2.1a	Annual incidence rate of hepatitis C in people who inject drugs (per 100 person years)	21.4	8.3	19.9	*i
		2.1b	*Additional information:* The hepatitis C notification rate per 100 000 population in people aged <25 years	17.6	15.4	15.8	15.2
Uptake of preventative measures	2.2 Reduce the risk behaviours associated with the transmission of hepatitis C	2.2a	Per capita number of needles and syringes distributed in the previous calendar year	2.8	2.8	2.9	3.1
		2.2b	Proportion of people attending needle and syringe programs who report using a new needle and syringe for all injections in the previous calendar month	75%	77%	74%	71%
		2.2c	Proportion of people who inject drugs reporting re-using another person's used needle and syringe in the previous month (receptive syringe sharing)	15%	16%	16%	19%
Treatment	2.3 Increase access to appropriate management and care for people with chronic hepatitis	2.3a	Proportion of people with chronic hepatitis C dispensed drugs for their infection in each year	2%	2%	3%	14%
		2.3b	Treatment for hepatitis C over lifetime in people who inject drugs and had a positive hepatitis C test^	11%	13%	11%	29%
		2.3c	*Additional information:* Recent hepatitis C treatment uptake (previous 12 months) in people who inject drugs and had a positive hepatitis C test ^	3%	1%	2%	22%
Personal and social impacts	2.4 Reduce the burden of disease attributed to chronic hepatitis C	*2.4a*	*Additional information:* The number of people with severe fibrosis/hepatitis C related cirrhosis	42 150	44 653	46 247	36 772
		2.4a	*Additional information*:Estimated number of deaths attributable to chronic hepatitis C	724	780	829	605
		2.4b	*Additional information:* Proportion of liver transplant recipients with hepatitis C	39%	38%	33%	31%
	2.5 Eliminate the negative impact of stigma, discrimination, and legal and human rights issues on people's health	2.5a	Proportion of people living with (or who had ever lived with) hepatitis C who report experiencing any stigma or discrimination in relation to their hepatitis C status in the last 12 months	*	*	*	56%
		2.5b	*Additional information:* Proportion of people who use drugs for injecting or who had ever injected drugs who report experiencing any stigma or discrimination in relation to their injecting drug use in the last 12 months	*	*	*	59% (CSRH) 64% (ANSPS)
		2.5c	*Additional information:* Proportion of health care workers expressing stigma or discrimination towards patients / clients living with hepatitis C or who inject drugs	*	*	*	10 – 12% (against clients with hepatitis C) 29 – 38% (against clients who inject drugs)

Incidence rates are per 100 person years, and to 1 decimal place; percentages (%) are rounded to the nearest whole number;

* Denotes data not available;

^ Among those testing HCV Ab positive excluding those who self-reported spontaneous clearance or treatment-induced clearance more than 12 months previously

i Hepatitis C incidence estimate among people inject drugs is not available for 2016, as insufficient time has passed to provide repeat testing information on all participants;

2.1 Reduce the incidence of hepatitis C

2.1a Annual incidence of hepatitis C in people who inject drugs

Indicator definition

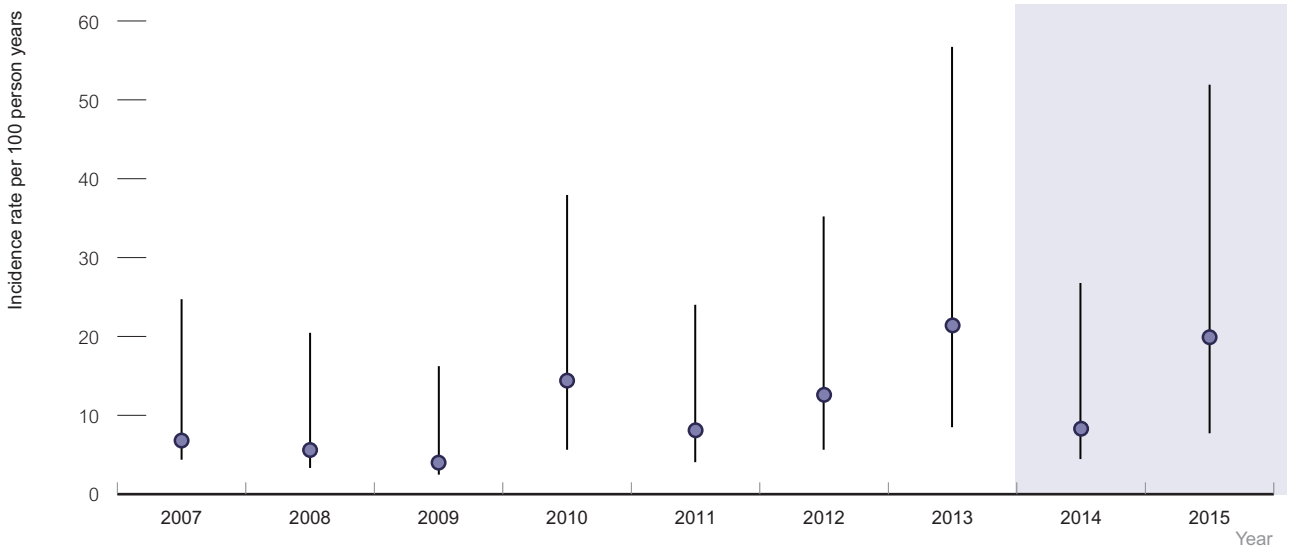
Numerator	Number of HCV seroconversions, defined as the midpoint between the last negative and first positive test for HCV antibodies
Denominator	Person years at risk, defined as the time between the first and last test in the cohort time period.

Background: 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.

Data source and considerations: Hepatitis C incidence can be calculated from repeat participants in the Australian Needle and Syringe Program Survey (ANSPS). Among those without prior exposure to hepatitis C, the number of seroconversions (HCV antibody negative to HCV antibody positive over a two-year period) is divided by the person time at risk. See Methodological Notes for further details and limitations.

Results: Over a nine-year study period (2007 – 2015) among people who inject drugs participating in the ANSPS on more than one occasion, there were 82 seroconversions, yielding a pooled hepatitis C incidence of 19.9 per 100 person-years (95%CI: 12.2 – 32.5). Hepatitis C incidence was 21.4 (95%CI 12.9 – 35.6) in 2013 and 8.3 (95%CI 3.8 – 18.6) in 2014 (Figure 11). Caution should be taken in interpretation of these rates as the confidence intervals between these estimates overlap, meaning the differences observed each year are not statistically significant. Fluctuations will be influenced by the number of hepatitis C antibody negative ANSPS respondents who have participated in multiple survey rounds. The incidence rate for 2016 is not available due to the method used to calculate incidence. See Methodological Notes for further details.

Figure 11 Estimated annual incidence rate of hepatitis C virus infection among people who inject drugs seen at needle and syringe programs, per 100 person-years, 2007 – 2015[1]



	2007	2008	2009	2010	2011	2012	2013	2014	2015
Incidence	6.8	5.6	4.0	14.4	8.1	12.6	21.4	8.3	19.9
Upper	18.1	14.9	12.3	23.8	16.2	22.8	35.6	18.6	32.5
Lower	2.6	2.1	1.3	8.7	4.0	7.0	12.9	3.8	12.2

[1] The confidence intervals between these estimates overlap meaning the differences observed are not statistically significant. An estimate is not available for 2016, as insufficient time has passed to provide repeat testing for all participants.

Source: Australian Needle and Syringe Program Survey

2.1b Hepatitis C notification rate in people aged <25 years (additional information)

Indicator definition

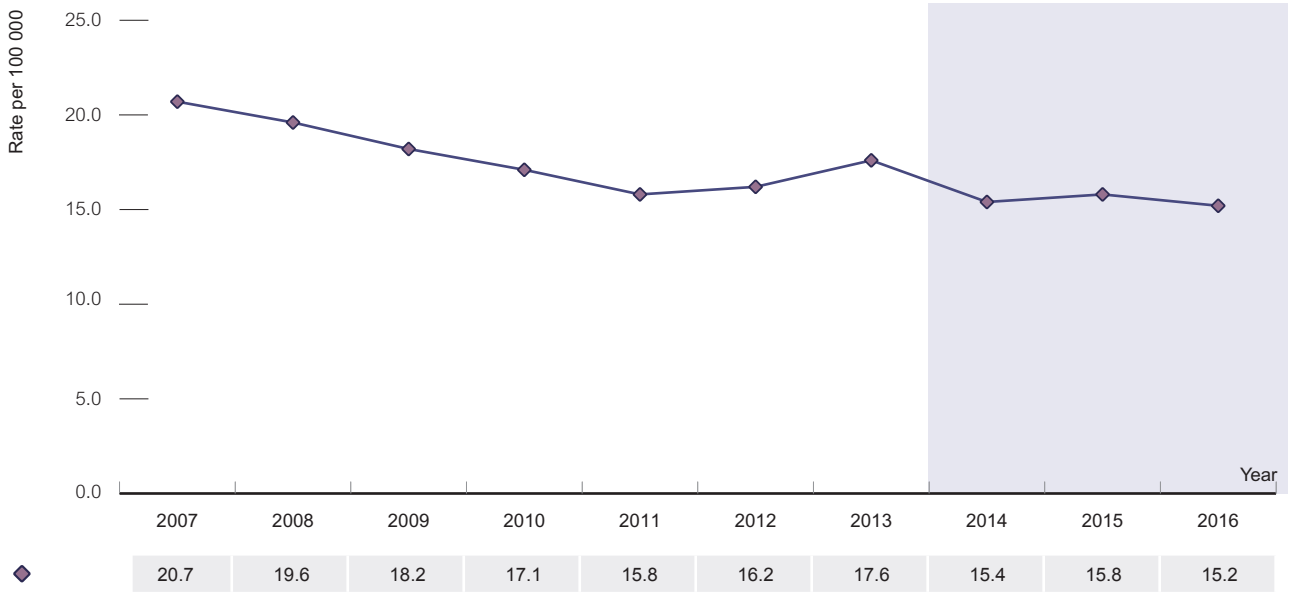
Numerator	Number of newly diagnosed hepatitis C infections (newly acquired and unspecified) in people aged <25 years reported to NNDSS
Denominator	Australian population <25 years of age reported by the ABS

Background: Reported numbers of newly diagnosed hepatitis C infections (newly acquired and unspecified) in people aged <25 years can be used to monitor the trends of transmission in Australia. As the primary route of transmission of hepatitis C is sharing injecting equipment, and injecting drug use typically starts in late adolescence or early adulthood, trends in the rate of diagnoses in those under 25 years can also be a proxy for the incidence of hepatitis C infection.

Data source and considerations: Hepatitis C infection is a notifiable disease in each State/Territory in Australia. All new hepatitis C diagnoses are reported by doctors and laboratories, through state/territory health authorities, to the NNDSS.

Results: Over the past ten years, the notification rate has decreased in the <25 year age group from 20.7 per 100 000 population in 2007 to 15.2 per 100 000 population in 2016 (27% decrease) (Figure 12) with the rate relatively stable between 2011 and 2016.

Figure 12 Hepatitis C notification rate per 100 000 population, 2007 – 2016 in people aged <25 years, by year



Source: National Notifiable Diseases Surveillance System

2.2 Reduce the risk behaviours associated with the transmission of hepatitis C

2.2a Per capita number of needles and syringes distributed in the previous calendar year

Indicator definition

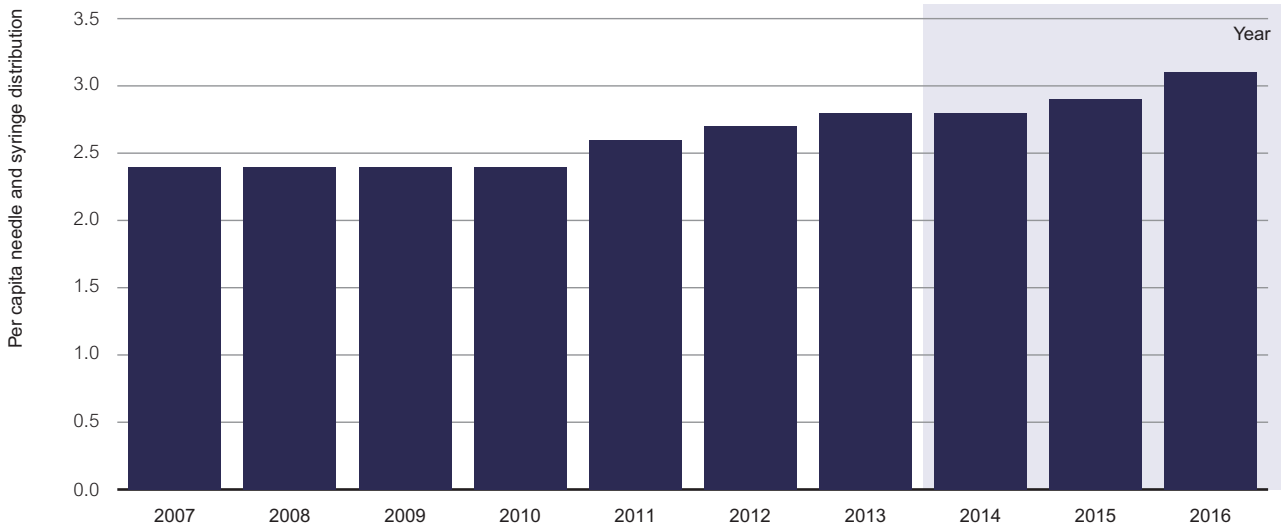
Numerator	Number of needles and syringes distributed by public and pharmacy needle and syringe programs reported by state and territory health departments
Denominator	Australian population aged 15 – 64 years reported by the ABS

Background: A key prevention strategy to protect people who inject drugs from acquiring and transmitting hepatitis C infection is the use of sterile needles and syringes for all injections. Australia introduced needle and syringe programs in 1986, and sterile injecting equipment is now provided at 3627 NSP sites across the country, including primary (n=98), secondary (n=784) NSP outlets, automatic dispensing machines (n=323), and pharmacies (n=2 422).[17]

Data source and considerations: Needle and syringe distribution data are available from the Needle and Syringe Program National Minimum Data Collection, and the 2016 estimate of the population size of people who inject drugs is 77 642 (as per the calendar year estimates from the ANSPS). However, per capita needle and syringe distribution is calculated by dividing the number of needles and syringes distributed by the ABS estimates of the Australian population aged 15 – 64 years.

Results: In 2016, the per capita rate of needle and syringe distribution increased by 11% as compared to 2013, from 2.8 to 3.1 (Figure 13). The number of needles and syringes distributed in Australia over the past decade increased from ~34 million in 2007 to ~50 million in 2016. This translates into an increase over ten years in the per capita number of needles and syringes distributed annually, from 2.4 in 2007, to 3.1 in 2016.

Figure 13 Per capita number of needles and syringes distributed in the previous calendar year, 2007 – 2016



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Number per capita	2.4	2.4	2.4	2.4	2.6	2.7	2.8	2.8	2.9	3.1

Note: Per capita population aged 15 – 64 years

Source: Needle and Syringe Program Minimum Data Collection

2.2b *Proportion of people who inject drugs attending NSPs who report using a new needle and syringe for all injections in the previous month*

Indicator definition

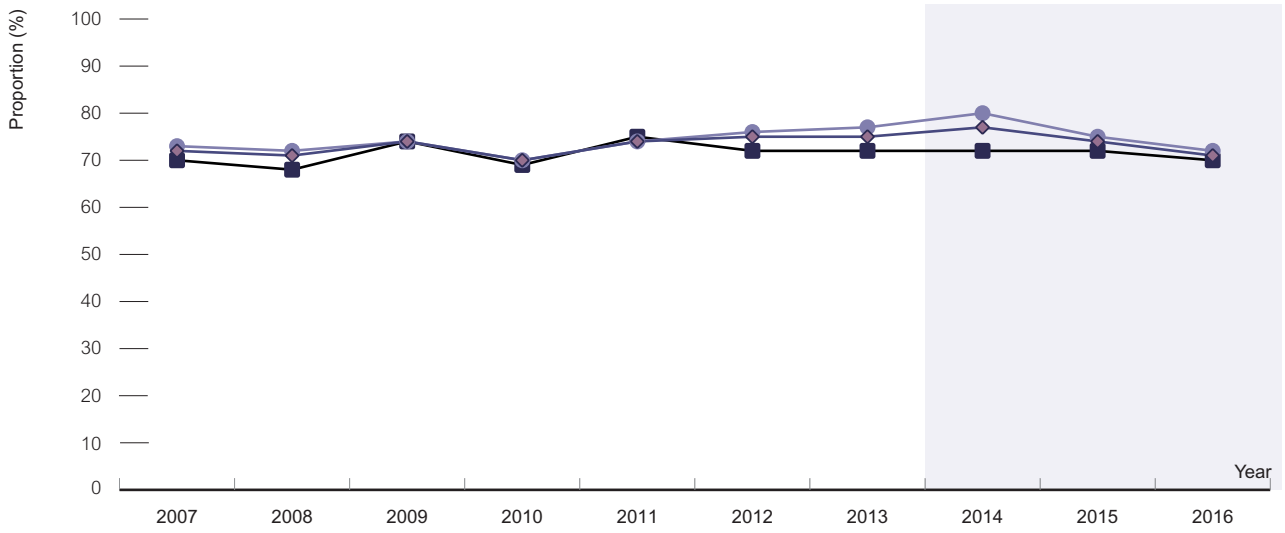
Numerator	Number of ANSPS participants who report using a new needle/syringe for all injections in the month preceding the survey
Denominator	Total number of ANSPS participants who report injecting drugs in the previous month

Background: Coverage is a critical indicator of the effectiveness of interventions such as needle and syringe programs to prevent or control BBV transmission among people who inject drugs. Syringe coverage can be determined at the population level and the individual-level. This indicator focuses on individual-level coverage.

Data source and considerations: The ANSPS is conducted annually and collects data from a large heterogeneous community-based sample of people (In 2016 n= 2 210) who inject drugs accessing primary needle and syringe programs (NSPs) from a range of geographical areas across all states and territories. The ANSPS collects data on the use of new needles/syringes for injecting. See Methodological Notes for further detail.

Results: In 2016, 71% of respondents reported using a new needle and syringe for all injections in the previous month, compared to 75% in 2013 (Figure 14). Across the ten-year period 2007 – 2016, the proportion of people who inject drugs who reported using a new needle or syringe for all injections in the previous month was relatively stable at 72% in 2007 and 71% in 2016 (Figure 14).

Figure 14 Proportion of all injections by people who inject drugs in which a new needle and syringe was used in the previous month*, 2007 – 2016.



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Total	72%	71%	74%	70%	74%	75%	75%	77%	74%	71%
Male	73%	72%	74%	70%	74%	76%	77%	80%	75%	72%
Female	70%	68%	74%	69%	75%	72%	72%	72%	72%	70%

* Total includes transgender and sex not reported

Source: Australian Needle and Syringe Program Survey

2.2c *Proportion of people who inject drugs reporting re-using another person's used needle and syringe in the previous month.*

Indicator definition

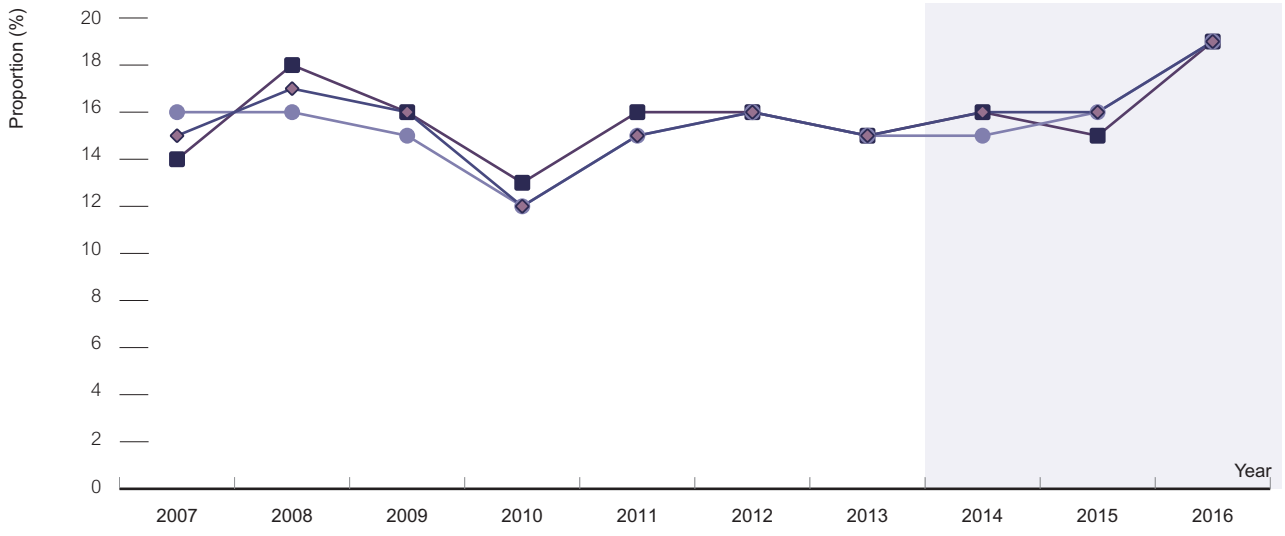
Numerator	Number of ANSPS participants who report re-use of another person's used needle and syringe (receptive syringe sharing) in the month preceding the survey
Denominator	Total number of ANSPS participants who report injecting drugs in the previous month

Background: The re-use of used needles and syringes, or receptive syringe sharing, is a major risk factor for the transmission of HIV, hepatitis and other blood borne viruses. Monitoring the prevalence of receptive syringe sharing among people who inject drugs is important as this behaviour can increase the risk of transmitting and acquiring blood-borne viruses (BBV) such as hepatitis C and HIV.

Data source and considerations: Each year, the ANSPS documents the proportion of participants who report receptive syringe sharing in the month preceding the survey. See Methodological Notes for further detail.

Results: During the period 2007 – 2016, between 12% and 19% of people who inject drugs attending needle and syringe programs reported receptive syringe sharing in the previous month. There has been a 24% increase in this key risk behaviour between 2013 (15%) and 2016 (19%) (Figure 15).

Figure 15 Proportion of people who inject drugs reporting receptive syringe sharing in the previous month*, 2007 – 2016



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Total	15%	17%	16%	12%	15%	16%	15%	16%	16%	19%
Male	16%	16%	15%	12%	15%	16%	15%	15%	16%	19%
Female	14%	18%	16%	13%	16%	16%	15%	16%	15%	19%

* Total includes transgender and sex not reported

Source: Australian Needle and Syringe Program Survey

2.3 Increase access to appropriate management and care for people with chronic hepatitis C

2.3a Proportion of people with chronic hepatitis C dispensed drugs for their infection in the previous calendar year

Indicator definition

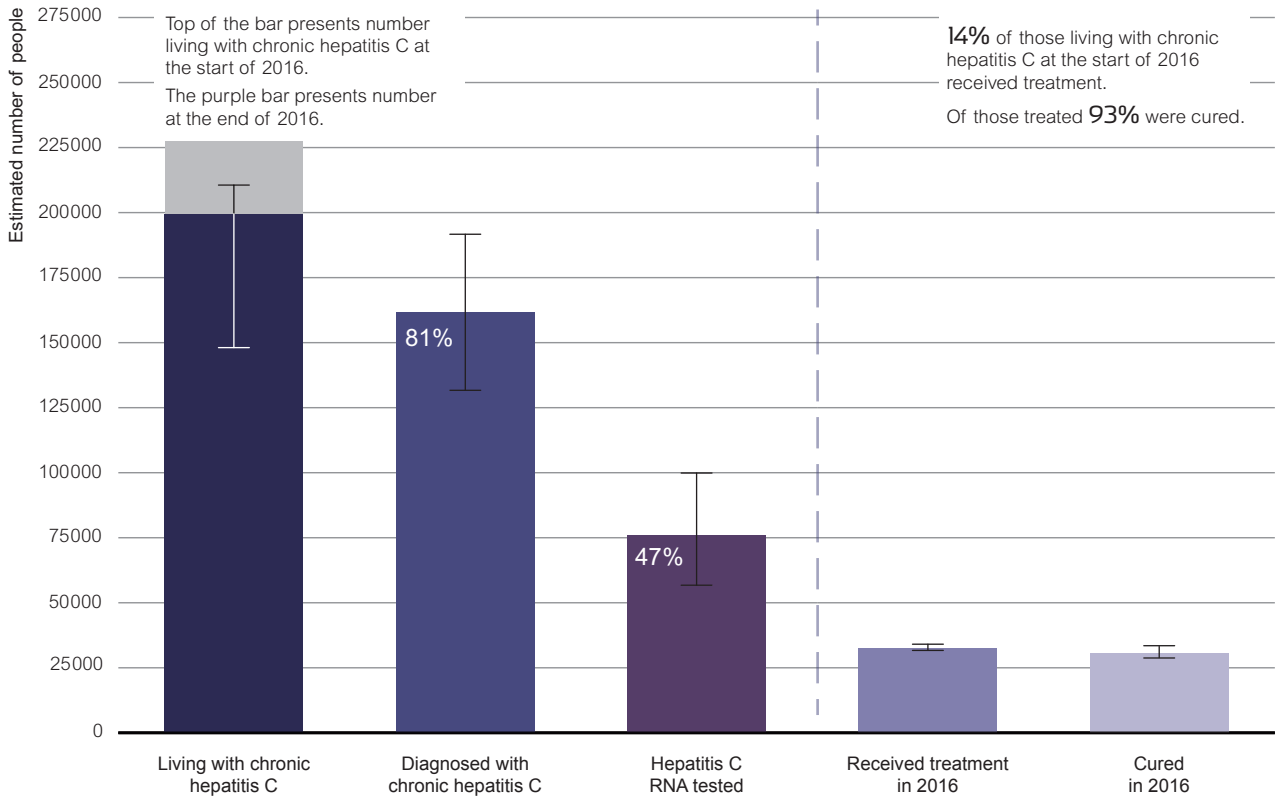
Numerator	Number of individuals dispensed medications for hepatitis C infection
Denominator	Estimated number of people living with hepatitis C infection in Australia

Background: Hepatitis C is a curable infection. Treating hepatitis C reduces an individual's risk of developing chronic liver disease, cirrhosis and hepatocellular carcinoma, and improves quality of life.[18] Also, mathematical modelling suggests treating sufficient number of people with hepatitis C who currently inject drugs could reduce disease transmission and lower the population prevalence and incidence of hepatitis C.[19] Treatments available prior to March 2016 had been limited with poor efficacy and considerable side effects. New direct-acting antivirals (DAAs) became available on the Australian PBS from 1 March 2016. Compassionate access to DAAs had commenced in late 2014, predominantly for people living with chronic hepatitis C and cirrhosis. In addition, generic DAA importation (from mid-2015) and DAA clinical trials contributed to DAA access prior to PBS listing.

Data sources and considerations: Information on number of individuals who were dispensed medications for hepatitis C infection comes from the Pharmaceutical Benefits Scheme (PBS). The estimated number of people living with hepatitis C infection in Australia was derived using a difference equation mathematical model produced collaboratively between the Center for Disease Analysis and the Kirby Institute. See Methodological Notes for further detail.

Results: At the start of 2016, an estimated 227 306 people were living with chronic hepatitis C in Australia, reducing to an estimated 199 412 living with chronic hepatitis C at the end of 2016 (Figure 16), due to 30 434 cured during 2016 being much greater than the estimated number of new hepatitis C infections. Of the estimated 227 306 people living with chronic hepatitis C at the start of 2016, 32 550 (14%) received hepatitis C treatment in 2016, compared to 7 326 (3.2%) in 2015 and 3 540 (1.5%) in 2013. This corresponds to a ninefold increase in the number of people receiving treatment between 2013 and 2016, and a fourfold increase between 2015 and 2016. Caution should be taken in interpreting this difference in proportions between 2013 and 2016 estimates due to difference in methods used in modelling in these years.

Figure 16 The 2016 hepatitis C diagnosis and care cascade



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

2.3b Treatment uptake for hepatitis C in people who inject drugs

Indicator definition

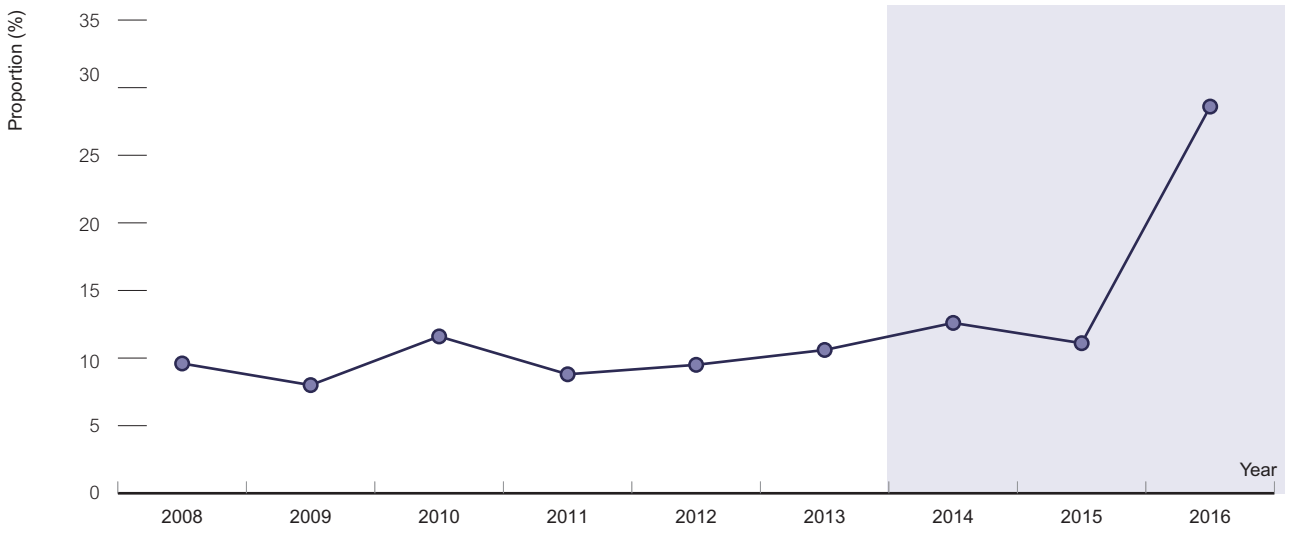
Numerator	Number of ANSPS participants who report any hepatitis C antiviral treatment over lifetime
Denominator	Total number of HCV antibody positive ANSPS participants, excluding those who self-reported spontaneous clearance

Background: See Section 2.3a

Data source and considerations: The ANSPS collects data on the lifetime uptake of hepatitis C antiviral therapy. See Methodological Notes for further detail. In 2016, the denominator of this indicator was modified from *'Total number of ANSP participants who report chronic hepatitis C infection or treatment induced viral clearance'* to *'Total number of HCV antibody positive ANSPS participants, excluding those who self-reported spontaneous clearance.'* The reason being that in 2016 a reasonable number of people did not know their current hepatitis C status as they were still undergoing treatment, and hence it was important to include this sub-group of people in the denominator.

Results: Between 2013 and 2016, the proportion of people who inject drugs participating in the ANSPS reporting a lifetime history of hepatitis C antiviral treatment increased dramatically from 10.6% to 28.6% (Figure 17). Prior to the large increase in treatment in 2016, the proportion of participants with a history of treatment ranged from 8.0 – 12.6%.

Figure 17 Proportion of hepatitis C antibody positive people seen at needle and syringe programs who report any hepatitis C antiviral treatment over lifetime, 2008 – 2016



9.6%	8.0%	11.6%	8.8%	9.5%	10.6%	12.6%	11.1%	28.6%

Note: Denominator restricted to people who tested HCV antibody positive and excludes people who self-reported spontaneous clearance
Source: Australian Needle and Syringe Program Survey

2.3c *Recent treatment uptake for hepatitis C in people who inject drugs (additional information)*

Indicator definition

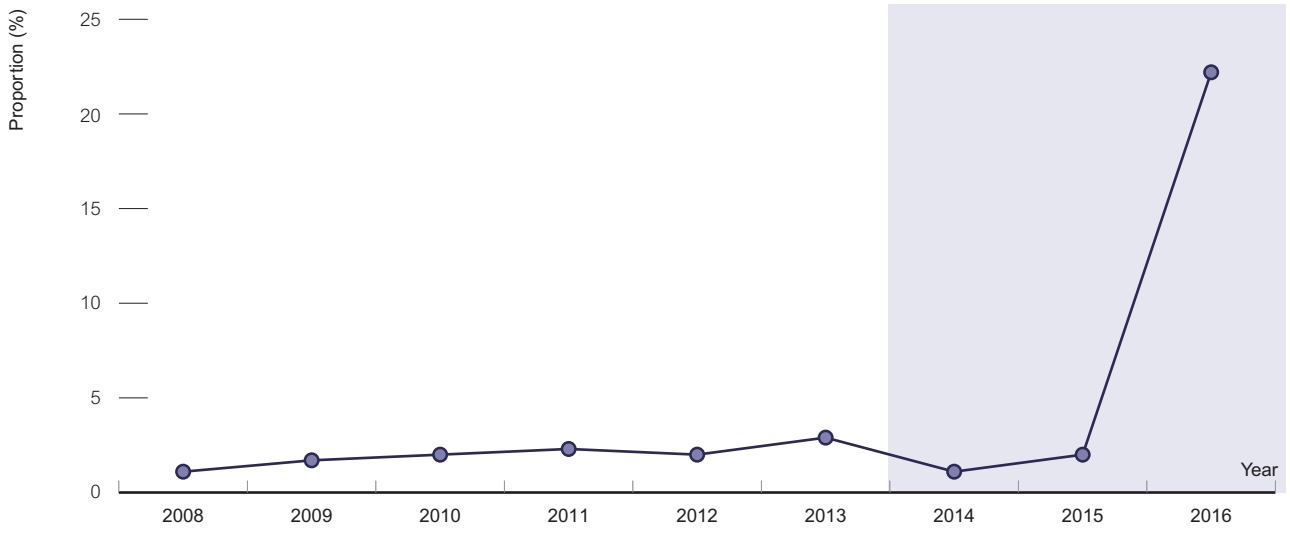
Numerator	Number of ANSPS participants who report hepatitis C antiviral treatment in the previous 12 months
Denominator	Total number of HCV antibody positive ANSPS participants, excluding those who self-reported spontaneous clearance and those who reported treatment-induced clearance within the previous 12 months

Background: See Section 2.3a

Data source and considerations: The ANSPS collects data on recent uptake of hepatitis C antiviral therapy. See Methodological Notes for further detail. In 2016, the denominator of this indicator was modified from *'total number of ANSP participants who report chronic hepatitis C infection or treatment induced viral clearance within the previous 12 months'* to *'total number of HCV antibody positive ANSPS participants, excluding those who self-reported spontaneous clearance, and those who reported treatment-induced clearance more than 12 months previously.'* The reason being that in 2016 a reasonable number of people did not know of their current hepatitis C status as they were still undergoing treatment, and hence it was important to include this sub-group of people in the denominator.

Results: Between 2013 and 2016, the proportion of people who inject drugs participating in the ANSPS who reported they had received treatment in the last 12 months increased exponentially from 2.9% to 22.2%, representing an eightfold increase (Figure 18). Over the last nine years, this proportion has shown a 20-fold increase from 1.1% in 2008 to 22.2% in 2016.

Figure 18 Recent uptake of hepatitis C antiviral treatment for people who inject drugs, 2008 – 2016



Note: Denominator restricted to people who tested HCV antibody positive and excludes people who self-reported spontaneous clearance or treatment induced clearance more than 12 month previously

Source: Australian Needle and Syringe Program Survey

2.4 Reduce the burden of disease attributed to chronic hepatitis C

2.4a The number of people with severe fibrosis/hepatitis C related cirrhosis, and estimated number of deaths (additional information)

Indicator definition

Single measure	Estimated number of people with severe fibrosis/hepatitis C related cirrhosis, and estimated number of deaths

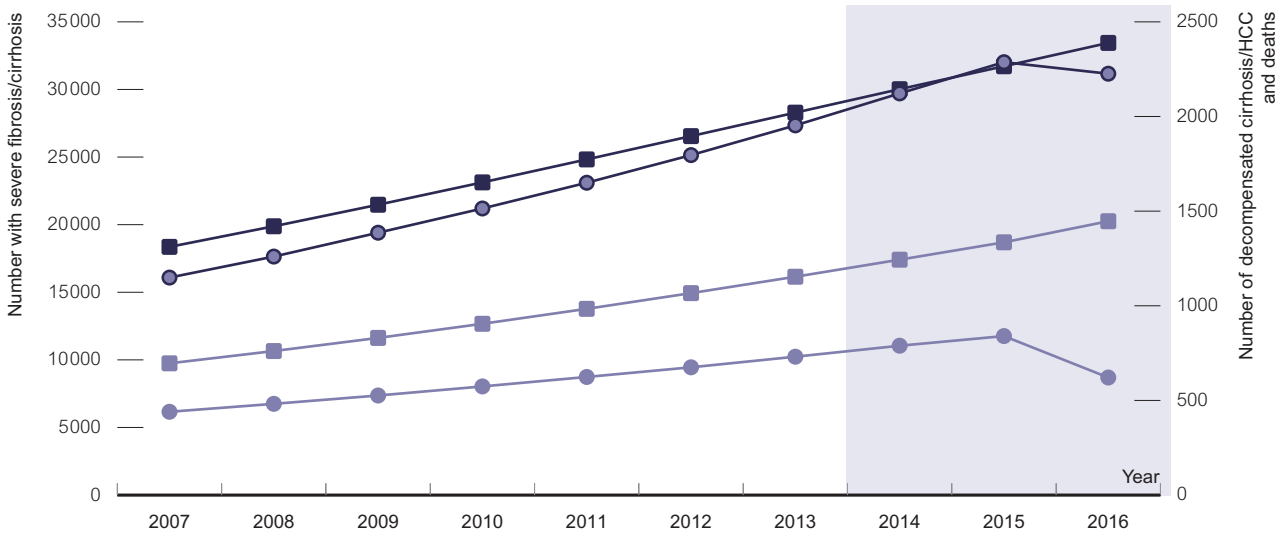
Background: To plan appropriate clinical care and treatment responses to the hepatitis C epidemic, accurate estimates of the rates of hepatitis C infection and its sequelae are essential.

Data source and considerations: The estimated number of people with severe fibrosis/hepatitis C related cirrhosis, and estimated number of deaths are derived using mathematical modelling after incorporating the impact of hepatitis C treatment, produced collaboratively between the Center for Disease Analysis and the Kirby Institute. Data are presented separately for: People living with chronic hepatitis C infection and those who have been cured of infection but still have hepatitis C related morbidity and mortality, and people with chronic hepatitis C infection only. See Methodological Notes for further detail.

Results: At the end of 2016, among people living with chronic hepatitis C and those who have been cured of chronic hepatitis C, there were an estimated 53 696 people with severe fibrosis and hepatitis C related cirrhosis (stage F3/4) (Figure 19a), a relative increase of 20.8% since 2013 and 91% since 2007 with 44, 434 and 28 101 severe fibrosis and hepatitis C related cirrhosis cases, respectively. Among people living with chronic hepatitis C and those who have been cured of chronic hepatitis C, the estimated number of new cases of hepatitis Crelated decompensated cirrhosis and hepatocellular carcinoma (HCC) was 2 226, a 13.9% increase from 1 953 cases in 2013 and 93.7% increase from 1 149 cases in 2007. The estimated number of hepatitis Crelated deaths in 2016 was 621, which is a 15% decrease since 2013 when there were an estimated 731 deaths, and an increase of 41.1% since 2007 where there were an estimated 440 deaths.

At the end of 2016, an estimated 199 412 people were living with chronic hepatitis C infection, and of these, 36 772 had severe fibrosis and hepatitis C related cirrhosis (stage F3/4) (Figure 19b), a relative decrease of 12.7% since 2013 with 42 150 severe fibrosis and hepatitis C related cirrhosis cases. However, over the past ten years, there has been a relative increase of 33.1% compared to the 27 620 cases in 2007. In 2016, among people living with chronic hepatitis C, the estimated number of new cases of hepatitis C-related decompensated cirrhosis and HCC was 1 829, a 5% decrease from 1 936 cases in 2013 but a 59.4% increase from 1 147 cases in 2007. An estimated 605 deaths attributable to chronic hepatitis C infection occurred in 2016, a decrease of 16.4% since 2013 when there were an estimated 724 deaths and an increase of 37.8% since 2007 where there were an estimated 439 deaths. This large increase over the last 10 years reflects the aging population with chronic hepatitis C and poor hepatitis C treatment uptake and outcomes in the interferon-containing treatment era, prior to availability of the new direct acting antivirals since March 2016.

