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SEXUALLY TRANSMITTED INFECTIONS IN NEW ZEALAND ANNUAL SURVEILLANCE REPORT 2017/2018/2019

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Disclaimer

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INTRODUCTION

The ‘Sexually transmitted infections in New Zealand: Annual Surveillance Report’ summarises the epidemiology of sexually transmitted infections (STIs) from 2017 to 2019 (the reporting period), with findings from 2015 to 2016 included for comparison and context. Surveillance data are presented by disease, as for previous annual reports.

Given delays in STI annual reporting and the development of online dashboard-based reporting for 2020 onward, three years have been combined into a single document for this one-off report.

During this reporting period there have been significant changes in legislation, and consequently collection and reporting of data. The Health (Protection) Amendment Act 2016 came into force in January 2017, making syphilis, gonorrhoea, HIV and AIDS notifiable to the Medical Officer of Health without identifying information (name, address, and place of work), whereas previously only AIDS was notifiable. An interim system for clinical reporting was established in November 2018 using REDCap, a secure web application hosted on an ESR server, to collect data for syphilis, gonorrhoea, and HIV in a survey format. A full description of this system can be found in Appendix 2.

With the implementation of the clinical notification system using REDCap for syphilis and gonorrhoea, the previous system of voluntary sentinel clinic surveillance from Sexual Health and Family Planning clinics for these diseases and for chlamydia was discontinued in 2019. This report presents findings from laboratory surveillance of gonorrhoea and chlamydia throughout the reporting period, gonorrhoea clinical notification for 2019, enhanced surveillance of syphilis for 2017 and 2018 and syphilis clinical notification data for 2019. Data from the voluntary sentinel clinic system previously in place for gonorrhoea, chlamydia, and syphilis, are not included in this report but are available on request. While sentinel clinic surveillance for first presentation genital warts, first presentation genital herpes, non-specific urethritis, lymphogranuloma venereum (LGV), chancroid and granuloma inguinale continued through this reporting period, based on feedback from stakeholders on the usefulness of this information, only first presentation genital warts and LGV are described in this report. Data on other STIs are also available on request.

In 2019 an online dashboard for quarterly reporting of STIs was published, this can be found here: STI Quarterly Dashboard.

A full description of methodology can be found in [Appendix 2: Description of STI surveillance and methodology].

TERMINOLOGY AND INTERPRETATION

Sex:

This refers to male, female and unknown rather than gender identity.

Age-group:

Based on age at diagnosis and rounded to the nearest year using normal rounding practices.

Geographic region:

Generally reported by District Health Board (DHB) except for Auckland which is reported as a region (combining Auckland, Waitemata and Counties Manukau DHB's) and Wellington which is reported as a region (combining Capital & Coast, Hutt Valley and Wairarapa DHB's).

Ethnicity:

Generally reported using prioritised ethnicity including Māori, Pacific, Asian, MELAA (Middle East, Latin America, and Africa), and European/Other. Clinic data does not specify Asian or MELAA ethnicity which are both reported as 'Other' for historical data capture reasons.

Reporting years:

This report is a combined 2017 – 2019 annual report with data from 2015 and 2016 generally reported to provide context and trends. Clinical notification data for gonorrhoea is only presented for 2019 as surveillance began in late 2018.

Surveillance data sources:

Three primary sources of data are used for surveillance; these include laboratory data, sentinel aggregate clinic data and clinical notification data.

Laboratory data includes all laboratory results for gonorrhoea and chlamydia alongside demographic information.

Sentinel, aggregate data is received from Sexual Health and Family Planning clinics for a group of other STIs including: genital warts (first diagnosis); genital herpes (first diagnosis); non-specific urethritis (NSU); lymphogranuloma venereum (LGV); granuloma inguinale (donovanosis); and chancroid.

Clinical notifications are received for gonorrhoea and syphilis directly from clinicians.

For further information on surveillance data sources and methodology please refer to the methods section [Appendix 2: Description of STI surveillance and methodology].

INFECTIOUS SYPHILIS

Syphilis data were previously reported via voluntary sentinel surveillance from sexual health clinics from 2013 to late 2018. In 2017, syphilis became notifiable, and an interim system was available from late 2018. This may have increased the number of cases notified and influenced trends.

KEY FINDINGS: 2017/2018/2019

- Reported number of infectious syphilis cases per year was 476 in 2017 (49% increase from 2016), 628 in 2018 (32% increase from 2017), and 722 in 2019 (15% increase from 2018) [Table 1]
- The number of cases among men who have sex with men (MSM) nationally continued to increase from 236 cases in 2016 to 455 in 2019 (92% increase).
- Of cases among MSM, 75% to 80% were in the 'larger urban areas' (Auckland, Wellington and Canterbury regions) throughout the reporting period.
- The largest number of cases amongst MSM were in the Auckland region, although MSM case numbers decreased in Auckland in 2019 (220 to 185 cases). In comparison, MSM case numbers increased in Canterbury (39 to 77 cases) and Wellington (39 to 62 cases) regions in 2019.
- Most of the smaller regions reported increased case numbers among MSM in 2018 and then case numbers remained steady or decreased slightly in 2019.
- MSM cases were fairly evenly distributed by age from 20 years through to 40+ years, and nearly two-thirds of MSM cases were of European/Other ethnicity.
- Cases among women who have sex with men (WSM) have increased markedly from 26 cases in 2016 to 91 cases in 2019.
- In 2019, 31 of 91 cases (34%) among WSM were reported in Auckland and 27 of 91 cases were in the Bay of Plenty, Waikato, and Lakes regions, which all border each other. Cases in most other areas rose slightly in 2019 following a larger increase in 2018. Previously, in 2015/2016, most cases (12/15, 80%) among WSM were reported in Auckland.
- Nearly half of all cases among WSM were of Māori ethnicity in 2017, 2018, and 2019. This is a change from 2015/16, where the majority of cases were of European/Other ethnicity.
- In the 2017–2019 period, 14 cases of congenital syphilis were reported, almost all in Māori and Pacific infants, all in regions of the North Island. Prior to 2016, one case of congenital syphilis was reported in 2011.
- Cases among men who have sex with women only (MSW) increased across all ethnicities during this reporting period, but the proportion of cases of Māori and Pacific ethnicities increased relative to those of other ethnicities, with Māori and Pacific comprising 26% of MSW cases (14/52) in 2016, increasing to 37% (53/142) in 2019.
- The proportion of cases among MSW in Auckland decreased from 77% in 2017 to 37% in 2019 highlighting the recent geographical spread of syphilis cases.
- Cases among MSW were predominantly in the 20–40+ year age-groups with very few cases reported among those <20 years of age.
- Overall, there was an increase in numbers of syphilis cases reported in all regions in 2017, 2018 and again in 2019. In 2019, numbers of reported cases in Auckland and some smaller regions decreased compared to 2018. The decrease in Auckland was among both European/Other and Māori ethnicities, and was observed in both MSM and WSM.

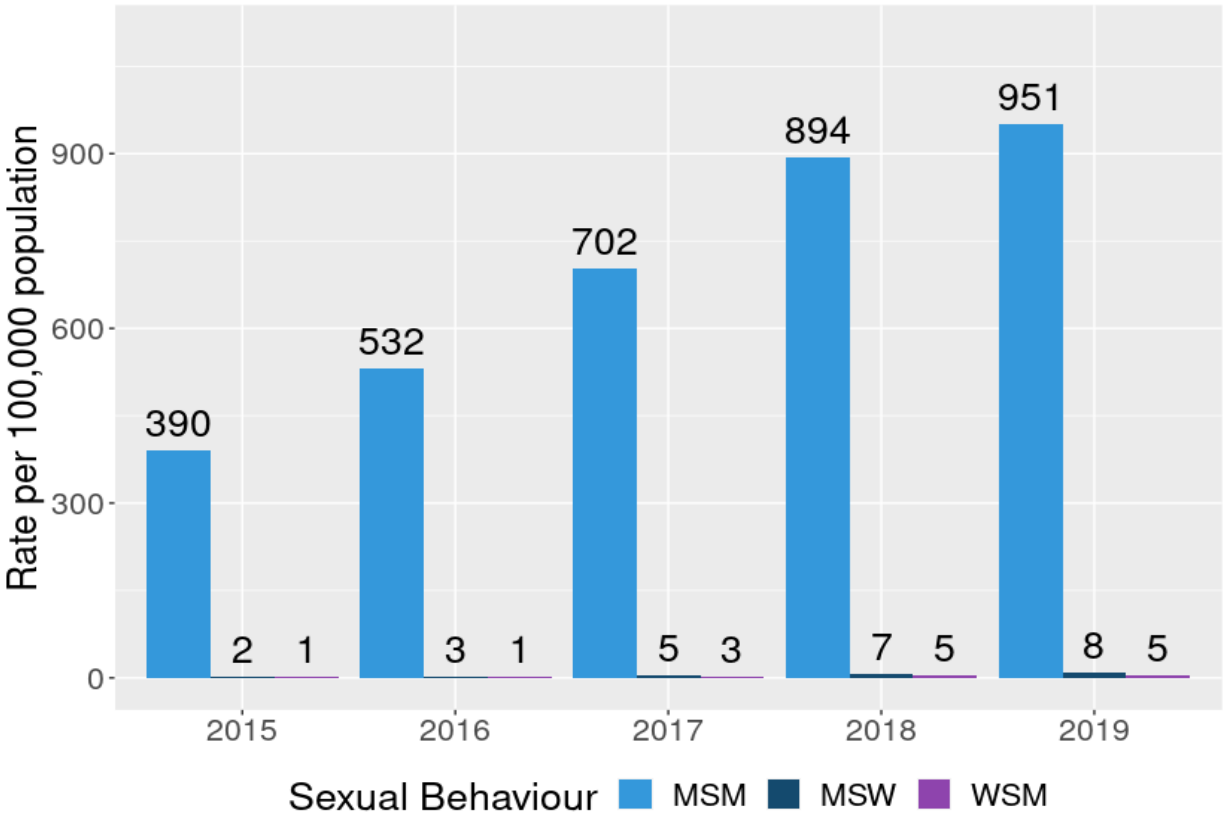
RATES OF INFECTIOUS SYPHILIS

Sexual Behaviour

Rates of infectious syphilis by sexual behaviour are calculated based on New Zealand Health Survey data collected from July 2014 to June 2015 (Ministry of Health, 2019). This estimates the proportion of the population aged 18–74 years who reported having had a same-sex sexual partner in the past 5 years. For further information on methods see [Rates calculations:].

There are marked inequities in rates of infectious syphilis by sexual behaviour, with the rate of syphilis amongst MSM 119 times the rate of MSW and 190 times the rate of WSM in 2019 [Figure 1]. Rates have increased across all these sexual behaviour groups during the reporting period. Women who have sex with women and transgender people account for small numbers and are included in the 'other' category in the above characteristic table, this other category is not shown in the following graphs.

Figure 1: Rates of infectious syphilis by sexual behaviour: 2015–2019

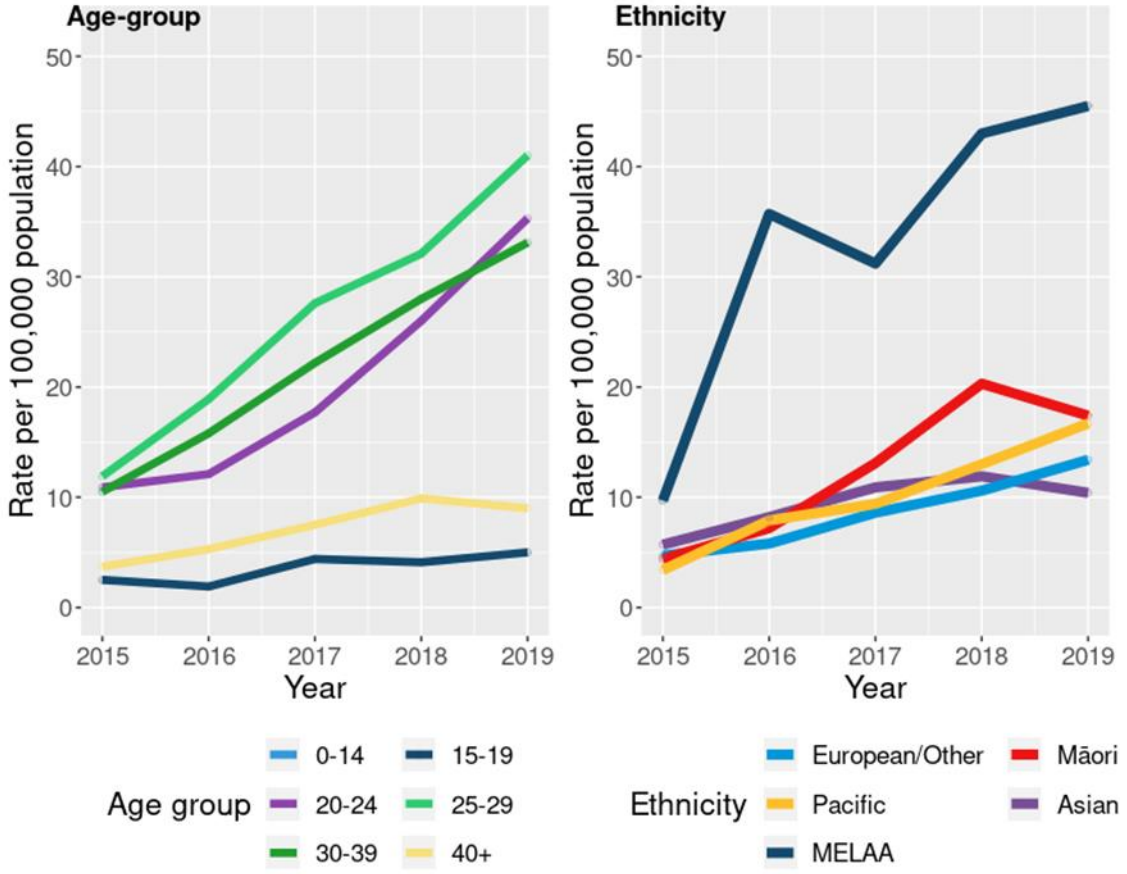


Age-group and ethnicity

Rates of syphilis have increased most markedly in the age-groups between 20–39 years with the highest rates among those aged 25–29 during this reporting period [Figure 2]. Rates in all age groups increased from 2017 to 2019, with the exception of the 40+ age-group. Rates in the 40+ age-group peaked at 10 per 100,000 population in 2018 before decreasing slightly to 9 per 100,000 population in 2019. Cases under 15 years of age are very rarely reported and congenital cases are discussed elsewhere [Congenital syphilis].

