Tracking the progress, 2018

National Strategies for blood-borne viruses and sexually transmissible infections 2014–2017

UNSW SYDNEY

Kirby Institute

ISSN xxxx-xxxx (Online)

This publication is available at Internet address
http://www.kirby.unsw.edu.au

Suggested citation:
The Kirby Institute. Tracking the progress, 2018. Sydney: Kirby Institute, UNSW Sydney; 2019.

The Kirby Institute for infection and immunity in society.
UNSW Sydney, Sydney NSW 2052

Telephone: 02 9385 0900 Facsimile: 02 9385 0920 International prefix: 61 2
Email: recpt@kirby.unsw.edu.au

Tracking the progress, 2018

National Strategies for blood-borne viruses and sexually transmissible infections 2014 – 2017

The Kirby Institute

in collaboration with

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

prepared by

Jonathan King

edited by

Dr Skye McGregor, Professor Rebecca Guy

other contributors:

- Office of Health Protection, Australian Government Department of Health State/territory health departments
- Aditi Dey, Frank Beard, National Centre for Immunisation Research and Surveillance
- Laila Khawar, Allison Carter, Denton Callander, Gregory Dore, Jane Costello, Jennifer Iversen, Rainer Puhr, The Kirby Institute, UNSW Sydney
- Karen McCulloch, Benjamin Cowie, Jennifer MacLachlan, Nicole Romero, WHO Collaborating Centre for Viral Hepatitis, Victorian Infectious Diseases Reference Laboratory, The Doherty Institute
- Campbell Aitken, Clarissa Moreira, Jason Asselin, Margaret Hellard, Burnet Institute
- Glenda Balderson, Australia and New Zealand Liver Transplant Registry
- Julia Brotherton, Lisette Bicknell, National HPV Vaccination Program Register
- Karen Chronister, Phillip Read, Kirketon Road Centre
- Limin Mao, Centre for Social Research in Health, UNSW Sydney

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

The Kirby Institute is funded by the Australian Government Department of Health. This report is produced in collaboration with the National Blood Borne Viruses and Sexually Transmissible Infection Subcommittee (NBBVSTI SCC) of Communicable Diseases Network Australia.

Table of Contents

Preface

Welcome to *Tracking the progress, 2018; National Strategies for blood-borne viruses and sexually transmissible infections 2014 – 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.

Preface

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 the 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 and, where feasible, makes reference to short- (since 2013, the last year of the previous National Strategies) and longer-term (generally since 2008) progress. The fourth and final year of the current Strategies, 2017, provides many encouraging results, where a number of targets from the Plan are either close to or have been met, and 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 three hepatitis B targets (Target 1) has been met for the first time in 2017 with hepatitis B vaccination coverage rates at 12 months of age reaching 95%, and 24 months of age reaching 96%, exceeding The Plan's target of 95%. Of the estimated 233 947 people living in Australia with chronic hepatitis B in 2017, an estimated 64% had been diagnosed (target 3 = 80%), 18% were in care and 8% were on treatment (target 4 = 15% on treatment).

For hepatitis C, Target 2 (increase the number of people receiving treatment by 50% each year) has not been met. Data was not available for 2017 to assess Target 1, however, trends in the rate of hepatitis C notification 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 has declined by 16% between the years 2013 – 2017. There has been a 34% reduction in treatment provision between 2016 and 2017. However, there has been a six-fold increase in the number of people receiving treatment since 2013. At the end of 2017, there were an estimated 145 838 people living and diagnosed with chronic hepatitis C as well as 20 454 who were cured of hepatitis C during 2017. Of these, an estimated 21 530 (13%) received treatment in 2017. The reduction in treatment numbers between 2016 and 2017 is partly due to the warehousing effect of people waiting for the widespread availability of DAAs commencing in March 2016.

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 80% and 76%, respectively in 2017 (target = 70%). Target 2, regarding testing coverage in priority populations, has been partially met with an increase in the proportion of gay men who had a STI test in the past year, from 68% in 2013 to 75% in 2017. However, the proportion of 15 – 29-year-olds receiving a chlamydia test was 14% in both 2013 and 2017 meaning the Target 2 was not completely met. Targets 3 – 5 relating to STI incidence and testing have not yet been met. Between 2013 and 2017 there was an increase in gonorrhoea notification rates (from 65.5 to 118.0 per 100 000 population); and infectious syphilis notification rates (from 7.8 to 18.3 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 2017 at 11% and 10%, respectively, signifying that chlamydia positivity has remained stable. Between 2013 and 2016 the number of congenital syphilis cases has reduced from eight to two and has since increased to eight in 2017 relating to an ongoing syphilis outbreak occurring across northern Australia. (see Table 4 notes for detail), 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 0.04 per 100 person years in 2017); people who inject drugs (HIV prevalence was 2.7% in 2017 or 0.7% if men who have sex with men are excluded); and mother-to-child HIV transmission (zero HIV cases in 2017). In 2017, 87% 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, one in 2016 and five in 2017 (target 1); which equates to 59% 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 not been met, with rates remaining high and the proportion of chlamydia tests yielding a positive result remaining steady with 11% in 2013 and 10% in 2017. However, notification rates of gonorrhoea declined relatively by 12% (from 713.9 per 100 000 population in 2013 to 627.5 per 100 000 population in 2017). Target 2 for infectious syphilis has not been met; with a more than fivefold increase in infectious syphilis notification rates (from 19.5 per 100 000 population in 2013 to 102.5 per 100 000 population in 2017). Similarly, target 3 has not been met; the use of receptive injecting equipment sharing among Aboriginal and Torres Strait Islander participants increased from 21% in 2013 to 26% in 2017 (15% in both 2013 and 2017 among 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 2017, 30% 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 reporting.

Detailed results of the 2017 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.

The five National Blood Borne Viruses (BBV) and Sexually Transmissible Infections (STI) Strategies 2018 – 2022 were released in November 2018. Future reporting will include detail on any new indicators and the differences with the National Strategies, 2014 – 2017.

Table 1 Progress with the National Strategies Targets

Strategy	Targets	2013 estimate	2014 estimate	2015 estimate	2016 estimate	2017 estimate	Meets target in 2017^
Hepatitis B	1. Achieve 95% hepatitis B childhood vaccination:						
	12 months of age	91%	92%	93%	94%	95%	Yes
	24 months of age	94%	94%	95%	96%	96%	Yes
	2. Increase to 80% the proportion of all people living with chronic hepatitis B who are diagnosed	62%	62%	63%	64%	64%	No
	3. Increase to 15% the proportion of all people living with chronic hepatitis B who are receiving antiviral treatment	5%	7%	8%	8%	8%	No

Note: Incidence rates are provided per 100 person years and notification rates are provided per 100 000 population.

^ Decisions on whether the target has been met are based on
- a) Meeting the target when the target is specific (e.g. increase to 80% the proportion with hepatitis B who are diagnosed);
- b) Based on previous year's modelling estimates;
- c) 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
- d) A relative change of ≥5% for number/notifications when the target is not specific (e.g. reduce incidence).

Strategy	Targets	2013 estimate	2014 estimate	2015 estimate	2016 estimate	2017 estimate	Meets target in 2017^
Hepatitis C	1. Reduce the hepatitis C notification rate of those aged less that 25 years of age	Notification rate of 17.5 per 100 000 population	Notification rate of 15.3 per 100 000 population	Notification rate of 15.8 per 100 000 population	Notification rate of 15.1 per 100 000 population	Notification rate of 14.7 per 100 000 population	Yes
	2. Increase the number of people receiving antiviral treatment by 50% each year	3 540	3 749	7 326	32 550	21 530	For 2014 – 2016: Yes For 2016 – 2017: No†

Note: Incidence rates are provided per 100 person years and notification rates are provided per 100 000 population.

^ Decisions on whether the target has been met are based on
- a) Meeting the target when the target is specific (e.g. increase to 80% the proportion with hepatitis B who are diagnosed);
- b) Based on previous year's modelling estimates;
- c) 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
- d) A relative change of ≥5% for number/notifications when the target is not specific (e.g. reduce incidence).

† The reduction in treatment numbers between 2016 and 2017 after the large increase between 2015 and 2016 is partly due to the warehousing effect of people waiting for the widespread availability of DAAs commencing in March 2016.

Strategy	Targets	2013 estimate	2014 estimate	2015 estimate	2016 estimate	2017 estimate	Meets target in 2017^
STI	1. Achieve human papillomavirus (HPV) vaccination coverage of 70%	72% in adolescent females	75% in adolescent females	79% in adolescent females	80% in adolescent females	80% in adolescent females	Yes
		30% in adolescent males	62% in adolescent males	68% in adolescent males	74% in adolescent males	76% in adolescent males	Yes
	2. Increase testing coverage in priority populations						
	a. Chlamydia testing in 15 – 29 year olds	14%	14%	15%	15%	14%	No
	b. STI testing in gay men	68%	70%	73%	72.3%	75%	Yes
	3. Reduce the incidence of chlamydia (15 – 29 year olds)§	11%	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 100.9 per 100 000 population	Notification rate of 118.0 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 11.9 per 100 000 population	Notification rate of 14.4 per 100 000 population	Notification rate of 18.3 per 100 000 population	No
	5b. Eliminate congenital syphilis#	8 cases	3 cases	3 cases	2 cases	8 cases	#No

Note: Incidence rates are provided per 100 person years and notification rates are provided per 100 000 population.

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

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

b) Based on previous year's modelling estimates;

c) 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

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

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.

Strategy	Targets	2013 estimate	2014 estimate	2015 estimate	2016 estimate	2017 estimate	Meets target in 2017^
HIV	1. Reduce sexual transmission of HIV by 50% by 2015††	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	*	Indicator not available for 2017
	2. Sustain the low general population rates of HIV in Aboriginal and Torres Strait Islander people and communities	Notification rate of 4.6 per 100 000 population	Notification rate of 5.4 per 100 000 population	Notification rate of 6.2 per 100 000 population	Notification rate of 6.5 per 100 000 population	Notification rate of 4.6 per 100 000 population	No
	3. Sustain the virtual elimination of HIV among sex workers	0.08 per 100 person years	0.00 per 100 person years	0.04 per 100 person years	0.04 per 100 person years	0.04 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	2.1% prevalence	Yes
	5. Sustain the virtual elimination of mother-to-child HIV transmission	0 cases	0 cases	2 cases	0 cases	0 cases	No
	6. Increase treatment uptake by people with diagnosed HIV to 90%	79% (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)	87% (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##

Note: 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

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

b) Based on previous year's modelling estimates;

c) 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

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

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.

†† 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 63% of notifications in 2017.

Strategy	Targets	2013 estimate	2014 estimate	2015 estimate	2016 estimate	2017 estimate	Meets target in 2017^
Aboriginal and Torres Strait Islander	1. Reduce the incidence of:						
	chlamydia (positivity in 15 – 29 year olds)	17%	16%	14%	14%	14%	No
	gonorrhoea, and	Notification rate of 713.9 per 100 000 population	Notification rate of 578.7 per 100 000 population	Notification rate of 572.2 per 100 000 population	Notification rate of 594.0 per 100 000 population	Notification rate of 627.5 per 100 000 population	No
	infectious syphilis	Notification rate of 19.5 per 100 000 population	Notification rate of 31.3 per 100 000 population	Notification rate of 56.1 per 100 000 population	Notification rate of 70.6 per 100 000 population	Notification rate of 102.5 per 100 000 population	No
	2. Eliminate congenital syphilis‡	4 cases	3 cases	2 cases	1 case	5 cases	‡No
	3. Increase the use of sterile injecting equipment for every injecting episode (Indicator used here is receptive needle/syringe sharing)	21%	22%	24%	28%	26%	No
	4. Increase treatment uptake by people with HIV‡‡	*	*	*	*	*	*
	5. hepatitis C, 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%	Treatment in the last 12 months 30%	Yes
	6. hepatitis B^^	*	*	*	*	*	*

Note: 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

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

b) Based on previous year's modelling estimates;

c) 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

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

‡ Not all cases of congenital syphilis where associated with live births.

‡‡ 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 reporting

^^ 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:

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.

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 fourth and final 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 2018*.[3]

Figures

Tables

1. Hepatitis B

Epidemiology overview:

At the end of 2017, an estimated 233 947 people were living with chronic hepatitis B infection in Australia. In 2017 the estimated prevalence of chronic hepatitis B infection among people living in Australia was 0.97%, which is higher than the latest modelled estimates of people living in the United Kingdom (<0.5%) but lower than many other countries in Southeast 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 or bodily fluids, especially among young children.[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. According to modelled estimates, of the 233 947 people living with chronic hepatitis B in Australia at the end of 2017, 90 027 (38.5%) people were born in the Northeast and Southeast Asian countries, 26 241 (11.2%) were Aboriginal and Torres Strait Islander people, 13 386 (5.7%) were people who inject drugs (including current and former), 10 470 (4.5%) were men who have sex with men and 8 167 (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 2018*.[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 two years) was 0.6 per 100 000 population in 2017, 25% lower than the rate of 0.8 in 2013. Over the last ten years this represents a decline of 50% from a notification rate of 1.2 per 100 000 population in 2008. The rate of overall notification (newly acquired and unspecified) has reduced by 16% over the past ten years, from 28.9 per 100 000 population in 2008 to 24.4 per 100 000 in 2017, with a more marked 52% decline in those aged less than 25 years.

Uptake of preventative measures

- The coverage of infant hepatitis B vaccination at 24 months has increased each year since 2012 and was 96% in 2017. The coverage at 12 months has increased from 91% in 2013 to 95% in 2017.

Testing and Treatment

- Based on modelled estimates, in 2017, 64% of people living in Australia with chronic hepatitis B infection had been diagnosed, 18% of those with chronic hepatitis B infection were in care and 8% of those with chronic hepatitis B infection received antiviral therapy.

Morbidity

- In 2017, 6% (13 of 224) of people who had a liver transplant had hepatitis B infection; compared with 3% (7 of the 233) in 2016, and 5% (9 out of 198) in 2013.
- There were an estimated 479 (range 465 to 501) deaths attributable to hepatitis B in 2017, compared to 504 (range 489 to 527) in 2016.

Personal and social impacts

- In a survey conducted in 2017, 50% of the surveyed general public reported that they would behave negatively towards other people due to their hepatitis B status.

Summary: In the fourth and final year of the Second National Hepatitis B Strategy, infant immunisation programs for hepatitis B meet the coverage target of 95% at both 24 months and 12 months of age. Evidence is emerging of the benefits of infant immunisation, with declining hepatitis B notification rates in younger age groups (<25 years) compared to ten years prior. Those currently younger than 25 years can be used as a proxy for those 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. In 2017, 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 was 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	2017 estimate
Incidence	1.1	Reduce hepatitis B infections	1.1a	Annual rate of notifications of newly acquired hepatitis B (per 100 000 population)^	0.8	0.7	0.6	0.7	0.6
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%	95% 96%
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	62%	62%	63%	64%	64%
			1.3b	Annual rate of notifications of unspecified hepatitis B (per 100 000 population)	28.2	27.2	26.6	26.6	24.4
			1.3c	Prevalence of hepatitis B in pregnant women by country of birth and Aboriginal and Torres Strait Islander status †	*	*	*	*	*
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%	7%	8%	8%	8%
			1.4b	*Additional information:* Proportion of people with chronic hepatitis B who received monitoring for chronic hepatitis B	14%	16%	18%	18%	18%
Personal and social Impact	1.5	Reduce burden of disease attributed to chronic hepatitis B	1.5a	Hepatitis B burden of disease indicator being developed.	*	*	*	*	*
			1.5b	*Additional information:* Proportion of liver transplant recipients with hepatitis B (including hepatitis B related liver cancers)	5%	7%	8%	3%	6%
	1.6	Eliminate the negative impact of stigma, discrimination, and legal and human rights issues on people's health	*1.6a*	Estimated deaths attributable to chronic hepatitis B:	567	548	527	504	479
			1.6b	*Additional information:* Proportion of surveyed health care workers who report expressing any stigma or discrimination towards clients living with hepatitis B	*	*	*	<10%	*
			1.6c	*Additional information:* Proportion of the general public who report that they would express any stigma or discrimination towards people living with hepatitis B	*	*	*	*	50%

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.

^ 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; 0Hepatitis B cascade modelling estimates for the years 2013 and 2014 have used separate estimates to the years 2015, 2016 and 2017 and therefore caution should be applied when comparing these time periods.

† data currently unavailable but will be included in future reporting.

1.1 Reduce new hepatitis B infections

1.1a Annual rate of notifications of newly acquired hepatitis B

Indicator definition

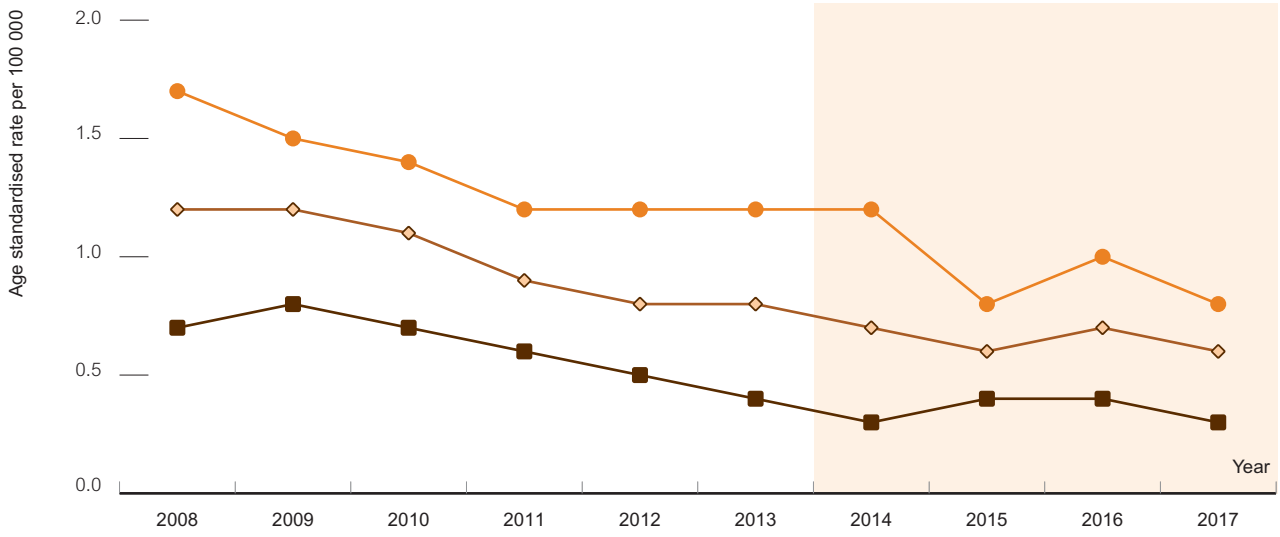
Numerator	Number of newly acquired hepatitis B notifications reported to National Notifiable Diseases Surveillance System (NNDSS)
Denominator	Australian population reported by the ABS

Background: Monitoring the rate of newly acquired (within the last two 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 an infection acquired within the last two years, or one that demonstrates clinical evidence suggesting an acute infection. 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. 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 2017, the age-standardised notification rate of newly acquired hepatitis B declined by 25%, from 0.8 to 0.6 per 100 000 population, respectively (Figure 1). In the past ten years, the notification rate of newly acquired hepatitis B has declined by 50% from 1.2 per 100 000 population in 2008 to 0.6 per 100 000 population in 2017, with declines in both males and females over this period. The decline was greatest in those aged 25 – 29 years (from 3.1 to 0.8 per 100 000), 20 – 24 years (from 2.5 to 0.4 per 100 000), and 15 – 19 years (from 0.9 to 0.1 per 100 000) (Figure 2). The overall notification rate (newly acquired and unspecified) show similar trends, with a 44% 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, the notification rate of newly acquired hepatitis B in males was at least twice that of females for years 2010 – 2017; the reasons for this difference are unclear and are being investigated for future reporting.

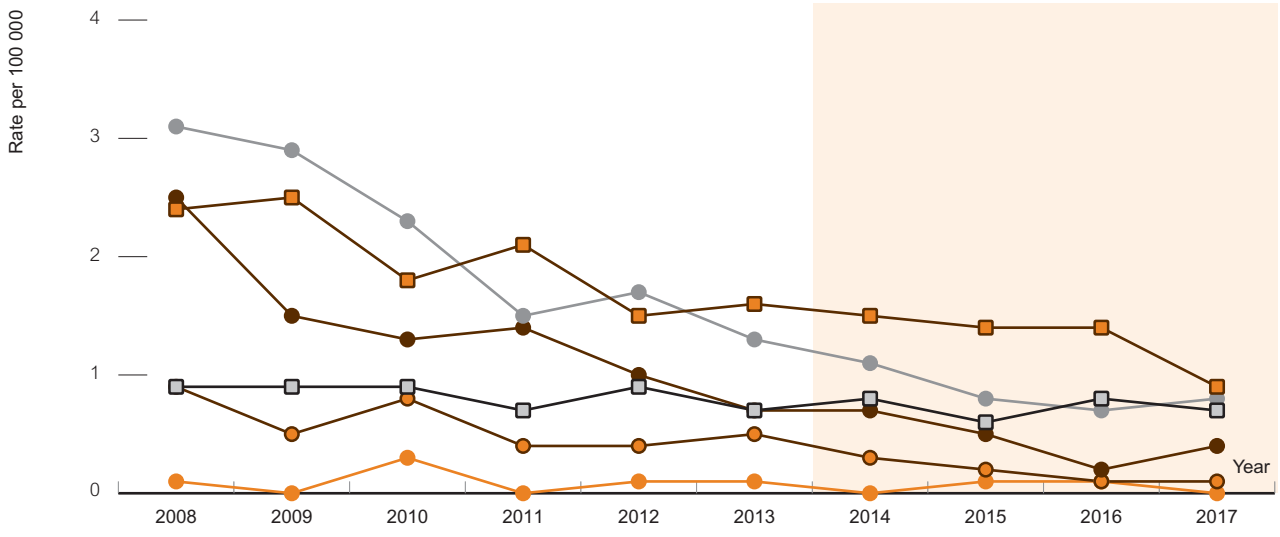
Figure 1 Newly acquired hepatitis B notification rate per 100 000 population, 2008 – 2017, by sex



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total	1.2	1.2	1.1	0.9	0.8	0.8	0.7	0.6	0.7	0.6
Male	1.7	1.5	1.4	1.2	1.2	1.2	1.2	0.8	1.0	0.8
Female	0.7	0.8	0.7	0.6	0.5	0.4	0.3	0.4	0.4	0.3

Source: National Notifiable Diseases Surveillance System

Figure 2 Newly acquired hepatitis B notification rate per 100 000 population, 2008 – 2017, by age group



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
0-14	0.1	0.0	0.3	0.0	0.1	0.1	0.0	0.1	0.1	0.0
15-19	0.9	0.5	0.8	0.4	0.4	0.5	0.3	0.2	0.1	0.1
20-24	2.5	1.5	1.3	1.4	1.0	0.7	0.7	0.5	0.2	0.4
25-29	3.1	2.9	2.3	1.5	1.7	1.3	1.1	0.8	0.7	0.8
30-39	2.4	2.5	1.8	2.1	1.5	1.6	1.5	1.4	1.4	0.9
40+	0.9	0.9	0.9	0.7	0.9	0.7	0.8	0.6	0.8	0.7

Source: National Notifiable Diseases Surveillance System

HBV

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

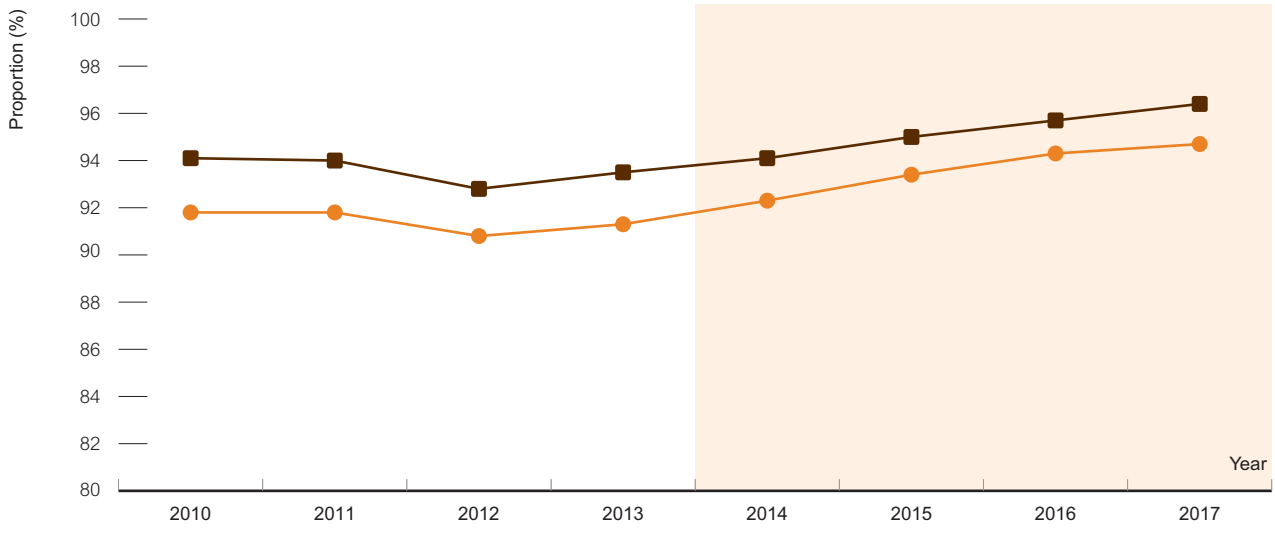
Numerator	Number of children in the relevant cohort who have dose 3 by 12 (and 24) months of age recorded on the Australian Childhood Immunisation Register (ACIR)
Denominator	Number of children turning 12 (and 24) months of age in the measurement year on the ACIR

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 six to 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 2017 from 93.5% to 96.4%, respectively (Figure 3). Over the period 2010 – 2017, hepatitis B vaccination coverage at 12 months of age was between 91.3% and 94.7%.

Figure 3 Hepatitis B vaccination coverage estimates at 12 and 24 months of age, 2010 – 2017



	2010	2011	2012	2013	2014	2015	2016	2017
12 months	91.8%	91.8%	90.8%	91.3%	92.3%	93.4%	94.3%	94.7%
24 months	94.1%	94.0%	92.8%	93.5%	94.1%	95.0%	95.7%	96.4%

Source: National Centre for Immunisation Research & Surveillance

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

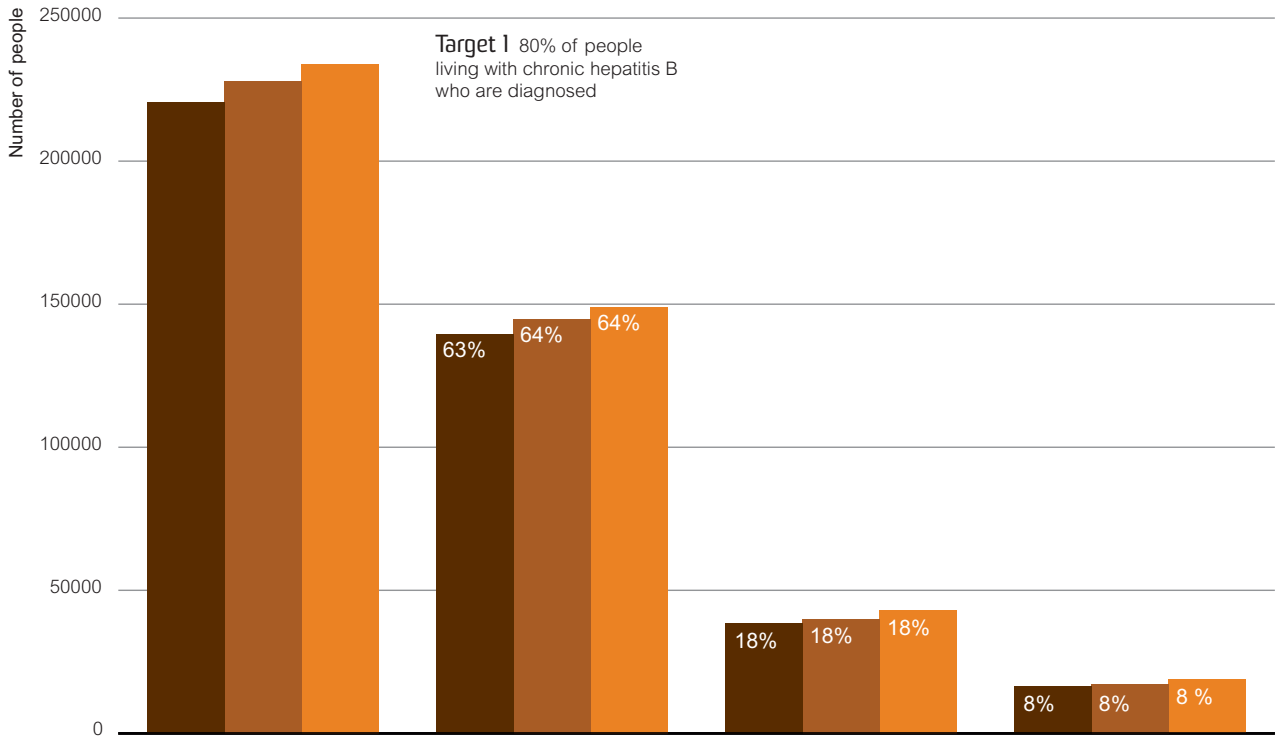
Numerator	Cumulative number of hepatitis B notifications reported to NNDSS from 1971 – 2017
Denominator	Modelled total number of people who have ever had chronic hepatitis B in Australia

Background: 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 – 2017 as the numerator. These estimates are produced by the WHO Collaborating Centre for Viral Hepatitis at the Peter Doherty Institute. See Methodological Notes for further detail.

Results: During 2017, an estimated 233 947 people were living with chronic hepatitis B and an estimated 149 118 (64%) were diagnosed with hepatitis B (Figure 4).

Figure 4 The hepatitis B diagnosis and care cascade, 2015 – 2017



	Living with hepatitis B infection	Diagnosed with hepatitis B	Receiving care	Received treatment
2015	220 774	139 507	38 694	16 622
2016	227 976	144 742	40 090	17 192
2017	233 947	149 118	43 218	18 851

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

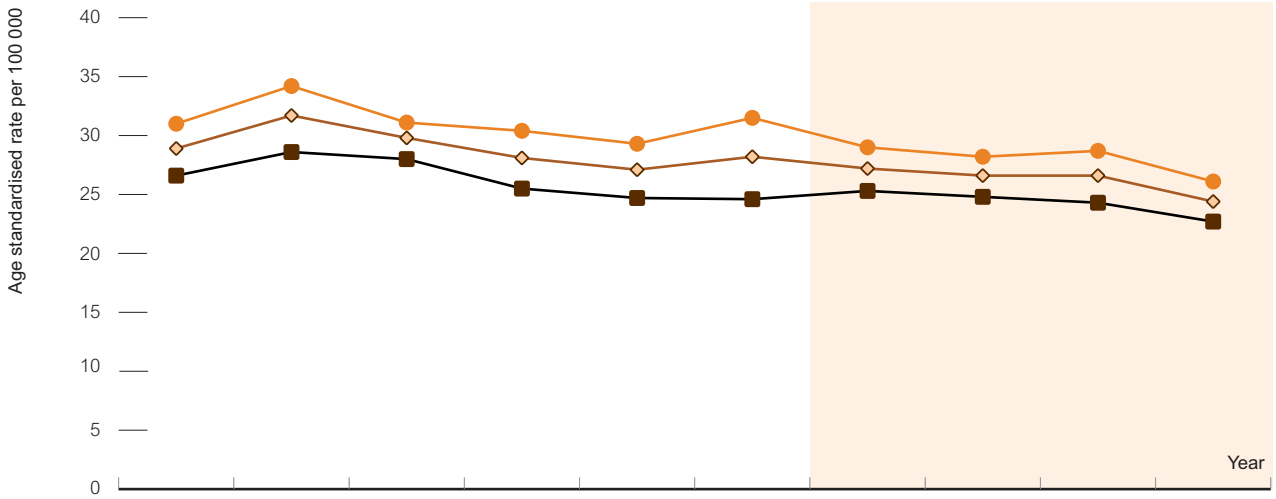
Numerator	Number of notifications of unspecified hepatitis B reported to NNDSS
Denominator	Australian population reported by the ABS

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 a relative 13% from 28.2 per 100 000 population in 2013 (6470 cases) to 24.4 per 100 000 population in 2017 (5961 cases) (Figure 5). Long-term the notification rate has decreased by 16% from 28.9 per 100 000 population in 2008. Notification rates among males were higher than among females in 2017, at 26.1 per 100 000 population for males and 22.7 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 5 Unspecified hepatitis B rate of notification per 100 000 population, 2008 – 2017, by sex



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total	28.9	31.7	29.8	28.1	27.1	28.2	27.2	26.6	26.6	24.4
Males	31.0	34.2	31.1	30.4	29.3	31.5	29.0	28.2	28.7	26.1
Females	26.6	28.6	28.0	25.5	24.7	24.6	25.3	24.8	24.3	22.7

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.

1.3d Prevalence of hepatitis B in Aboriginal women giving birth in New South Wales and the Northern Territory (additional information)

Indicator definition

Numerator	Number of Aboriginal women who gave birth during the specified time in New South Wales and the Northern Territory who were also notified as living with hepatitis B.
Denominator	Number of Aboriginal women recorded as giving birth during the specified time period in New South Wales and the Northern Territory

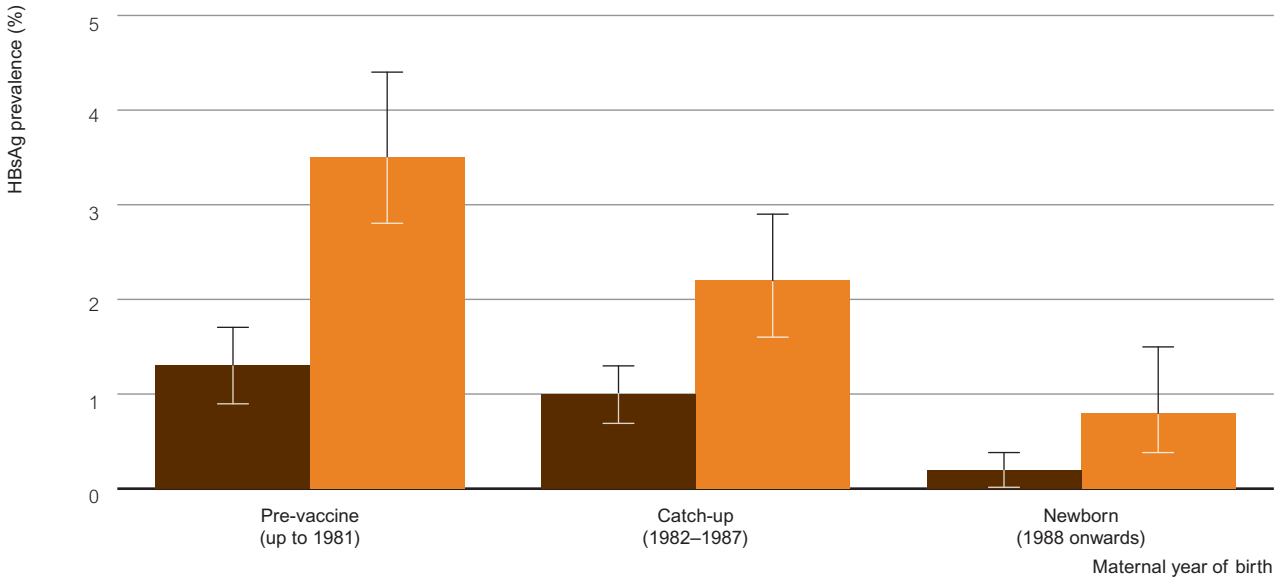
Background: See 1.3c

Data source and considerations: Prevalence estimates for Aboriginal women giving birth can be provided from two published studies [12, 13]. The NSW study linked data from two statutory registers – the NSW Perinatal Data Collection (which records all births in NSW of babies at least 400 grams birth weight or 20 weeks gestation) and the NSW Notifiable Conditions Information System (which records all notifications of conditions notifiable under the NSW Public Health Acts 1991 and 2010). The study was limited to women of resident in NSW, of reproductive age (10 – 55 years at time of giving birth), who gave birth to their first child between January 2000 (when routine antenatal screening began) and December 2012.The Northern Territory study linked data from the Northern Territory Perinatal Register (which records all births in the Northern Territory of babies at least 400 grams birth weight or 20 weeks gestation) and the Northern Territory Notifiable Diseases System (which contains a record of every diagnosis of HBV in the Northern Territory). The study was limited to all women giving birth as public patients in the Northern Territory between September 2005 and 31 December 2010. Women born overseas or not usually resident in the Northern Territory were excluded.

Although data were collected prior to the years of the 2014 – 2017 national blood-borne virus (BBV) and sexually transmissible infections (STIs) strategies, they do give an indication of the effectiveness of the infant hepatitis B vaccination programs.

Results: These studies suggest that among Aboriginal women giving birth in the Northern Territory and NSW, hepatitis B prevalence rates are around 80% lower in women born after childhood hepatitis B vaccination was introduced in 1988 than in those born in the pre-vaccine period (Figure 6).

Figure 6 Prevalence of chronic hepatitis B infection among Aboriginal women giving birth in NSW (2000 – 2012) and the Northern Territory (2005 – 10) by maternal year of birth



	Pre-vaccine (up to 1981)	Catch-up (1982–1987)	Newborn (1988 onwards)
NSW (%)	1.3	1.0	0.2
NT (%)	3.5	2.2	0.8

Source: Deng et al and Liu et al (12)

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.[14, 15]

Data source and considerations: The number of people receiving treatment for chronic hepatitis B in 2015 – 2017 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 2015, 2016 and 2017, an estimated 8% of all people living with hepatitis B received antiviral treatment (Figure 4). In 2013 this proportion was estimated to be 5% (data not shown).

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.[14] In people not on treatment, hepatitis B DNA viral load testing is an important component of monitoring disease progression.[16] Monitoring of viral load in people on treatment is important to provide information on success and required duration of antiviral therapy.[17]

Data source and considerations: The number of people who received monitoring and/or antiviral treatment for chronic hepatitis B in 2017 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 2017, nationally 43 218 people received either antiviral therapy or a yearly viral load test. This represents an estimated 18% of people living with chronic hepatitis B in care or on treatment (see Figure 4), compared with 14% in 2013 (data not shown).