Figure 19a Estimated number of people* with hepatitis C-related severe fibrosis and cirrhosis; estimated number of new cases of hepatitis C-related decompensated cirrhosis/hepatocellular carcinoma and deaths, 2007 – 2016



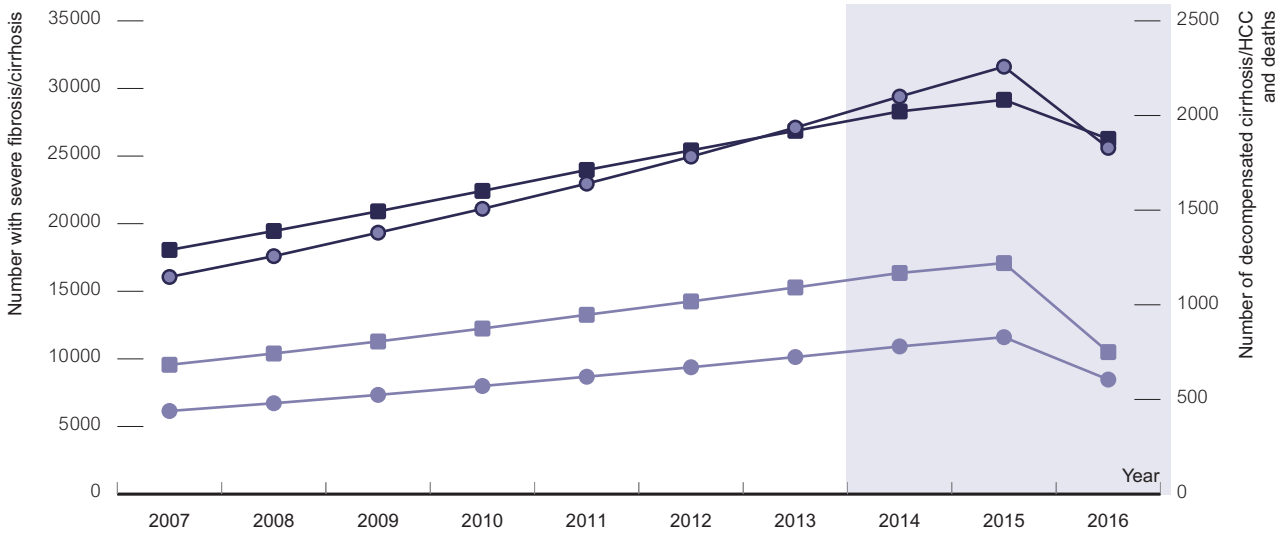
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Severe fibrosis	18 357	19 881	21 473	23 127	24 826	26 549	28 285	30 021	31 716	33 442
Hepatitis C related cirrhosis	9744	10 652	11 624	12 668	13 774	14 936	16 149	17 410	18 695	20 254
Decompensated cirrhosis/HCC	1149	1260	1386	1514	1650	1796	1953	2122	2287	2226
Deaths	440	482	526	574	624	675	731	789	840	621

*Note: Including people with chronic hepatitis C infection and those who have been cured of infection but still experience hepatitis C related morbidity and mortality

Source: See Methodological Notes for detail

HCV

Figure 19b Estimated number of people* living with chronic hepatitis C with severe fibrosis/ hepatitis C-related cirrhosis; estimated number of new cases of hepatitis C-related decompensated cirrhosis/hepatocellular carcinoma, and deaths in people living with chronic hepatitis C, 2007 – 2016



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Severe fibrosis	18 057	19 458	20 912	22 423	23 972	25 421	26 868	28 301	29 162	26 270
Hepatitis C related cirrhosis	9 563	10 397	11 286	12 244	13 260	14 250	15 282	16 352	17 085	10 502
Decompensated cirrhosis/HCC	1 147	1 257	1 381	1 507	1 640	1 783	1 936	2 100	2 258	1 829
Deaths	439	480	524	571	620	670	724	780	829	605

*Note: Only including people with chronic hepatitis C infection (uncured of infection)
Source: See Methodological Notes for detail

2.4b *Proportion of liver transplant recipients with hepatitis C (including hepatitis C related liver cancers) (additional information)*

Indicator definition

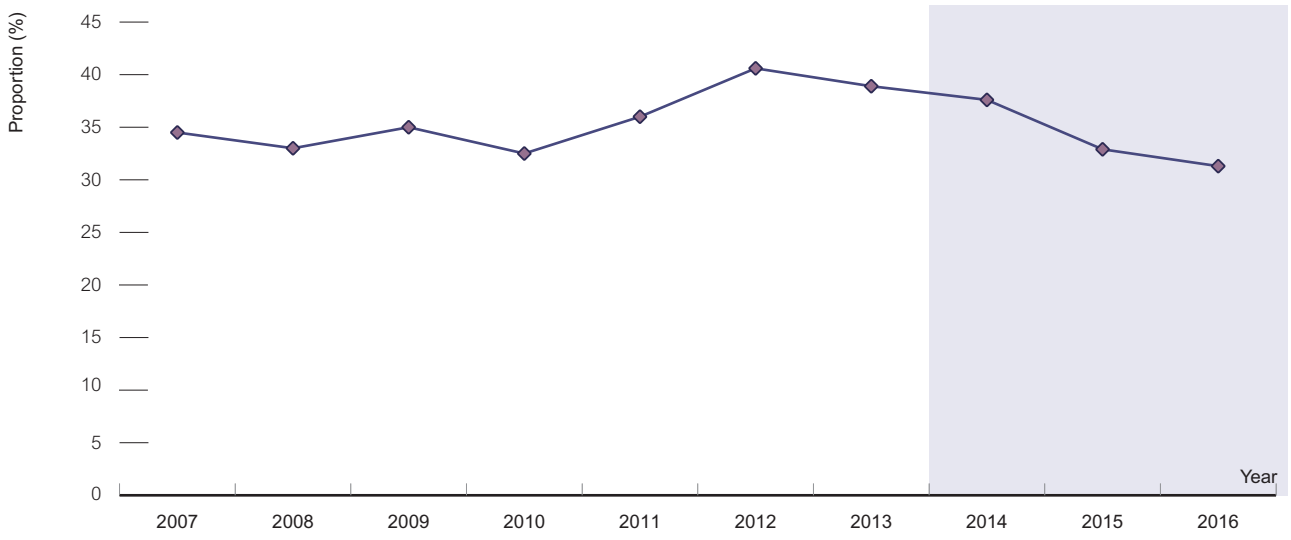
Numerator	Number of liver transplant recipients with chronic hepatitis C related diseases, including hepatocellular cancers
Denominator	Total number of liver transplants in a year

Background: There is no comprehensive registry of advanced illness related to hepatitis C in Australia. A further indicator of the extent of illness caused by hepatitis C is the number of liver transplants due to chronic infection.

Data source and considerations: The Australian and New Zealand Liver Transplant Registry (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.

Result: In 2016, 73 of 233 (31.3%) people who had a liver transplant had hepatitis C infection, compared to 77 of 198 (38.9%) in 2013 (Figure 20). Overall, during the past ten years, 2007 – 2016, 619 of 1 732 (35.7%) people who had liver transplant had hepatitis C infection. Caution should be taken in interpreting these data, as the numbers are small and changes will be influenced by liver donor supply and overall transplant rates.

Figure 20 Proportion of liver transplant recipients with hepatitis C, 2007 – 2016



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Liver transplant recipients (%)	34.5%	33.0%	35.0%	32.5%	36.0%	40.6%	38.9%	37.6%	32.9%	31.3%
Liver transplant recipients (n)	40	51	51	51	58	73	77	73	72	73

Source: Australian and New Zealand Liver Transplant Registry

2.5 Eliminate the negative impact of stigma, discrimination, and legal and human rights issues on people's health

2.5a Proportion of people experiencing any stigma or discrimination in relation to their hepatitis C status in the last 12 months

Indicator definition

Numerator	Number of surveyed people living with hepatitis C who report experiencing any stigma or discrimination in relation to their hepatitis C status in the last 12 months
Denominator	Total number of people living with hepatitis C surveyed

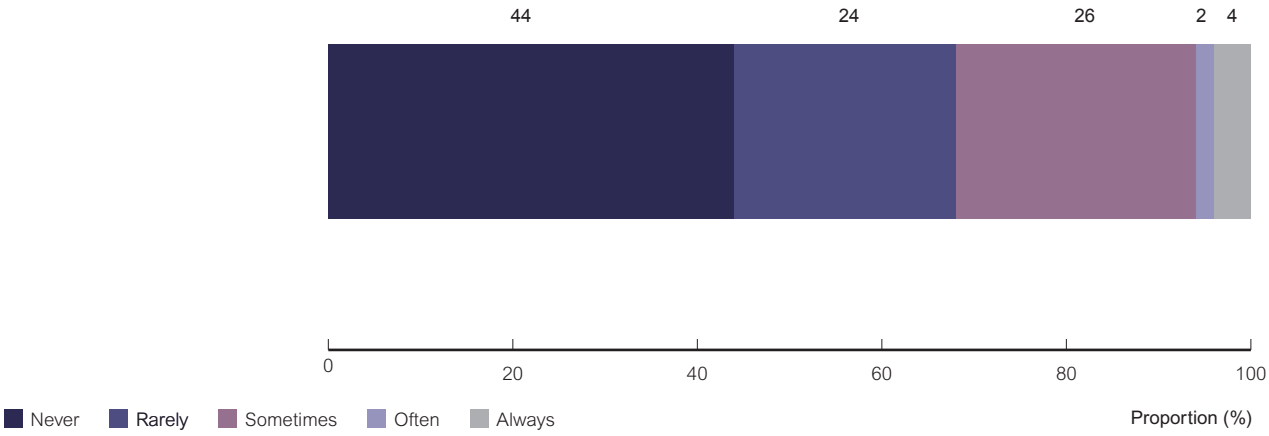
Background: See Section 1.6

Data source and considerations: The Centre for Social Research in Health (CSRH) developed an indicator of stigma that could be used across the key priority populations identified in the national strategies, in relation to blood borne virus (BBV) status, injecting drug use, sexual orientation and sex work. A single question was selected to indicate stigma in relation to hepatitis C status: "In the last 12 months, to what extent have you experienced any stigma or discrimination (e.g. avoidance, pity, blame, shame, rejection, verbal abuse, bullying) in relation to your hepatitis C status?"

An online survey was developed for people who had ever lived with hepatitis C. Participants were recruited through promotion by state and territory hepatitis organisations and national drug user organisations, which was facilitated by the national peak bodies for viral hepatitis and drug use: Hepatitis Australia and AIVL. It must be noted that this sample is not representative and is smaller than was anticipated due to recruitment challenges.

Result: In the 2016 online survey (N=123), 56% of people who had ever lived with hepatitis C reported experiencing some level of stigma or discrimination in relation to their hepatitis C status in the last 12 months (Figure 21).

Figure 21 Proportion of people experiencing any stigma or discrimination in relation to their hepatitis C status in the last 12 months



Source: The Centre for Social Research in Health

2.5b *2.5b. Proportion of surveyed people who use drugs for injecting who report experiencing any stigma or discrimination in relation to their injecting drug use in the last 12 months (additional information)*

Indicator definition

Numerator	Number of surveyed people who use drugs for injecting who report experiencing any stigma or discrimination in relation to their injecting drug use in the last 12 months
Denominator	Total number of people who use drugs for injecting surveyed

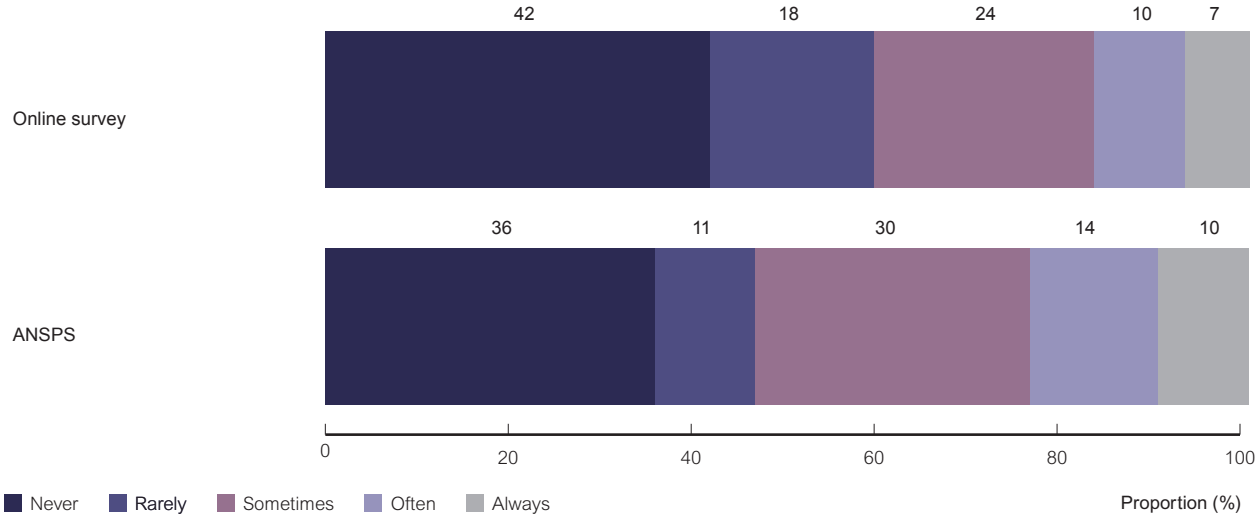
Background: See Section 1.6

Data source and considerations: Since hepatitis C is often associated with injecting drug use, the Centre for Social Research in Health (CSRH) developed an additional indicator to indicate the extent to which people who inject drugs had experienced stigma related to their injecting drug use. A single question was selected to indicate stigma in relation to injecting drug use: "In the last 12 months, to what extent have you experienced any stigma or discrimination (e.g. avoidance, pity, blame, shame, rejection, verbal abuse, bullying) in relation to your use of drugs for injecting?" This same injecting drug use indicator was included in the 2016 Australian Needle and Syringe Program Survey (ANSPS; Kirby Institute, UNSW).

An online survey was developed for people who injected drugs. Participants were recruited through promotion by state and territory hepatitis organisations and national drug user organisations, which was facilitated by the national peak bodies for viral hepatitis and drug use: Hepatitis Australia and AIVL. It must be noted that this sample is not representative and is smaller than was anticipated due to recruitment challenges.

Results: In the 2016 CRSH survey (N=124), around 59% of people who had ever injected drugs reported experiencing some level of stigma or discrimination in relation to their injecting drug use in the last 12 months (Figure 22). In comparison, of the 2060 ANSPS participants, 64% reported experiencing some level of stigma or discrimination in relation to their injecting drug use in the last 12 months (Figure 22).

Figure 22 Proportion of people* experiencing any stigma or discrimination in relation to their injecting drug use in the last 12 months



*Note: The total % of people experiencing any stigma or discrimination in relation to their injecting drug use in the last 12 months may add to more than 100 due to rounding

Source: The Centre for Social Research in Health

2.5c *Proportion of health care workers expressing stigma or discrimination towards clients living with hepatitis C (additional information)*

A mirrored stigma indicator has also been implemented with health care workers to identify their expression of stigma towards clients living with hepatitis C and those who inject drugs)

Indicator definition

Numerator	Number of surveyed health care workers who report expressing any stigma or discrimination towards clients living with hepatitis C or who inject drugs
Denominator	Total number of health care workers surveyed

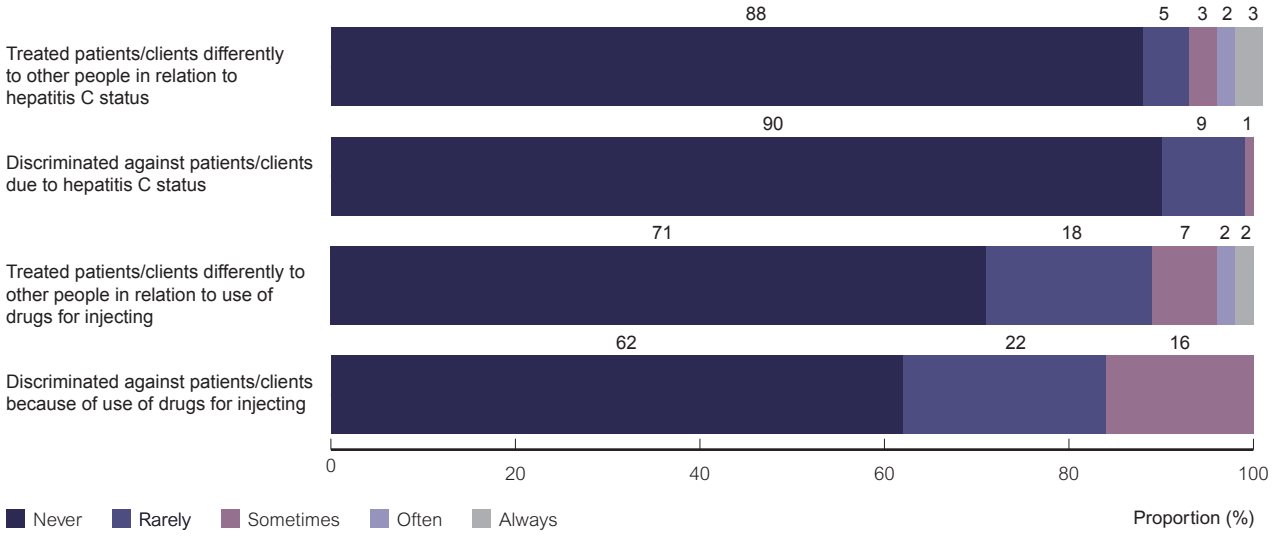
Background: See Section 1.6.

Data source and considerations: The Centre for Social Research in Health (CSRH) also developed a mirrored stigma indicator that has been implemented with health care workers to identify their expression of stigma towards clients living with hepatitis C and those who inject drugs. A single question was selected to indicate expressed stigma in relation to hepatitis C status: "In the last 12 months, to what extent have you treated patients/clients differently to other people in relation to their hepatitis C status?" The wording of this question was subsequently revised to clarify that the indicator referred to discriminatory behaviour: "In the last 12 months, do you feel that you may have discriminated against patients/clients because of their hepatitis C status?" Similarly, a single question was asked regarding stigma towards clients who inject drugs: "In the last 12 months, to what extent have you treated patients/clients differently to other people because of their use of drugs for injecting?" The wording of this question was also subsequently revised: "In the last 12 months, do you feel that you may have discriminated against patients/clients because of their use of drugs for injecting?" Data is presented on both the initial and the revised question.

An online survey was developed for health care workers. Participants were recruited through the Australasian Society for HIV, Viral Hepatitis and Sexual Health Medicine (ASHM). It must be noted that this sample is not representative, and is likely to show an underrepresentation of stigma expressed by health care workers more generally.

Results: In the 2016 online survey, between 10 – 12% of (N=342) health care workers reported discriminating against clients or treating them differently because of their hepatitis C status in the last 12 months. Between 29 – 38% of (N=337) health care workers reported discriminating against clients or treating them differently because of their injecting drug use in the last 12 months.

Figure 23 Proportion of health care workers* expressing stigma or discrimination towards clients living with hepatitis C and those who inject drugs in the last 12 months



*Note: The total % of health workers who treated patients/clients differently to other people in relation to hepatitis C status in the last 12 months may add to more than 100 due to rounding

Source: The Centre for Social Research in Health

HCV

3. Sexually Transmitted Infections

Epidemiology overview

Gonorrhoea: In Australia, gonorrhoea continues to be an infection primarily among men who have sex with men in urban settings, and of heterosexual Aboriginal and Torres Strait Islander people in remote communities. There were 23 887 cases of gonorrhoea notified in 2016 which is a 29% increase from 18 511 notifications in 2015; 3 779 (16%) notifications in the Aboriginal and Torres Strait Islander population, and 8450 (35%) notifications for which Indigenous status was not reported. In 2016, notifications in non-Indigenous people were predominantly in men (male-to-female ratio of 3:1), and the majority in people residing in urban settings. Among the Aboriginal and Torres Strait Islander population, there were nearly equal numbers of notifications among males and females in 2016 (male-to-female ratio of 0.9:1), and the majority resided in remote or very remote areas. The rate of notification of gonorrhoea in the Aboriginal and Torres Strait Islander population was seven times that in the non-Indigenous population in 2016 (582 vs 84 per 100 000 population).

Infectious syphilis: In Australia, infectious syphilis also continues to be an infection primarily among men who have sex with men in urban settings, and of heterosexual Aboriginal and Torres Strait Islander people in remote and outer regional areas. There were a total of 3 367 infectious syphilis notifications nationally in 2016; 530 (16%) notifications in the Aboriginal and Torres Strait Islander population, and 335 (10%) notifications for which Indigenous status was not reported. Infectious syphilis diagnoses in non-Indigenous people were predominantly in men. Among the Aboriginal and Torres Strait Islander population, there were roughly equal numbers of notifications among males (54%) and females (46%) in 2016, and the majority resided in remote or very remote areas. The notification rate of diagnosis of infectious syphilis in the Aboriginal and Torres Strait Islander population in 2016 was six times higher than the notification rate in the non-Indigenous population due to an outbreak in Northern Australia.

Chlamydia: Nationally, during 2016, there were a total of 71 751 cases of chlamydia notified to NNDSS, with the majority (75%, n=54 038) of diagnoses among 15 – 29 year olds. Based on mathematical modelling data, there were an estimated 258 139 chlamydia infections in 15 – 29 year olds in 2016. From these modelled data, there were a higher number of new infections in males than females aged 15 – 29 years in 2016 (154 007 vs 104 132), reflecting infections from both heterosexual males and men who have sex with men, and there are higher rates of re-infection in men who have sex with men. The estimated prevalence of chlamydia in young men and women aged 15 – 29 years is 4-5%.[20] The modelled estimate of a total of 72 785 diagnosed with chlamydia in 15 – 29 year olds make up only 28% of all the estimated infections, highlighting that notifications only reflect a subset of all chlamydia infections each year. The notification rate of chlamydia in the Aboriginal and Torres Strait Islander population was nearly three times that in the non-Indigenous population in 2016 (1193.9 vs 419.0 per 100 000 population).

Human papillomavirus (HPV) infections cause virtually all cases of cervical cancer, the second-most common malignancy in women globally, and are responsible for up to half of a range of other cancers, primarily squamous cell carcinomas.[21, 22] HPV also causes genital warts.[23] Prior to the National HPV Vaccination Program[24] which was implemented for adolescents in 2007, the prevalence of HPV subtypes which cause cervical cancer was 21.3% for HPV16 and 8.4% for HPV18 in 18 – 24 year olds[25] and 11% of Australian-born women attending sexual health clinics, aged 21 years or younger were diagnosed with genital warts.[26] Since the immunisation program commenced there has been over a 92% reduction in diagnosis rates of genital warts in young women aged under 21 years, and 94% reductions in genital warts in Australian-born heterosexual men of the same age suggesting herd protection, (63% reduction since 2013 when male vaccination was introduced).[27] The prevalence of vaccine-susceptible HPV types in women eligible for the HPV vaccine has also declined significantly from 22.7% pre-vaccine implementation to 1.5% in 2015 in a post-vaccine implementation sample.[28]

Donovanosis: Once a regularly diagnosed sexually transmissible infection among remote Aboriginal and Torres Strait Islander populations, donovanosis is now close to elimination in Australia, with only two cases detected since 2011. There were no cases in 2015 and 2016.

Further details are provided in the HIV, viral hepatitis and sexually transmissible infections in Australia: Annual Surveillance Report 2017.[3]

Indicator status

Incidence

- The notification rate is used here as a surrogate for incidence (see section 3.2 on data considerations). There was a 53% increase in the gonorrhoea notification rate between 2013 and 2016 from 65.4 per 100 000 population in 2013 to 100.8 per 100 000 population in 2016 (41% increase in females and 59.7% increase in males), with a long-term increase of nearly threefold from 37.1 per 100 000 population in 2007.
- The infectious syphilis notification rate increased by 83% from 7.8 per 100 000 population in 2013 to 14.3 per 100 000 population in 2016, with a long-term increase of 104% from 7.0 per 100 000 population in 2007.
- It is important to consider trends in chlamydia notifications in the context of patterns of testing, as changes in notification rates can be an indication of changes in testing, changes in disease incidence, or both. From 2008 – 2016, the ratio of chlamydia notifications to Medicare-rebated chlamydia tests declined in both males and females aged 15 – 29 years.

Uptake of preventative measures

- High HPV vaccination 3-dose coverage has been achieved in females turning 15 years of age, with 71.7% coverage in 2013 increasing to 78.6% in 2016. A vaccination program for adolescent males was introduction in 2013, which achieved 62% coverage in 2014 and 73% coverage in 2016.

Knowledge and risk behaviour

- In 2013 (the most recent National Survey of Australian Secondary Students and Sexual Health),[29] the proportion of students with knowledge about the transmissibility of asymptomatic infections was high (89%); but a lower proportion (60%) were aware that chlamydia affects both men and women; just over half were aware that chlamydia can lead to sterility in women (56%); and less than half (46%) knew that genital herpes results in life-long infection.
- In 2013, less than half (43%) of sexually active students reported always using a condom in the last twelve months. This proportion increased to 59% in relation to condom use at last sex. Condom use was higher among males than females both in 12 months and at last sex.
- A fifth (21%) of year 10 students reported being drunk or high at last sex and almost a quarter (23%) of sexually active students reported three or more sexual partners in 2013, a 7% decrease from 30% in 2008. The next survey will occur in 2018.

Testing

- Of young people aged 15 – 29 years, 15% claimed the Medicare rebate for a chlamydia test in 2016, a relative 12% increase from the 13% in 2013.
- The proportion of gay men reporting having had an STI test in the past 12 months was 72.8% in 2016, increasing by a relative 6% from the level in 2013 (68.4%). The proportion of gay men who reported having had comprehensive STI testing (having at least four different samples collected for STI testing) in the previous 12 months was 39.5% in 2013, increasing to 44.6% in 2016, with a 74% increase over the past ten years.

Morbidity

- There were two notifications of congenital syphilis in 2016 compared to eight (See footnotes of Table 4 for further detail) reported in 2013, with increases observed in the past ten years coinciding with peaks in infectious syphilis notifications, largely driven by an outbreak in Northern Australia. Elimination targets set by WHO are <50 per 100 000 live births. Data are not available on the other two WHO elimination targets of testing and treatment coverage needed for confirmation of elimination. It is important to note that we have chosen not to refer to the WHO targets as these are for the global elimination of syphilis, and alternative targets may be more relevant for Australia.

Summary: In the third year of the Third National STI Strategy, coverage of HPV vaccination in adolescent females remains high (79%) and male vaccination coverage was also high (73%), representing a success story in STI prevention programs. However, between 2013 and 2016 there was an increase in infectious syphilis and gonorrhoea notification rates. Chlamydia testing rates in young people has slightly increased from 13% in 2013 to 15% in 2016. As historically seen, gonorrhoea and syphilis have been diagnosed more frequently in men in the past five years. These increases may be due to increased testing and use of more sensitive gonorrhoea tests. The rise may also relate to increases in condom-less sex among men who have sex with men, linked to the greater availability and awareness of highly effective HIV prevention strategies. There has also been an increase in gonorrhoea notifications in women in Australia which may be due to most pathology laboratories in Australia adopting dual testing, whereby if a test for either chlamydia or gonorrhoea is ordered by a clinician, both are conducted.

Objectives and indicators

The Sexually Transmitted Infections Strategy 2014 – 2017 identified six specific objectives, with associated indicators. Progress against these objectives and indicators is outlined in Table 5. Incidence is a difficult indicator to measure, and notifications have been used as a surrogate, recognising that for most infections, they represent only a proportion of the total cases (e.g. only those cases for which health care was sought, a test conducted and a diagnosis made, followed by a notification to health authorities). Also, annual changes in notifications may represent responses to testing policies and programs, different diagnostic tests, changes in surveillance practices and awareness campaigns rather than true changes in incidence. Some *'additional information'* has been included due to data sources becoming available after the Plan was agreed and is marked accordingly.

Main Findings

Table 4 National STI Strategy progress

Theme	Objective	Indicator		2013	2014	2015	2016
Uptake of preventative measures	3.1 Achieve and maintain high levels of HPV vaccination	3.1a	HPV three-dose vaccination coverage for 15 year old				
			Females	72%	74%	78%	79%
			Males^	29%	62%	67%	73%
Incidence and prevalence	3.2 Reduce the incidence of STI	3.2a	Annual rate of notifications of gonorrhoea (per 100 000 population)[i]	65.4	68.0	78.9	100.8
		3.2b	Annual rate of notifications of infectious syphilis (per 100 000 population)[i]	7.8	9.0	11.7	14.3
		3.2c	Proportion of chlamydia tests that yield a positive result 15 – 29 year age group	11%	10%	10%	10%
Knowledge	3.3 Improve knowledge and reduce risk behaviours associated with the transmission of STI	3.3a	Proportion of secondary school students giving the correct answer to STI knowledge and behaviour questions:				
			i. Potentially asymptomatic nature of many STIs	89%	*	*	*
			ii. Chlamydia affects both men and women	60%	*	*	*
			iii. Chlamydia can lead to sterility among women	56%	*	*	*
			iv. Once a person has genital herpes they will always have the virus	46%	*	*	*
		3.3b	*Additional information:* Proportion of secondary school students reporting certain risky sexual behaviours				
			i. Condom use in the last 12 months	43%	*	*	*
			ii. Condom use at most recent sex	59%	*	*	*
			iii. Drunk or high at last sex	21%	*	*	*
			iv. Three or more sexual partners in the past year	23%	*	*	*
Testing	3.4 Increase testing among priority populations	3.4a	Proportion of 15 – 29 year olds receiving a chlamydia test in the previous 12 months (in general practice clinics)	13%	14%	14%	15%
		3.4b	Proportion of gay men who report having had an STI test in the previous 12 months	68%	70%	73%	73%
		3.4c	*Additional information:* Proportion of gay men who report having had comprehensive STI testing in the previous 12 months	40%	38%	44%	45%
Treatment	3.5 Increase appropriate management and reduce associated morbidity	3.5a	Notifications of congenital syphilis annually Number of cases	8¥	3	3	2
	3.6 Eliminate the negative impact of stigma, discrimination, and legal and human rights issues on people's health		Stigma indicator being developed[ii]	**	**	**	**

Notification rates are given out of 100 000 population and to 1 decimal place; percentages (%) are rounded to the nearest whole number;

^ HPV vaccination for boys launched was launched in 2013;

* Data not available as the National Survey of Australian Secondary School Students and Sexual Health is only conducted every five years;

** Data not available;

¥ 8 cases of congenital syphilis were reported by the NNDSS at time of reporting, however this has recently been updated to 7 cases by the NNDSS;

i In the absence of appropriate data for incidence, notifications data have been used, and should be interpreted with caution as a range of factors influence notifications

ii Indicator being developed and tested by the Centre for Social Research in Health, UNSW , however, at this stage, the stigma indicator has not been explicitly implemented among people living with STIs. Future phases of the stigma indicator project will include secondary analysis of data collected from people living with HIV who also reported STI diagnosis; the STI stigma indicator is also being included in a forthcoming survey of young people.

3.1 Achieve and maintain high levels of HPV vaccination

3.1a HPV three-dose vaccination coverage for males and females turning 15 years of age

Indicator definition

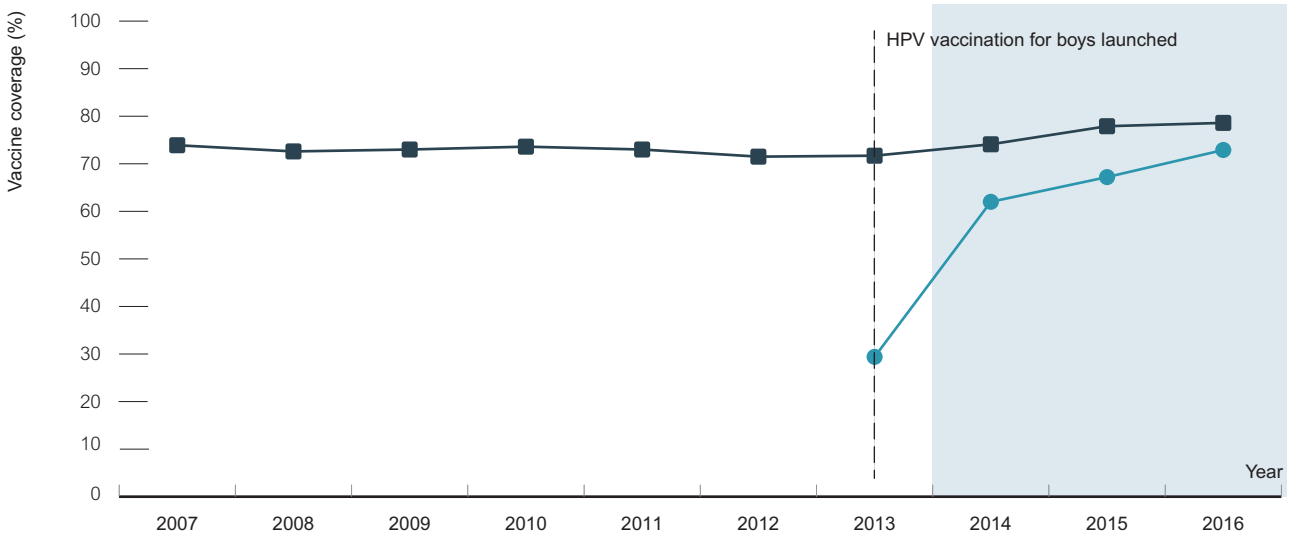
Numerator	Number of males and females turning 15 years of age reported to the NHVPR that comply with the recommended vaccine dosage and administration as per the Australian Immunisation Handbook
Denominator	Number of males and females turning 15 years of age in the Australian population reported by the ABS

Background: The HPV vaccine is provided free in schools to all boys and girls aged 12 – 13 years under the National HPV Vaccination Program. The National HPV Vaccination Program began in 2007 for females, and was extended to include males in 2013. The government also funded a 2-year catch-up program for 13 to 18 year-old girls in schools and 18 to 26 year-old women through general practice and community-based programs until December 2009.[30] Immunisation programs target the years of early adolescence, prior to the onset of sexual activity, thereby providing protection through the age range of maximum risk. As well as preventing a substantial proportion of cancers and virtually all genital warts, the vaccine prevents pre-cancerous lesions detected by cervical screening programs that would have otherwise required biopsies, surgery or both.

Data source and considerations: HPV vaccination coverage data are derived from the National Human Papillomavirus Vaccination Program Register (NHVPR).[24] 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. See Methodological Notes for further detail.

Results: Following the introduction of vaccination against HPV in 2007, high coverage of the 3-dose vaccine has been achieved in females turning 15 years of age, with 74% in the first year of the program, dropping to 71.7% in 2013, and increasing to 78.6% in 2016 (Figure 24). A vaccination program for boys was introduced in 2013, which achieved 62% coverage in 2014 and 73% coverage in 2016 (Figure 24).

Figure 24 Three dose HPV vaccination coverage for all females and males turning 15 years of age, 2007 – 2016



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Females turning 15	73.9%	72.6%	73.0%	73.6%	73.0%	71.5%	71.7%	74.1%	77.9%	78.6%
Males turning 15							29.4%	62.0%	67.2%	72.9%

Source: Human Papillomavirus Vaccination Program Register

3.2 Reduce the incidence of STI

3.2a Annual rate of notifications of gonorrhoea

Indicator definition

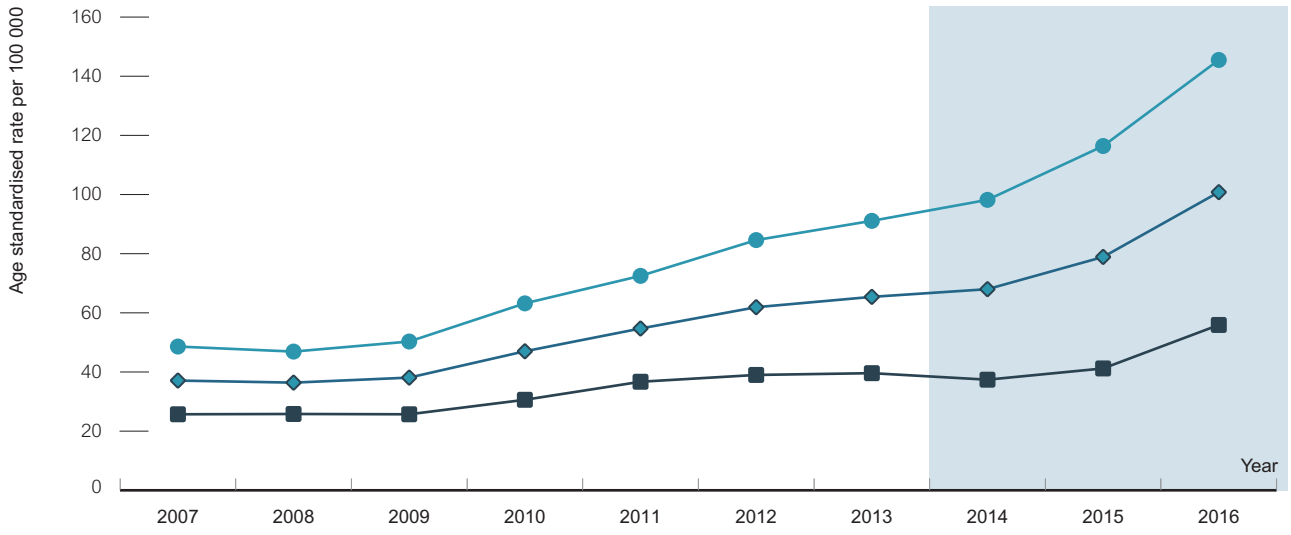
Numerator	Number of notifications of gonorrhoea reported to NNDSS
Denominator	Australian population reported by the ABS

Background: Gonorrhoea is often asymptomatic, and if left untreated, can lead to reproductive morbidity, disseminated infection and increase the risk of HIV infection.[31] Timely and appropriate testing is needed to reduce the risk of short- and long-term sequelae and onward transmission to sexual partners.

Data source and considerations: Incidence is a difficult indicator to measure, and notifications have been used as a surrogate, recognising that for most infections, they represent only a proportion of the total cases and may be influenced by changes to testing patterns. Data on gonorrhoea are collected against nationally agreed data specifications and reported, by all jurisdictions, to NNDSS. 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. See Methodological Notes for further detail.

Results: The gonorrhoea notification rate was 65.4 per 100 000 population in 2013, and 100.8 in 2016 representing a 54% increase. Between 2013 and 2016, the notification rate increased by 41% in females (from 39.6 to 55.9 per 100 000 population), and increased in males by 59.7% (from 91.1 to 145.5 per 100 000 population) (Figure 25). Over the past 10 years, the national notification rate for gonorrhoea increased nearly threefold to 100.8 cases per 100 000 population in 2016 from 37.1 per 100 000 population in 2007.

Figure 25 Gonorrhoea notification rate per 100 000 population, 2007 – 2016, by sex



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Total	37.1	36.4	38.1	47.0	54.7	61.9	65.4	68.0	78.9	100.8
Males	48.6	46.9	50.3	63.2	72.5	84.6	91.1	98.2	116.4	145.5
Females	25.7	25.8	25.7	30.6	36.7	39.0	39.6	37.4	41.2	55.9

Source: National Notifiable Diseases Surveillance System

3.2b *Annual rate of notifications of infectious syphilis*

Indicator definition

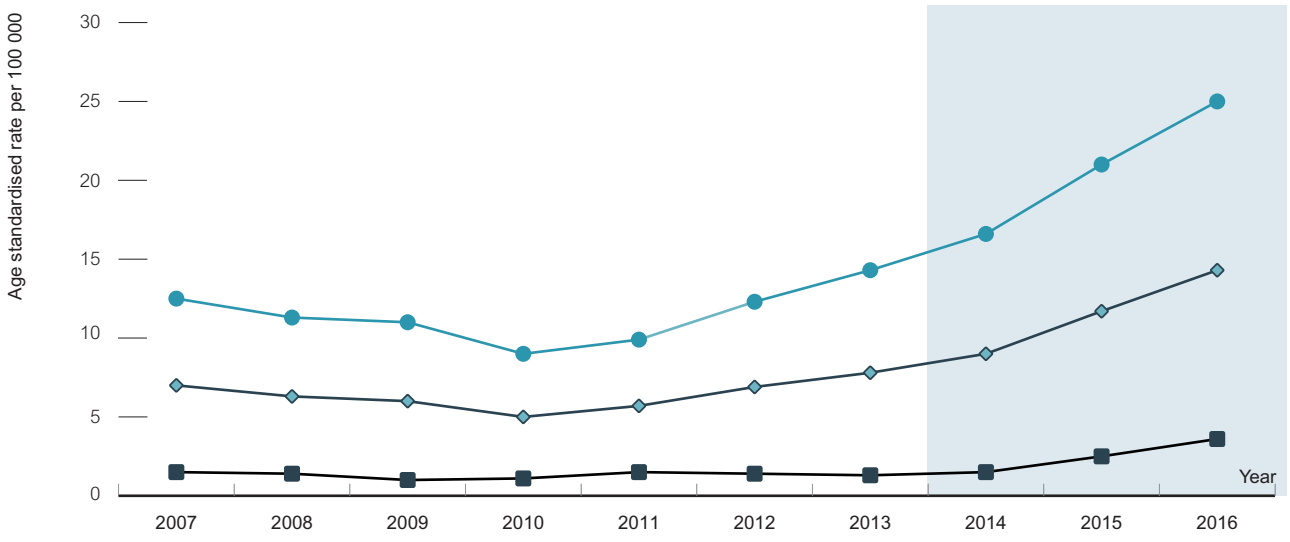
Numerator	Number of notifications of infectious syphilis (less than 2 years duration) reported to NNDSS
Denominator	Australian population reported by the ABS

Background: There are four stages of syphilis infection, primary, secondary, latent and tertiary. Only the first two and the early latent stages are infectious, and symptoms vary according to the stage. The first stage of syphilis (9 – 90 days after infection) can be missed as there may be no symptoms, or it may occur as a sore (ulcer) on the genital area (including the penis or vagina), anus or the mouth. During the second stage of syphilis (up to two years), there may be a rash, swollen lymph nodes and other non-specific symptoms.[32] Surveillance focuses on monitoring infectious syphilis in Australia, which is infection of less than two years of duration and include primary, secondary and early latent cases.

Data source and considerations: Incidence is a difficult indicator to measure, and notifications have been used as a surrogate, recognising that for most infections, they represent only a proportion of the total cases and may be influenced by changes to testing patterns. Data on infectious syphilis are collected against nationally agreed data specifications and reported, by all jurisdictions, to NNDSS. Classification as infectious syphilis requires laboratory definitive or suggestive evidence together with clinical evidence of a recent infection, including evidence of a negative test result in the past two years. This two-year period covers primary and secondary stages of syphilis. This definition may exclude some young people who have not had a previous syphilis test. The infectious syphilis case definition was updated in July 2015,[33] to include probable cases to capture cases that are not covered by the confirmed case definition. See Methodological Notes for further detail.

Results: The notification rate of infectious syphilis was 7.8 per 100 000 population in 2013 increasing to14.3 per 100 000 in 2016. Between 2013 and 2016, the notification rate increased in women by nearly threefold (1.3 to 3.6 per 100 000 population), and in men by 74% (from 14.3 to 25.0 per 100 000 population). Over the past ten years, the notification rate of infectious syphilis among men has doubled from 12.5 per 100 000 population in 2007 to 25.0 in 2016 and among women increased by more than twofold from 1.5 to 3.6 per 100 000 population during the same time period (Figure 26). The higher notification rate among males reflects that most cases of infectious syphilis are among men who have sex with men.