Rates by ethnicity are highest in the small heterogeneous Middle Eastern Latin American and African (MELAA) ethnicity group. This group represents 2.1% of the population and accounts for the lowest number of cases. Following this, rates are highest among Māori. Among Māori, rates of infectious syphilis peaked at 20 per 100,000 population in 2018 and decreased slightly in 2019, to 17 per 100,000 population. Among Pacific people, rates increased across the reporting period and were third highest after MELAA and Māori in 2018 and 2019. Case numbers were highest throughout the reporting period among those of European/Other ethnicity [Table 1]. The rate of syphilis amongst those of Māori ethnicity was 1.9 times that of European/Other in 2018 and 1.3 times in 2019.

Figure 2: Rates of infectious syphilis in New Zealand by age and ethnicity: 2015–2019



CASE COUNTS OF INFECTIOUS SYPHILIS IN DIFFERENT RISK GROUPS

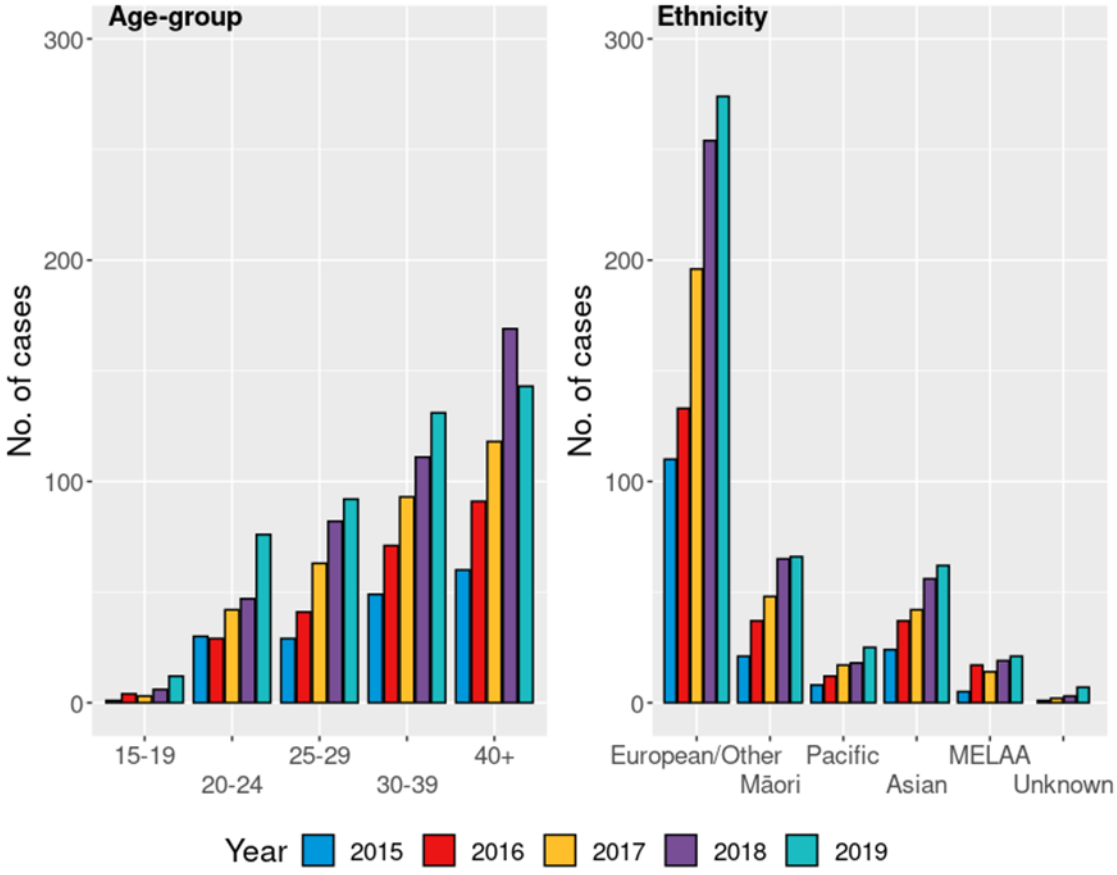
MSM by age-group & ethnicity

The number of reported cases among MSM increased by a similar proportion across all age-groups during the reporting period, except in the 40+ age group in which case numbers decreased in 2019 compared to 2018 [Figure 3].

The number of reported cases among MSM also increased across all ethnicities by a similar proportion during the reporting period. The majority of cases among MSM (55–65%) were of European/Other ethnicity. Cases of Māori and Asian ethnicity accounted for around 15% of all cases among MSM over the reporting period while cases of Pacific and MELAA ethnicity represented around 5% of all cases among MSM in this time.

The majority of cases among MSM were reported in the larger urban areas (Auckland, Wellington, and Canterbury regions) throughout the reporting period, trending down slightly over this time from 80% in 2017 to just over 70% in 2018 and 2019. In 2015 to 2016, cases among MSM in Auckland comprised nearly half of all syphilis cases nationally and 62% of all cases among MSM. This proportion steadily decreased to only 25% of all cases in 2019. Notably, the number of MSM cases in the Southern DHB increased from 10 cases in 2018 to 38 in 2019, a nearly four-fold increase in one year.

Figure 3: Infectious syphilis cases amongst MSM by age-group and ethnicity: 2015–2019



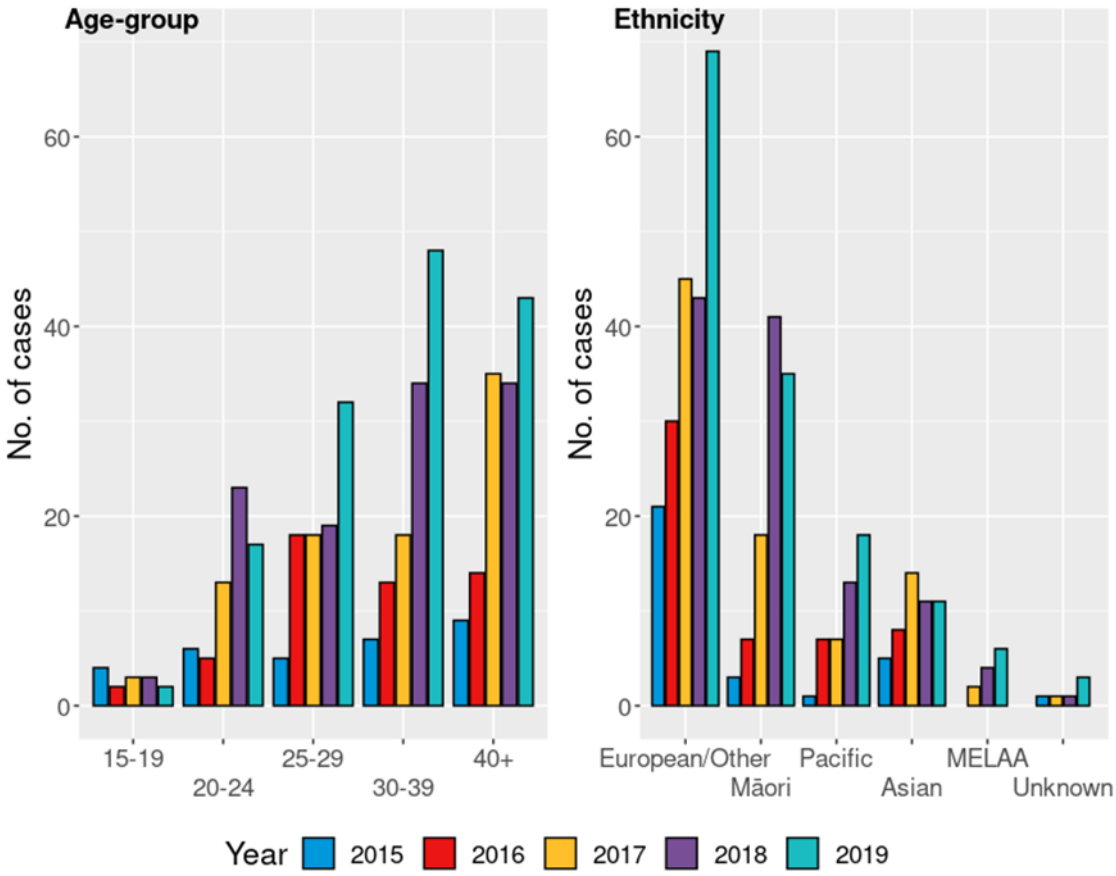
MSW by age-group & ethnicity

The number of infectious syphilis cases among men who have sex with women (MSW) increased across all age-groups over the reporting period, except the 15–19-year age-group in which very few cases were reported each year [Figure 4]. Notably, in 2019 there was a marked increase in case numbers in all age groups over 25 years. The highest proportion of cases of European/Other ethnicity were in older age groups, with nearly 30% aged 30–39 years and 42% aged 40+. Cases of other ethnicities were more evenly distributed across the 20–40+ age categories.

The reported number of cases among MSW increased across all ethnicities over the reporting period, except for people of Asian ethnicity among whom case numbers decreased after a peak in 2017. The highest number of cases were reported among people of European/Other ethnicity each year, followed by Māori and Pacific. The proportion of cases by ethnicity has fluctuated but overall; the proportion of cases of European/Other and Asian ethnicities have decreased relative to those of Māori ethnicity, while those of Pacific ethnicity have remained steady. The proportion of cases among MSW of Māori ethnicity increased from 14% (7/52 cases) in 2016, to 36% (41/113 cases) in 2018, and 25% (35/142) in 2019.

Cases among MSW in Auckland have levelled off from 47 cases in 2017 to 52 cases in 2019. The proportion of cases in Auckland decreased over the reporting period from 77% in 2017 to 37% in 2019, highlighting the geographical spread of syphilis cases. Cases among MSW outside of Auckland increased from seven cases in 2015 to 40 cases in 2017 and continued to increase throughout the reporting period to 90 cases in 2019.

Figure 4: Infectious syphilis cases amongst MSW by age-group and ethnicity: 2015–2019



WSM by age-group & ethnicity

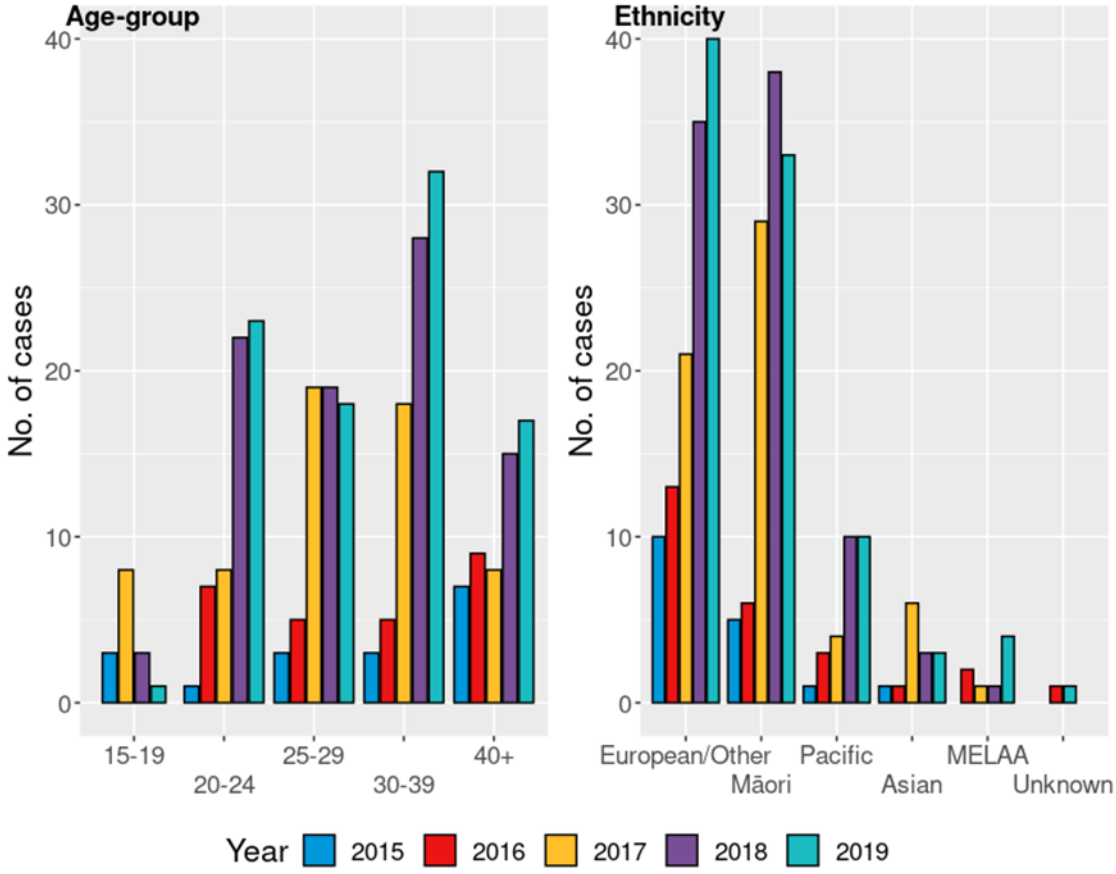
Cases of infectious syphilis among women who have sex with men (WSM) increased markedly through the reporting period, and by nearly 400% between 2016 and 2019 (26 cases in 2016 to 91 cases in 2019). This increase was primarily amongst those aged 20–39 years although cases among those aged 40+ also increased in 2018 [Figure 5].

The majority of cases among WSM were of reproductive age (defined by the Ministry of Health as aged 15–44 years (Ministry of Health, 2021).