1.5 Reduce burden of disease attributed to chronic hepatitis B

1.5a Estimates of mortality attributable to chronic hepatitis B

Indicator definition

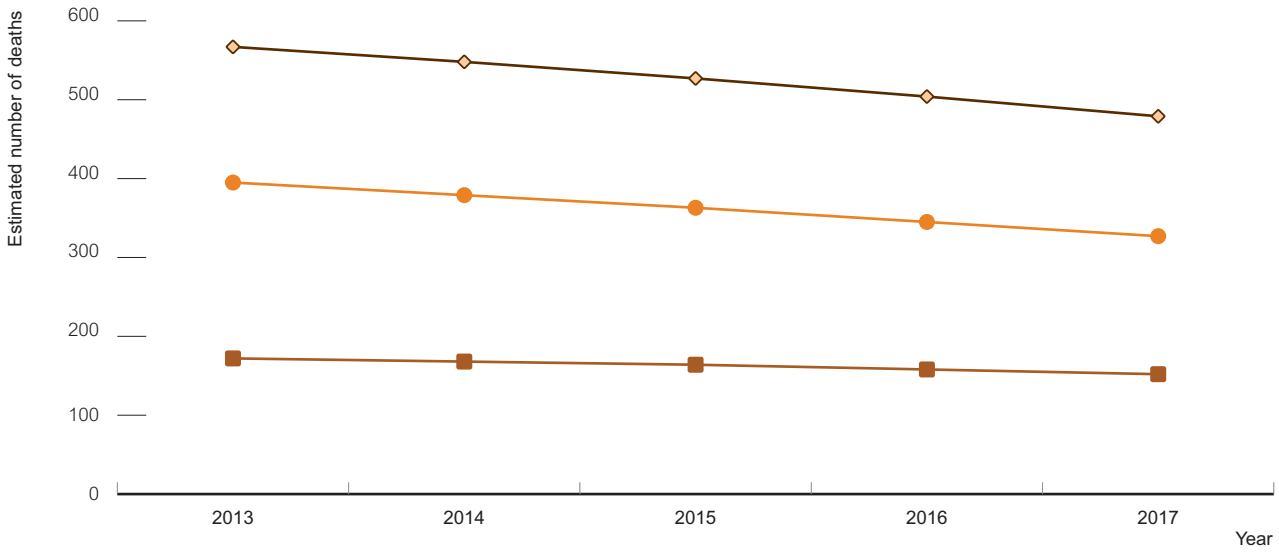
Single measure	Estimated number of deaths due to chronic hepatitis B related cirrhosis and hepatocellular carcinoma.

Background: To plan appropriate clinical care and treatment responses to the hepatitis B epidemic, accurate estimates of the rates of chronic hepatitis B related mortality are essential.

Data source and considerations: The estimated number of deaths due to chronic hepatitis B related cirrhosis and hepatocellular carcinoma are derived using mathematical modelling. These estimates are produced by the WHO Collaborating Centre for Viral Hepatitis at the Peter Doherty Institute. See Methodological Notes for further detail.

Results: In 2017, there were an estimated 479 (range 465 – 501) deaths attributable to chronic hepatitis B. This number has reduced by 16% since 2013 when there were 567 (range 538 – 598) deaths. Of the estimated 479 deaths in 2017, 327 were due to hepatocellular carcinoma and 152 were due to decompensated cirrhosis (Figure 7).

Figure 7 National estimates of the number of deaths attributable to chronic hepatitis B, 2013 – 2017



	2013	2014	2015	2016	2017
Decompensated Cirrhosis	172	168	164	158	152
Hepatocellular Carcinoma	395	379	363	345	327
Total	567	548	527	504	479

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

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

Indicator definition

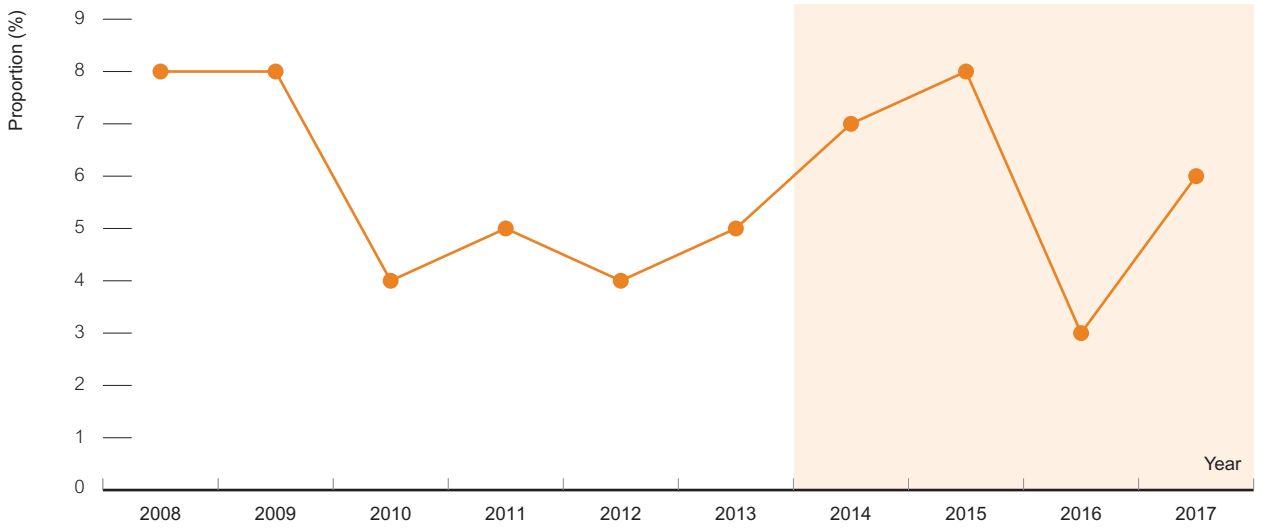
Numerator	Number of liver transplant recipients with chronic hepatitis B related diseases, including hepatocellular cancers
Denominator	Total number of liver transplants in a year

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 since 1985. People undergoing liver transplantation have been routinely tested for hepatitis B infection and 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.

Results: In 2017, 13 of 224 (6%) 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 8). 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 8 Proportion of liver transplant recipients with hepatitis B, 2008 – 2017



Liver transplant recipients (%)

●	8%	8%	4%	5%	4%	5%	7%	8%	3%	6%

Liver transplant recipients (n)

	9	12	7	8	7	9	13	17	7	13

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, health care workers and the general public.

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. A qualitative study has been conducted within the Chinese community to scope key issues of relevance to this group with the results of this study due for release in 2019. The Stigma Indicator Monitoring project has measured 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.

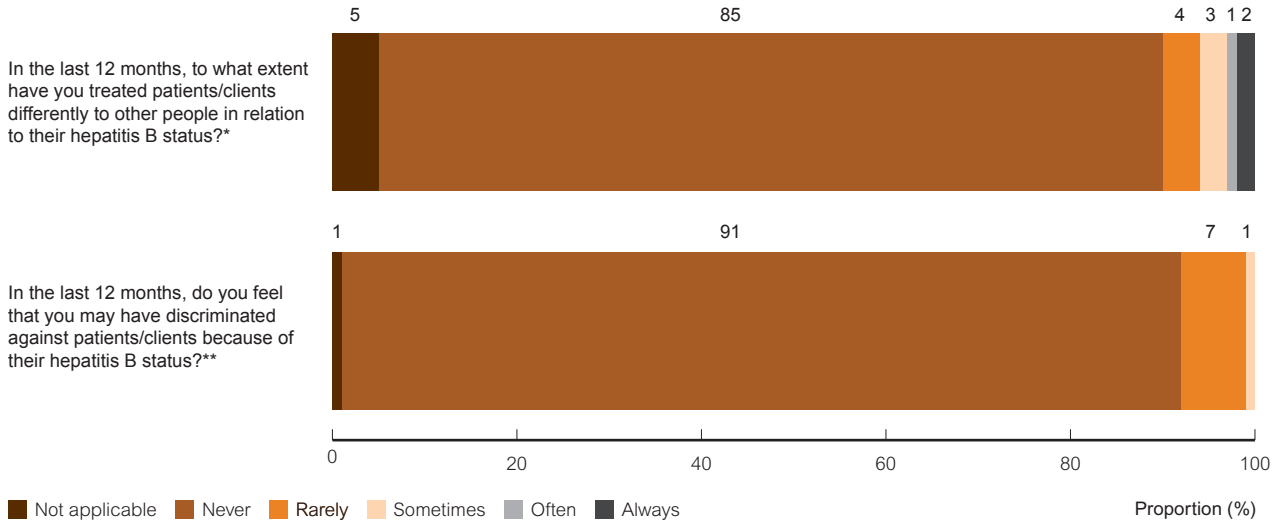
Data source and considerations: The Centre for Social Research in Health developed an indicator of expressed stigma that has been used with health care workers in relation to key attributes related to the national strategies. A single question was selected to indicate expressed stigma in relation to 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 revised in the subsequent round of the survey 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 is important to note 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=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. For this survey, 253 respondents answered the original version of the survey and 98 respondents answered the revised version (Figure 9)

HBV

Figure 9 Proportion of health care workers expressing stigma or discrimination towards clients living with hepatitis B in the last 12 months



* Original version of the survey question;
** Revised version of the survey question

Source: The Centre for Social Research in Health

1.6c Proportion of the Australian public who report they would express stigma or discrimination towards people living with hepatitis B (additional information)

A mirrored stigma indicator has been implemented with a representative sample of the Australian general public to identify the extent to which they would express stigma towards people living with hepatitis B.

Indicator definition

Numerator	Proportion of the general public who report that they would express any stigma or discrimination towards people living with hepatitis B
Denominator	Total number of the general public surveyed

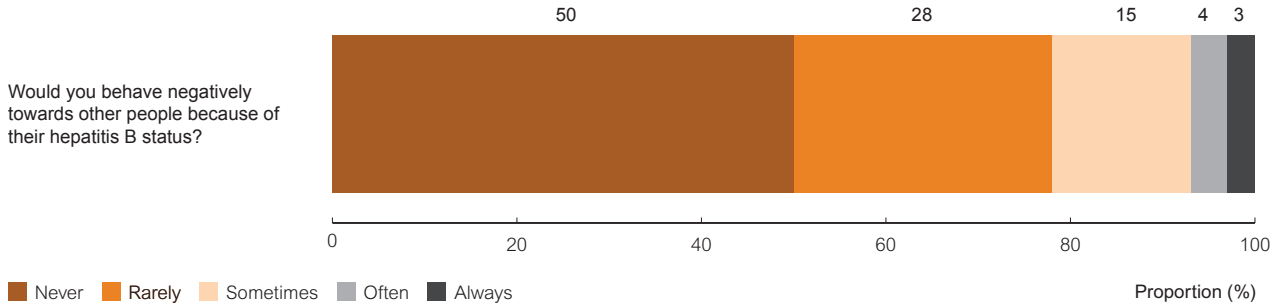
Background: See Section 1.6.

Data source and considerations: The Centre for Social Research in Health (CSRH) also developed a mirrored stigma indicator that has been implemented with the general public to identify their expression of stigma towards people living with hepatitis B. The mirrored indicator was included in three waves of the 2017 Australian Survey of Social Attitudes (AuSSA), conducted by the Australian Consortium for Social and Political Research Incorporated (ACSPRI).

A single question was selected to indicate the extent to which people would discriminate against other people due to their hepatitis B status: "Would you behave negatively towards other people because of their hepatitis B status?"

Results: In the 2017 survey (N=1001), half of the surveyed general public reported they would never behave negatively towards other people because of their hepatitis B status. Conversely, 22% of respondents reported they would sometimes, often or always behave negatively towards other people because of their hepatitis B status, while 28% reported that they would do so rarely (Figure 10).

Figure 10 Proportion of the general public who report that they would express any stigma or discrimination towards people living with hepatitis B



Source: The Centre for Social Research in Health


HBV

2. Hepatitis C

Epidemiology overview

At the end of 2017, an estimated 182 144 people were living with chronic hepatitis C. In Australia, most hepatitis C transmission occurs through unsterile injecting drug use practices, with a hepatitis C RNA prevalence of 25% 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 2018*.[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

- 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,[18] trends in the rate of diagnoses in those under 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 has declined by 16% between 2013 and 2017.

Uptake of preventive measures

- The per capita number of needles and syringes distributed annually increased between 2013 and 2017 from 2.8 to 3.0 per capita, respectively, among the population aged 15 – 64 years. This equates to ~48 million needles and syringes distributed in 2017, an increase of 30% 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 75% in both 2013 and 2017, with the proportion relatively stable since 2008 (between 70% and 77%).
- In 2017, 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 17% compared to 15% in 2013.

Treatment

- During 2017, 21 530 (13%) received hepatitis C treatment during the year, compared to 32 600 (17%) receiving treatment in 2016 and 3540 (2%) in 2013.

Morbidity

- At the end of 2017, the estimated number of people with severe fibrosis/hepatitis C related cirrhosis was 56 001, a 26% increase from the 44 414 cases in 2013. There has been an 83% increase, from the 30 528 cases observed in 2008.
- There were an estimated 584 deaths attributable to chronic hepatitis C infection in 2017, a 20% decrease since 2013 when there were 726 deaths; however there has been a 18% relative increase since 2008 when there were an estimated 480 deaths.
- Around a third (30%) of people who had a liver transplant in 2017 (66 of 233) had hepatitis C infection, compared to 39% (77 of 198) in 2013.

Personal and social impacts

- In a survey conducted in 2017, 50% of the surveyed general public reported that they would behave negatively towards other people due to their hepatitis C status,
- In the same survey, 85% of respondents said they would behave negatively towards other people because of their use of drugs for injecting.

Summary: Between 2013 and 2017, the notification rate of hepatitis C has decreased in the <25-year age-group from 17.5 to 14.7 per 100 000 population, a decline of 16%. In 2017, 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 17% compared to 15% in 2013.

In 2017, 13% 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. Of those who received treatment, 20 454 people were cured of hepatitis C.

At the end of 2017, an estimated 56 001 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 26% more than 44 414 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 30% in 2017.

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	2017
Incidence	2.1 Reduce the incidence of new hepatitis C infections by 50% each year	*2.1a*	*Additional information:* The hepatitis C notification rate per 100 000 population in people aged <25 years	17.5	15.3	15.8	15.1	14.7
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	3.2	3.0
		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%	75%
		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%	17%
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%	4%	17%	13%
		2.3b	Treatment for hepatitis C over lifetime in people who inject drugs and had a positive hepatitis C test†	11%	13%	11%	29%	45%
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	44 414	47 407	50 383	53 327	56 001
		2.4a	*Additional information:* Estimated number of deaths attributable to chronic hepatitis C	726	283	833	658	584
		2.4b	*Additional information:* Proportion of liver transplant recipients with hepatitis C	39%	38%	33%	31%	30%

	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% (towards clients with hepatitis C) 29-38% (towards clients who inject drugs)	*
		2.5d	*Additional information:* Proportion of the general public who report that they would express any stigma or discrimination towards:					
			people living with hepatitis C;	*	*	*	*	50%
			people who use drugs for injecting	*	*	*	*	86%

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 living with chronic hepatitis C and those were cured of hepatitis C in 2017.

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

2.1 Reduce the incidence of hepatitis C

2.1a Hepatitis C notification rate in people aged <25 years

Indicator definition

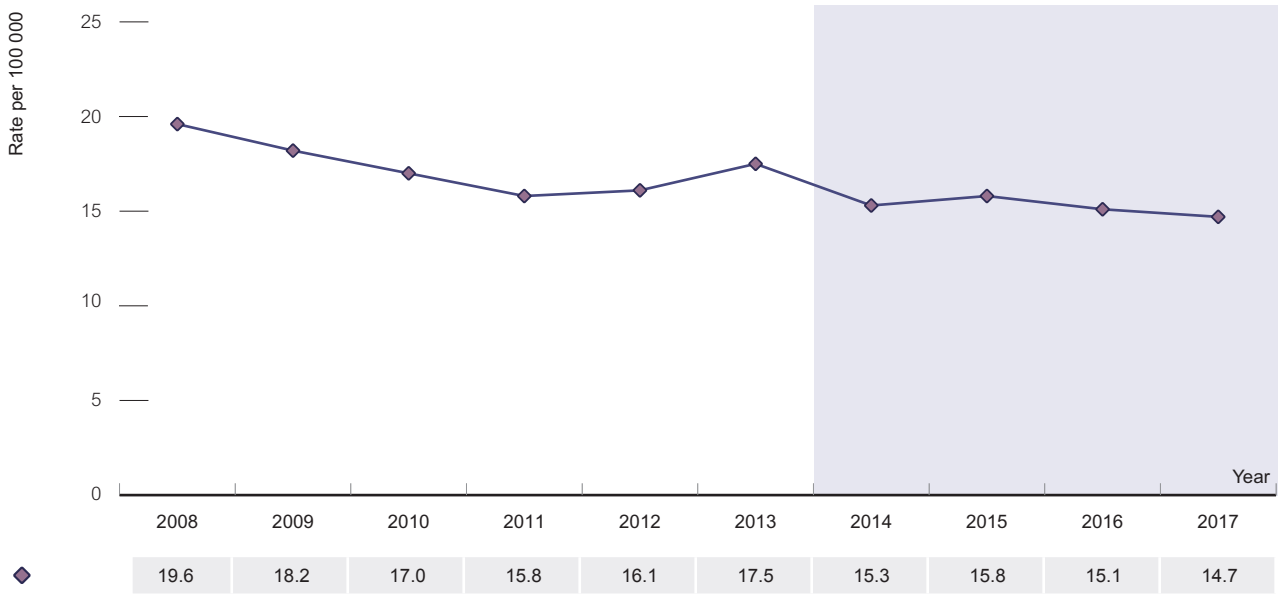
Numerator	Number of newly diagnosed hepatitis C infections (newly acquired and unspecified) in people aged <25 years reported to NNDSS
Denominator	Australian population <25 years of age reported by the ABS

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: Between 2013 and 2017, the notification rate has decreased in the <25 year age group from 17.5 to 14.7 per 100 000 population, a decline of 16%. Over the past ten years, the notification rate has decreased from 19.6 per 100 000 population in 2008 (25% decrease) (Figure 11).

Figure 11 Hepatitis C notification rate per 100 000 population, 2008 – 2017 in people aged <25 years, by year



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
◆	19.6	18.2	17.0	15.8	16.1	17.5	15.3	15.8	15.1	14.7

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

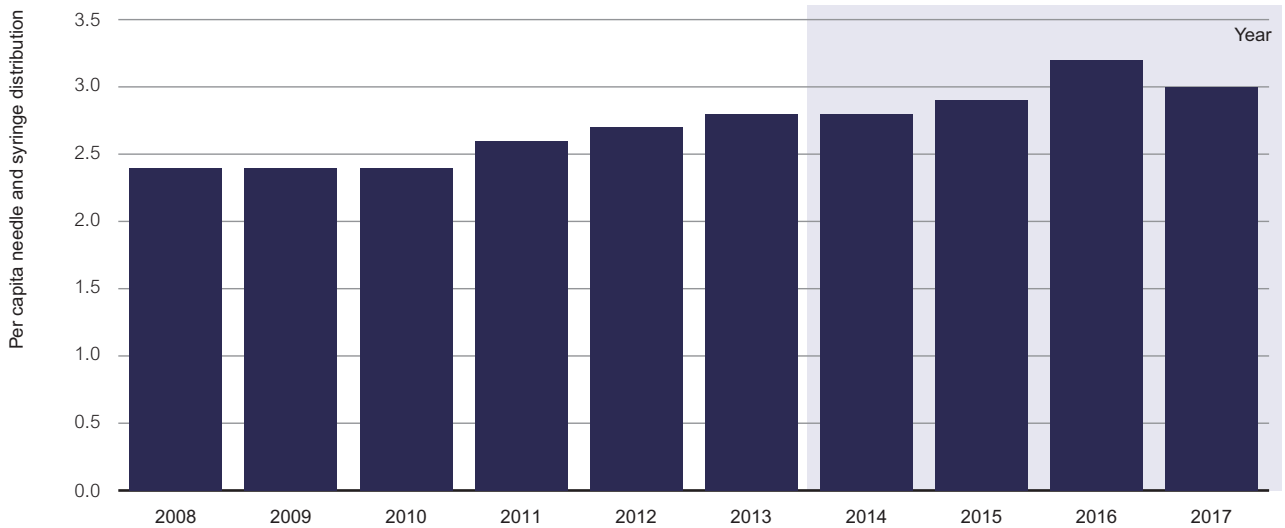
Numerator	Number of needles and syringes distributed by public and pharmacy needle and syringe programs reported by state and territory health departments
Denominator	Australian population aged 15 – 64 years reported by the ABS

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 (NSP) 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=2422).[19]

Data source and considerations: Needle and syringe distribution data are available from the Needle and Syringe Program National Minimum Data Collection, and the 2017 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 2017, the per capita rate of needle and syringe distribution increased by 7% as compared to 2013, from 2.8 to 3.0 (Figure 12). The number of needles and syringes distributed in Australia over the past decade increased from ~34 million in 2008 to ~48 million in 2017. This translates into an increase over ten years in the per capita number of needles and syringes distributed annually, from 2.4 in 2008, to 3.0 in 2017.

Figure 12 Per capita number of needles and syringes distributed in the previous calendar year, 2008 – 2017



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

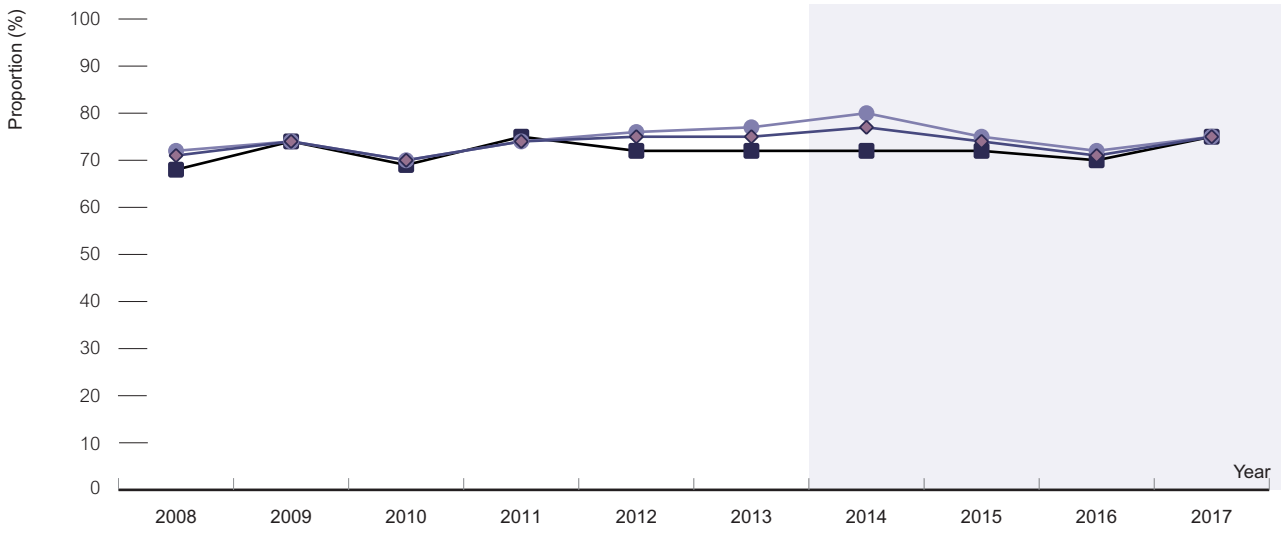
Numerator	Number of ANSPS participants who report using a new needle/syringe for all injections in the month preceding the survey
Denominator	Total number of ANSPS participants who report injecting drugs in the previous month

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 2017 n=2314) 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 both 2013 and 2017, 75% of respondents reported using a new needle and syringe for all injections in the previous month (Figure 13). Across the ten-year period 2008 – 2017, 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 71% in 2008 and 75% in 2017 (Figure 13).

Figure 13 Proportion of all injections by people who inject drugs in which a new needle and syringe was used in the previous month, 2008 – 2017



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total*	71%	74%	70%	74%	75%	75%	77%	74%	71%	75%
Male	72%	74%	70%	74%	76%	77%	80%	75%	72%	75%
Female	68%	74%	69%	75%	72%	72%	72%	72%	70%	75%

* Total includes transgender and 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

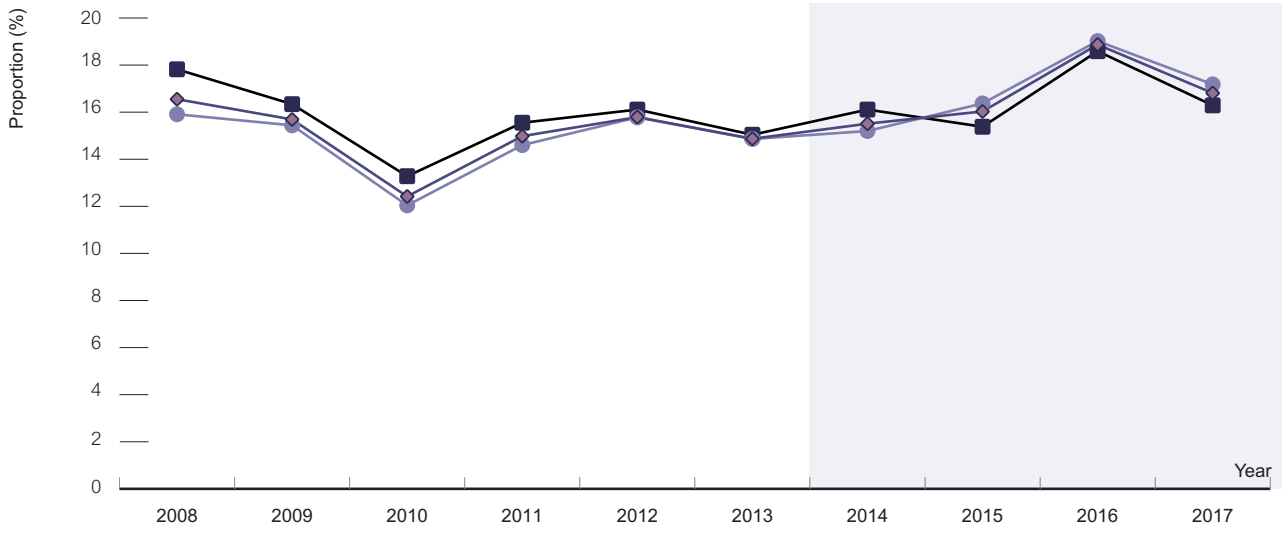
Numerator	Number of ANSPS participants who report re-use of another person's used needle and syringe (receptive syringe sharing) in the month preceding the survey
Denominator	Total number of ANSPS participants who report injecting drugs in the previous month

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 2008 – 2017, 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 2% absolute increase in this key risk behaviour between 2013 (15%) and 2017 (17%) (Figure 14).

Figure 14 Proportion of people who inject drugs reporting receptive syringe sharing in the previous month*, 2008 – 2017



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total	17%	16%	12%	15%	16%	15%	16%	16%	19%	17%
Male	16%	15%	12%	15%	16%	15%	15%	16%	19%	17%
Female	18%	16%	13%	16%	16%	15%	16%	15%	19%	16%

* Total includes transgender and 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

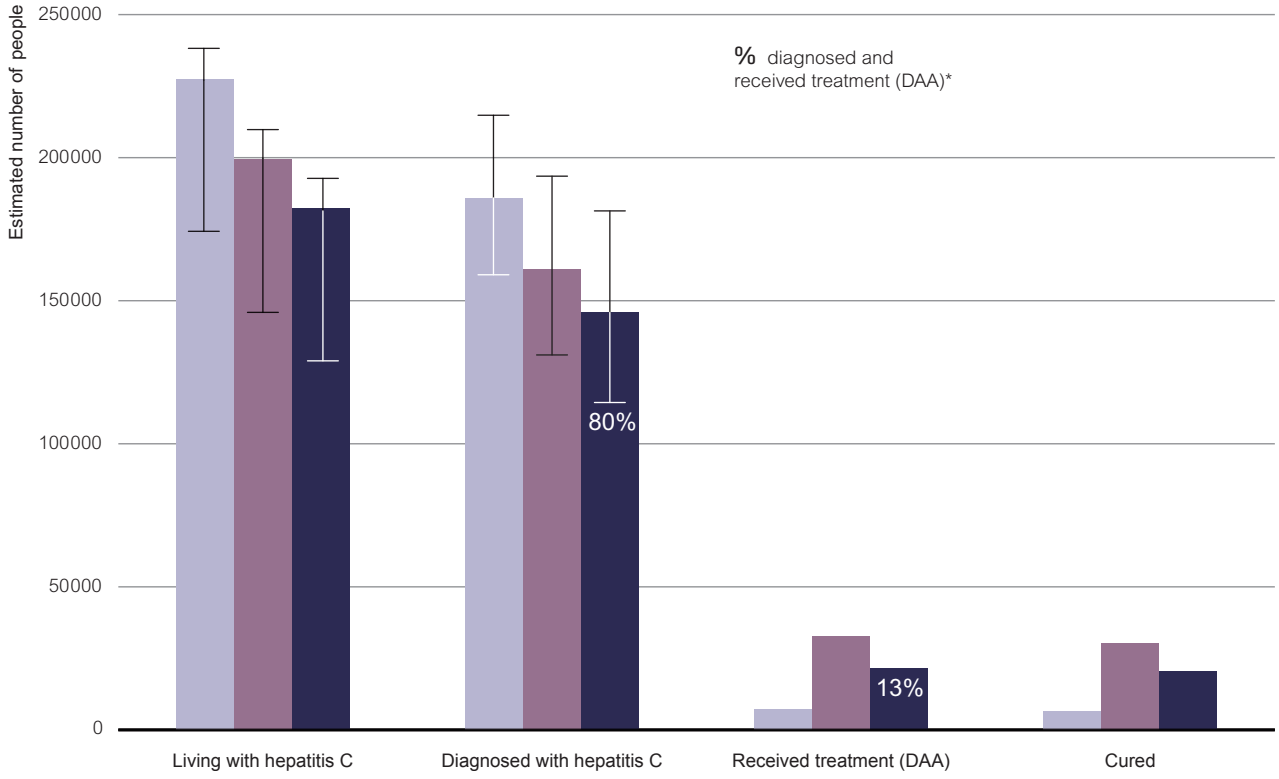
Numerator	Number of individuals dispensed medications for hepatitis C infection
Denominator	Estimated number of people living and diagnosed with hepatitis C infection in Australia as well as those who were cured during 2017

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.[20] Also, mathematical modelling suggests treating a 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.[21] 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 the number of individuals who were dispensed medications for hepatitis C infection comes from the PBS. The estimated number of people living and diagnosed 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 2017, an estimated 145 838 people were living and diagnosed with chronic hepatitis C and in Australia (Figure 15). An additional 20 454 people were cured of hepatitis C due to DAA treatment. From these populations, an estimated 21 530 (13%) received hepatitis C treatment in 2017. This corresponds to a six-fold increase in the number of people receiving treatment since 2013, but a 34% reduction between 2016 and 2017. The reduction in treatment numbers between 2016 and 2017 after the large increase between 2015 and 2016 is likely due to the warehousing effect of people waiting for the widespread availability of DAAs commencing in March 2016.

Figure 15 The 2017 hepatitis C diagnosis and care cascade



	Living with hepatitis C	Diagnosed with hepatitis C	Received treatment (DAA)	Cured
2015	227 306	185 865	7296	6566
2016	199 230	160 790	32 600	30 400
2017	182 144	145 838	21 530	20 454

* Of those who were diagnosed as well as those who were cured of hepatitis C in 2017

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

HCV

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

Indicator definition

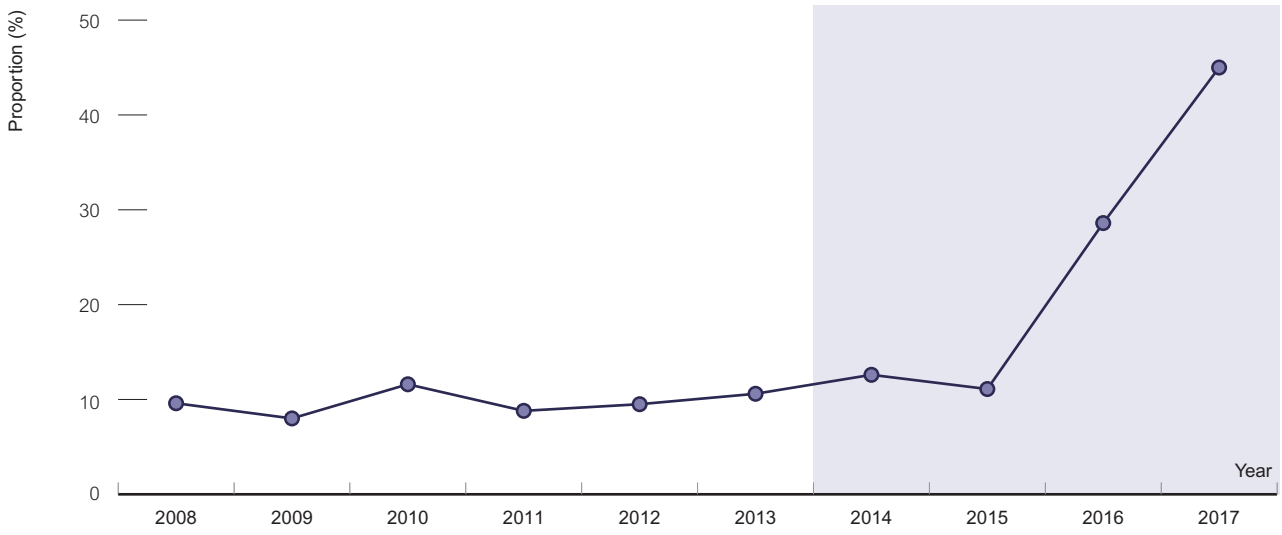
Numerator	Number of ANSPS participants who report any hepatitis C antiviral treatment over lifetime
Denominator	Total number of HCV antibody positive ANSPS participants, excluding those who self-reported spontaneous clearance

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 from 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 exclude this sub-group of people from the denominator.

Results: Between 2013 and 2017, 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 45.0% (Figure 16). Prior to the large increase in treatment from 2016, the proportion of participants with a history of treatment ranged from 8.0 – 12.6%.

Figure 16 Proportion of hepatitis C antibody positive people seen at needle and syringe programs who report any hepatitis C antiviral treatment over lifetime, 2008 – 2017



9.6%	8.0%	11.6%	8.8%	9.5%	10.6%	12.6%	11.1%	28.6%	45.0%

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

2.4 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

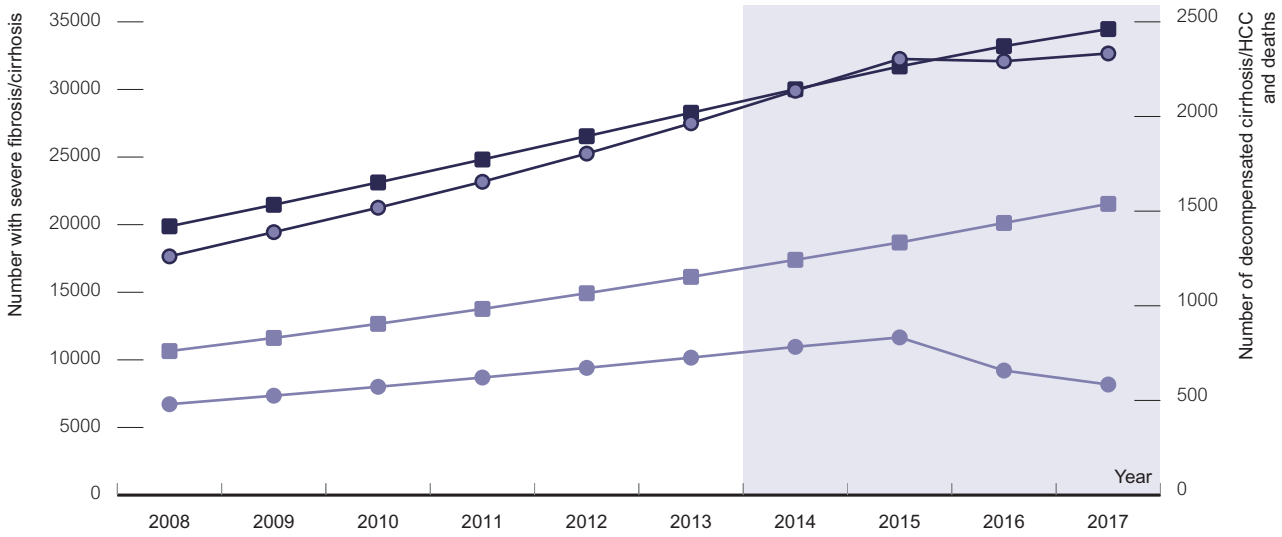
Background: To plan appropriate clinical care and treatment responses to the hepatitis C epidemic, accurate estimates of the rates of hepatitis C infection and its sequelae are essential.

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 2017, according to model estimates, among people living with chronic hepatitis C and those who have been cured of chronic hepatitis C, there were 56 001 people with severe fibrosis and hepatitis C related cirrhosis (stage F3/4) (Figure 17a). This was a relative increase of 26% since 2013 and 83% since 2008 with an estimated 44 414 and 30 528 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 C-related decompensated cirrhosis and hepatocellular carcinoma (HCC) was 2 333, a 19% increase from 1964 cases in 2013 and 85% increase from 1261 cases in 2008. The estimated number of hepatitis Crelated deaths in 2017 was 584, which is a 20% decrease since 2013 when there were an estimated 726 deaths, but an increase of 22% since 2008 where there were an estimated 480 deaths.