Figure 26 Infectious syphilis notification rate per 100 000 population, 2007 – 2016, by year and sex



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Total	7.0	6.3	6.0	5.0	5.7	6.9	7.8	9.0	11.7	14.3
Males	12.5	11.3	11.0	9.0	9.9	12.3	14.3	16.6	21.0	25.0
Females	1.5	1.4	1.0	1.1	1.5	1.4	1.3	1.5	2.5	3.6

Source: National Notifiable Diseases Surveillance System

3.2c *Proportion of chlamydia tests that yield a positive result in 15 – 29 year age group*

Indicator definition

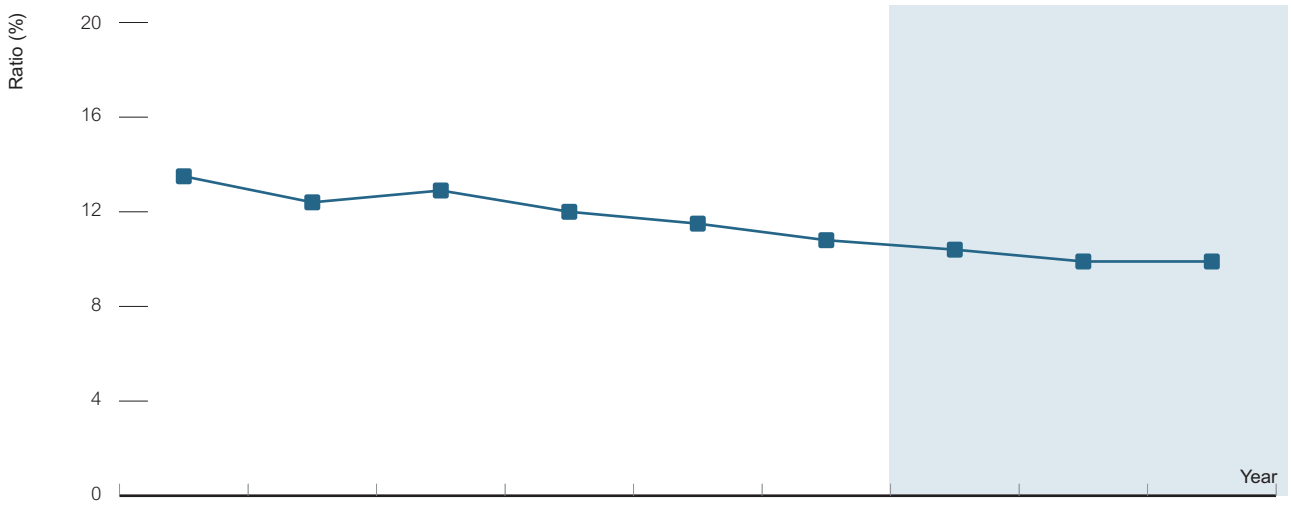
Numerator	Number of notifications of chlamydia in 15 – 29 year olds reported to NNDSS
Denominator	Number of chlamydia tests conducted for 15 – 29 year olds reported to Medicare (item numbers 69316, 69317, 69319)

Background: The NNDSS System involves a passive surveillance system for chlamydia which provides information on an ongoing basis, has wide geographic coverage, is relatively inexpensive and includes basic demographic information.[34] However, changes in notifications need to be considered in the context of testing patterns.[35] While Medicare data do not include much testing conducted in public hospitals and sexual health services, they provide information more broadly on testing trends, and can be used as a denominator to determine chlamydia positivity.

Data source and considerations: Medicare data provide a reasonable representation of the number of chlamydia tests undertaken in Australia, and are a suitable denominator for measuring population level estimates of chlamydia testing rates among young people in general practices.[36] Data on the number of chlamydia notifications in 15 – 29 year olds come from the National Notifiable Diseases Surveillance System. However, there is a subset of the population that accesses other services, such as sexual health clinics, that do not require a Medicare card, and are therefore are not eligible for a Medicare rebate. These patients are more commonly within high risk populations and have a higher prevalence of chlamydia compared to the general population.[37] Consequently, testing and positivity rates may be underestimated using Medicare data. See Methodological Notes for further detail.

Results: Over the nine-year period, the ratio of chlamydia notifications to Medicare rebated chlamydia tests declined in 15 – 29 years olds by an absolute 3.6% from 13.5 notifications per 100 tests in 2008 to 9.9 notifications per 100 tests in 2016 (Figure 27). It is important to note that the 2015 and 2016 data exclude Victoria as data were unavailable at the time of reporting (data would be available for the 2018 report). From 2008 – 2016, the declines have been across all age groups and in both males and females (not shown in figure).

Figure 27 Ratio of chlamydia notifications to Medicare-rebated chlamydia tests, 2008 – 2016



Source: Medicare, National Notifiable Diseases Surveillance System

3.3 Improve knowledge and reduce risk behaviours associated with the transmission of STI

3.3a Proportion of secondary school students giving the correct answer to STI knowledge and behaviour questions

Indicator definition

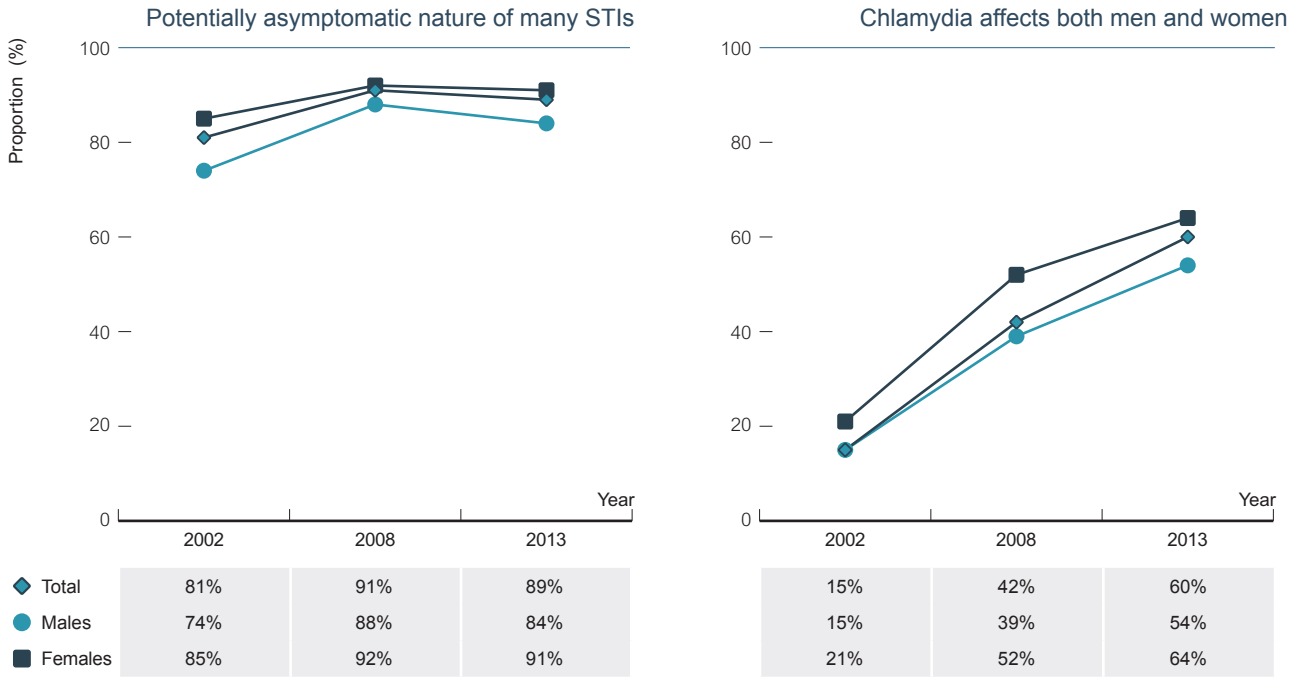
Numerator	Number of SASSH respondents answering STI knowledge questions correctly
Denominator	SASSH respondents (representative of Year 10 students across government, catholic & independent school systems from all jurisdictions)

Background: The provision of sexual health information to populations at risk of STIs may help reduce the incidence of infection by encouraging a reduction in risk behaviours. In particular, exposure to information on methods of transmission, prevention and treatment will help individuals when making specific behavioural choices. The delivery of age-appropriate education within the school curriculum is an important mechanism for improving young people's STI knowledge.

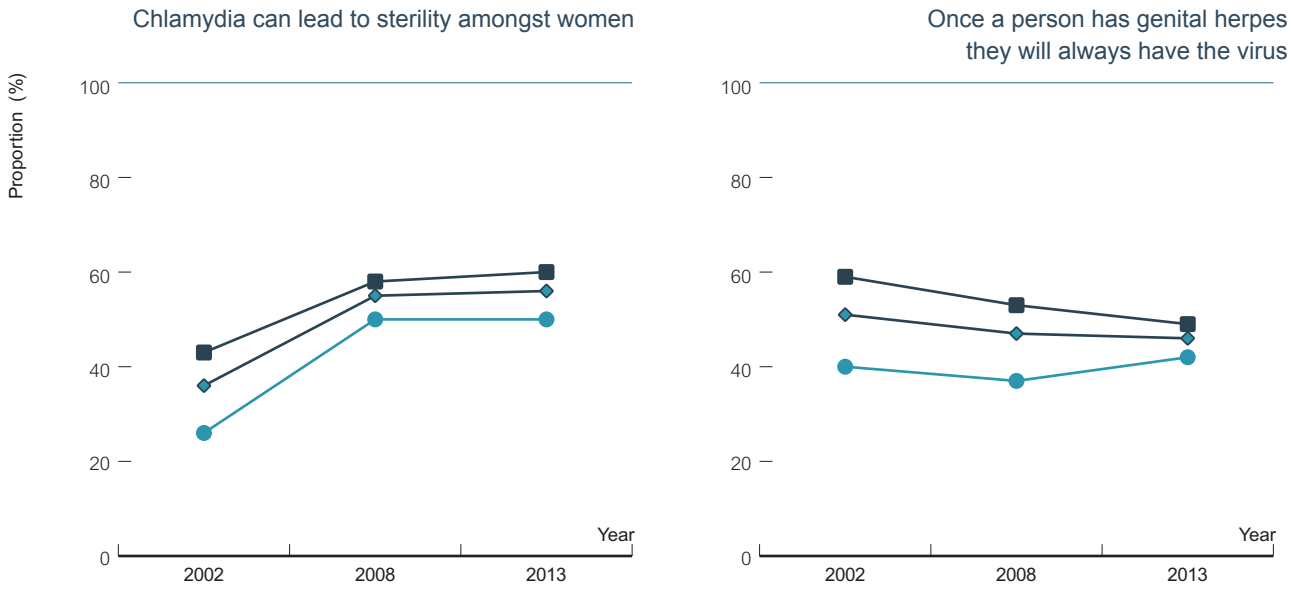
Data source and considerations: The National Survey of Australian Secondary Students and Sexual Health (SASSH)[29] provides a picture of sexual attitudes, knowledge and sexual practices of young Australian people and has been carried out approximately every five years since 1992, with the most recent survey completed in 2013. The survey asks young people about their understanding of STIs. See Methodological Notes for further detail.

Results: The highest levels of student knowledge regarding STIs were demonstrated about the potentially asymptomatic nature of many infections, and lower levels of knowledge were seen in relation to chlamydia and herpes (Figure 28). In 2013, the majority of students knew that someone could still pass on a sexually transmissible infection without having any obvious symptoms (89%). Fewer students were aware that chlamydia affects both men and women (60%) and can lead to sterility amongst women (56%) and that once a person has genital herpes they will always have the virus (46%). Over all, a higher proportion of female students answered STI knowledge questions correctly than their male peers. Compared to 2002, there was an increase in knowledge in all areas except for genital herpes, where the proportion correctly answering decreasing from 51% in 2002 to 46% in 2013 (Figure 24). The next survey will take place in 2018.

Figure 28 Proportion of secondary school students giving the correct answer to STI knowledge and behaviour questions, 2002, 2008 and 2013, by sex



	Potentially asymptomatic nature of many STIs			Chlamydia affects both men and women		
	2002	2008	2013	2002	2008	2013
Total	81%	91%	89%	15%	42%	60%
Males	74%	88%	84%	15%	39%	54%
Females	85%	92%	91%	21%	52%	64%



	Chlamydia can lead to sterility amongst women			Once a person has genital herpes they will always have the virus		
	2002	2008	2013	2002	2008	2013
Total	36%	55%	56%	51%	47%	46%
Males	26%	50%	50%	40%	37%	42%
Females	43%	58%	60%	59%	53%	49%

Source: The National Survey of Australian Secondary Students and Sexual Health

3.3b Proportion of secondary school students reporting certain risky sexual behaviours (additional information)

Indicator definition

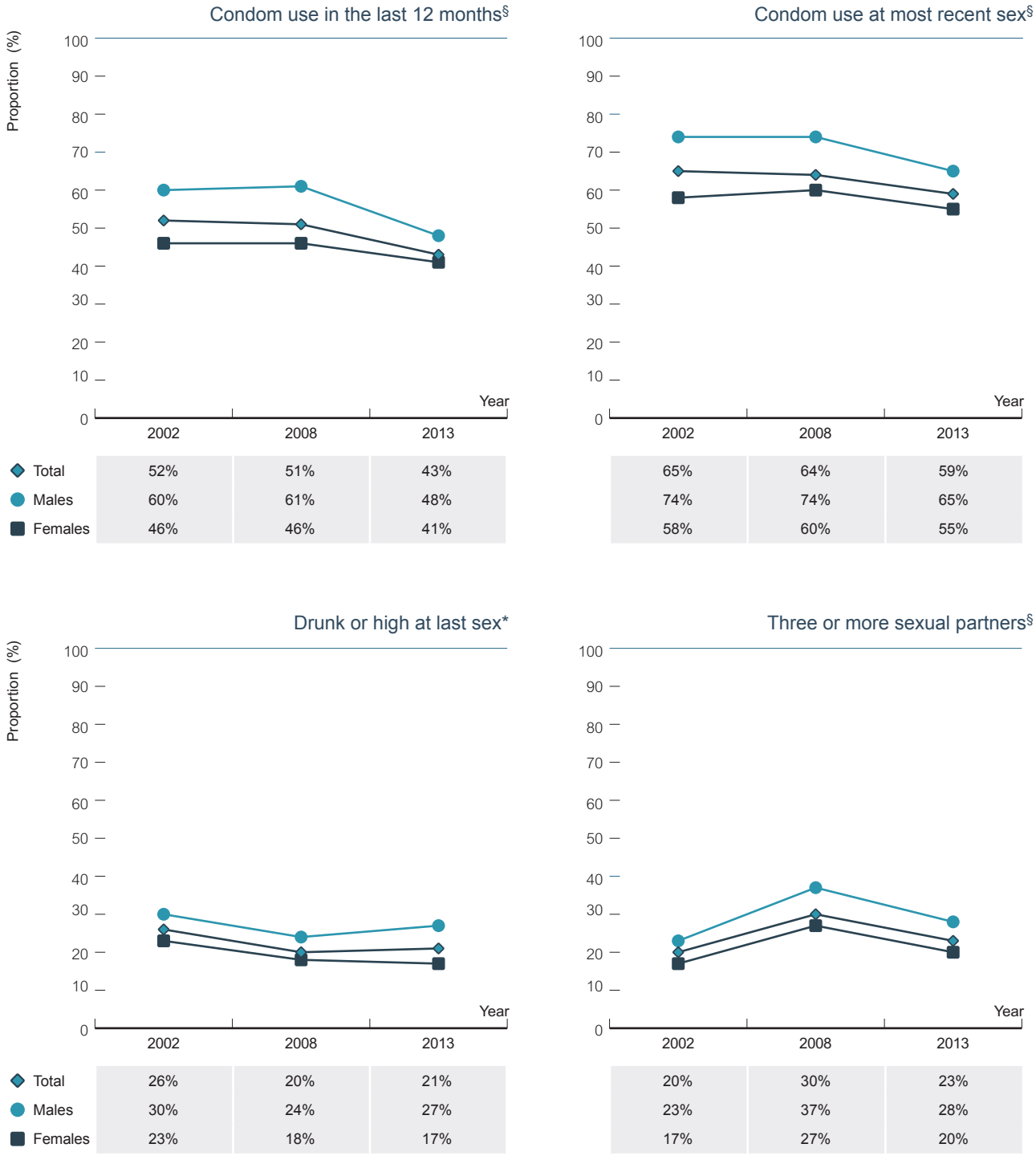
Numerator	Number of SASSH respondents reporting risky sexual behaviours
Denominator	SASSH respondents (representative of Year 10 students across government, catholic & independent school systems from all jurisdictions)

Background: Sexual risk behaviours place adolescents at risk of unintended pregnancy, and sexually transmitted infections, including HIV. Sexual risk behaviours include having unprotected sex, multiple sex partners, and sex under the influence of drugs or alcohol.[38]

Data source and considerations: The National Survey of Australian Secondary Students and Sexual Health (SASSH)[39] asks students questions about sexual behaviour and risk taking. See 3.3a and Methodological Notes for further detail.

Results: In the most recent year of the survey (2013) (N=2 136), the proportion of all sexually active respondents reporting always using a condom when they had sex in the last twelve months was 43%, a decrease from 51% in 2008 and 52% in 2002 (Figure 29). The proportion reporting condom use at last sex was slightly higher at 59% in 2013 but a decline from previous surveys (64% in 2008 and 65% in 2002). Condom use was higher among males than females in all years. A fifth (21%) of year 10 students reported being high or drunk at last sex in the 2013 survey, compared to 20% in 2008 and 26% in 2002. A higher proportion of males reported being drunk or high at last sex. Almost a quarter (23%) of participants reported three or more sexual partners the past year in 2013, a decrease from 30% in 2008, but an increase on 20% in 2002. A higher proportion of males reported three or more sexual partners than females in all three years of the survey.

Figure 29 Proportion of secondary school students reporting key sexual behaviours, 2002, 2008 and 2013, by sex



	Condom use in the last 12 months§			Condom use at most recent sex§		
	2002	2008	2013	2002	2008	2013
Total	52%	51%	43%	65%	64%	59%
Males	60%	61%	48%	74%	74%	65%
Females	46%	46%	41%	58%	60%	55%

	Drunk or high at last sex*			Three or more sexual partners§		
	2002	2008	2013	2002	2008	2013
Total	26%	20%	21%	20%	30%	23%
Males	30%	24%	27%	23%	37%	28%
Females	23%	18%	17%	17%	27%	20%

§ All sexually active respondents;
* Year 10 students

Source: The National Survey of Australian Secondary Students and Sexual Health

3.4 Increase testing among priority populations

3.4a Proportion of 15 – 29 year olds receiving a chlamydia test in the previous 12 months

Indicator definition

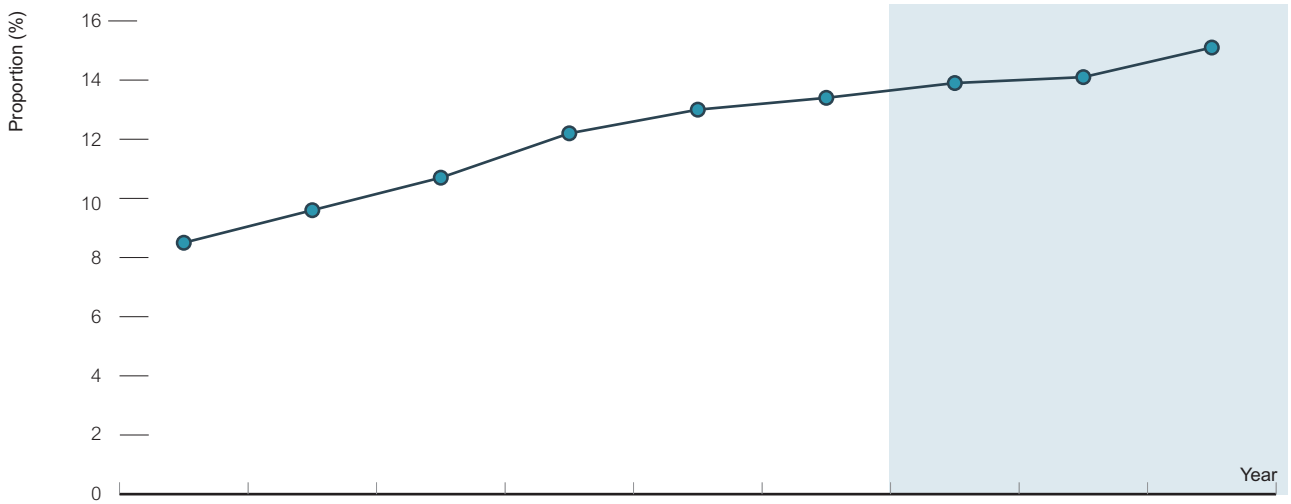
Numerator	Number of individuals aged 15 – 29 years tested at least once in the previous 12 months reported to Medicare (item numbers 69316, 69317, 69319)
Denominator	Australian population aged 15 – 29 years reported by the ABS

Background: About 80% of chlamydia infections are asymptomatic. Untreated chlamydia can lead to reproductive tract complications such as pelvic inflammatory disease (PID), ectopic pregnancy and tubal factor infertility.[31] In addition, untreated chlamydia can cause adverse pregnancy and neonatal outcomes,[40] and can enhance the risk of sexual transmission and acquisition of HIV.[41, 41] Therefore, clinical guidelines recommend annual screening for sexually active young males and females aged <30 years and gay and other men who have sex with men.

Data source and considerations: Medicare data do not include testing conducted in public hospitals and most sexual health services, and thus may under-estimate the true testing rate in the population

Results: In 2016, a low proportion of young people aged 15 – 29 years were tested for chlamydia (15.1%). There was a relative 12% increase between 2013 and 2016, (13.4% vs 15.1%) (Figure 30), and there has been a relative increase of 77.9% since 2008.

Figure 30 Proportion of 15 – 29 year olds receiving a chlamydia test in the previous 12 months, 2008 – 2016



	2008	2009	2010	2011	2012	2013	2014	2015	2016
●	8.5%	9.6%	10.7%	12.2%	13.0%	13.4%	13.9%	14.1%	15.1%

Source: Medicare, Department of Human Services

3.4b *Proportion of gay men who report having had an STI test in the previous 12 months*

Indicator definition

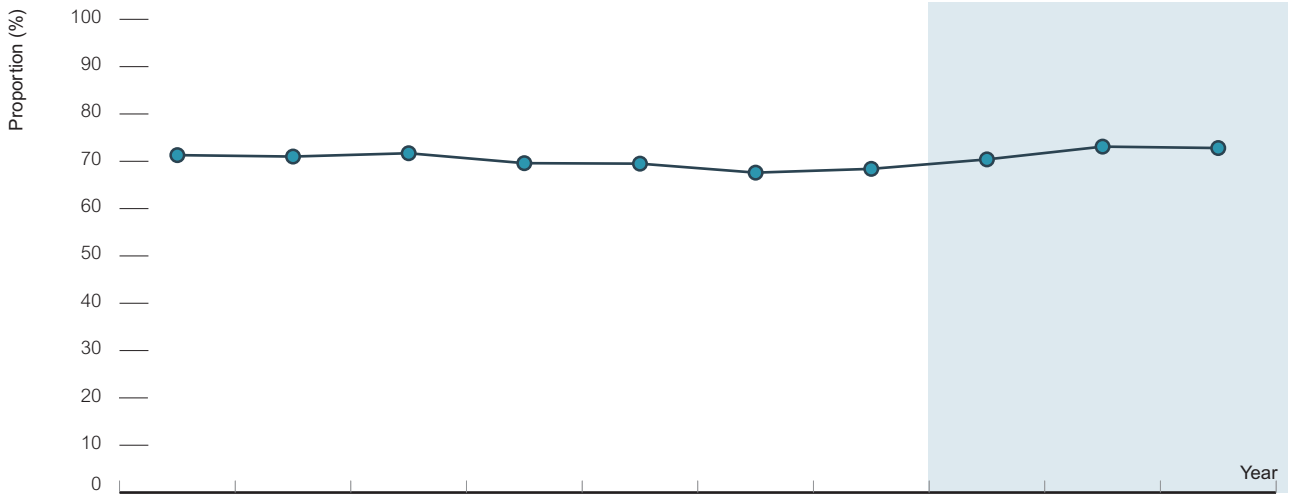
Numerator	Number of gay men who have had an STI test in the previous 12 months reported in the Gay Community Periodic Surveys (GCPS)
Denominator	Number of gay men participating in GCPS

Background: Based on the incidence of STIs[43, 44] and the largely asymptomatic nature of infections, clinical guidelines recommend annual screening for sexually active gay and other men who have sex with men and 3 – 6 monthly testing for men at higher risk indicated by high partner numbers (>10 in 6 months), group sex, use of drugs, being HIV-positive or those reporting unprotected anal sex. STIs have also been associated with increased risk of HIV seroconversion.[45]

Data source and considerations: The GCPS undertake behavioural surveillance and monitoring of testing and risk behaviour among gay men, and 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 by the Centre for Social Research in Health, UNSW Sydney. See Methodological Notes for further detail.

Results: Between 2013 and 2016, the proportion of gay men reporting having had any STI test in the past 12 months increased from 68.4% to 72.8%. Over the ten-year period 2007 to 2016, the proportion has fluctuated between 68% and 73% (Figure 31).

Figure 31 Proportion of gay men who reported an STI test in the past 12 months, 2007 – 2016



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
STI test	71.3%	71%	71.7%	69.6%	69.5%	67.6%	68.4%	70.4%	73.1%	72.8%

Source: The Gay Community Periodic Surveys

3.4c *Proportion of gay men who report having had comprehensive STI testing in the previous 12 months (additional information)*

Indicator definition

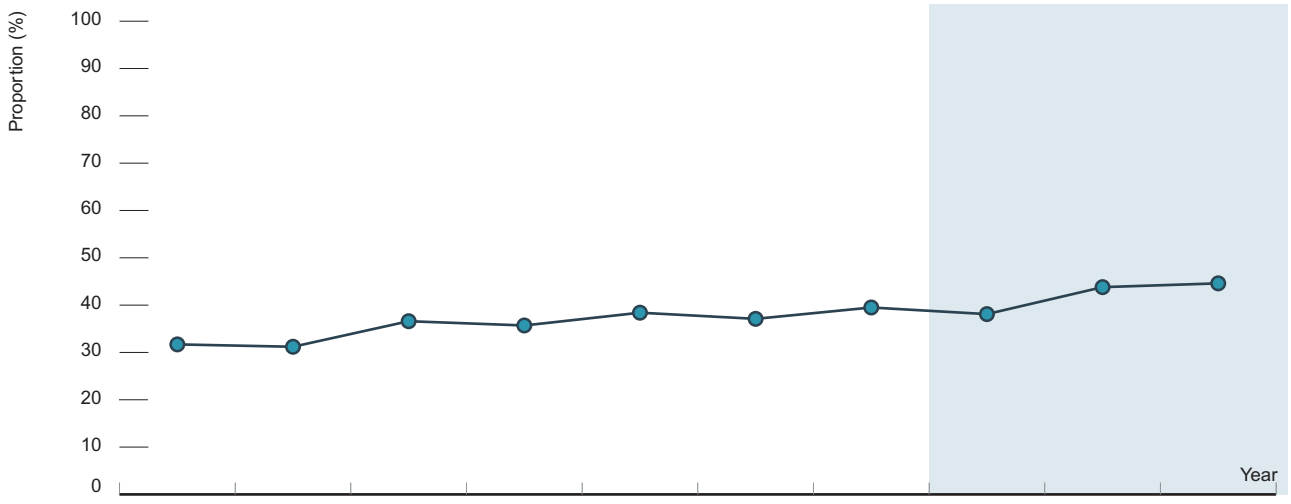
Numerator	Number of gay men who have had comprehensive STI testing in the previous 12 months reported in GCPS
Denominator	Number of gay men participating in GCPS

Background: STI co-infections are common among gay and bisexual men,[46, 47] therefore clinical guidelines recommend annual comprehensive testing for all men who have sex with another man in the previous year and quarterly testing for all men who have sex with men who have had unprotected anal sex, more than ten sexual partners in six months, participate in group sex, use recreational drugs during sex, or are HIV-positive.[48] According to the guidelines, comprehensive testing involves testing for chlamydia, gonorrhoea, syphilis, hepatitis B, hepatitis C and where indicated, HIV. This includes specimen collection via swab (chlamydia and gonorrhoea), urine (chlamydia), and blood (syphilis and HIV).[48]

Data source and considerations: The GCPSs are conducted annually using time and location convenience samples of men primarily at gay community venues and events in capital cities (Sydney, Melbourne, Queensland, Adelaide, Perth and Canberra) plus online recruitment. Data from 42 sexual health clinics, and four general practice clinics with a high case load of gay men (in Victoria and New South Wales) participating in the ACCESS project, were also used to provide additional information on repeat testing for this indicator. See Methodological Notes for further detail.

Results: Results from the GCPS indicate 39.5% of gay men reported having at least four out of five samples collected for STI testing (anal swab, throat swab, penile swab, urine, blood test) in the 12 months prior to the survey in 2013, increasing to 44.6% in 2016 (Figure 32). The proportion has increased from 31.7% in 2007. In 2013, 49% of gay and bisexual men attending sexual health clinics returned for a repeat comprehensive testing for STIs (chlamydia, gonorrhoea, syphilis, and where indicated, HIV) (Figure 33), increasing in 2016 to 56%.

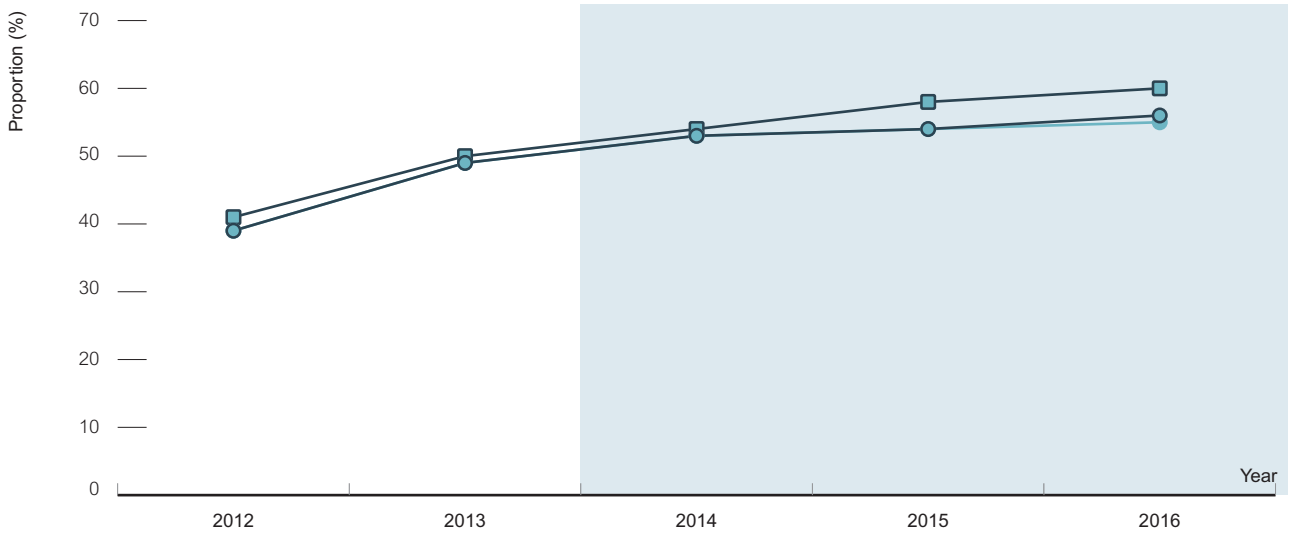
Figure 32 Gay men who reported having at least four samples collected for STI testing (anal swab, throat swab, penile swab, urine, blood test) in the 12 months prior to the survey, 2007 – 2016



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Proportion	31.7%	31.2%	36.6%	35.7%	38.4%	37.1%	39.5%	38.1%	43.8%	44.6%

Source: Gay Community Periodic Surveys

Figure 33 Repeat comprehensive STI testing (within 13 months): gay and bisexual men attending sexual health clinics, 2012 – 2016



	2012	2013	2014	2015	2016
Gay and bisexual men	39%	49%	53%	54%	56%
HIV negative gay and bisexual men	39%	49%	53%	54%	55%
HIV positive gay and bisexual men	41%	50%	54%	58%	60%

Source: ACCESS: the Australian Collaboration for Coordinated Enhanced Sentinel Surveillance of Sexually Transmissible Infections and Blood-borne Viruses

3.5 Increase appropriate management and reduce associated morbidity

3.5a Number of notifications of congenital syphilis annually

Indicator definition

Single measure	Number of congenital syphilis notifications reported to NNDSS

Background: Transplacental infection with syphilis can occur at any stage of pregnancy and during any stage of maternal syphilis. Although the majority of congenital syphilis cases are diagnosed at birth, diagnosis can occur at a later stage in life. Untreated maternal syphilis can result in stillbirth or perinatal death, premature delivery or long-term neurological sequelae for half of the survivors. In order to prevent foetal and infant deaths caused by maternal syphilis, the World Health Organization (WHO) has set the following Global Elimination of Congenital Syphilis Targets[49]:

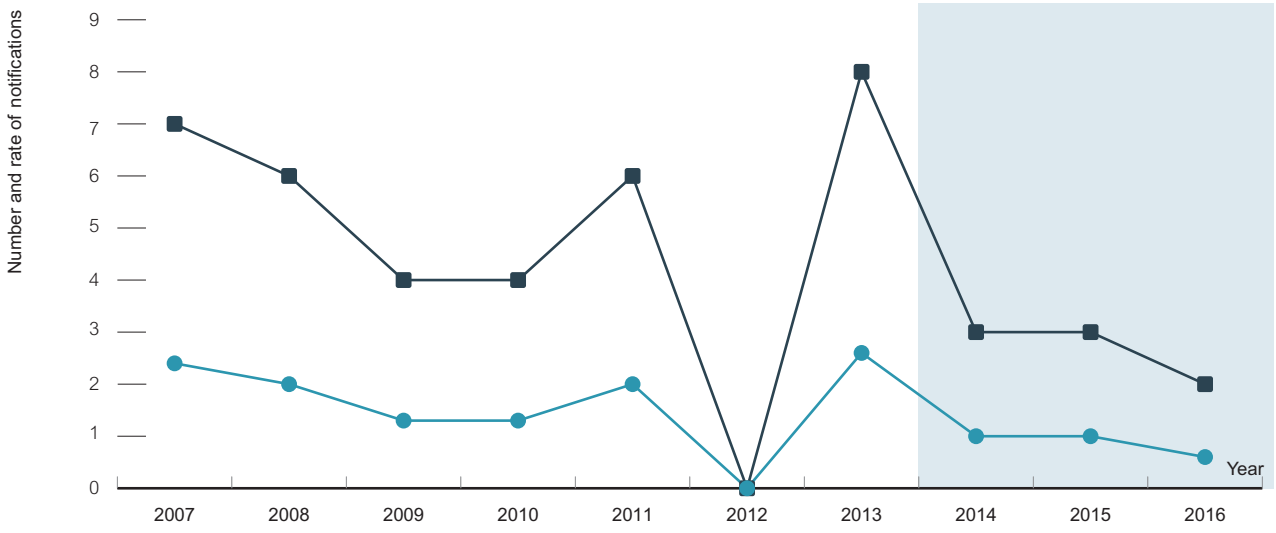
- <50 cases of congenital syphilis per 100 000 live births.
- Coverage of syphilis testing of pregnant women of > 95%
- Treatment of syphilis-seropositive pregnant women of > 95%

It is important to note that these targets are for the global elimination of syphilis, and alternative targets may be more relevant for high income countries like Australia, particularly in the context of a syphilis outbreak in the Aboriginal and Torres Strait Islander population. A more suitable elimination target for congenital syphilis in the Australian context will likely be outlined in the next set of National Strategies in 2018. Syphilis screening at the initial antenatal visit is part of routine obstetric care as women may have asymptomatic latent infection (hidden stage when symptoms associated with early stages of the disease disappear). Some states and territories also recommend further testing, particularly in women considered high risk for acquiring syphilis.

Data source and considerations: Data on congenital syphilis are collected against nationally agreed data specifications and reported by all jurisdictions to NNDSS. The number of births is sourced from the Australian Bureau of Statistics (ABS) 3101.0 Australian Demographic Statistics, June 2016. See Methodological Notes for further detail. Current systems do not collect clinical information about congenital syphilis cases.

Results: Two cases of congenital syphilis were reported in 2016, one of which was in Aboriginal and Torres Strait Islander peoples. This represents a notification rate of 0.6 per 100 000 live births, a relative decrease of 76% compared to 2.6 per 100 000 live births in 2013. Notifications of congenital syphilis declined from 7 in 2007 to 0 in 2012, and then increased to 8* in 2013 (Figure 34). See Section 5.2c for details of congenital syphilis in the Aboriginal and Torres Strait Islander population.

Figure 34 Annual number of notifications of congenital syphilis, and rate of notifications per 100 000 live births, 2007 – 2016



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Number of diagnoses	7	6	4	4	6	0	8	3	3	2
Rate per 100 000 live births	2.4	2.0	1.3	1.3	2.0	0.0	2.6	1.0	1.0	0.6

*Note: 8 cases of congenital syphilis were reported by NNDSS at time of reporting, however this has recently been updated to 7 cases by NNDSS

Source: National Notifiable Diseases Surveillance System; Australian Bureau of Statistics

3.6 Eliminate the negative impact of stigma, discrimination, and legal and human rights issues on people's health

Sexually transmitted infections: Indicator being developed (see Section 1.6 for further information)

To date, this indicator has not been implemented among people living with STIs. Future phases of the stigma indicator project will include secondary analysis of data collected from people living with HIV who also reported an STI diagnosis. The STI stigma indicator is also being included in a forthcoming survey of young people. The expression of stigma towards people living with STIs will also be measured in a survey of the general population.

4. HIV

Epidemiology overview

During 2016, an estimated 26 444 people were living with HIV and 89% or 23 648 were diagnosed. Transmission of HIV in Australia continues to occur primarily through sexual contact between men. The annual number of new HIV diagnoses in Australia has remained stable for the past five years, with 1 030 notifications in 2013, 1 084 in 2014, 1 027 in 2015 and 1 013 in 2016. In 2016, 90.8% of the new HIV diagnoses were in males, 70.2% occurred among men who have sex with men, 5.0% due to male-to-male sex and injecting drug use, 20.6% were attributed to heterosexual sex, and 1.3% to injecting drug use. As noted, Australia continues to have a concentrated HIV epidemic among men who have sex with men with results from the GCPS indicating a prevalence of 7 – 9% among gay men in the past ten years. At 0.1%, the prevalence or overall proportion of people in Australia who have HIV is lower than other comparable high-income countries, and other countries in the region. Further details are provided in the HIV, viral hepatitis and sexually transmissible infections in Australia: Annual Surveillance Report 2017.[3]

Indicator status

Incidence and prevalence

- The population notification rate is used here as a surrogate for incidence (see section 4.1c for data considerations). The notification rate of new HIV diagnoses across Australia was 4.2 per 100 000 population in 2016, comparable to the rate of 4.5 per 100 000 population in 2013. Over the past ten years, 2006 – 2015, the notifications rate of HIV has remained relatively stable between 4.2 to 4.8 per 100 000 population.
- The estimated HIV incidence among gay and bisexual men undergoing repeat HIV testing at sexual health clinics was 0.85 per 100 person-years in 2016 (95% CI: 0.65-1.11), slightly increasing from 0.71 (95% CI: 0.53-0.84) in 2013 (Figure 36). It is important to note that the confidence intervals between these estimates overlap.
- HIV prevalence continues to be very low among people who inject drugs at 1.4% in 2016 (0.7% if homosexual and bisexual men are excluded), and HIV incidence remains extremely low among women involved in sex work, with only 1 new case detected in 2016 and no cases detected in 2015, giving an overall HIV incidence of 0.05 (95% CI: 0.02-0.11) for 2012 – 2016.
- Among 43 women with HIV who gave birth in 2016, the transmission to newborns was 0%, the same as in 2013, but lower than the 8.6% (n=3) transmission rate in 2007.

Uptake of preventative measures

- Pre-exposure prophylaxis (PrEP) involves the use of antiretroviral therapy by an HIV negative person for HIV prevention. PrEP uptake has slightly increased among gay and bisexual men, with 4.6% in 2016, as compared to 1.3% in 2013.
- In 2016 the proportion of gay men reporting condomless anal intercourse (CLAI) with casual male partners was 43.9%; increasing from 36.7% in 2013 and 28.0% in 2007.
- In 2016, among people who inject drugs, the proportion re-using someone else's needle and syringe in the previous month was 19%. This proportion has increased from 15% reported in 2013, after remaining stable at around 15% between 2007 and 2015.

Indicator status (cont.)

Testing

- Among the estimated 26 444 people living with HIV in Australia in 2016, an estimated 10.5% were living with undiagnosed HIV by the end of 2016.
- Based on behavioural surveys, the proportion of gay men who reported having a HIV test in the past year has increased from 60.7% in 2013 to 68.3% in 2016 and the proportion of HIV-negative men having 3 or more HIV tests in the past year has also substantially increased in recent years, from 21.5% in 2013, to 32.7% in 2016.
- Based on tests for immune function, nearly one-third (32.7%) of the new HIV notifications in 2016 were determined to be diagnosed late (CD4 count <350 cells/μl), in that they were in people who were likely to have had their infection for at least four years without being tested; this was comparable to 2013 (32.1%) and 2007 (31.8%).

Treatment

- Among the estimated 223 648 people diagnosed with HIV in Australia, an estimated 86% were receiving treatment with antiretroviral therapy in 2016, a relative increase of 9% as compared to 79% in 2013.
- Information from the HIV diagnosis and care cascade demonstrated that nationally in 2016 an estimated 93% of people on treatment had supressed viral load (<200 HIV-1 RNA copies/mL), which is an increase compared to 89% in 2013.

Personal and social impacts

- Self-rating of wellbeing of people living with HIV was reported as 'good' or 'excellent' by 59% of respondents in HIV Futures 8 survey (2015 – 16). These proportions were similar to those reported in HIV Futures 7 (2011 – 12) and Futures 6 (2008 – 9).

Summary: In the third year of the Seventh National HIV Strategy, HIV notifications and incidence rates remained similar to the previous two years. Overall, initiatives to promote HIV testing have achieved high levels of uptake. Pre-exposure prophylaxis (PrEP) coverage remains low, reflecting limited access at the time through demonstration projects and personal purchase and importation of drugs from overseas. However PrEP uptake has increased in 2016 due to three large state-funded PrEP implementation programs commencing in New South Wales, Victoria and Queensland. HIV treatment coverage has increased to 86% in 2016, likely reflecting new clinical guidelines for universal treatment following diagnosis. Consistent with virtual elimination targets, the prevalence of HIV in people who inject drugs remains low, highlighting the importance of sustaining successful harm reduction strategies. Extremely low rates of maternal transmission have been achieved through comprehensive medical interventions. The incidence rate of HIV among women involved in sex work is extremely low due to successful promotion of safe sex practices. Overall these data highlight the need to maintain and strengthen established strategies of health promotion, testing, treatment and risk reduction, but also expand coverage of new technologies, such as PrEP and home testing, , once a device is approved for use in Australia.