Prior to 2017, most infectious syphilis cases among WSM were of European/Other ethnicity [Figure 5]. However, during the reporting period there has been a rapid increase in the number of cases amongst those of European/Other and Māori ethnicity from 2017 and to a lesser extent Pacific ethnicity in 2018. Significantly, the largest increase is amongst those of Māori ethnicity who reported a higher number of cases than those of European/Other ethnicity in 2017 and 2018, despite having a much smaller population.

The number of cases among MSW in Auckland peaked in 2018 (46 cases) before returning to a similar level as seen in other years in 2019 (31 cases). In contrast, cases among MSW nationally increased from 40 cases in 2017 to 90 cases in 2019, hence the proportion of cases outside of Auckland increased from 42% to 66% from 2016 to 2019. Outside of Auckland, nearly 30% of cases among WSM were in the Bay of Plenty, Waikato, and Lakes regions, which all border each other.

Figure 5: Infectious syphilis cases amongst WSM by age-group and ethnicity: 2015–2019



SPECIAL POPULATIONS WITH INFECTIOUS SYPHILIS

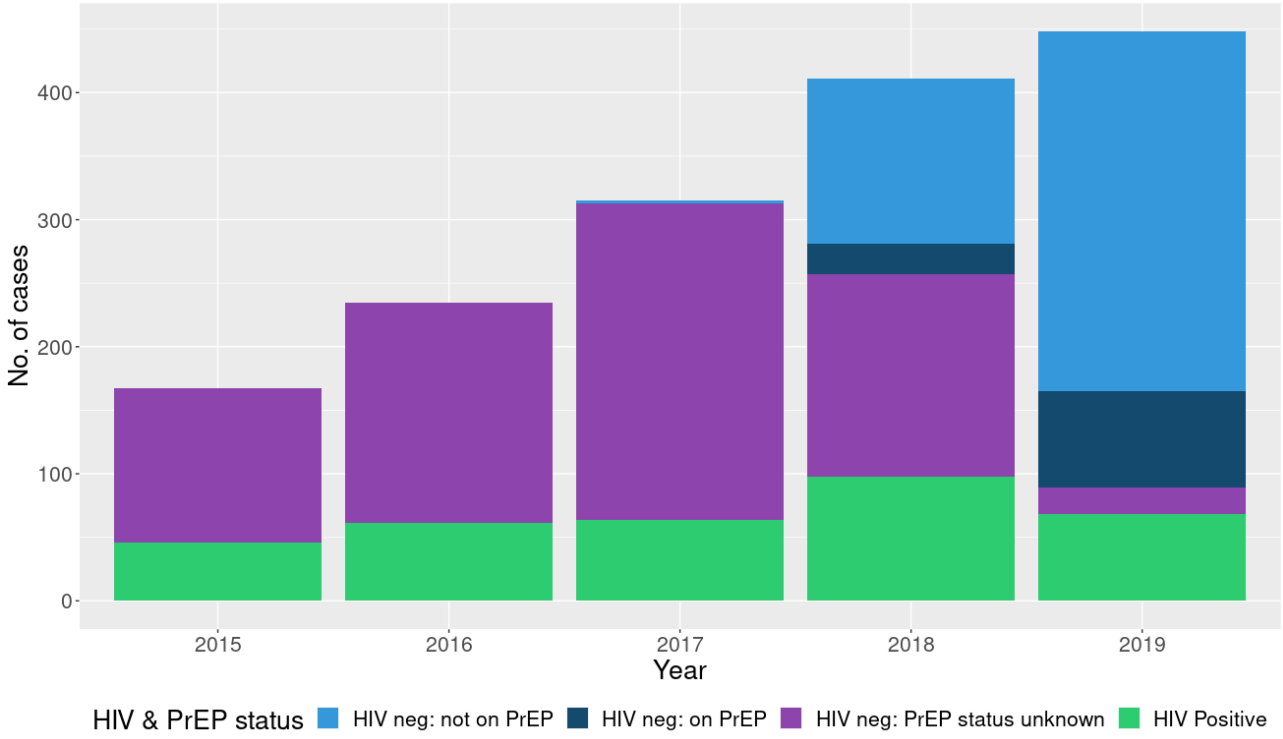
HIV & PrEP status amongst MSM

Pre-Exposure Prophylaxis (PrEP) is a medication for HIV-negative people which significantly reduces the chance of acquiring HIV. PrEP became available in New Zealand as part of a research trial and via importations in 2018, and since 2019 has been funded for those who meet special authority criteria (PHARMAC, 2021). PrEP users are primarily MSM.

The number of HIV positive syphilis cases amongst MSM increased from 64 in 2017 to 98 in 2018 and then decreased to 68 in 2019 [Figure 6]. Apart from 2018, the proportion of MSM cases who are HIV positive has decreased from 26% in 2016 to 15% in 2019.

The number and proportion of syphilis cases amongst MSM increased from 24 cases (6% of MSM cases) in 2018 to 76 (17% of MSM cases) in 2019.

Figure 6: HIV and PrEP status amongst MSM with syphilis: 2015–2019



Women aged 15–44, pregnant women, and congenital syphilis cases

Women between 15 and 44 years of age are considered to be of reproductive age for the purposes of this report, based on Ministry of Health definitions (Ministry of Health, 2021). The ethnicity profile of cases who were women of reproductive age changed over the reporting period with the proportion of Māori ethnicity increasing and European/Other decreasing [Figure 7]. In 2016, European/Other cases represented 61% of cases in women aged 15–44 (14/23) and Māori 22% of cases (5/23). By 2019, 45% of cases in women aged 15–44 were European/Other ethnicity (42/93 cases) and 41% were Māori (38/93 cases).

The number of pregnant women reported with syphilis increased from 6 cases in 2016, to 13 cases in 2017, 24 in 2018 and 23 in 2019 [Figure 8]. The distribution of these cases by age-group has fluctuated with a slightly younger distribution in 2017 moving towards a slightly older distribution in 2019.

The majority of pregnant women with syphilis were of European/Other and Māori ethnicity, followed by Pacific [Figure 7] [Figure 8]. There were more cases among pregnant Māori women than pregnant European/Other women in every year of this reporting period. In 2017, Māori represented 54% (7/13) of all pregnant cases, followed by European/Other, who represented 23% (3/13 cases). In 2018, Māori represented 54% (13/24) of cases compared to 21% (5/24 cases) for European and 21% of cases (5/24) for Pacific. In 2019, European/Other represented 35% (8/23) of cases compared to Māori who represented 39% (9/23) and 22% (5/23) of cases for Pacific.

In 2017, nearly half the pregnant syphilis cases were reported in Lakes/Bay of Plenty region (5/13), with 3/13 cases reported in the Auckland region. From 2018, most pregnant cases were reported in the Auckland region; 15/24 cases in 2018 and 10/23 in 2019. The remaining cases were all in the North Island, except for a very small number of cases reported in Canterbury.

Figure 7:Infectious syphilis cases amongst women of reproductive age by age-group and ethnicity: 2015–2019

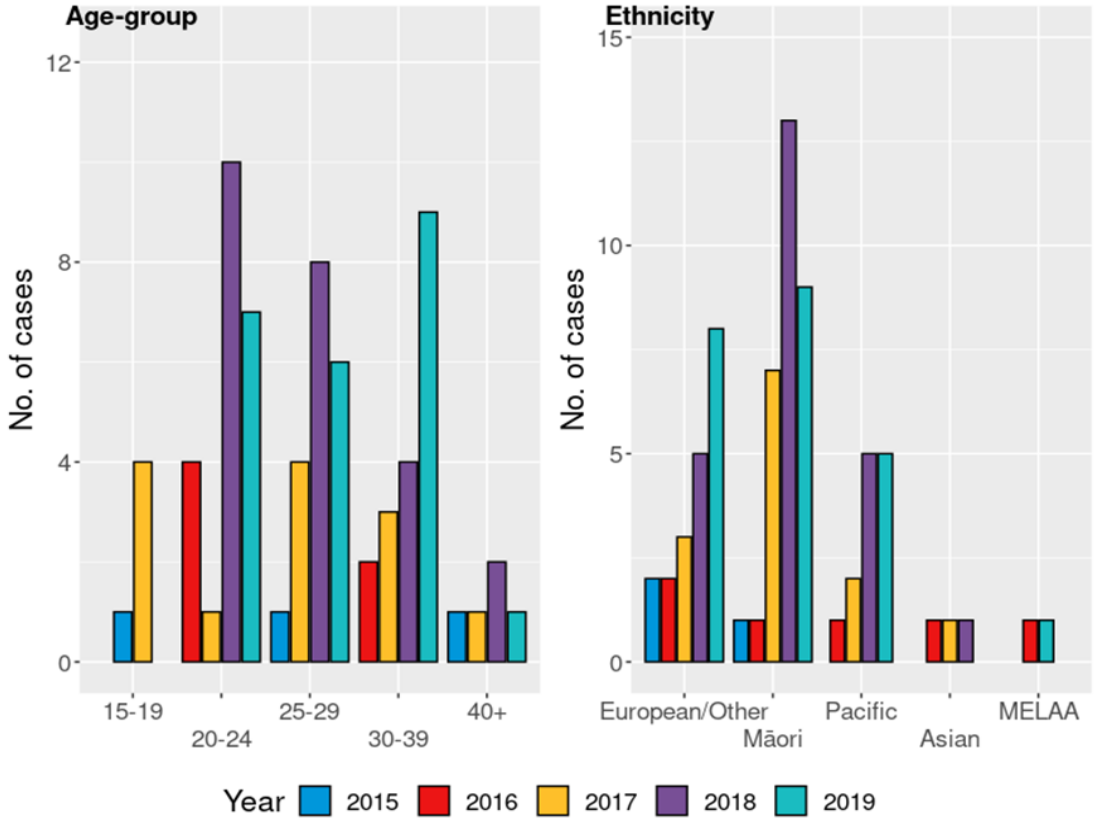
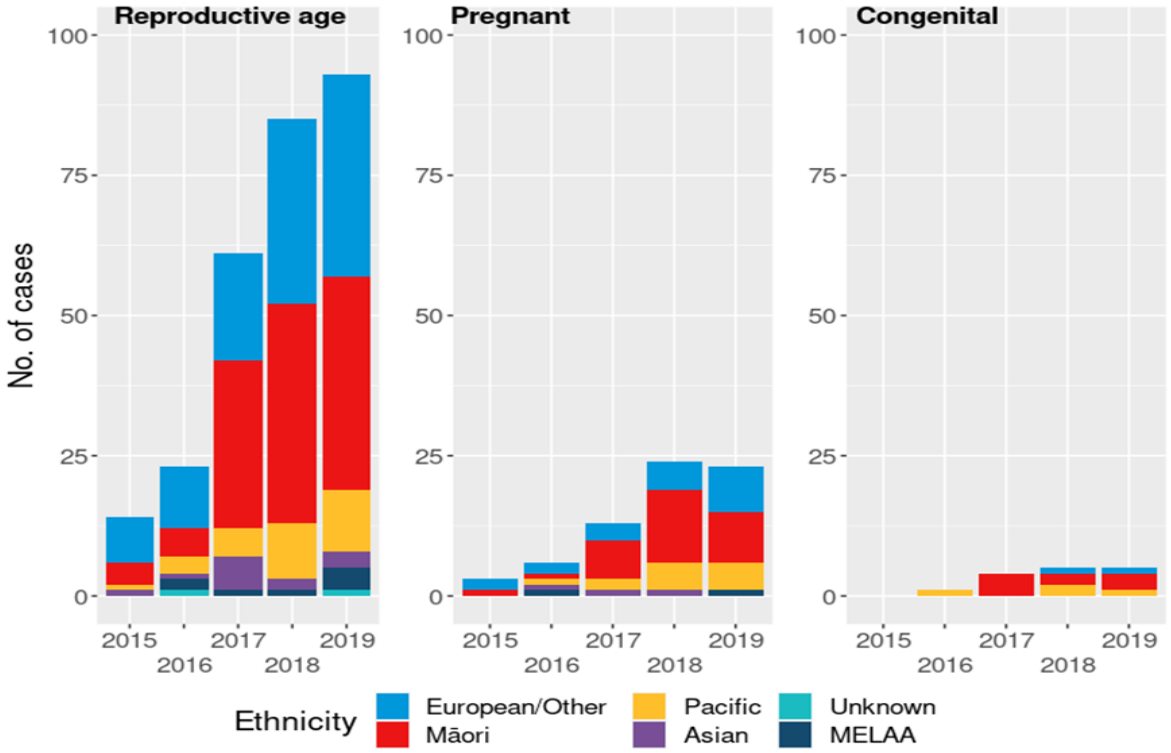


Figure 8: Infectious syphilis amongst women who are: of reproductive age, pregnant and congenital syphilis cases by ethnicity: 2015 – 2019 by ethnicity

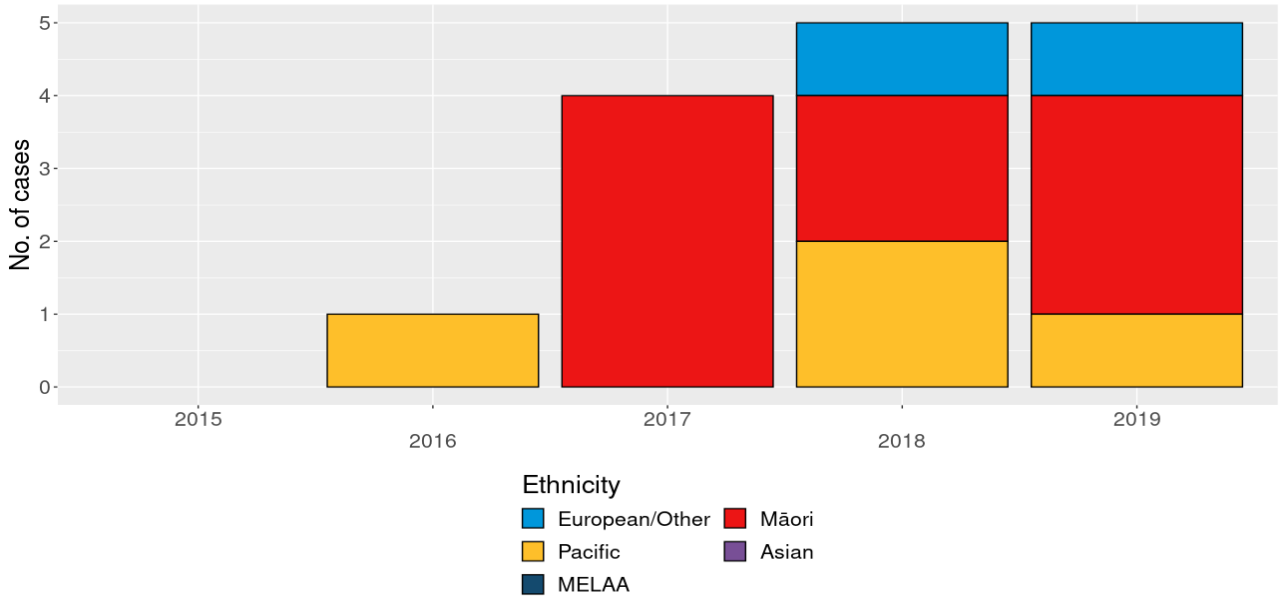


Congenital syphilis

In 2016, the first case of congenital syphilis was reported since 2011.