At the end of 2017, an estimated 182 144 people were living with chronic hepatitis C infection, and of these, 35 094 had severe fibrosis and hepatitis C related cirrhosis (stage F3/4) (Figure 17b), a relative decrease of 17% since 2013 with 42 079 severe fibrosis and hepatitis C related cirrhosis cases. However, over the past ten years, there has been a relative increase of 18% compared to the 29 831 cases in 2008. In 2017, among people living with chronic hepatitis C, the estimated number of new cases of hepatitis C-related decompensated cirrhosis and HCC was 1600, a 17% decrease from 1934 cases in 2013 but a 27% increase from 1256 cases in 2008. An estimated 540 deaths attributable to chronic hepatitis C infection occurred in 2017, a decrease of 25% since 2013 when there were an estimated 723 deaths but an increase of 13% since 2008 where there were an estimated 480 deaths. This 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 17 a 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, 2008 – 2017

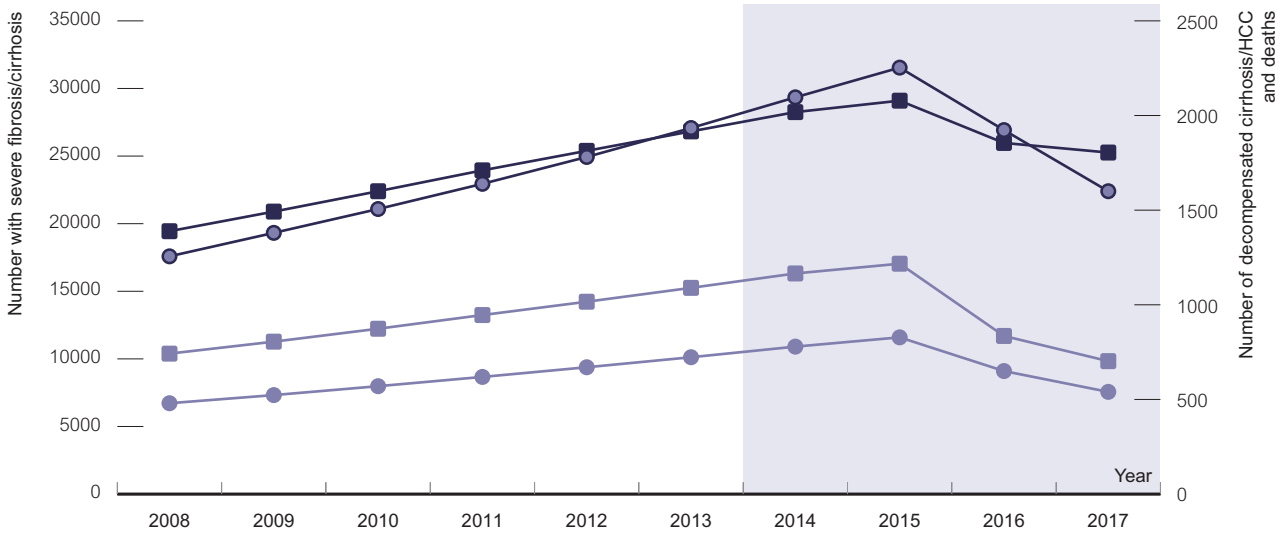


	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Severe fibrosis	19 878	21 469	23 121	24 819	26 541	28 275	30 010	31 703	33 202	34 465
Hepatitis C related cirrhosis	10 650	11 621	12 664	13 768	14 928	16 139	17 397	18 680	20 125	21 536
Decompensated cirrhosis/HCC	1 261	1 389	1 518	1 655	1 804	1 964	2 136	2 304	2 292	2 333
Deaths	480	525	572	621	672	726	783	833	658	584

* 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

Figure 17b 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, 2008 – 2017



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Severe fibrosis	19 443	20 893	22 399	23 944	25 386	26 826	28 252	29 097	25 971	25 261
Hepatitis C related cirrhosis	10 388	11 274	12 229	13 242	14 227	15 253	16 318	17 039	11 696	9 833
Decompensated cirrhosis/HCC	1 256	1 380	1 506	1 639	1 781	1 934	2 096	2 253	1 923	1 600
Deaths	480	523	570	619	670	723	779	828	650	540

* Only including people with chronic hepatitis C infection (uncured of infection)

Source: See Methodological Notes for detail

HCV

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

Indicator definition

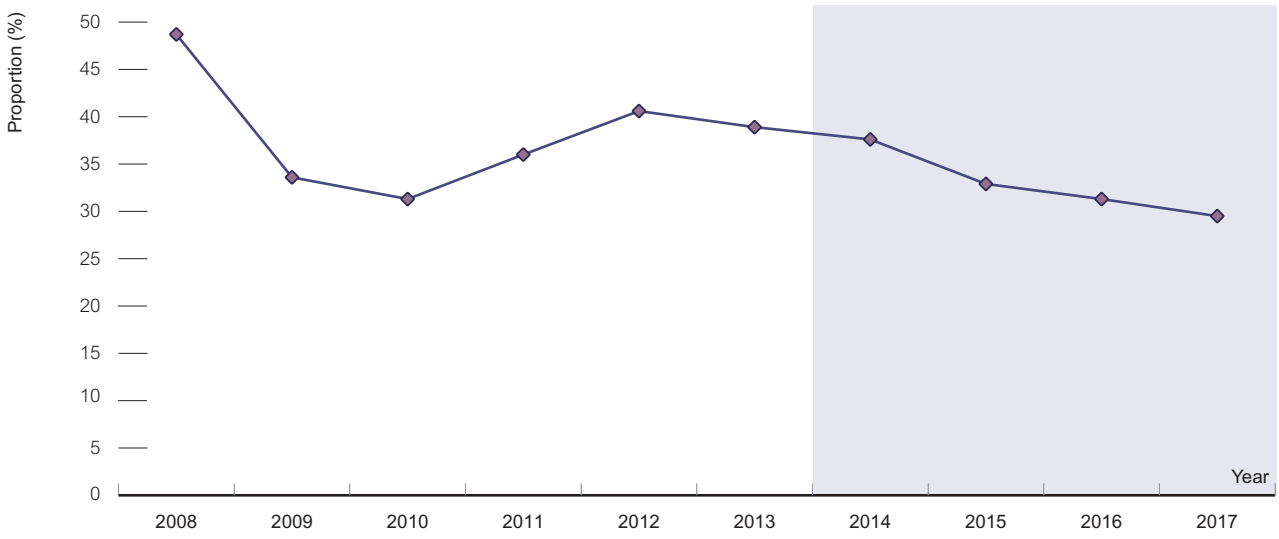
Numerator	Number of liver transplant recipients with chronic hepatitis C related diseases, including hepatocellular cancers
Denominator	Total number of liver transplants in a year

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 since 1999. 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 2017, 66 of 233 (29.5%) people who had a liver transplant had hepatitis C infection, compared to 77 of 198 (38.9%) in 2013 (Figure 18). Overall, during the past ten years, 2008 – 2017, 650 of 1 837 (35.4%) people who had a liver transplant had a history of 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 18 Proportion of liver transplant recipients with a history of hepatitis C, 2008 – 2017



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Liver transplant recipients (%)	48.7%	33.6%	31.3%	36.0%	40.6%	38.9%	37.6%	32.9%	31.3%	29.5%
Liver transplant recipients (n)	58	49	51	58	73	77	73	72	73	66

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

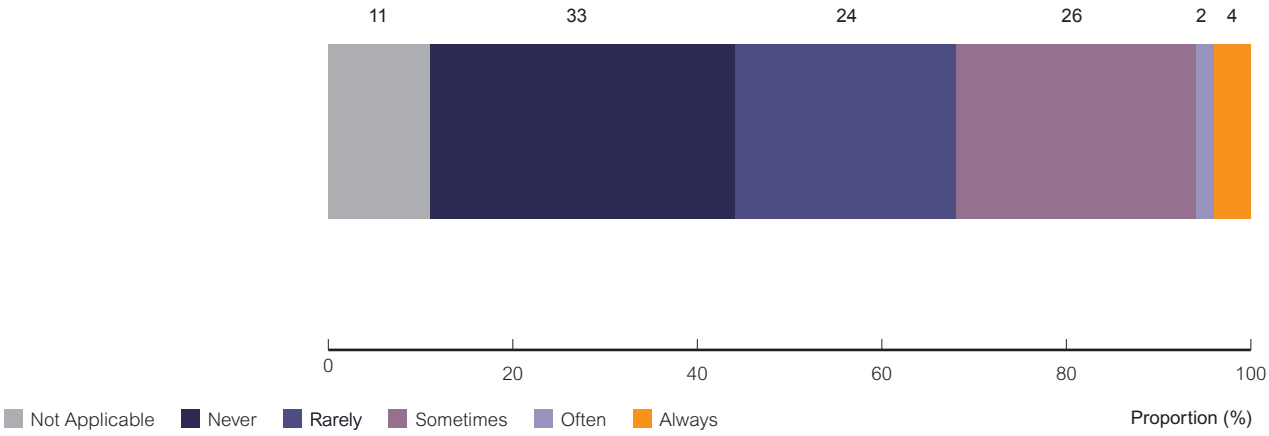
Background: See Section 1.6

Data source and considerations: The 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 19).

Figure 19 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 *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

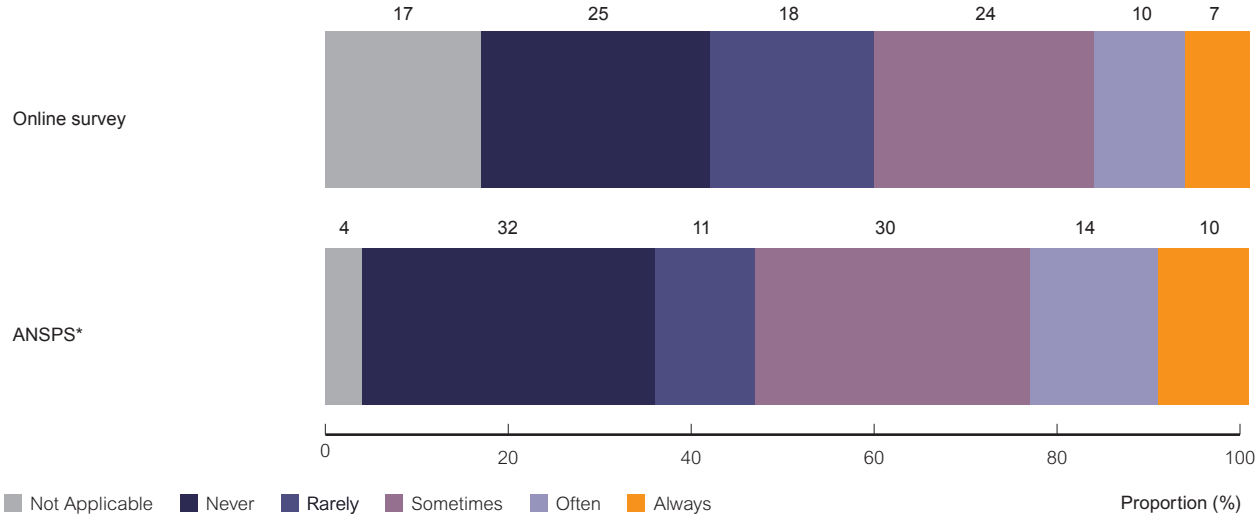
Background: See Section 1.6

Data source and considerations: Since hepatitis C is often associated with injecting drug use, the 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 20). By comparison, of the 2060 Australian Needle and Syringe Program Survey participants in 2016, 65% reported experiencing some level of stigma or discrimination in relation to their injecting drug use in the last 12 months (Figure 20).

Figure 20 Proportion of people experiencing any stigma or discrimination in relation to their injecting drug use in the last 12 months



Note: The total % may not add to 100 due to rounding; excludes respondents where data was missing

Source: The Centre for Social Research in Health and The Australian Needle and Syringe Program Survey

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

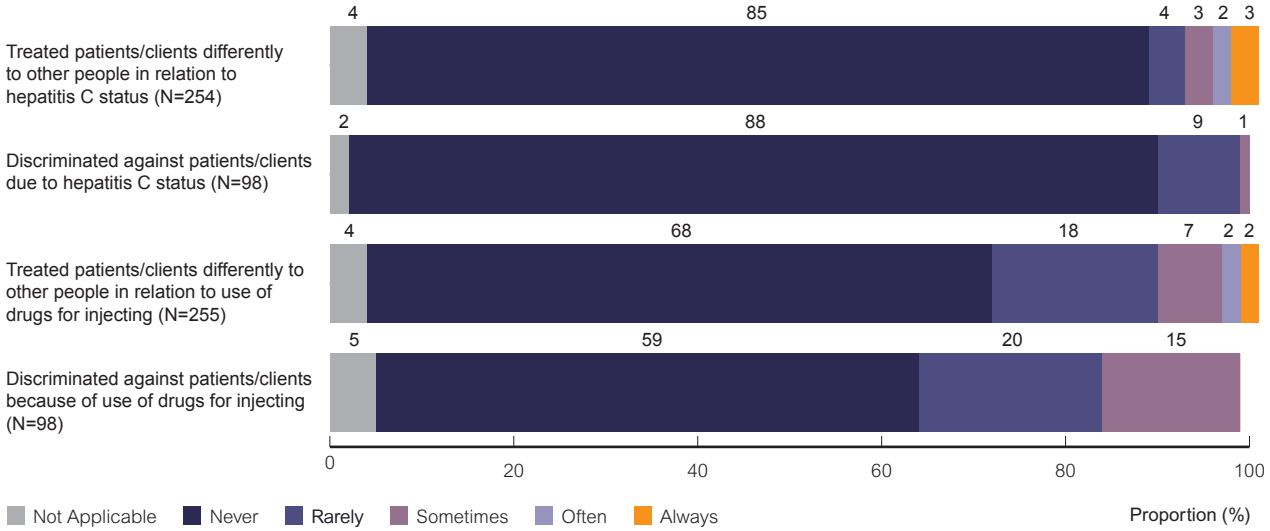
Background: See Section 1.6.

Data source and considerations: The 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 is important to note 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 – 35% 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 21).

Figure 21 Proportion of health care workers expressing stigma or discrimination towards clients living with hepatitis C and those who inject drugs in the last 12



Note: The total % of health care workers who treated patients/clients differently to other people in relation to hepatitis C status in the last 12 months may not add to 100 due to rounding

Source: The Centre for Social Research in Health

2.5d *Proportion of the Australian public who report they would express stigma or discrimination towards people living with hepatitis C or people who would use drugs for injecting (additional information)*

A mirrored stigma indicator has been implemented with a representative sample of the Australian general public to identify the extent to which they would express stigma towards people living with hepatitis C.

Indicator definition

Numerator	Proportion of the general public who report that they would express any stigma or discrimination towards people living with hepatitis C or who use drugs for injecting
Denominator	Total number of the general public surveyed

Background: See Section 1.6.

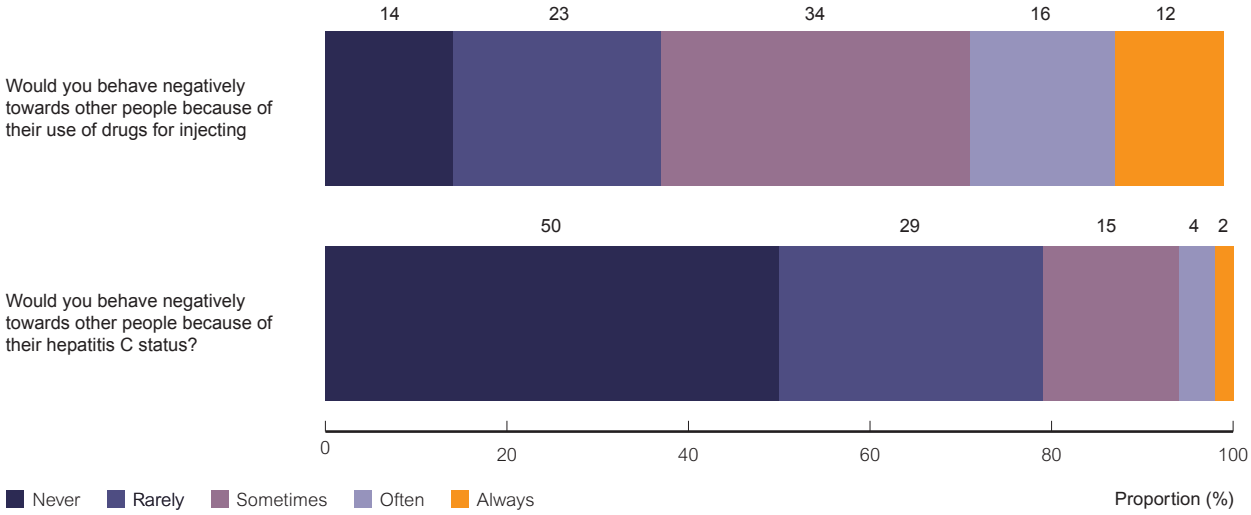
Data source and considerations: The CSRH has also developed a mirrored stigma indicator that has been implemented with the general public to identify their expression of stigma towards people living with hepatitis C and people who use drugs for injecting. The mirrored indicator was included in three waves of the 2017 Australian Survey of Social Attitudes (AuSSA), conducted by the Australian Consortium for Social and Political Research Incorporated (ACSPRI).

A single question was selected to indicate the extent to which people would discriminate against other people due to their hepatitis C status: "Would you behave negatively towards other people because of their hepatitis C status?" Similarly, a single question was asked regarding stigma towards people who inject drugs: "Would you behave negatively towards other people because of their use of drugs for injecting?"

Results: In the 2017 survey (N=1001), half of the surveyed general public reported they would never behave negatively towards other people because of their hepatitis C status. Conversely, 21% of respondents reported they would sometimes, often or always behave negatively towards other people because of their hepatitis C status while 29% reported that they would do so rarely (Figure 22).

In the same survey, only 14% of respondents reported that they would never behave negatively towards other people because of their use of drugs for injecting. Conversely, almost two-thirds (62%) of respondents reported they would sometimes, often or always behave negatively towards other people because of their use of drugs for injecting while 23% reported that they would do so rarely (Figure 22).

Figure 22 Proportion of the general public who report that they would express any stigma or discrimination towards people living with hepatitis C



Note: The total % may not add to 100 due to rounding

Source: The Centre for Social Research in Health

3. Sexually Transmissible Infections

Epidemiology overview

Gonorrhoea: There were 28 364 cases of gonorrhoea notified in 2017 which is a 16% increase from 23 875 notifications in 2016. Of the notifications in 2017, 4119 (15%) notifications were in the Aboriginal and Torres Strait Islander population, and there were 8961 (32%) notifications for which Indigenous status was not reported. In 2017, about three-quarters of notifications were in males (21 010, 74%), resulting in a male-to-female ratio of 3:1 indicating that gonorrhoea continues to be an infection primarily among men who have sex with men in urban settings; however, rates have been rising in the female population in recent years. Among the Aboriginal and Torres Strait Islander population, there were nearly equal numbers of notifications among males and females in 2017 (male-to-female ratio of 0.9:1), and the majority resided in remote or very remote areas. In 2017, 53% (14 934) of all notifications were in people aged 15 – 29 years. By comparison, in the Aboriginal and Torres Strait Islander population, 3935 (42%) of notifications were aged 15 – 29 years. The notification rate of gonorrhoea in the Aboriginal and Torres Strait Islander population was more than six times that in the non-Indigenous population in 2017 (627.5 vs 95.6 per 100 000 population).

Infectious syphilis: Currently there is an ongoing syphilis outbreak occurring across northern Australia. Across Australia, infectious syphilis 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 was a total of 4298 infectious syphilis notifications nationally in 2017; 779 (18%) notifications in the Aboriginal and Torres Strait Islander population, and 305 (7%) 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 (50%) and females (50%) in 2017, and the majority resided in remote or very remote areas. The notification rate of infectious syphilis in the Aboriginal and Torres Strait Islander population was more than six times that in the non-Indigenous population in 2017 (102.5 vs 15.5 per 100 000 population).

Chlamydia: Nationally, during 2017, there were a total of 100 775 cases of chlamydia notified to NNDSS, with the majority (73%, n=73 380) of diagnoses among 15–29-year-olds. Based on mathematical modelling data, there were an estimated 255 258 new chlamydia infections in 15–29-year-olds in 2017. From these modelled data, there were a higher number of new infections in males than females aged 15 – 29 years in 2016 (159 672 vs 95 556), 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%.[22] The modelled estimate of 73 299 people diagnosed with chlamydia in 15 – 29-year-olds make up only 29% of all estimated infections in this age group, highlighting that the chlamydia diagnoses leading to notifications only reflect a subset of all chlamydia infections each year [3]. The notification rate of chlamydia in the Aboriginal and Torres Strait Islander population was nearly three times that in the non-Indigenous population in 2017 (1193.9 vs 427.0 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.[23, 24] HPV also causes genital warts.[25] Prior to the National HPV Vaccination Program[26] which was implemented for adolescent females 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[27] and 11% of Australian-born women attending sexual health clinics, aged 21 years or younger were diagnosed with genital warts.[28] Since the immunisation program commenced there has been over a 96% reduction in diagnosis rates of genital warts in young women aged under 21 years, and 98% reductions in genital warts in Australian-born heterosexual men of the same age suggesting herd protection, (31% reduction since 2013 when male vaccination was introduced).[28] 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.[29]

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, 2016 or 2017.

Further details are provided in the *HIV, viral hepatitis and sexually transmissible infections in Australia: Annual Surveillance Report 2018*.[3]

Indicator status

Uptake of preventative measures

- High HPV vaccination 3-dose coverage has been achieved in females turning 15 years of age, with 72.1% coverage in 2013 increasing to 80.2% in 2017. A vaccination program for adolescent males was introduction in 2013, which achieved 62.4% coverage in 2014 and 75.9% coverage in 2017.

Incidence

- The notification rate is used here as a surrogate for incidence (see section 3.2 on data considerations). There was a 73% increase in the gonorrhoea notification rate between 2013 and 2017 from 68.1 per 100 000 population in 2013 to 118 per 100 000 population in 2017 (65% increase in females and 91% increase in males), with a long-term increase of more than three-fold from 36.4 per 100 000 population in 2008.
- The infectious syphilis notification rate increased by 135% from 7.8 per 100 000 population in 2013 to 18.3 per 100 000 population in 2017 in line with the ongoing syphilis outbreak occurring across northern Australia, with a longer-term increase of 190% from 6.3 per 100 000 population in 2008.
- 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 – 2017 the ratio of chlamydia notifications to Medicare-rebated chlamydia tests declined in those aged 15 – 29 years from 14% to 10.3%.

Testing

- Of young people aged 15 – 29 years, 14.0% claimed the Medicare rebate for a chlamydia test in 2017, similar to the 13.8% in 2013.
- The proportion of gay men reporting having had an STI test in the past 12 months was 74.5% in 2017, increasing by a relative 9% 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 51.2% in 2017, with a 64% increase over the past ten years.

Morbidity

- There were eight notifications of congenital syphilis in 2017, the same as in 2013, with increases observed in the past ten years coinciding with peaks in infectious syphilis notifications, largely driven by the 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.

Personal and social impacts

- In a survey conducted in 2017, 58% of the surveyed general public reported that they would behave negatively towards other people due to their sexually transmissible infection status.

Summary: In the fourth and final year of the Third National Sexually Transmissible Infections Strategy, coverage of HPV vaccination in adolescent females remains high (80%) and male vaccination coverage was also high (76%), representing a success story in STI prevention programs. However, between 2013 and 2017 there has been an increase in infectious syphilis and gonorrhoea notification rates. Chlamydia testing rates in 15 – 29 year olds have remained steady at 14% in both 2013 and 2017. However, the ratio of chlamydia notifications to Medicare-rebated chlamydia tests in people aged 15 – 29 years has reduced slightly from 10.9% to 9.8% 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 use of highly effective non-condom-based HIV prevention strategies.

Objectives and indicators

The Sexually Transmissible 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	2017
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%	79%	80%	80%
			Males^	29%	62%	67%	73%	76%
Incidence and prevalence	3.2 Reduce the incidence of STI	3.2a	Annual rate of notifications of gonorrhoea (per 100 000 population)†	65.5	68.1	79.0	100.9	118.0
		3.2b	Annual rate of notifications of infectious syphilis (per 100 000 population)†	7.8	9.0	11.9	14.4	18.3
		3.2c	Proportion of chlamydia tests that yield a positive result 15 – 29-year age group	11%	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)	14%	14%	15%	15%	14%
		3.4b	Proportion of gay men who report having had an STI test in the previous 12 months	68%	70%	73%	72%	75%
		3.4c	*Additional information:* Proportion of gay men who report having had comprehensive STI testing in the previous 12 months	40%	38%	44%	46%	51%
Treatment	3.5 Increase appropriate management and reduce associated morbidity	3.5a	Notifications of congenital syphilis annually					
			Number of cases	7	3	4	2	8
	3.6 Eliminate the negative impact of stigma, discrimination, and legal and human rights issues on people's health	*3.6a*	*Additional information:* Proportion of the general public who report that they would express any stigma or discrimination towards people living with a sexually transmissible infection	*	*	*	*	58%

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.

† 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.

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

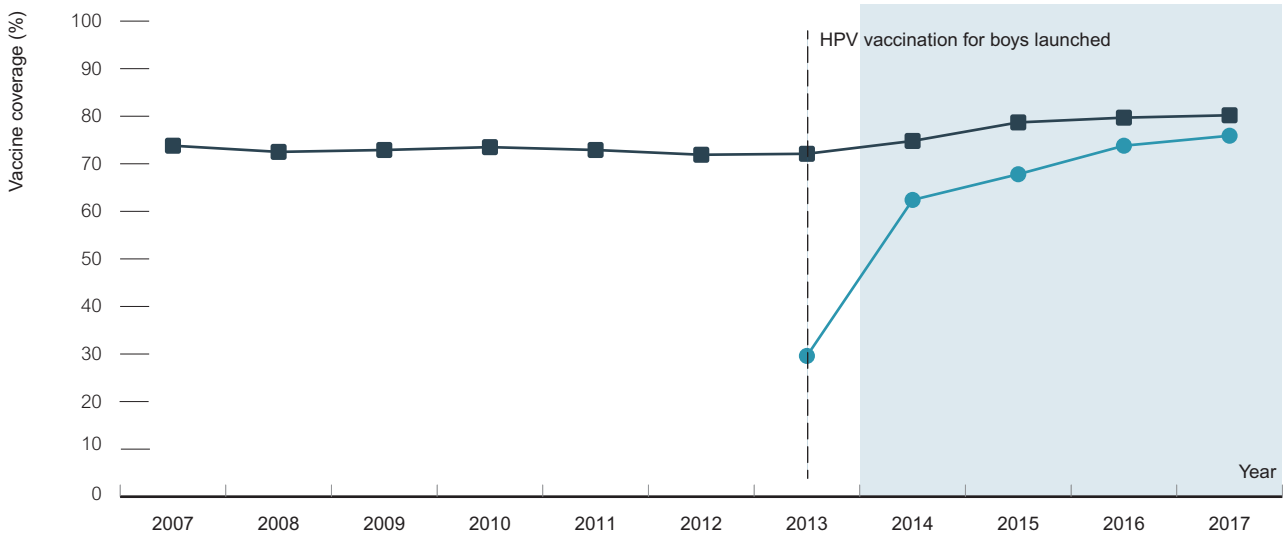
Numerator	Number of males and females turning 15 years of age reported to the NHVPR that comply with the recommended vaccine dosage and administration as per the Australian Immunisation Handbook
Denominator	Number of males and females turning 15 years of age in the Australian population reported by the 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 two-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.[31] 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).[26] 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 73.8% in the first year of the program, dropping to 72.1% in 2013, and increasing to 80.2% in 2017 (Figure 23). A vaccination program for boys was introduced in 2013, which achieved 62.4% coverage in 2014, increasing to 75.9% coverage in 2017 (Figure 23).

Figure 23 Three dose HPV vaccination coverage for all females and males turning 15 years of age, 2008 – 2017



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Females turning 15	73.8%	72.5%	72.9%	73.5%	72.9%	71.9%	72.1%	74.8%	78.7%	79.7%	80.2%
Males turning 15							29.6%	62.4%	67.8%	73.8%	75.9%

Source: Human Papillomavirus Vaccination Program Register

3.2 Increase testing among priority populations

3.2a Proportion of 15 – 29-year-olds receiving a chlamydia test in the previous 12 months.

Indicator definition

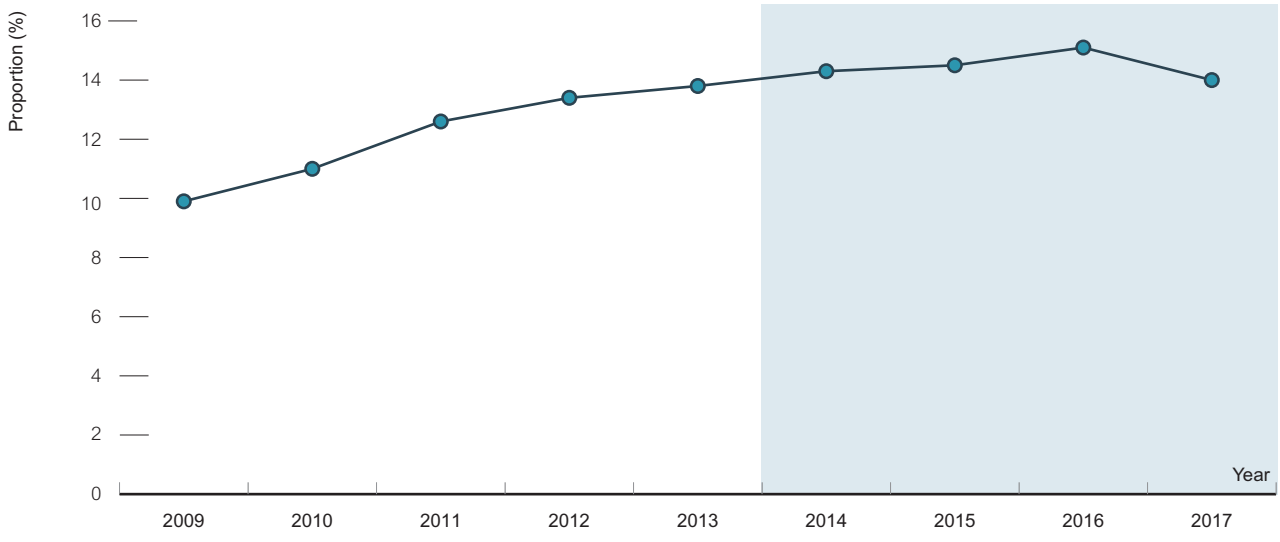
Numerator	Number of individuals aged 15 – 29 years tested at least once in the previous 12 months reported to Medicare (item numbers 69316, 69317, 69319)
Denominator	Australian population aged 15 – 29 years reported by the ABS

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.[32] In addition, untreated chlamydia can cause adverse pregnancy and neonatal outcomes,[33] and can enhance the risk of sexual transmission and acquisition of HIV.[34, 35] Therefore, clinical guidelines recommend annual screening for sexually active young males and females aged <30 years and 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 underestimate the true testing rate in the population.

Results: In 2017, a low proportion of young people aged 15 – 29 years were tested for chlamydia (14.0%). Rates were similar between 2013 and 2017, (13.8% vs 14.0%), and there has been an absolute increase of 4.1% since 2009 (Figure 24).

Figure 24 Proportion of 15–29-year-olds receiving a chlamydia test in the previous 12 months, 2009 – 2017



2009	2010	2011	2012	2013	2014	2015	2016	2017
9.9%	11.0%	12.6%	13.4%	13.8%	14.3%	14.5%	15.1%	14.0%

Source: Medicare, Department of Human Services

3.2b Proportion of gay men who report having had an STI test in the previous 12 months

Indicator definition

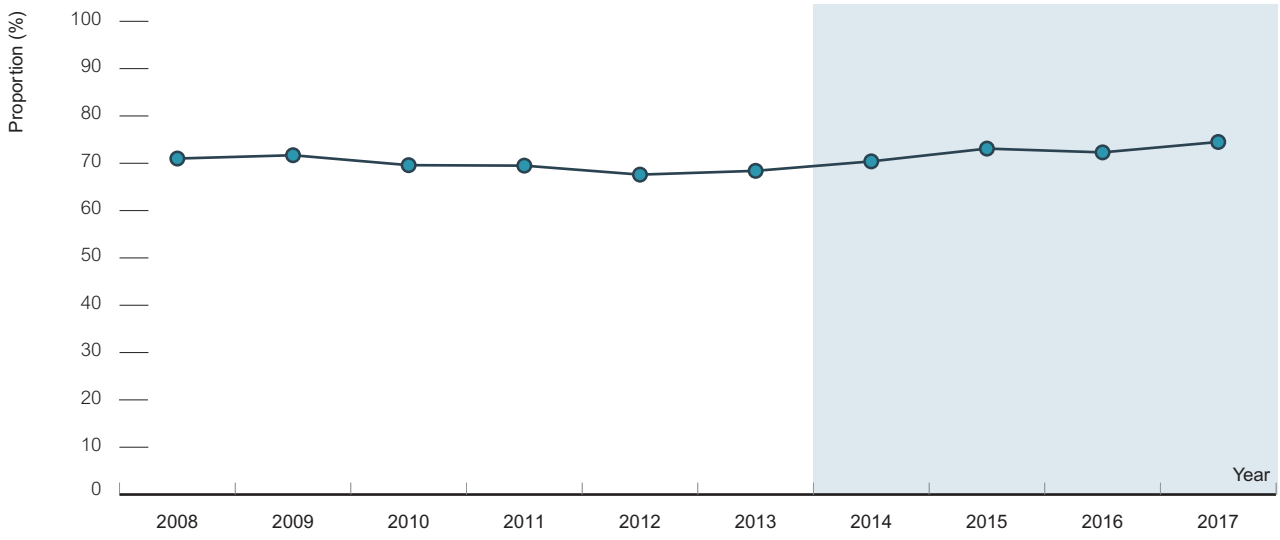
Numerator	Number of gay men who have had an STI test in the previous 12 months reported in the Gay Community Periodic Surveys (GCPS)
Denominator	Number of gay men participating in GCPS

Background: Based on the incidence of STIs[36, 37] 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.[38]

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 2017, the proportion of gay men reporting having had any STI test in the past 12 months increased from 68% to 75%. Over the ten-year period 2008 to 2017, the proportion has fluctuated between 68% and 75% with the highest proportion occurring in 2017 (Figure 25).

Figure 25 Proportion of gay men who reported an STI test in the past 12 months, 2008 – 2017



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
STI test	71.0%	71.7%	69.6%	69.5%	67.6%	68.4%	70.4%	73.1%	72.3%	74.5%

Source: The Gay Community Periodic Surveys

3.2c *Proportion of gay men who report having had comprehensive STI testing in the previous 12 months (additional information)*

Indicator definition

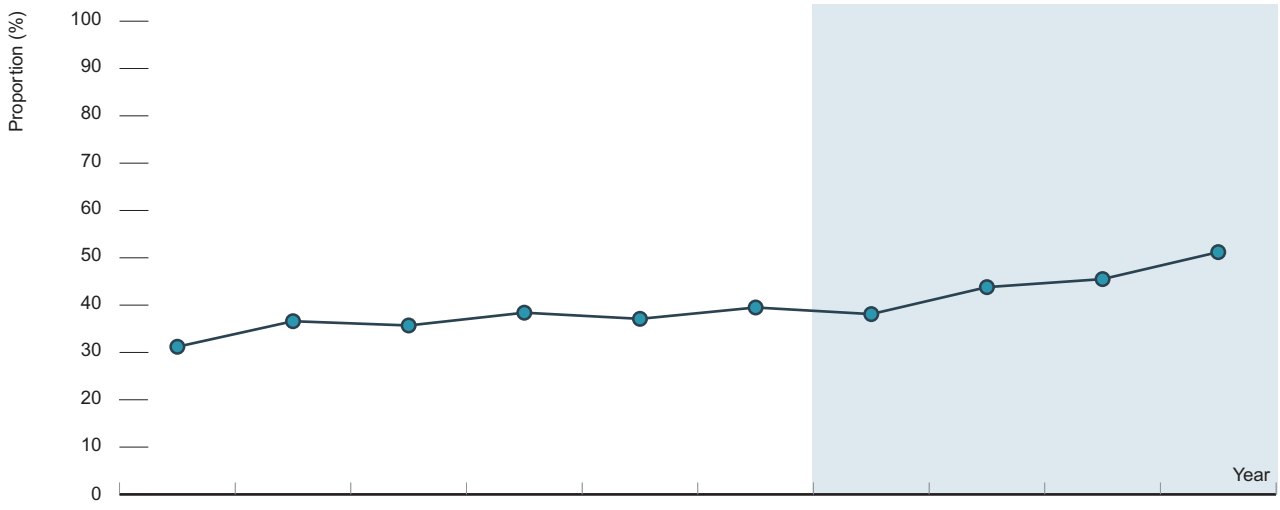
Numerator	Number of gay men who have had comprehensive STI testing in the previous 12 months reported in GCPS
Denominator	Number of gay men participating in GCPS

Background: STI co-infections are common among gay and bisexual men,[39, 40] therefore clinical guidelines recommend annual comprehensive testing for all men who have had sex with another man in the previous year and quarterly testing for all men who have had 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.[41] 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).[41]

Data source and considerations: The GCPS 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 44 sexual health clinics, and 24 general practice clinics 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 51.2% in 2017 (Figure 26). The proportion has increased from 31.2% in 2008. In 2013, 54% of gay and bisexual men attending sexual health clinics returned for a repeat comprehensive testing for STIs (chlamydia, gonorrhoea, syphilis, and where indicated, HIV), increasing in 2017 to 68% (Figure 27).