Objectives and indicators

The National HIV Strategy 2014 – 2017 identified six specific objectives, with associated indicators. Progress against these objectives and indicators is outlined in Table 6. Incidence is a difficult indicator to measure, and notifications have been used as a surrogate, recognising that for most infections, they represent only a proportion of the total cases (e.g. only those cases for which health care was sought, a test conducted and a diagnosis made, followed by a notification to health authorities). Also, annual changes in notifications may represent responses to testing policies and programs, different diagnostic tests, changes in surveillance practices and awareness campaigns rather than true changes in incidence. Some *'additional information'* has been included due to data sources becoming available after the Plan was agreed and is marked accordingly.

Main Findings

Table 5 National HIV Strategy progress

Theme	Objective		Indicator		2013	2014	2015	2016
Incidence and prevalence	4.1	Reduce the incidence of HIV	4.1a	Recent HIV infection^ among new HIV diagnoses[∞] (proportion acquired within 12 months)[i]	34%	39%	39%	36%
			4.1b	HIV Incidence rate in gay and bisexual men who test for HIV infection at selected health services (per 100 person-years)	0.71	0.81	0.58	0.85
		Sustain the virtual elimination of HIV among sex workers	*4.1b*	*Additional information:* HIV incidence rate in female sex workers attending sexual health clinics (per 100 person-years)	0.06	0.11	0.00	0.07
			4.1c	*Additional information:* Annual notification rate of new HIV diagnoses (per 100 000 population)[i]	4.5	4.7	4.4	4.2
		Sustain the virtual elimination of HIV amongst people who inject drugs	*4.1d*	*Additional information:* HIV prevalence among people who inject drugs attending needle syringe programs:				
				All	2.1%	1.7%	1.7%	1.4%
				Excluding homosexual and bisexual men	~0.5%	~0.5%	~0.5%	0.7%
		Sustain the virtual elimination of mother to child transmission of HIV	*4.1e*	*Additional information:* Transmission to newborns among women with HIV who gave birth	0%	0%	6.5%	0.0%
Uptake of preventative measures	4.2	Reduce the risk behaviours associated with the transmission of HIV	4.2a	Proportion of gay men who have engaged in condomless anal intercourse with casual male partners in the previous six months	37%	39%	41%	44%
			4.2b	Proportion of people who inject drugs who report re-use of someone else's needle and syringe in the previous month	15%	16%	16%	19%
			4.2c	*Additional information:* Proportion of gay men who have received PrEP in the last year	2%	1%	2%	5%
Testing	4.3	Decrease the number of people with undiagnosed HIV infection	4.3a	Proportion of gay men who have been tested for HIV in the previous 12 months	61%	62%	66%	68%
			4.3b	Proportion of people who inject drugs who have been tested for HIV in the previous 12 months	50%	49%	50%	51%
			4.3c	Median CD4 counts at HIV diagnosis (cells per μL)[i]	420	440	440	420
			4.3d	*Additional information:* Proportion of HIV negative gay men who have been tested 3+ times in the previous 12 months	22%	23%	29%	33%
			4.3e	*Additional information:* Proportion of people living with HIV who are undiagnosed	12%	12%	11%	11%
			4.3f	*Additional information:* Proportion of new HIV diagnoses determined to be late (CD4 count <350 cell/μL)[i]	32%	29%	29%	33%

Theme	Objective		Indicator		2013	2014	2015	2016
Treatment	4.4	Increase the proportion of people living with HIV on treatments with an undetectable viral load	4.4a	Proportion of people living with diagnosed HIV who are receiving antiretroviral treatment	79%	83%	85%	86%
			4.4b	Proportion of people receiving antiretroviral treatment for HIV infection whose viral load is suppressed (less than 200 copies/mL).	90%	92%	94%	94%
Personal and social impacts	4.5	Improve quality of life of people living with HIV	4.5a	Proportion of people with HIV who report their general health status and their general well-being to be excellent or good	*	*	*	General health status: Good-62% Excellent-19% General well-being: Good-44% Excellent-15%
	4.6	Eliminate the negative impact of stigma, discrimination, and legal and human rights issues on people's health	4.6a.	Proportion of people living with HIV who report experiencing any stigma or discrimination in relation to their HIV status in the last 12 months	*	*	*	74%
			4.6b.	*Additional information:* Proportion of men who have sex with men who report experiencing any stigma or discrimination in relation to their sexual orientation in the last 12 months	*	*	*	70%
			4.6c.	*Additional information:* Proportion of health workers expressing stigma or discrimination towards clients living with HIV, and because of their sexual orientation	*	*	*	7 – 11% (against clients living with HIV) 12 – 13% (against clients due to their sexual orientation)
		Maintain effective prevention programs targeting sex workers	Indicator not yet identified[ii]		*	*	*	*

Notification rates are given out of 100 000 population and incidence rates out of 100 person-years; rates are given to 1 decimal place if >1/100 000 population or >1/100 person-years and to 2 decimal places if <1/100 000 population or <1/100 person-years; percentages (%) are rounded to the nearest whole number;

^ Recent HIV infection – same as newly acquired HIV infection which is defined as newly diagnosed infection with a negative or indeterminate HIV antibody test result or a diagnosis of primary HIV within one year of HIV diagnosis;

∞ New HIV diagnoses – same as newly diagnosed cases: cases that are first diagnosed with HIV in Australia during the reporting year;

* Denotes data not available;

i Interpretation of these data is not clear without additional knowledge of the context of HIV testing and prevention strategies;

ii HIV prevention among sex workers has been highly successful in Australia and has resulted in HIV incidence rates among the lowest in the world. There is international documentation of the best measures of effective prevention programs,[1] and discussions are ongoing as to the most relevant data to report on this target in Australia

4.1 Reduce the incidence of HIV

4.1a *Recent HIV infection among new HIV diagnoses*

Indicator definition

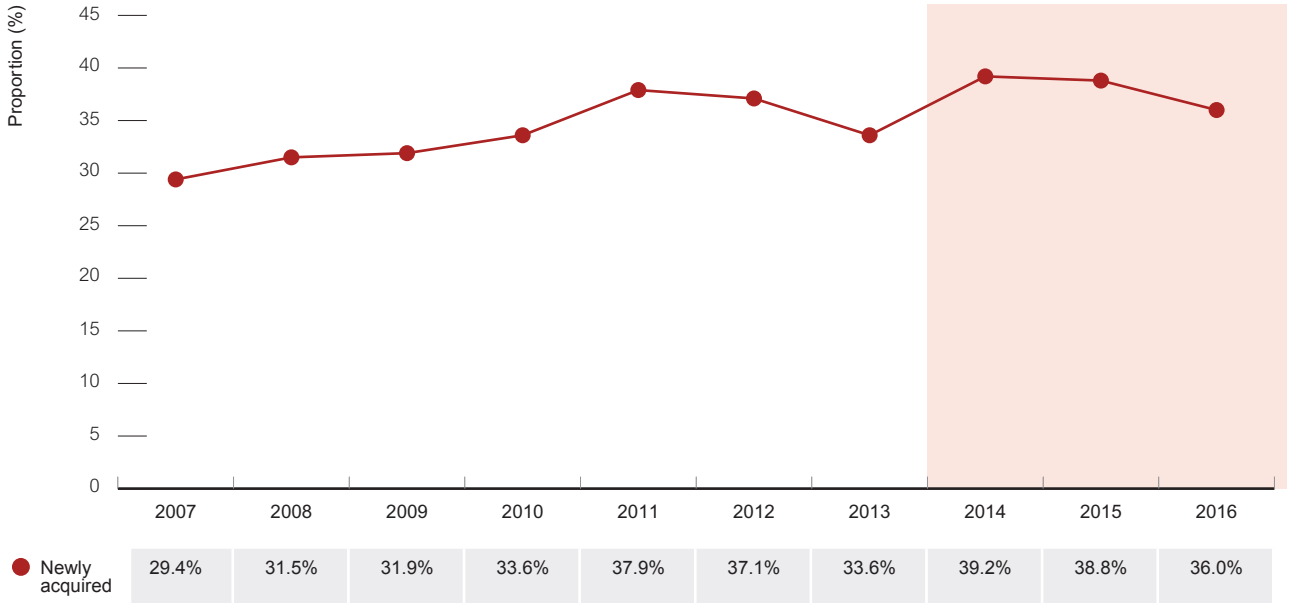
Numerator	Number of newly diagnosed cases with a negative test, onset of primary HIV infection and/or an indeterminate test less than 365 days
Denominator	Number of newly diagnosed HIV infections recorded in the National HIV Registry

Background: HIV incidence is defined as the number of new HIV infections in a population during a specified time period. Understanding HIV incidence in a population is important to monitor the epidemic, improve the development and implementation of interventions and to evaluate the impact of prevention and treatment programs.[50] Determining the best strategy for measuring incidence remains a challenge. For some newly diagnosed HIV cases, it is possible to determine that they were acquired in the 12 months prior to diagnosis (newly acquired or recent HIV infections), on the basis of a recent prior negative test or other laboratory and clinical evidence.

Data source and considerations: Incidence is a difficult indicator to measure, and notifications have been used as a surrogate, recognising that for most infections, they represent only a proportion of the total cases and may be influenced by changes to testing patterns. 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. Details of notifications are then forwarded to the Kirby Institute, UNSW Sydney, for inclusion in the National HIV Registry. See Methodological Notes for further detail. Trends in the proportion of diagnoses 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.

Results: In 2016 36% of newly diagnosed cases of HIV were classified as newly acquired, which is a 7% relative increase from 2013 (33.6%). The number of newly acquired HIV infections has been increasing over the last 10 years, from 278 (29.4% of all new notifications) in 2006, to 346 (33.6%) in 2013 and 365 (36.0%) in 2016 (Figure 35). This increase may reflect increasing testing rates in people at higher risk of HIV acquisition.

Figure 35 Proportion of newly diagnosed HIV classified as newly acquired HIV infection, 2007 – 2016



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Newly acquired	29.4%	31.5%	31.9%	33.6%	37.9%	37.1%	33.6%	39.2%	38.8%	36.0%

Note: The increase in the proportion of newly diagnosed HIV classified as newly acquired HIV infection shown in Figure 35 may reflect increasing testing rates in people at higher risk of HIV acquisition.
Source: State and Territory health authorities

4.1b *HIV incidence based on repeat testing*

Indicator definition

Numerator	Number of HIV seroconversions, defined as the midpoint between the last negative and first positive test for HIV
Denominator	Person years at risk, defined as the time between the first and last test in the cohort time period.

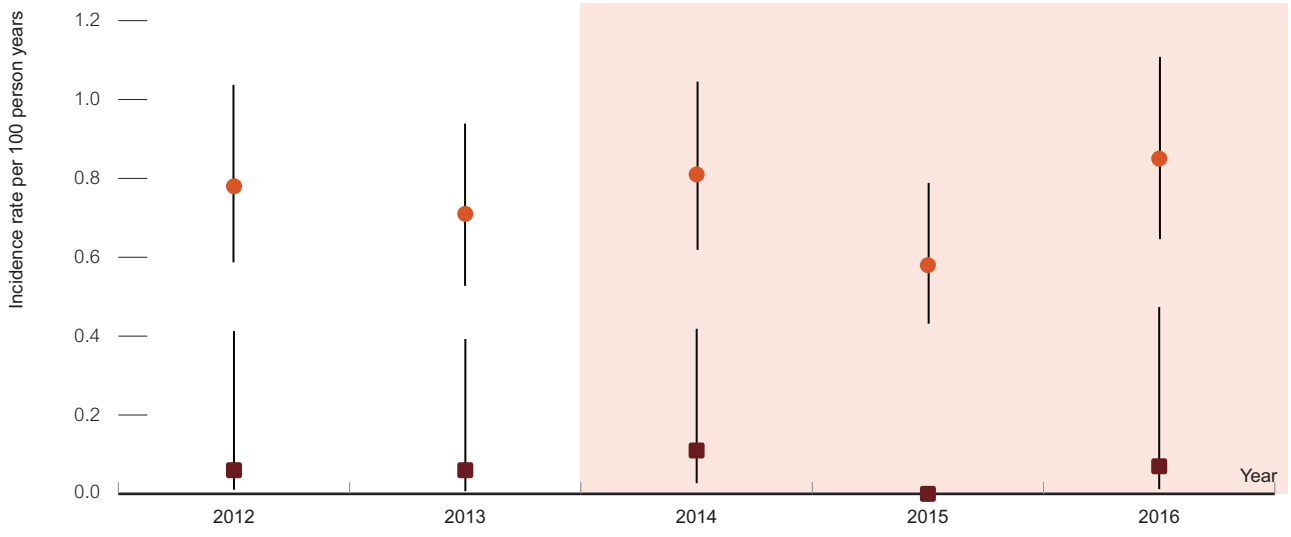
Background: HIV incidence can be measured in cohorts of people at risk of HIV infection, who are documented as having a negative HIV antibody test at entry into the cohort and are followed up at regular intervals over time to document their HIV status and track potential seroconversion. If cohorts are sufficiently large, and representative of the population group(s) of interest, then robust estimates of incidence can be obtained. However, it is not feasible to recruit and maintain such cohorts for estimating incidence in the Australian population. Instead, cohorts based on routine HIV testing data in populations who test regularly are increasingly being used to measure incidence.

Data source and considerations: Data from 42 sexual health clinics participating in the ACCESS network enable calculation of HIV incidence in key populations, including gay and bisexual men and female sex workers. HIV incidence is calculated by dividing the number of seroconversions among people undergoing repeat HIV testing at sexual health clinics by the person's time at risk (determined by the time between repeat HIV tests). Incidence estimates from populations attending sexual health clinics may not be generalisable to the broader populations at risk. See Methodological Notes for further detail.

Results: Estimates of incidence based on repeat testing in gay and bisexual men show a slight increase over the period of the National HIV Strategy with an incidence rate of 0.71 (95%CI: 0.53-0.94) per 100 person-years in 2013, and 0.85 (95%CI: 0.65-1.11) in 2016 (Figure 36). It is important to note the confidence intervals between these estimates overlap.

HIV incidence remains extremely low among women involved in sex work, with only 1 case among women tested in 2016. The overall incidence rate in the past five years was 0.05 per 100 person-years (95%CI: 0.02-0.011). The HIV incidence remained at or under 0.11 per 100 personyears over the past five years (Figure 36).

Figure 36 HIV incidence rate per 100 person-years in gay and bisexual men and female sex workers attending sexual health clinics, 2012 – 2016



	2012	2013	2014	2015	2016
Gay and bisexual men	0.78	0.71	0.81	0.58	0.85
Female sex workers	0.06	0.06	0.11	0.00	0.07

Source: ACCESS: the Australian Collaboration for Coordinated Enhanced Sentinel Surveillance of Sexually Transmissible Infections and Blood-borne viruses

4.1c *Annual notification rate of new HIV diagnoses HIV (additional information)*

Indicator definition

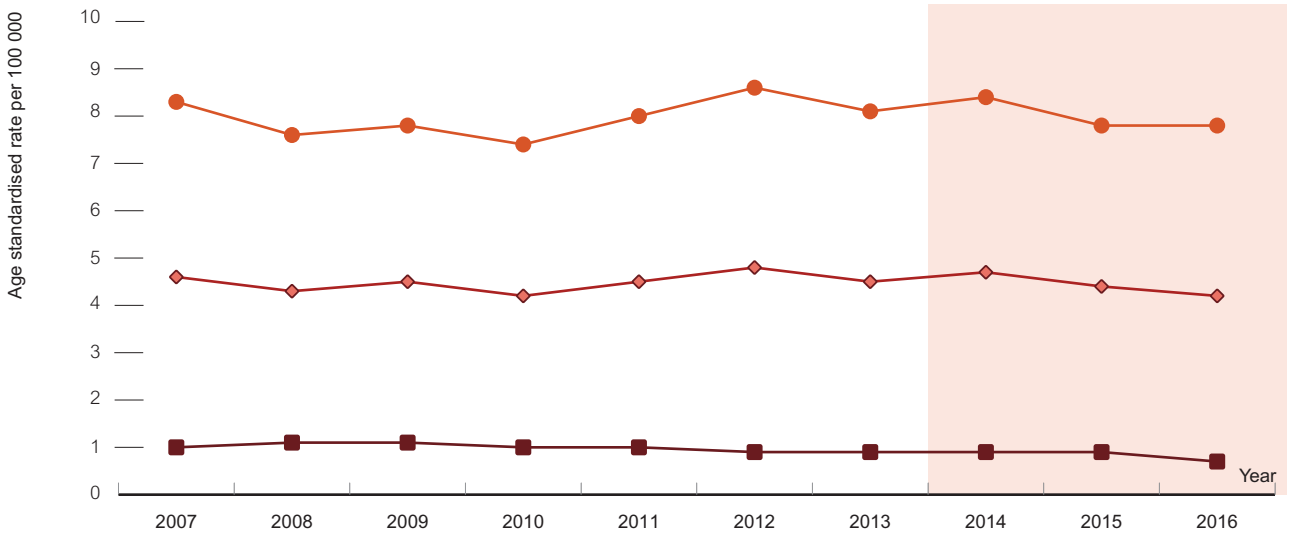
Numerator	Number of new HIV diagnoses recorded in the National HIV Registry
Denominator	Australian population reported by the ABS

Background: Reported numbers of HIV diagnoses can be used to monitor the trends of HIV transmission in Australia. However, trends in diagnoses may only reflect trends in incidence if testing is relatively frequent and rates of testing are relatively constant among people at risk of HIV infection.

Data sources and considerations: Incidence is a difficult indicator to measure, and notifications have been used as a surrogate, recognising that for most infections, they represent only a proportion of the total cases and may be influenced by changes to testing patterns. HIV infection is a notifiable disease in each State/Territory in Australia. All new HIV diagnoses are reported by doctors and laboratories to State/Territory health authorities, and then forwarded to the Kirby Institute for collation and analysis. See Methodological Notes for further detail.

Results: The HIV notification rate shows little change between 2013 and 2016, with 4.5 per 100 000 population in 2013, and 4.2 per 100 000 population in 2016, with rates stable in both females and males. The population notification rate of new HIV diagnoses across Australia declined between 2007 and 2010, increased from 2010 to 2012 and has remained fairly stable thereafter (Figure 37).

Figure 37 New HIV diagnoses, rate per 100 000 population, 2007 – 2016, by sex



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Total	4.6	4.3	4.5	4.2	4.5	4.8	4.5	4.7	4.4	4.2
Male	8.3	7.6	7.8	7.4	8.0	8.6	8.1	8.4	7.8	7.8
Female	1.0	1.1	1.1	1.0	1.0	0.9	0.9	0.9	0.9	0.7

Source: State and Territory health authorities

The HIV targets 3, 4 and 5 (sustain the virtual elimination of HIV among sex workers; sustain the virtual elimination of HIV amongst people who inject drugs; and sustain the virtual elimination of mother to child transmission of HIV) do not have specific indicators; however additional data has been presented in 4.1b (above) and 4.1d and 4.1e (below) to support the progress in these areas.

4.1d *HIV prevalence among people who inject drugs attending needle syringe programs (additional information)*

Indicator definition

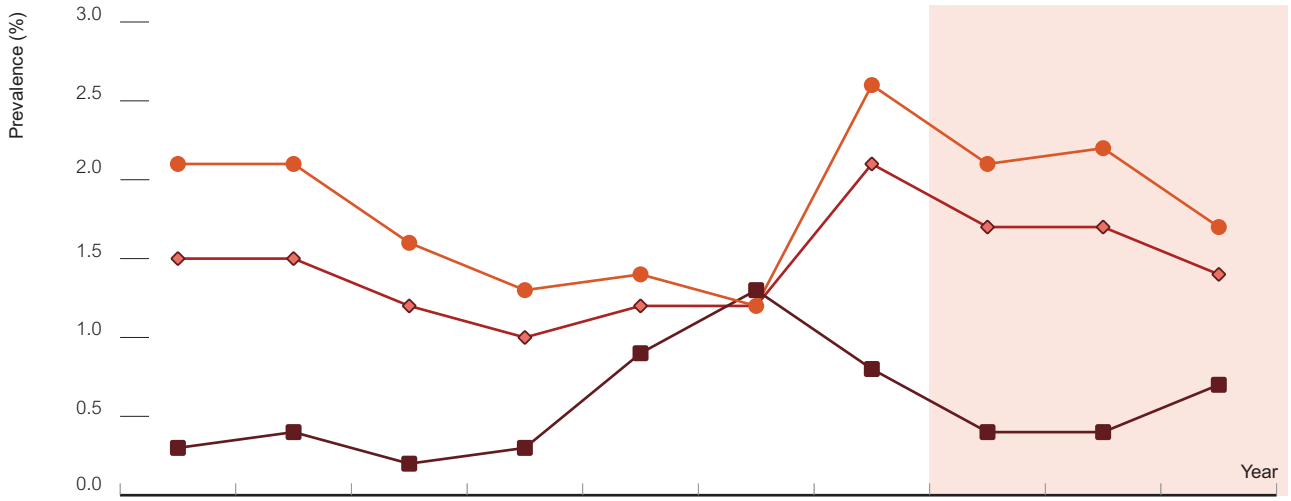
Numerator	Number of people testing positive for HIV among people who inject drugs attending needle and syringe programs
Denominator	Number of people who inject drugs attending needle and syringe programs

Background: HIV prevention among people who inject drugs has been highly successful in Australia and has resulted in sustained low HIV prevalence. People who inject drugs remain a priority population because of the potential for an increase in HIV transmission; for example, through changes in the availability of clean injecting equipment.

Data source and considerations: Same as Section 2.2b

Results: In 2016, HIV prevalence among people who inject drugs remained low at 1.4%, below the 2.1% reported in 2013 (Figure 34). Prevalence was higher in 2016 among males (1.7%) compared to females (0.7%). When homosexual and bisexual men were excluded, HIV prevalence in 2016 among people who inject drugs was 0.7% (data not shown).

Figure 38 HIV prevalence among people who inject drugs attending needle and syringe programs, 2007 – 2016, by sex



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Total*	1.5%	1.5%	1.2%	1.0%	1.2%	1.2%	2.1%	1.7%	1.7%	1.4%
Males	2.1%	2.1%	1.6%	1.3%	1.4%	1.2%	2.6%	2.1%	2.2%	1.7%
Females	0.3%	0.4%	0.2%	0.3%	0.9%	1.3%	0.8%	0.4%	0.4%	0.7%

* Includes transgender

Source: Australian Needle and Syringe Program Survey

4.1e *HIV transmission to newborns perinatally exposed to HIV (additional information)*

Indicator definition

Numerator	Number of HIV positive infants born to HIV-positive mothers
Denominator	Number of infants born to HIV-positive mothers

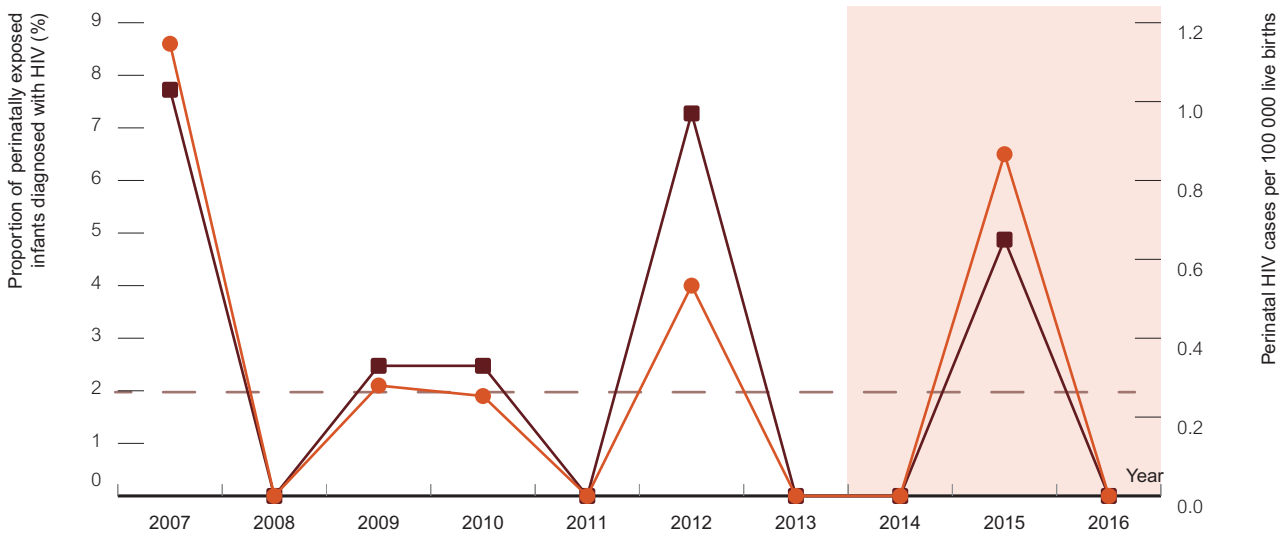
Background: The internationally endorsed strategy of early testing and treatment has the potential to eliminate mother-to-child transmission (MTCT) of HIV in countries where treatment coverage is high. In order to prevent MTCT, the World Health Organization (WHO) has set the following Global Elimination of Mother to Child Transmission of HIV Targets[49]:

- New paediatric HIV infections due to mother-to-child transmission of HIV are less than 50 cases per 100 000 live births
- Mother-to-child transmission rate of HIV is less than 5% in breastfeeding populations or less than 2% in non-breastfeeding populations
- More than 95% of pregnant women, both who know and do not know their HIV status, received at least one antenatal visit
- More than 95% of pregnant women know their HIV status
- More than 95% of HIV-positive pregnant women receive antiretroviral drugs

Data source and considerations: Data from the Australian Paediatric Surveillance Unit (APSU) is recorded in the Australian Perinatal HIV Surveillance System. Paediatricians and other child health professionals participating in the APSU notify infants born to HIV-positive mothers. Further information is then sought including demographics of infant and mother, maternal HIV exposure risk, HIV prevention interventions used (antiretroviral therapy (ART), mode of delivery, breastfeeding status) and the infant's HIV status.

Results: There were no cases of HIV amongst perinatally exposed infants born in Australia in 2016, sustaining the virtual elimination of mother to child HIV transmission seen in 2013 and 2014, however there were two HIV positive infants reported in 2015, equating to a rate of 0.65 per 100 000 live births. The rate per 100 000 live births was 0.00 in 2016, the same as in 2013 and 2014 (Figure 39).

Figure 39 Mother-to-child transmission of HIV, 2007 – 2016



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Perinatal HIV cases per 100 000 live births	1.03	0.00	0.33	0.33	0.00	0.97	0.00	0.00	0.65	0.00
Proportion of perinatally exposed infants diagnosed with HIV	8.6%	0.0%	2.1%	1.9%	0.0%	4.0%	0.0%	0.0%	6.5%	0.0%
Number of HIV positive infants born to HIV-positive mothers	3	0	1	1	0	3	0	0	2	0

Note: The broken line indicates the WHO target of 2% mother-to-child transmission
Source: Australian Paediatric Surveillance Unit

4.2 Reduce the risk behaviours associated with the transmission of HIV

4.2a *Proportion of gay men who have engaged in condomless anal intercourse with casual male partners in the previous six months*

Indicator definition

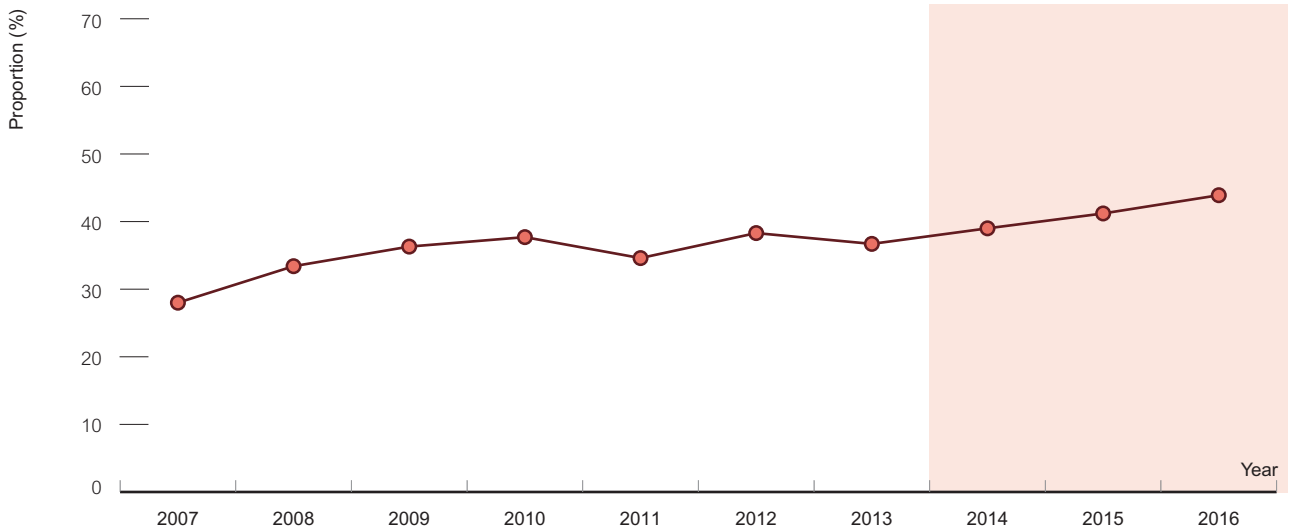
Numerator	Number of participants in Gay Community Periodic Surveys who report any CLAI with casual male partners in previous six months
Denominator	Number of participants in Gay Community Periodic Surveys

Background: In Australia, condomless anal intercourse with casual male partners is a key risk factor for acquiring HIV in gay and other men who have sex with men and a reliable indicator of subsequent trends in HIV infection.[51] However it is important to note that these men may not all be at risk of HIV due to adoption of other risk reduction strategies, such as sero-sorting, pre-exposure prophylaxis (PrEP) and antiretroviral treatment in men with HIV (treatment as prevention).

Data source and considerations: Same as Section 3.4b.

Results: Results from the GCPSs indicate that in 2016 44% of gay men with casual partners reported condomless anal intercourse in the previous six months. Conversely, this means over half of men with casual partners use condoms or avoid anal sex entirely. Between 2013 and 2016 the proportion reporting condomless anal intercourse with a casual partner has increased from 36.7% to 43.9% (Figure 40). Further information regarding sexual risk behaviour appears in the *Annual Report of Trends in Behaviour 2017*, prepared by the Centre for Social Research in Health.

Figure 40 Proportion of gay men with casual partners who reported any condomless anal intercourse in the six months prior to the survey, 2007 – 2016



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Proportion	28.0%	33.4%	36.3%	37.7%	34.6%	38.3%	36.7%	39.0%	41.2%	43.9%

Source: Gay Community Periodic Survey

4.2b *Proportion of people who inject drugs who report re-use of someone else's needle and syringe in the previous month.*

Indicator definition

Numerator	Number of ANSPS participants who inject drugs who report re-using another person's used needle and syringe (receptive syringe sharing) in the previous month
Denominator	Total number of ANSPS participants

Background: Monitoring risk behaviours among people who inject drugs is essential to ensure that an HIV epidemic does not emerge among this priority population.

Data source and considerations: Same as Section 2.2b

Results: The proportion of people who inject drugs (seen through the Australian needle and syringe programs), who reported receptive syringe sharing, has increased by a relative 24% between 2013 (15%) and 2016 (19%). This proportion remained stable at around 15% between 2007 – 2015 (see Figure 15, Section 2.2c).

4.2c *Proportion of non-HIV positive gay men who have received PrEP in the last year (additional information)*

Indicator definition

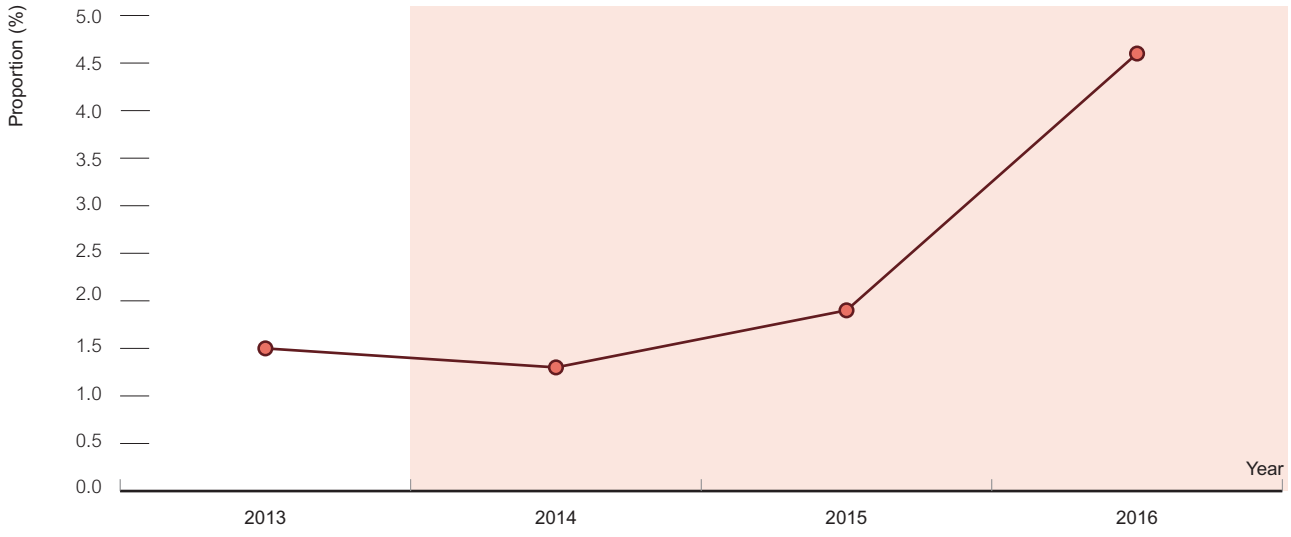
Numerator	Number of non-HIV-positive gay men who received PrEP for HIV in the six months prior to the survey, reported in GCPS
Denominator	Number of non-HIV-positive gay men participating in GCPS

Background: Pre-exposure prophylaxis (PrEP) involves a combination of antiretrovirals taken before exposure to HIV to prevent HIV infection. Published efficacy studies have shown that among men who have sex with men who took PrEP every day (adherent) the drugs were highly effective.[52] In Australia, PrEP (Truvada) has been registered under the Therapeutic Goods Administration (TGA). From 2014, a number of small-scale demonstration projects commenced in New South Wales and Victoria and in Queensland in 2015. In 2016 three large state-funded PrEP implementation programs commenced in New South Wales, Victoria and Queensland.[53 – 55] People can also personally import PrEP from overseas. Systems are being established to monitor the uptake, adherence and effectiveness of PrEP.

Data source and considerations: Same as Section 3.4b.

Results: Results from the GCPSs indicate that among non-HIV-positive men in Australia, PrEP use was minimal between 2013 and 2015 with very little change (between 1.5-1.9%). However, in 2016, 4.6% of non-HIV positive gay and bisexual men reported PrEP use, which is a threefold increase from the 1.5% reported in 2013 (Figure 41). It is important to note that in 2016 the GCPS was conducted in NSW and Victoria before the commencement of PrEP implementation programs, EPIC and PrEP-X, respectively. Therefore, the data on the proportion of gay and bisexual men on PrEP in 2016 reflects the proportion of PrEP in the first quarter of 2016 and is likely to be significantly less than the proportion on PrEP by the end of 2016.

Figure 41 PrEP use reported by all non-HIV-positive participants in the Gay Community Periodic Survey, 2013 – 2016



Source: Gay Community Periodic Survey

4.3 Decrease the number of people with undiagnosed HIV infection

4.3a Proportion of gay men who have been tested for HIV in the previous 12 months.

Indicator definition

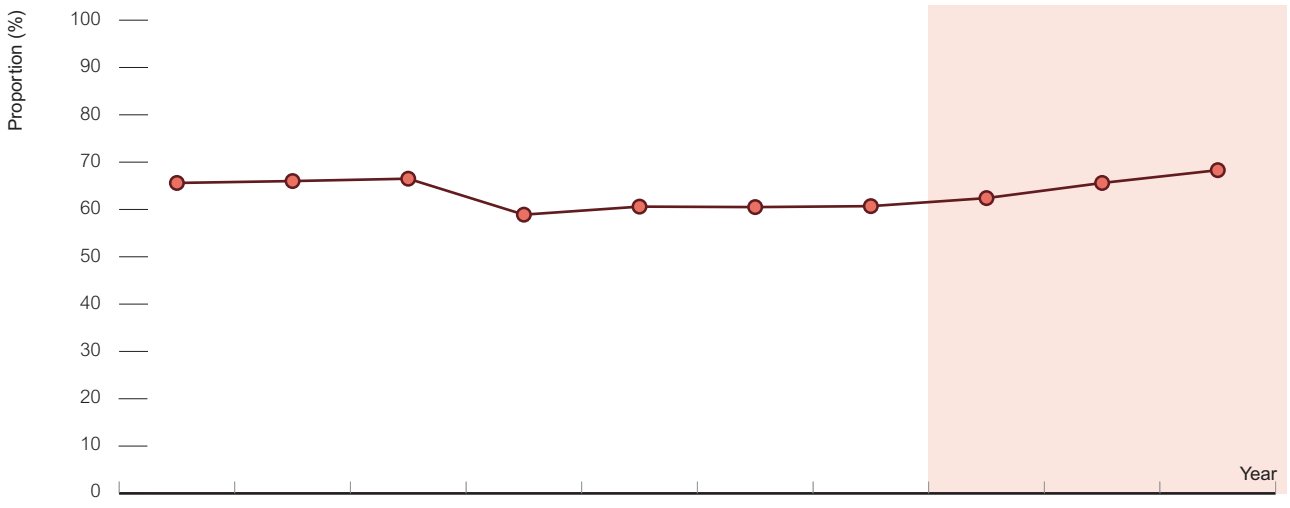
Numerator	Number of non-HIV-positive gay men who have been tested for HIV in the previous twelve months, reported in GCPS
Denominator	Number of non-HIV-positive gay men participating in GCPS

Background: The Australian HIV epidemic has predominantly been due to transmission through male-to-male sex. Of the 1 013 new HIV notifications in 2016, 70% reported an exposure category including male-to-male sex.[3] Increasing the proportion of men who test regularly and are aware of their HIV status is therefore of critical importance. Clinical guidelines recommend that all sexually active men who have sex with men are tested for HIV and STIs at least once a year, and up to four times a year based on number of partners and other behavioural risks.

Data source and considerations: Same as Section 3.4b.

Results: Results from the GCPSs indicate that in 2016 68.3% of non-HIV-positive gay male participants reported having an HIV test in the 12 months prior to the survey, an increase by a relative 13% compared to 60.7% in 2013. This proportion has shown a slight increase over the last five years (Figure 42).

Figure 42 Proportion of non-HIV-positive men tested for HIV in the 12 months prior to completing the survey, 2007 – 2016



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Proportion	65.6%	66.0%	66.5%	58.9%	60.6%	60.5%	60.7%	62.4%	65.6%	68.3%

Source: Gay Community Periodic Survey

4.3b Proportion of people who inject drugs who have been tested for HIV in the previous 12 months

Indicator definition

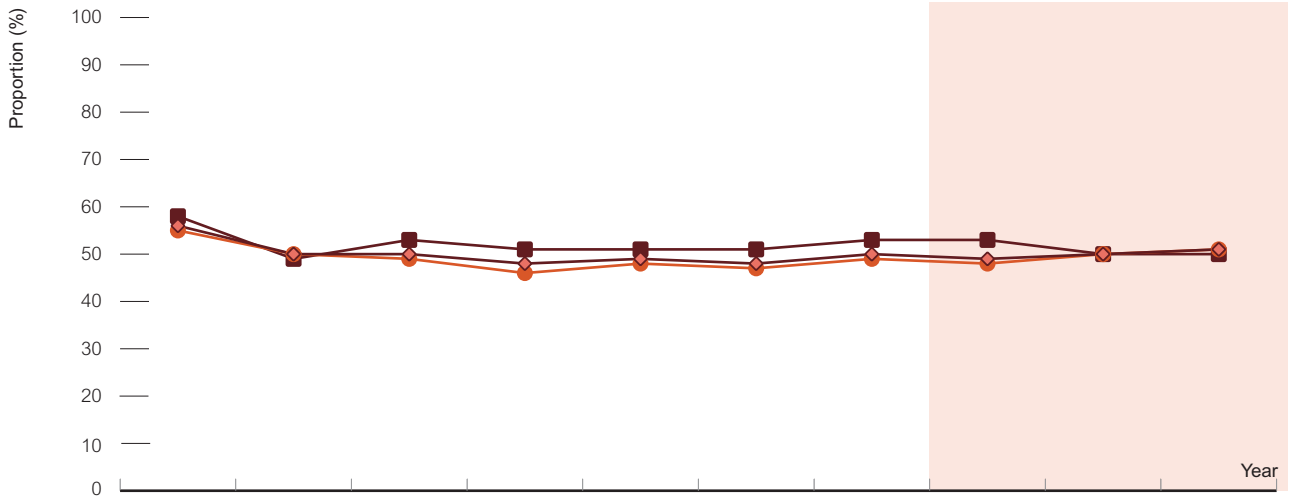
Numerator	Number of ANSPS participants who report having had an HIV test in the last 12 months
Denominator	Total number of participants in the ANSPS

Background: Preventing transmission of HIV through injecting drug use has been effectively underpinned by needle and syringe programs. Timely testing is a secondary prevention strategy and aims to increase case detection and enable people to commence treatment earlier.

Data source and considerations: Data regarding the number of people who inject drugs who have been tested for HIV in the previous year was collected by the annual ANSPS. See Methodological Notes for further detail.

Results: Between 2013 and 2016, the proportion of all respondents in ANSPS reporting an HIV antibody test in the previous 12 months remained steady between 49 – 51% (Figure 43).

Figure 43 Proportion of people who inject drugs who attended needle and syringe programs and reported an HIV test in the past 12 months, 2007 – 2016, by sex



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Total	56%	50%	50%	48%	49%	48%	50%	49%	50%	51%
Males	55%	50%	49%	46%	48%	47%	49%	48%	50%	51%
Females	58%	49%	53%	51%	51%	51%	53%	53%	50%	50%

Source: Australian Needle and Syringe Program Survey

4.3c Median CD4 counts at HIV diagnosis.