In the 2017–2019 reporting period there were 14 cases of congenital syphilis reported to ESR: four in 2017, and five in both 2018 and 2019 [Figure 9]. There were marked ethnic inequities in congenital syphilis over these years. In 2017 all four cases were Māori. In 2017, two were Māori, two Pacific and one European/Other, and in 2018, three were Māori, one Pacific, and one European/Other. From 2017 to 2019 six cases were stillborn.

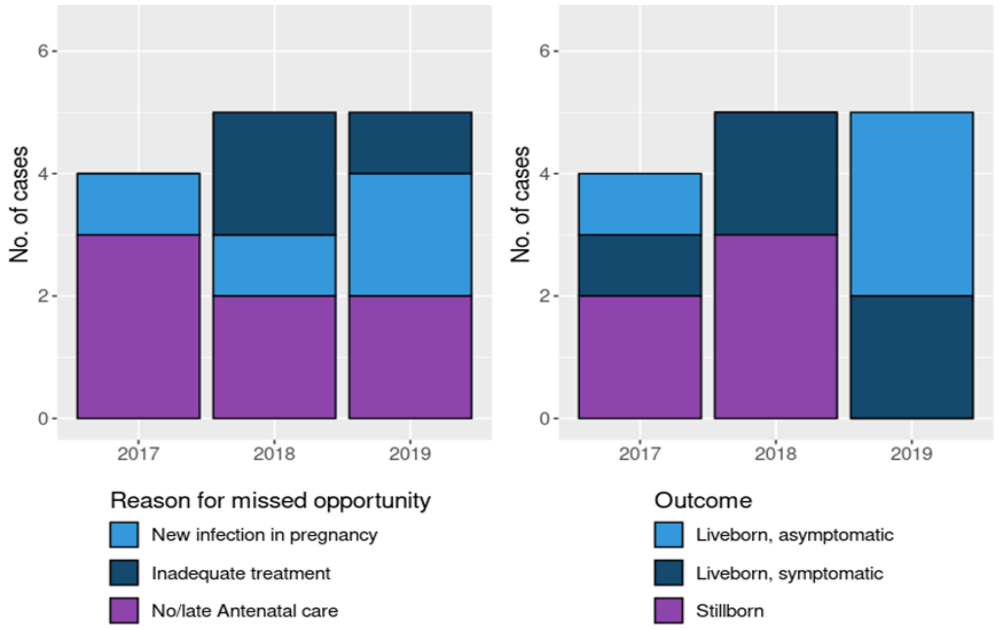
Figure 9: Congenital syphilis cases by ethnicity: 2015–2019



No congenital cases of Asian or MELAA ethnicity reported

Analysis of information on case report forms for infants with congenital syphilis and their mothers was undertaken to identify where in the antenatal care pathway the opportunity to prevent a case of congenital syphilis was missed. To prevent congenital syphilis, pregnant women must receive antenatal care, which includes first trimester screening for syphilis, be treated appropriately for the stage of disease and pregnancy at least 4 weeks prior to delivery and remain syphilis-free at delivery (New Zealand Sexual Health Society, 2020). The most common missed opportunity was access to antenatal care. Between 2017 and 2019 there were seven cases of congenital syphilis in which mothers received no antenatal care and were presented and tested at the time of or after delivery or received antenatal care and testing less than 4 weeks before delivering [Figure 10]. The second most common missed opportunity in this reporting period was for four cases in which the mother's first antenatal test was negative, but her infant had congenital syphilis. In these four cases syphilis infection was either incubating at the time of testing, or infection occurred later in pregnancy. In three cases the mother did not receive adequate treatment during pregnancy to prevent congenital syphilis, with either the incorrect formulation or treatment schedule given for the stage or pregnancy or disease.

Figure 10: Congenital syphilis: missed opportunities and outcomes: 2017–2019



Sex workers with infectious syphilis

There has been an increase in the number and proportion of cases who report being sex workers, from five cases (1.6%) in 2016 to 24 cases in 2019 (3.3%) [Table 1].

Most cases who reported being sex workers over this period reported MSM sexual behaviour, except in 2017 when nine of 16 cases reported WSM sexual behaviour. Very few cases reported MSW sexual behaviour during this reporting period.

Most sex workers reported to have syphilis were of European/Other or Māori ethnicity. The highest proportion of cases of syphilis reporting sex work were in Auckland, with the remainder generally distributed in the other main centres (Canterbury, Wellington and Waikato).

Table 1: Sex worker status amongst infectious syphilis cases: 2015–2019

Sex Worker Status	2015*	2016	2017	2018	2019
Case is a sex worker	<5	5 (1.6%)	16 (3.4%)	19 (3.0%)	24 (3.3%)
Case is not a sex worker	>200	305 (95.3%)	442 (92.9%)	580 (92.4%)	632 (87.5%)
Unknown		10 (3.1%)	18 (3.8%)	29 (4.6%)	66 (9.1%)
Total	**220 (100.0%)**	**320 (100.0%)**	**476 (100.0%)**	**628 (100.0%)**	**722 (100.0%)**

* Numbers removed for privacy reasons.

GONORRHOEA

KEY FINDINGS: 2017/2018/2019

LABORATORY SURVEILLANCE

- The rate of individuals tested for gonorrhoea per year has remained relatively stable overall during the reporting period.
- Testing rates increased by 16% in males and decreased by 4% in females from 2016 to 2019. The number of individual females tested remained more than three times that of males [Figure 11].
- The highest rates of testing for gonorrhoea are among females, those aged 20–29 years and those of MELAA ethnicity (noting this is a small heterogenous group), followed by those of Māori and Pacific ethnicity [Figure 11].
- The highest test positivity [Table 3] and the highest rates of gonorrhoea were among people of Māori and Pacific ethnicity [Figure 12].
- There was a marked increase in the test positivity from 2018 to 2019 and overall, test positivity doubled among females and increased by 25% among males from 2015 to 2019 [Figure 12].
- Test positivity and rates of gonorrhoea infection per 100,000 population have remained stable among those aged 15–19 years in contrast to nearly all other age-groups [Figure 12].
- The highest positivity rates and rates of gonorrhoea cases per 100,000 population were reported in the Auckland region and the Hawke's Bay. Cases in Auckland and other large urban areas (Wellington and Canterbury regions) tended to be male, slightly older and of European/Other ethnicity. Of all MSM cases nationally, 80% were reported in these three regions [Figure 15]. In contrast, most cases in Hawke's Bay and a number of other smaller regions tended to be female, slightly younger, and of Māori ethnicity [Figure 15].

CLINIC NOTIFICATIONS

- Of the clinical notifications received for gonorrhoea, the largest group was amongst MSM (31%), followed by WSM (28%), and MSW (21%). Sexual behaviour was not reported for 17% of cases [Table 5].
- The majority of notified MSM were European (61%) while the largest groups amongst WSM were Māori (45%) followed by European/Other (35%) [Table 5].

LABORATORY TESTING SURVEILLANCE

CHARACTERISTICS OF INDIVIDUALS TESTED

This table summarises the characteristics of individuals tested for gonorrhoea per year [Table 2]. Only the first test result for each individual per year is included. The number of individuals tested is likely overestimated as given the information collected, it is not always possible to identify duplicates.

Table 2: Number of individuals tested for gonorrhoea by sex, age-group, ethnicity, and region: 2015–2019

Sex	2015	2016	2017	2018	2019
Female	252,883	244,525	235,071	242,228	247,571
Male	60,181	63,735	66,817	73,216	78,804
Unknown	352	338	392	352	435
Age-group					
0–14	4,176	3,626	3,741	3,592	3,676
15–19	40,182	40,215	39,547	39,225	38,770
20–24	72,967	73,136	71,230	72,060	71,220
25–29	55,487	57,326	58,435	61,401	62,511
30–39	71,036	69,689	68,945	74,835	78,740
40+	68,644	63,674	59,749	63,961	65,453
Ethnicity					
European/Other	167,579	165,794	158,788	170,887	174,044
Māori	53,253	53,893	52,453	59,704	61,734
Pacific	23,441	22,440	21,299	22,330	23,039
Asian	33,119	31,667	31,683	35,584	38,132
MELAA	5,360	5,579	5,738	6,646	7,321
Unknown	30,664	29,225	32,319	20,645	22,540
DHB/region					
Auckland Region	121,822	113,334	109,901	114,336	116,559
Bay of Plenty	13,869	14,929	14,013	14,680	15,350
Canterbury	36,525	37,684	38,902	41,258	42,474
Hawke's Bay	9,264	9,310	9,343	9,978	10,391
Lakes	8,600	8,726	8,091	8,248	7,809
MidCentral	9,668	9,688	9,594	9,458	9,863
Nelson Marlborough	7,021	6,862	6,919	7,464	7,690
Northland	10,770	10,629	9,912	9,788	10,062
South Canterbury	2,844	2,921	2,708	2,600	2,776
Southern	22,213	22,402	22,050	23,081	23,284
Tairawhiti	3,361	3,421	3,527	3,442	3,517
Taranaki	1,843	1,829	1,984	5,373	8,736
Waikato	25,472	25,292	24,137	24,515	25,036
Wellington Region	35,125	36,040	35,748	35,907	37,544
West Coast	1,700	1,704	1,572	1,580	1,637
Whanganui	3,317	3,827	3,879	3,760	4,082
Total	**313,414**	**308,598**	**302,280**	**315,468**	**326,810**

LABORATORY TESTING COVERAGE RATES BY SEX, AGE, AND ETHNICITY

Many people are tested several times each year and from multiple anatomical sites. Therefore, duplicate tests are removed to calculate rates of the population being tested. The first test for each individual is used to calculate the testing rate per 100,000 population by sex, age, and ethnicity each year.

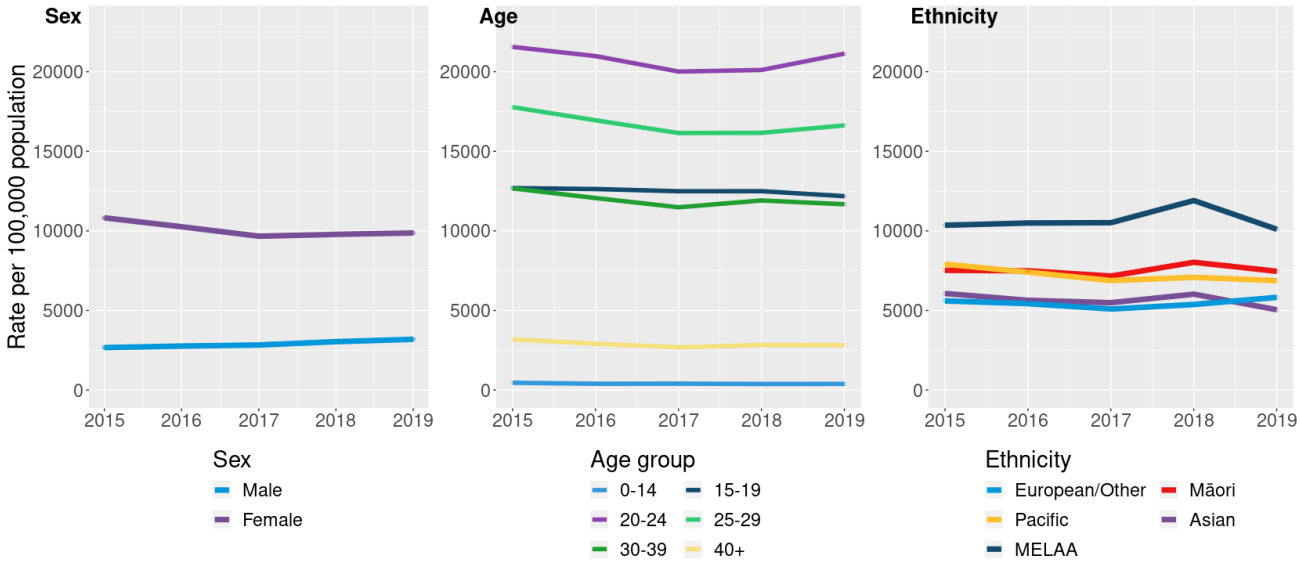
Testing rates fluctuated yearly by age but overall, from 2016 to 2019 testing rates remained stable.

Testing rates increased by 16% amongst males from 2016 to 2019 but decreased by 4% among females over this time [Figure 11]. The number of individual females tested remained more than three times that of males throughout this reporting period.

Rates of testing have fluctuated or decreased amongst most ethnicities. Testing rates by ethnicity are highest in the small heterogeneous Middle Eastern Latin American and African (MELAA) ethnicity group. This group represents 2.1% of the population and accounts for the lowest number of cases. Gonorrhoea testing rates decreased amongst those of Asian (11% decline) and Pacific ethnicities (7% decline) between 2016 and 2019, while testing rates amongst all other ethnicities remained relatively stable. Rates of testing amongst those of Māori and Pacific ethnicities were 28% and 17% higher respectively than those of European/Other ethnicity.