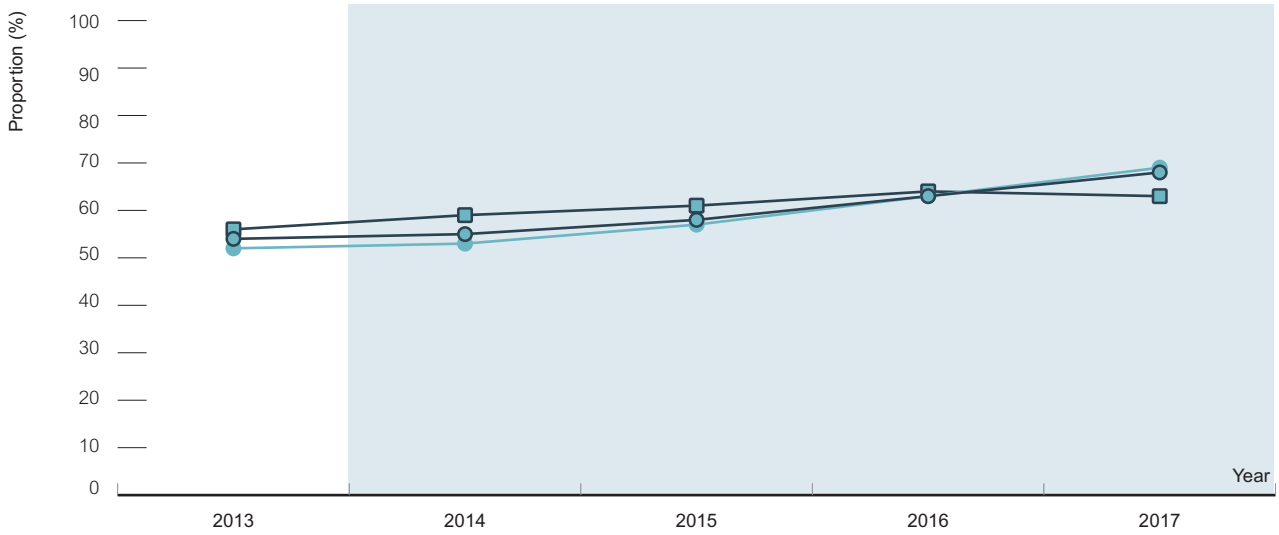
Figure 26 Gay men who reported having at least four samples collected for STI testing (anal swab, throat swab, penile swab, urine, blood test) in the 12 months prior to the survey, 2008 – 2017



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
STI test	31.2%	36.6%	35.7%	38.4%	37.1%	39.5%	38.1%	43.8%	45.5%	51.2%

Source: Gay Community Periodic Surveys

Figure 27 Repeat comprehensive STI testing (within 13 months): gay and bisexual men attending sexual health clinics, 2013 – 2017



	2013	2014	2015	2016	2017
Gay and bisexual men	54%	55%	58%	63%	68%
HIV negative gay and bisexual men	52%	53%	57%	63%	69%
HIV positive gay and bisexual men	56%	59%	61%	64%	63%

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

3.3 Reduce the incidence of STI

3.3a Proportion of chlamydia tests that yield a positive result in 15 – 29 year age group

Indicator definition

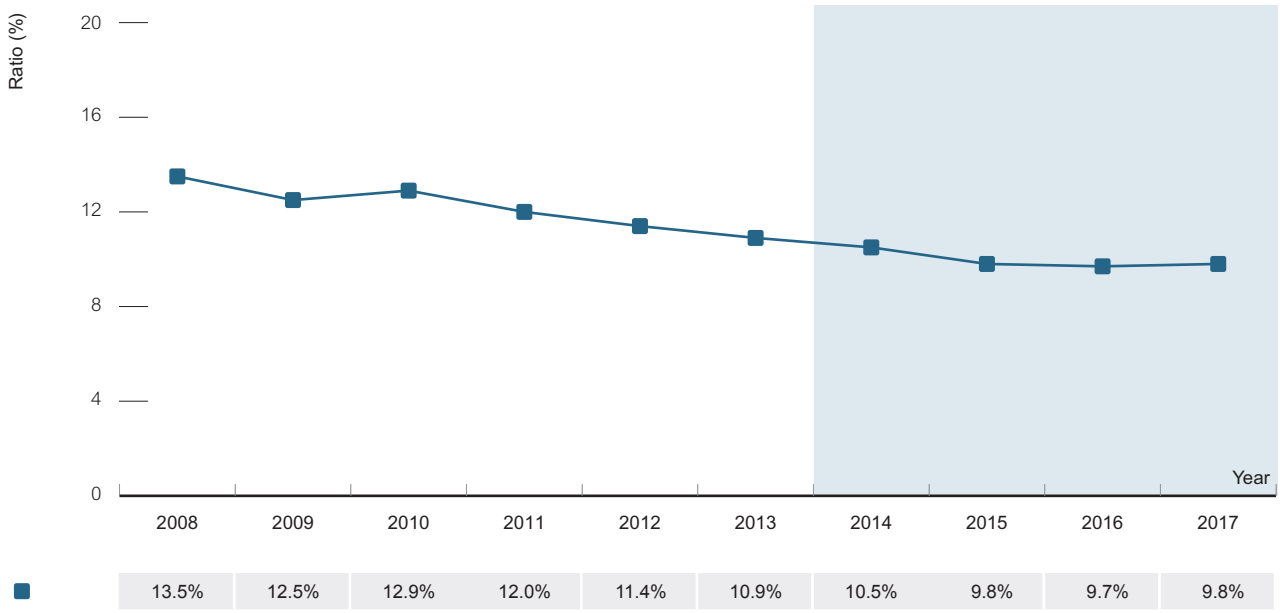
Numerator	Number of notifications of chlamydia in 15 – 29-year-olds reported to NNDSS
Denominator	Number of chlamydia tests conducted for 15 – 29-year-olds reported to Medicare (item numbers 69316, 69317, 69319)

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.[42] However, changes in notifications need to be considered in the context of testing patterns.[43] 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.[44] 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.[45] Consequently, testing and positivity rates may be underestimated using Medicare data. See Methodological Notes for further detail.

Results: Over the ten-year period 2008 – 2017, the ratio of chlamydia notifications to Medicare rebated chlamydia tests declined in 15–29-year-olds by 27% from 13.5 notifications per 100 tests in 2008 to 9.8 notifications per 100 tests in 2017 (Figure 28). From 2008 – 2017, the declines have been across all age groups and in both males and females (data not shown).

Figure 28 Ratio of chlamydia notifications to Medicare-rebated chlamydia tests, 2008 – 2017



Source: Medicare, National Notifiable Diseases Surveillance System

3.3b *Annual rate of notifications of gonorrhoea*

Indicator definition

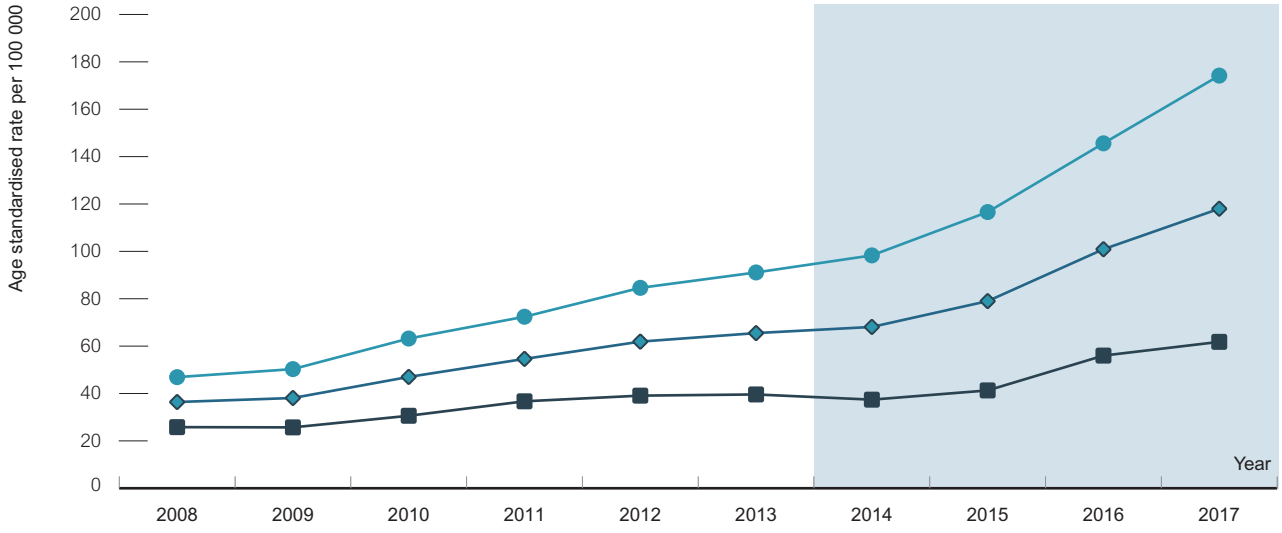
Numerator	Number of notifications of gonorrhoea reported to NNDSS
Denominator	Australian population reported by the ABS

Background: Gonorrhoea is often asymptomatic, and if left untreated, can lead to reproductive morbidity, disseminated infection and increase the risk of HIV infection.[32] 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 65.5 per 100 000 population in 2013, and 118.0 in 2017 representing a 73% increase. Between 2013 and 2017, the notification rate increased by 65% in females (from 39.6 to 61.8 per 100 000 population), and increased in males by 91% (from 91.1 to 174.2 per 100 000 population) (Figure 29). Over the past 10 years, the national notification rate for gonorrhoea increased more than three-fold to 118.0 cases per 100 000 population in 2017 from 36.4 per 100 000 population in 2008.

Figure 29 Gonorrhoea notification rate per 100 000 population, 2008 – 2017, by sex



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total	36.4	38.1	47.0	54.6	61.9	65.5	68.1	79.0	100.9	118.0
Males	46.9	50.3	63.2	72.4	84.6	91.1	98.3	116.6	145.6	174.2
Females	25.8	25.7	30.6	36.7	39.1	39.6	37.4	41.3	56.0	61.8

Source: National Notifiable Diseases Surveillance System

3.3c *Annual rate of notifications of infectious syphilis*

Indicator definition

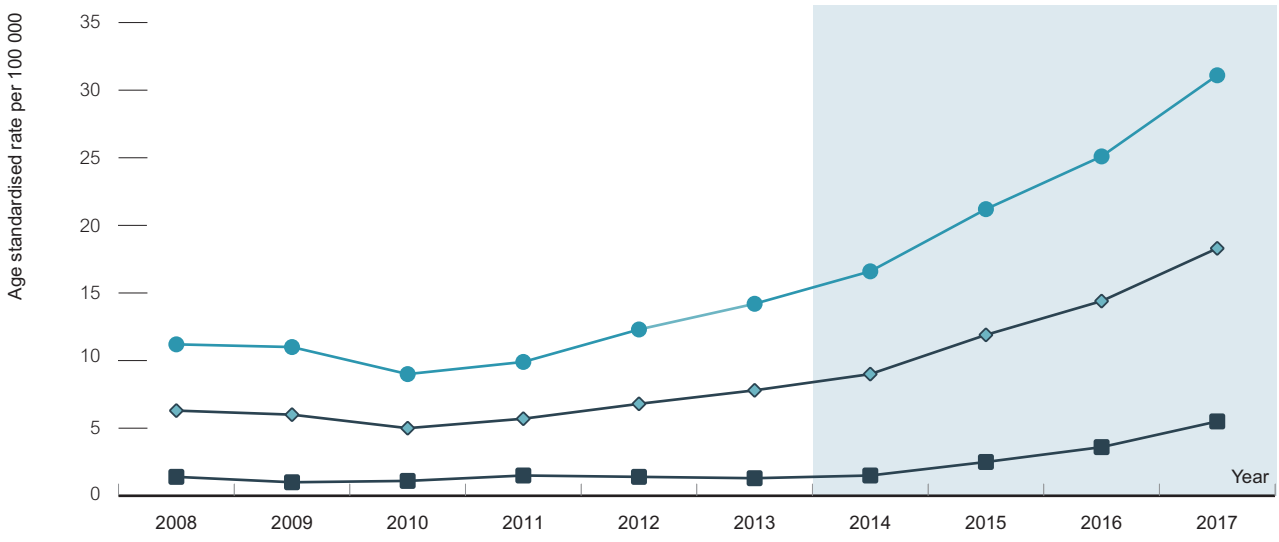
Numerator	Number of notifications of infectious syphilis (less than 2 years duration) reported to NNDSS
Denominator	Australian population reported by the ABS

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.[46] 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 that do not have a previous testing history. The infectious syphilis case definition was updated in July 2015[47] 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 to 18.3 per 100 000 in 2017 relating to the syphilis outbreak across Northern Australia. Between 2013 and 2017, the notification rate increased in women by more than four-fold (1.3 to 5.5 per 100 000 population), and in men by more than two-fold (from 14.2 to 31.1 per 100 000 population). Over the past ten years, the notification rate of infectious syphilis among men has almost tripled from 11.2 per 100 000 population in 2008 to 31.1 in 2017 and among women increased by almost four-fold from 1.4 to 5.5 per 100 000 population during the same time period (Figure 30). The higher notification rate among males reflects that most cases of infectious syphilis are among men who have sex with men.

Figure 30 Infectious syphilis notification rate per 100 000 population, 2008 – 2017, by year and sex



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total	6.3	6.0	5.0	5.7	6.8	7.8	9.0	11.9	14.4	18.3
Males	11.2	11.0	9.0	9.9	12.3	14.2	16.6	21.2	25.1	31.1
Females	1.4	1.0	1.1	1.5	1.4	1.3	1.5	2.5	3.6	5.5

Source: National Notifiable Diseases Surveillance System

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

3.4a Proportion of secondary school students giving the correct answer to STI knowledge and behaviour questions

Indicator definition

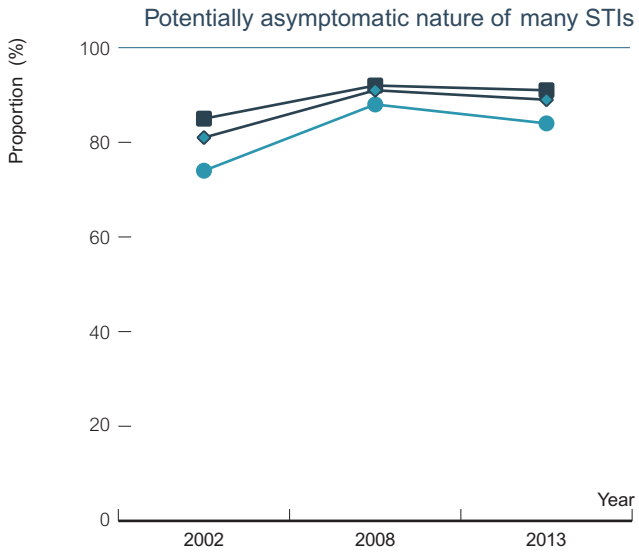
Numerator	Number of SASSH respondents answering STI knowledge questions correctly
Denominator	SASSH respondents (representative of Year 10 students across government, catholic & independent school systems from all jurisdictions)

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.

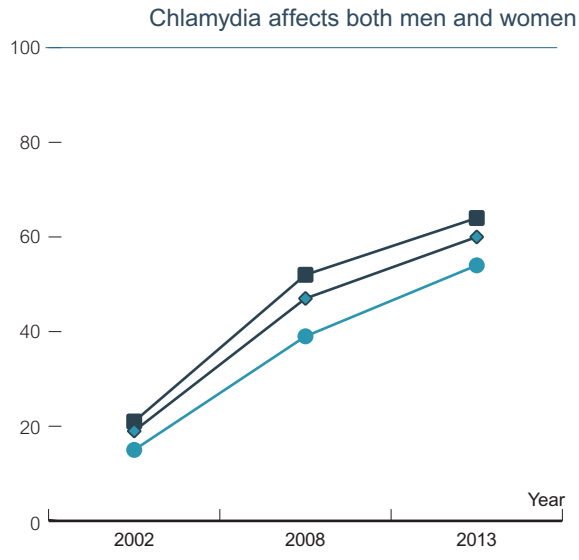
Data source and considerations: The National Survey of Australian Secondary Students and Sexual Health (SASSH)[48] provides a picture of sexual attitudes, knowledge and sexual practices of young Australian people and has been carried out approximately every five years since 1992, with the most recent 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 31). 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 31).

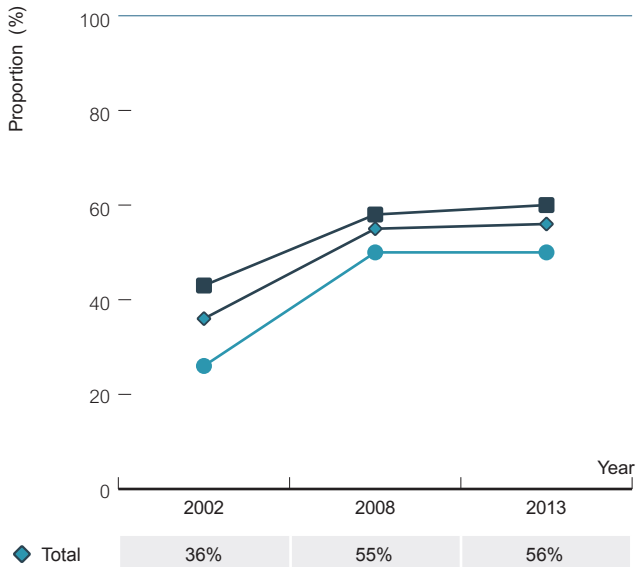
Figure 31 Proportion of secondary school students giving the correct answer to STI knowledge and behaviour questions, 2002, 2008 and 2013, by sex



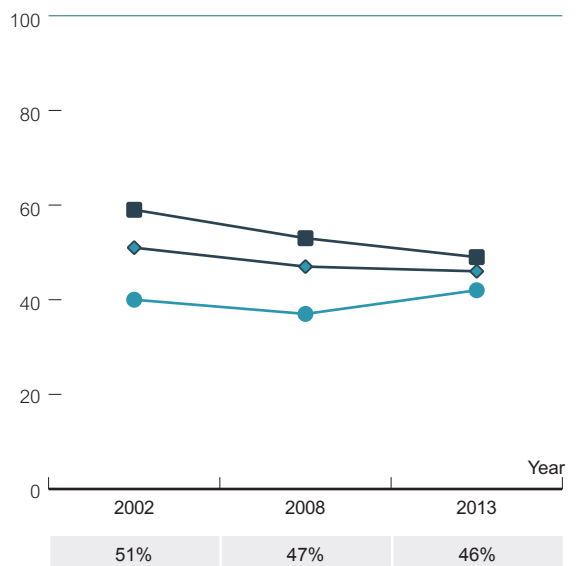
	2002	2008	2013
Total	81%	91%	89%
Males	74%	88%	84%
Females	85%	92%	91%



	2002	2008	2013
Total	19%	47%	60%
Males	15%	39%	54%
Females	21%	52%	64%



	2002	2008	2013
Total	36%	55%	56%
Males	26%	50%	50%
Females	43%	58%	60%



	2002	2008	2013
Total	51%	47%	46%
Males	40%	37%	42%
Females	59%	53%	49%

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

3.4b *Proportion of secondary school students reporting certain risky sexual behaviours (additional information)*

Indicator definition

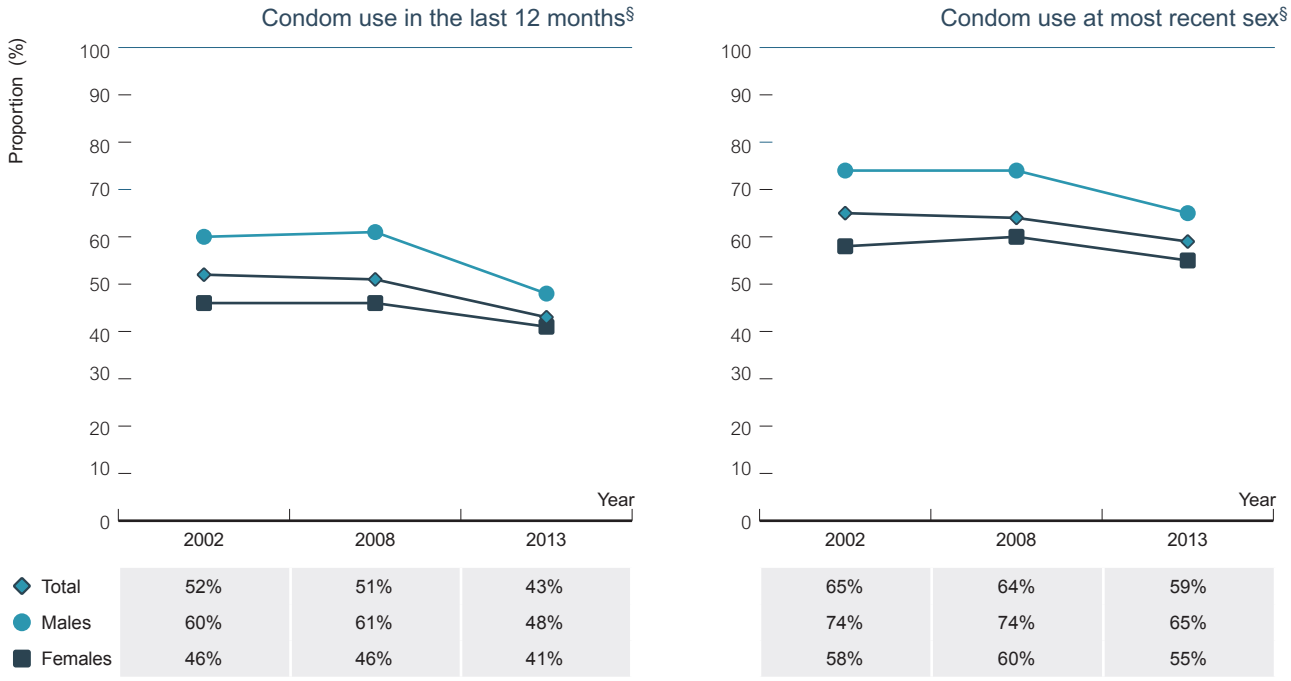
Numerator	Number of SASSH respondents reporting risky sexual behaviours
Denominator	SASSH respondents (representative of Year 10 students across government, catholic & independent school systems from all jurisdictions)

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.[49]

Data source and considerations: The National Survey of Australian Secondary Students and Sexual Health (SASSH)[50] asks students questions about sexual behaviour and risk taking. See 3.3a and Methodological Notes for further detail.

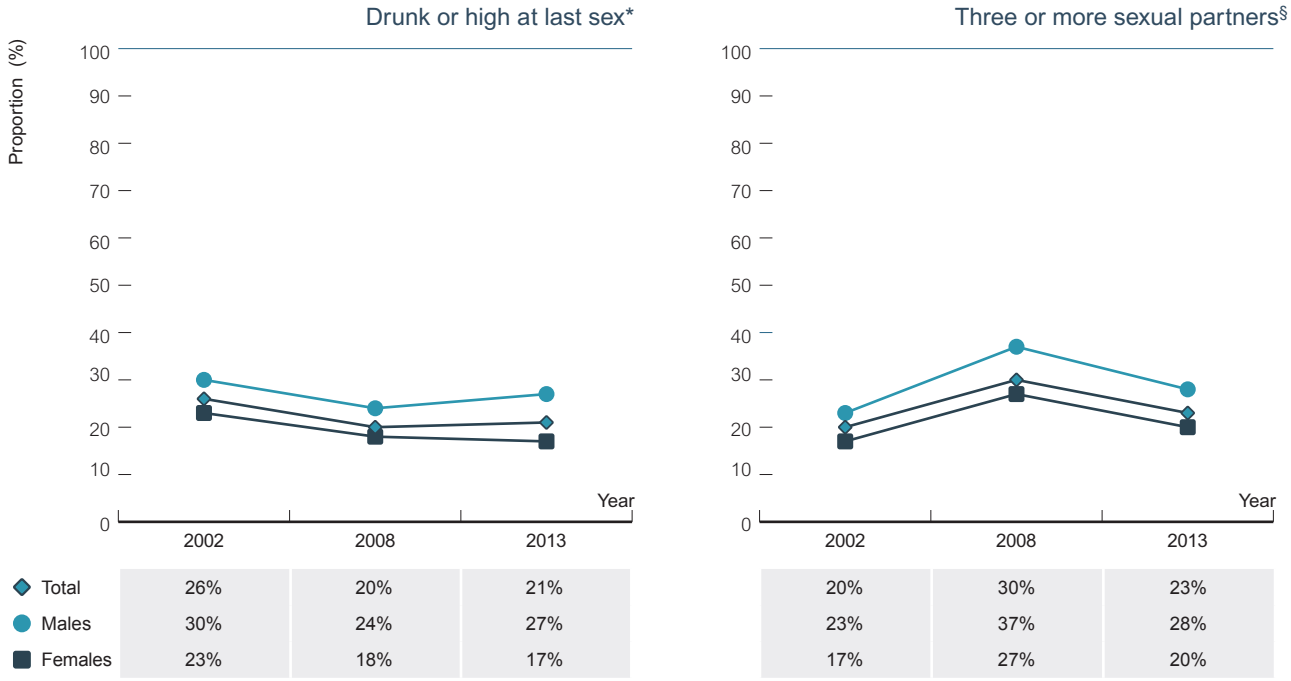
Results: In the most recent year of the survey (2013) (N=2,136), the proportion of all sexually active respondents reporting always using a condom when they had sex in the last twelve months was 43%, a decrease from 51% in 2008 and 52% in 2002 (Figure 32). The proportion reporting condom use at last 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 32 Proportion of secondary school students reporting key sexual behaviours, 2002, 2008 and 2013, by sex



	2002	2008	2013
Total	52%	51%	43%
Males	60%	61%	48%
Females	46%	46%	41%

	2002	2008	2013
Total	65%	64%	59%
Males	74%	74%	65%
Females	58%	60%	55%



	2002	2008	2013
Total	26%	20%	21%
Males	30%	24%	27%
Females	23%	18%	17%

	2002	2008	2013
Total	20%	30%	23%
Males	23%	37%	28%
Females	17%	27%	20%

§ All sexually active respondents;
* Year 10 students

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

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. The majority of congenital syphilis cases are diagnosed at birth and 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[51]:

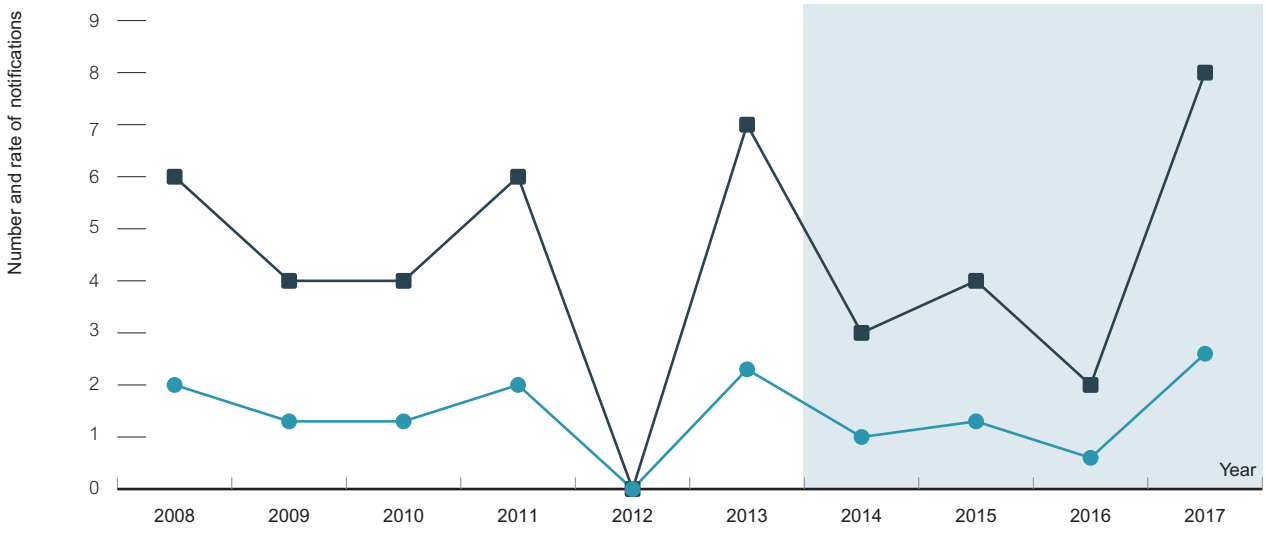
- <50 cases of congenital syphilis per 100 000 live births.
- Coverage of syphilis testing in pregnant women of > 95%
- Treatment of syphilis-seropositive pregnant women of > 95%

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 is outlined in the next set of National Strategies. 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. Congenital syphilis notifications include those associated with live births as well as those associated with deaths due to congenital syphilis. The number of live births is sourced from the Australian Bureau of Statistics (ABS) 3101.0 Australian Demographic Statistics, June 2016. See Methodological Notes for further detail.

Results: Eight cases of congenital syphilis were reported in 2017, five of which were in Aboriginal and Torres Strait Islander peoples. This represents a notification rate of 2.6 per 100 000 live births, a relative increase of 13% compared to 2.6 per 100 000 live births in 2013. The range of the number of notifications between 2008 and 2017 is none (in 2012) and eight (in 2017) (Figure 33). See Section 5.2c for details of congenital syphilis in the Aboriginal and Torres Strait Islander population.

Figure 33 Annual number of notifications of congenital syphilis, and rate of notifications per 100 000 live births, 2008 – 2017*



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Number of diagnoses	6	4	4	6	0	7	3	4	2	8
Rate per 100 000 live births	2.0	1.3	1.3	2.0	0.0	2.3	1.0	1.3	0.6	2.6

*Note: Not all cases of congenital syphilis were associated with live births and therefore caution should be applied when interpreting these data

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

3.6a Proportion of the general public who would express stigma or discrimination towards people living with a sexually transmissible infection (additional information)

A mirrored stigma indicator has been implemented with the general public to identify their expression of stigma towards people living with a sexually transmissible infection.

Indicator definition

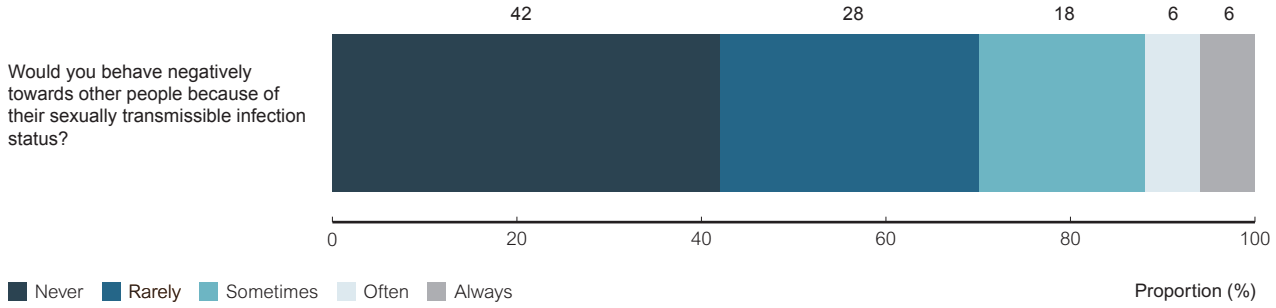
Numerator	Proportion of the surveyed general public who have reported they would express any stigma or discrimination towards people living with a sexually transmissible infection
Denominator	Total number of the general public surveyed

Background: See Section 1.6.

Data source and considerations: The Centre for Social Research in Health has developed an indicator of expressed stigma that could be used with the general public in relation to key attributes related to the national strategies. A single question was selected to indicate expressed stigma in relation to sexually transmissible infections: "Would you behave negatively towards other people because of their sexually transmissible infection?" The mirrored indicator was included in three waves of the 2017 Australian Survey of Social Attitudes (AuSSA), conducted by the Australian Consortium for Social and Political Research Incorporated (ACSPRI).

Result: In the 2017 survey (N=1001), 42% of the surveyed general public reported they would never behave negatively towards other people because of a sexually transmissible infection. Conversely, 30% of respondents reported they would sometimes, often or always behave negatively towards other people because of a sexually transmissible infection while 28% reported that they would do so rarely (Figure 34).

Figure 34 Proportion of the general public who report that they would express any stigma or discrimination towards people living with a sexually transmissible infection



Source: The Centre for Social Research in Health

3.6b Proportion of people aged 15 – 29 years who would express stigma or discrimination towards people living with a sexually transmissible infection (additional information)

A mirrored stigma indicator has been implemented with young people, aged 15 – 29 years to identify their expression of stigma towards people living with a sexually transmissible infection.

Indicator definition

Numerator	Proportion of surveyed people aged 15 – 29 years who have reported they would behave negatively towards people living with a sexually transmissible infection
Denominator	Total number of young people surveyed

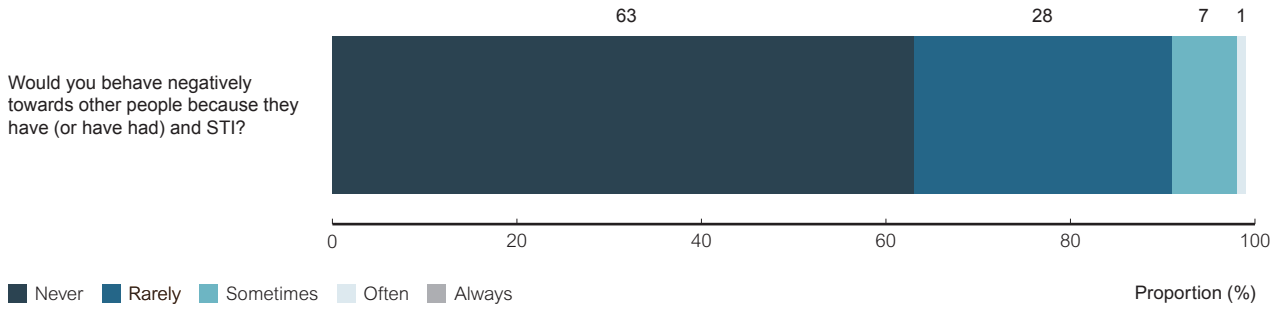
Background: See Section 1.6.

Data source and considerations: The Centre for Social Research in Health has developed an indicator of expressed stigma that could be used with young people aged 15 – 29 years in relation to key attributes related to the national strategies. Two questions were selected to indicate expressed stigma in relation to sexually transmissible infections, with the first being; "Would you behave negatively towards other people because have (or have had) an STI (sexually transmissible infection)?" The second question was: "If you ever had and STI, do you think you would experience any stigma or discrimination in relation to this STI?". The mirrored indicator was included in the Debrief online survey, conducted by the Centre for Social Research in Health.

Result: In the 2017 survey (N=1526), for the first question, 63% of respondents reported they would never behave negatively towards other people because of a sexually transmissible infection. Conversely, 36% of the surveyed young people reported they would behave negatively towards other people because of a sexually transmissible infection. Of these, 28% of people report they would never behave negatively while 7% and 1% report they would behave negatively sometimes and often, respectively. No respondents reported they would always behave negatively towards someone living with a sexually transmissible infection. (Figure 35)

In response to the second question, 12% of respondents reported they would never experience any stigma or discrimination in relation to having this STI. Of the 88% of respondents that reported they would experience any stigma or discrimination, 26% said they would experience this rarely, 43% said they would sometimes while 19% said they would often or always. (Figure 36)

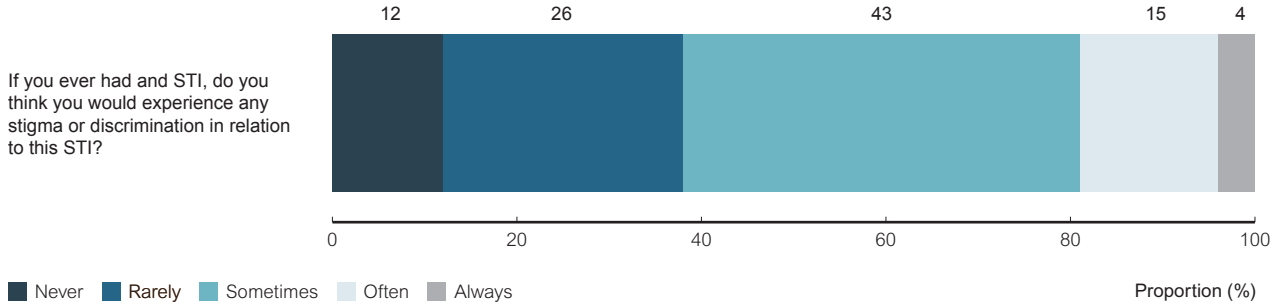
Figure 35 Proportion of young people who report that they would behave negatively towards people living with a sexually transmissible infection



Note: The total % may not add to 100 due to rounding

Source: The Centre for Social Research in Health

Figure 36 Proportion of young people who report that they would experience any stigma or discrimination on relation to this STI



Source: The Centre for Social Research in Health

4. HIV

Epidemiology overview

During 2017, an estimated 27 545 people were living with HIV in Australia and 89% or 24 646 people were diagnosed. Transmission of HIV in Australia continues to occur primarily through sexual contact between men. The annual number of HIV notifications in Australia has declined by 7% in the past five years, with 1032 notifications in 2013, and 963 in 2017. In 2017, 88% of the new HIV diagnoses were in males, 63% occurred among men who have sex with men, 6% due to male-to-male sex and injecting drug use, 25% were attributed to heterosexual sex, and 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 2018*.[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 HIV across Australia was 4.0 per 100 000 population in 2017, an 11% decline compared to the rate of 4.5 per 100 000 population in 2013. Over the past ten years, 2008 – 2017, the notification rate of HIV has remained relatively stable between 4.0 to 4.7 per 100 000 population.
- The estimated HIV incidence among female sex workers undergoing repeat HIV testing at sexual health clinics was 0.04 per 100 person-years in 2017 (95% CI: 0.01 – 0.30), slightly decreasing from 0.08 (95% CI: 0.02 – 0.33) in 2013. It is important to note that the confidence intervals between these estimates overlap, meaning that the between year differences are not statistically significant.
- HIV prevalence continues to be very low among people who inject drugs at 2.1% in 2017 (0.7% if gay and bisexual men are excluded), and HIV incidence remains extremely low among women involved in sex work, with only one new case detected in 2017 and no cases detected in 2015, giving an HIV incidence of 0.04% (95% CI: 0.01 – 0.22) for 2017.
- Among 43 women known to be living with HIV and who gave birth in 2017, the transmission to their newborns was 0%, the same as in 2013, and in 2008.

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 increased considerably among gay and bisexual men, with 15.6% in 2017, as compared to 0.9% in 2013.
- Treatment as prevention (TasP) is a highly effective strategy for the prevention of onward transmission of HIV. See the section on HIV treatment for further details regarding the proportion of people who are receiving antiretroviral treatment for HIV and have a suppressed viral load.
- In 2017 the proportion of gay men reporting condomless anal intercourse (CLAIC) with casual male partners was 52.6%; increasing from 35.5% in 2013. However, this increase parallels the increase in the proportion of men reporting CLAIC who are also taking PrEP.
- In 2017, among people who inject drugs, the proportion re-using someone else's needle and syringe in the previous month was 17%. This proportion has increased slightly from 15% reported in 2013.