Indicator definition

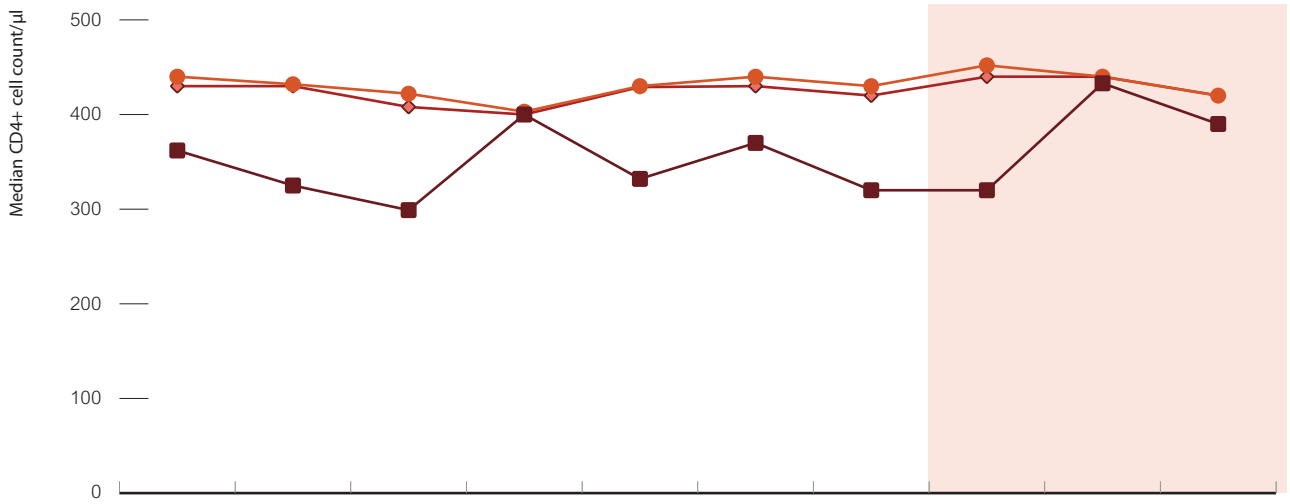
Single Measure	Median of the CD4 counts for all HIV diagnosis within the last 12 months

Importance: In people with HIV, CD4+ cell count/µl is the most important laboratory indicator of how well the immune system is working and is the strongest predictor of HIV progression. The median CD4 cell count in healthy HIV-negative people is 952 cells/µL (range 771 – 1109 cells/µL) and the median time taken to develop AIDS without treatment is around 11 years after seroconversion.[56] The human immunodeficiency virus mainly infects the CD4 cells in the immune system. During primary HIV infection, the number of CD4 cells in the bloodstream decreases by 20% to 40%. Progression of HIV infection impairs immune function and causes a median decline in CD4 cell count per year of 67 cells/µL (range 50 – 100 cells/µL).[57]

Data source and considerations: The CD4+ cell counts are reported at diagnosis for the new HIV diagnoses and recorded in the National HIV Registry; See Methodological Notes for further detail. Changes in median CD4+ cell count over time should be interpreted with caution, as increases in testing during primary infection may lower the median CD4+ cell count.

Results: In 2016, the median CD4+ cell count at diagnosis was 420 cells/µL, the same as in 2013. In nearly all years since 2007 the median CD4+ cell count was higher in males than females (Figure 44).

Figure 44 Median CD4+ cell count for new HIV diagnoses, 2007 – 2016, by sex



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Total*	430	430	408	400	429	430	420	440	440	420
Male	440	432	422	403	430	440	430	452	440	420
Female	362	325	299	400	332	370	320	320	433	390

* Total includes transgender

Source: State and Territory health authorities

4.3d *Proportion of non-HIV-positive gay men who have been tested one, two or three or more times in the previous 12 months (additional information)*

Indicator definition

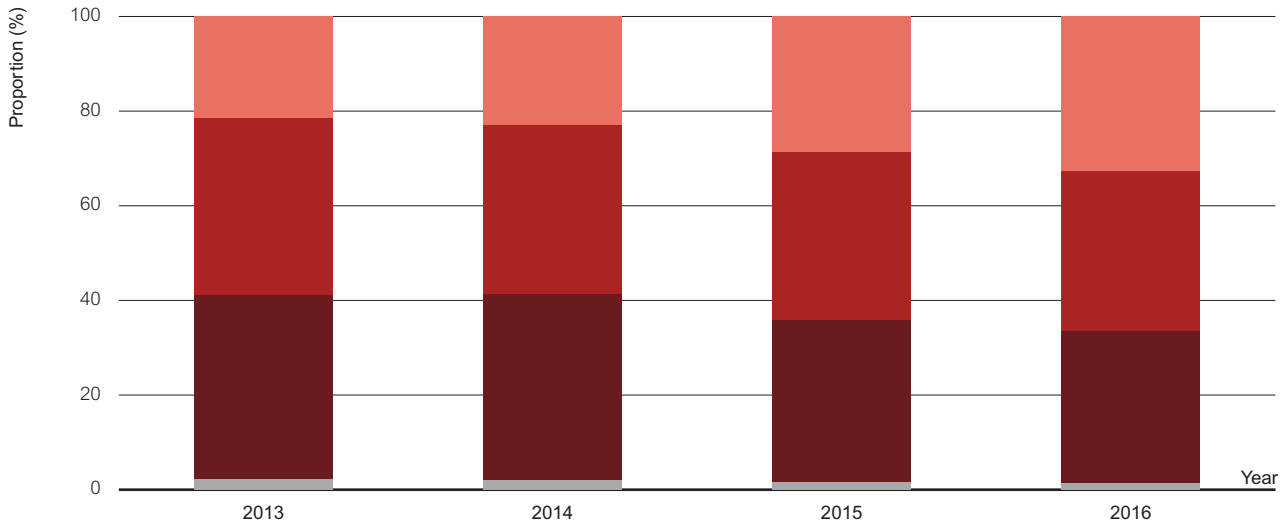
Numerator	Number of non-HIV-positive gay men who have been tested one, two or three or more times for HIV in the previous twelve months, reported in GCPS
Denominator	Number of non-HIV-positive gay men participating in GCPS

Importance: Clinical guidelines recommend 3 – 6 monthly testing for men at higher-risk indicated by condomless sex, >10 partners in the last 6 months and other risk criteria.[58] More frequent testing is important to detect infections earlier and enable people to start treatment earlier and thus reduce their viral load to undetectable levels, reducing the risk of further transmission. Earlier treatment also improves health outcomes for the individual.[59]

Data source and considerations: Same as Section 3.4b. Data on frequency of HIV tests in the previous 12 months are not available from years before 2013.

Results: The proportion of non-HIV positive gay men receiving three or more HIV tests in the previous 12 months was 32.7% in 2016, an increase of 52% compared to 21.5% in 2013 (Figure 45).

Figure 45 Proportion of non-HIV positive gay men reporting one, two or three or more HIV tests in the previous 12* months, 2013 – 2016



	2013	2014	2015	2016
Three or more	21.5%	23.0%	28.7%	32.7%
Two	37.5%	35.8%	35.5%	33.8%
One	38.7%	39.2%	34.3%	32.1%
Missing data	2.3%	2.0%	1.5%	1.4%

* showing unadjusted % change, 2013 – 2016.
Note: Data only available from 2013
Source: Gay Community Periodic Survey

4.3e Proportion of people living with HIV who are undiagnosed (additional information)

Indicator definition

Numerator	Estimated number of people who have undiagnosed HIV infection in Australia
Denominator	Estimated number of people living with HIV in Australia

Background: HIV diagnosis is the essential first step in the HIV care continuum. Diagnosis allows an individual to receive care and treatment to reduce viral load, increase immune function, and thereby reducing morbidity, mortality and the risk for onward transmission.[60] Individuals who are aware of their infection can also make behavioural changes to reduce transmission.[61]

Data source and considerations: HIV notifications data were provided from the National HIV Registry. The number of people living with undiagnosed HIV infection was estimated using annual notifications adjusted for duplicate notifications, estimated mortality rates, and overseas migration rates. See Methodological Notes for further detail.

Results: During 2016, an estimated 26 444 people were living with HIV, and 2 796 were undiagnosed. This corresponds to 10.5% of all people living with HIV being undiagnosed with HIV infection (see Figure 47 for details of the HIV cascade). The proportion has remained stable, with an estimated 12% (2 739) living with undiagnosed HIV infection in 2013.

4.3f Proportion of new HIV diagnoses determined to be late (additional information).

Indicator definition

Numerator	Number of new HIV diagnoses classified as late* per year
Denominator	Total number of new HIV diagnoses per year

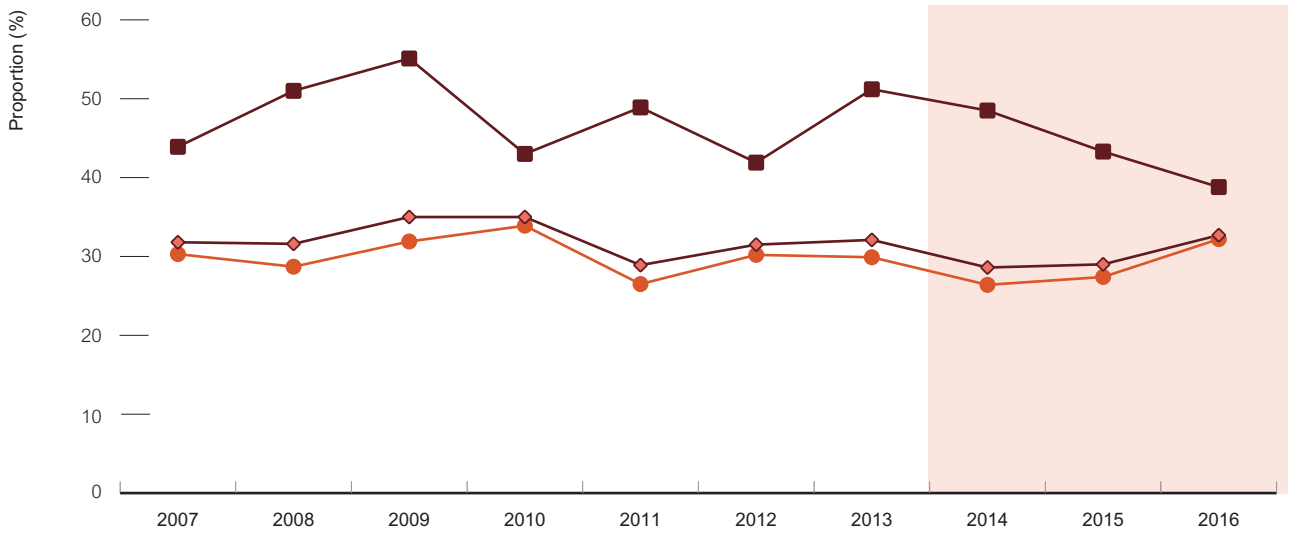
* Late diagnosis= Defined by a CD4+ cell count less than 350 cells/μL at diagnosis

Importance: There is a critical role for effective and timely HIV antibody testing for minimising ongoing HIV transmission, minimising the morbidity and mortality caused by HIV, minimising the personal and social impact of HIV infection, and for more accurate populationlevel surveillance.[62] Late HIV diagnoses (defined as new HIV diagnoses with a CD4+ cell count of less than 350 cells/μL) leads to late initiation of antiretroviral treatment for minimising the risk of progression of HIV disease and for minimising the risk of onwards HIV transmission. A CD4+ count of <350 cells/μL indicates that a person has probably acquired their infection about 4 – 5 years earlier, but have not been tested.

Data source and considerations: Data on newly diagnosed notifications of HIV are from the National HIV Registry; See Methodological Notes for further detail. Late HIV diagnosis was defined as new HIV diagnoses with a CD4+ cell count of less than 350 cells/μL. Notifications classified as newly acquired were excluded from late or advanced categorisation.

Results: In 2016, the proportion of new HIV diagnoses classified as late was 32.7%, similar to 32.1% in 2013 (Figure 46). The proportion of late diagnoses showed a gradual decline over the past ten years, from 43.9% in 2007 to 32.7% in 2016. In all years a higher proportion of notifications in females were classified as late diagnoses compared to males.

Figure 46 Proportion of late diagnoses among new HIV diagnoses, 2007 – 2016, by sex



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Total	31.8%	31.6%	35.0%	35.0%	28.9%	31.5%	32.1%	28.6%	29.0%	32.7%
Males	30.3%	28.7%	31.9%	33.9%	26.5%	30.2%	29.9%	26.4%	27.4%	32.2%
Females	43.9%	51.0%	55.1%	43.0%	48.9%	41.9%	51.2%	48.5%	43.3%	38.8%

Source: State and territory health authorities

4.4 Increase the proportion of people living with HIV on treatments with an undetectable viral load

4.4a Proportion of people living with diagnosed HIV who are receiving antiretroviral treatment

Indicator definition

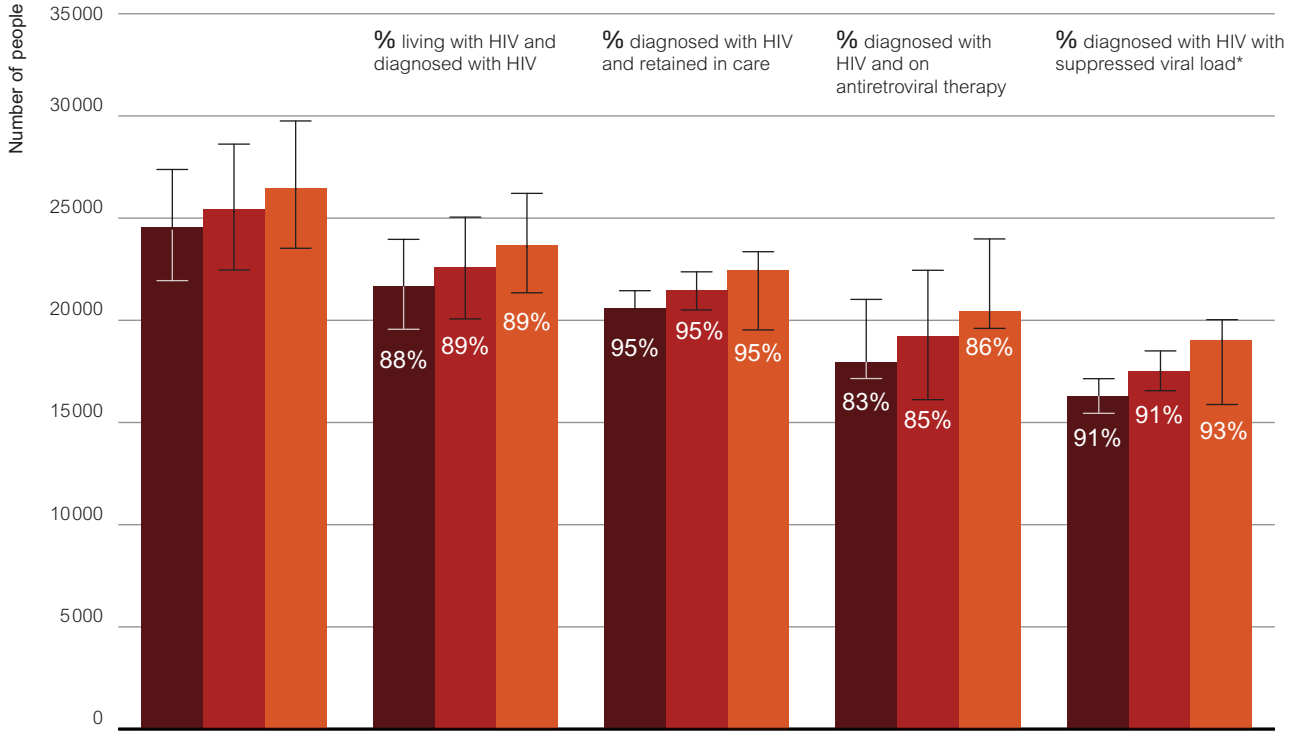
Numerator	Number of people with HIV prescribed antiretroviral treatment
Denominator	Model–based estimate of number of people living with diagnosed HIV

Importance: There is strong evidence that effective antiretroviral treatment leads to reduction of viral load to undetectable levels which virtually eliminates the risk of onward HIV transmission to sexual partners.[63 – 65] New evidence on personal health benefit of early HIV therapy were published in July 2015 [66] and have led to changes in HIV treatment guidelines in Australian and internationally to recommend that HIV therapy be offered immediately on HIV diagnosis irrespective of CD4 level.

Data source and considerations: The number of people receiving ART was estimated using a 10% sample of the Pharmaceutical Benefits Scheme (PBS) patient level script claims data provided by the company Prospection, and an estimate of people living with HIV and receiving treatment under compassionate access schemes. See Methodological Notes for further detail.

Results: During 2016, an estimated 26 444 people were living with HIV and 20 440 were on antiretroviral therapy, this corresponds to 86% of all people living with diagnosed HIV (Figure 47) on antiretroviral therapy, higher than the 79% in 2013.

Figure 47 The HIV diagnosis and care cascade, 2014 – 2016



	Living with HIV	Living with HIV and diagnosed	Retained in care	Receiving antiretroviral therapy	Supressed viral load
2014	24 531	21 665	20 582	17 939	16 279
2015	25 404	22 577	21 448	19 189	17 517
2016	26 444	23 648	22 465	20 440	19 013

* Viral suppression classified as <200 copies/mL

Source: See Methodological Notes for detail

4.4b *Proportion of people receiving antiretroviral treatment for HIV infection whose viral load is less than 200 copies/mL**

Indicator definition

Numerator	Number of people receiving antiretroviral treatment for HIV whose viral load is less than 200 copies/mL reported in the AHOD
Denominator	Number of people receiving antiretroviral treatment for HIV reported in the AHOD

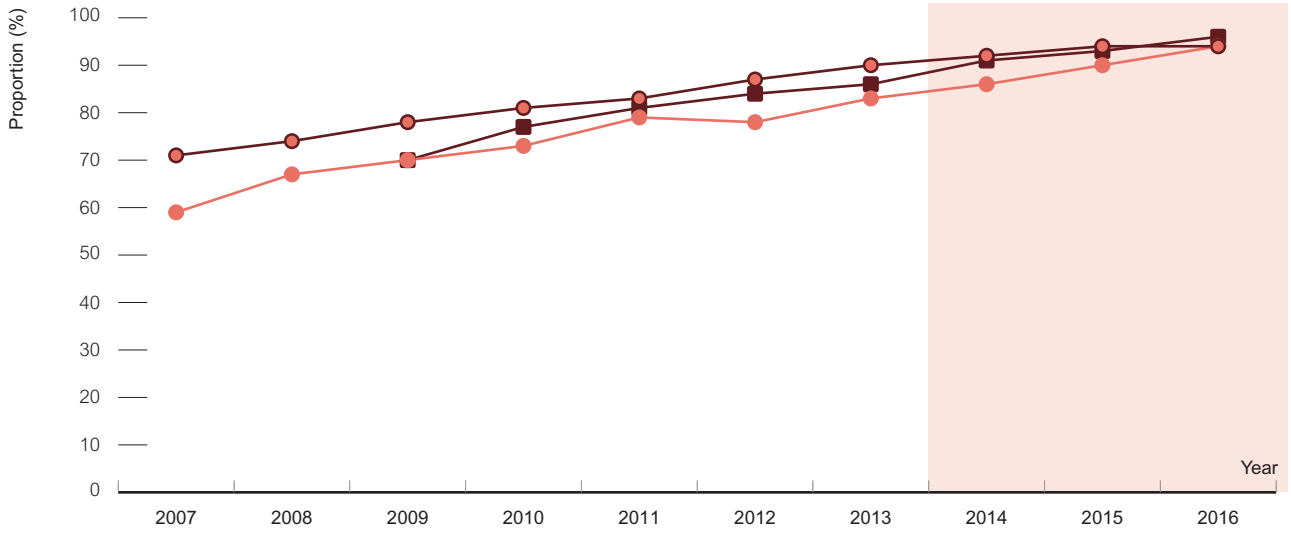
* The National Blood-borne Viruses and Sexually Transmissible Infections Surveillance and Monitoring Plan 2014 – 2017 specifies a viral load of less than 50 copies/mL. However, to maintain consistency with the 2017 Annual Surveillance Report of HIV, viral hepatitis, and STIs in Australia, a viral load of less than 200 copies/mL is reported here.

Importance: HIV viral load represents the amount of HIV virus in a person's blood, once a person is on antiretroviral treatment and has a stable undetectable HIV viral load then there is a very low risk of onward HIV transmission. A number of clinical trials have found no transmissions from a partner with undetectable viral load.[67, 68] In the HPTN 052 trial of early HIV treatment, a small number of HIV transmissions likely occurred before or soon after the index partner started antiretroviral treatment and after the index failed early HIV treatment.[69]

Data source and considerations: The proportion of people on ART with viral load less than 200 copies/mL was sourced from the Australian HIV Observational Database (AHOD). Additional data are available from 42 sexual health clinics and 4 primary care clinics in Victoria and New South Wales with a high case load of gay and bisexual men participating in the ACCESS project. See Methodological Notes for further detail.

Results: As treatment coverage has increased in Australia, there has been a corresponding increase in the proportion of people with undetectable viral load (<200 copies/mL). The AHOD data show that the proportion of people with undetectable viral load was 94% in 2016, higher than the 90% in 2013; with a greater increase over ten years, from 71% in 2007 (Figure 48). Data from ACCESS sexual health clinics shows an 11% absolute increase in the proportion of people with undetectable viral load in 2016 at 94% as compared to 83% in 2013; with a greater increase over ten years, from 59% in 2007. In high case load general practice clinics undetectable viral load was 96% in 2016, a relative 11.5% higher than the 86% in 2013; with a greater increase from 70% in 2009.

Figure 48 Proportion of people with HIV receiving antiretroviral treatment whose viral load is less than 200 copies/mL and (i) participate in the Australian HIV Observational Database, and (ii) attended sexual health and general practice clinics participating in ACCESS, 2007 – 2016



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
AHOD	71%	74%	78%	81%	83%	87%	90%	92%	94%	94%
Sexual health clinics	59%	67%	70%	73%	79%	78%	83%	86%	90%	94%
High case load general practice			70%	77%	81%	84%	86%	91%	93%	96%

Note: Data is available for only 2009 – 2016 period for the high case load general practice clinics

Source: Australian HIV Observational Database; ACCESS: the Australian Collaboration for Coordinated Enhanced Sentinel Surveillance of Sexually Transmissible Infections and Blood-borne Viruses

4.5 Improve quality of life of people living with HIV

4.5a Proportion of people with HIV who report their general health status and their general well-being to be excellent or good

Indicator definition

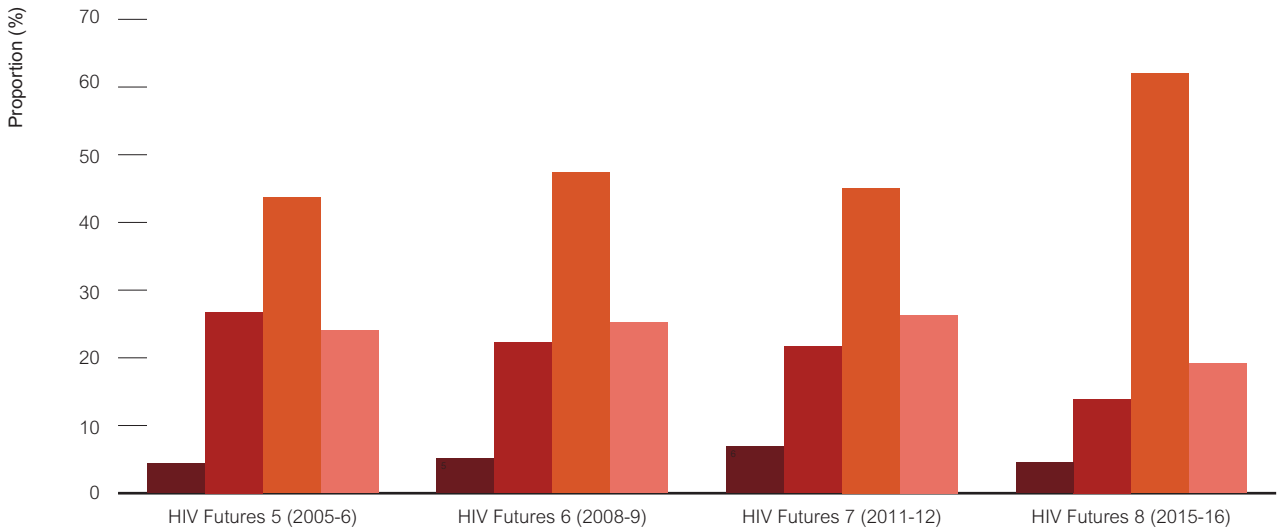
Numerator	Number of people with HIV who report their general health status and their general well-being to be excellent or good in the HIV Futures Study
Denominator	Number of people with HIV who participate in the HIV Futures study

Importance: With the recent advances in treatments for HIV, the survival of PLHIV has been increased and their quality of life and general well-being has emerged as an important focus for researchers and healthcare providers.[70] The term 'quality of life' is used to convey an overall sense of well-being and includes aspects such as happiness and satisfaction with life as a whole.[71] Given that HIV patients struggle with numerous social problems such as stigma, depression, substance abuse, and cultural beliefs which can affect not only their physical well-being but also their mental and social health, it is important to provide a broad indication of the morbidity and the social impact of HIV infection.[71]

Data source and considerations: Currently, the Futures study is the only regular crosssectional study of the experiences of people living with HIV nationally. The HIV Futures Study is conducted every 2 – 3 years and is a national crosssectional anonymous selfadministered survey of people living with HIV. HIV Futures 8, the latest iteration of this study, sampled 895 people living with HIV in Australia.[72] The most recent survey was conducted from July 2015 to June 2016. See Methodological Notes for further detail.

Results: Among people living with HIV who participated in HIV Futures 8 survey, 81.2% reported their health as 'good' or 'excellent' (Figure 45), an increase of 14% from HIV Futures Survey 5 in 2005 – 2006 (67.7%). Self-rating of well-being was reported as 'good' or 'excellent' by 60% of respondents in HIV Futures 8 survey (Figure 46), similar to the proportion in previous surveys.

Figure 49 Participants' self-ratings of general health status* in the HIV Future 5, 6, 7 and 8 studies

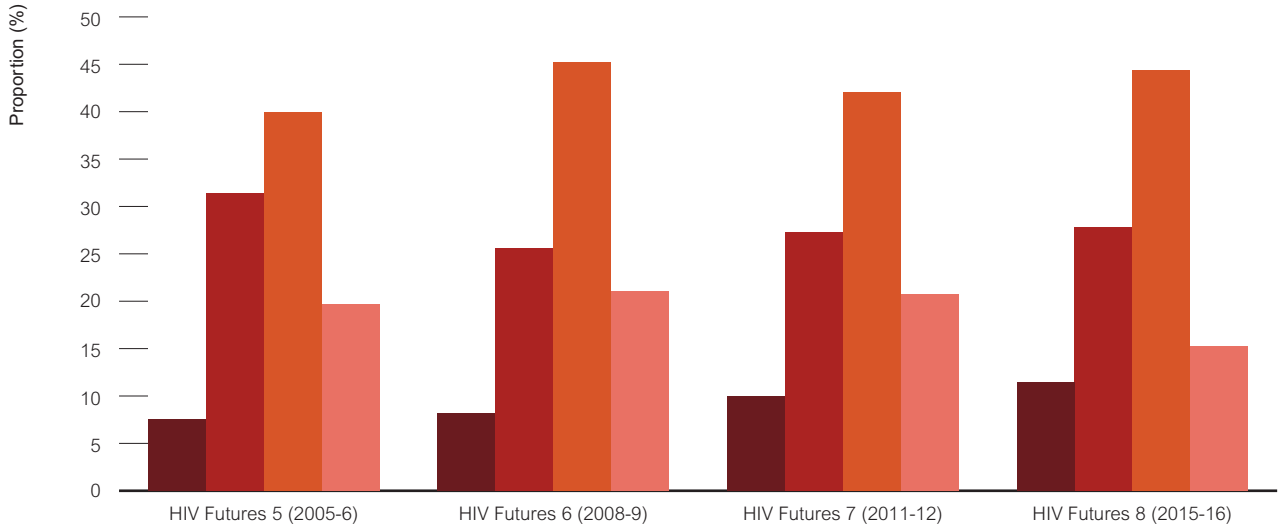


	HIV Futures 5 (2005-6)	HIV Futures 6 (2008-9)	HIV Futures 7 (2011-12)	HIV Futures 8 (2015-16)
Poor	4.4%	5.1%	6.9%	4.5%
Fair	26.8%	22.3%	21.7%	13.9%
Good	43.7%	47.4%	45.1%	62.0%
Excellent	24.0%	25.2%	26.3%	19.2%

* Note: The HIV Futures 8 recorded "very good" as an additional category in 2015 – 2016, this has been combined with "good" to maintain consistency with the previous years

Source: Futures Study

Figure 50 Participants' self-ratings of overall wellbeing in the HIV Future 5, 6 and 7 studies



	HIV Futures 5 (2005-6)	HIV Futures 6 (2008-9)	HIV Futures 7 (2011-12)	HIV Futures 8 (2015-16)
Poor	7.5%	8.2%	10.0%	11.4%
Fair	31.4%	25.6%	27.3%	27.8%
Good	39.9%	45.2%	42.0%	44.4%
Excellent	19.7%	21.0%	20.7%	15.2%

Source: Futures Study

4.6 Eliminate the negative impact of stigma, discrimination, and legal and human rights issues on people's health

4.6a Proportion of surveyed people living with HIV who report experiencing any stigma or discrimination in relation to their HIV status in the last 12 months

Indicator definition

Numerator	Proportion of surveyed people living with HIV who report experiencing any stigma or discrimination in relation to their HIV status in the last 12 months
Denominator	Total number of people living with HIV surveyed

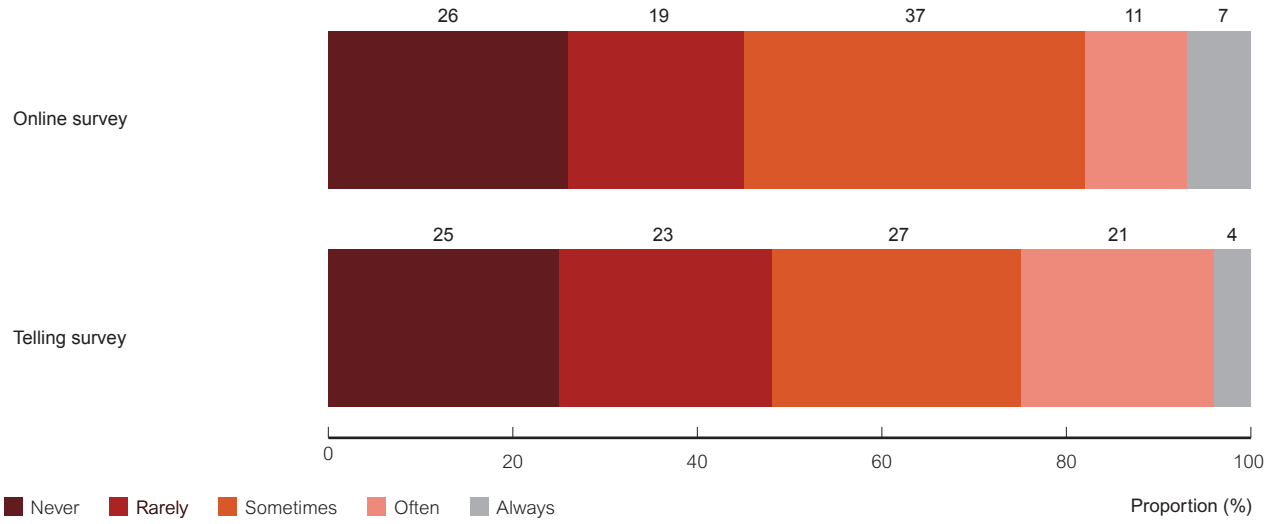
Background: See Section 1.6

Data source and considerations: The Centre for Social Research in Health (CSRH) developed an indicator of stigma that could be used across the key priority populations identified in the National Strategies, in relation to blood borne virus (BBV) status, injecting drug use, sexual orientation and sex work. A single question was selected to indicate stigma in relation to HIV status: *"In the last 12 months, to what extent have you experienced any stigma or discrimination (e.g. avoidance, pity, blame, shame, rejection, verbal abuse, bullying) in relation to your HIV status?"*

An online survey was developed for people living with HIV. Participants were recruited through promotion by the Australian Federation of AIDS Organisations (AFAO) and the National Association of People with HIV Australia (NAPWHA). Due to recruitment challenges, the online survey sample is smaller than had been expected. The indicator was also included in a 2016 online survey on disclosure among men who have sex with men in Australia (*Telling*; Kirby Institute, UNSW). People living with HIV comprised a subset of the *Telling* survey sample, also resulting in a small number of respondents to this indicator item. Caution should therefore be taken when interpreting results from these non-representative samples.

Result: In the 2016 online survey (N=181), 74% of people living with HIV reported experiencing any stigma in the last 12 months (Figure 51). Similarly, 75% of *Telling* survey participants (N=56) who were living with HIV reported experiencing any stigma in the last 12 months (Figure 51).

Figure 51 Proportion of people experiencing any stigma or discrimination in relation to their HIV status in the last 12 months



Source: The Centre for Social Research in Health

4.6b *Proportion of surveyed men who have sex with men who report experiencing any stigma or discrimination in relation to their sexual orientation in the last 12 months (additional information)*

Indicator definition

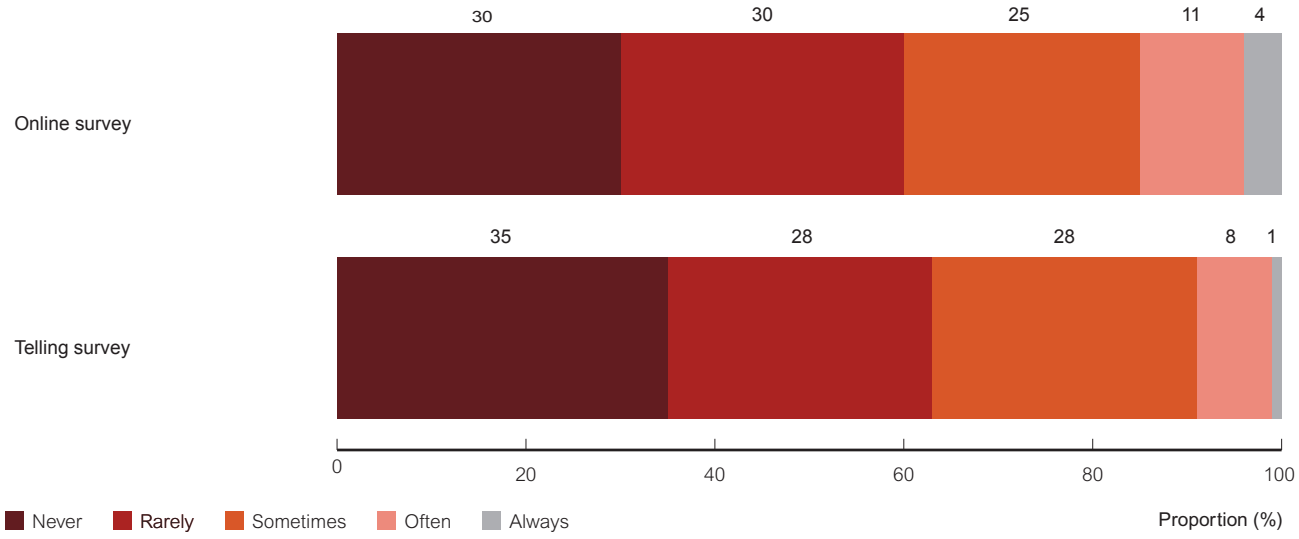
Numerator	Proportion of surveyed men who have sex with men who report experiencing any stigma or discrimination in relation to their sexual orientation in the last 12 months
Denominator	Total number of men who have sex with men surveyed

Background: See Section 1.6.

Data source and considerations: HIV is an issue of great significance within populations of men who have sex with men. Therefore, an indicator of stigma in relation to sexual orientation was also developed by the CSRH, and included in the online survey (see section 4.6a for details). A single question was selected to indicate stigma or discrimination in relation to their sexual orientation: *"In the last 12 months, to what extent have you experienced any stigma or discrimination (e.g. avoidance, pity, blame, shame, rejection, verbal abuse, bullying) in relation to your sexual orientation?"* The indicator was also included in a 2016 online survey on disclosure among men who have sex with men in Australia (*Telling*; Kirby Institute, UNSW).

Results: In the online survey (N=142), 70% of non-heterosexual men reported experiencing any stigma in relation to their sexual orientation in the last 12 months (Figure 52). Comparatively, 65% of 339 *Telling* survey participants reported any experiences of stigma in relation to their sexual orientation in the last 12 months (Figure 52).

Figure 52 Proportion of men who have sex with men experiencing any stigma or discrimination in relation to their sexual orientation in the last 12 months



Source: The Centre for Social Research in Health

4.6c *Proportion of health care workers expressing stigma or discrimination towards clients living with HIV (additional information)*

A mirrored stigma indicator has also been implemented with health care workers to identify their expression of stigma towards clients living with HIV, and because of their sexual orientation

Indicator definition

Numerator	Proportion of surveyed health care workers who report expressing any stigma or discrimination towards clients living with HIV, and because of their sexual orientation
Denominator	Total number of health care workers surveyed

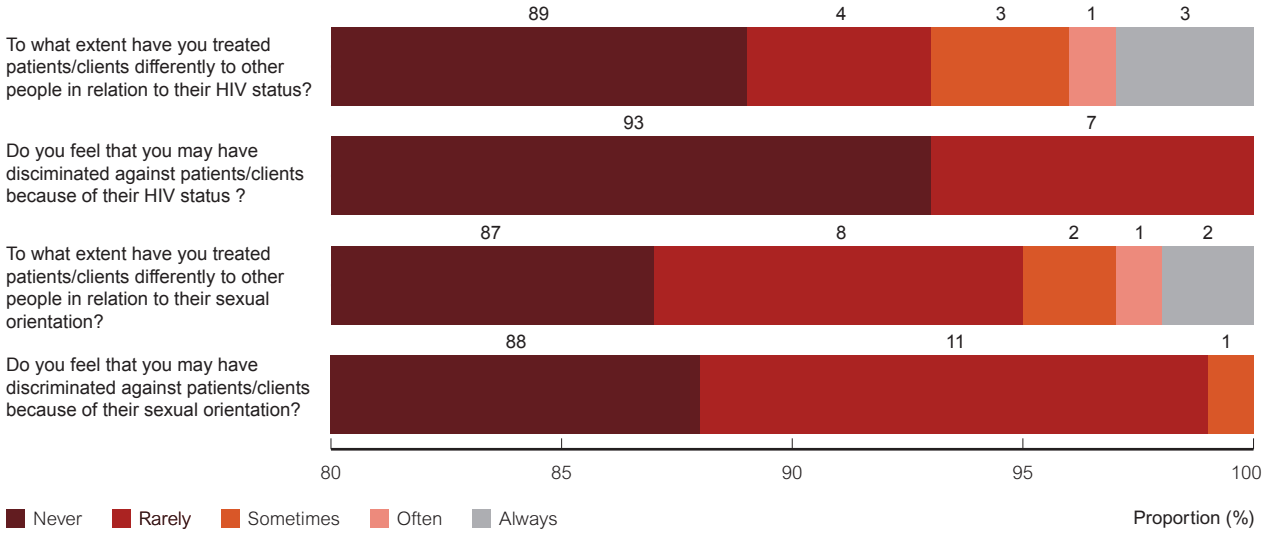
Background: See Section 1.6

Data source and considerations: The Centre for Social Research in Health (CSRH) developed an indicator of expressed stigma that could be used with health care workers in relation to key attributes related to the national strategies. A single question was selected to indicate expressed stigma in relation to HIV status: *"In the last 12 months, to what extent have you treated patients/clients differently to other people in relation to their HIV status?"* The wording of this question was subsequently revised to clarify that the indicator referred to discriminatory behaviour: *"In the last 12 months, do you feel that you may have discriminated against patients/clients because of their HIV status?"* A single question was also asked in relation to sexual orientation: *"In the last 12 months, to what extent have you treated patients/clients differently to other people in relation to their sexual orientation?"* The wording of this question was subsequently revised: *"In the last 12 months, do you feel that you may have discriminated against patients/clients because of their sexual orientation?"*

An online survey was developed for health care workers. Participants were recruited through the Australasian Society for HIV, Viral Hepatitis and Sexual Health Medicine (ASHM). It must be noted that this sample is not representative, and is likely to show an underrepresentation of stigma expressed by health care workers more generally.

Results: In the 2016 online survey (N=331), between 7 – 11% of health care workers reported discriminating against clients or treating them differently because of their HIV in the last 12 months (Figure 53). Between 12 – 13% of the 345 health care workers reported discriminating against clients or treating them differently because of their sexual orientation in the last 12 months (Figure 53).

Figure 53 Proportion of health care workers expressing stigma or discrimination towards clients living with HIV in the last 12 months



Source: The Centre for Social Research in Health

HIV

5. Aboriginal and Torres Strait Islander

Epidemiology overview

Hepatitis B:

There were a total of 176 notifications of new hepatitis B diagnoses reported among Aboriginal and Torres Strait Islander people in Australia in 2016. Newly diagnosed hepatitis B infections include newly acquired and unspecified infections (see Hepatitis B section). Of all the notifications of new hepatitis B infections in Australia in 2016, Aboriginal and Torres Strait Islander status was not reported for 56%. Newly diagnosed hepatitis B notification rates are based on data from five jurisdictions (Australian Capital Territory, the Northern Territory, South Australia, Tasmania, and Western Australia), where Aboriginal and Torres Strait Islander status was ≥50% complete for hepatitis B notifications for each year of the past five years 2012 – 2016. In 2016, the notification rate of newly diagnosed hepatitis B infection for the Aboriginal and Torres Strait Islander population was 1.4 times higher than the non-Indigenous population (31.1 per 100 000 population versus 22.8 per 100 000 population). However, in the period 2012 – 2016, there was a 50% decline in the notification rate of newly diagnosed hepatitis B infection in the Aboriginal and Torres Strait Islander population (from 62.4 per 100 000 population in 2012) suggesting the immunisation programs for hepatitis B are starting to show a benefit.