Rates of testing by region during the reporting period range from 4,342 per 100,000 population in South Canterbury in 2018 to 7,517 per 100,000 population in the Lakes region in 2018. Rates have remained steady across most regions during the reporting period. The three largest urban regions by population (Auckland, Wellington, Canterbury) reported higher rates of testing than many of the smaller regions.

Figure 11: Laboratory testing coverage rates by sex, age, and ethnicity: 2015–2019



POSITIVITY OF GONORRHOEA LABORATORY TESTING BY SEX, AGE-GROUP, ETHNICITY AND REGION

All positive results (including repeat tests) are the numerator and all test results are the denominator [Table 3].

Table 3: Positivity of gonorrhoea tests by sex, age, ethnicity, and region: 2015–2019

	2015	2016	2017	2018	2019
Total tests	**460,996**	**456,998**	**453,397**	**483,560**	**518,260**
National positivity	1%	1.2%	1.5%	1.5%	1.9%
Sex					
Female	0.5%	0.5%	0.6%	0.7%	1%
Male	3.2%	3.4%	3.9%	3.8%	4%
Age group					
0–14	1.2%	1.5%	1.5%	1.4%	1.7%
15–19	1.6%	1.8%	1.6%	1.6%	1.8%
20–24	1.1%	1.3%	1.6%	1.6%	1.8%
25–29	1.1%	1.2%	1.5%	1.7%	2.2%
30–39	0.8%	0.9%	1.4%	1.5%	2.0%
40+	0.7%	0.8%	1.2%	1.2%	1.3%
Ethnicity					
European/Other	0.7%	0.8%	1.0%	1.0%	1.3%
Māori	1.7%	1.8%	1.9%	2.2%	2.8%
Pacific	1.8%	2.3%	2.9%	2.7%	3.6%
Asian	0.5%	0.7%	1.1%	1.1%	1.4%
MELAA	1.0%	1.1%	2.0%	1.9%	2.1%
Unknown	1.8%	1.8%	2.0%	2.5%	2.5%
DHB/region					
Auckland Region	1.5%	1.6%	2.1%	2.1%	2.7%
Bay of Plenty	0.9%	1.1%	1.1%	1.1%	1.3%
Canterbury	0.4%	0.6%	0.9%	1.2%	1.5%
Hawke's Bay	1.3%	1.8%	1.6%	2.2%	2.5%
Lakes	1.5%	1.2%	1.2%	1.3%	1.2%
MidCentral	0.8%	0.4%	0.8%	0.8%	1.3%
Nelson Marlborough	0.5%	0.4%	0.5%	0.7%	0.6%
Northland	0.8%	1.2%	1.4%	1.6%	1.7%
South Canterbury	0.2%	0.7%	0.1%	0.6%	1.0%
Southern	0.4%	0.5%	0.5%	0.7%	0.6%
Tairawhiti	2.8%	2.3%	1.1%	1.0%	1.5%
Taranaki *	-	-	-	0.9%	1.2%
Waikato	1.2%	1.0%	1.2%	1.5%	1.7%
Wellington Region	0.6%	1.0%	1.4%	1.1%	1.4%
West Coast	0.1%	0.3%	0.3%	0.3%	1.2%
Whanganui	0.8%	0.6%	0.4%	0.6%	0.7%

* Taranaki removed until 2018 due to incomplete testing data prior to 2018

POSITIVITY OF LABORATORY TESTING BY SEX, AGE, AND ETHNICITY.

The test positivity is calculated by dividing all positive test results by all test results. This includes testing for the same person using different methods (PCR and culture) and sites of infection, tests of cure, and subsequent retesting throughout a year. As an example, an individual reporting MSM sexual behaviour and taking HIV pre-exposure prophylaxis will have PCR testing from three sites at least four times per year. If found to have gonorrhoea, they may also have a swab taken for culture and a further PCR swab for test of cure for pharyngeal gonorrhoea. One episode of gonorrhoea may result in three or more positive test results. Therefore, these data are likely to overestimate the percentage of people testing positive per visit.

Males were more than four times more likely to test positive for gonorrhoea compared to females. This is likely to be due to high prevalence of gonorrhoea among MSM and multiple positive tests for an individual as described above. Males are also more likely to be symptomatic with urogenital gonorrhoea than females.

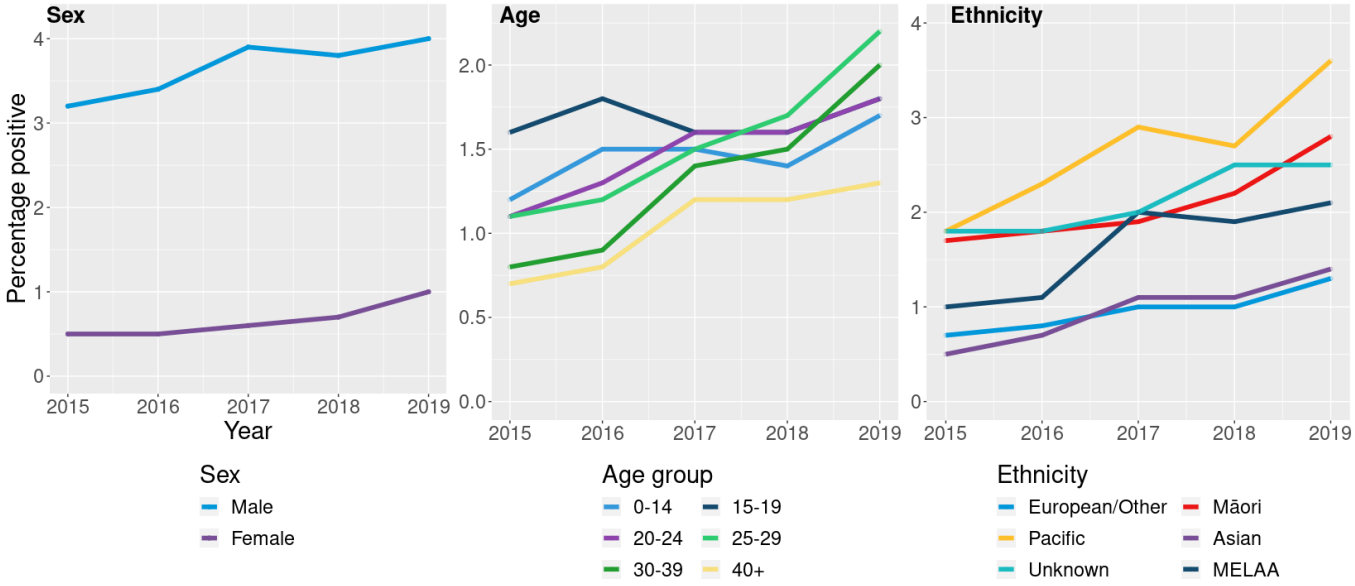
Positivity increased from 1.2% in 2016 to 1.9% in 2019 [Figure 12]. By sex, positivity amongst females doubled from 0.5% to 1.0% while positivity amongst males has increased 18% since 2016.

Positivity amongst all age-groups increased slightly between 2016 and 2019. While positivity was stable between 2017 and 2018, an increase then occurred across most age-groups in 2019. The largest increase in positivity was among those aged 25–29 and 30–39 years increasing by 1.0% and 1.1% respectively from 2016 to 2019.

Pacific people reported the highest positivity for gonorrhoea and test positivity increased from 2.3% to 3.6% between 2016 and 2019. Those of Māori ethnicity report the next highest test positivity rates, increasing from 1.8% to 2.8% over the same period. Positivity amongst Māori and Pacific was two to three times that of European/Other and Asian ethnicity.

Positivity was highest in the Auckland region and Hawkes Bay throughout the reporting period and increased by 69% in Auckland and 28% in the Hawkes Bay from 2016 to 2019. Positivity in these two regions was nearly 60% higher than the next highest geographic region.

Figure 12: Positivity of gonorrhoea testing by sex, age, and ethnicity: 2015–2019



LABORATORY CASE SURVEILLANCE

Here we report on all laboratory reported gonorrhoea cases by year from 2017 to 2019, with 2015–16 data provided for comparison, by sex, age group, ethnicity, and geographic region. These data come from laboratory surveillance, which include all gonorrhoea test results reported to ESR.

Gonorrhoea notification and clinic surveillance

Since November 2018 when the interim notification system was implemented, clinicians have also been required to notify cases of gonorrhoea via the RedCap system [REDCap]. These notifications include information on sexual behaviour. However, clinical notifications are not completed for every case, so these are a subset of laboratory notifications. Unlike for syphilis, there was no enhanced surveillance for gonorrhoea prior to implementation of the interim notification system, therefore sexual behaviour for gonorrhoea cases is reported for 2019 only.
Prior to January 2019, gonorrhoea was also under clinic surveillance in sexual health and Family Planning clinics, with data for 2017 and 2018 summarised at the end of this chapter. Further details on methods can be found in [Appendix 2: Description of STI surveillance and methodology].

Gonorrhoea antimicrobial resistance

Antimicrobial resistance (AMR) data is only received from some diagnostic laboratories. AMR data is therefore incomplete and has not been presented in this report. For further information about gonococcal AMR the latest AMR survey is available here.

CHARACTERISTICS OF ALL LABORATORY REPORTED GONORRHOEA CASES

Laboratory-reported cases include all episodes of gonorrhoea with duplicate positive results within 10 days for cultures and 21 days for NAAT removed. This is intended to capture multiple infections for the same individual within a year but remove multiple positive results from the same episode of infection.

Table 4: Laboratory reported gonorrhoea cases by year, sex, age, ethnicity, and region: 2015–2019

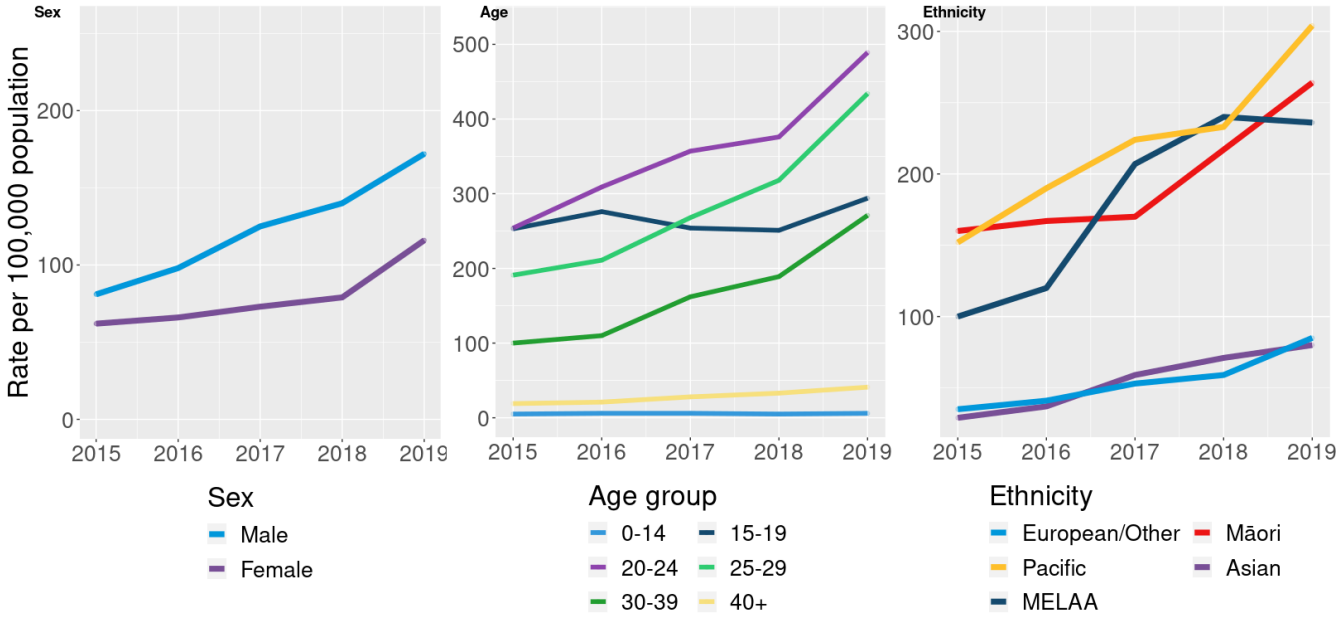
Sex	2015	2016	2017	2018	2019
Female	1,458	1,565	1,768	1,966	2,912
Male	1,817	2,272	2,939	3,376	4,242
Unknown	13	30	30	36	46
Age group					
0–14	50	59	57	48	57
15–19	800	880	805	788	936
20–24	859	1,077	1,271	1,347	1,648
25–29	595	713	969	1,207	1,630
30–39	558	638	972	1,185	1,829
40+	404	466	628	750	948
Ethnicity					
European/Other	1,048	1,248	1,638	1,880	2,535
Māori	1,132	1,203	1,244	1,615	2,188
Pacific	451	576	694	736	1,020
Asian	158	207	342	418	608
MELAA	52	64	113	134	171
Unknown	447	569	706	595	678
DHB/region					
Auckland Region	1,714	1,952	2,576	2,865	3,965
Bay of Plenty	111	189	157	171	215
Canterbury	148	214	336	483	597
Hawke's Bay	231	358	546	436	613
Lakes	149	197	173	255	333
MidCentral	155	128	118	114	117
Nelson Marlborough	68	44	93	94	148
Northland	37	34	39	52	54
South Canterbury	108	173	183	189	229
Southern	6	23	5	14	32
Tairawhiti	82	96	119	171	169
Taranaki	102	101	51	47	61
Waikato	6	22	20	58	134
Wellington Region	338	305	296	400	475
West Coast	3	6	5	4	20
Whanganui	28	25	20	25	38
Total	**3,286**	**3,867**	**4,737**	**5,378**	**7,200**

RATES OF GONORRHOEA BY SEX, AGE-GROUP, AND ETHNICITY

National rates of gonorrhoea increased from 82 per 100,000 population in 2016 to 145 per 100,000 population in 2019.

Although overall rates of gonorrhoea amongst males have increased more than females between 2016 and 2019, rates amongst females increased by 47% from 2018 to 2019, compared to 19% amongst males [Figure 13].