Indicator status (cont.)

Testing

- Among the estimated 27 545 people living with HIV in Australia in 2017, an estimated 10.5% were living with undiagnosed HIV.
- Based on behavioural surveys, the proportion of gay men who reported having a HIV test in the past year has increased from 61% in 2013 to 67% in 2017 and the proportion of HIV-negative men having three or more HIV tests in the past year has also substantially increased in recent years, from 22% in 2013, to 42% in 2017.
- Based on tests for immune function, approximately a third (36%) of the new HIV notifications in 2017 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 higher when compared to 2013 (31.9%) and 2008 (31.4%).

Treatment

- Among the estimated 24 646 people living with diagnosed HIV in Australia, an estimated 87% were receiving treatment with antiretroviral therapy in 2017, an increase of 7% as compared to 80% in 2013.
- Information from the HIV diagnosis and care cascade demonstrated that nationally in 2017 an estimated 96% of people on treatment had supressed viral load (<200 HIV-1 RNA copies/mL), which is an absolute increase of 8% when compared to 88% in 2013.

Personal and social impacts

- In a survey conducted in 2017, 52% of the surveyed general public reported that they would behave negatively towards other people due to their HIV status,

Summary: In the fourth and final year of the Seventh National HIV Strategy, HIV notifications and incidence rates have shown a decline since 2013. Overall, initiatives to promote HIV testing have achieved high levels of uptake. Although Pre-exposure prophylaxis (PrEP) coverage remains low, PrEP uptake has rapidly increased since 2015 due to large state and territory-funded PrEP implementation programs as well as funding of PrEP through the Medicare Benefits Scheme. However, funding of the latter does not cover temporary residents who are ineligible for Medicare, for example, international students. HIV treatment coverage has increased to 87% in 2017, likely reflecting 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 strategies of health promotion, testing, treatment and risk reduction. These strategies include the promotion of PrEP, TasP and other forms of prevention to people who could benefit from these strategies and to increase prevention initiatives in people born overseas and Aboriginal and Torres Strait Islander peoples.

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	2017
Incidence and prevalence	4.1 Reduce the incidence of HIV	4.1a Recent HIV infection^ among new HIV diagnoses∞ (proportion acquired within 12 months)†	34%	39%	39%	36%	25%
		4.1b HIV Incidence rate in female sex workers who test for HIV infection at selected health services based on repeat testing (per 100 person-years)	0.08	0.00	0.04	0.04	0.04
		4.1c Additional information: Annual notification rate of new HIV diagnoses (per 100 000 population)	4.5	4.7	4.4	4.2	4.0
		4.1d Additional information: Number of HIV notifications by exposure risk					
		Male-to-male sex	680	761	700	712	607
		Male-to-male sex and injecting drug use	44	50	49	51	53
		Injecting drug use	28	31	30	14	33
		Heterosexual sex	217	201	205	209	238
		Mother with/at risk of HIV infection	4	3	4	5	3
		Other/undetermined	59	38	38	22	29
	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)	0.08	0.00	0.04	0.04	0.04
	Sustain the virtual elimination of HIV amongst people who inject drugs	*4.1e Additional information:* HIV prevalence among people who inject drugs attending needle syringe programs:					
		All	2.1%	1.7%	1.7%	1.4%	2.1%
		Excluding men who have sex with men	~0.5%	~0.5%	~0.5%	0.7%	0.7%
	Sustain the virtual elimination of mother to child transmission of HIV	*4.1f Additional information:* Transmission to newborns among women with HIV who gave birth	0%	0%	6.5%	0.0%	0.0

Theme	Objective	Indicator	2013	2014	2015	2016	2017
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%	45%	53%
		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%	17%
		4.2c Additional information: Proportion of gay men who have received PrEP in the last year	0.9%	0.7%	1.2%	4.5%	15.6%
Testing	4.3 Decrease the number of people with undiagnosed HIV infection	4.3a Proportion of non-HIV positive gay men who have been tested for HIV in the previous 12 months	61%	62%	66%	68%	67%
		4.3b Proportion of people who inject drugs who have been tested for HIV in the previous 12 months	53%	53%	50%	50%	47%
		4.3c Median CD4 counts at HIV diagnosis (cells per μL)†	420	440	440	420	390
		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%	41.7%
		4.3e Additional information: Proportion of people living with HIV who are undiagnosed	12%	12%	11%	11%	11%
		4.3f Additional information: Proportion of new HIV diagnoses determined to be late (CD4 count <350 cell/μL)†	32%	29%	29%	33%	36%
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	80%	83%	85%	86%	87%
		4.4b Proportion of people receiving antiretroviral treatment for HIV infection whose viral load is suppressed - (less than 50 copies/mL)/ (less than 200 copies/mL).	83%/89%	86%/90%	88%/92%	90%/93%	93%/96%

Theme	Objective	Indicator	2013	2014	2015	2016	2017
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)	*
		4.6d. Additional information: Proportion of the general public who report that they would express any stigma or discrimination towards people living with HIV.	*	*	*	*	52%
		4.6e. Additional information: Proportion of the general public who report that they would express any stigma or discrimination towards people based on their sexual orientation.	*	*	*	*	38%
		4.6f. Additional information: Proportion of the general public who report that they would express any stigma or discrimination towards people because of their sex work.	*	*	*	*	64%
	Maintain effective prevention programs targeting sex workers	Indicator not yet identified§	*	*	*	*	*

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.

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

^ 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.

* Denotes data not available.

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

§ 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 notifications

Indicator definition

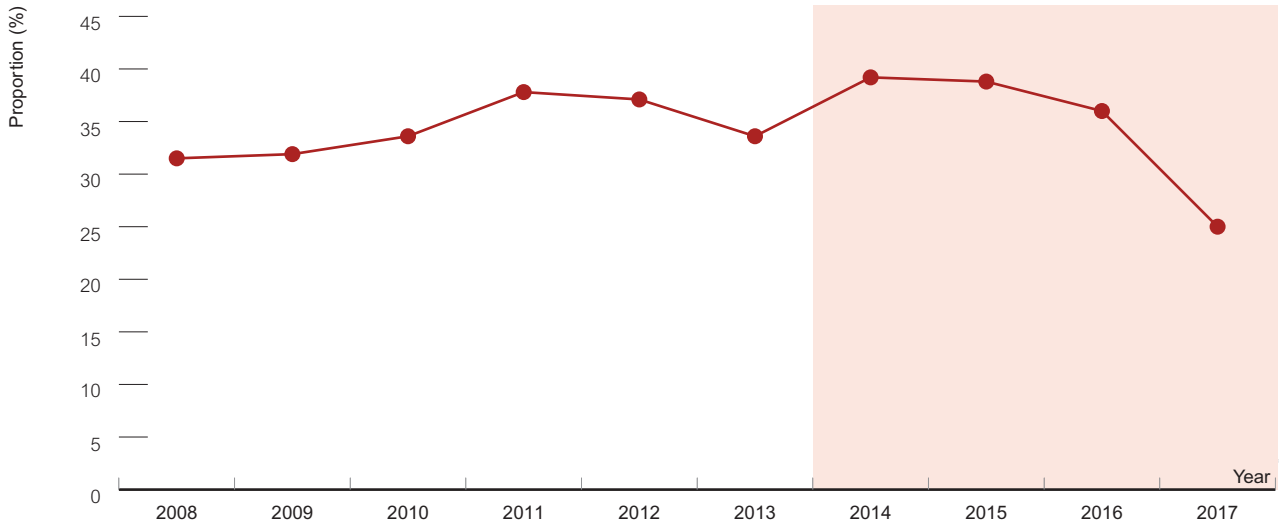
Numerator	Number of HIV notifications with either: an onset of primary HIV infection, negative HIV test or an indeterminate HIV test in the previous year.
Denominator	Number of HIV notifications recorded in the National HIV Registry.

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.[52] 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 2017 25% of HIV notifications were classified as newly acquired, which is a 26% relative decrease from 2013 (34%) and an 11% decrease since 2016 (31%) Between 2008 and 2016 the proportion of HIV notifications classified as newly acquired fluctuated between 32% and 39% until 2017 when the proportion dropped to 25% (Figure 37).

Figure 37 Proportion of HIV notifications classified as newly acquired HIV infection, 2008 – 2017



Source: State and Territory health authorities

4.1b *HIV incidence based on repeat testing*

Indicator definition

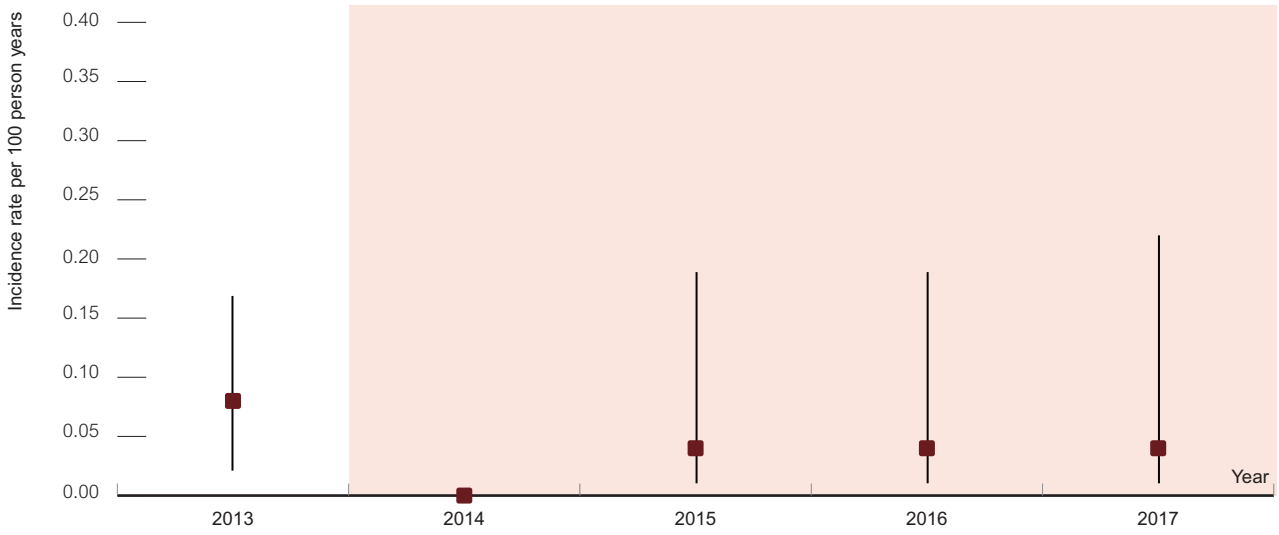
Numerator	Number of HIV seroconversions, defined as the midpoint between the last negative and first positive test for HIV
Denominator	Person years at risk, defined as the time between the first and last test in the cohort time period.

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 44 sexual health clinics participating in the ACCESS network enable calculation of HIV incidence in 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 female sex workers are extremely low among women involved in sex work, with only one case among women tested in 2017. The overall incidence rate in the past five years was 0.04 per 100 person-years (95%CI: 0.01 – 0.30). The HIV incidence remained at or under 0.08 per 100 personyears over the past five years (Figure 38).

Figure 38 HIV incidence rate per 100 person-years in female sex workers attending sexual health clinics, 2013 – 2017



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

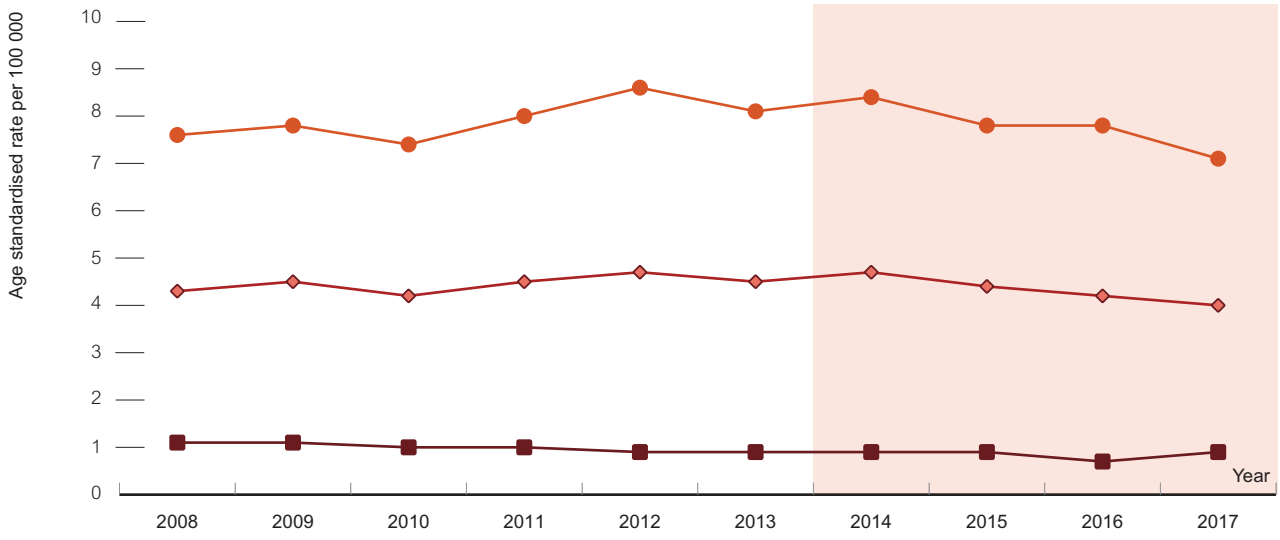
Numerator	Number of HIV notifications recorded in the National HIV Registry
Denominator	Australian population reported by the ABS

Background: Reported rates of HIV notification 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 has gradually declined between 2013 and 2017, and was 4.5 per 100 000 population in 2013, and 4.0 per 100 000 population in 2017, with the reduction largely a result of a decrease in the notification rate among males. The HIV notification rate has remained stable among females, but is low overall compared with that in males (0.9 vs 7.1 per 100 000 in 2017) (Figure 39).

Figure 39 HIV notifications, rate per 100 000 population, 2008 – 2017, by sex



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total	4.3	4.5	4.2	4.5	4.7	4.5	4.7	4.4	4.2	4.0
Male	7.6	7.8	7.4	8.0	8.6	8.1	8.4	7.8	7.8	7.1
Female	1.1	1.1	1.0	1.0	0.9	0.9	0.9	0.9	0.7	0.9

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 Number of HIV notifications by exposure category (additional information)

Indicator definition

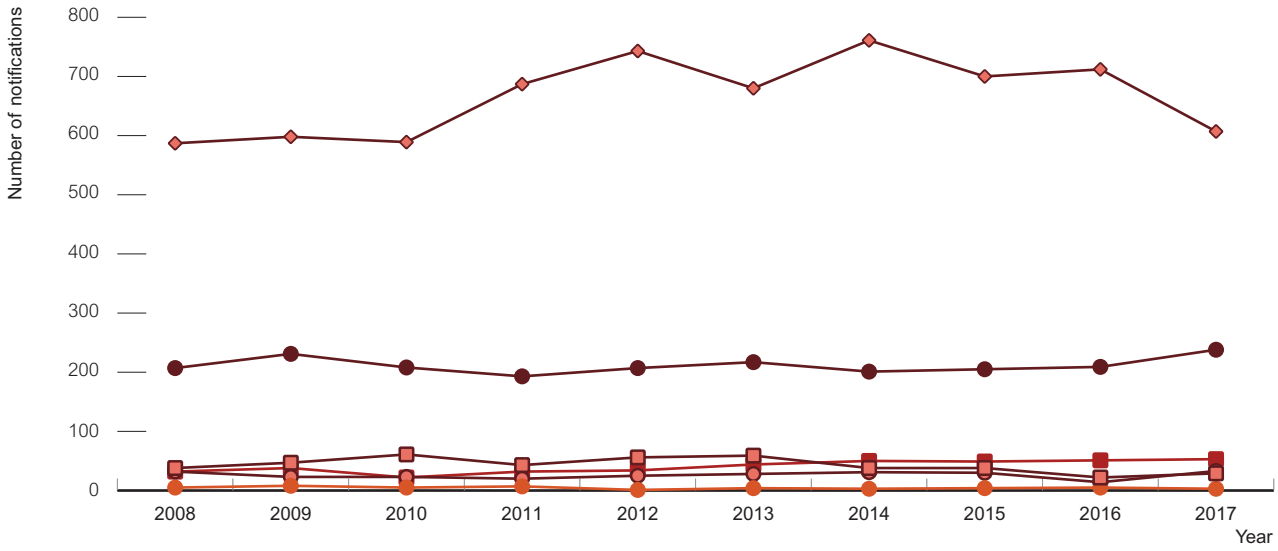
Single measure	Number of HIV notifications recorded in the National HIV Registry stratified by exposure risk

Background: HIV notifications can be used to monitor the trends of HIV transmission in Australia. By examining exposure risk, inferences can be made about the changing patterns of transmission pathways contributing to HIV incidence, particularly in priority populations.

Data source and considerations: See section 4.1c.

Results: Transmission of HIV in Australia continues to occur primarily through male-to-male sexual contact. About two thirds (63%; 607) of HIV notifications were attributed to male-to-male sex in 2017, a 7% decrease from 70% (712) in 2016. The proportion of notifications with a risk exposure reported as male–to–male sex decreased slightly from 66% in 2013 to 63% in 2017. This proportion has risen from 57% since 2008. Heterosexual sex accounted for 238 (25%) of notifications, an increase from 21% (209) in 2016. In 2017, other risk exposures were: both male-to-male sex and injecting drug use for 53 (6%) notifications, and injecting drug use only for 33 (3%) notifications (Figure 40).

Figure 40 Number of new HIV diagnoses, 2008 – 2017, by exposure category



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Male-to-male sex	587	598	589	687	743	680	761	700	712	607
Male-to-male sex and injecting drug use	32	38	22	32	34	44	50	49	51	53
Injecting drug use	32	23	23	20	25	28	31	30	14	33
Heterosexual sex	207	231	208	193	207	217	201	205	209	238
Mother with/at risk of HIV infection	5	8	5	7	1	4	3	4	5	3
Other/undetermined	38	47	61	43	56	59	38	38	22	29

Source: State and Territory health authorities

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

Indicator definition

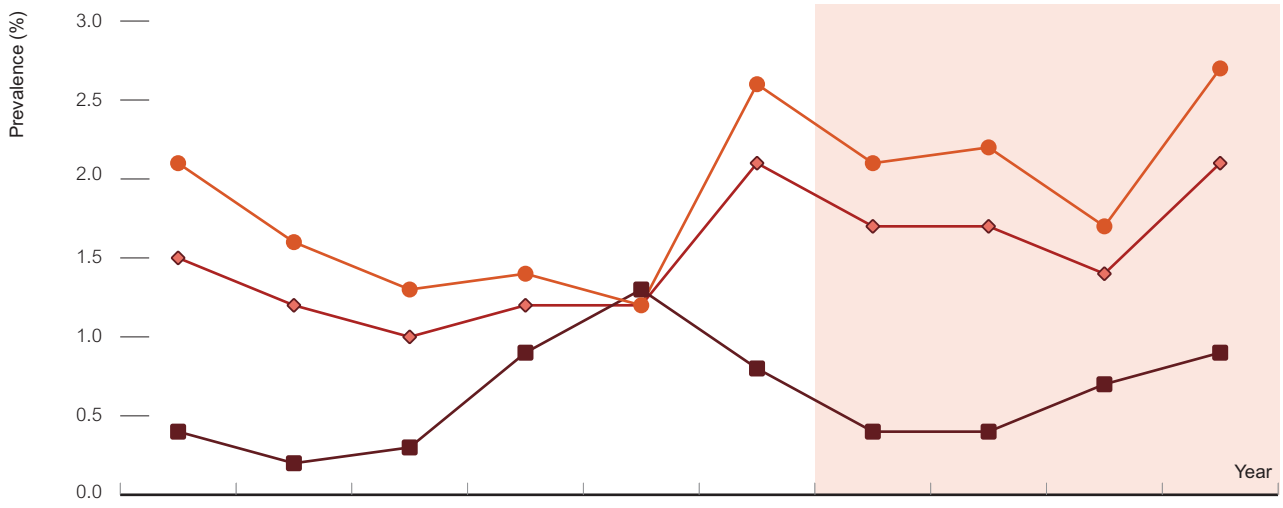
Numerator	Number of people testing positive for HIV among people who inject drugs attending needle and syringe programs
Denominator	Number of people who inject drugs attending needle and syringe programs

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: The ANSPS is conducted annually and collects data from a large heterogeneous community-based sample of people (in 2017 n=2314) 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 HIV prevalence in those who attend needle and syringe programs. See Methodological Notes for further detail.

Results: In 2017, HIV prevalence among people who inject drugs, at 2.1%, was the same as reported in 2013 (Figure 41). Prevalence was higher in 2017 among men (2.7%) compared with females (0.9%). When men who have sex with men were excluded, HIV prevalence in 2017 among people who inject drugs was 0.7% (data not shown).

Figure 41 HIV prevalence among people who inject drugs attending needle and syringe programs, 2008 – 2017



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total*	1.5%	1.2%	1.0%	1.2%	1.2%	2.1%	1.7%	1.7%	1.4%	2.1%
Males	2.1%	1.6%	1.3%	1.4%	1.2%	2.6%	2.1%	2.2%	1.7%	2.7%
Females	0.4%	0.2%	0.3%	0.9%	1.3%	0.8%	0.4%	0.4%	0.7%	0.9%

* Includes transgender

Source: Australian Needle and Syringe Program Survey

4.1f *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

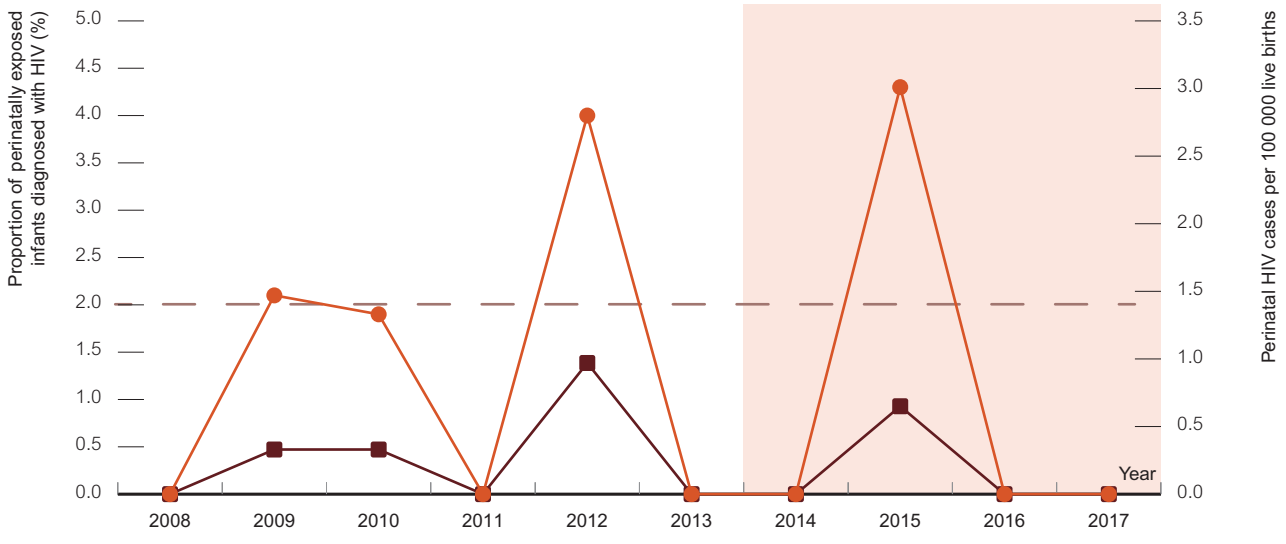
Background: The internationally endorsed strategy of early testing and treatment has the potential to eliminate mother-to-child transmission (MTCT) of HIV in countries where treatment coverage is high. In order to prevent MTCT, the World Health Organization (WHO) has set the following Global Elimination of Mother to Child Transmission of HIV Targets[51]:

- 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. It should be noted that not all cases of HIV due to MTCT are reported to the APSU and so caution should be applied in the interpretation of these figures.

Results: There were no cases of HIV amongst perinatally exposed infants born in Australia in 2017, 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 2017, the same as in 2013, 2014 and 2016 (Figure 42).

Figure 42 Mother-to-child transmission of HIV, 2008 – 2017



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Perinatal HIV cases per 100 000 live births	0.00	0.33	0.33	0.00	0.97	0.00	0.00	0.65	0.00	0.00
Proportion of perinatally exposed infants diagnosed with HIV	0.0%	2.1%	1.9%	0.0%	4.0%	0.0%	0.0%	4.3%	0.0%	0.0%
Number of HIV positive infants born to HIV-positive mothers	0	1	1	0	3	0	0	2	0	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

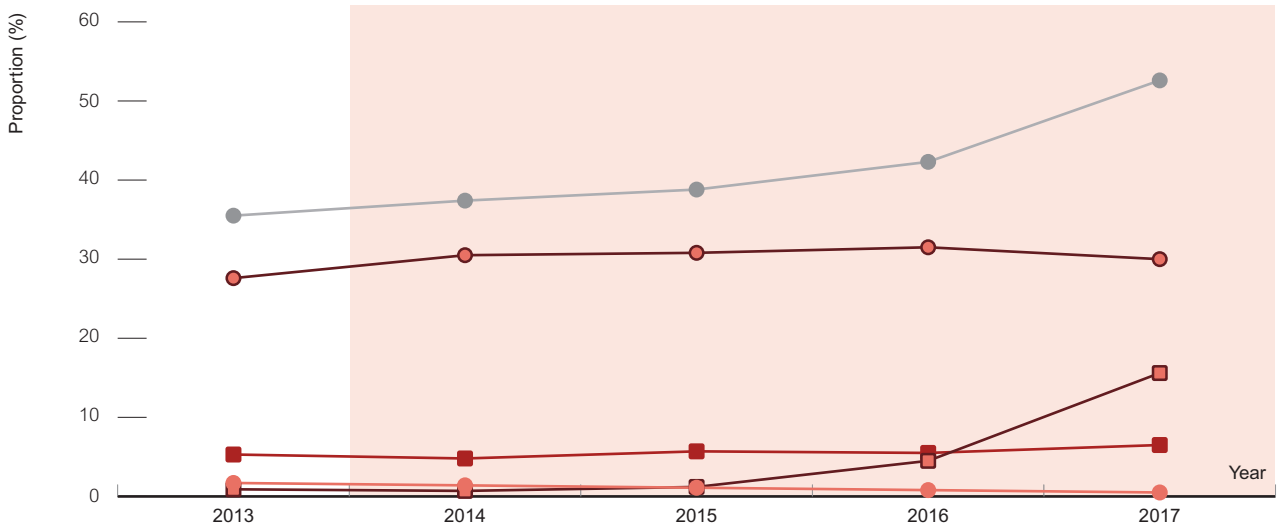
Background: In Australia, condomless anal intercourse with casual male partners is a key risk factor for acquiring HIV in gay and other men who have sex with men and a reliable indicator of subsequent trends in HIV infection.[53] However it is important to note that these men may not all be at risk of HIV due to adoption of other risk reduction strategies, such as sero-sorting, pre-exposure prophylaxis (PrEP) and antiretroviral treatment (ART) in men with HIV (treatment as prevention).

Data source and considerations: See Section 3.4b.

Results: Results from the GCPSs indicate that in 2017, 53% of gay men with casual partners reported condomless anal intercourse (CLAIC) in the previous six months. Conversely, this means just less than half of men with casual partners use condoms or avoid anal sex entirely. Between 2013 and 2017 the proportion reporting CLAIC with a casual partner has increased from 36% to 53% (Figure 43). A large component of this increase is due to those who report CLAIC, who were HIV-negative and also on PrEP (0.9% in 2013 to 15.6% in 2017). The proportion of those reporting CLAIC who are HIV-positive and either taking ART or not taking ART has remained stable. Likewise, the proportion of those whose HIV status is unknown and reported CLAIC has remained stable since 2013. Further information regarding sexual risk behaviour appears in the *Annual Report of Trends in Behaviour 2018*, prepared by the Centre for Social Research in Health.

HIV

Figure 43 Proportion of gay men with casual partners who reported any condomless anal intercourse in the six months prior to the survey, 2013 – 2017



	2013	2014	2015	2016	2017
CLAIC: HIV negative/unknown	27.6%	30.5%	30.8%	31.5%	30.0%
CLAIC: HIV positive not on ART/DVL	1.7%	1.4%	1.1%	0.8%	0.5%
CLAIC: HIV negative on PrEP	0.9%	0.7%	1.2%	4.5%	15.6%
CLAIC: HIV positive on ART/DVL	5.3%	4.8%	5.7%	5.5%	6.5%
Total	35.5%	37.4%	38.8%	42.3%	52.6%

Note: Stratifications are based on relative risk of CLAIC.

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: See Section 2.2c.

Results: The proportion of people who inject drugs (seen through the Australian needle and syringe programs), who reported receptive syringe sharing, has increased by 2% between 2013 (15%) and 2017 (17%). Since 2008, this proportion has fluctuated between 12% (2010) and 19% (2016) (see Figure 14, Section 2.2c).

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

Indicator definition

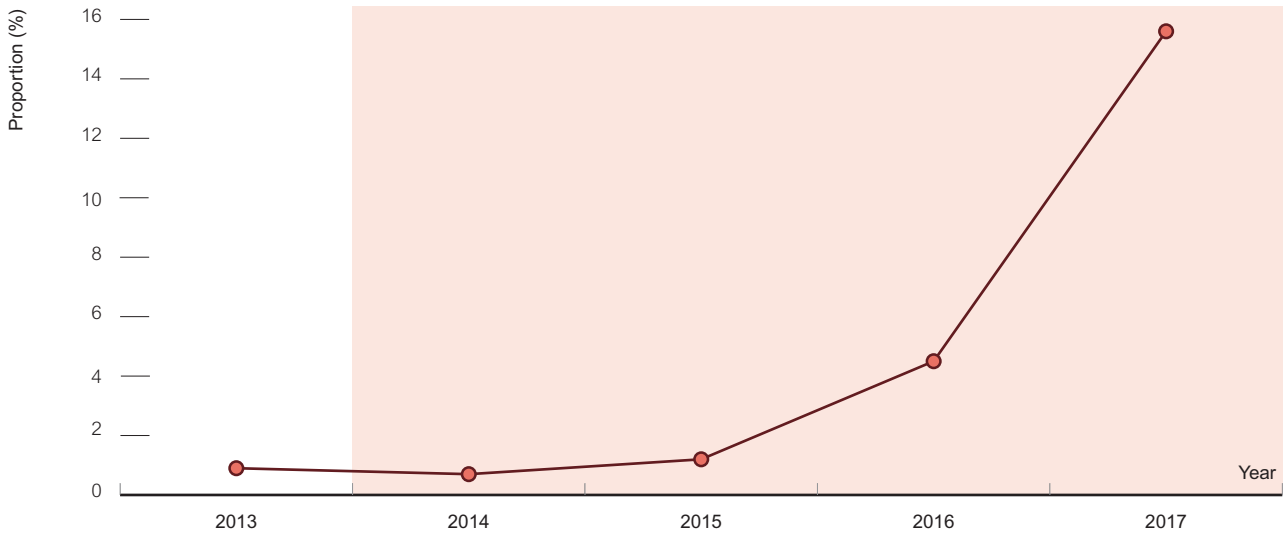
Numerator	Number of non-HIV-positive gay men who received PrEP for HIV in the six months prior to the survey, reported in GCPS
Denominator	Number of non-HIV-positive gay men participating in GCPS

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.[54] In Australia, PrEP (Truvada) has been registered under the Therapeutic Goods Administration (TGA). From 2014, a number of small-scale demonstration projects commenced in NSW and Victoria and in Queensland in 2015. In 2016 three large state-funded PrEP implementation programs commenced in NSW, Victoria and Queensland.[55-57] By November 2017, with the exception of the Northern Territory, every state and territory had initiated a state-funded PrEP implementation program. Since April, 2018 PrEP has been available on the PBS, allowing for much wider access in Australia. Systems are being established to monitor the uptake, adherence and effectiveness of PrEP on an ongoing basis.

Data source and considerations: See Section 3.4b.

Results: Results from the GCPS indicate that among non-HIV-positive men in Australia, PrEP use was minimal between 2013 and 2015 with very little change (between 0.7 – 1.9%). However, in 2016, 4.5% of non-HIV-positive gay and bisexual men reported PrEP use, and then in 2017, the figure jumped sharply to 15.6%, a 17-fold increase since 2013 (Figure 44). 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 44 PrEP use reported by all non-HIV-positive participants in the Gay Community Periodic Survey, 2013 – 2017



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

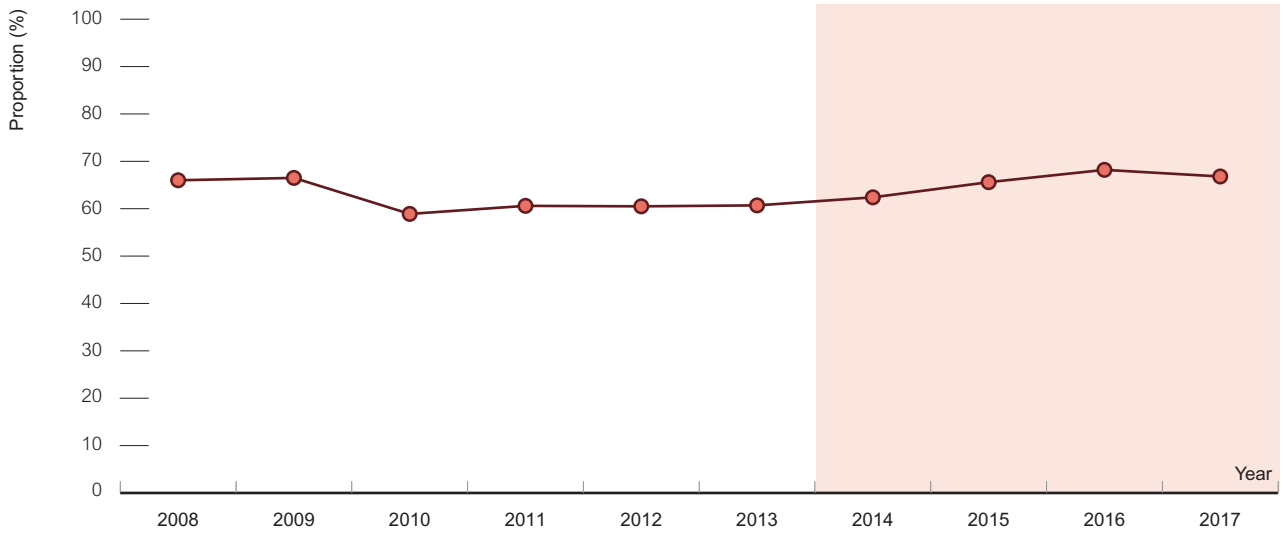
Numerator	Number of non-HIV-positive gay men who have been tested for HIV in the previous twelve months, reported in GCPS
Denominator	Number of non-HIV-positive gay men participating in GCPS

Background: The Australian HIV epidemic has predominantly been due to transmission through male-to-male sex. Of the 963 new HIV notifications in 2017, 68% reported an exposure category including male-to-male sex.[30] 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: See Section 3.4b.

Results: Results from the GCPS indicate that in 2017 67% of non-HIV-positive gay male participants reported having an HIV test in the 12 months prior to the survey, an increase of 6% compared to 2013 (61%). (Figure 45).

Figure 45 Proportion of non-HIV-positive men tested for HIV in the 12 months prior to completing the survey, 2008 – 2017



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

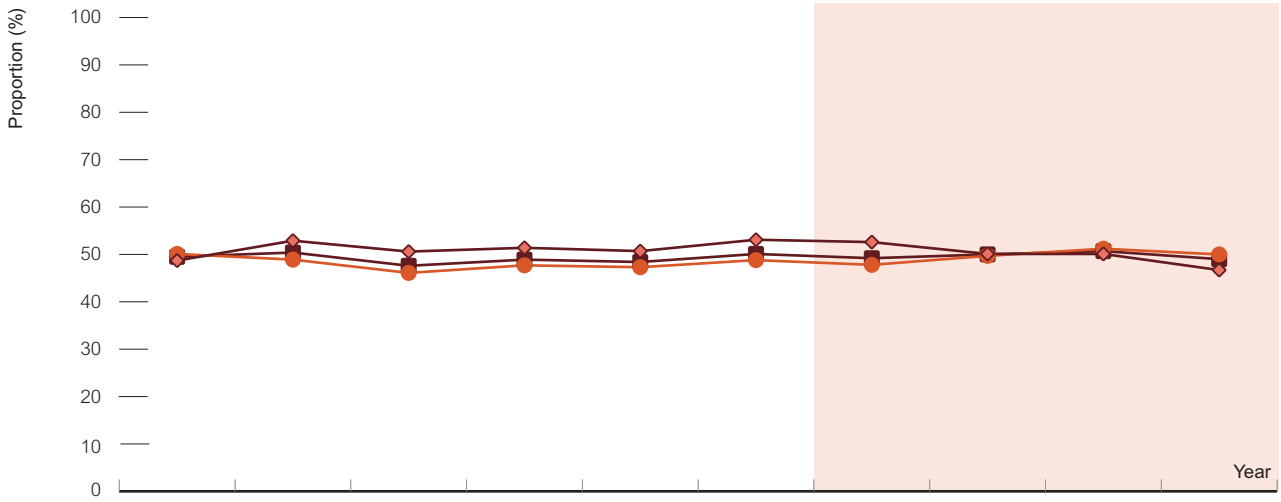
Numerator	Number of ANSPS participants who report having had an HIV test in the last 12 months
Denominator	Total number of participants in the ANSPS

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 2017, the proportion of all respondents in ANSPS reporting an HIV antibody test in the previous 12 months remained steady between 49 – 51% (Figure 46).

Figure 46 Proportion of people who inject drugs who attended needle and syringe programs and reported an HIV test in the past 12 months, 2008 – 2017



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total	49%	53%	51%	51%	51%	53%	53%	50%	50%	47%
Males	50%	49%	46%	48%	47%	49%	48%	50%	51%	50%
Females	50%	50%	48%	49%	48%	50%	49%	50%	51%	49%

Source: Australian Needle and Syringe Program Survey

4.3c Median CD4 counts at HIV diagnosis.