Hepatitis C:

A total of 1 122 cases of newly diagnosed hepatitis C infection were reported in Aboriginal and Torres Strait Islanders in 2016. Of all the new hepatitis C diagnoses in Australia in 2016, Aboriginal and Torres Strait Islander status was not reported for 54% notifications. Hepatitis C notification rates are based on data from five jurisdictions (the Northern Territory, Tasmania, Western Australia, Queensland and South Australia) where Aboriginal and Torres Strait Islander status was ≥50% complete for hepatitis C notifications for every year of the past five years 2012 – 2016. The notification rate of new hepatitis C diagnoses in the Aboriginal and Torres Strait Islander population was 172.7 per 100 000 population, almost 4 times higher than 45.2 per 100 000 population in the non-Indigenous population. In the past five years, there was a 25% increase in the notification rate of new hepatitis C diagnoses in the Aboriginal and Torres Strait Islander population (from 138.1 in 2011).

HIV:

A total of 46 notifications of new HIV diagnoses were reported in Aboriginal and Torres Strait Islander population in 2016. In 2016, the notification rate of HIV was higher for the Aboriginal and Torres Strait Islander population compared to the non-Indigenous population (6.4 vs. 2.9 per 100 000 population). All jurisdictions have high completeness rates for Aboriginal and Torres Strait Islander status in HIV notifications and thus data from all jurisdictions are included. In the five-year period 2012 – 2016, a higher proportion of notifications of HIV infection among the Aboriginal and Torres Strait Islander population compared with the non-Indigenous Australian-born population were attributed to injecting drug use (14% vs. 3%) and heterosexual sex (20% vs. 15%).

Chlamydia:

In 2016, there were a total of 71 751 chlamydia notifications, 6 925 (10%) were among the Aboriginal and Torres Strait Islander population, 29 094 (41%) were among the non-Indigenous population, and Indigenous status was not reported for 35 732 (50%) notifications. Data for 2015 – 16 for Victoria were unavailable at the time of reporting. Chlamydia notification rates are based on data from four jurisdictions (the Northern Territory, Queensland, South Australia, and Western Australia), where Aboriginal and Torres Strait Islander status was ≥50% complete for chlamydia notifications for each year of the past five years 2012 – 2016. The chlamydia notification rate for the Aboriginal and Torres Strait Islander population was 1 193.9 per 100 000 population in 2016 and was nearly three times that of the non-Indigenous notification rate at 419.0 per 100 000 population. In 2016, 81% of chlamydia notifications among the Aboriginal and Torres Strait Islander population, and 77% among the non-Indigenous population were in 15 – 29 year olds.

Gonorrhoea:

There were a total of 23 887 gonorrhoea notifications in Australia in 2016; 3779 (16%) were among the Aboriginal and Torres Strait Islander population, 11 658 (49%) were in the non-Indigenous population, and there were a further 8 450 (35%) for which Aboriginal and Torres Strait Islander status was not reported. Gonorrhoea notification rates are based on data from seven jurisdictions (the Australian Capital Territory, the Northern Territory, South Australia, Tasmania, Victoria, Queensland and Western Australia), where Aboriginal and Torres Strait Islander status was ≥50% complete for gonorrhoea notifications for each year of the five years 2012 – 2016. In 2016, the gonorrhoea notification rate in the Aboriginal and Torres Strait Islander population was seven times that of the non-Indigenous population (581.8 vs. 84.1 per 100 000 population). In 2016, 70.7% of cases among the Aboriginal and Torres Strait Islander population were diagnosed among people in the age group 15 – 29 years compared with 53% in the non-Indigenous population. In Aboriginal and Torres Strait Islander peoples, the notification rate of gonorrhoea diagnosis among males and females is nearly equal, indicating predominantly heterosexual transmission.

Infectious syphilis:

There were a total of 3 367 infectious syphilis notifications nationally in 2016, with 530 (16%) among the Aboriginal and Torres Strait Islander population, 2 502 (74%) among the non-Indigenous population, and a further 335 (10%) notifications for which Indigenous status was not reported. Accurate and complete systems for the notification of infectious syphilis exist at jurisdictional level, enabling at least 50% completion rate for Aboriginal and Torres Strait Islander status of all infectious syphilis notifications. In 2016, the infectious syphilis notification rate in the Aboriginal and Torres Strait Islander population was five times higher than the non-Indigenous population (67.1 vs. 12.4 per 100 000 population) increasing to 50.1 times higher in remote and very remote areas. Notification rates of infectious syphilis among the Aboriginal and Torres Strait Islander population increased by nearly threefold in 15 – 19 year olds in 2016 (from 53.1 per 100 000 population in 2013 to 140.9 per 100 000 population in 2016). In Aboriginal and Torres Strait Islander peoples, the notification rate among males and females is roughly equal, indicating predominantly heterosexual transmission. There were 43 congenital syphilis cases over the period 2007 – 2016, 55% [24] of which were in the Aboriginal and Torres Strait Islander population.

Donovanosis:

The National Donovanosis Eradication (Elimination) Project was implemented in 2001 – 2004, following the introduction of improved methods of diagnosis and treatment of donovanosis. The project was carried out employing strategies such as targeted surveillance, high quality education and support of primary health care workers in their management of genital ulcerative disease, intermittent or short course oral medication and new laboratory techniques, for the elimination of donovanosis. Since 2009 there have been fewer than three notifications of donovanosis per year nationally, with zero in 2011, one in 2012, zero in 2013, one in 2014 and zero in 2015 and 2016. There were no notifications of donovanosis in the Australian Capital Territory, New South Wales, South Australia, Tasmania, Queensland, Victoria and the Northern Territory in the past 5 years. In Western Australia there were two notifications in this period, one in 2012 (non-Indigenous) and one in 2014 (Aboriginal and Torres Strait Islander).

Genital warts:

Following the introduction of quadrivalent vaccination against HPV in 2007, a decline has been observed in the diagnosis of genital warts at first visit at sexual health clinics. Information available from 43 sexual health clinics included in the Genital Warts Surveillance Network indicate an 88% relative reduction in the diagnosis of genital warts at first visit among Aboriginal and Torres Strait Islander men and 100% reduction in women aged 21 years or younger to <1% in 2016. In 21 – 30 year olds reductions were greater in women than men, reflecting the catch up campaign in women aged up until 26 years in 2007 – 2009.

Further information about national BBV and STI epidemiology in the Aboriginal and Torres Strait Islander people can be found in Bloodborne viral and sexually transmissible infections in Aboriginal and Torres Strait Islander people - Annual Surveillance Report 2017.[73]

Note: Notification rates per 100 000 population only include states/territories with >50% completeness of Aboriginal and Torres Strait Islander status.

Indicators status

Knowledge

- In a 2011 – 2013 national survey (GOANNA) 82% of participants correctly identified that STIs can be symptomless in males, and 81% that STIs can be symptomless in females. A lower proportion (60%) correctly identified that chlamydia can cause infertility in women.
- Broadly, females had higher levels of STI knowledge than males (median score 10 versus 9 respectively) and just over a third (35%) of respondents correctly answered 11 or more of the 12 questions

Incidence and prevalence

- Chlamydia positivity among 15 – 29 year old Aboriginal and Torres Strait Islander people attending sexual health clinics has shown a decreasing trend over the past four years with 14% in 2016 and 2015, and 17% in 2013.
- The notification rate is used here as a surrogate for incidence (see section 5.2 for data considerations).
- In 2016 chlamydia notification rate for the Aboriginal and Torres Strait Islander population was 1 193.9 per 100 000 population, similar to the 1 167.9 per 100 000 population in 2015, and slightly less than 1 282.2 in 2013. There has been very little change to the rate of notification in the past five years, at 1 280.3 per 100 000 population in 2012.
- In 2016 the gonorrhoea notification rate in the Aboriginal and Torres Strait Islander population was 581.8 per 100 000 population, which is a 16.5% decline relative to the rate of 696.8 per 100 000 population in 2013. Similarly, rates of notification have declined by 17% in the five-year period 2012 – 2016, from 702 per 100 000 population in 2012.
- In 2016 the rate of infectious syphilis notification among the Aboriginal and Torres Strait Islander population was 67.1 per 100 000 population, compared to 19.1 per 100 000 population in 2013, representing nearly a fourfold increase. Infectious syphilis notification rates have increased by twofold over the last ten years, from 31.1 per 100 000 population in 2007.
- In 2016 the newly acquired hepatitis B notification rate in the Aboriginal and Torres Strait Islander population was 2.1 per 100 000 population compared to 1.8 per 100 000 population in 2013. Over the five-year period 2012 – 2016, the notification rate has decreased by 22%, from 2.7 per 100 000 population in 2012.
- In 2016 the notification rate of newly acquired hepatitis C infection among the Aboriginal and Torres Strait Islander population was 29.5 per 100 000 population, representing a relative 32.5% increase compared to 22.3 per 100 000 population in 2013. The increase was even greater over the five-year period 2012 – 2016, with a 49.7% relative increase from 19.7 per 100 000 population in 2012.
- In 2016 the notification rate of HIV among the Aboriginal and Torres Strait Islander population was 6.4 per 100 000 population, showing a 41.7% relative increase from 4.5 per 100 000 population in 2013. In the ten-year period 2007 – 2016 there was a 77.7% relative increase in the HIV notification rate, from 3.6 per 100 000 population in 2007.

Uptake of preventative measures

- In 2016 coverage of hepatitis B vaccination at 12 months was 92.3% (compared to the 94.3% in all children at 12 months – see 1.2a), showing a 5.7% increase as compared to 87.3% in 2013, and coverage at 24 months has increased by 2.5%, from 94.4% in 2013 to 96.8% in 2016 (higher than the 95.7% in all children at 24 months – see 1.2a).
- Receptive syringe sharing among Aboriginal and Torres Strait Islander participants in the ANSPS increased between 2013 and 2016, from 21% to 28%, respectively, and was higher than that observed in non-Indigenous participants (15 – 19%).

Testing

- The GOANNA survey conducted in 2011 – 2013 found that 42% of participants had been tested for an STI in the previous 12 months.

Indicators status (cont.)

Morbidity

- The number of cases of congenital syphilis notified among Aboriginal and Torres Strait Islander population was four in 2013 and one in 2016, equating to a notification rate of 5.4 per 100 000 live births in 2016 (compared to 0.3 per 100 000 in the non-Indigenous population).

Summary: The third year of the 4th National Aboriginal and Torres Strait Islander Blood-borne Viruses and Sexually Transmissible Infections Strategy highlights the need for improved coverage of vaccination, health promotion, testing, treatment, NSP and other prevention tools in this population. The gap in hepatitis B vaccine coverage between 12 and 24 months suggests issues around timeliness of completion of the course of vaccines. Overall, notifications rates for all STIs (including congenital syphilis) and BBVs in Aboriginal and Torres Strait Islander people were higher than the overall Australian rates and between 2013 and 2016, there were increases in notification rates of infectious syphilis, newly acquired hepatitis C and HIV. Only the notification rates of chlamydia and gonorrhoea have seen small declines since 2013. Data on treatment uptake for HIV and hepatitis B among Aboriginal and Torres Strait Islander peoples were not available at the time of report preparation, but activities are planned to provide this information for future reports. Given the small number of Aboriginal and Torres Strait Islander notifications for a number of infections, particularly newly acquired hepatitis B and C, and HIV, changes from one year to the next should be interpreted with caution. Detailed comparisons between non-Indigenous and Aboriginal and Torres Strait Islander populations are provided in the *Bloodborne viral and sexually transmissible infections in Aboriginal and Torres Strait Islander people: Annual Surveillance Report 2017*.[73] Completeness of Aboriginal and Torres Strait Islander status is an ongoing issue, with reporting only including states and territories with greater than 50% completeness. In 2016, all jurisdictions reported Aboriginal and Torres Strait Islander status for greater than 50% of notifications for HIV, infectious syphilis and newly acquired hepatitis B and C.

Note: Stigma is recognised as being a critical barrier to effective responses to blood-borne viruses and sexually transmissible infections, and data will be available on this indicator in 2016.

Objectives and indicators

The National Aboriginal and Torres Strait Islander Strategy 2014 – 2017 identified five specific objectives, with associated indicators. Progress against these objectives and indicators is outlined in Table 7. Incidence is a difficult indicator to measure, and notifications have been used as a surrogate, recognising that for most infections, they represent only a proportion of the total cases (e.g. only those cases for which health care was sought, a test conducted and a diagnosis made, followed by a notification to health authorities). Also, annual changes in notifications may represent responses to testing policies and programs, different diagnostic tests, changes in surveillance practices and awareness campaigns rather than true changes in incidence. Some *'additional information'* has been included due to data sources becoming available after the Plan was agreed and is marked accordingly.

Main Findings

Table 7 National Aboriginal and Torres Strait Islander Strategy progress

Theme	Objective		Indicator		2013	2014	2015	2016
Knowledge	5.1	Improve the knowledge and awareness of STI and BBV	5.1a	Proportion of Aboriginal and Torres Strait Islander people giving the correct answer to knowledge and behaviour questions on BBV and STI	35%**	*[i]	*[i]	*[i]
Incidence and prevalence	5.2	Reduce the incidence of STI in Aboriginal and Torres Strait Islander people and communities	5.2a	Proportion of chlamydia tests that yield a positive result in 15 – 29 year age group	17%	16%	14%	14%
			5.2b	Annual rate of notifications[¥] of infectious syphilis in Aboriginal and Torres Strait Islander people (per 100 000 Aboriginal population)	22.4	36.0	64.2	78.1
			5.2b	Annual rate of notifications[¥] of chlamydia[ii] in Aboriginal and Torres Strait Islander people (per 100 000 Aboriginal population)	1 282.2	1 216.6	1 167.9	1 193.9
			5.2b	Annual rate of notifications[¥] of gonorrhoea[iii] in Aboriginal and Torres Strait Islander people per 100 000 Aboriginal population)	696.8	556.6	533.4	581.8
			5.2c	Number of notifications of congenital syphilis annually	4	3	2	1
Update of preventative measures	5.2.1	Achieve high levels of HPV vaccination	5.2.1a	HPV three-dose vaccination coverage for Aboriginal and Torres Strait Islander males and females turning 15 years of age[iv]	*	*	*	*
	5.2.2	Reduce the risk behaviours associated with transmission of STIs	No indicator available		*	*	*	
Testing	5.2.3	Increase appropriate testing and follow-up among those at elevated risk	5.2.3a	Proportion of Aboriginal 15 – 29 year olds receiving chlamydia testing in the previous 12 months:				
				16 – 19 years	29%	*[i]	*[i]	*[i]
				20 – 24 years	51%	*[i]	*[i]	*[i]
				25 – 29 years	52%	*[i]	*[i]	*[i]
Incidence and prevalence	5.3	Reduce the incidence of BBV in Aboriginal and Torres Strait people and communities	5.3a	Annual rate of notification of newly acquired hepatitis B in Aboriginal and Torres Strait Islander people (per 100 000 Aboriginal population)	1.8	2.0	2.1	2.1
			5.3b	Annual rate of notification of newly acquired hepatitis C[v] in Aboriginal and Torres Strait Islander people (per 100 000 Aboriginal population)	22.3	25.4	35.3	29.5
			5.3c	Notification rate of newly diagnosed HIV (per 100 000 Aboriginal and Torres Strait Islander population)	4.5	5.3	6.1	6.4

Theme	Objective		Indicator	2013	2014	2015	2016
Preventative measures	5.3.1	Achieve high levels of hepatitis B vaccination	5.3.1a Hepatitis B immunisation in Aboriginal and Torres Strait Islander children				
			12 months	87%	88%	90%	92%
			24 months	94%	95%	96%	97%
	5.3.2	Reduce the risk behaviours associated with transmission	5.3.2a Proportion of Aboriginal and Torres Strait Islander people who inject drugs reporting re-using another person's needle and syringe in the previous month	21%	22%	24%	28%
			5.3.2b Proportion of Aboriginal and Torres Strait Islander people who are notified as newly diagnosed with HIV who report injecting drug use	23%	27%	15%	4%
	5.3.3	Decrease the number of Aboriginal people with undiagnosed BBV	No indicator available	*	19%^ undiagnosed HIV (estimated)	19%^ undiagnosed HIV (estimated)	19%^ undiagnosed HIV (estimated)
	5.4	Increase the number of Aboriginal and Torres Strait Islander peoples with BBV receiving appropriate management, care and support for BBV	No indicator available[vi]	*	*	*	*
			5.4a Additional information: Proportion of hepatitis C antibody positive Aboriginal and Torres Strait Islander people seen at needle syringe programs with a recent (past 12 months) history of hepatitis C treatment	2%	1%	3%	18%
	5.5	Eliminate the negative impact of stigma, discrimination, and legal and human rights issues on people's health	Eliminate the negative impact of stigma, discrimination and human rights issues on Aboriginal and Torres Strait Islander health	*	*	*	* [vii]
	5.5.1	Actively engage community	Indicator unavailable	*	*	*	*
	5.5.2	Improve delivery of appropriate services	Indicator unavailable	*	*	*	*

Notification rates are given out of 100 000 population and to 1 decimal place; percentages (%) are rounded to the nearest whole number;

* Data not available;

** 2011 – 2013 survey data;

¥ In the absence of appropriate data for incidence, notifications data have been used, and should be interpreted with caution as a range of factors influence notifications;

^ Based on the updated (unpublished) modelling estimates from previous years.[3]

i There is currently no regular periodic survey of young Aboriginal and Torres Strait Islander people;

ii Includes the Northern Territory, Queensland, South Australia, and Western Australia;

iii includes the Northern Territory, South Australia, Tasmania, Victoria, the Australian Capital Territory and Western Australia;

iv Poor completeness of Indigenous status in the National Human Papillomavirus Register restricts reporting against this indicator;

v Increases from previous years (reported in the 2016 report) in the reported number of newly acquired reflect the inclusion of data from Queensland for the first time;

vi Work is being done to develop a cascade of care for HIV, hepatitis C and chlamydia for the Aboriginal and Torres Strait Islander population;

vii The Centre for Social Research in Health developed an indicator of stigma that could be used across the key priority populations identified in the national strategies, in relation to BBV status, injecting drug use, sexual orientation and sex work. However, through the data collection undertaken to date, an insufficient number of Aboriginal and Torres Strait Islander participants responded to enable specific investigation of Aboriginal and Torres Strait Islander health; options will be explored to develop an indicator that informs activities and strategies in a meaningful way.

5.1 Improve knowledge and awareness of STI and BBV

5.1a Proportion of Aboriginal and Torres Strait Islander people giving correct answers to knowledge and behaviour questions on BBV and STI.

Indicator definition

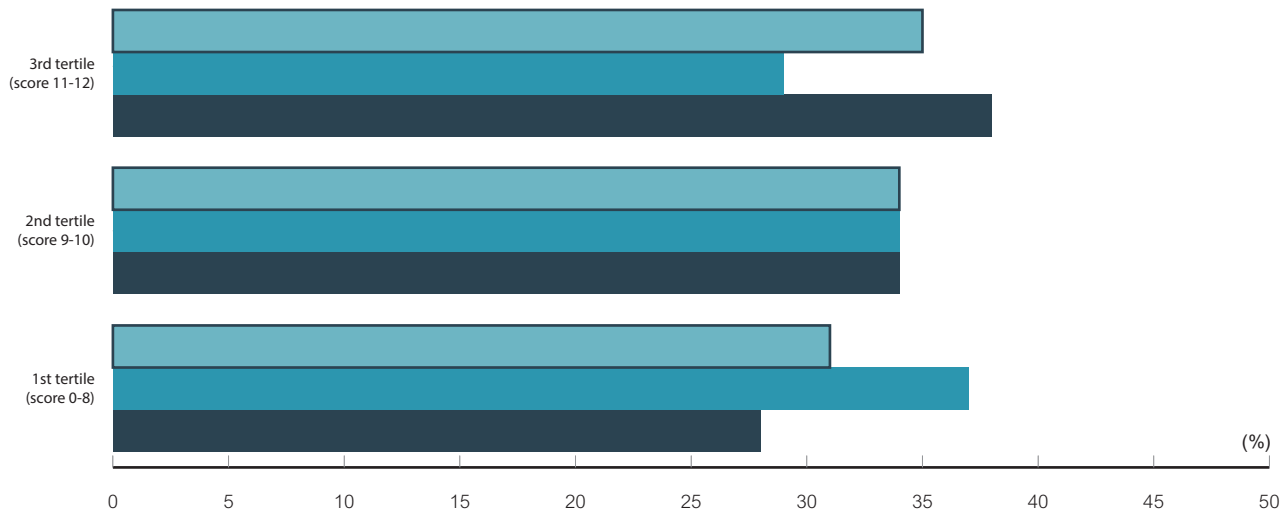
Numerator	Number of Aboriginal and Torres Islander people giving correct answers to questions on BBV and STI in the 'Sexual health and relationships in young Indigenous people study' (GOANNA)
Denominator	Number of Aboriginal and Torres Islander people in the GOANNA study

Background: Improved knowledge about STIs and BBVs in the Aboriginal and Torres Strait Islander community can play an important role in encouraging safer sexual practices and seeking regular testing and treatment, therefore reducing the transmission of these infections.

Data source and considerations: The 'Sexual Health and Relationships in young Indigenous people study' (GOANNA) the first national survey of young Aboriginal and Torres Strait Islander people in relation to STIs and BBVs undertaken in Australia was conducted during 2011 – 2013, see Methodological Notes for further detail. While studies of this nature can never claim to be truly representative of the total study population–in this case the total Aboriginal and Torres Strait Islander population aged 16 – 29 years–the respondent population includes a range of demographic characteristics, such as the ages within the study group aged 16 – 29 years, representation from urban, regional and remote areas and both heterosexual and homosexual identities similar to the broader population. The GOANNA study findings are currently the only source of data to measure this indicator. Participants' knowledge about the ways in which STIs and BBVs can be transmitted and treated was assessed using 12 questions. A repeat GOANNA study is planned for future years.

Results: The majority of participants correctly answered that STIs could be symptomless in men (82% responded correctly) and women (81% responded correctly). A lower proportion (60%) correctly answered that chlamydia could cause infertility in women. Participants' knowledge is presented in tertiles of the total score by gender (Figure 54). Approximately, one third of the participants (35%) responded correctly to at least 11 questions; females scored higher than males (median knowledge score: 10 vs. 9 respectively).

Figure 54 Proportion of young Aboriginal and Torres Strait Islander people surveyed about sexual health knowledge with 0 – 8, 9 – 10, 11 – 12 correct answers, by sex



	1st tertile (score 0-8)	2nd tertile (score 9-10)	3rd tertile (score 11-12)
Total	31%	34%	35%
Male	37%	34%	29%
Female	28%	34%	38%

Source: GOANNA survey

5.2 Reduce the incidence of STI in Aboriginal and Torres Strait Islander people and communities

5.2a Proportion of chlamydia tests that yield a positive result in 15 – 29 year age group.

Indicator definition

Numerator	Number of positive chlamydia test results in 15 – 29 year old Aboriginal and Torres Strait Islander people
Denominator	Number of chlamydia tests conducted in 15 – 29 year old Aboriginal and Torres Strait Islander people

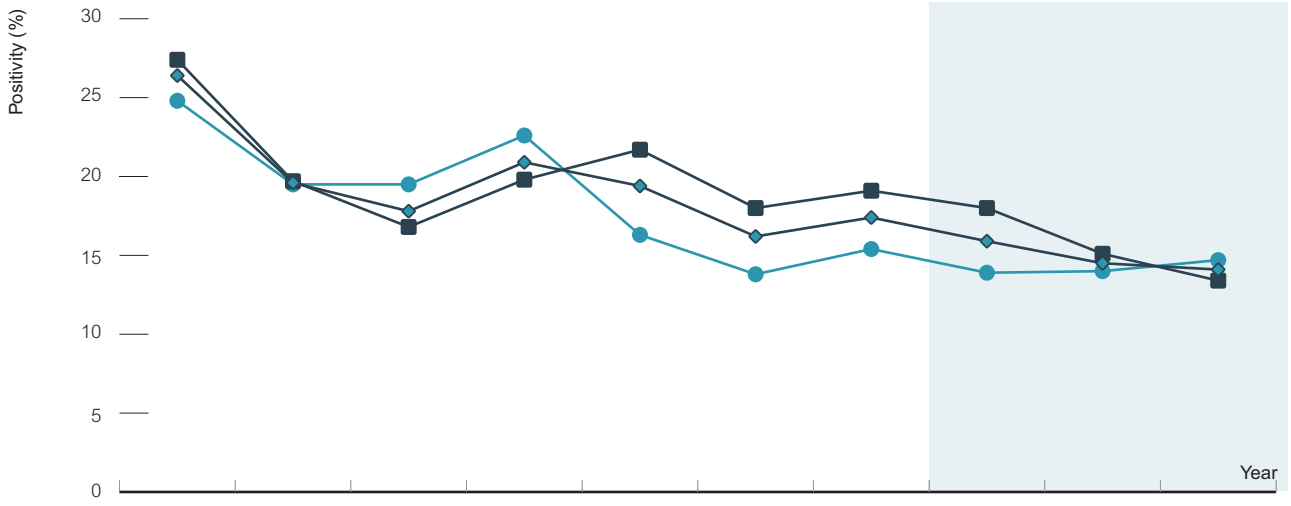
Background: Achieving a high level of testing and treatment of bacterial STIs in sexually active 15 – 29 year olds is an important component of reducing the risk of transmission and morbidity (such as pelvic inflammatory disease) and if high enough levels are achieved in the community, mathematical modelling predicts a decrease in the prevalence of these infections among young Aboriginal and Torres Strait Islander people.[74] In the shortterm, successful testing and treatment strategies will increase the notifications of bacterial STIs, however, a reduction will be observed in the long term.[75]

Data and considerations: Similar mechanisms to measure this indicator as described under objective 3.2 of the STI Strategy, cannot be applied to the Aboriginal and Torres Strait Islander population due to poor completeness of the Voluntary Indigenous Identifier (VII) field collected through Medicare registration forms. VII, introduced in 2002, covers approximately 50% of the Aboriginal and Torres Strait Islander population and is likely to take a number of years before the data are sufficient to use for this purpose.[76]

In the interim, sentinel surveillance within healthcare settings with higher attendance of Aboriginal and Torres Strait Islander people, such as Aboriginal Community Controlled Health Services (ACCHS), Aboriginal Medical Services (AMS) and sexual health clinics, may be a suitable option to measure chlamydia testing uptake and positivity rate. The data presented below comes from the ACCESS network of sexual health clinics. See Methodological Notes for further detail.

Results: Data available from the ACCESS project report chlamydia positivity in 14 239 Aboriginal and Torres Strait Islander 15 – 29 year olds attending sexual health clinics between 2007 and 2016 (Figure 55). Positivity was 17% in 2013, with a 19% relative decrease in 2016 where the positivity was 14%. Results show a peak of positivity in 2007 at 26%. Positivity in 2016 was higher among males (15%) than females (13%), with decreases in females between 2013 and 2016, and stable rates in males during the same time period (Figure 55).

Figure 55 Chlamydia positivity in Aboriginal and Torres Strait Islander 15 – 29 year olds attending sexual health clinics, 2007 – 2016, by sex



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Total	26%	20%	18%	21%	19%	16%	17%	16%	14%	14%
Male	25%	20%	19%	23%	16%	14%	15%	14%	14%	15%
Female	27%	20%	17%	20%	22%	18%	19%	18%	15%	13%

Source: ACCESS: the Australian Collaboration for Coordinated Enhanced Sentinel Surveillance of Sexually Transmissible Infections and Blood-borne Viruses

5.2b Annual rate of notifications of infectious syphilis, chlamydia and gonorrhoea.

Indicator definition

Numerator	Number of infectious syphilis (defined as infection of less than 2 years duration), chlamydia and gonorrhoea notifications reported as Aboriginal and Torres Strait Islander people to NNDSS
Denominator	Aboriginal and Torres Strait Islander population reported by Australian Bureau of Statistics (ABS)

Incidence is a difficult indicator to measure, and notifications have been used as a surrogate, recognising that for most infections, they represent only a proportion of the total cases (e.g. only those cases for which health care was sought, a test conducted and a diagnosis made, followed by a notification to health authorities). Also, annual changes in notifications may represent responses to testing policies and programs, different diagnostic tests, changes in surveillance practices and awareness campaigns rather than true changes in incidence.

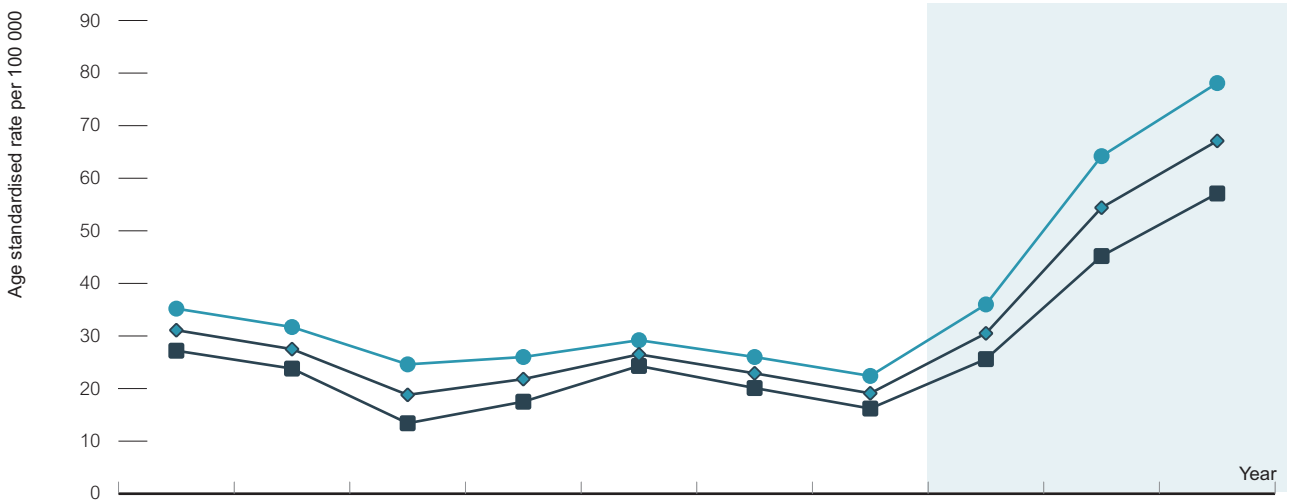
Infectious syphilis

Background: Infectious syphilis is highly transmissible and untreated infections can lead to serious adverse health outcomes including cardiovascular and neurological disease. See Section 3.2 for further detail.

Data source and considerations: Data on infectious syphilis are collected against nationally agreed data specifications and reported, by all jurisdictions, to NNDSS. See Methodological Notes for further detail. Accurate and complete systems for the notification of infectious syphilis exist at jurisdictional level, enabling at least 50% completion rate for Aboriginal and Torres Strait Islander status of all infectious syphilis notification in every year of the last 10 years. For this reason, infectious syphilis data are presented for 10 years.

Results: In 2016, the rate of infectious syphilis notification among the Aboriginal and Torres Strait Islander population was 67.1 per 100 000 population, compared to 19.1 per 100 000 population in 2013, representing nearly a fourfold increase (Figure 56). In 2016, notification rates were higher among males (78.1 per 100 000 population) than females (57.1 per 100 000 population). Over the ten-year period 2007 – 2016 notification rates have increased by twofold from 31.1 per 100 000 population in 2007.

Figure 56 Infectious syphilis notification rate per 100 000 population in Aboriginal and Torres Strait Islander people, 2007 – 2016, by sex



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Total	31.1	27.5	18.8	21.8	26.5	22.9	19.1	30.5	54.4	67.1
Male	35.2	31.7	24.6	26.0	29.2	26.0	22.4	36.0	64.2	78.1
Female	27.2	23.8	13.4	17.5	24.3	20.1	16.2	25.6	45.2	57.1

Source: National Notifiable Diseases Surveillance System

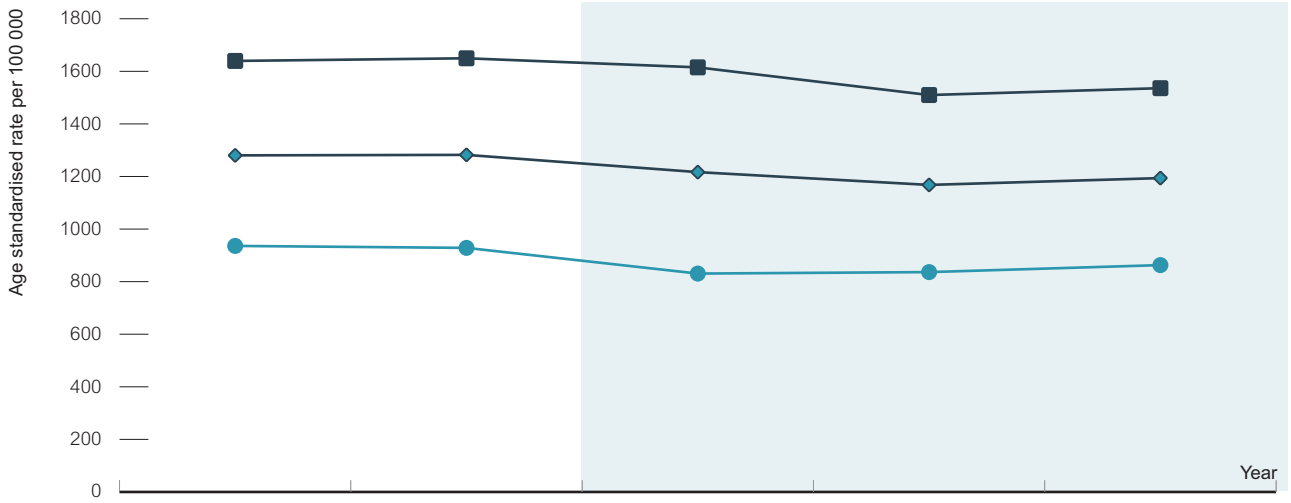
Chlamydia

Background: Untreated chlamydia can lead to pelvic inflammatory disease, infertility and ectopic pregnancy [77 – 79], see Section 3.2 for further detail. Chlamydia is the most frequently diagnosed sexually transmissible infection in Australia, and Aboriginal and Torres Strait Islander people continue to experience a disproportionate disease burden.[80]

Data source and considerations: Data on chlamydia diagnoses are collected against nationally agreed data specifications and reported, by all jurisdictions, to NNDSS. See Methodological Notes for further detail. Chlamydia notification rates are based on data from four jurisdictions (the Northern Territory, Queensland, South Australia, and Western Australia), where Aboriginal and Torres Strait Islander status was ≥50% complete for chlamydia notifications for each year of the five years 2012 – 2016.

Results: In 2016, the chlamydia notification rate for the Aboriginal and Torres Strait Islander population was 1 193.9 per 100 000 population, which is comparable to the 1 282.2 per 100 000 population in 2013 (Figure 57). The notification rate among females was 1 535.9 per 100 000 population in 2016 and 1 649.6 per 100 000 population in 2013. Between 2012 and 2016, notification rates were lower among Aboriginal and Torres Strait Islander males as compared to females, with 862.9 per 100 000 population in 2016 and 928.4 per 100 000 population in 2013. Over the five-year period 2012 – 2016, notification rates have remained relatively stable with 1 280.3 per 100 000 population in 2012.

Figure 57 Chlamydia notification rate per 100 000 population in Aboriginal and Torres Strait Islander peoples, 2012 – 2016, by sex



	2012	2013	2014	2015	2016
Total	1280.3	1282.2	1216.6	1167.9	1193.9
Male	935.9	928.4	830.7	836.3	862.9
Female	1639.5	1649.6	1615.1	1509.8	1535.9

Source: National Notifiable Diseases Surveillance System; includes jurisdictions with Aboriginal and Torres Strait Islander status completeness ≥50% (Northern Territory, Queensland, South Australia, and Western Australia) for each of the five years 2012 – 2016

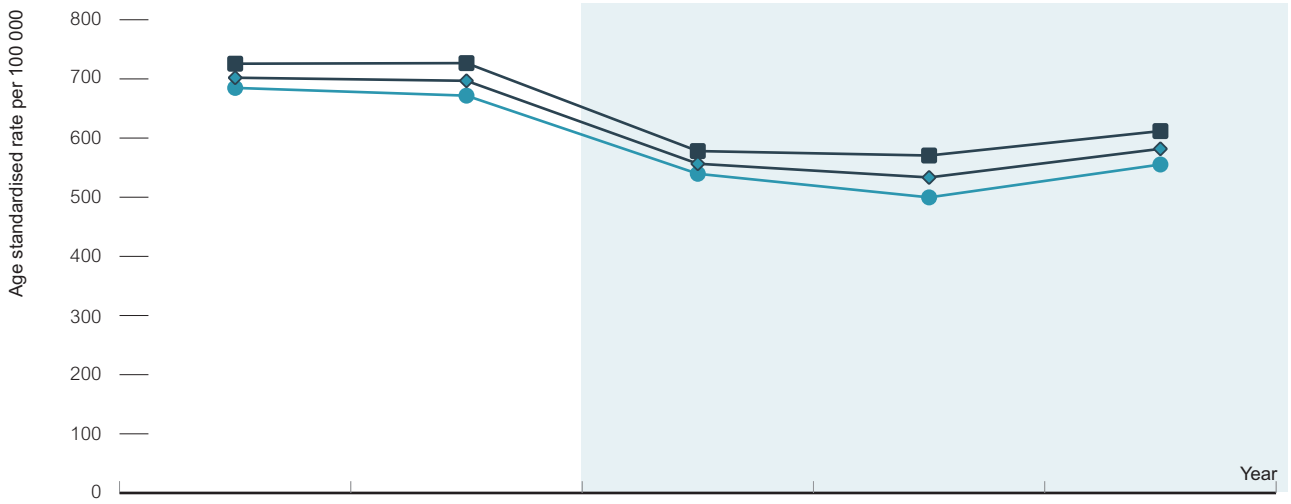
Gonorrhoea

Background: Gonorrhoea has similar symptoms and sequelae to chlamydia (described above), and untreated gonorrhoea may also lead to disseminated gonococcal infection.[31, 81] Unlike chlamydia, symptomatic disease is more common, particularly in men.[31]

Data source and considerations: Data on gonorrhoea are collected against nationally agreed data specifications and reported, by all jurisdictions, to NNDSS. See Methodological Notes for further detail. Gonorrhoea notification rates are based on data from seven jurisdictions (the Australian Capital Territory, the Northern Territory, South Australia, Tasmania, Victoria, Queensland and Western Australia), where Aboriginal and Torres Strait Islander status was ≥50% complete for gonorrhoea notifications for each year of the five years 2012 – 2016.

Results: In 2016, the gonorrhoea notification rate for the Aboriginal and Torres Strait Islander population was 581.2 per 100 000 population, with very little change from 533.4 per 100 000 population in 2015, and 16% decrease from 696.8 per 100 000 in 2013 (Figure 58). Notification rates have decreased by 17% since 2012, when the rate was 702 per 100 000 population. Notification rates among females were 611.8 per 100 000 population in 2016 as compared to 726.7 per 100 000 population in 2013, reflecting a relative decrease of 16%. Between 2012 and 2016, notification rates were lower among Aboriginal and Torres Strait Islander males, with 555.3 per 100 000 population in 2016 and 671.7 per 100 000 population in 2013.

Figure 58 Gonorrhoea notification rate per 100 000 population in Aboriginal and Torres Strait Islander peoples, 2012 – 2016, by sex



	2012	2013	2014	2015	2016
Total	702.0	696.8	556.6	533.4	581.8
Male	684.8	671.7	539.6	499.7	555.3
Female	725.7	726.7	578.0	570.5	611.8

Source: National Notifiable Diseases Surveillance System; includes jurisdictions with Aboriginal and Torres Strait Islander status completeness ≥50% (Australian Capital Territory, Northern Territory, Queensland, South Australia, Tasmania, Victoria and Western Australia) for each of the five years 2012 – 2016

5.2c *Number of notifications of congenital syphilis annually.*

Indicator definition

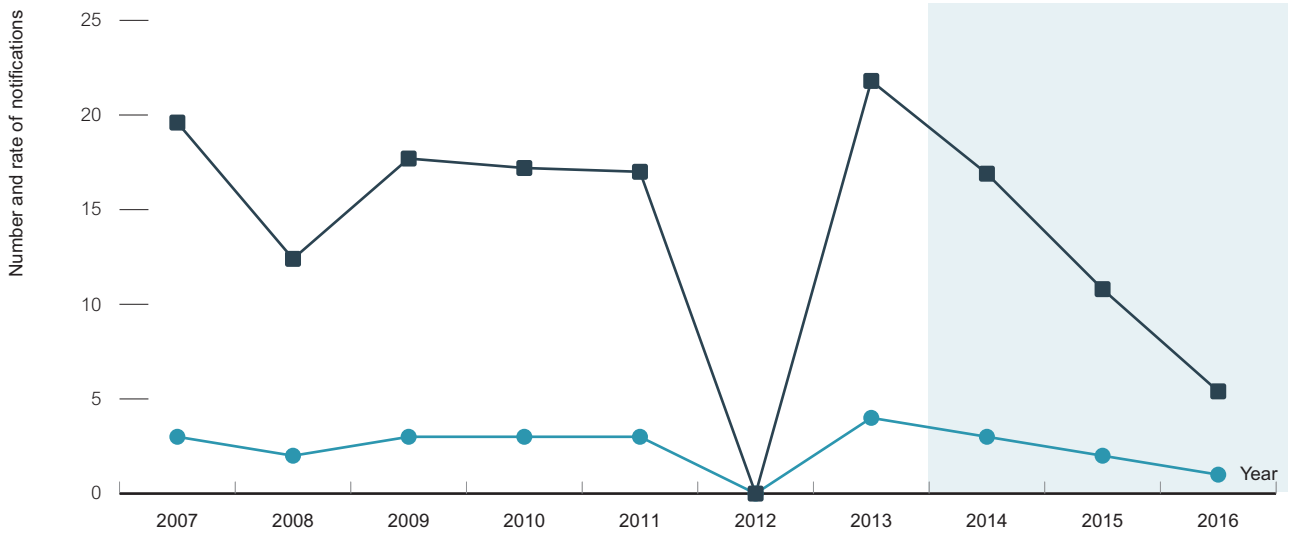
Single measure	Number of congenital syphilis notifications reported as Aboriginal and Torres Strait Islander people to NNDSS

Background: Syphilis can also be passed on to the unborn infant during pregnancy, resulting in miscarriage, stillbirth, neonatal death, and other serious health consequences for the child, including blindness, deafness and intellectual disabilities.[82]

Data source and considerations: Data on congenital syphilis are collected against nationally agreed data specifications and reported by all jurisdictions, to NNDSS. The number of births is sourced from the Australian Bureau of Statistics 3301.0 Births, Australia, 2016. See Methodological Notes for further detail. Current systems do not collect clinical information about the cases.