Figure 13: Rates of laboratory reported gonorrhoea cases by sex, age, and ethnicity: 2015–2019



Rates of gonorrhoea were highest amongst those aged 20–29 from 2017 to 2019. Rates in all age groups from 20 to 40 years increased substantially over the reporting period, by between 90% and 170%. The rate among those aged 15–19 years increased to a much lesser degree, by 7% from 2016–2019. Consequently, rates in the 15–19 age-group which were the highest in 2015 were the third highest in 2019, and much lower than rates in 20–29-year-olds.

Rates of gonorrhoea were highest and increased the most amongst those of Pacific, Māori, and MELAA ethnicities throughout the reporting period, around three times those of European/Other and Asian ethnicities. Those of MELAA ethnicity are a small heterogenous group.

The two regions with the highest test positivity (Auckland and Hawke's Bay) also reported the highest rates of gonorrhoea cases per 100,000 population since 2017 in Auckland and 2018 in Hawke's Bay. The epidemiology of gonorrhoea in these two regions differs markedly however, with the majority of cases in the Hawke's Bay being female, slightly younger, and of Māori ethnicity compared to Auckland cases which are predominantly male, slightly older, and of European/Other ethnicity.

Rates amongst most regions were steady in 2017 to 2018, with increases in Canterbury (41%) and Hawke's Bay (46%). Many regions report larger increases in 2019 compared to 2018 with large increases observed in Taranaki (127%) and Auckland (40%) and smaller increases in Northland, Tairawhiti, Wellington, Waikato, Canterbury, Bay of Plenty, Midcentral and Whanganui.

CLINICAL NOTIFICATION SURVEILLANCE OF GONORRHOEA 2019

Clinical notifications have been collected since late 2018 hence data presented includes 2019 only [Table 5]. Clinic notifications have been received from a non-random subset of all laboratory confirmed cases.

CHARACTERISTICS OF ALL CLINICAL GONORRHOEA NOTIFICATIONS 2019

Table 5: Clinical gonorrhoea notifications by sexual behaviour and age, ethnicity, and region: 2019

Age-group	MSM	MSW	WSM	Other	Unknown
0–14	2	2	7	5	6
15–19	25	44	128	12	48
20–24	146	160	243	11	129
25–29	250	134	197	13	121
30–39	332	203	220	20	158
40+	213	112	88	3	79
Ethnicity					
European/Other	594	262	310	28	204
Māori	133	203	404	31	203
Pacific	63	115	130	5	75
Asian	145	54	34	0	32
MELAA	30	16	7	1	11
Unknown	14	11	4	1	18
DHB/region					
Auckland	502	302	403	31	267
Canterbury	121	73	80	8	52
Wellington	160	52	48	4	52
Waikato	47	71	97	0	45
Southern	27	22	25	2	14
Bay of Plenty	20	27	43	1	15
Lakes	16	22	27	0	7
MidCentral	42	9	19	3	1
Hawke's Bay	13	26	59	10	31
Taranaki	11	22	31	0	17
Whanganui	1	1	4	1	4
Nelson Marlborough	8	4	10	1	7
Northland	7	23	33	3	22
Tairawhiti	3	3	8	2	8
South Canterbury	1	3	1	0	1
West Coast	0	1	1	0	0
Total	**979**	**661**	**889**	**66**	**543**

CLINICAL GONORRHOEA NOTIFICATION COUNTS 2019

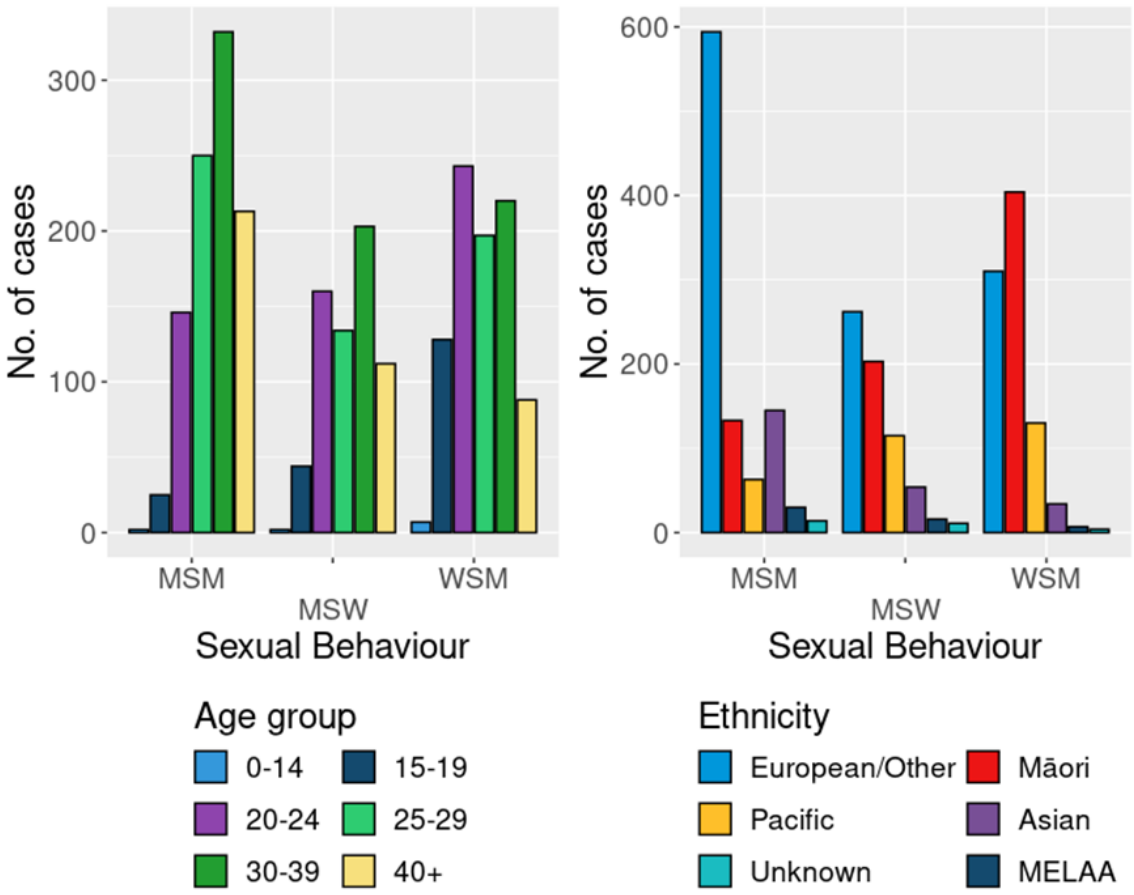
Sexual behaviour by age-group and ethnicity

Of the clinical notifications for gonorrhoea, the largest group were reported to be MSM (31%) followed by WSM (28%) and MSW (21%) [Figure 14]. Women who have sex with women and transgender people account for small numbers of cases (2% included in 'other' category in Table 5). For a considerable group (17%), clinicians reported their sexual behaviour as 'unknown'. The 'other' and 'unknown' categories are not included in the following graphs.

By age and sexual behaviour, MSM and MSW were slightly older and predominantly in the 20 – 40+ age-groups, WSM were slightly younger and predominantly in the 15 – 39-year age-groups.

Cases among MSM were predominantly European/Other ethnicity (61% of cases), followed by Asian (15% of cases) and then Māori (14% of cases). Cases among MSW were also predominantly European/Other (40% of cases) followed by Māori (31% of cases) and then Pacific (18% of cases). The highest number of WSM cases was reported amongst those of Māori ethnicity (45% of cases), followed by European/Other (35% of cases), and then Pacific (15% of cases).

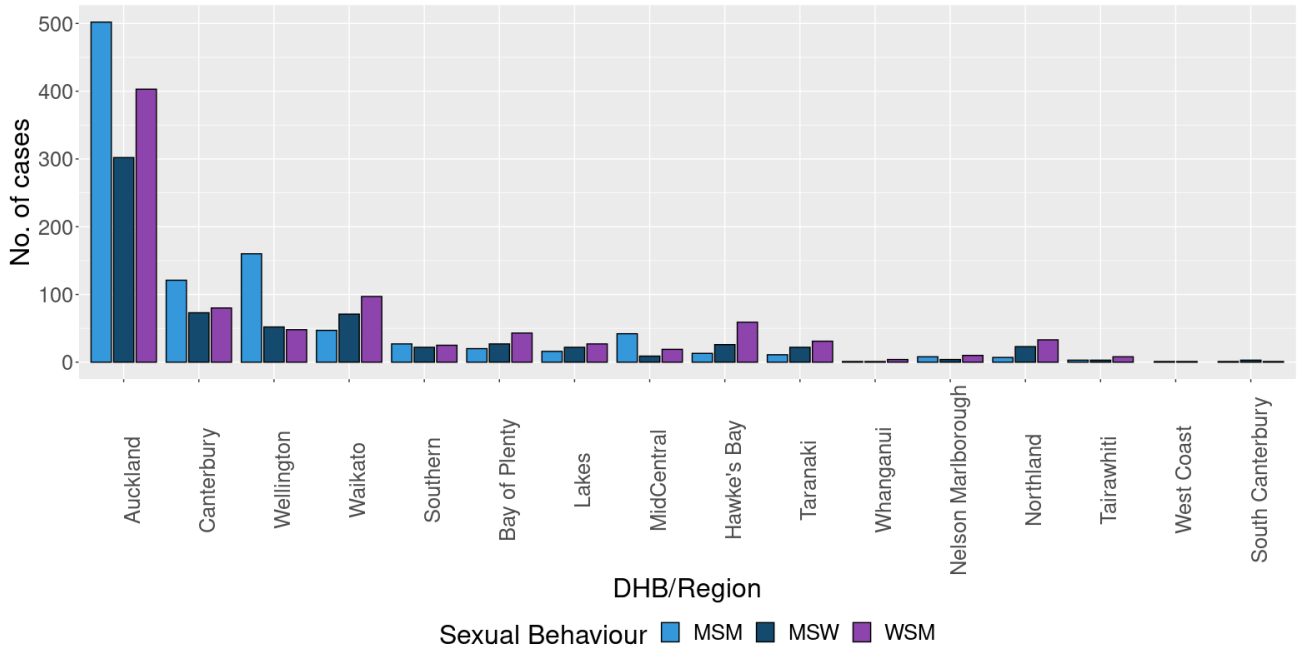
Figure 14: Clinical notifications for gonorrhoea by sexual behaviour and age-group and ethnicity: 2019



Sexual behaviour of cases notified with gonorrhoea in 2019 by DHB/region

Nearly half the clinical notifications for gonorrhoea were received from the Auckland region and amongst MSM cases [Figure 15]. Auckland, Wellington, and Canterbury regions accounted for 80% of all MSM cases, while MidCentral also had more notifications who reported MSM behaviour than other sexual behaviours. Other regions including Northland, Waikato, Bay of Plenty, Lakes, Tairawhiti and Taranaki all reported more case amongst WSM than other sexual behaviours.

Figure 15: Clinical notifications for gonorrhoea by sexual behaviour and region: 2019



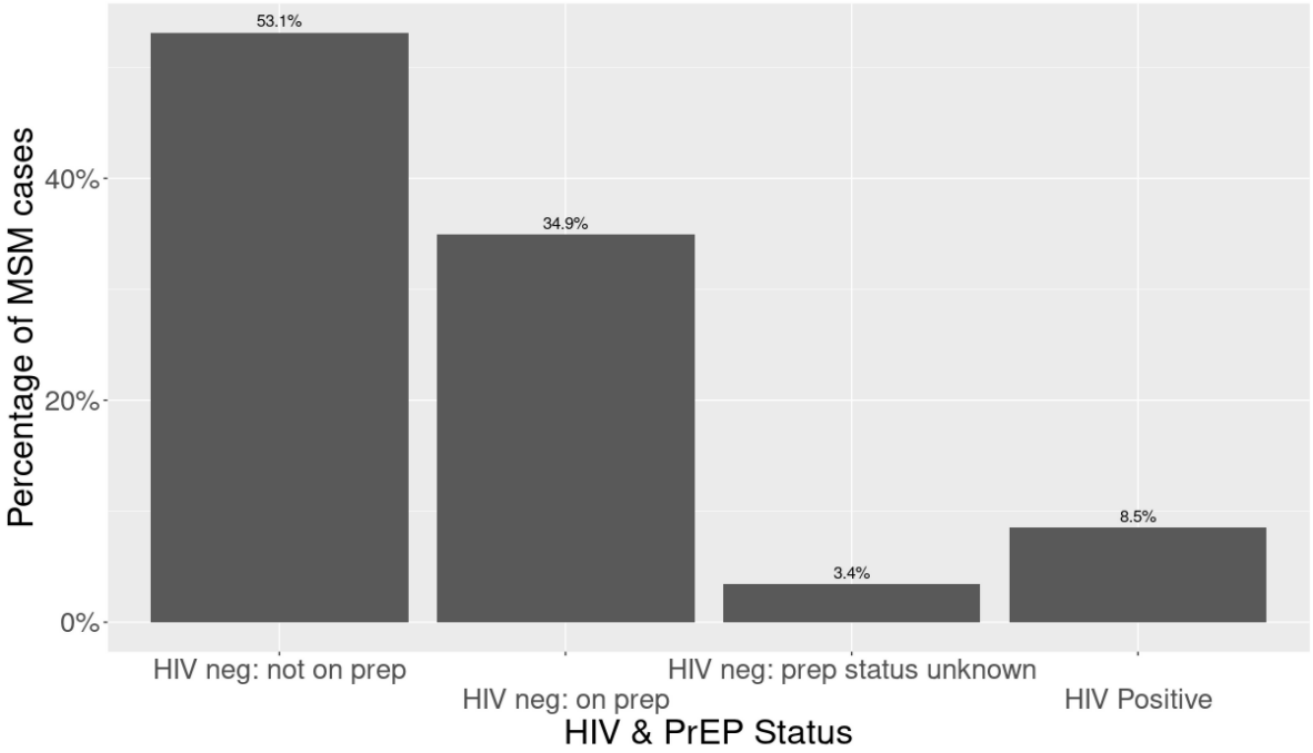
SPECIAL POPULATIONS AMONG CASES NOTIFIED WITH GONORRHOEA IN 2019

HIV & PrEP status amongst MSM

Of the 979 gonorrhoea cases reported as MSM, 825 (84.0%) were reported as HIV negative, 77 (8.0%) were living with HIV and the HIV status of 77 cases (8.0%) were unknown [Figure 16].