Indicator definition

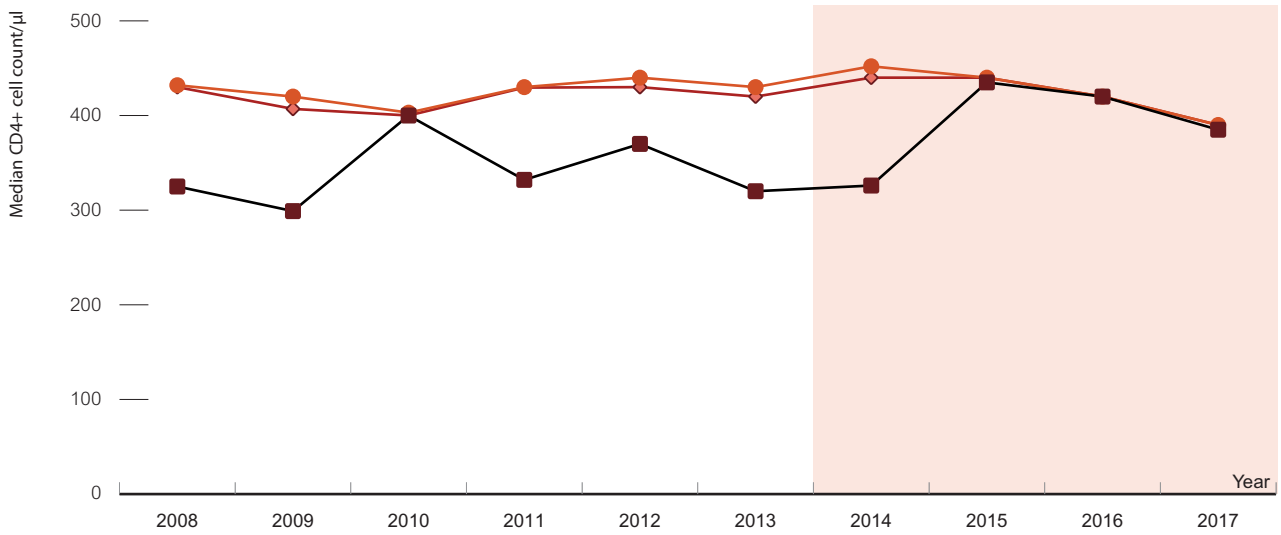
Single Measure	Median of the CD4 counts for all HIV diagnosis within the last 12 months

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.[58] 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).[59]

Data source and considerations: CD4+ cell counts are reported at diagnosis for 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 2017, the median CD4+ cell count at diagnosis was 390 cells/µL, slightly lower than in 2013 (420 cells/µL). In all years since 2008 the median CD4+ cell count was either the same or greater in males than females (Figure 47).

Figure 47 Median CD4+ cell count for new HIV diagnoses, 2008 – 2017, by sex



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total*	430	407	400	429.5	430	420	440	440	420	390
Male	432	420	403	430	440	430	452	440	420	390
Female	325	299	400	332	370	320	326	435	420	385

* 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

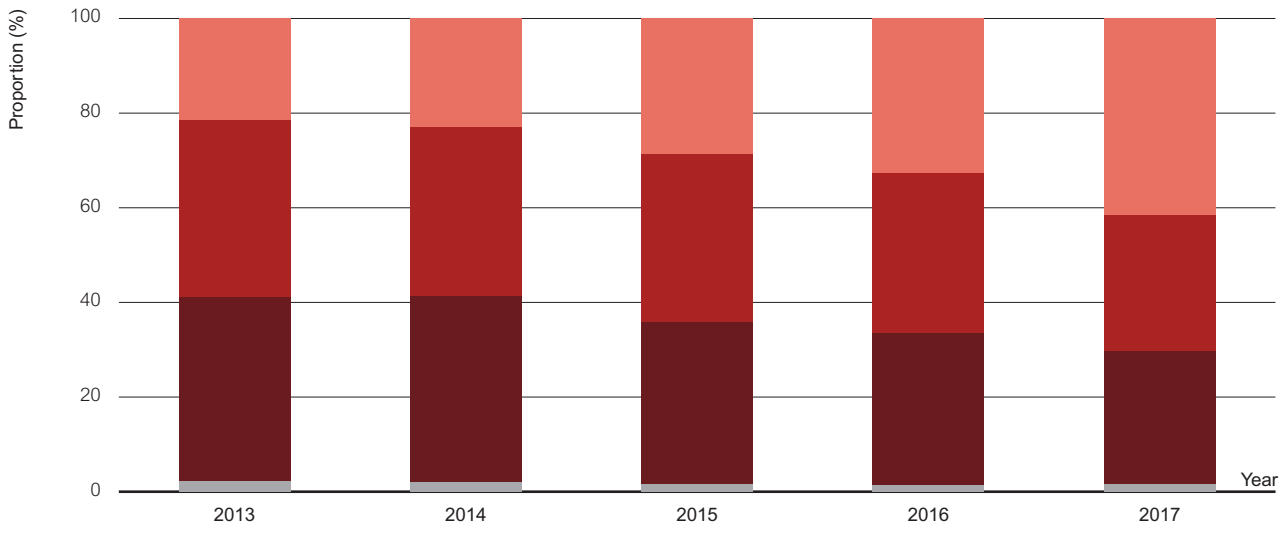
Numerator	Number of non-HIV-positive gay men who have been tested one, two or three or more times for HIV in the previous twelve months, reported in GCPS
Denominator	Number of non-HIV-positive gay men participating in GCPS

Importance: Clinical guidelines recommend 3 – 6 monthly testing for men at higher-risk indicated by condomless sex, >10 partners in the last six months and other risk criteria.[60] 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.[61]

Data source and considerations: See 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 41.7% in 2017, an increase of 20.2% compared to 21.5% in 2013 (Figure 48).

Figure 48 Proportion of non-HIV-positive gay men reporting one, two or three or more HIV tests in the previous 12 months, 2013 – 2017



	2013	2014	2015	2016	2017
Three or more	21.5%	23.0%	28.7%	32.7%	41.7%
Two	37.5%	35.8%	35.5%	33.8%	28.6%
One	38.7%	39.2%	34.3%	32.1%	28.1%
Missing data	2.3%	2.0%	1.5%	1.4%	1.6%

Note: Showing unadjusted % change, 2013 – 2017.
Source: Gay Community Periodic Survey

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

Indicator definition

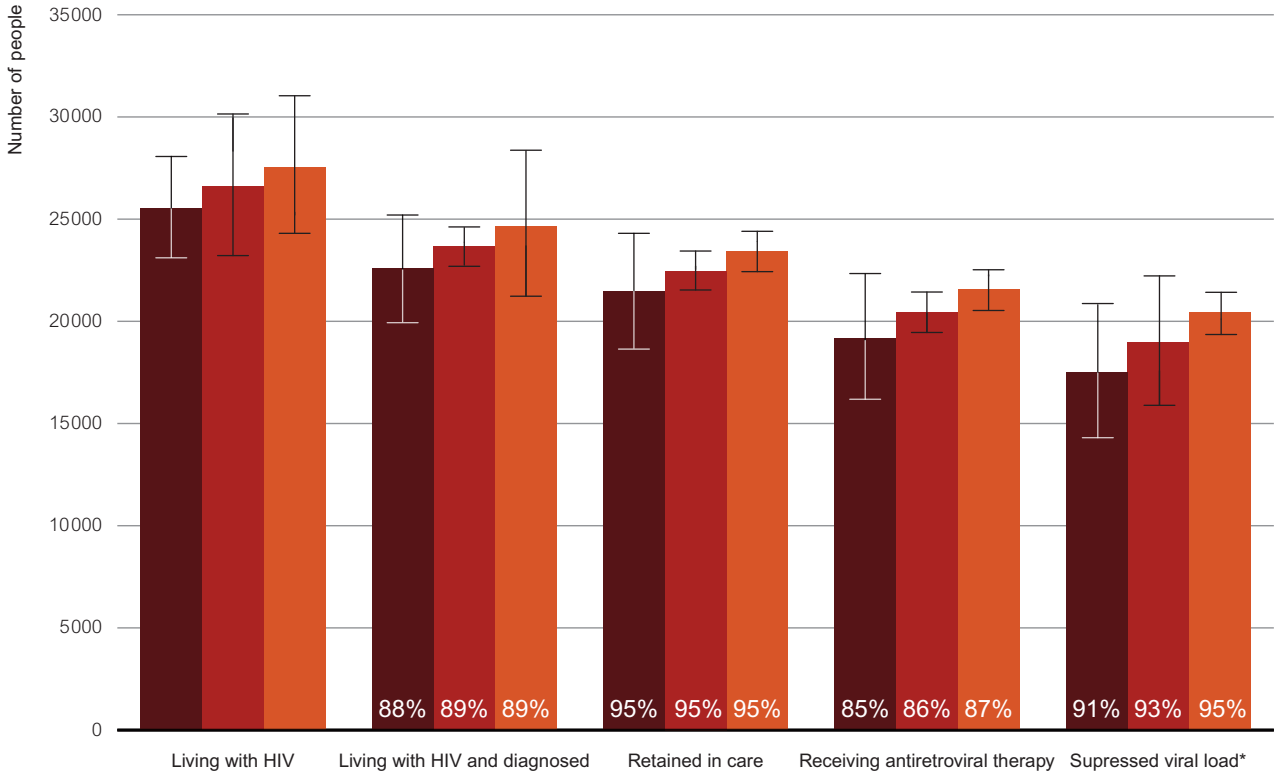
Numerator	Estimated number of people who have undiagnosed HIV infection in Australia
Denominator	Estimated number of people living with HIV in Australia

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.[62] Individuals who are aware of their infection can also make behavioural changes to reduce transmission.[63]

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 2017, an estimated 27 545 people were living with HIV, and 2899 were undiagnosed. This corresponds to 10.5% of all people living with HIV being undiagnosed with HIV infection (Figure 49). The proportion has remained stable, with an estimated 13% (3000 people) living with undiagnosed HIV infection in 2013.

Figure 49 The HIV diagnosis and care cascade, 2015 – 2017



	Living with HIV	Living with HIV and diagnosed	Retained in care	Receiving antiretroviral therapy	Supressed viral load*
2015	25 543	22 583	21 454	19 164	17 505
2016	26 578	23 644	22 462	20 413	18 945
2017	27 545	24 646	23 414	21 560	20 412

* Viral suppression classified as <200 copies/mL

Source: See Methodological Notes for detail

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

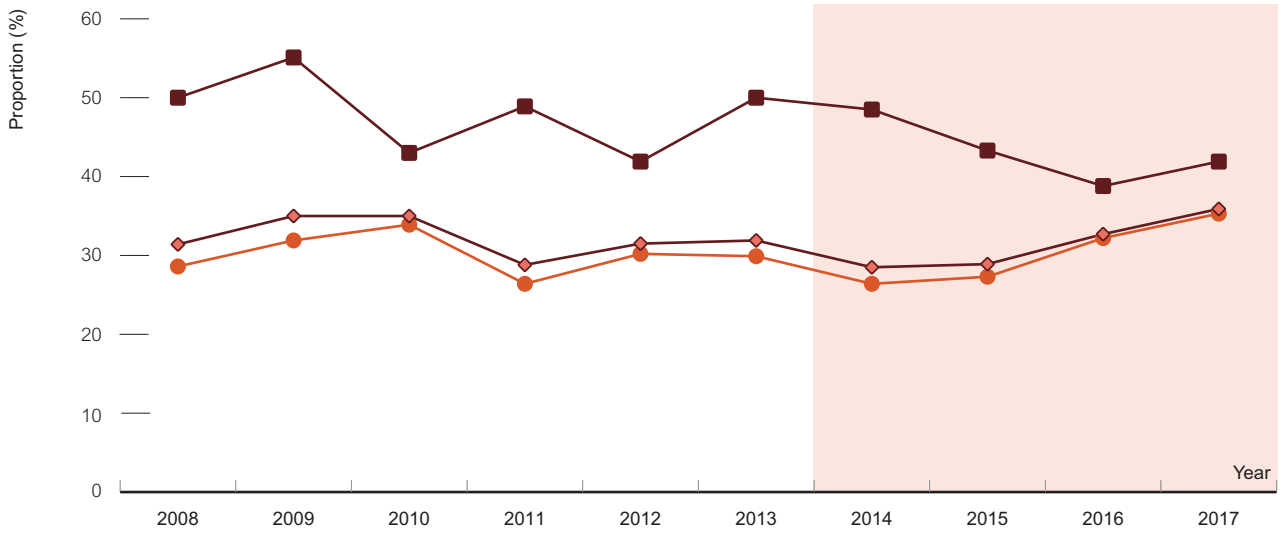
* Late diagnosis= Defined by a CD4+ cell count less than 350 cells/μL at diagnosis

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.[64] 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 diagnosis 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 2017, the proportion of new HIV diagnoses classified as late was 35.9%, a relative increase of 13% since 2013 (31.9%) (Figure 50). The proportion of late diagnoses has fluctuated over the past ten years but remain high at 35.9% in 2017. In all years a higher proportion of notifications in females were classified as late diagnoses compared to males.

Figure 50 Proportion of late diagnoses among new HIV diagnoses, 2008 – 2017, by sex



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total	31.4%	35.0%	35.0%	28.8%	31.5%	31.9%	28.5%	28.9%	32.7%	35.9%
Males	28.6%	31.9%	33.9%	26.4%	30.2%	29.9%	26.4%	27.3%	32.2%	35.3%
Females	50.0%	55.1%	43.0%	48.9%	41.9%	50.0%	48.5%	43.3%	38.8%	41.9%

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.[65-67] Evidence on the personal health benefit of early HIV therapy was published in July 2015 [68] and led to changes in HIV treatment guidelines in Australia 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 2017, an estimated 27 545 people were living with HIV and 21 560 were on antiretroviral therapy, this corresponds to 87% of all people living with diagnosed HIV (Figure 47) on antiretroviral therapy, higher than the 80% in 2013 (Figure 49).

*4.4b Proportion of people receiving antiretroviral treatment for HIV infection whose viral load is less than 50 copies/mL**

Indicator definition

Numerator	Number of people receiving antiretroviral treatment for HIV whose viral load is less than 50 copies/mL reported in the AHOD
Denominator	Number of people receiving antiretroviral treatment for HIV reported in the AHOD

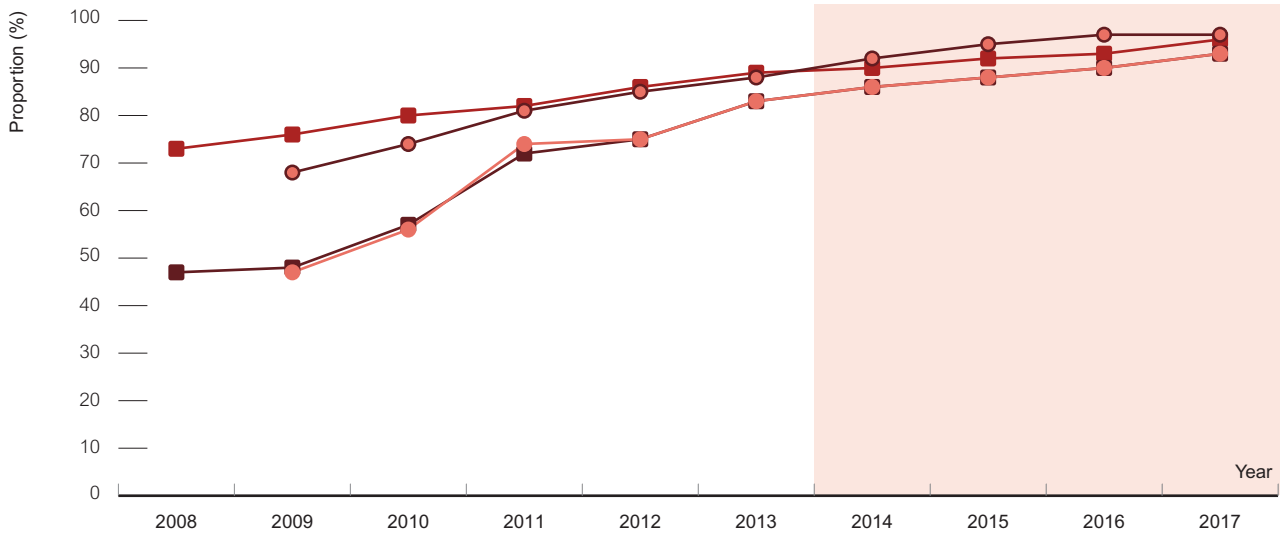
* The National Blood-borne Viruses and Sexually Transmissible Infections Surveillance and Monitoring Plan 2014 – 2017 specifies a viral load of less than 50 copies/mL. However, to maintain consistency with the *HIV, viral hepatitis and sexually transmissible infections in Australia: Annual Surveillance Report 2018*.[3], a viral load of less than 200 copies/mL is also 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.[69, 70] 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.[71]

Data source and considerations: The proportions of people on ART with a viral load less than 200 copies/mL and less than 50 copies/mL were sourced from the Australian HIV Observational Database (AHOD). Additional data are available for men who have sex with men from sexual health and high-caseload primary healthcare clinics 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 a viral load of less than both 50 copies/mL and 200 copies/mL. The AHOD data show that the proportion of people with a viral load of less than 50 copies/mL and 200 copies/mL was 93% and 96% respectively in 2017, higher than the 83% and 89% in 2013; with a greater increase over ten years, from 47% and 73% respectively in 2008 (Figure 51). Data from ACCESS shows an 11% absolute increase in the proportion of men who have sex with men with a viral load of less than 50 copies/mL and 200 copies/mL in 2017 at 93% and 97% respectively as compared to 83% and 88% respectively in 2013; with a greater increase over nine years, from 47% and 68% in 2009, respectively (Figure 51).

Figure 51 Proportion of people with HIV receiving antiretroviral treatment whose viral load is less than 200 copies/mL and participate in the Australian HIV Observational Database participating in ACCESS, 2008 – 2017



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
AHOD(<50 copies/mL)	47%	48%	57%	72%	75%	83%	86%	88%	90%	93%
AHOD(<200 copies/mL)	73%	76%	80%	82%	86%	89%	90%	92%	93%	96%
Men who have sex with men(< 50 copies/mL)		47%	56%	74%	75%	83%	86%	88%	90%	93%
Men who have sex with men(<200 copies/mL)		68%	74%	81%	85%	88%	92%	95%	97%	97%

Note: Data is available for only 2009 – 2017 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

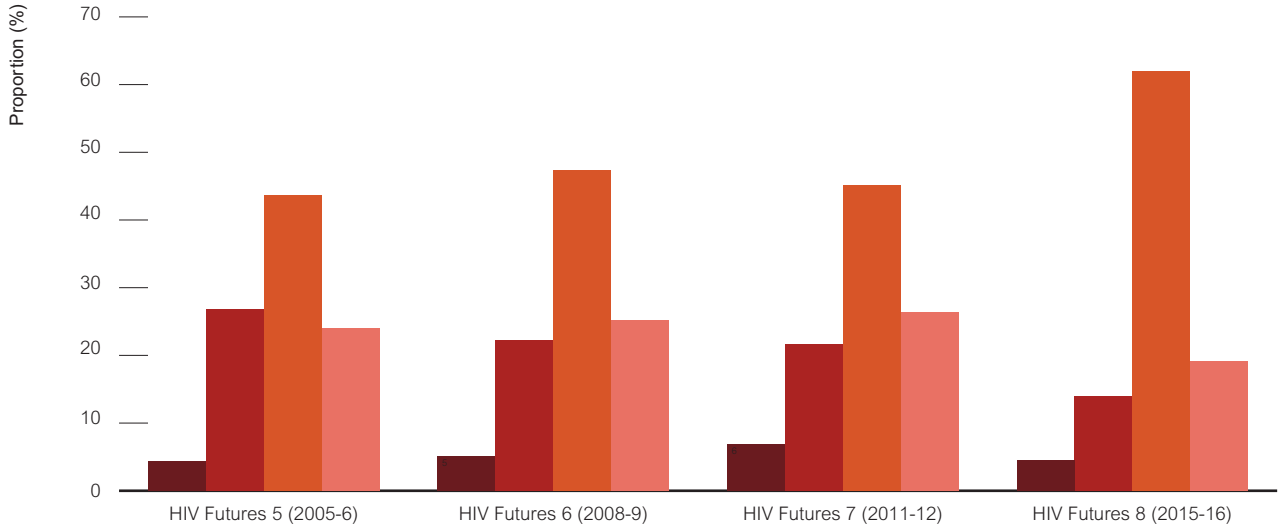
Numerator	Number of people with HIV who report their general health status and their general well-being to be excellent or good in the HIV Futures Study
Denominator	Number of people with HIV who participate in the HIV Futures Study

Importance: With the recent advances in treatments for HIV, the survival of people living with HIV has been increased and their quality of life and general well-being has emerged as an important focus for researchers and healthcare providers.[72] 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.[73] Given that some people living with HIV 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.[73]

Data source and considerations: Currently, the Futures study is the only regular cross-sectional 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.[74] 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 52), 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 59.6% of respondents in HIV Futures 8 survey (Figure 53), similar to the proportion in previous surveys.

Figure 52 Participants' self-ratings of general health status in the HIV Future 5, 6, 7 and 8 studies

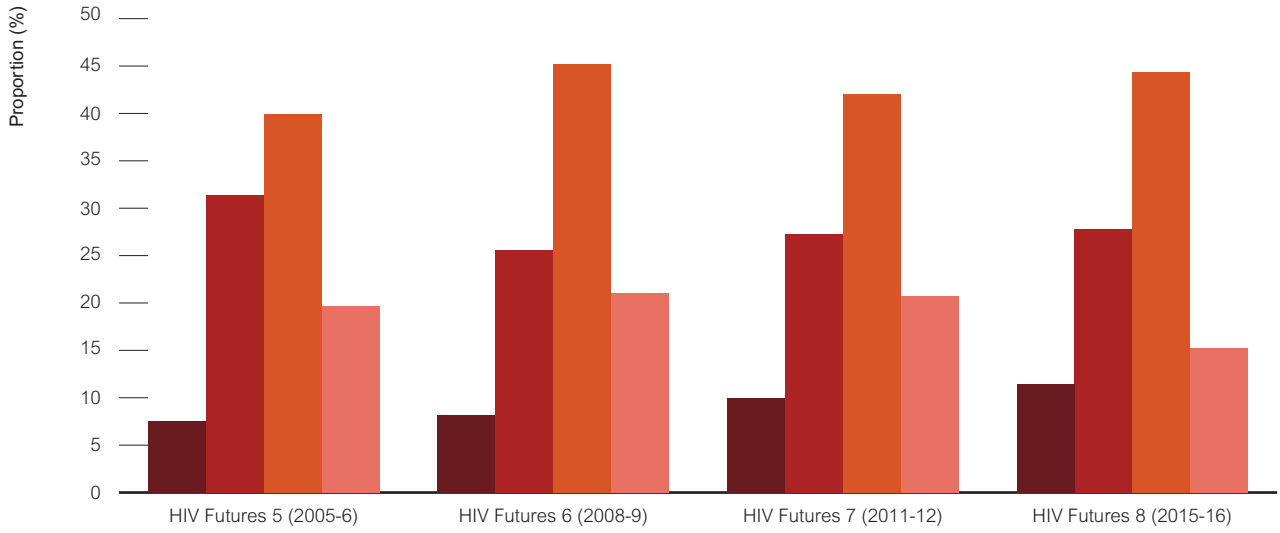


	HIV Futures 5 (2005-6)	HIV Futures 6 (2008-9)	HIV Futures 7 (2011-12)	HIV Futures 8 (2015-16)
Poor	4.4%	5.1%	6.9%	4.5%
Fair	26.8%	22.3%	21.7%	13.9%
Good	43.7%	47.4%	45.1%	62.0%
Excellent	24.0%	25.2%	26.3%	19.2%

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 53 Participants' self-ratings of overall wellbeing 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	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

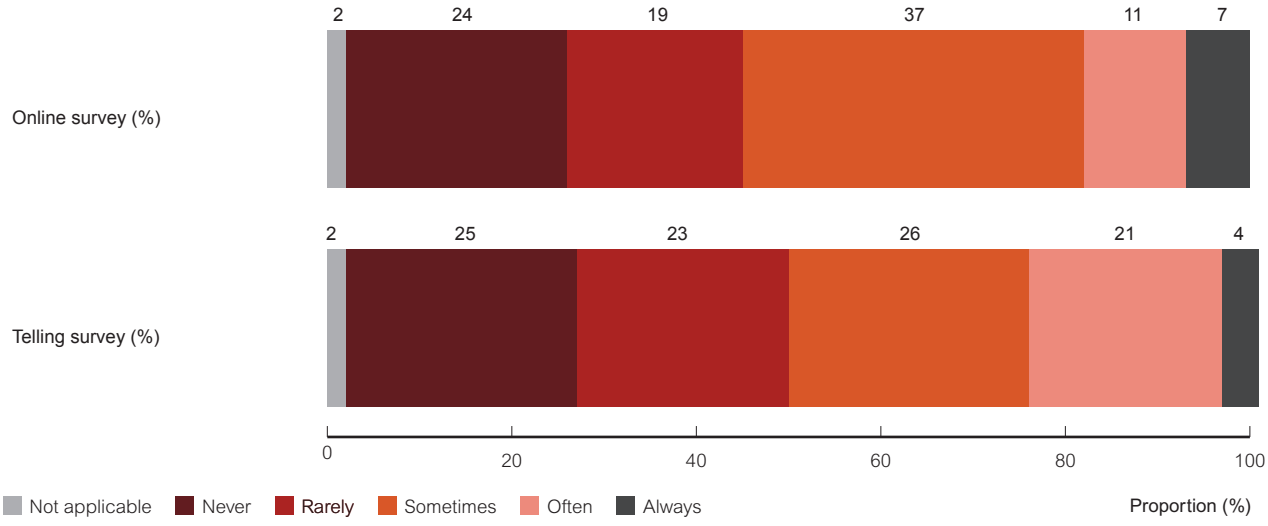
Background: See Section 1.6

Data source and considerations: The 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 54). Similarly, 75% of *Telling* survey participants (N=57) who were living with HIV reported experiencing any stigma in the last 12 months (Figure 54).

Figure 54 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

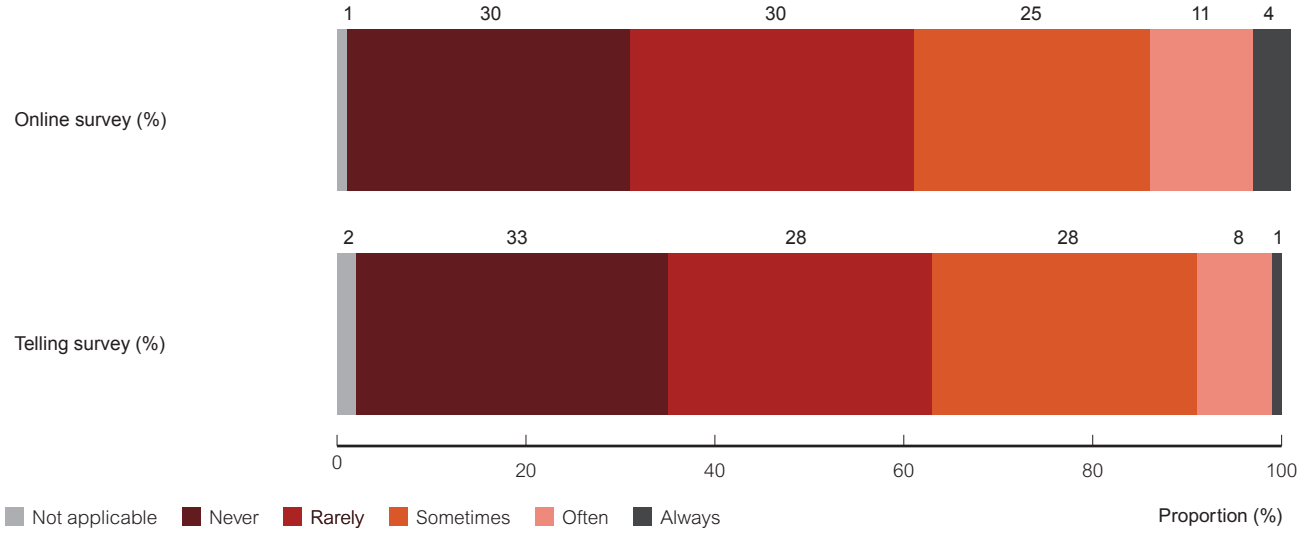
Numerator	Proportion of surveyed men who have sex with men who report experiencing any stigma or discrimination in relation to their sexual orientation in the last 12 months
Denominator	Total number of men who have sex with men surveyed

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). Caution should therefore be taken when interpreting results from these non-representative samples.

Results: In the online survey (N=143), 70% of non-heterosexual men reported experiencing any stigma in relation to their sexual orientation in the last 12 months (Figure 55). Comparatively, 65% of 339 *Telling* survey participants reported any experiences of stigma in relation to their sexual orientation in the last 12 months (Figure 55).

Figure 55 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)*

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

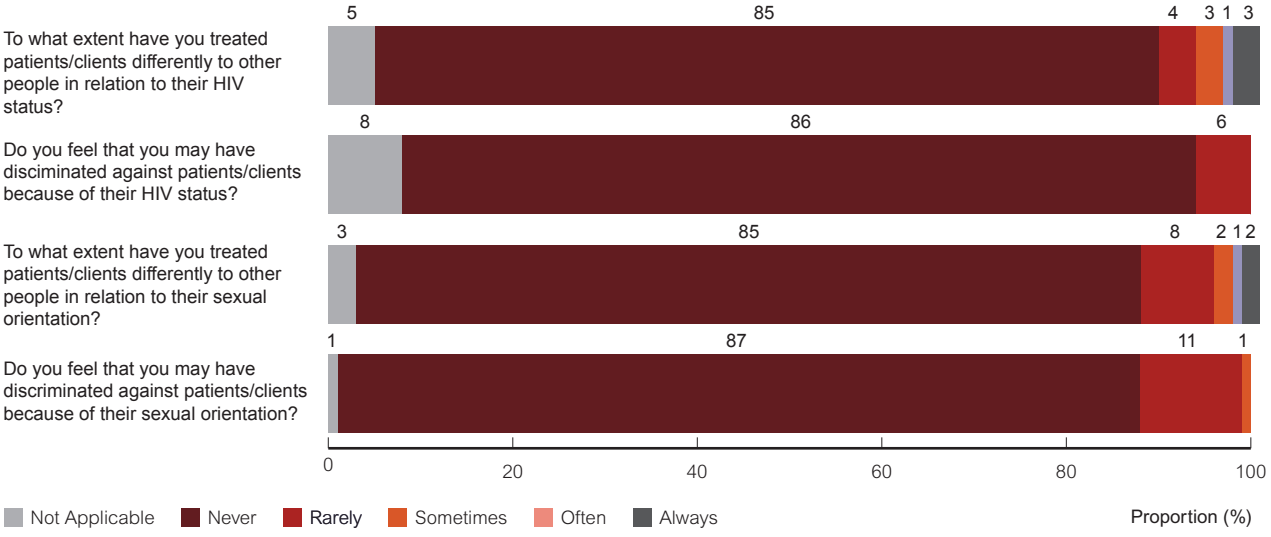
Background: See Section 1.6

Data source and considerations: The 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 6 – 8% of health care workers reported discriminating against clients or treating them differently because of their HIV in the last 12 months (Figure 56). Between 11 – 12% 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 56).

Figure 56 Proportion of health care workers expressing stigma or discrimination towards clients living with HIV in the last 12 months



Note: The total % may not add to 100 due to rounding

Source: The Centre for Social Research in Health

4.6d *Proportion of the Australian public who report they would express stigma or discrimination towards people living with HIV (additional information)*

Indicator definition

Numerator	Proportion of the general public who report that they would express any stigma or discrimination towards people living with HIV
Denominator	Total number of the general public surveyed

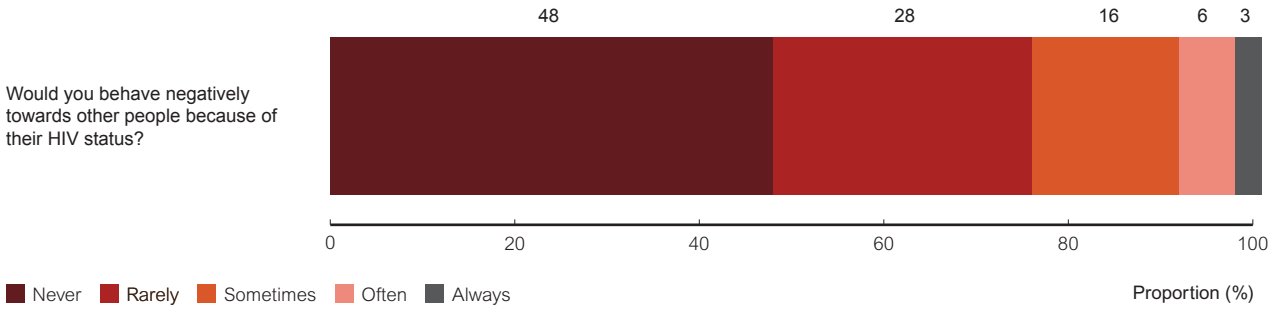
Background: See Section 1.6.

Data source and considerations: The CSRH also developed a mirrored stigma indicator that has been implemented with the general public to identify their expression of stigma towards people living with HIV. The mirrored indicator was included in three waves of the 2017 Australian Survey of Social Attitudes (AuSSA), conducted by the Australian Consortium for Social and Political Research Incorporated (ACSPRI).

A single question was selected to indicate the extent to which people would discriminate against other people due to their HIV status: *"Would you behave negatively towards other people because of their HIV status?"*

Result: In the 2017 survey (N=1001), almost half of the surveyed general public (48%) reported they would never behave negatively towards other people because of their HIV status. Conversely, 25% of respondents reported they would sometimes, often or always behave negatively towards other people because of their HIV status while 28% reported that they would do so rarely (Figure 57).

Figure 57 Proportion of the general public who report that they would express any stigma or discrimination towards people living with HIV



Note: The total % may not add to 100 due to rounding

Source: The Centre for Social Research in Health

4.6e Proportion of the Australian public who report they would express stigma or discrimination towards people based on their sexual orientation (additional information)

Indicator definition

Numerator	Proportion of the general public who report that they would express any stigma or discrimination towards people based on their orientation
Denominator	Total number of the general public surveyed

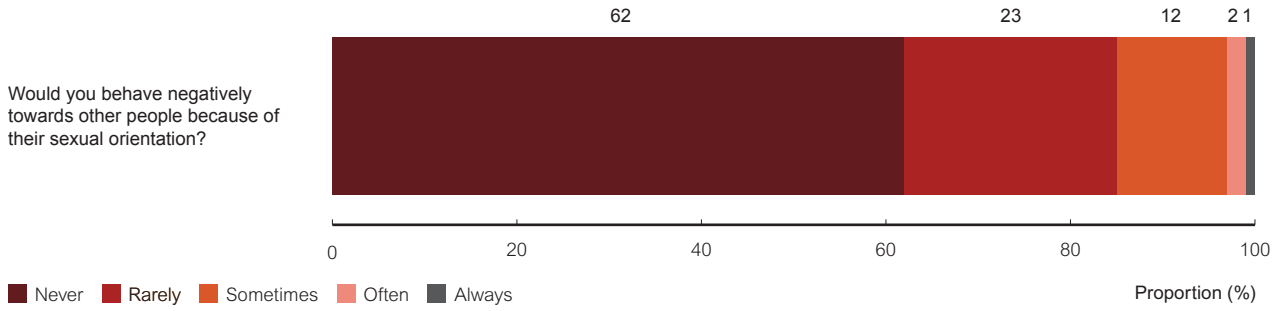
Background: See Section 1.6.

Data source and considerations: The CSRH also developed a mirrored stigma indicator that has been implemented with the general public to identify their expression of stigma towards people based on their sexual orientation. The mirrored indicator was included in three waves of the 2017 Australian Survey of Social Attitudes (AuSSA), conducted by the Australian Consortium for Social and Political Research Incorporated (ACSPRI).

A single question was selected to indicate the extent to which people would discriminate against other people due to their sexual orientation: *"Would you behave negatively towards other people because of their sexual orientation?"*

Result: In the 2017 survey (N=1001), almost two-thirds of the surveyed general public (62%) reported they would never behave negatively towards other people because of their sexual orientation. Conversely, 15% of respondents reported they would sometimes, often or always behave negatively towards other people because of their sexual orientation while 23% reported that they would do so rarely (Figure 58).

Figure 58 Proportion of the general public who report that they would express any stigma or discrimination towards people based on their sexual orientation



Source: The Centre for Social Research in Health

4.6f *Proportion of the Australian public who report they would express stigma or discrimination towards people because of their sex work (additional information)*

Indicator definition

Numerator	Proportion of the general public who report that they would express any stigma or discrimination towards people because of their sex work
Denominator	Total number of the general public surveyed

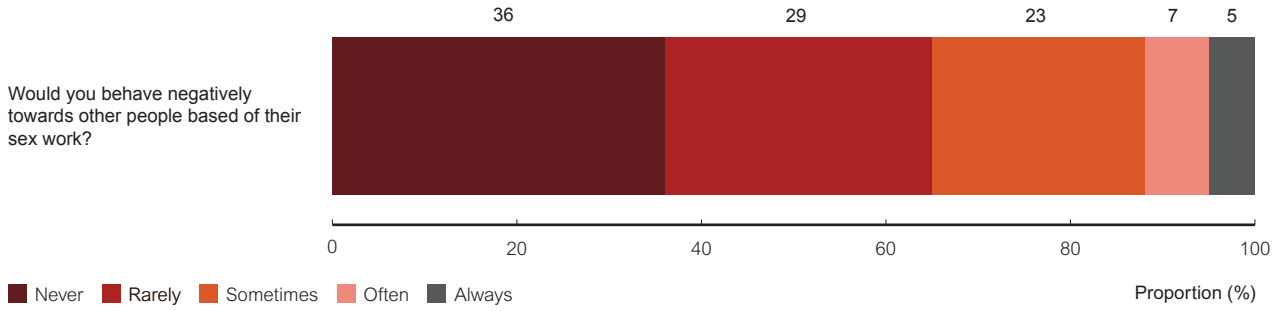
Background: See Section 1.6.