Results: Over the past 10 years, more than half (55%, 24) of the 43 congenital syphilis notifications were in Aboriginal and Torres Strait Islander people. In 2016 the rate of congenital syphilis notification among Aboriginal and Torres Strait Islander population was 5.4 per 100 000 live births (1 case in 2016), showing a 50% relative decrease as compared to 10.8 per 100 000 in 2015 (2 cases), and a 75% relative decrease as compared to the 21.8 per 100 000 observed in 2013 (4 cases) (Figure 59). Caution should be taken in interpreting these data as the numbers are small. See section 3.5 for information on all notifications. As noted in Table 1, we have chosen not to refer to the WHO target for elimination here as the notification rate of congenital syphilis in Aboriginal and Torres Strait Islander peoples is ninefold higher than the overall Australian notification rate and applicability of the WHO definition to the Australian context is questionable

Figure 59 Number of congenital syphilis notifications, and rate of notification per 100 000 births in Aboriginal and Torres Strait Islander peoples, 2007 – 2016



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Number of Aboriginal and Torres Strait Islander notifications	3	2	3	3	3	0	4	3	2	1
Rate per 100 000 births	19.6	12.4	17.7	17.2	17.0	0.0	21.8	16.9	10.8	5.4

Source: National Notifiable Diseases Surveillance System; ABS; includes all jurisdictions as Aboriginal and Torres Strait Islander status was ≥50% in each year of the ten years presented

5.2.1 Achieve high levels of HPV vaccination

5.2.1a HPV three dose vaccination coverage for males and females turning 15 years of age.

Indicator definition

Numerator	Number of Aboriginal and Torres Strait Islander males and females turning 15 years of age reported to the NHVPR that comply with the recommended vaccine dosage and administration as per the Australian Immunisation Handbook
Denominator	Aboriginal and Torres Strait Islander population reported by Australian Bureau of Statistics (ABS)

Data source and considerations: HPV vaccination coverage data are derived from the National Human Papillomavirus Vaccination Program Register (NHVPR). Indigenous status is a non-mandatory field for reporting to the NHVPR, with completeness of this field varying over time and across jurisdictions. Current Indigenous status completeness estimates are poor and therefore data are not available; however, work is ongoing to improve reporting particularly in the school-based program.

5.2.2 Reduce the risk behaviours associated with transmission of STIs

An indicator to monitor this objective is currently unavailable. Options will be explored to develop an indicator that informs activities and strategies in a meaningful way.

5.2.3 Increase appropriate testing and follow up among those at elevated risk

5.2.3a Proportion of 15 – 29 year olds receiving chlamydia test in the previous 12 months

Indicator definition

Numerator	Number of Aboriginal and Torres Strait Islander people aged 15 – 29 years who report having a chlamydia tests in the previous 12 months reported the GOANNA study
Denominator	Number of Aboriginal and Torres Islander people in the GOANNA study

Background: Chlamydia is the most frequently notified sexually transmissible infection in Australia, with highest numbers in the 15 – 29 year age group. Chlamydia notification rates have been consistently higher among the Aboriginal and Torres Strait Islander population compared to the non-Indigenous, and were nearly three times higher in 2016.[73] With the majority of chlamydia infections asymptomatic, regular STI testing is an important prevention strategy to ensure timely detection and treatment.[83] National guidelines recommend annual chlamydia testing for all 15 – 29 year olds.[84]

Data source and considerations: Similar mechanisms to measure this indicator as described under objective 3.2 of the STI Strategy, cannot be applied to the Aboriginal and Torres Strait Islander population due to poor completeness of the Voluntary Indigenous Identifier (VII) field collected through Medicare registration forms. The VII, introduced in 2002, covers approximately 50% of the Aboriginal and Torres Strait Islander population and is likely to take a number of years before the data is sufficient to use for this purpose.

The one-off 'Sexual health and relationships in young Indigenous people study' (GOANNA),[85] collected data on participant demographics, STI and BBV risk knowledge, sexual behaviours and access to health services. A repeat GOANNA study is planned for future years. See section Methodological Notes for detail.

Results: Results from the GOANNA study found that testing for an STI in 2013 was reported by 29%, 51% and 52% of 16 – 19, 20 – 24 and 25 – 29 year old participants respectively.

5.3 Reduce the incidence of BBV

5.3a Annual rate of notifications of newly acquired hepatitis B

Indicator definition

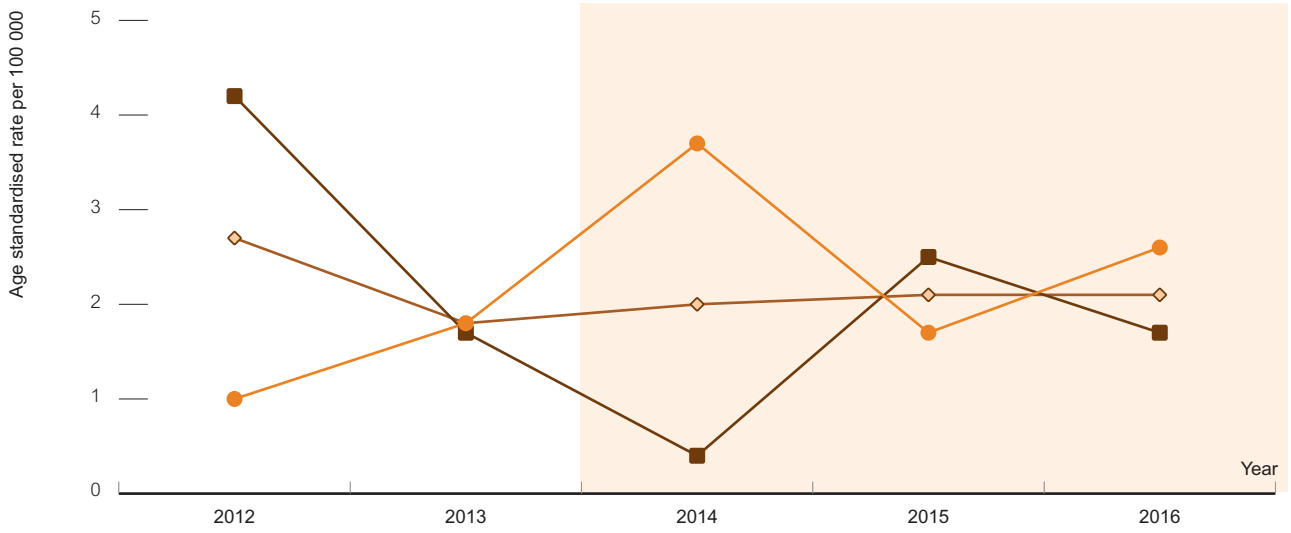
Numerator	Number of newly acquired hepatitis B notifications reported as Aboriginal and Torres Strait Islander people to NNDSS
Denominator	Aboriginal and Torres Strait Islander population reported by Australian Bureau of Statistics (ABS)

Background: The timing of hepatitis B treatment depends upon: i) when, in the course of disease, the person is diagnosed, and ii) apparent liver disease; therefore, early identification of hepatitis B infection ensures people receive appropriate care and treatment, and onward transmission can be reduced.[86] Despite the introduction of a universal hepatitis B vaccination program in 1990 in the Northern Territory and 2000 for the rest of Australia, the prevalence of hepatitis B is still higher among the Aboriginal and Torres Strait Islander population than the non-Indigenous population.[80] Newly acquired hepatitis B infection is defined as hepatitis B infection in a person known not to have the infection within the last two years. 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.

Data source and considerations: Incidence is a difficult indicator to measure, and notifications have been used as a surrogate, recognising that for most infections, they represent only a proportion of the total cases and may be influenced by changes to testing patterns. Data on hepatitis B diagnoses are collected against nationally agreed data specifications and reported by all jurisdictions, to NNDSS. See Methodological Notes for further detail. Also, determination of a case as 'newly acquired' is heavily reliant on public health follow-up, with the method and intensity of follow-up varying by jurisdiction and over time. Information on Aboriginal and Torres Strait Islander status was reported for more than 50% of notifications of newly acquired hepatitis B infection in all jurisdictions in the five-year period 2012 – 2016.

Results: Between 2013 and 2016, there was a 22.5% relative increase in newly acquired hepatitis B notification rate in Aboriginal and Torres Strait Islander population (from 1.8 per 100 000 in 2013 to 2.1 per 100 000 in 2016). Given the small number of notifications, this increase should be interpreted with caution. In the five-year period 2012 – 2016 the notification rate of newly acquired hepatitis B infection in the Aboriginal and Torres Strait Islander population fluctuated between 1.8 and 2.7 per 100 000 population (Figure 60).

Figure 60 Newly acquired hepatitis B notification rate per 100 000 population, 2012 – 2016, by sex



	2012	2013	2014	2015	2016
Total	2.7	1.8	2.0	2.1	2.1
Male	1.0	1.8	3.7	1.7	2.6
Female	4.2	1.7	0.4	2.5	1.7

Source: National Notifiable Diseases Surveillance System; includes jurisdictions (New South Wales, Northern Territory, Queensland, South Australia, Tasmania, Victoria, and Western Australia) with Aboriginal and Torres Strait Islander status completeness ≥50% for each of the five years 2012 – 2016.

5.3b *Annual rate of notifications of newly acquired hepatitis C*

Indicator definition

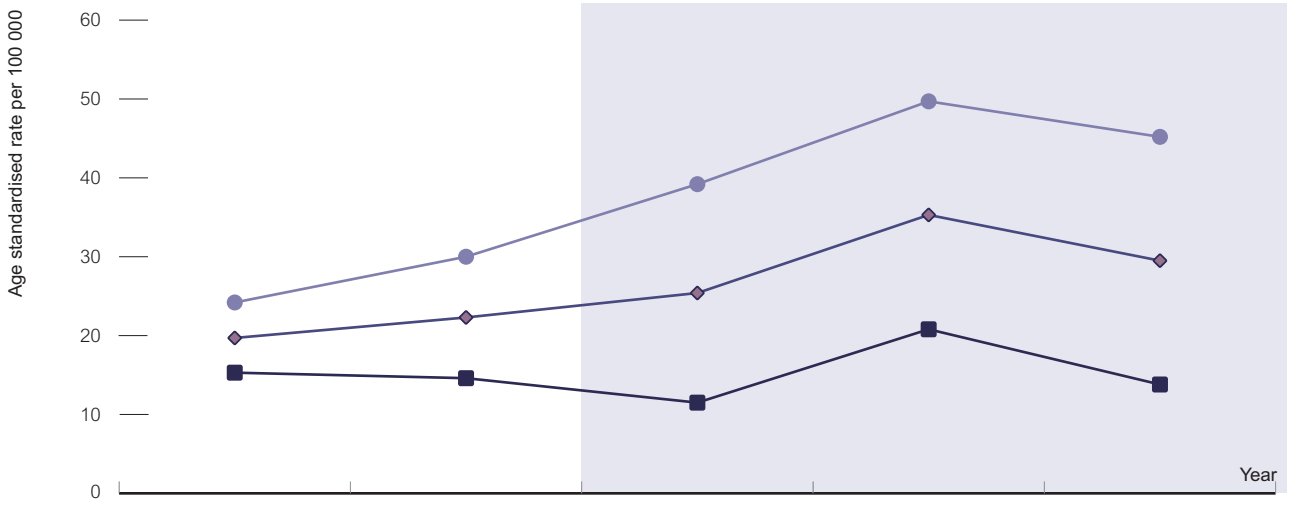
Numerator	Number of newly acquired hepatitis C notifications reported as Aboriginal and Torres Strait Islander people to NNDSS
Denominator	Aboriginal and Torres Strait Islander population reported by ABS

Background: Newly acquired hepatitis C infection means that a person known not to have the infection within the last two years has been tested and now found to have the infection. These data on newly acquired infections should be interpreted with caution as they are likely to under-estimate the true number of newly acquired infections in the community for a number of reasons: infections are rarely symptomatic in the early stages and most cases will therefore remain undetected. Also, even if testing is conducted, it may be difficult to distinguish a newly diagnosed case as newly acquired unless there is a history of a negative test in the last 24 months prior to the positive diagnosis or clinical evidence of newly acquired hepatitis C.

Data source and considerations: Incidence is a difficult indicator to measure, and notifications have been used as a surrogate, recognising that for most infections, they represent only a proportion of the total cases and may be influenced by changes to testing patterns. Data on hepatitis C diagnoses are collected against nationally agreed data specifications and reported by all jurisdictions, to NNDSS. See Methodological Notes for further detail. For some newly diagnosed cases of hepatitis C, 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. This information is only available for states/territories which conduct enhanced surveillance so do not reflect the true number of newly acquired cases. Information on Aboriginal and Torres Strait Islander status was reported for more than 50% of notifications of newly acquired hepatitis C infection in all jurisdictions Queensland commenced reporting on newly acquired hepatitis C cases in 2016. Increases from previous years in the reported number of newly acquired hepatitis C reflect the inclusion of data from Queensland for the first time.

Results: In 2016 the rate of newly acquired hepatitis C notifications in Aboriginal and Torres Strait Islander peoples was 29.5 per 100 000 population, with a 32.5% relative increase as compared to the rate of 22.3 per 100 000 population in 2013. In the five-year period 2012 – 2016, the notification rate of newly acquired hepatitis C infection in the Aboriginal and Torres Strait Islander population increased from 19.7 per 100 000 in 2012 to 29.5 per 100 000 in 2016 (Figure 61). In 2013, notification rates of newly acquired hepatitis C among Aboriginal and Torres Strait Islander males were twice as much as the rates in females. This difference in notification rates among Aboriginal and Torres Strait Islander males was three times higher than rates among females in 2016 (Figure 61).

Figure 61 Newly acquired hepatitis C notification rate per 100 000 population, 2012 – 2016, by sex



	2012	2013	2014	2015	2016
Total	19.7	22.3	25.4	35.3	29.5
Male	24.2	30.0	39.2	49.7	45.2
Female	15.3	14.6	11.5	20.8	13.8

Source: National Notifiable Diseases Surveillance System; includes jurisdictions with Aboriginal and Torres Strait Islander status completeness ≥50% (Australian Capital Territory, New South Wales, Northern Territory, Queensland, South Australia, Tasmania, Victoria and Western Australia) for each of the five years 2012 – 2016. .

5.3c *Estimated incidence of recent HIV infection*

Indicator definition

Numerator	Number of newly diagnosed HIV infection notifications reported as Aboriginal and Torres Strait Islander people to the HIV Registry
Denominator	Aboriginal and Torres Strait Islander population reported by ABS

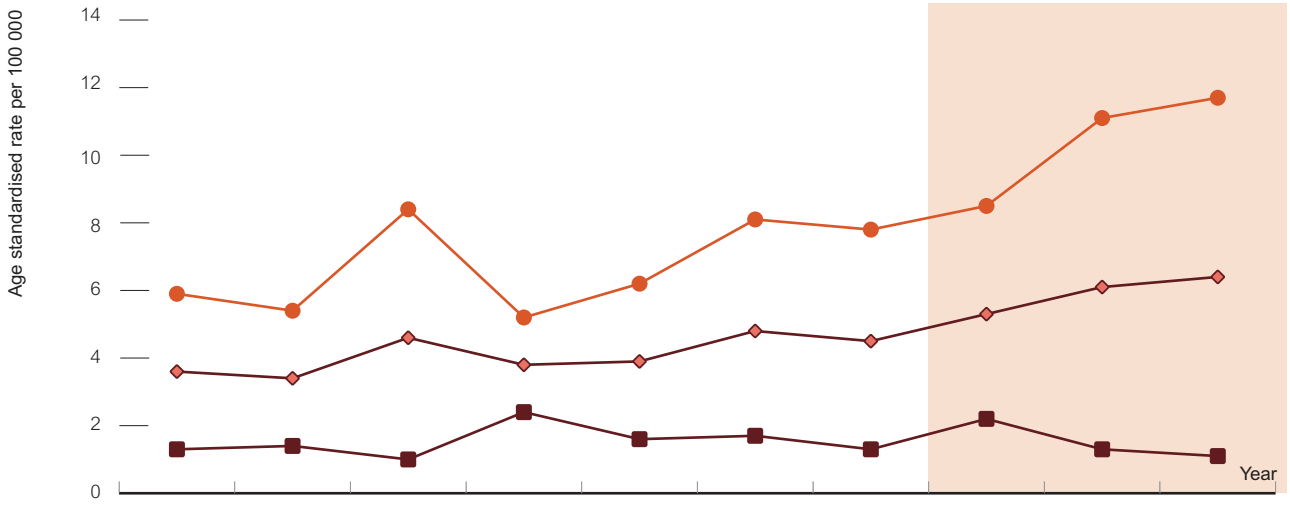
Background: HIV incidence is defined as the number of new HIV infections in a population during a specified time period. Understanding HIV incidence in a population is important to monitor the epidemic, improve the development and implementation of interventions and to evaluate the impact of prevention and treatment programs.[50] Reported numbers of diagnoses of HIV can be used to monitor the trends of transmission in Australia. However, trends in diagnoses may only reflect trends in incidence if testing is relatively frequent and rates of testing are relatively constant among people at risk of HIV infection.

Data source and considerations: Incidence is a difficult indicator to measure, and notifications have been used as a surrogate, recognising that for most infections, they represent only a proportion of the total cases and may be influenced by changes to testing patterns. 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. See Methodological Notes for further detail. All jurisdictions have >95% completeness rates for Aboriginal and Torres Strait Islander status in HIV notifications and thus data from all jurisdictions are included.

Results: The notification rate of newly diagnosed HIV in the Aboriginal and Torres Strait Islander population was 6.4 per 100 000 population in 2016, showing a 41.7% relative increase as compared to 4.5 per 100 000 population in 2013. In the past ten years, the notification rate of newly diagnosed HIV infection in the Aboriginal and Torres Strait Islander population was 3.6 per 100 000 population in 2007, remained fairly stable between 2007 and 2011 and then increased in 2012 – 2016, reaching 6.4 per 100 000 population in 2016 (Figure 55).

The notification rate of newly diagnosed HIV infection in Aboriginal and Torres Strait Islander males fluctuated over the ten-year period, with a gradual increase in 2012 – 2016 period (from 8.1 to 11.7 per 100 000 population). The notification rates of newly diagnosed HIV infection among Aboriginal and Torres Strait Islander females fluctuated between 1.3 per 100 000 population in 2007 to 1.1 per 100 000 population in 2016 (Figure 62).

Figure 62 Newly diagnosed HIV notification rate in the Aboriginal and Torres Strait Islander population per 100 000 population, 2007 – 2016, by sex



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Total	3.6	3.4	4.6	3.8	3.9	4.8	4.5	5.3	6.1	6.4
Males	5.9	5.4	8.4	5.2	6.2	8.1	7.8	8.5	11.1	11.7
Females	1.3	1.4	1.0	2.4	1.6	1.7	1.3	2.2	1.3	1.1

Source: State and territory health authorities; includes all states and territories due to high completeness (>95%) of Aboriginal and Torres Strait Islander status in all years

5.3.1 Achieve high levels of hepatitis B vaccination

5.3.1a Hepatitis B immunisation coverage in children at 12 and 24 months of age.

Indicator definition

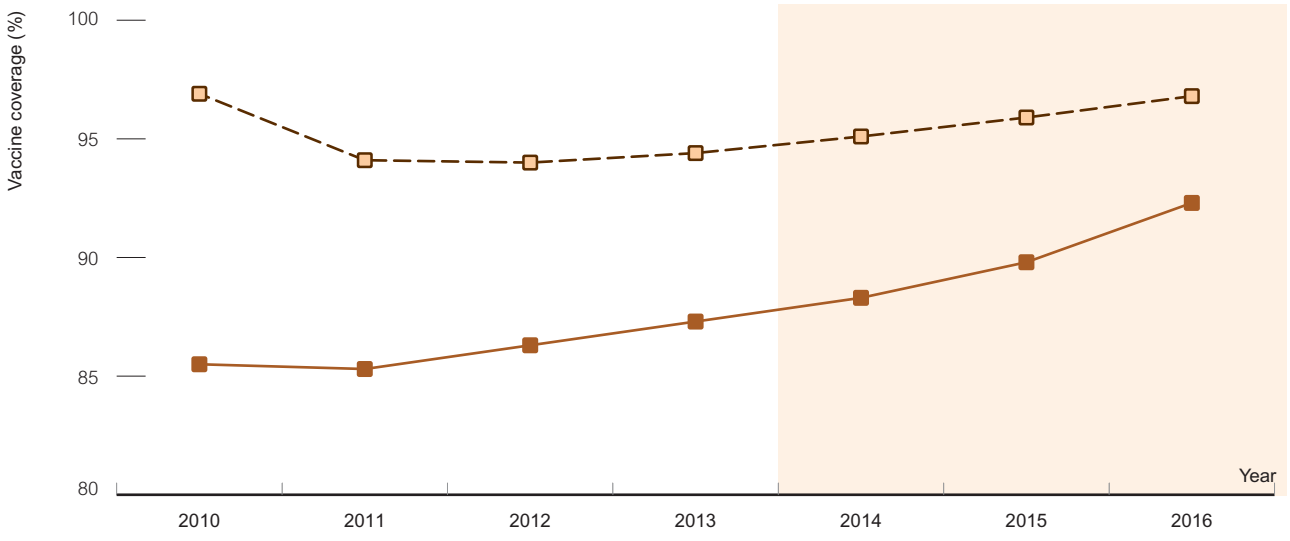
Numerator	Number of Aboriginal and Torres Strait Islander children in the relevant birth cohort who have been administered dose three of hepatitis B vaccine by 12 months of age recorded on the ACIR
Denominator	Number of Aboriginal and Torres Strait Islander children turning 12 months of age in the measurement year on the ACIR
Numerator	Number of Aboriginal and Torres Strait Islander children in the relevant birth cohort who have been administered dose three of hepatitis B vaccine by 24 months of age recorded on the ACIR
Denominator	Number of Aboriginal and Torres Strait Islander children turning 24 months of age in the measurement year on the ACIR

Background: Hepatitis B vaccination, including universal infant vaccination, is the most effective prevention measure for hepatitis B. Hepatitis B vaccination for Aboriginal and Torres Strait Islander infants was introduced in the Northern Territory in 1988, expanding to all newborns in 1990.[5] Australia wide universal vaccination was introduced in 2000.[87] Rates of hepatitis B are disproportionately higher in the Aboriginal and Torres Strait Islander population than the non-Indigenous[88], highlighting the importance of high vaccination coverage in this population.

Data source and considerations: Hepatitis B vaccine coverage was estimated using data from the National Centre for Immunisation Research of Vaccine Preventable Diseases (NCIRS) surveillance of immunisation coverage and the Australian Childhood Immunisation Register (ACIR). See Methodological Notes for further detail. Data are only included from 2010 onwards, as the definition of 'fully vaccinated' changed in late 2009.[6]

Results: Hepatitis B vaccination coverage in Aboriginal and Torres Strait Islander children at 12 months was 92.3% in 2016, increasing from 87% in 2013. At 24 months the coverage was 96.8% in 2016, as compared to 94.4% in 2013. The lower rates at 12 months compared with all children overall suggest issues around timeliness of completion of the course of vaccinations in Aboriginal and Torres Strait Islander children, which may lead to increased risk of disease acquisition. Over the seven-year period 2010 – 2016, hepatitis B immunisation coverage rates at 12 months for Aboriginal and Torres Strait Islander children ranged from 85.3% to 92.3%, while 24-month coverage fluctuated between 94.0% and 96.9% (Figure 63).

Figure 63 Hepatitis B vaccination coverage estimates at 12 and 24 months in Aboriginal and Torres Strait Islander children, 2010 – 2016



	2010	2011	2012	2013	2014	2015	2016
12 months	85.5%	85.3%	86.3%	87.3%	88.3%	89.8%	92.3%
24 months	96.9%	94.1%	94.0%	94.4%	95.1%	95.9%	96.8%

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

5.3.2 Reduce the risk behaviours associated with the transmission of BBV

5.3.2a Proportion of people who inject drugs reporting reusing another person's used needle and syringe in the previous month.

Indicator definition

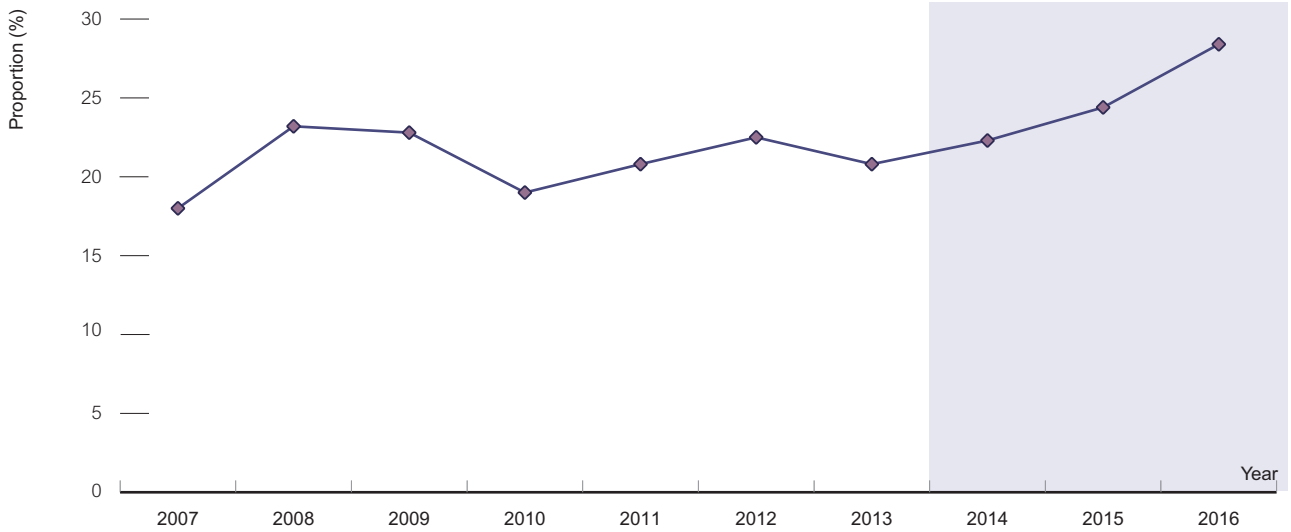
Numerator	Number of Aboriginal and Torres Strait Islander participants in the ANSPS who report re-using another person's used needle and syringe in the previous month (receptive syringe sharing)
Denominator	Total number of Aboriginal and Torres Strait Islander participants in the ANSPS

Background: Receptive syringe sharing is a major risk factor for the transmission of hepatitis B, hepatitis C, HIV and other blood-borne viruses. Higher rates of injection risk behaviour among Aboriginal and Torres Strait Islanders who inject drugs,[89] indicate that this population is at an increased risk of transmission of hepatitis B, hepatitis C and HIV through injecting drug use. Monitoring of injecting behaviours is essential to better understand the ongoing risk of transmission.

Data source and considerations: Each year, the ANSPS documents the proportion of participants who report receptive syringe sharing in the month preceding the survey.[90] Although the representativeness of Aboriginal and Torres Strait Islander people participating in the ANSPS is unknown, this group have comprised more than 10% of the ANSPS sample since 2004, with representation from all states and territories. In 2016, 18% of respondents identified as Aboriginal and Torres Strait Islander. See Methodological Notes for further detail.

Results: The proportion of Aboriginal and Torres Strait Islander respondents reporting receptive syringe sharing was 28.4% in 2016, and 20.8% in 2013, reflecting a 37% relative increase. The proportion reporting receptive syringe sharing has increased between 2007 and 2016 (from 18.0% to 28.4%) (Figure 64).

Figure 64 Proportion of Aboriginal and Torres Strait Islander people who inject drugs reporting receptive syringe sharing in the previous month, 2007 – 2016



18.0%	23.2%	22.8%	19.0%	20.8%	22.5%	20.8%	22.3%	24.4%	28.4%

Note: Total includes transgender and not reported
Source: Australian Needle and Syringe Program Survey

5.3.2b *Number of Aboriginal and Torres Strait Islander people who are notified as newly diagnosed with HIV who report injecting drug use*

Indicator definition

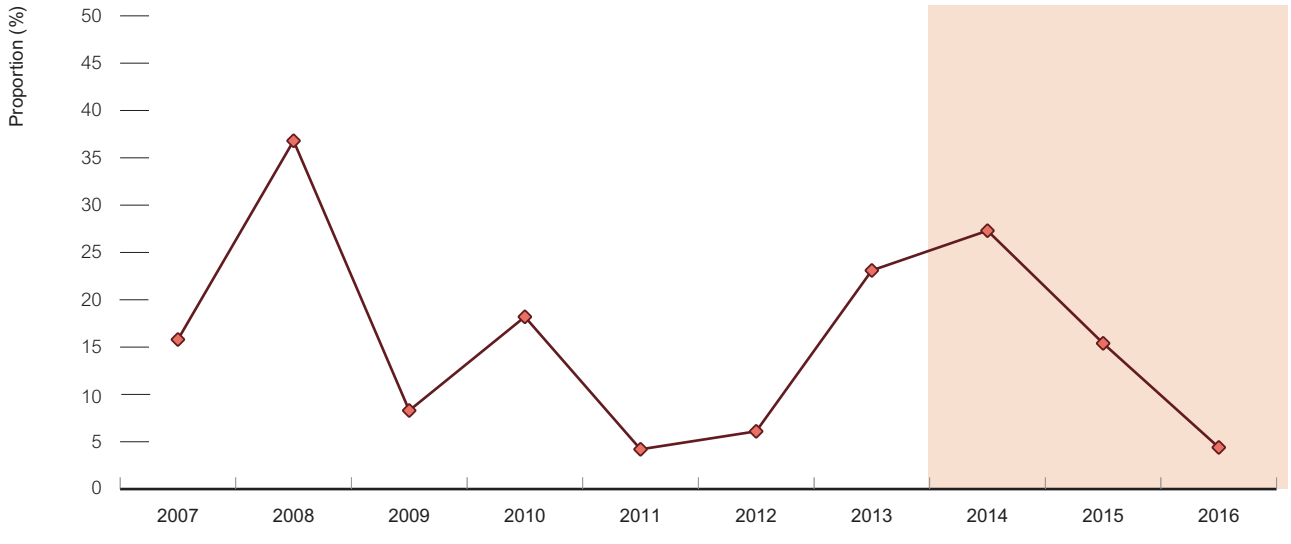
Numerator	Number of Aboriginal and Torres Strait Islander people who are newly diagnosed with HIV who report injecting drug use reported by National HIV Registry
Denominator	Number of Aboriginal and Torres Strait Islander people who are newly diagnosed with HIV reported by National HIV Registry

Background: Injecting drug use is a major risk factor for HIV transmission.[91] See Section 5.3.2 for further detail.

Data source and considerations: HIV 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, and then forwarded to the Kirby Institute for collation and analysis. See Methodological Notes for further detail. Self-reported HIV risk is used to determine exposure category according to a hierarchy of risk. Due to the small number of Aboriginal and Torres Strait Islander notifications per exposure category, caution should be taken in interpretation of these data.

Results: In 2016 the proportion of HIV notifications in Aboriginal and Torres Strait Islander population attributed to injecting drug use was 4.4%, decreasing by 81% as compared to the 23.1% in 2013. Between 2007 and 2016, the total proportion of HIV notifications in Aboriginal and Torres Strait Islander population attributed to injecting drug use ranged from 4.2 – 36.8% (Figure 65).

Figure 65 Proportion of HIV notifications in Aboriginal and Torres Strait Islander people attributed to injecting drug use, 2007 – 2016



15.8%	36.8%	8.3%	18.2%	4.2%	6.1%	23.1%	27.3%	15.4%	4.4%

Source: State and Territory health authorities

5.3.3 Decrease the number with undiagnosed BBV

An indicator to monitor this objective is currently unavailable. Options will be explored to develop an indicator that informs activities and strategies in a meaningful way. While no specific indicator is currently available for this target, it is estimated that in 2016 19% of Aboriginal and Torres Strait Islander people living with HIV were undiagnosed.[73]

5.4 Increase the number receiving treatment and appropriate management, care and support for BBV

An indicator to monitor this objective is currently unavailable. Options will be explored to develop an indicator that informs activities and strategies in a meaningful way.

5.4a Proportion of hepatitis C antibody positive people seen at needle and syringe programs with a recent (previous 12-months) history of hepatitis C treatment, 2008 – 2016, by Aboriginal and Torres Strait Islander status (additional information)

Indicator definition

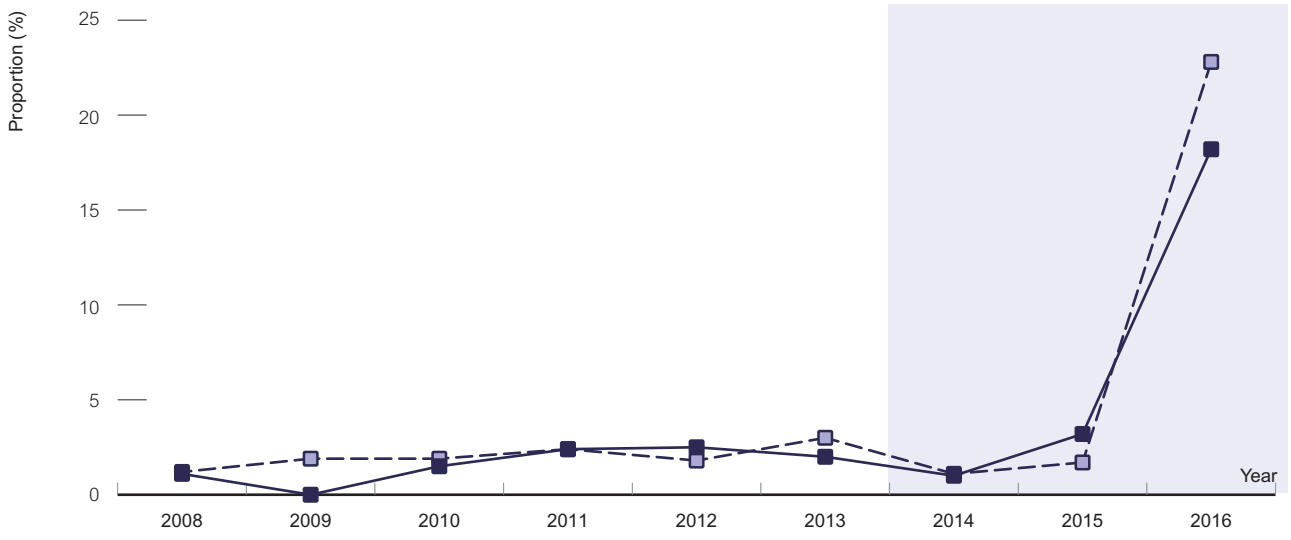
Numerator	Number of Aboriginal and Torres Strait Islander participants in the ANSPS who report receiving treatment for hepatitis C in the previous 12 months
Denominator	Total number of Aboriginal and Torres Strait Islander participants in the ANSPS with hepatitis C antibody positive serology excluding those who self-reported spontaneous clearance and those who reported treatment-induced clearance in the past 12 months

Background: See Section 2.3a

Data source and considerations: Same as Section 2.2b

Results: According to the Australian Needle Syringe Program Survey, among Aboriginal and Torres Strait Islander participants in 2016, 18.2% reported treatment in the last 12 months, which is ninefold higher than the 2% in 2013 (Figure 66). These proportions were slightly lower in the Aboriginal and Torres Strait Islander people versus the non-Indigenous participants in 2016 (18.2% versus 22.8%).

Figure 66 Proportion of hepatitis C antibody positive people seen at needle and syringe programs with a history of hepatitis C treatment in the past 12 months, 2008 – 2016, by Aboriginal and Torres Strait Islander status



	2008	2009	2010	2011	2012	2013	2014	2015	2016
Treatment in the last 12 months – Aboriginal and Torres Strait Islander	1.1%	0.0%	1.5%	2.4%	2.5%	2.0%	1.0%	3.2%	18.2%
Treatment in the last 12 months – non-Indigenous	1.2%	1.9%	1.9%	2.4%	1.8%	3.0%	1.1%	1.7%	22.8%

Note: Denominator restricted to people with hepatitis C antibody positive serology and excludes people who self-reported spontaneous clearance, and those who self-reported treatment induced viral clearance more than 12 months previously.

Source: Australian Needle and Syringe Program Survey

5.5 Eliminate the negative impact of stigma, discrimination and human rights issues on Aboriginal and Torres Strait Islander health

The Centre for Social Research in Health developed an indicator of stigma that could be used across the key priority populations identified in the national strategies, in relation to BBV status, injecting drug use, sexual orientation and sex work. However, through the data collection undertaken to date, an insufficient number of Aboriginal and Torres Strait Islander participants responded to enable specific investigation of Aboriginal and Torres Strait Islander health.

Options will be explored to develop an indicator that informs activities and strategies in a meaningful way, see Section 1.6

5.5.1 Actively engage with the Aboriginal and Torres Strait Islander community

An indicator to monitor this objective is currently unavailable. Options will be explored to develop an indicator that informs activities and strategies in a meaningful way.

5.5.2 Improve delivery of and access to appropriate services

An indicator to monitor this objective is currently unavailable. Options will be explored to develop an indicator that informs activities and strategies in a meaningful way.

Methodological notes

It is recognised that there are a number of gaps in reporting in the third year of the National Strategies. A number of targets and objectives do not yet have associated indicators identified, as detailed below.

HIV target 7:
Maintain effective prevention programs targeting sex workers and for people who inject drugs

An indicator is not yet identified for HIV target 7 however, it is recognised that HIV prevention among sex workers has been highly successful in Australia and has resulted in HIV incidence rates among the lowest in the world. There is international documentation of the best measures of effective prevention programs,[1] and discussions are ongoing as to the most relevant data to report on this target in Australia.

Objectives 1.6a, 3.6, 5.5:
Eliminate the negative impact of stigma, discrimination, and legal and human rights issues on people's health

The Centre for Social Research in Health, UNSW received funding from the Australian Government Department of Health to develop an indicator of stigma among priority groups identified by the five national strategies addressing blood borne viruses (BBVs) and sexually transmissible infections. An indicator of stigma among people living with hepatitis C, and HIV has been developed and implemented, and data on these indicators have been presented for the first time in this year's report in addition to stigma in relations to injecting drug use and sexual orientation. A mirrored stigma indicator on health care workers to identify their expression of stigma towards clients living with hepatitis B, hepatitis C, HIV, or their clients' sexual orientation and injecting drug use was also implemented, and data were presented in this year's report.

However, at this stage, the stigma indicator has not been implemented with people living with hepatitis B. In the upcoming phase of the stigma indicator project, a qualitative study will be conducted within the Chinese community to scope key issues of relevance to this group. This approach will establish networks to facilitate the conduct of survey research in future project phases. Future phases of the project will also measure the expression of stigma towards people living with hepatitis B in a survey of the general population. Similarly, the stigma indicator has not been explicitly implemented among people living with STIs. Future phases of the stigma indicator project will include secondary analysis of data collected from people living with HIV who also reported STI diagnosis. The STI stigma indicator is also being included in a forthcoming survey of young people. The expression of stigma towards people living with STIs will also be measured in a survey of the general population. In addition, the data collection undertaken to date for the stigma indicator, an insufficient number of Aboriginal and Torres Strait Islander participants responded to enable specific investigation of Aboriginal and Torres Strait Islander health.

Objective 5.2.2:
Reduce the risk behaviours associated with transmission (in the Aboriginal and Torres Strait Islander population)

There is no indicator identified for this objective. There is currently no regular periodic survey of young Aboriginal and Torres Strait Islander people, but discussions are ongoing as to available data to inform this objective.

Objective 5.4:
Increase the number of Aboriginal and Torres Strait Islander people with BBV receiving appropriate management, case and support for BBV.

Work is being undertaken to develop a cascade of care for HIV, hepatitis C and chlamydia for the Aboriginal and Torres Strait Islander population, which will inform this objective. It is expected that data will be available for the next reporting period.

It is also acknowledged that a number of targets and indicators do not have appropriate or recent data available.

Indicator 1.2b
Additional information: Proportion of population attending STI clinics vaccinated or with past infection for hepatitis B

Data are not available for specific priority populations which may mask any differences between populations, and further work is being done to present these data by specific priority population in future reports. This will provide valuable information to inform targeted vaccination programs for priority populations. Also, reporting on proportion of patients in each category of serology test/clinical diagnoses would help fill the gap in data's ability to differentiation between vaccine immunity and immunity due to past infection, and would be included in future reports.

Also, as mentioned in section 1.2b, classification of hepatitis B vaccination and immunity among sexual health service attendees was based on pathology results for tests of hepatitis B surface antigens (HBsAg), core antibodies (anti-HBc), and surface antibodies (anti-HBs); clinical diagnoses of acute or chronic hepatitis B. Patients were only included in this analysis if one or more of these data were available. Therefore, currently there is a gap

Incidence

Incidence is a difficult indicator to measure, and for a number of indicators notifications have been used as a surrogate, recognising that for most infections, they represent only a proportion of the total cases (e.g. only those cases for which health care was sought, a test conducted and a diagnosis made, followed by a notification to health authorities). Also, annual changes in notifications may represent responses to testing policies and programs, different diagnostic tests, changes in surveillance practices and awareness campaigns rather than true changes in incidence.

Objective 3.3
Improve knowledge and reduce risk behaviours associated with the transmission of STI

The National Survey of Australian Secondary School Students and Sexual Health is only conducted every five years, and as such, the most recent data available is for 2013. As new data becomes available it will be included in subsequent reports.

Objective 4.5
Improve quality of life of people living with HIV

The HIV Futures Study is conducted every 23 years (see below for further detail), with the most recent survey carried out over 6 months from July 2015 to June 2016.

Objective 5.1:
Improve the knowledge and awareness of STI and BBV and Objective 5.2.3: Increase appropriate testing and follow-up among those at elevated risk

The 'Sexual Health and Relationships in young Indigenous people study' (GOANNA – see below for further detail) the first national survey of young Aboriginal and Torres Strait Islander people in relation to STIs and BBVs undertaken in Australia was undertaken during 2011 – 2013. As such, no data are available for this indicator for 2014. There is currently no regular periodic survey of young Aboriginal and Torres Strait Islander people.

Objective 5.3.3:
Decrease the number of Aboriginal people with undiagnosed BBV

Work is being undertaken to develop a cascade of care for HIV, hepatitis B and C and chlamydia for the Aboriginal and Torres Strait Islander population. It is expected that data will be available for the next reporting period.