Of the 825 MSM cases with a known HIV negative status, 58.0% (479) were not on PrEP, 38.2% (315) reported being on PrEP, while PrEP status was unknown for 3.8% (31).

Figure 16: HIV and PrEP status amongst all MSM gonorrhoea clinical notifications: 2019



Sex workers

Of all clinical notifications received, 2.9% identified as sex workers [Table 6]. Amongst female cases, 5.5% were reported to be sex workers, amongst male cases 1.1% were reported to be sex workers. The sex worker status of cases was unknown in 22% of female cases and 12% of male cases.

Table 6: Sex worker status of gonorrhoea cases by sex in 2019

Sex Worker Status	Female	Male
Case is a sex worker	69	21
Case is not a sex worker	901	1,632
Unknown	285	230
Total	**1,255**	**1,883**

The majority of cases identified as sex workers live in the Auckland region (60/90) with the remainder primarily in Waikato (8 cases), Wellington (7 cases) and Canterbury (5 cases). Very few cases were reported outside of these regions.

Most cases were of European/Other (40/90 cases) or Māori (25/90 cases) ethnicity. Of the 90 cases, 68 were female, 12 were male and 10 were transgender. By sexual behaviour, 57 (63%) were WSM, 14 (16%) MSM, 6 (7%) MSW, and 13 (14%) other or unknown.

CHLAMYDIA

KEY FINDINGS: 2017/ 2018/2019

- Testing coverage rates for chlamydia in the overall New Zealand population were stable, increasing by 2% over the reporting period, 2017–2019 [Table 7].
- Although testing coverage rates increased by 17% for males and remained steady for females, rates amongst females remained three times that of males. Testing rates among those of Asian and Pacific ethnicity decreased by around 15% over the reporting period, whereas testing coverage rates among Māori and European/Other ethnicities remained stable.
- Nationally, rates of chlamydia per 100,000 population remained stable during the reporting period with rates increasing slightly among males and decreasing slightly among females.
- Rates of chlamydia per 100,000 population have remained steady amongst most age-groups except for those aged 15–19 years for whom rates decreased slightly, and those aged 20–24 years in whom there was a 9% increase in 2019.
- Rates of chlamydia per 100,000 population amongst those of Māori and Pacific ethnicity remain nearly three times those of European/Other and Asian ethnicity.
- Rates of chlamydia per 100,000 population by DHB/region remained steady amongst most DHB/regions and decreased in the three DHB/regions with the highest rates of chlamydia (Tairawhiti, Hawke's Bay and Lakes).
- Positivity remained steady in all age-groups except those aged 15–19 years (8% decrease).
- Positivity was highest amongst those in Tairawhiti and Hawke's Bay, between 50–90% higher than positivity rates in the larger cities.

LABORATORY TESTING SURVEILLANCE

This table summarises the characteristics of individuals tested for gonorrhoea each year [Table 7]. Only the first test result for each individual per year is included. The number of individuals tested is likely overestimated as some results do not include NHI and therefore duplicates cannot be identified.

CHARACTERISTICS OF INDIVIDUALS TESTED

Table 7: Number of individuals tested for chlamydia each year by sex, age, ethnicity, and region: 2015–2019

Sex	2015	2016	2017	2018	2019
Female	245,092	238,478	228,023	235,069	239,841
Male	58,302	62,272	65,997	72,500	77,996
Unknown	347	329	396	333	430
Age-group					
0–14	3,713	3,281	3,393	3,243	3,207
15–19	39,780	39,952	39,373	39,040	39,013
20–24	72,293	72,534	70,608	71,483	71,669
25–29	54,654	56,662	57,470	60,445	62,609
30–39	69,086	68,359	67,175	73,066	78,263
40+	63,831	59,996	56,117	60,265	62,977
Ethnicity					
European/Other	161,296	161,122	153,642	165,658	169,710
Māori	52,007	52,974	51,382	58,666	61,077
Pacific	23,174	22,277	21,021	22,135	22,773
Asian	32,252	31,285	31,034	34,923	37,493
MELAA	5,249	5,512	5,655	6,553	7,207
Unknown	29,763	27,909	31,682	19,967	20,007
DHB/region					
Auckland Region	120,770	113,957	109,297	114,035	116,068
Bay of Plenty	13,856	14,935	14,028	14,670	15,863
Canterbury	32,348	33,767	34,728	36,943	38,329
Hawke's Bay	9,110	9,240	9,300	9,948	10,359
Lakes	8,621	8,740	8,072	8,254	8,000
MidCentral	9,546	9,502	9,488	9,103	9,097
Nelson Marlborough	7,018	6,845	6,917	7,459	7,686
Northland	9,316	9,054	9,071	9,015	9,345
South Canterbury	2,604	2,643	2,414	2,337	2,547
Southern	22,150	22,374	22,041	23,055	23,230
Tairawhiti	3,293	3,412	3,500	3,345	3,286
Taranaki *	-	-	-	4,659	7,159
Waikato	24,417	24,912	24,152	24,446	24,985
Wellington Region	35,117	35,897	35,704	35,890	37,524
West Coast	1,702	1,705	1,581	1,571	1,629
Whanganui	3,262	3,480	3,342	3,172	3,160
Total	**303,741**	**301,079**	**294,416**	**307,902**	**318,267**

* Taranaki removed until 2018 due to incomplete negative results data prior to 2018

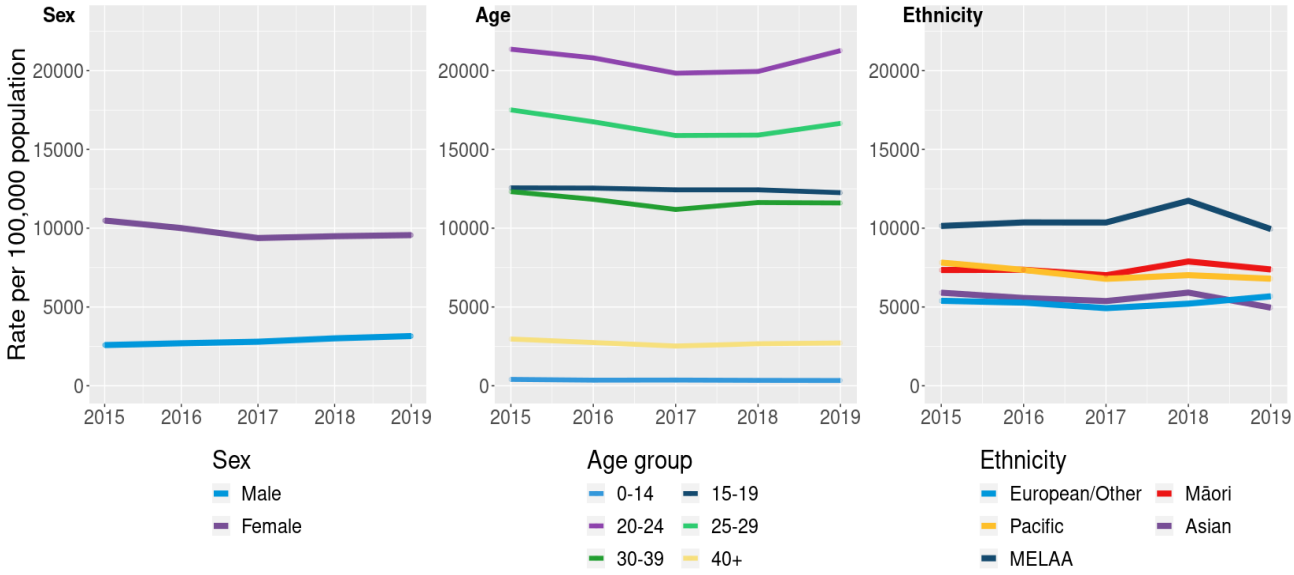
LABORATORY TESTING COVERAGE RATES BY SEX, AGE, AND ETHNICITY

Overall, testing rates per 100,000 population increased by 2% from 2017 to 2019 following a decrease of 11% in 2015 to 2016 [Figure 17]. Although testing rates among males increased 17% from 2016 to 2019, testing rates among females remained three times that of males in 2019, compared to 3.7-times in 2016.

Testing rates among those aged 20–24 and 25–29 years remained stable from 2017 to 2018 and increased in 2019 to similar levels reported in 2015. Rates of testing among other age groups remained relatively stable.

Testing rates by ethnicity were highest in the small heterogenous MELAA group. This group represents 2.1% of the population and accounts for the lowest number of cases. Testing rates among those of Asian and Pacific ethnicity decreased by around 15% between 2016 and 2019. Testing rates among Māori and European ethnicities remained relatively stable throughout the reporting period.

Figure 17: Laboratory testing coverage rates of chlamydia by sex, age, and ethnicity: 2015–2019



The rate of individuals tested per 100,000 population for chlamydia ranged from under 4,000 in South Canterbury to 7,523 in the Lakes region in 2018. During the reporting period, testing in most regions remained steady or decreased slightly with the biggest decrease in the Lakes region (15% decrease) and an increase in Canterbury (8%). Testing rates increased in Auckland between 2017 – 2019 but remained at a lower level to the testing rates in 2016.

POSITIVITY OF CHLAMYDIA LABORATORY TESTING BY SEX, AGE, ETHNICITY AND REGION

Table 8: Positivity of chlamydia laboratory tests by sex, age, ethnicity, and DHB/region: 2015–2019

Descriptor	2015	2016	2017	2018	2019
	413,843	420,891	421,026	454,941	488,192
National positivity					
	7.6%	7.8%	7.9%	7.5%	7.2%
Sex					
Female	6.7%	7.0%	7.2%	6.9%	6.6%
Male	11.2%	10.4%	9.9%	9.1%	8.6%
Unknown	15.2%	14.5%	13.4%	10.4%	12.2%
Age group					
0–14	11.3%	12.2%	11.4%	9.4%	9.0%
15–19	15.5%	15.2%	14.8%	14.2%	13.6%
20–24	10.6%	10.7%	10.9%	10.5%	10.5%
25–29	6.9%	7.1%	7.0%	7.1%	6.7%
30–39	3.7%	4.0%	4.4%	4.5%	4.4%
40+	2.0%	2.2%	2.3%	2.4%	2.6%
Ethnicity					
European/Other	5.2%	5.5%	5.7%	5.5%	5.2%
Māori	12.9%	13.1%	12.7%	12.3%	11.8%
Pacific	13.2%	13.8%	14.3%	13.8%	13.7%
Asian	3.2%	3.7%	4.5%	4.2%	4.3%
MELAA	3.9%	4.1%	4.1%	4.7%	4.5%
Unknown	11.0%	10.4%	9.6%	9.1%	8.6%
DHB/region					
Auckland Region	6.5%	7.1%	7.4%	7.2%	6.9%
Bay of Plenty	9.1%	8.0%	7.7%	8.2%	8.6%
Canterbury	6.5%	6.6%	6.3%	6.1%	5.8%
Hawke's Bay	12.4%	11.9%	11.9%	10.7%	10.3%
Lakes	9.7%	10.0%	10.5%	9.8%	9.1%
MidCentral	9.1%	9.0%	8.8%	9.3%	8.9%
Nelson Marlborough	7.4%	6.6%	6.6%	7.0%	6.1%
Northland	10.3%	10.9%	9.7%	9.5%	8.3%
South Canterbury	6.5%	5.9%	6.4%	8.7%	7.6%
Southern	7.2%	7.7%	8.1%	7.0%	6.2%
Tairawhiti	13.5%	14.0%	12.4%	12.4%	11.0%
Taranaki *	-	-	-	11.0%	7.7%
Waikato	8.6%	7.8%	8.0%	8.2%	9.0%
Wellington Region	6.6%	7.0%	6.8%	6.5%	6.4%
West Coast	6.7%	6.7%	5.8%	4.3%	5.3%
Whanganui	9.6%	9.1%	9.4%	9.5%	9.7%

* Taranaki removed until 2018 due to incomplete testing data prior to 2018

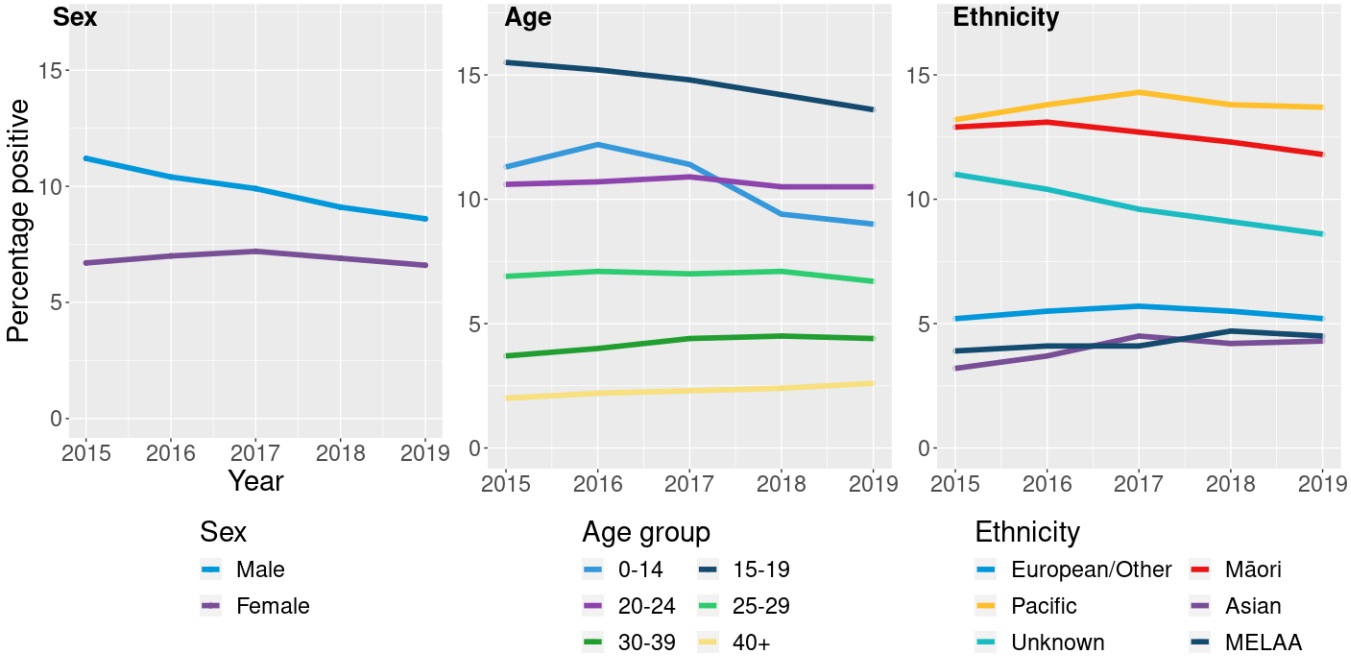
Chlamydia test positivity in males steadily decreased from 2015 [Figure 18] [Table 8]. During the reporting period chlamydia test positivity in males continued to decrease, from 9.9% in 2017 to 8.6% in 2019. In contrast, positivity in females remained more stable throughout the reporting period, with the 2019 level similar to that of 2016.