Data source and considerations: The CSRH also developed a mirrored stigma indicator that has been implemented with the general public to identify their expression of stigma towards people because of their sex work. The mirrored indicator was included in three waves of the 2017 Australian Survey of Social Attitudes (AuSSA), conducted by the Australian Consortium for Social and Political Research Incorporated (ACSPRI).

A single question was selected to indicate the extent to which people would discriminate against other people due to their sex work : *"Would you behave negatively towards other people because of their sex work?"*

Result: In the 2017 survey (N=1001), more than a third of the surveyed general public (36%) reported they would never behave negatively towards other people because of their sex work. Conversely, 35% of respondents reported they would sometimes, often or always behave negatively towards other people because of their sex work while 29% reported that they would do so rarely (Figure 59).

Figure 59 Proportion of the general public who report that they would express any stigma or discrimination towards people because of their sex work



Source: The Centre for Social Research in Health

5. Aboriginal and Torres Strait Islander

Epidemiology overview

Hepatitis B:

There were a total of 151 of hepatitis B notifications reported among Aboriginal and Torres Strait Islander people in Australia in 2017. Newly diagnosed hepatitis B infections include newly acquired and unspecified infections (see Hepatitis B section for further detail). Of all the notifications of hepatitis B in Australia in 2017, Aboriginal and Torres Strait Islander status was not reported for 51%. 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 2013 – 2017. In 2017, the notification rate of hepatitis B for the Aboriginal and Torres Strait Islander population was 2.3 times higher than the non-Indigenous population (45.1 per 100 000 population versus 19.2 per 100 000 population). However, in the period 2013 – 2017, there was a 37% decline in the notification rate of newly diagnosed hepatitis B infection in the Aboriginal and Torres Strait Islander population (from 71.6 per 100 000 population in 2013) suggesting the immunisation programs for hepatitis B are starting to show a benefit.

Hepatitis C:

A total of 1210 hepatitis C notifications (newly acquired and unspecified) were reported in Aboriginal and Torres Strait Islander people in Australia in 2017. Of all the hepatitis C notifications in Australia in 2017, Aboriginal and Torres Strait Islander status was not reported for 49% of notifications. Hepatitis C notification rates are based on data from five jurisdictions (the Northern Territory, Queensland, South Australia, Tasmania and Western Australia) where Aboriginal and Torres Strait Islander status was ≥50% complete for hepatitis C notifications for every year of the past five years 2013 – 2017. The notification rate of new hepatitis C diagnoses in the Aboriginal and Torres Strait Islander population was 168.1 per 100 000 population, more than four times as high when compared with 38.4 per 100 000 population in the non-Indigenous population. In the past five years, there was a 15% increase in the notification rate of new hepatitis C diagnoses in the Aboriginal and Torres Strait Islander population (from 146.4 in 2013).

HIV:

A total of 31 HIV notifications were reported in the Aboriginal and Torres Strait Islander population in 2017. In 2017, the notification rate of HIV was higher for the Aboriginal and Torres Strait Islander population compared with the non–Indigenous Australian-born population (4.6 vs. 2.8 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 2013 – 2017, 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 (12% vs. 6%) or heterosexual sex (21% vs. 17%).

Chlamydia:

In 2017, there were a total of 100 775 chlamydia notifications, 7015 (7%) were among the Aboriginal and Torres Strait Islander population, 31 502 (31%) were among the non-Indigenous population, and Indigenous status was not reported for 62 258 (62%) notifications. 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 2013 – 2017. The chlamydia notification rate for the Aboriginal and Torres Strait Islander population was 1193.9 per 100 000 population in 2017 and was nearly three times that of the non-Indigenous notification rate at 427.0 per 100 000 population. In 2017, 82% of cases among the Aboriginal and Torres Strait Islander population were diagnosed among people in the age group 15 – 29 years compared with 75% in the non-Indigenous population.

Gonorrhoea:

There were a total of 28 364 gonorrhoea notifications in Australia in 2017; 4119 (15%) were among the Aboriginal and Torres Strait Islander population, 15 284 (54%) were in the non-Indigenous population, and there were a further 8961 (32%) 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, Queensland, South Australia, Tasmania, Victoria and Western Australia), where Aboriginal and Torres Strait Islander status was ≥50% complete for gonorrhoea notifications for each year of the five years 2013 – 2017. In 2017, the gonorrhoea notification rate in the Aboriginal and Torres Strait Islander population was more than six times that of the non-Indigenous population (627.5 vs. 95.6 per 100 000 population). In 2017, 73% of cases among the Aboriginal and Torres Strait Islander population were diagnosed among people in the age group 15 – 29 years compared with 52% 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. By comparison the rate of gonorrhoea diagnosis in males is more than three times that of females in the non-Indigenous population indicating greater transmission through male-to-male sex in this population.

Infectious syphilis:

Currently there is an ongoing syphilis outbreak occurring across northern Australia. There were a total of 4398 infectious syphilis notifications nationally in 2017, with 779 (18%) among the Aboriginal and Torres Strait Islander population, 3314 (75%) among the non-Indigenous population, and a further 305 (7%) notifications for which the 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 with all infectious syphilis notifications. In 2017, the infectious syphilis notification rate in the Aboriginal and Torres Strait Islander population was six times as high as in the non-Indigenous population (102.5 vs. 15.5 per 100 000 population) increasing to 27 times higher in remote and very remote areas. In the years 2013 – 2017, notification rates of infectious syphilis among the Aboriginal and Torres Strait Islander population aged 15 – 19 years increased by more than 200% (from 53.8 per 100 000 population in 2013 to 187.0 per 100 000 population in 2013). In Aboriginal and Torres Strait Islander people, the notification rate among males and females is roughly equal, indicating predominantly heterosexual transmission. By comparison the rate of infectious syphilis diagnosis in males is more than 12 times that of females in the non-Indigenous population indicating greater transmission through male-to-male sex in this population. There were 44 congenital syphilis cases over the period 2008 – 2017, more than half (26) 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, 2016 and 2017. There were no notifications of donovanosis in the Australian Capital Territory, NSW, South Australia, Tasmania, Queensland, Victoria and the Northern Territory in the past five years. In Western Australia there were one notification in this period, in 2014.

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 44 sexual health clinics included in the Genital Warts Surveillance Network indicate that, since the introduction of the vaccine, an 82% 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 2017. In 21–29 -year-olds reductions were greater in women than men, reflecting the catch-up campaign in women aged up to 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 2018*.[75]

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

Indicators status

Incidence and prevalence

- Chlamydia positivity among 15–29-year-old Aboriginal and Torres Strait Islander people attending sexual health clinics has shown a fluctuating trend over the past four years with 19% in 2017, 17% in 2016, and 23% in 2013.
- The notification rate is used here as a surrogate for incidence (see section 5.2 for data considerations).
- In 2017 chlamydia notification rate for the Aboriginal and Torres Strait Islander population was 1193.9 per 100 000 population, similar to the 1221.7 per 100 000 population in 2016, and slightly less than 1312.2 in 2013.
- In 2017 the gonorrhoea notification rate in the Aboriginal and Torres Strait Islander population was 627.5 per 100 000 population, which is a 12% decline relative to the rate of 713.9 per 100 000 population in 2013.
- In 2017 the rate of infectious syphilis notification among the Aboriginal and Torres Strait Islander population was 102.5 per 100 000 population, compared with 19.5 per 100 000 population in 2013, representing a more than five-fold increase. Infectious syphilis notification rates have increased by almost four-fold over the last ten years, from 27.5 per 100 000 population in 2008.
- In 2017 the newly acquired hepatitis B notification rate in the Aboriginal and Torres Strait Islander population was 1.3 per 100 000 population compared to 1.8 per 100 000 population in 2013.
- In 2017 the notification rate of newly acquired hepatitis C infection among the Aboriginal and Torres Strait Islander population was 24.6 per 100 000 population, representing a relative 19% increase compared to 20.6 per 100 000 population in 2013.
- In 2017 the notification rate of HIV among the Aboriginal and Torres Strait Islander population was 4.6 per 100 000 population, the same rate as in 2013. In the ten-year period 2008 – 2017 there was a 35% relative increase in the HIV notification rate, from 3.4 per 100 000 population in 2008.

Uptake of preventative measures

- In 2017 coverage of hepatitis B vaccination at 12 months was 93.0% (compared to the 94.7% in all children at 12 months. see 1.2a), showing a 7% increase as compared to 87.3% in 2013, and coverage at 24 months has increased by 3.6%, from 94.4% in 2013 to 97.5% in 2017 (higher than the 96.4% 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 2017, from 21% to 26%, and in 2017, was higher than that observed in non-Indigenous participants (15%).

Testing

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

Morbidity

- The number of cases of congenital syphilis notified among Aboriginal and Torres Strait Islander population was four in 2013 and five in 2017, equating to a notification rate of 24.5 per 100 000 live births in 2017 (compared with 1.0 per 100 000 in the non-Indigenous population). However, due to low numbers, these rates should be interpreted with caution.

Indicators status (cont.)

Summary: The fourth and final year of the 4th National Aboriginal and Torres Strait Islander Blood-borne Viruses and Sexually Transmissible Infections Strategy highlights the need for improved health promotion, testing, treatment, NSP and other prevention tools in this population. The poor reporting of Indigenous status associated with HPV vaccination means that Aboriginal and Torres Strait Islander coverage estimates are difficult to identify. Hepatitis B vaccination rates in Aboriginal and Torres Strait Islander children are improving despite lower rates at 12 months of age. 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 non-Indigenous rates and between 2013 and 2017, there was a small increase the notification rate of newly acquired hepatitis C, while infectious syphilis has shown a marked increase in notification rates. The HIV rate for the Aboriginal and Torres Strait Islander population has risen from 4.5 per 100 000 in 2013 to 6.5 per 100 000 in 2016, before falling to 4.6 per 100 000 in 2017, although give the small numbers of HIV notifications in Aboriginal and Torres Strait Islander people these rates should be interpreted with caution. Notification rates of newly acquired hepatitis B, 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 in future reporting. 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 2018*.[75] Completeness of Aboriginal and Torres Strait Islander status is an ongoing issue, with reporting only including states and territories with greater than 50% completeness. A number of enhanced surveillance and health work force education activities are being undertaken at the jurisdictional and national level, in an effort to improve completeness of Indigenous status. Continued focus on this area is essential to improve completion of data relating to Aboriginal and Torres Strait Islander people as stated in national strategies. In 2017, all jurisdictions reported Aboriginal and Torres Strait Islander status for greater than 50% of notifications for HIV, infectious syphilis and newly acquired hepatitis C.

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 6 National Aboriginal and Torres Strait Islander Strategy progress

Theme	Objective		Indicator		2013	2014	2015	2016	2017
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%**	*†	*†	*†	*†
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	23%	20%	18%	17%	19%
			5.2b	Annual rate of notifications¥ of infectious syphilis in Aboriginal and Torres Strait Islander people (per 100,000 Aboriginal population)	19.5	31.3	56.1	70.6	102.5
			5.2b	Annual rate of notifications¥ of chlamydia‡ in Aboriginal and Torres Strait Islander people (per 100,000 Aboriginal population)	1312.2	1245.1	1195.1	1221.7	1193.9
			5.2b	Annual rate of notifications¥ of gonorrhoea§ in Aboriginal and Torres Strait Islander people per 100,000 Aboriginal population)	713.9	578.7	572.2	594.0	627.5
			5.2c	Number of notifications of congenital syphilis annually	4	3	2	1	5
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 ††	*	*	*	*	*
	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%	*†	*†	*†	*†
				20 – 24 years	51%	*†	*†	*†	*†
				25 – 29 years	52%	*†	*†	*†	*†
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 population)	1.8	2.2	2.7	2.1	1.3
			5.3b	Annual rate of notification of newly acquired hepatitis C in Aboriginal and Torres Strait Islander people (per 100,000 Aboriginal population)	20.6	23.2	33.7	28.8	24.6
			5.3c	Notification rate of newly diagnosed HIV (per 100,000 Aboriginal and Torres Strait Islander population)	4.6	5.4	6.2	6.5	4.6

Theme	Objective		Indicator	2013	2014	2015	2016	2017
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%	93%
			24 months	94%	95%	96%	97%	98%
	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%	26%
			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%	26%
	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)	14%^ 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^^	*	*	*	*	*
			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%	30%
	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	*	*	*	* §§	*
	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 modelling estimates.[3]

† There is currently no regular periodic survey of young Aboriginal and Torres Strait Islander people.

‡ Includes the Northern Territory, Queensland, South Australia, and Western Australia.

§ Includes the Australian Capital Territory, the Northern Territory, Queensland, South Australia, Tasmania, Victoria and Western Australia.

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

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

§§ 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

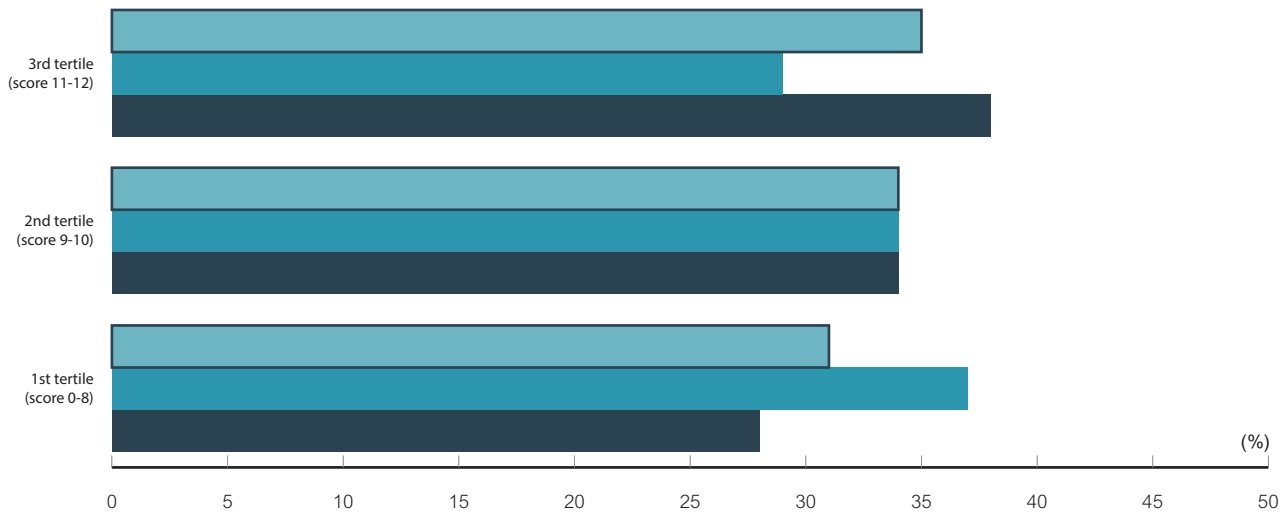
Numerator	Number of Aboriginal and Torres Islander people giving correct answers to questions on BBV and STI in the 'Sexual health and relationships in young Indigenous people study' (GOANNA)
Denominator	Number of Aboriginal and Torres Islander people in the GOANNA study

Background: Improved knowledge about STIs and BBVs in Aboriginal and Torres Strait Islander communities 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 60). 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 60 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

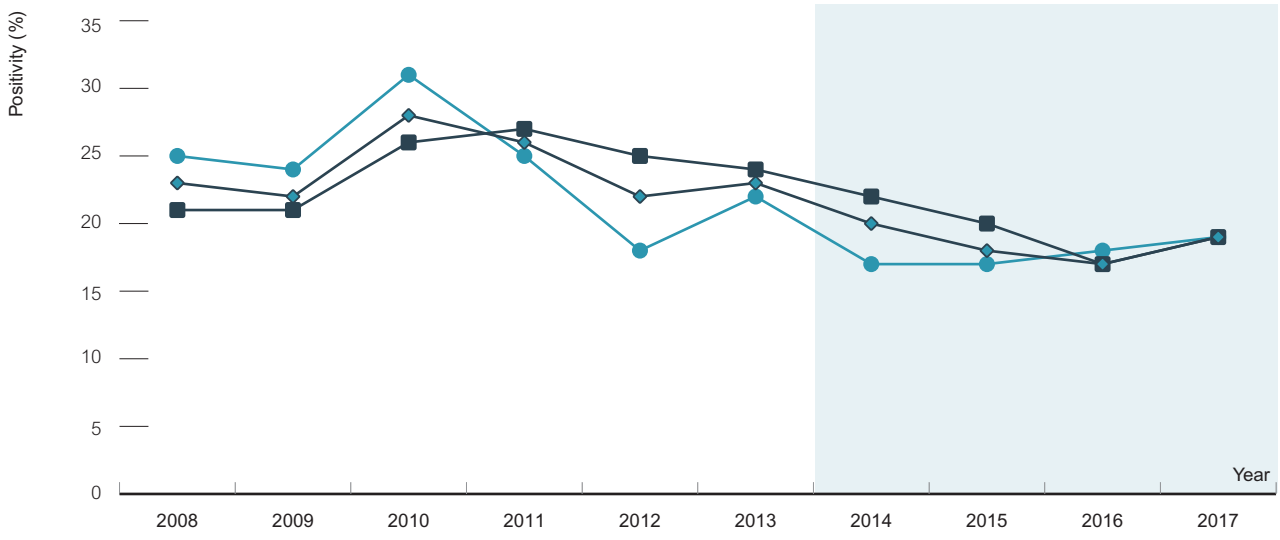
Background: Achieving a high level of testing and treatment of bacterial STIs in sexually active 15 – 29-year-olds is an important component of reducing the risk of transmission and morbidity (such as pelvic inflammatory disease) and if high enough levels are achieved in the community, mathematical modelling predicts a decrease in the prevalence of these infections among young Aboriginal and Torres Strait Islander people.[76] In the short-term, successful testing and treatment strategies will increase the notifications of bacterial STIs, however, a reduction will be observed in the long-term.[77]

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 the 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.[78]

In the interim, sentinel surveillance within healthcare settings with higher attendance of Aboriginal and Torres Strait Islander peoples, 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 12 373 Aboriginal and Torres Strait Islander 15 – 29-year-olds attending sexual health clinics between 2008 and 2017 (Figure 61). Positivity was 23% in 2013, with a 17% relative decrease in 2017 when the positivity was 19%. Positivity in 2017 was 19% in both males and females (Figure 61).

Figure 61 Chlamydia positivity in Aboriginal and Torres Strait Islander 15 – 29-year-olds attending sexual health clinics, 2008 – 2017, by sex



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total	23%	22%	28%	26%	22%	23%	20%	18%	17%	19%
Male	25%	24%	31%	25%	18%	22%	17%	17%	18%	19%
Female	21%	21%	26%	27%	25%	24%	22%	20%	17%	19%

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.

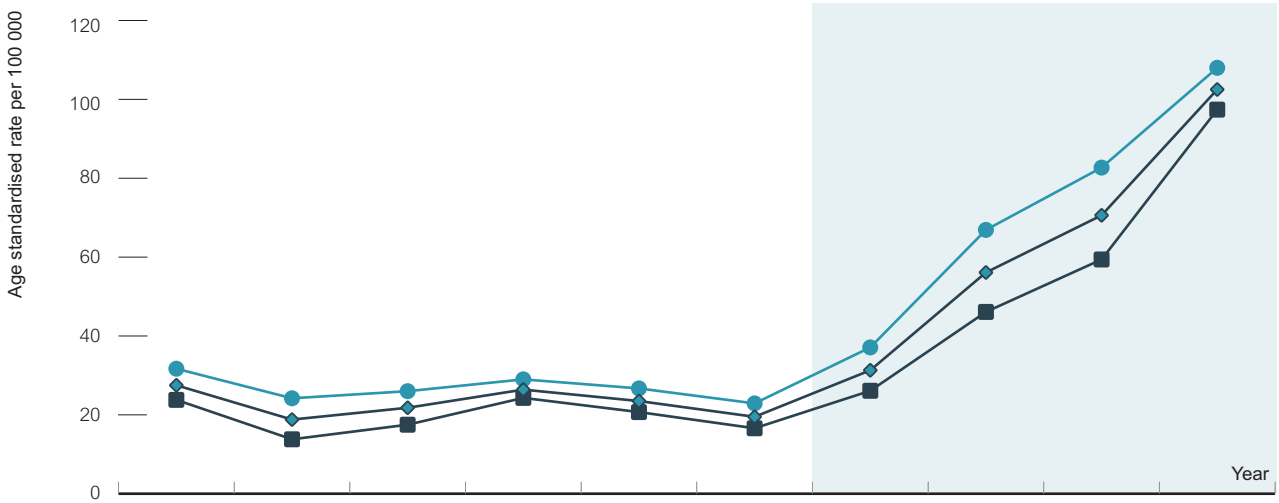
Infectious syphilis

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 the 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 ten years. For this reason, national infectious syphilis data are presented for ten years.

Results: In 2017, the rate of infectious syphilis notification among the Aboriginal and Torres Strait Islander population was 102.5 per 100 000 population, compared with 19.5 per 100 000 population in 2013, representing more than a five-fold increase (Figure 62). In 2017, notification rates were higher among males (108.0 per 100 000 population) than females (97.4 per 100 000 population). Over the ten-year period 2008 – 2017 notification rates have increased by almost three-fold from 27.5 per 100 000 population in 2008.

Figure 62 Infectious syphilis notification rate per 100 000 population in Aboriginal and Torres Strait Islander people, 2008 – 2017, by sex



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total	27.5	18.8	21.8	26.4	23.5	19.5	31.3	56.1	70.6	102.5
Male	31.7	24.2	26.0	29.0	26.7	22.9	37.1	66.9	82.7	108.0
Female	23.8	13.8	17.5	24.3	20.7	16.6	26.1	46.1	59.4	97.4

Source: National Notifiable Diseases Surveillance System

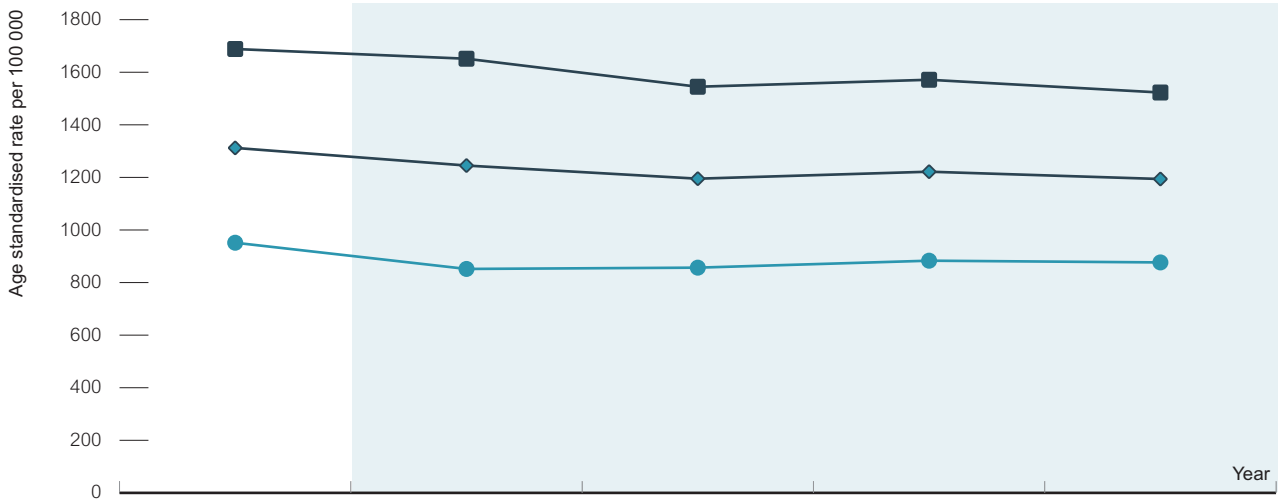
Chlamydia

Background: Untreated chlamydia can lead to pelvic inflammatory disease, infertility and ectopic pregnancy [79-81], 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.[75]

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 2013 – 2017.

Results: In 2017, the chlamydia notification rate for the Aboriginal and Torres Strait Islander population was 9% lower than in 2013 (1193.9 and 1312.2 per 100 000 population respectively) (Figure 63). The notification rate among females was 1522.9 per 100 000 population in 2017 and 1688.4 per 100 000 population in 2013. Every year for the period 2013 – 2017, notification rates were lower among Aboriginal and Torres Strait Islander males as compared to females.

Figure 63 Chlamydia notification rate per 100 000 population in Aboriginal and Torres Strait Islander peoples, 2013 – 2017, by sex



	2013	2014	2015	2016	2017
Total	1312.2	1245.1	1195.1	1221.7	1193.9
Male	951.5	851.8	856.7	883.2	876.6
Female	1688.4	1651.4	1544.8	1571.4	1522.9

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 2013 – 2017. Just over half (57%) of the Aboriginal and Torres Strait Islander population reside in these jurisdictions, and therefore the data may not be nationally representative

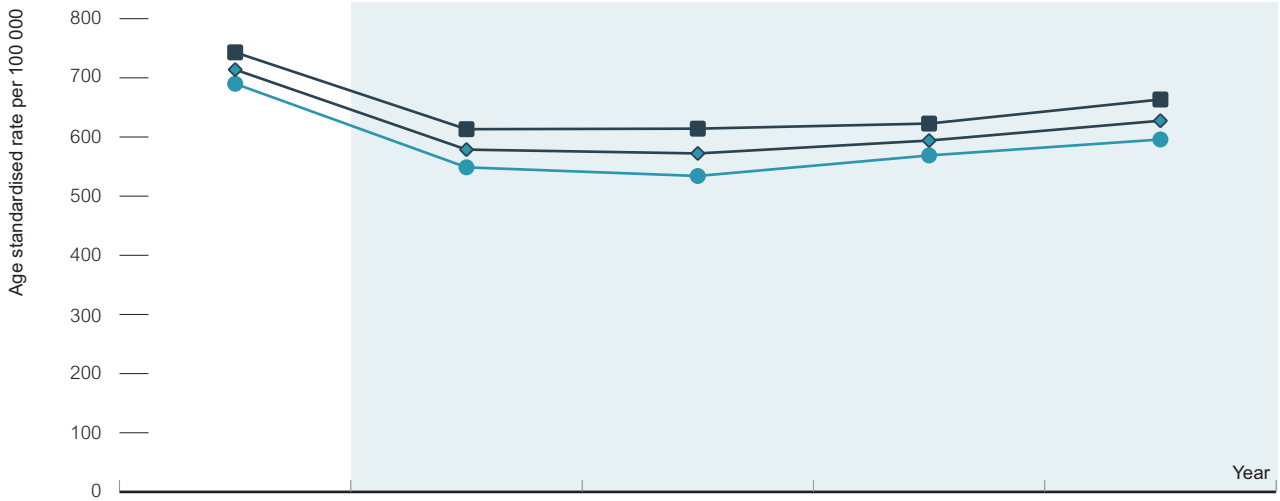
Gonorrhoea

Background: Gonorrhoea has similar symptoms and sequelae to chlamydia (described above), and untreated gonorrhoea may also lead to disseminated gonococcal infection.[32, 82] Unlike chlamydia, symptomatic disease is more common, particularly in men.[32]

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, Queensland, South Australia, Tasmania, Victoria and Western Australia), where Aboriginal and Torres Strait Islander status was ≥50% complete for gonorrhoea notifications for each year of the five years 2013 – 2017.

Results: In 2017, the gonorrhoea notification rate for the Aboriginal and Torres Strait Islander population was 627.5 per 100 000 population, a slight increase from 594.0 per 100 000 population in 2016, and a 12% decrease from 713.9 per 100 000 in 2013 (Figure 64). Notification rates among females were 663.4 per 100 000 population in 2017 as compared to 743.1 per 100 000 population in 2013, reflecting a relative decrease of 11%. Between 2013 and 2017, notification rates were lower among Aboriginal and Torres Strait Islander males than females, at 595.8 per 100 000 population in 2017 and 690.0 per 100 000 population in 2013.

Figure 64 Gonorrhoea notification rate per 100 000 population in Aboriginal and Torres Strait Islander peoples, 2013 – 2017, by sex



	2013	2014	2015	2016	2017
Total	713.9	578.7	572.2	594.0	627.5
Male	690.0	548.7	534.1	568.8	595.8
Female	743.1	613.2	614.1	622.7	663.4

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 2013 – 2017. Approximately two-thirds (69%) of the Aboriginal and Torres Strait Islander population reside in these jurisdictions, and therefore the data may not be nationally representative.

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

Indicator definition

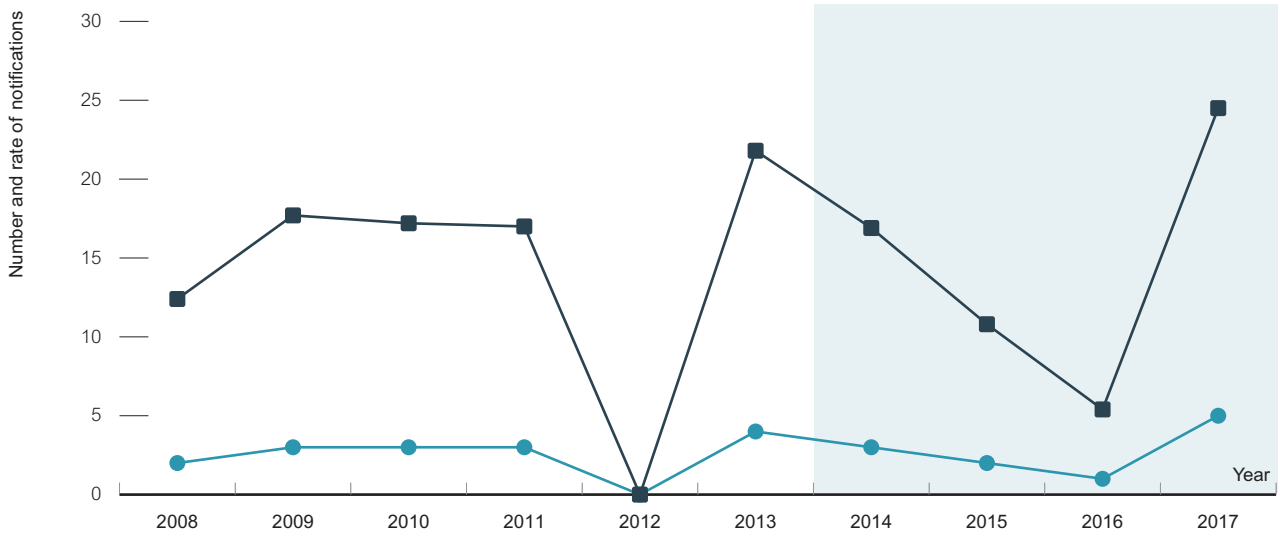
Single measure	Number of congenital syphilis notifications reported as Aboriginal and Torres Strait Islander people to NNDSS

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.[83]

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 (59%, 26) of the 44 congenital syphilis notifications were in Aboriginal and Torres Strait Islander infants. In 2017 the rate of congenital syphilis notification among the Aboriginal and Torres Strait Islander population was 24.5 per 100 000 births (5 cases in 2017), showing a five-fold increase as compared with 5.4 per 100 000 in 2016 (1 case), and a 12% relative increase as compared to the 21.8 per 100 000 observed in 2013 (4 cases) (Figure 65). Caution should be taken in interpreting these data as the number of cases per year is small. See section 3.5a for information on all congenital syphilis 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 nine-fold higher than the overall Australian notification rate and applicability of the WHO definition to the Australian context is questionable.

Figure 65 Number of congenital syphilis notifications, and rate of notification per 100 000 livebirths in Aboriginal and Torres Strait Islander peoples, 2008 – 2017*



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Number of Aboriginal and Torres Strait Islander notifications	2	3	3	3	0	4	3	2	1	5
Rate per 100 000 births	12.4	17.7	17.2	17.0	0.0	21.8	16.9	10.8	5.4	24.5

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 2017.[75] With the majority of chlamydia infections asymptomatic, regular STI testing is an important prevention strategy to ensure timely detection and treatment.[84] National guidelines recommend annual chlamydia testing for all 15–29-year-olds.[85]

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),[86] 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

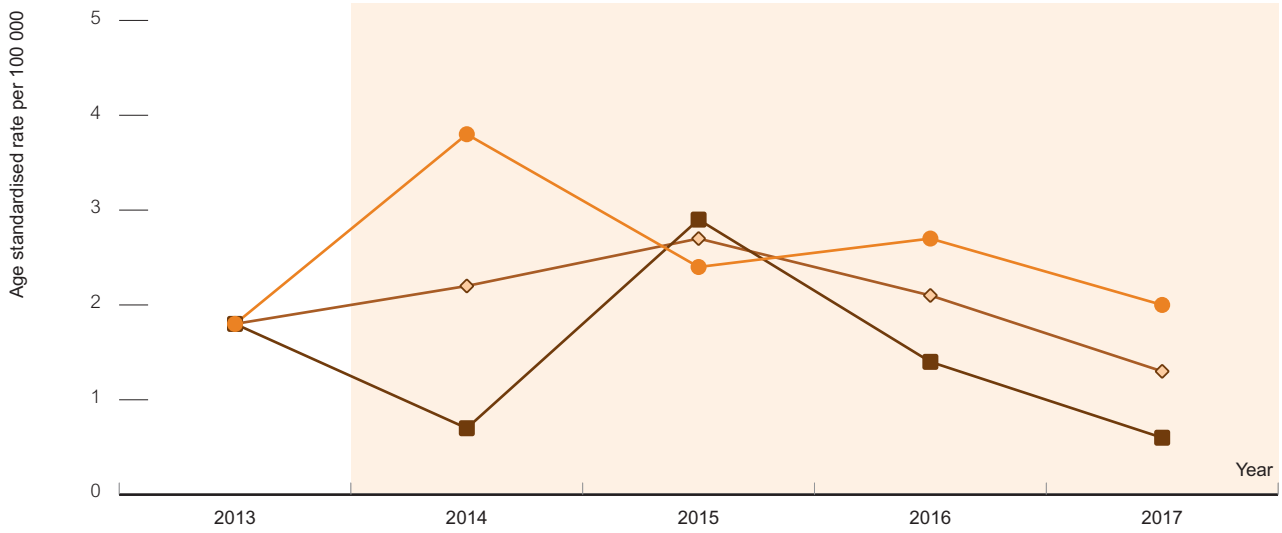
Numerator	Number of newly acquired hepatitis B notifications reported as Aboriginal and Torres Strait Islander people to NNDSS
Denominator	Aboriginal and Torres Strait Islander population reported by Australian Bureau of Statistics (ABS)

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.[87] Despite the introduction of a universal hepatitis B vaccination program in 1990 in the Northern Territory and in 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.[75] 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 2013 – 2017.

Results: Between 2013 and 2017, there was a 28% relative decrease in newly acquired hepatitis B notification rate in Aboriginal and Torres Strait Islander population (from 1.8 per 100 000 in 2013 to 1.3 per 100 000 in 2017). Given the small number of notifications, this increase should be interpreted with caution. In the five-year period 2013 – 2017 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 66).

Figure 66 Newly acquired hepatitis B notification rate per 100 000 population, 2013 – 2017, by sex



	2013	2014	2015	2016	2017
Total	1.8	2.2	2.7	2.1	1.3
Male	1.8	3.8	2.4	2.7	2.0
Female	1.8	0.7	2.9	1.4	0.6

Source: National Notifiable Diseases Surveillance System; includes jurisdictions (NSW, 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 2013 – 2017.

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

Indicator definition

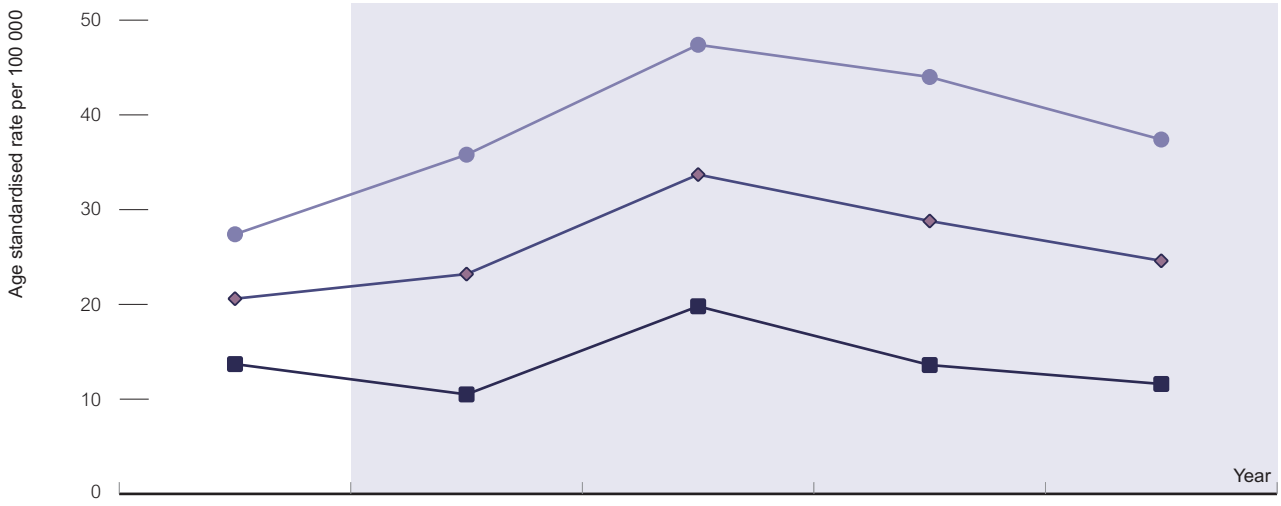
Numerator	Number of newly acquired hepatitis C notifications reported as Aboriginal and Torres Strait Islander people to NNDSS
Denominator	Aboriginal and Torres Strait Islander population reported by ABS

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 with the exception of the Australian Capital Territory. 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 2017 the rate of newly acquired hepatitis C notifications in Aboriginal and Torres Strait Islander peoples was 24.6 per 100 000 population, with a 19% relative increase as compared with the rate of 20.6 per 100 000 population in 2013 (Figure 67). In 2013, notification rates of newly acquired hepatitis C among Aboriginal and Torres Strait Islander males were twice as high as the rates in females (27.4 vs 13.7 per 100 000 population respectively). This difference in notification rates among Aboriginal and Torres Strait Islander males was more than three-times as high as the rates among females in 2017 (37.4 vs. 11.6 per 100 000 population respectively) (Figure 67).