The below information provides further detail on the different data sources used to calculate progress against the various objectives and indicators. The data sources and indicators were selected to provide as complete as possible national data, and no state/territory level breakdowns are given. However, it is important to note that individual state-based reporting may use different data sources to track progress. For all: notification rates are calculated based on the annual number of new cases notified per 100 000 population; incidence rates are calculated based on the number of new cases out of a person-time denominator.

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-nndssndssintro.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, and in the quarterly journal Communicable Diseases Intelligence.

Core 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.

Notified cases over time do not solely reflect changes in disease prevalence. Changes in testing policies, surveillance practices, screening programs, including preferential testing of high-risk populations; the use of less invasive and more sensitive diagnostic tests; and periodic awareness campaigns, may influence the number of notifications that are received over time.[92] Another major limitation of the notification data is that they represent only a proportion of the total cases occurring in the community, that is, only those cases for which health care was sought, a test conducted and a diagnosis made, followed by a notification to health authorities. The degree of under-representation of all cases is unknown but is most likely variable by jurisdiction. Of note, diagnosis date was used to define the period of analysis in this year's report (as compared to date of notification used in previous reports), and therefore some of the data may vary from the previous reports.

Viral hepatitis

New diagnoses of hepatitis B and C were notifiable conditions in all State/Territories in Australia. Newly acquired hepatitis B and C infections were recorded in all health jurisdictions. Cases were notified by the diagnosing laboratory, medical practitioner, hospital or a combination of these sources, through State/Territory health authorities, to the NNDSS. Population rates of diagnosis of viral hepatitis were calculated 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). The unspecified hepatitis B and C infections are those cases that do not meet the criteria for newly acquired infections. The unspecified cases include people who have migrated to Australia with known HBV, so their 'unspecified diagnosis' is based on their initial testing in Australia; this likely makes up the majority of new unspecified cases in Australia now and therefore trends may reflect migration patterns from highly endemic countries.

Sexually transmissible infections

Diagnoses of specific sexually transmissible infections were notified by State/Territory health authorities to the NNDSS, maintained by the Australian Government Department of Health. Chlamydia has been notifiable in all health jurisdictions since 1998, Gonorrhoea since 1991 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).

Diagnosis	Australian Capital Territory	New South Wales	Northern Territory	Queensland	South Australia	Tasmania	Victoria	Western Australia
Gonorrhoea	Doctor Laboratory Hospital	Laboratory	Doctor Laboratory	Doctor Laboratory Hospital	Doctor Laboratory	Laboratory	Doctor Laboratory	Doctor
Infectious Syphilis	Doctor Laboratory Hospital	Doctor Laboratory Hospital	Doctor Laboratory	Doctor Laboratory Hospital	Doctor Laboratory	Laboratory	Doctor Laboratory	Doctor
Chlamydia	Doctor Laboratory Hospital	Laboratory	Doctor Laboratory	Doctor Laboratory Hospital	Doctor Laboratory	Laboratory	Doctor Laboratory	Doctor
Donovanosis	Doctor Laboratory Hospital	Laboratory	Doctor Laboratory	Doctor Laboratory Hospital	Doctor Laboratory	Doctor 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).

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 sexual health surveillance network which uses 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. Groups include 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 elsewhere.[93] 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. The ACCESS Sexual Health Clinic network comprises a total of 52 clinics in all Australian jurisdictions. Only clinics that could provide complete data for the entire reporting period were included in this report, resulting in the exclusion of eight clinics. In total, 42 sexual health clinics from four Australian jurisdictions provided data for this report: 19 located in major cities, 14 inner regional, 8 outer regional, and 4 in remote or very remote areas. There are 6 high case load general practice clinics in New South Wales and Victoria in ACCESS, and data from 4 were included in this report.

The hepatitis B diagnosis and care cascade

Cascade estimates were developed by the Who Collaborating Centre for Viral Hepatitis, 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 – 2016 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 2014 – 2016 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 2014 – 2016 was derived using pharmaceutical dispensing data from the Department of Human Services Australia on the number of scripts dispensed for treatment indicated for hepatitis B virus infection (adefovir, entecavir, lamivudine, telbivudine, tenofovir, and pegylated interferon). Patient-level estimates provided, allowing removal of those receiving tenofovir for the treatment of HIV and to avoid duplication of people receiving combination therapy, were used for validation.

Detailed methodology and source references can be found in the published paper which described the derivation of these estimates[94] and in the methods of the National Hepatitis B Mapping Project Reports (http://www.ashm.org.au/HBV/more-about/hepatitis-b-mapping-project).

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.

Number of people living with hepatitis B

The estimate of the number of people living with hepatitis B in Australia was developed using a deterministic compartmental mathematical model of hepatitis B infection in the Australian population from 1951 to 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 allcause 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 estimated for the number of individuals living with chronic hepatitis B for 2014–2016 was derived by allowing the FoI and the proportion of migrants entering the population with chronic hepatitis B to vary according to a given distribution. These distributions were chosen to reflect prior knowledge regarding the FoI within Australia and prevalence of chronic hepatitis B in source countries. This was achieved by using Latin hypercube sampling (LHS).[95] The mathematical model described above was run using 2000 different combinations of the parameters being varied, which produced a range of overall estimates. The minimum and maximum estimates produced by the model were taken to define the plausible range around the point estimate value. 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[96,97]; the estimates from which were then adjusted upwards to account for the disparity in prevalence between men and women as identified in an Australian seroprevalence study,[98] a study of hepatitis B prevalence in migrants to the United States[99]; and the most recent global seroprevalence estimates undertaken on behalf of the World Health Organization.[100] The Australian prevalence figure was obtained from local modelled estimates.[101]

Hepatitis C diagnosis and care cascade

This cascade was developed collaboratively between the Kirby Institute and the Center for Disease Analysis (centerforda. com).

Number of people living with hepatitis C

This estimate was derived nationally and for each state and territory using a difference equation mathematical model, as described below:

- To determine hepatitis C incidence as a result of injecting drug use, the model used 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.
- The relative change in incidence since 2005 was informed by hepatitis C notifications in people aged 15–29 years, reflecting the population most at risk of acquiring infection. As the primary route of transmission is injecting drug use, a practice that primarily starts in late adolescence or early adulthood, trends in the rate of diagnoses in those aged under 30 years can be interpreted as surrogate for the incidence of hepatitis C.
- The estimates of hepatitis C 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 infection in migrants.
- The model also includes the effects of treatment with associated sustained virological response (SVR) rates reflecting treatment regimen, genotype and access to directacting antivirals (DAA) through compassionate access and clinical trials in 2014–2015, and generic supply in 2015. From 2016 the SVR rates were based on DAA treatment from clinical studies and reflected the disease stage at initiation.
- Estimates of the number of people experiencing longterm sequelae of chronic hepatitis C were then obtained from the estimated pattern of hepatitis C incidence using rates of progression derived from cohort studies. People cured with late stages of disease had a lower progression rate to decompensated cirrhosis, and hepatocellular carcinoma.
- Estimates of the numbers of people living with chronic hepatitis C in 2016 were adjusted to allow for mortality related to hepatitis C, injecting drug use and unrelated to hepatitis C 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

This estimate was derived from totalling all hepatitis C notifications from 1991 to 2016 and adjusting for spontaneous hepatitis C clearance, mortality, hepatitis C cure through treatment, and overseas migration, with adjustments as follows:

- The proportion with spontaneous hepatitis C clearance was estimated at 20%.
- The annual proportion with mortality among people with a hepatitis C notification in NSW (1993–2015) was extrapolated to the total number of hepatitis C notifications in Australia.
- The estimated number of individuals with cure of hepatitis C was deducted from the number of total hepatitis C notifications.
- The level of overseas migration was assumed to be small, given the characteristics of the infected population, and was given by the annual number of permanent departures for the general population divided by the estimated resident population as estimated by the Australian Bureau of Statistics (series 340102).

Number of people who have ever received HCV treatment

To estimate the numbers of people treated for hepatitis C we totalled the number of prescriptions dispensed to public patients, reported by the Pharmaceutical Benefits Scheme (PBS), since 1997.

- For estimates in 2013–2015, data from longitudinal tracking of a 10% random sample of PBS prescriptions were used.
- For 2014 and 2015, we included estimates for the number of patients receiving directacting antiviral therapies through clinical trials, patient access programs and generic drugs.
- For 2016, we assumed all treated patients received directacting antiviral therapy following its listing on the PBS. We estimated the number of people receiving directacting antiviral treatment in 2016 using the 10% sample of PBS patientlevel script claims data provided by the company Prospection. Our estimate is the number of unique patients in the PBS data who filled at least one script in the 12 months prior to the end of December 2016 multiplied by 10. We assumed that 10% of the Australian population were sampled to estimate the uncertainty range as a 95% confidence interval (which equates to approximately 5%).
- The numbers of interferonbased hepatitis C treatments dispensed were adjusted for multiple counting considering the duration of treatment for each regimen and treatment compliance rate.
- For genotypespecific regimens, a distribution of 50% genotype 1 and 50% genotypes 2 or 3 was assumed.

- The total number treated was adjusted for annual mortality and overseas migration (using the same overseas migration rate as for the diagnosed stage).
- People with chronic hepatitis C who have been cured were assumed to have lower rates of disease progression to decompensated cirrhosis (80% to 90% reduction) and hepatocellular carcinoma (70% reduction).
- The cured population with decompensated cirrhosis was assumed to have a 50% reduction in liverrelated death rate.
- The general population mortality rate was used for those who were successfully cured. The hepatitis C mortality rate from people with a hepatitis C notification in New South Wales was used for patients who did not achieve sustained virological response.
- We estimated the proportion of directacting antiviral treatments initiated by patients in each fibrosis stage using REACHC study data.52 The number of people on treatment with cirrhosis, decompensated cirrhosis, and hepatocellular carcinoma was estimated from data on planned duration. As REACHC is likely to be biased towards early disease, given community and primary carebased involvement, we adjusted the estimates to reflect higher coverage of antiviral treatment in the F3–F4 stages.

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

This component was estimated by taking the number of people receiving hepatitis C treatment in each year and multiplying it by the proportion with sustained virological response (SVR) reported in the literature (regimenspecific). We assumed the following:

- Australian data on the proportion with SVR were prioritised, if available. A distribution of 50% genotype 1 and 50% genotypes 2 or 3 among people receiving hepatitis C treatment was assumed for interferonbased therapies.
- A 95% SVR rate (range: 90% to 97%) was used for directacting antiviral therapies in F0–F3 fibrosis stages and a 90% SVR rate was used in the F4 fibrosis stage (cirrhosis) and for people with decompensated cirrhosis and hepatocellular carcinoma.
- The total number cured was adjusted for annual mortality and overseas migration as for the diagnosed and treated stages.

National surveillance for new HIV diagnoses

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 notification data 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 new HIV diagnoses 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/.

New HIV diagnoses

New HIV diagnoses are cases that are diagnosed with HIV for the first time in Australia.

Newly acquired HIV infection

Newly acquired HIV infection is defined as HIV infections 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/μl, and late HIV diagnosis was defined as newly diagnosed HIV infection with a CD4+ cell count of less than 350 cells/μl.

Rates of HIV diagnosis

Notification rates were calculated using population denominators obtained from the 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 evaluated 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. Further details are provided in the HIV, viral hepatitis and sexually transmissible infections in Australia: Annual Surveillance Report 2017.

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 al.[102] The number of deaths up to 2003 was 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 2003.[102] The number of deaths after 2003 was estimated using annual mortality rates from the Australian HIV Observational Database (AHOD).[103] Between 2004 and 2016, 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.

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 the European Center for Disease Control (ECDC) HIV modelling tool to estimate the proportion of people with HIV who are undiagnosed.[104]

The ECDC tool is a multistate backcalculation model using notifications data and estimates for the rate of CD4+ cell count decline to fit diagnoses rates over time, producing estimates for HIV incidence, time between infection and diagnosis, and the undiagnosed population by CD4+ cell count strata, using surveillance data on new HIV and AIDS diagnoses. To run the model, notifications data are split by CD4+ cell count strata, whether the patient had AIDS at the time of diagnosis, and optional risk of exposure categories. Diagnosis rates can be adjusted to reflect changes over time and whether people living with HIV are more likely to be diagnosed at later stages of infection.

For the cascade estimates we divided all annual notifications into those attributed to maletomale sex, heterosexual contact, injecting drug use, and other risk exposures. We ran the ECDC tool for each exposure risk category as well as overall (with all groups combined) and excluding maletomale sex. Separate models were run for Indigenous and nonIndigenous Australianborn populations, males and females, and for each region of birth. The tool's diagnosis rate options were adjusted to best fit the CD4+ cell count at diagnosis data.

For validation we compared the model estimates for undiagnosed gay and bisexual men with empirical data from the COUNT study.[105] This study was conducted alongside routine behavioural surveillance surveys in which gay and homosexually active men from Sydney, Melbourne, Canberra and Perth recruited from a range of gay community sites in 2013 and 2014. In this study 8.9% of participants were reported to have undiagnosed HIV (95% CI 5.8–13.5%). This is closely matched by the ECDC tool estimated percentage undiagnosed in 2014 for gay and bisexual men of 8.4% (range 7.6% to 9.2%). The overall prevalence of HIV in Australia and for each subpopulation was then estimated by inflating the calculated number of people living with diagnosed infection by the estimated level of undiagnosed infection. Due to running the ECDC model separately, the sum of number undiagnosed for individual subpopulations can be different from the overall population estimate.

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 Prospection. This is a randomised patient level, de-identified PBS script claims data set from 2006 to the 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 2016 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 200 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 200 copies per ml at their last viral load test. Uncertainty bounds were estimated by calculating the 95% confidence interval for this proportion. 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.

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 elsewhere.[106]

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.

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 participating at needle and syringe program (NSP) 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 elsewhere.[107]

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.

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.

HIV Futures

HIV Futures is an anonymous survey of people living with HIV (PLHIV). It asks people about a range of issues including their health, treatments, work and financial situation. HIV Futures surveys have been conducted every two to three years since 1997, attracting responses from around 1000 PLHIV each time. The HIV Futures Study is conducted every 23 years and is a national crosssectional survey of people living with HIV. The HIV Futures 5 study was conducted in 2005 – 2006, HIV Futures 6 during 2008 – 2009, HIV Futures 7 in 2011 – 2012, and HIV Futures 8 in 2015 – 2016. HIV Futures 8, the latest of these anonymous selfadministered surveys to be completed, sampled 895 people living with HIV infection in Australia.[108] The survey was carried out from July 2015 to June 2016.

The Gay Community Periodic Survey (GCPS)

The Gay Community Periodic Surveys are conducted annually or biennially in seven states and territories. The GCPS use time and location convenience samples of men primarily at gay community venues and events in capital cities (Sydney, Melbourne, Queensland, Adelaide, Perth and Canberra), plus online recruitment (added as a supplemental recruitment strategy since 2014). The GCPS are led by the Centre for Social Research in Health, UNSW Australia, which is the data custodian and produces jurisdictional- and national-based reports. The methods of the GCPSs have been described in detail elsewhere.[109,110]

Centre for Social Research in Health (CSRH)

Centre for Social Research in Health launched the Stigma Indicator Monitoring Project in 2016 and developed an indicator of stigma among priority groups identified by the five national strategies addressing blood borne viruses and sexually transmissible infections, including men who have sex with men, people who inject drugs, people living with HIV, people living with viral hepatitis (B and C) and people who engage in sex work. The indicator was included in existing routine surveys of people who inject drugs and men who have sex with men, and in new surveys of people living with HIV and hepatitis C. A mirrored indicator was also included in a new survey of health care providers to monitor the expression of stigma.

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 Australian 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.

The National Survey of Australian Secondary Students and Sexual Health (SASSH)

The SASSH provides a picture of sexual attitudes, knowledge and experiences of young Australian people and has been carried out approximately every five years since 1992. The survey uses convenience sampling for school-based and online recruitment rather than random sampling, which may affect the generalizability of the results; however, this method enables easier recruitment of participants to maintain adequate numbers of participants. The last survey was carried out in 2013, and involved more than 2 000 students in years 10, 11 and 12, at Government, Catholic and Independent schools.[39]

Registered births

The number of live births is sourced from the Australian Bureau of Statistics 3301.0 *Births, Australia*, 2016. Live birth refers to the number of births registered within each calendar year and excludes still births/foetal deaths. The National Perinatal Epidemiology and Statistics Unit of the Australian Institute of Health and Welfare (AIHW) also collects birth data from midwives and other health professionals who attend births. As information from these two collections are from different sources, the statistics obtained may vary. Differences in numbers reported may reflect processes of data collection, and that parent(s) delay or fail to register the birth of a child. For a full list of caveats refer to the explanatory notes of the ABS *Births Australia* releases (catalogue number 3301.0).

Sexual Health and Relationships in young Indigenous people study' (GOANNA)

The 'Sexual Health and Relationships in young Indigenous people study' (GOANNA) is the first national survey of young Aboriginal and Torres Strait Islander people in relation to STIs and BBVs undertaken in Australia. During 2011 – 2013, 2 877 Aboriginal and Torres Strait Islander people aged 16 – 29 years from every jurisdiction were surveyed and data were collected on participant demographics, STI and BBV risk knowledge, sexual behaviours and access to health services.[111] While studies of this nature can never claim to be truly representative of the total study population – in this case the total Aboriginal and Torres Strait Islander population aged 16–29 years – the study population includes a range of demographic characteristics, such as the ages within the study group aged 16–29 years, representation from urban, regional and remote areas and both heterosexual and homosexual identities similar to the broader population.. Within the sample, there was a modest over-representation of women in our study population, which is typical of a voluntary survey of this type. Despite representation from residents in urban, regional and remote areas, a lower proportion of remote community residents made up the study population relative to the proportion of Aboriginal and Torres Strait Islander people living in remote areas. Despite these limitations, the GOANNA study findings are currently the only source of data to measure this indicator. A repeat GOANNA study is planned for future years.

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 Prospection 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.

References

1. Bekker LG, Johnson L, Cowan F, Overs C, Besada D, Hillier S, et al. Combination HIV prevention for female sex workers: what is the evidence? Lancet. 2015;385(9962):72 – 87.
2. Communicable Diseases Network of Australia. National Blood-borne Viruses and Sexually Transmissible Infections Surveillance and Monitoring Plan 2014 – 2017. In: (AHPPC) AHPPC, editor. Canberra, Australia2015.
3. Kirby Institute. HIV, viral hepatitis and sexually transmissible infections in Australia: annual surveillance report 2017. Sydney: Kirby Institute, UNSW Sydney. 2017.
4. Mast EE, Ward JW. Hepatitis B vaccines. In: Plotkin SA, Orenstein WA, Offit PA, eds. Vaccines. 5th ed. Philadelphia, PA: Saunders Elsevier, 2008.
5. Liu B, Guthridge S, Li SQ, Markey P, Krause V, McIntyre P, et al. The end of the Australia antigen? An ecological study of the impact of universal newborn hepatitis B vaccination two decades on. Vaccine. 2012;30(50):7309 – 14.
6. Hull B, Dey A, Menzies R, McIntyre P. Annual immunisation coverage report, 2010. Communicable diseases intelligence quarterly report. 2013;37(1):E21 – 39.
7. Prevention of perinatal transmission of hepatitis B virus: prenatal screening of all pregnant women for hepatitis B surface antigen. MMWR Morbidity and mortality weekly report. 1988;37(22):341-6, 51.
8. Stevens CE, Toy PT, Tong MJ, Taylor PE, Vyas GN, Nair PV, et al. Perinatal hepatitis B virus transmission in the United States. Prevention by passive-active immunization. Jama. 1985;253(12):1740-5.
9. Stevens CE, Beasley RP, Tsui J, Lee WC. Vertical transmission of hepatitis B antigen in Taiwan. The New England journal of medicine. 1975;292(15):771-4.
10. Recommendations of the Immunization Practices Advisory-Committee Prevention of Perinatal Transmission of Hepatitis-B Virus - Prenatal Screening of All Pregnant-Women for Hepatitis-B Surface-Antigen. Am J Dis Child. 1988;142(9):921-3.
11. Australian Government Department of Health. Hepatitis B. 2015. In: The Australian immunization handbook [Internet]. Canberra, Australia: Commonwealth of Australia. Available from: http://www.health.gov.au/internet/immunise/publishing.nsf/content/Handbook10-home~handbook10part4~handbook10-4-5.
12. Hepatitis B Mapping Project: Estimates of chronic hepatitis B diagnosis, monitoring and treatment by Medicare Local, 2012/13 - National Report. Australasian Society for HIV Medicine and Victorian Infectious Diseases Reference Laboratory, The Doherty Institute; 2015.
13. Department of Health. Second National Hepatitis B Strategy 2014 – 2017. Canberra, Australia: Commonwealth of Australia; 2014.
14. Marugan RB, Garzon SG. DNA-guided hepatitis B treatment, viral load is essential, but not sufficient. World J Gastroentero. 2009;15(4):423 – 30.
15. Andersson KL, Chung RT. Monitoring during and after antiviral therapy for hepatitis B. Hepatology. 2009;49(5 Suppl):S166 – 73.
16. Council NR. Preventing drug abuse: what do we know?: National Academies Press; 1993.
17. Heard S, Iversen J, Kwon AJ, Maher L. Needle Syringe Program National Minimum Data Collection: National Data Report 2017. Sydney: Kirby Institute, UNSW Sydney; 2017.
18. Sublette VA, Smith SK, George J, McCaffery K, Douglas MW. The Hepatitis C treatment experience: Patients' perceptions of the facilitators of and barriers to uptake, adherence and completion. Psychology & health. 2015;30(8):987 – 1004.
19. Martin NK, Vickerman P, Foster GR, Hutchinson SJ, Goldberg DJ, Hickman M. Can antiviral therapy for hepatitis C reduce the prevalence of HCV among injecting drug user populations? A modeling analysis of its prevention utility. Journal of hepatology. 2011;54(6):1137 – 44.
20. Lewis D, Newton DC, Guy RJ, Ali H, Chen MY, Fairley CK, et al. The prevalence of Chlamydia trachomatis infection in Australia: a systematic review and meta-analysis. BMC infectious diseases. 2012;12:113.
21. Schiffman M, Castle PE, Jeronimo J, Rodriguez AC, Wacholder S. Human papillomavirus and cervical cancer. The Lancet.370(9590):890 – 907.
22. Muñoz N, Castellsagué X, de González AB, Gissmann L. Chapter 1: HPV in the etiology of human cancer. Vaccine. 2006;24, Supplement 3:S1-S10.
23. Bhatia N, Lynde C, Vender R, Bourcier M. Understanding genital warts: epidemiology, pathogenesis, and burden of disease of human papillomavirus. Journal of cutaneous medicine and surgery. 2013;17 Suppl 2:S47 – 54.

24. National HPV Vaccination Program Register 2016 [Available from: http://www.hpvregister.org.au/.
25. Tabrizi SN, Brotherton JM, Kaldor JM, Skinner SR, Liu B, Bateson D, et al. Assessment of herd immunity and cross-protection after a human papillomavirus vaccination programme in Australia: a repeat cross-sectional study. Lancet Infect Dis. 2014;14(10):958 – 66.
26. Ali H, Donovan B, Wand H, Read TR, Regan DG, Grulich AE, et al. Genital warts in young Australians five years into national human papillomavirus vaccination programme: national surveillance data. Bmj. 2013;346:f2032.
27. Ali H, Donovan B, Wand H, Read TRH, Regan DG, Grulich AE, et al. Genital warts in young Australians five years into national human papillomavirus vaccination programme: national surveillance data. Bmj-Brit Med J. 2013;346.
28. Machalek DA, Garland SM, Brotherton JML, Bateson D, McNamee K, Stewart M, et al. Very low prevalence of vaccine human papillomavirus (HPV) types among 18 to 35 year old Australian women, nine years following implementation of vaccination. The Journal of infectious diseases. 2018.
29. Mitchell A, Patrick K, Heywood W, Blackman P, Pitts M. National survey of Australian secondary students and sexual health 2013. Melbourne: Australian Research Centre in Sex Health and Society & La Trobe University. 2014.
30. Gertig DM BJSM. Measuring human papillomavirus (HPV) vaccination coverage and the role of the National HPV Vaccination Program Register, Australia. . Sexual Health. 2011;8:171–8.
31. Bowden FJ, Tabrizi SN, Garland SM, Fairley CK. Infectious diseases. 6: Sexually transmitted infections: new diagnostic approaches and treatments. The Medical journal of Australia. 2002;176(11):551-7.
32. Horváth A. Biology and Natural History of Syphilis. In: Gross GE, Tyring SK, editors. Sexually Transmitted Infections and Sexually Transmitted Diseases: Springer Berlin Heidelberg; 2011. p. 129 – 41.
33. Australian Government Department of Health. Syphilis - infectious (primary, secondary and early latent), less than 2 years duration case definition 2015 [Available from: http://www.health.gov.au/internet/main/publishing.nsf/Content/cda-surveil-nndss-casedefs-cd_syphl2.htm.
34. Ali H, Guy RJ, Fairley CK, Wand H, Chen MY, Dickson B, et al. Understanding trends in genital Chlamydia trachomatis can benefit from enhanced surveillance: findings from Australia. Sexually transmitted infections. 2012;88(7):552-7.
35. Ali H, Guy RJ, Fairley CK, Wand H, Chen MY, Dickson B, et al. Understanding trends in genital Chlamydia trachomatis can benefit from enhanced surveillance: findings from Australia. Sexually transmitted infections. 2012;88(7):552-U142.
36. Kong FY, Guy RJ, Hocking JS, Merritt T, Pirotta M, Heal C, et al. Australian general practitioner chlamydia testing rates among young people. The Medical journal of Australia. 2011;194(5):249 – 52.
37. O'Connor CC, Ali H, Guy RJ, Templeton DJ, Fairley CK, Chen MY, et al. High chlamydia positivity rates in Indigenous people attending Australian sexual health services. The Medical journal of Australia. 2014;200(10):595-8.
38. Manhart LE, Epstein M, Bailey JA, Hill KG, Haggerty KP, Catalano RF. HIV/Sexually Transmitted Infection Prevention Messaging: Targeting Root Causes of Sexual Risk Behavior. Sex Transm Dis. 2016;43(2):71-7.
39. Mitchell A, Patrick K, Heywood W, Blackman P, Pitts M. National Survey of Australian Secondary Students and Sexual Health 2013. Melbourne: Australian Research Centre in Sex, Health and Society, La Trobe University; 2014.
40. Mullick S, Watson-Jones D, Beksinska M, Mabey D. Sexually transmitted infections in pregnancy: prevalence, impact on pregnancy outcomes, and approach to treatment in developing countries. Sexually transmitted infections. 2005;81(4):294 – 302.
41. Kissinger P, Adamski A. Trichomoniasis and HIV interactions: a review. Sexually transmitted infections. 2013;89(6):426 – 33.
42. Rottingen JA, Cameron DW, Garnett GP. A systematic review of the epidemiologic interactions between classic sexually transmitted diseases and HIV: how much really is known? Sex Transm Dis. 2001;28(10):579 – 97.
43. Jin F, Prestage GP, Zablotska I, Rawstorne P, Imrie J, Kippax SC, et al. High incidence of syphilis in HIV-positive homosexual men: data from two community-based cohort studies. Sex Health. 2009;6(4):281-4.
44. Templeton DJ, Jin F, McNally LP, Imrie JC, Prestage GP, Donovan B, et al. Prevalence, incidence and risk factors for pharyngeal gonorrhoea in a community-based HIV-negative cohort of homosexual men in Sydney, Australia. Sexually transmitted infections. 2010;86(2):90-6.
45. Guy RJ, Spelman T, Stoove M, El-Hayek C, Goller J, Fairley CK, et al. Risk factors for HIV seroconversion in men who have sex with men in Victoria, Australia: results from a sentinel surveillance system. Sex Health. 2011;8(3):319 – 29.
46. Templeton DJ, Manokaran N, O'Connor CC. Prevalence and predictors of chlamydia co-infection among patients infected with gonorrhoea at a sexual health clinic in Sydney. Sex Health. 2012;9(4):392-4.

47. Botham SJ, Ressler KA, Maywood P, Hope KG, Bourne CP, Conaty SJ, et al. Men who have sex with men, infectious syphilis and HIV coinfection in inner Sydney: results of enhanced surveillance. Sex Health. 2013;10(4):291-8.
48. Australian Sexually Transmitted Infection and HIV testing guidelines 2014: For asymptomatic men who have sex with men 2014 [Available from: http://stipu.nsw.gov.au/wp-content/uploads/STIGMA_Testing_Guidelines_Final_v5.pdf.
49. Global guidance on criteria and processes for validation: elimination of mother-to-child transmission (EMTCT) of HIV and syphilis. Geneva, Switzerland: World Health Organization; 2014.
50. HIV Incidence World Health Organization; 2016 [Available from: http://www.who.int/diagnostics_laboratory/links/hiv_incidence_assay/en/.
51. Zablotska IB, Prestage G, Middleton M, Wilson D, Grulich AE. Contemporary HIV diagnoses trends in Australia can be predicted by trends in unprotected anal intercourse among gay men. Aids. 2010;24(12):1955-8.
52. Grant RM, Lama JR, Anderson PL, McMahan V, Liu AY, Vargas L, et al. Preexposure chemoprophylaxis for HIV prevention in men who have sex with men. New England Journal of Medicine. 2010;363(27):2587 – 99.
53. Zablotska IB, Selvey C, Guy R, Price K, Holden J, Schmidt H-M, et al. Expanded HIV pre-exposure prophylaxis (PrEP) implementation in communities in New South Wales, Australia (EPIC-NSW): design of an open label, single arm implementation trial. BMC public health. 2018;18(1):210.
54. QPrepd project – #ComePrEPd. [Available from: www.comeprepd.info/qprepd-project/]
55. PrEPX: Rapid scale-up of HIV pre-exposure prophylaxis (PrEP) [Available from: https://www.burnet.edu.au/projects/320_prepx_rapid_scale_up_of_hiv_pre_exposure_prophylaxis_prep].
56. Time from HIV-1 seroconversion to AIDS and death before widespread use of highly-active antiretroviral therapy: a collaborative re-analysis. Collaborative Group on AIDS Incubation and HIV Survival including the CASCADE EU Concerted Action. Concerted Action on SeroConversion to AIDS and Death in Europe. Lancet. 2000;355(9210):1131-7.
57. Lodi S, Phillips A, Touloumi G, Pantazis N, Bucher HC, Babiker A, et al. CD4 decline in seroconverter and seroprevalent individuals in the precombination of antiretroviral therapy era. Aids. 2010;24(17):2697 – 704.
58. Centers for Disease Control. Revised recommendations for HIV testing of adults, adolescents, and pregnant women in health-care settings. MMWR Recomm Rep 2006; 55: (RR14);1–17.
59. Lundgren JD, Babiker AG, Gordin F, Emery S, Grund B, Sharma S, et al. Initiation of Antiretroviral Therapy in Early Asymptomatic HIV Infection. The New England journal of medicine. 2015;373(9):795 – 807.
60. Bradley H, Hall HI, Wolitski RJ, Van Handel MM, Stone AE, LaFlam M, et al. Vital signs: HIV diagnosis, care, and treatment among persons living with HIV—United States, 2011. MMWR Morb Mortal Wkly Rep. 2014;63(47):1113-7.
61. Marks G, Crepaz N, Senterfitt JW, Janssen RS. Meta-analysis of high-risk sexual behavior in persons aware and unaware they are infected with HIV in the United States: implications for HIV prevention programs. JAIDS Journal of Acquired Immune Deficiency Syndromes. 2005;39(4):446 – 53.
62. Wilson DP, Hoare A, Regan DG, Law MG. Importance of promoting HIV testing for preventing secondary transmissions: modelling the Australian HIV epidemic among men who have sex with men. Sexual health. 2009;6(1):19 – 33.
63. Cohen MS, Chen YQ, McCauley M, Gamble T, Hosseinipour MC, Kumarasamy N, et al. Prevention of HIV-1 infection with early antiretroviral therapy. New England journal of medicine. 2011;365(6):493 – 505.
64. Rodger A, Bruun T, Weait M, Vernazza P, Collins S, Estrada V, et al. Partners of people on ART-a New Evaluation of the Risks (The PARTNER study): design and methods. BMC Public Health. 2012;12(1):296.
65. Grulich A, Bavinton B, Jin F, Prestage G, Zablotska I, Koelsch K, editors. HIV transmission in male serodiscordant couples in Australia, Thailand and Brazil. Seattle, Washington: 22nd Conference on Retroviruses and Opportunistic Infections; 2015.
66. Whittaker B. An early start: Major study finds early HIV treatment is best. 2015.
67. Rodger A, Cambiano V, Bruun T, Vernazza P, Collins S, Estrada V, et al., editors. HIV transmission risk through condomless sex if the HIV positive partner is on suppressive ART: PARTNER study. CROI; 2014; Boston.
68. Grulich AE, Bavinton BR, Jin F, Prestage G, Zablotska I, Grinsztejn B, et al., editors. HIV transmission in male serodiscordant couples in Australia, Thailand and Brazil. CROI; 2015; Seattle, Washington.
69. Cohen M. Antiretroviral Treatment Prevents HIV Transmission: Final Results from the HPTN 052 Randomized Controlled Trial. 8th IAS Conference on HIV Pathogenesis, Treatment, and Prevention; July 20; Vancouver2015.
70. Clayson DJ, Wild DJ, Quarterman P, Duprat-Lomon I, Kubin M, Coons SJ. A comparative review of health-related quality-of-life measures for use in HIV/AIDS clinical trials. Pharmacoeconomics. 2006;24(8):751 – 65.
71. Basavaraj KH, Navya MA, Rashmi R. Quality of life in HIV/AIDS. Indian journal of sexually transmitted diseases. 2010;31(2):75 – 80.
72. Power J, Thorpe, R, Brown, G, Lyons, A, Dowsett, GW, Lucke, J. HIV Futures 8: Health and Wellbeing of People Living with HIV. Melbourne: Australian Research Centre in Sex, Health and Society, La Trobe University. 2016.

73. Kirby Institute. Bloodborne viral and sexually transmissible infections in Aboriginal and Torres Strait Islander people: annual surveillance report 2017. Sydney: Kirby Institute, UNSW Sydney; 2017.
74. Regan DG, Wilson DP, Hocking JS. Coverage is the key for effective screening of Chlamydia trachomatis in Australia. Journal of Infectious Diseases. 2008;198(3):349 – 58.
75. Land JA, Van Bergen JE, Morre SA, Postma MJ. Epidemiology of Chlamydia trachomatis infection in women and the cost-effectiveness of screening. Human reproduction update. 2010;16(2):189 – 204.
76. Australian Institute of Health and Welfare. The inclusion of Indigenous status on pathology request forms. Cat.no. IHW 103. Canberra: AIHW; 2013.
77. Peipert JF. Clinical practice. Genital chlamydial infections. The New England journal of medicine. 2003;349(25):2424 – 30.
78. Oakeshott P, Kerry S, Aghaizu A, Atherton H, Hay S, Taylor-Robinson D, et al. Randomised controlled trial of screening for Chlamydia trachomatis to prevent pelvic inflammatory disease: the POPI (prevention of pelvic infection) trial. Bmj. 2010;340:c1642.
79. Haggerty CL, Gottlieb SL, Taylor BD, Low N, Xu F, Ness RB. Risk of sequelae after Chlamydia trachomatis genital infection in women. The Journal of infectious diseases. 2010;201 Suppl 2:S134 – 55.
80. The Kirby Institute. HIV, viral hepatitis and sexually transmissible infections in Australia Annual Surveillance Report 2015. The Kirby Institute, The University of New South Wales, Sydney, NSW 2052; 2015.
81. Skerlev M, Culav-Koscak I. Gonorrhea: new challenges. Clinics in dermatology. 2014;32(2):275 – 81.
82. Ward JS, Guy RJ, Akre SP, Middleton MG, Giele CM, Su JY, et al. Epidemiology of syphilis in Australia: moving toward elimination of infectious syphilis from remote Aboriginal and Torres Strait Islander communities? The Medical journal of Australia. 2011;194(10):525-9.
83. Graham S, Guy RJ, Ward JS, Kaldor J, Donovan B, Knox J, et al. Incidence and predictors of annual chlamydia testing among 15 – 29 year olds attending Aboriginal primary health care services in New South Wales, Australia. BMC health services research. 2015;15:437.
84. NACCHO/RACGP. National guide to a preventive health assessment for Aboriginal and Torres Strait Islander people: Second edition. South Melbourne: The RACGP; 2012.
85. Ward J, Bryant J, Wand H, Pitts M, Smith A, Delaney-Thiele D, et al. Sexual Health and relationships in young Aboriginal and Torres Strait Islander people: Results from the first national study assessing knowledge, risk practices and health service use in relation to sexually transmitted infections and blood borne viruses. Alice Springs: Baker IDI Heart & Diabetes Institute; 2014.
86. Chapter 4: Hepatitis B. Manual for the Surveillance of Vacine-Preventable Diseases. Atlanta: United States Centers for Disease Control and Prevention; 2014.
87. Australian Immunisation Handbook 9th Edition.;Accessed at: http://www.health.gov.au/internet/immunise/publishing.nsf/Content/Handbook-hepatitisb.
88. The Kirby Institute. HIV, viral hepatitis and sexually transmissible infections in Australia: Annual Surveillance Report 2015. Sydney, Australia: The Kirby Institute, UNSW Australia; 2015.
89. Ward J, Topp L, Iversen J, Wand H, Akre S, Kaldor J, et al. Higher HCV antibody prevalence among Indigenous clients of needle and syringe programs. Australian and New Zealand journal of public health. 2011;35(5):421-6.
90. Iversen JaLM. Australian NSP Survey: National Data Report 1995 – 2014. Prevalence of HIV, HCV and injecting and sexual behaviour among NSP attendees. Kirby Institute, The University of New South Wales: Sydney; 2014.
91. Mathers BM, Degenhardt L, Phillips B, Wiessing L, Hickman M, Strathdee SA, et al. Global epidemiology of injecting drug use and HIV among people who inject drugs: a systematic review. Lancet. 2008;372(9651):1733 – 45.
92. National HBV Testing Policy Expert Reference Committee. National hepatitis B testing policy 2012 v1.0. In: Commonwealth of Australia, editor. Darlinghurst NSW: ASHM; 2012.
93. Ali H, Donovan B, Fairley CK, Chen MY, O'Connor CC, Grulich AE, et al. Increasing access by priority populations to Australian sexual health clinics. Sex Transm Dis. 2013;40(10):819 – 21.
94. Allard NL, MacLachlan JH, Cowie BC. The cascade of care for Australians living with chronic hepatitis B: measuring access to diagnosis, management and treatment. Australian and New Zealand journal of public health. 2015.
95. Marino S, Hogue IB, Ray CJ, et al. A methodology for performing global uncertainty and sensitivity analysis in systems biology. Journal of Theoretical Biology. 2008;254(1):178–96. doi: 10.1016/j.jtbi.2008.04.011.
96. Turnour CE, Cretikos MA, Conaty SJ. Prevalence of chronic hepatitis B in South Western Sydney: evaluation of the country of birth method using maternal seroprevalence data. Australian and New Zealand journal of public health. 2011;35(1):22-6.
97. Reekie J, Gidding HF, Kaldor JM, Liu B. Country of birth and other factors associated with hepatitis B prevalence in a population with high levels of immigration. Journal of gastroenterology and hepatology. 2013;28(9):1539 – 44.

98. Cowie B, Karapanagiotidis T, Enriquez A, et al. Markers of hepatitis B virus infection and immunity in Victoria, Australia, 1995 to 2005. Australian and New Zealand Journal of Public Health. 2010;34(1):72–8.
99. Kowdley KV, Wang CC, Welch S, Roberts H, Brosgart CL. Prevalence of chronic hepatitis B among foreign-born persons living in the United States by country of origin. Hepatology. 2012;56(2):422 – 33.
100. Schweitzer A, Horn J, Mikolajczyk RT, Krause G, Ott JJ. Estimations of worldwide prevalence of chronic hepatitis B virus infection: a systematic review of data published between 1965 and 2013. Lancet. 2015;386(10003):1546 – 55.
101. MacLachlan JH AN, Towell V, et al. The burden of chronic hepatitis B virus infection in Australia, 2011. Australian and New Zealand Journal of Public Health. 2013;37(5):416–22. doi: 10.1111/1753 – 6405.12049.
102. Nakhaee F, Black D, Wand H, McDonald A, Law M. Changes in mortality following HIV and AIDS and estimation of the number of people living with diagnosed HIV/AIDS in Australia, 1981 – 2003. Sex Health. 2009;6(2):129 – 34.
103. Australian HIV Observational Database Annual Report. In: Institute TK, editor.: The University of New South Wales; 2013.
104. Van Sighem A, Nakagawa F, De Angelis D, et al. Estimating HIV incidence, time to diagnosis, and the undiagnosed HIV epidemic using routine surveillance data. Epidemiology. 2015;26(5):653–60. doi: 10.1097/EDE.0000000000000324.
105. Holt M, Lea T, Asselin J, et al. The prevalence and correlates of undiagnosed HIV among Australian gay and bisexual men: results of a national, community-based, bio-behavioural survey. Journal of the International AIDS Society. 2015;18:20526. doi: 10.7448/ias.18.1.20526.
106. The Australian HIV Observational Database. Rates of combination antiretroviral treatment change in Australia, 1997 – 2000. HIV Med. 2002;3(1):28 – 36.
107. MacDonald M, Wodak AD, Ali R, Crofts N, Cunningham PH, Dolan KA, et al. HIV prevalence and risk behaviour in needle exchange attenders: a national study. The Collaboration of Australian Needle Exchanges. Med J Aust. 1997;166(5):237 – 40.
108. Power, J, Brown, G, Lyons, A, Dowsett, G W, Lucke, J, Thorpe, R. HIV FUTURES 8. Health and wellbeing of people living with HIV. Australian Research Centre in Sex, Health and Society. 2016.
109. Holt M, Lea T, Mao L, Zablotska I, Lee E, Hull P, et al. Adapting behavioural surveillance to antiretroviral-based HIV prevention: reviewing and anticipating trends in the Australian Gay Community Periodic Surveys. Sexual Health. 2016;14(1):72-9.
110. Zablotska IB, Kippax S, Grulich A, Holt M, Prestage G. Behavioural surveillance among gay men in Australia: methods, findings and policy implications for the prevention of HIV and other sexually transmissible infections. Sexual Health. 2011;8(3):272-9.
111. Ward J, Bryant J, Wand H, Pitts M, Smith A, Thiele DD, et al. Sexual health and relationships in young Aboriginal and Torres Strait Islander people. 2014.

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