Figure 67 Newly acquired hepatitis C notification rate per 100 000 population, 2013 – 2017, by sex



	2013	2014	2015	2016	2017
Total	20.6	23.2	33.7	28.8	24.6
Male	27.4	35.8	47.4	44.0	37.4
Female	13.7	10.5	19.8	13.6	11.6

Source: National Notifiable Diseases Surveillance System.

5.3c *Estimated incidence of recent HIV infection*

Indicator definition

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

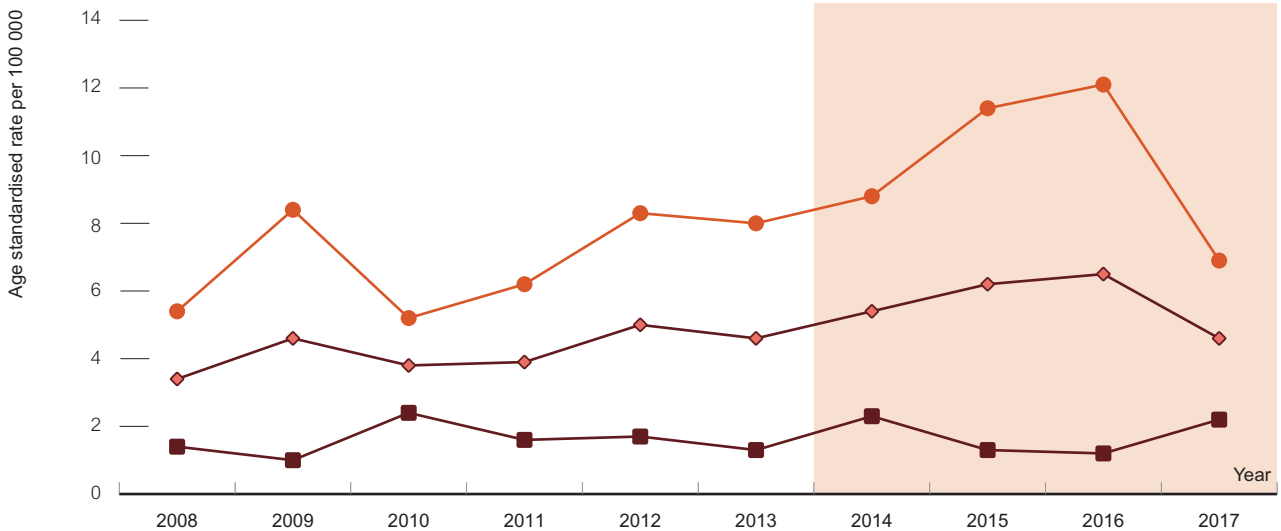
Background: HIV incidence is defined as the number of new HIV infections in a population during a specified time period. Understanding HIV incidence in a population is important to monitor the epidemic, improve the development and implementation of interventions and to evaluate the impact of prevention and treatment programs.[52] 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 >90% completeness rates for Aboriginal and Torres Strait Islander status in HIV notifications for the period 2008-2017 and thus data from all jurisdictions are included.

Results: The notification rate of HIV in the Aboriginal and Torres Strait Islander population was 4.6 per 100 000 population in both 2013 and 2017. In 2008, the notification rate of HIV in the Aboriginal and Torres Strait Islander population was 3.4 per 100 000 population. It then gradually increased between 2010 and 2016, and then reduced from 6.5 to 4.6 per 100 000 population between 2016 and 2017 (Figure 68). Due to the relatively small numbers of HIV notifications in the Aboriginal and Torres Strait Islander population caution must be applied to the interpretation of HIV notification rates in this population.

The notification rate of HIV in Aboriginal and Torres Strait Islander males fluctuated over the ten-year period, with a steady increase in the 2013 – 2016 period (from 8.0 to 12.1 per 100 000 population) before nearly halving in 2017 to 6.9 per 100 000 population. In the same time period, the notification rate of HIV among Aboriginal and Torres Strait Islander females fluctuated between 1.0 per and 2.4 per 100 000 population (Figure 68).

Figure 68 HIV notification rates in the Aboriginal and Torres Strait Islander population per 100 000 population, 2008 – 2017, by sex



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total	3.4	4.6	3.8	3.9	5.0	4.6	5.4	6.2	6.5	4.6
Males	5.4	8.4	5.2	6.2	8.3	8.0	8.8	11.4	12.1	6.9
Females	1.4	1.0	2.4	1.6	1.7	1.3	2.3	1.3	1.2	2.2

Source: State and territory health authorities; includes all states and territories due to high completeness (>90%) 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 definitions

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 AIR
Denominator	Number of Aboriginal and Torres Strait Islander children turning 12 months of age in the measurement year on the AIR

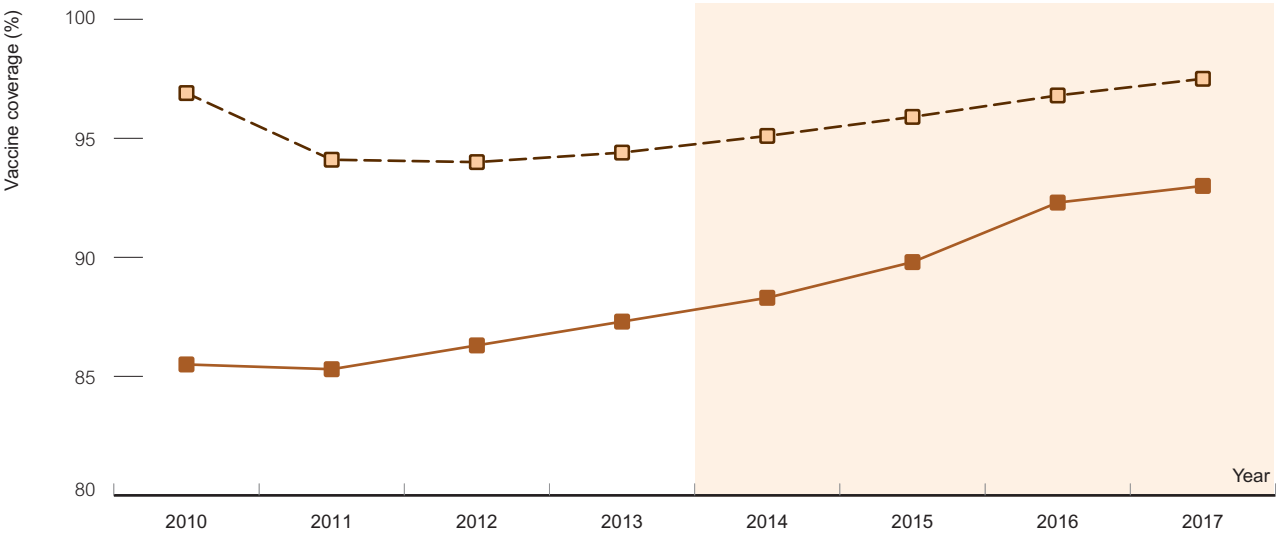
Numerator	Number of Aboriginal and Torres Strait Islander children in the relevant birth cohort who have been administered dose three of hepatitis B vaccine by 24 months of age recorded on the AIR
Denominator	Number of Aboriginal and Torres Strait Islander children turning 24 months of age in the measurement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

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.[11] Rates of hepatitis B are disproportionately higher in the Aboriginal and Torres Strait Islander population than the non-Indigenous[75], 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 and Surveillance (NCIRS) surveillance of immunisation coverage and the Australian Immunisation Register (AIR). 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 93.0% in 2017, increasing from 87.3% in 2013. At 24 months the coverage was 97.5% in 2017, 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 eight-year period 2010 – 2017, hepatitis B immunisation coverage rates at 12 months for Aboriginal and Torres Strait Islander children ranged from 85.3% to 93.0%, while 24-month coverage fluctuated between 94.0% and 98.0% (Figure 69).

Figure 69 Hepatitis B vaccination coverage estimates at 12 and 24 months in Aboriginal and Torres Strait Islander children, 2010 – 2017



	2010	2011	2012	2013	2014	2015	2016	2017
12 months	85.5%	85.3%	86.3%	87.3%	88.3%	89.8%	92.3%	93.0%
24 months	96.9%	94.1%	94.0%	94.4%	95.1%	95.9%	96.8%	97.5%

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

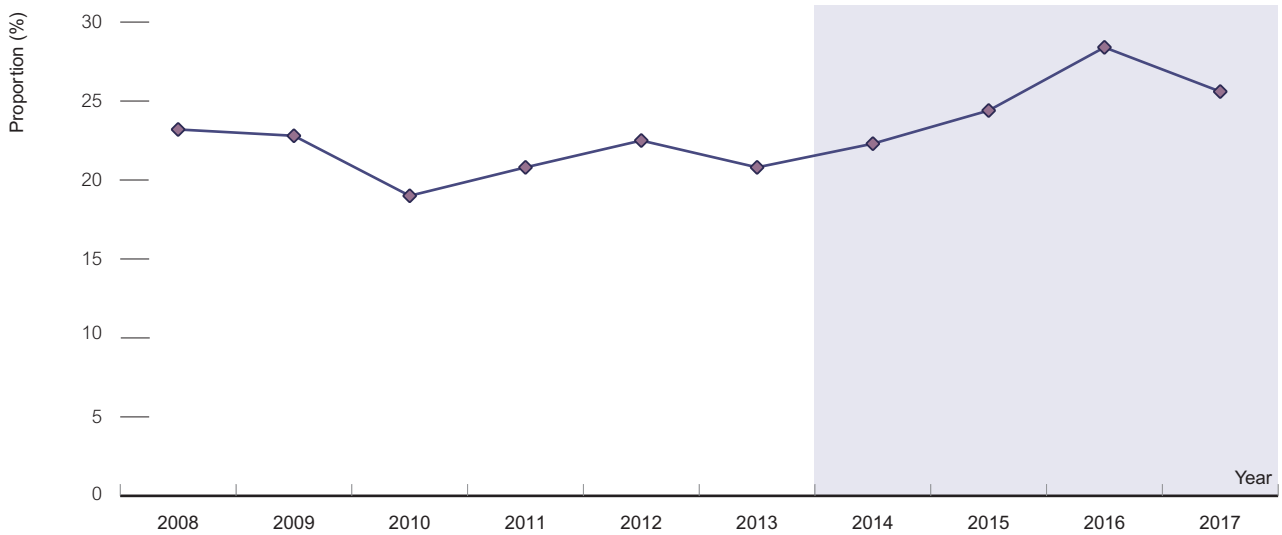
Numerator	Number of Aboriginal and Torres Strait Islander participants in the ANSPS who report re-using another person's used needle and syringe in the previous month (receptive syringe sharing)
Denominator	Total number of Aboriginal and Torres Strait Islander participants in the ANSPS

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,[88] 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.[89] 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 2017, 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 25.6% in 2017, and 20.8% in 2013, reflecting a 23% relative increase. The proportion reporting receptive syringe sharing has increased between 2008 and 2017 (from 23.2% to 25.6%) (Figure 70).

Figure 70 Proportion of Aboriginal and Torres Strait Islander people who inject drugs reporting receptive syringe sharing in the previous month, 2008 – 2017



2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
23.2%	22.8%	19.0%	20.8%	22.5%	20.8%	22.3%	24.4%	28.4%	25.6%

Source: Australian Needle and Syringe Program Survey

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

Indicator definition

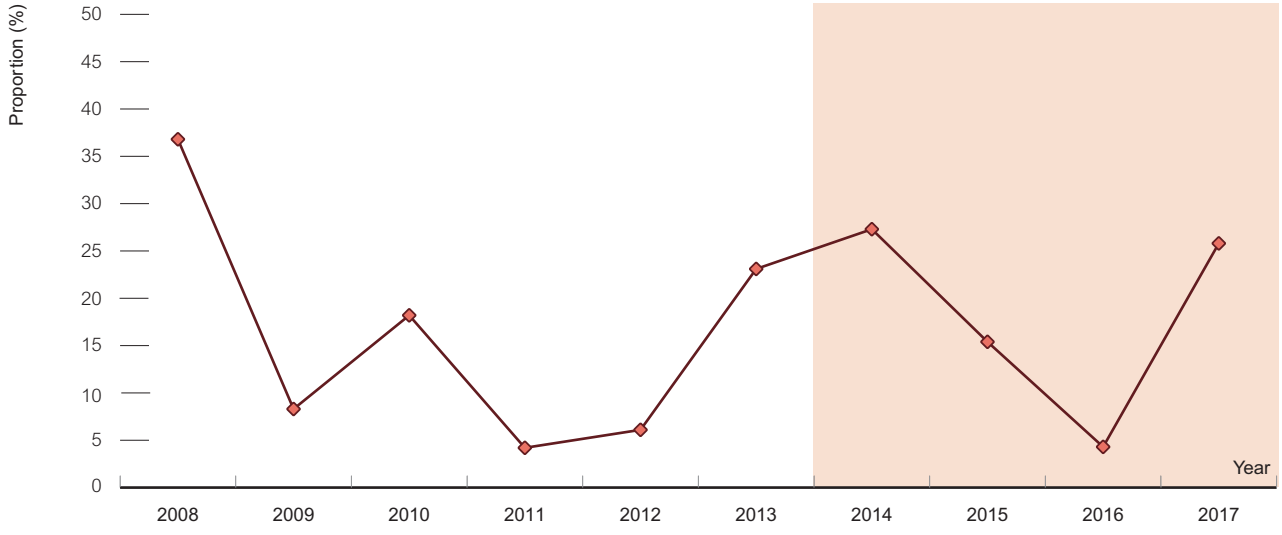
Numerator	Number of Aboriginal and Torres Strait Islander people who are notified with HIV who report injecting drug use reported by National HIV Registry
Denominator	Number of Aboriginal and Torres Strait Islander people who are notified with HIV reported by National HIV Registry

Background: Injecting drug use is a major risk factor for HIV transmission.[90] 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 2017 the proportion of HIV notifications in Aboriginal and Torres Strait Islander population attributed to injecting drug use was 25.8%, a 12% relative increase as compared to the 23.1% in 2013. Between 2008 and 2017, 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 71).

Figure 71 Proportion of HIV notifications in Aboriginal and Torres Strait Islander people attributed to injecting drug use, 2008 – 2017



36.8%	8.3%	18.2%	4.2%	6.1%	23.1%	27.3%	15.4%	4.3%	25.8%

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 2017 14% of Aboriginal and Torres Strait Islander people living with HIV were undiagnosed.[3]

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 – 2017, by Aboriginal and Torres Strait Islander status (additional information)

Indicator definition

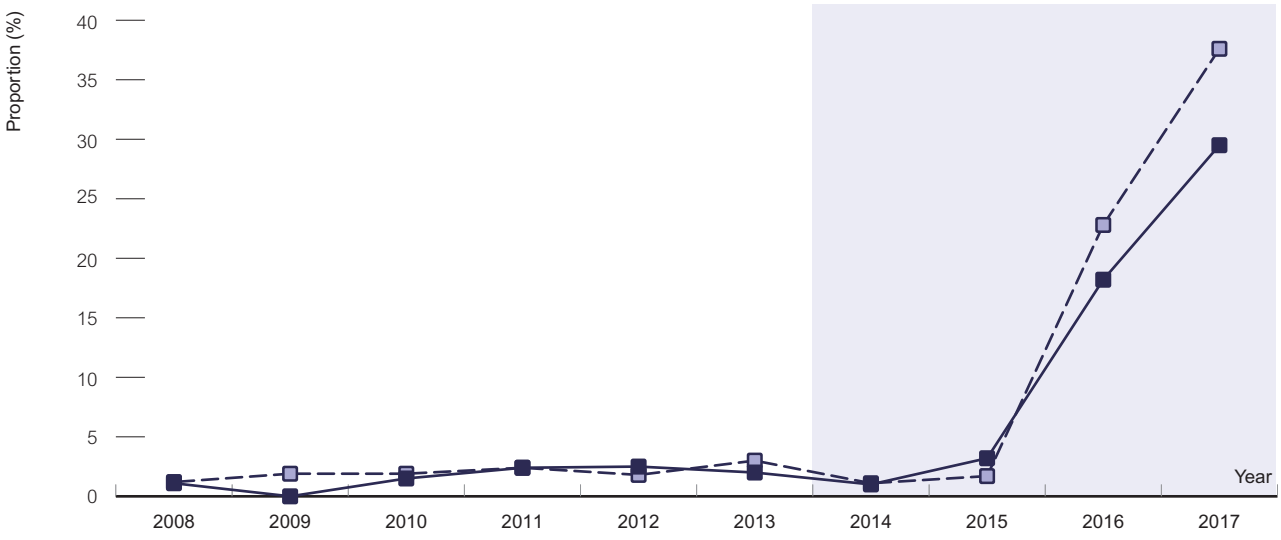
Numerator	Number of Aboriginal and Torres Strait Islander participants in the ANSPS who report receiving treatment for hepatitis C in the previous 12 months
Denominator	Total number of Aboriginal and Torres Strait Islander participants in the ANSPS with hepatitis C antibody positive serology excluding 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: See Section 2.2b.

Results: According to the Australian Needle Syringe Program Survey, among Aboriginal and Torres Strait Islander participants in 2017, 29.5% reported treatment in the last 12 months, which is almost 15-fold higher than the 2.0% in 2013 (Figure 72). However, this proportion was 22% lower in Aboriginal and Torres Strait Islander people when compared with the non-Indigenous participants in 2017 (29.5% versus 37.6%).

Figure 72 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 – 2017, by Aboriginal and Torres Strait Islander status



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
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%	29.5%
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%	37.6%

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 for further detail.

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 fourth and final 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 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 has also been implemented. Also, a mirrored stigma indicator has been implemented with a representative sample of the Australian general public to identify the extent to which they would express stigma towards people living with hepatitis B, hepatitis C, a sexually transmissible infection or HIV. These data are also 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 reporting. 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.

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 two to three 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 2017. 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.[91] 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, from 2016, diagnosis date was used to define the period of analysis instead of dated of notification (as 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	NSW	Northern Territory	Queensland	South Australia	Tasmania	Victoria	Western Australia
Gonorrhoea	Doctor Laboratory Hospital	Laboratory	Doctor Laboratory	Doctor Laboratory Hospital	Doctor Laboratory	Doctor Laboratory Hospital	Doctor Laboratory	Doctor Laboratory
Infectious syphilis	Doctor Laboratory Hospital	Doctor Laboratory Hospital	Doctor Laboratory	Doctor Laboratory Hospital	Doctor Laboratory	Doctor Laboratory Hospital	Doctor Laboratory	Doctor Laboratory
Chlamydia	Doctor Laboratory Hospital	Laboratory	Doctor Laboratory	Doctor Laboratory Hospital	Doctor Laboratory	Laboratory	Doctor Laboratory	Doctor Laboratory
Donovanosis	Not applicable	Laboratory	Doctor Laboratory	Doctor Laboratory Hospital	Doctor Laboratory	Laboratory	Doctor Laboratory	Doctor Laboratory

Respective age-standardised rates of notification for chlamydia, gonorrhoea and infectious syphilis were calculated using analogous procedures to those described above for HIV notifications (see HIV notifications 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.[92] 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, 52 sexual health clinics from four Australian jurisdictions provided data for this report: 17 located in major cities, 12 inner regional, 8 outer regional, and 3 in remote or very remote areas. There are 7 high case load general practice clinics in NSW 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 – 2017 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 2015 – 2017 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 2015 – 2017 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[93] 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 2013 – 2017 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).[19] 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[94, 95]; 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,[20] a study of hepatitis B prevalence in migrants to the United States[57]; and the most recent global seroprevalence estimates undertaken on behalf of the World Health Organization.[96] The Australian prevalence figure was obtained from local modelled estimates.[97]

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 notifications 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 with chronic hepatitis C who have been cured were assumed to have lower rates of disease progression to decompensated cirrhosis (76% reduction) and hepatocellular carcinoma (77% reduction).
- 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 340 102).

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).

- 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 NSW was used for patients who did not achieve sustained virological response.
- We estimated the proportion of direct acting antiviral treatments initiated by patients in each fibrosis stage using REACHC study data. 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 NSW, Victoria and Queensland since 2004 and by all jurisdictions since 2008.

In NSW, 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/.

HIV notifications

HIV notifications 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 3101 051-3101 058) and were standardised using ABS Standard Population Catalogue 3100DO003_201 212. 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 1270055 006_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 2018*.[3].

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.[98] 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.[98] The number of deaths after 2003 was estimated using annual mortality rates from the Australian HIV Observational Database (AHOD).[99] Between 2004 and 2017, 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 340 102) and the estimated resident population (ABS series 310 104). 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 Centre for Disease Control (ECDC) HIV modelling tool to estimate the proportion of people with HIV who are undiagnosed.[22]

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.[23] 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 2017 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.[100]

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 2018, 31 participating clinical sites enrolled over 4 557 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.[101]

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.[24] 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.[102, 103]

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. Mirrored indicators were also included in a survey of health care providers to monitor the expression of stigma as well as a representative survey of the general public to monitor the extent to which they would express 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.[50]

Registered births

The number of live births is sourced from the Australian Bureau of Statistics 3301.0 Births, Australia, 2018. 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.[86] 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.

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
- Burnet Institute, Melbourne, VIC
- Centre for Social Research in Health, UNSW Sydney, 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

State/Territory Health Departments

- Communicable Disease Control Section, Health Protection Service, ACT Government, Canberra, ACT
- Communicable Diseases Branch, Health Protection NSW, NSW Health, NSW Government, North Sydney, NSW
- Sexual Health and Blood Borne Virus Unit, Centre for Disease Control, Northern Territory Department of Health, Northern Territory Government, Darwin, NT
- 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
- Clinic 34 Darwin and Alice Springs, Sexual Health & Blood Borne Virus Unit, Centre for Disease Control, 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
- Northside Clinic, North Fitzroy; Prahran Market Clinic, South Yarra; Melbourne Sexual Health Centre, Melbourne; The Alfred Hospital, Melbourne; Monash Medical Centre, Clayton; VIC
- Department of Clinical Immunology, Royal Perth Hospital, Perth, WA
- Waikato District Hospital, Hamilton; Wellington Hospital, Wellington; New Zealand

Australian Collaboration for Coordinated Enhanced Sentinel Surveillance (ACCESS) of STIs and BBVs

- Canberra Sexual Health Centre, Canberra; Interchange General Practice, Canberra; ACT
- Liverpool Sexual Health Clinic, Liverpool; Coffs Harbour Sexual Health Clinic, Coffs Harbour; Grafton Sexual Health Clinic, Grafton; Albury Sexual Health Clinic, Albury; Goulburn Sexual Health Clinic, Goulburn; Griffith Sexual Health Clinic, Griffith; Narooma Sexual Health Clinic, Narooma; Queanbeyan Sexual Health Clinic, Queanbeyan; Wagga Sexual Health Clinic, Wagga Wagga; Holden Street Clinic, Gosford; Newcastle Sexual Health Clinic, Newcastle; Forster Sexual Health Clinic, Forster; Bligh Street Clinic, Tamworth; Taree Manning Clinic, Taree; Illawarra Sexual Health Clinic, Warrawong; Nowra Sexual Health Clinic, Nowra; Kirketon Road Centre, Darlinghurst; Clinic 180, Potts Point; Lismore Sexual Health Service, Lismore; Tweed Heads Sexual Health Service, Tweed Heads; Clinic 16, North Shore Sexual Health Service, Sydney; Manly Sexual Health Clinic, Sydney; RPA Sexual Health Clinic, Sydney; Short Street Centre Sexual Health Clinic, Kogarah; Western Sydney Sexual Health Centre, Parramatta; Mt Druitt Sexual Health Clinic (formerly Luxford Road Sexual Health Clinic), Mt Druitt; Blue Mountains Sexual Health Clinic, Katoomba; Nepean Sexual Health Clinic, Penrith; Sydney Sexual Health Centre, Sydney; WAYS Youth Health Clinic, Bondi Junction; Lightning Ridge Sexual Health Service, Lightning Ridge; Bourke Sexual Health Service, Bourke; Dubbo Sexual Health, Dubbo; Orange Sexual Health Clinic, Kite Street Community Health Centre, Orange; Broken Hill Sexual Health, Broken Hill; a[TEST], Darlinghurst; a[TEST], Newtown; Bungendore Medical Centre, Bungendore; East Sydney Doctors, Darlinghurst; Fountain Street General Practice, Alexandria; Macleay Street Medical, Potts Point; UNSW Health Service, Kensington; Taylor Square Private Clinic, Surry Hills; Dr Doong Practice, Burwood; Kildare Road Medical Centre, Blacktown; Waterloo Medical Centre, Waterloo; Holdsworth House Medical Practice, Darlinghurst; Family Planning NSW; Westmead Hospital, Westmead; Immunology B Ambulatory Care, St Vincent's Hospital, Darlinghurst; NSW
- Clinic 34 Darwin and Clinic 34 Alice Springs, Sexual Health and Blood Borne Virus Unit, Centre for Disease Control, Department of Health, Darwin, NT
- Cairns Sexual Health Clinic, Cairns; Gold Coast Sexual Health Service, Miami; Princess Alexandra Sexual Health, Woolloongabba; Townsville Sexual Health Service, Townsville; Mackay Sexual Health Clinic, Mackay; Mount Isa Sexual Health Clinic, Mount Isa; Palm Island Sexual Health Clinic, Palm Island; QLD
- Clinic 275 Sexual Health, Adelaide; O'Brien Street General Practice, Adelaide; Rapido Testing Service, Shine SA, Adelaide; 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; Centre Clinic, St Kilda; Frankston Health, Frankston; Cohealth (formerly known as North Yarra Community Health), Collingwood; North Richmond Community Health, Richmond; Bendigo Community Health Clinic, Bendigo; EACH Social and Community Health, Melbourne; Dandenong Superclinic, Dandenong; Prahran Market Clinic, Prahran; Northside Clinic, North Fitzroy; Family Planning Victoria, Melbourne; Clarinda Medical Centre, Clarinda; The Alfred Hospital, Melbourne; VIC
- Fremantle Hospital Sexual Health Clinic, Fremantle; M Clinic, Perth; GP on Beaufort, Mount Lawley; 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, 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; Youth Service Providers (YouthLink), Cairns; 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

References

1. Bekker LG, Johnson L, Cowan F, 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, Australia 2015.
3. Kirby Institute. HIV, viral hepatitis and sexually transmissible infections in Australia: annual surveillance report 2018. Sydney: Kirby Institute, UNSW Sydney. 2018.
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, 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, et al. 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, 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, et al. 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 Technical Advisory Group on Immunisation (ATAGI). Australian Immunisation Handbook. Canberra: Australian Government Department of Health; 2018.
12. Deng L, Reekie J, Ward JS, et al. Trends in the prevalence of hepatitis B infection among women giving birth in New South Wales. *The Medical journal of Australia*. 2017;206(7):301-5.
13. Graham S, Guy RJ, Cowie B, et al. Chronic hepatitis B prevalence among Aboriginal and Torres Strait Islander Australians since universal vaccination: a systematic review and meta-analysis. *BMC infectious diseases*. 2013;13:403.
14. 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.
15. Department of Health. Second National Hepatitis B Strategy 2014-2017. Canberra, Australia: Commonwealth of Australia; 2014.
16. Marugan RB, Garzon SG. DNA-guided hepatitis B treatment, viral load is essential, but not sufficient. *World J Gastroentero*. 2009;15(4):423-30.
17. Andersson KL, Chung RT. Monitoring during and after antiviral therapy for hepatitis B. *Hepatology*. 2009;49(5 Suppl):S166-73.
18. Council NR. Preventing drug abuse: what do we know?: National Academies Press; 1993.
19. Heard S, Iversen J, Kwon AJ, et al. Needle Syringe Program National Minimum Data Collection: National Data Report 2017. Sydney: Kirby Institute, UNSW Sydney; 2017.
20. Sublette VA, Smith SK, George J, et al. 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.
21. Martin NK, Vickerman P, Foster GR, et al. 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.

22. Lewis D, Newton DC, Guy RJ, et al. The prevalence of Chlamydia trachomatis infection in Australia: a systematic review and meta-analysis. *BMC infectious diseases*. 2012;12:113.

23. Schiffman M, Castle PE, Jeronimo J, et al. Human papillomavirus and cervical cancer. *The Lancet*. 370(9590):890-907.

24. Muñoz N, Castellsagué X, de González AB, et al. Chapter 1: HPV in the etiology of human cancer. *Vaccine*. 2006;24, Supplement 3:S1-S10.

25. Bhatia N, Lynde C, Vender R, et al. Understanding genital warts: epidemiology, pathogenesis, and burden of disease of human papillomavirus. *Journal of cutaneous medicine and surgery*. 2013;17 Suppl 2:S47-54.

26. National HPV Vaccination Program Register [Available from: http://www.hpvregister.org.au/].

27. Tabrizi SN, Brotherton JM, Kaldor JM, et al. Assessment of herd immunity and cross-protection after a human papillomavirus vaccination programme in Australia: a repeat cross-sectional study. *The Lancet Infectious diseases*. 2014;14(10):958-66.

28. Ali H, Donovan B, Wand H, et al. Genital warts in young Australians five years into national human papillomavirus vaccination programme: national surveillance data. *BMJ (Clinical research ed)*. 2013;346:2032.

29. Machalek DA, Garland SM, Brotherton JML, 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. *J Infect Dis*. 2018.

30. Kirby Institute. HIV, viral hepatitis and sexually transmissible infections in Australia: annual surveillance report 2017. Sydney: Kirby Institute, UNSW Sydney. 2017.

31. 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.

32. Bowden FJ, Tabrizi SN, Garland SM, et al. Infectious diseases. 6: Sexually transmitted infections: new diagnostic approaches and treatments. *The Medical journal of Australia*. 2002;176(11):551-7.

33. Mullick S, Watson-Jones D, Beksinska M, et al. 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.

34. Kissinger P, Adamski A. Trichomoniasis and HIV interactions: a review. *Sexually transmitted infections*. 2013;89(6):426-33.

35. 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? *Sexually transmitted diseases*. 2001;28(10):579-97.

36. Jin F, Prestage GP, Zablotska I, 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.

37. Templeton DJ, Jin F, McNally LP, 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.

38. Guy RJ, Spelman T, Stoove M, 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.

39. 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.

40. Botham SJ, Ressler KA, Maywood P, 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.

41. 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].

42. Ali H, Guy RJ, Fairley CK, et al. Understanding trends in genital Chlamydia trachomatis can benefit from enhanced surveillance: findings from Australia. *Sexually transmitted infections*. 2012;88(7):552-7.

43. Ali H, Guy RJ, Fairley CK, et al. Understanding trends in genital Chlamydia trachomatis can benefit from enhanced surveillance: findings from Australia. *Sexually transmitted infections*. 2012;88(7):552-U142.

44. Kong FY, Guy RJ, Hocking JS, et al. Australian general practitioner chlamydia testing rates among young people. *The Medical journal of Australia*. 2011;194(5):249-52.

45. O'Connor CC, Ali H, Guy RJ, et al. High chlamydia positivity rates in Indigenous people attending Australian sexual health services. *The Medical journal of Australia*. 2014;200(10):595-8.

46. 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.

47. 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].

48. Mitchell A, Patrick K, Heywood W, et al. National survey of Australian secondary students and sexual health 2013. *Melbourne: Australian Research Centre in Sex Health and Society & La Trobe University*. 2014.

49. Manhart LE, Epstein M, Bailey JA, et al. HIV/Sexually Transmitted Infection Prevention Messaging: Targeting Root Causes of Sexual Risk Behavior. *Sexually transmitted diseases*. 2016;43(2):71-7.

50. Mitchell A, Patrick K, Heywood W, et al. National Survey of Australian Secondary Students and Sexual Health 2013. Melbourne: Australian Research Centre in Sex, Health and Society, La Trobe University; 2014.

51. 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.

52. HIV Incidence World Health Organization; 2016 [Available from: http://www.who.int/diagnostics_laboratory/links/hiv_incidence_assay/en/].

53. Zablotska IB, Prestage G, Middleton M, et al. Contemporary HIV diagnoses trends in Australia can be predicted by trends in unprotected anal intercourse among gay men. *AIDS (London, England)*. 2010;24(12):1955-8.

54. Grant RM, Lama JR, Anderson PL, et al. Preexposure chemoprophylaxis for HIV prevention in men who have sex with men. *New England Journal of Medicine*. 2010;363(27):2587-99.

55. Zablotska IB, Selvey C, Guy R, 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.

56. 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.

57. Kowdley KV, Wang CC, Welch S, et al. Prevalence of chronic hepatitis B among foreign-born persons living in the United States by country of origin. *Hepatology*. 2012;56(2):422-33.

58. 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.

59. Lodi S, Phillips A, Touloumi G, et al. CD4 decline in seroconverter and seroprevalent individuals in the precombination of antiretroviral therapy era. *AIDS (London, England)*. 2010;24(17):2697-704.

60. 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.

61. Lundgren JD, Babiker AG, Gordin F, et al. Initiation of Antiretroviral Therapy in Early Asymptomatic HIV Infection. *The New England journal of medicine*. 2015;373(9):795-807.

62. Bradley H, Hall HI, Wolitski RJ, et al. Vital signs: HIV diagnosis, care, and treatment among persons living with HIV—United States, 2011. *MMWR Morbidity and mortality weekly report*. 2014;63(47):1113-7.

63. Marks G, Crepaz N, Senterfitt JW, et al. 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.

64. Wilson DP, Hoare A, Regan DG, et al. 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.

65. Cohen MS, Chen YQ, McCauley M, et al. Prevention of HIV-1 infection with early antiretroviral therapy. *New England journal of medicine*. 2011;365(6):493-505.

66. Rodger A, Bruun T, Weait M, 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.

67. Grulich A, Bavinton B, Jin F, et al., editors. HIV transmission in male serodiscordant couples in Australia, Thailand and Brazil. Seattle, Washington: 22nd Conference on Retroviruses and Opportunistic Infections; 2015.

68. Whittaker B. An early start: Major study finds early HIV treatment is best. 2015.

69. Rodger A, Cambiano V, Bruun T, et al., editors. HIV transmission risk through condomless sex if the HIV positive partner is on suppressive ART: PARTNER study. CROI; 2014; Boston.

70. Grulich AE, Bavinton BR, Jin F, et al., editors. HIV transmission in male serodiscordant couples in Australia, Thailand and Brazil. CROI; 2015; Seattle, Washington.

71. 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; Vancouver 2015.

72. Clayson DJ, Wild DJ, Quarterman P, et al. A comparative review of health-related quality-of-life measures for use in HIV/AIDS clinical trials. *Pharmacoeconomics*. 2006;24(8):751-65.

73. Basavaraj KH, Navya MA, Rashmi R. Quality of life in HIV/AIDS. *Indian journal of sexually transmitted diseases*. 2010;31(2):75-80.

74. 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.

75. Kirby Institute. Bloodborne viral and sexually transmissible infections in Aboriginal and Torres Strait Islander people: annual surveillance report 2018. Sydney: Kirby Institute, UNSW Sydney. 2018.

76. 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.

77. Land JA, Van Bergen JE, Morre SA, et al. Epidemiology of Chlamydia trachomatis infection in women and the cost-effectiveness of screening. *Human reproduction update*. 2010;16(2):189-204.

78. Australian Institute of Health and Welfare. The inclusion of Indigenous status on pathology request forms. Cat.no. IHW 103. Canberra: AIHW; 2013.

79. Peipert JF. Clinical practice. Genital chlamydial infections. *The New England journal of medicine*. 2003;349(25):2424-30.

80. Oakeshott P, Kerry S, Aghaizu A, et al. Randomised controlled trial of screening for Chlamydia trachomatis to prevent pelvic inflammatory disease: the POPI (prevention of pelvic infection) trial. *BMJ (Clinical research ed)*. 2010;340:c1642.

81. Haggerty CL, Gottlieb SL, Taylor BD, et al. Risk of sequelae after Chlamydia trachomatis genital infection in women. *J Infect Dis*. 2010;201 Suppl 2:S134-55.

82. Skerlev M, Culav-Koscak I. Gonorrhea: new challenges. *Clinics in dermatology*. 2014;32(2):275-81.

83. Ward JS, Guy RJ, Akre SP, 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.

84. Graham S, Guy RJ, Ward JS, 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.

85. NACCHO/RACGP. National guide to a preventive health assessment for Aboriginal and Torres Strait Islander people: Second edition. South Melbourne: The RACGP; 2012.

86. Ward J, Bryant J, Wand H, 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.

87. Chapter 4: Hepatitis B. Manual for the Surveillance of Vacine-Preventable Diseases. Atlanta: United States Centers for Disease Control and Prevention; 2014.

88. Ward J, Topp L, Iversen 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.

89. Iversen J, Maher L. 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.

90. Mathers BM, Degenhardt L, Phillips B, et al. Global epidemiology of injecting drug use and HIV among people who inject drugs: a systematic review. *Lancet*. 2008;372(9651):1733-45.

91. National HBV Testing Policy Expert Reference Committee. National hepatitis B testing policy 2012 v1.0. In: Commonwealth of Australia, editor. Darlinghurst NSW: ASHM; 2012.

92. Ali H, Donovan B, Fairley CK, et al. Increasing access by priority populations to Australian sexual health clinics. *Sexually transmitted diseases*. 2013;40(10):819-21.

93. 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.

94. 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.

95. Reekie J, Gidding HF, Kaldor JM, et al. 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.

96. Schweitzer A, Horn J, Mikolajczyk RT, et al. Estimations of worldwide prevalence of chronic hepatitis B virus infection: a systematic review of data published between 1965 and 2013. *Lancet*. 2015;386(10 003):1546-55.

97. 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: 10.1111/1753-6405.12 049.

98. Nakhaee F, Black D, Wand H, et al. 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.

99. Australian HIV Observational Database Annual Report. In: Institute TK, editor.: The University of New South Wales; 2017.

100. The Australian HIV Observational Database. Rates of combination antiretroviral treatment change in Australia, 1997-2000. *HIV medicine*. 2002;3(1):28-36.

101. MacDonald M, Wodak AD, Ali R, et al. HIV prevalence and risk behaviour in needle exchange attenders: a national study. The Collaboration of Australian Needle Exchanges. *The Medical journal of Australia*. 1997;166(5):237-40.

102. Holt M, Lea T, Mao L, 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.

103. Zablotska IB, Kippax S, Grulich A, et al. 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.