Throughout the reporting period positivity remained steady for those aged 20–29 and 30–39 years and increased slightly for those aged 40+. Positivity of those aged 15–19 years decreased by 8% from 2016 to 2019. Positivity in 0–14-year-olds children fluctuated due to the very low testing rates.

Throughout the reporting period positivity remained highest amongst those of Pacific ethnicity (13.7% in 2019) and Māori ethnicity (11.8% in 2019); and positivity was more than twice that of European/Other (5.2%) and Asian ethnicity (4.3%). Positivity among all ethnic groups decreased slightly over the reporting period.

Test positivity was highest amongst those in Tairawhiti and Hawke's Bay throughout the reporting period. In contrast, positivity in the three regions with large urban areas (Auckland, Wellington, Canterbury regions) was 50–90% lower than the highest two regions. Test positivity trended down in most regions during the reporting period.

Figure 18:Positivity of chlamydia testing by sex, age, and ethnicity: 2015–2019



LABORATORY CASE SURVEILLANCE

CHARACTERISTICS OF ALL LABORATORY CONFIRMED CHLAMYDIA CASES

Table 9:Characteristics of laboratory confirmed chlamydia cases by year, sex, age, ethnicity, and region: 2015–2019

Sex	2015	2016	2017	2018	2019
Female	20,629	21,424	21,149	21,254	21,038
Male	8,662	9,067	9,642	10,422	11,236
Unknown	53	51	65	46	70
Age-group					
0–14	491	502	448	342	326
15–19	8,899	8,846	8,548	8,186	7,873
20–24	10,460	10,900	10,967	11,081	11,317
25–29	4,872	5,272	5,492	5,970	5,988
30–39	3,061	3,412	3,713	4,286	4,663
40+	1,427	1,495	1,546	1,784	2,119
Ethnicity					
European/Other	10,740	11,510	11,616	12,364	12,481
Māori	9,130	9,629	9,047	10,182	10,373
Pacific	3,863	3,965	3,970	4,100	4,292
Asian	1,235	1,372	1,710	1,855	2,120
MELAA	256	293	312	429	457
Unknown	4,120	3,773	4,201	2,792	2,621
DHB region					
Auckland Region	9,917	10,484	10,849	11,310	11,501
Bay of Plenty	1,574	1,430	1,387	1,559	1,785
Canterbury	2,743	2,924	2,905	3,136	3,152
Hawke's Bay	1,519	1,505	1,499	1,466	1,501
Lakes	1,096	1,158	1,133	1,107	998
MidCentral	1,112	1,127	1,160	1,205	1,132
Nelson Marlborough	660	580	588	678	623
Northland	1,221	1,272	1,134	1,134	1,045
South Canterbury	219	197	186	252	248
Southern	2,049	2,305	2,399	2,225	2,044
Tairawhiti	544	602	560	537	473
Taranaki	542	524	669	594	695
Waikato	2,759	2,560	2,514	2,703	3,047
Wellington Region	2,864	3,349	3,363	3,349	3,600
West Coast	130	134	103	78	106
Whanganui	395	391	407	389	394
Total	**29,344**	**30,542**	**30,856**	**31,722**	**32,344**

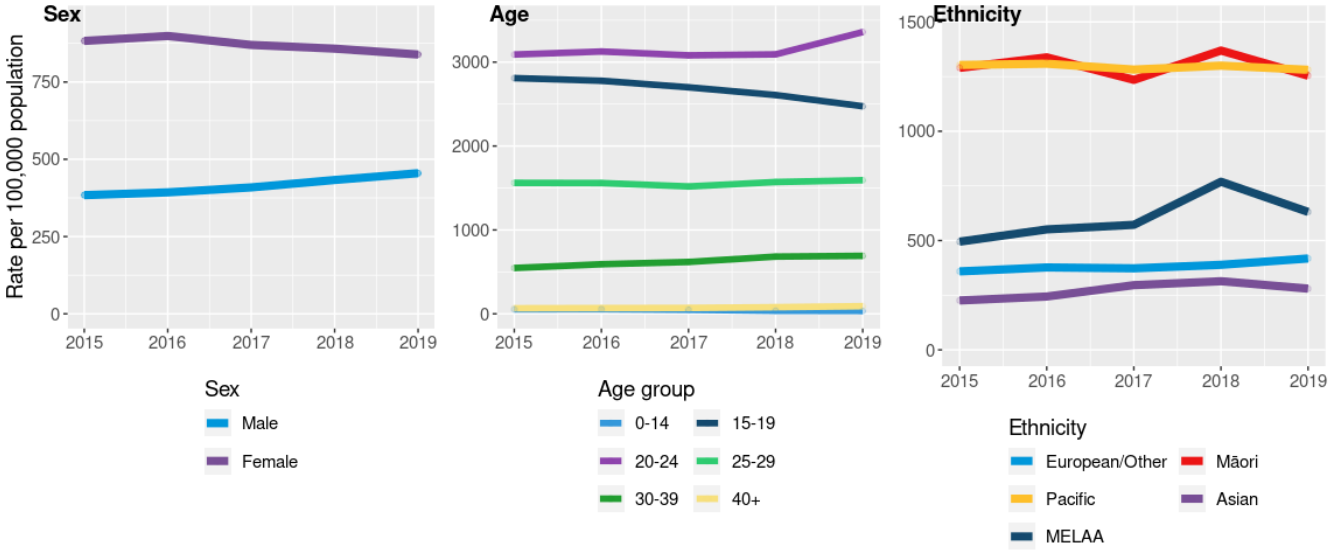
RATES OF CHLAMYDIA BY SEX, AGE-GROUP, AND ETHNICITY

Overall, national rates of chlamydia remained nearly unchanged between 2016 (651 per 100,000 population) and 2019 (650 per 100,000 population). By sex, rates among males steadily increased by 16% from 2016 to 2019 while female rates decreased by 7% over the same period [Figure 19].

Those aged 20–24 years had the highest reported rates of chlamydia throughout the reporting period, with a 9% increase in 2019 to 3,359 per 100,000 population. Other notable changes include an 11% decrease among those aged 15–19 years, and a 17% increase in those aged 30–39 within the reporting period.

Rates of chlamydia among Māori and Pacific were nearly three times those of European/Other ethnicity throughout the reporting period. Rates increased by 16% among those of European/Other ethnicity and 15% among those of MELAA ethnicity over the reporting period, while there was little overall change in rates among other ethnicities.

Figure 19: Rates of chlamydia by sex, age, and ethnicity: 2015–2019



Tairawhiti, Lakes, and Hawke's Bay reported the highest rates of chlamydia during the reporting period, although rates have decreased in all three areas during the reporting period. Most regions reported rates between 500–750 cases per 100,000 during the reporting period. The epidemiology in Tairawhiti, Lakes, and Hawke's Bay region is similar to that seen for gonorrhoea and quite different to the larger cities. Cases are predominantly female (around 80%) and of Māori ethnicity (around 60%) in these regions, compared to Auckland and Wellington where females account for <70% of cases and around 25% of cases are of Māori ethnicity.

PERINATAL GONORRHOEA AND CHLAMYDIA LABORATORY SURVEILLANCE

If untreated during pregnancy, chlamydia and gonorrhoea can be transmitted from mother to child around the time of birth. The most common presentation in infants is conjunctivitis, which occurs in 30–50% of infants born to mothers with chlamydia or gonorrhoea (Hammerschlag, 2011). These perinatal infections are preventable through antenatal STI screening and treatment of the mother.

CHARACTERISTICS OF ALL PAEDIATRIC CHLAMYDIA CASES

The number of cases of chlamydia in infants increased in 2017 (97) cases, decreasing slightly in 2018 (75), and increasing again to 86 in 2019 [Table 10]. The site of infection was the eye for all cases where a site of for infection was recorded (80 – 85% of cases each year. The highest number of cases were reported in Māori infants throughout this reporting period (33–44% of cases each year), followed by Pacific and European/Other infants.

Table 10: Laboratory reported chlamydia by sex, ethnicity, and site of infection: 2015 – 2019

Ethnicity	2015	2016	2017	2018	2019
Māori	35	28	37	25	36
Pacific	17	14	15	14	18
Asian	5	3	5	2	5
European/Other	16	11	11	14	23
MELAA	1	1	1	0	0
Unknown	5	13	28	20	4
Sex*					
Female	37	36	49	33	45
Male	42	34	46	42	41
Site of Infection					
Eye	67	56	74	64	73
Unknown	12	14	23	11	13
Total	**79**	**70**	**97**	**75**	**86**

*Two cases unknown sex in 2017

CHARACTERISTICS OF ALL PAEDIATRIC GONORRHOEA CASES

Although case numbers are small, there has been an increasing trend of gonorrhoea cases reported in infants under one year of age since 2017, primarily among Māori infants [Table 11].

Table 11: Laboratory reported gonorrhoea by sex, ethnicity, and site of infection: 2015–2019

Ethnicity	2015	2016	2017	2018	2019
European/Other	1	2	0	2	6
Māori	3	2	3	5	10
MELAA	0	0	0	1	0
Pacific	1	1	3	1	0
Unknown	0	2	5	0	0
Sex*					
Female	4	3	5	6	9
Male	1	3	5	3	7
Site of Infection					
Eye	3	3	7	9	9
Unknown	2	4	4	0	7
Total	**5**	**7**	**11**	**9**	**16**

*Two cases unknown sex in 2016 and 2017 respectively

GENITAL WARTS

First presentations of genital warts to Sexual Health and Family Planning clinics around New Zealand are reported to ESR to monitor the impact of the human papillomavirus (HPV) vaccination. HPV is implicated in the development of both genital warts and ano-genital, head, and neck cancers. HPV vaccination has been part of the national immunisation programme for girls aged 12 years since 2008 and was extended to include boys from 2017 (Ministry of Health, 2021).

Table 12: Characteristics of first presentation genital warts cases by sex, age, ethnicity, and region: 2015–2019

Year	2015, N = 1,692[1]	2016, N = 1,399[1]	2017, N = 1,183[1]	2018, N = 1,111[1]	2019, N = 856[1]
Sex					
Female	716(42%)	584(42%)	477(40%)	468(42%)	336(39%)
Male	973(58%)	811(58%)	698(59%)	641(58%)	520(61%)
Unknown/Other	3(0%)	4(0%)	8(1%)	2(0%)	0(0%)
Age Group					
0–14	1(0%)	0(0%)	0(0%)	1(0%)	0(0%)
15–19	164(10%)	127(9%)	106(9%)	77(7%)	52(6%)
20–24	447(26%)	400(29%)	352(30%)	307(28%)	234(27%)
25–29	443(26%)	335(24%)	285(24%)	281(25%)	184(22%)
30–39	390(23%)	315(23%)	259(22%)	258(23%)	207(24%)
40+	246(15%)	221(16%)	181(15%)	187(17%)	177(21%)
Unknown	1	1	0	0	2
Ethnicity					
European/Pakeha	1,103(65%)	953(68%)	802(68%)	752(68%)	465(54%)
Maori	214(13%)	204(15%)	136(11%)	164(15%)	136(16%)
Other	228(13%)	163(12%)	164(14%)	149(13%)	213(25%)
Pacific Peoples	69(4%)	46(3%)	38(3%)	22(2%)	32(4%)
Unknown	78(5%)	33(2%)	43(4%)	24(2%)	10(1%)
Geographical Region					
Auckland region	624(37%)	444(32%)	379(32%)	395(36%)	302(35%)
Bay of Plenty	156(9%)	88(6%)	98(8%)	83(7%)	47(5%)
Canterbury	205(12%)	173(12%)	109(9%)	128(12%)	107(12%)
Hawkes Bay	35(2%)	23(2%)	31(3%)	22(2%)	13(2%)
Lakes	10(1%)	24(2%)	22(2%)	24(2%)	15(2%)
MidCentral	45(3%)	35(3%)	20(2%)	4(0%)	10(1%)
Nelson Marlborough	58(3%)	70(5%)	69(6%)	94(8%)	56(7%)
Northland	16(1%)	9(1%)	9(1%)	11(1%)	18(2%)
South Canterbury	9(1%)	7(1%)	2(0%)	6(1%)	5(1%)
Southern	97(6%)	81(6%)	66(6%)	55(5%)	53(6%)
Tairawhiti	3(0%)	4(0%)	0(0%)	4(0%)	1(0%)
Taranaki	52(3%)	44(3%)	38(3%)	28(3%)	31(4%)
Waikato	174(10%)	196(14%)	163(14%)	116(10%)	94(11%)
Wellington region	190(11%)	180(13%)	163(14%)	126(11%)	94(11%)
West Coast	11(1%)	13(1%)	9(1%)	9(1%)	6(1%)
Whanganui	7(0%)	8(1%)	5(0%)	6(1%)	4(0%)

[1]n(%)

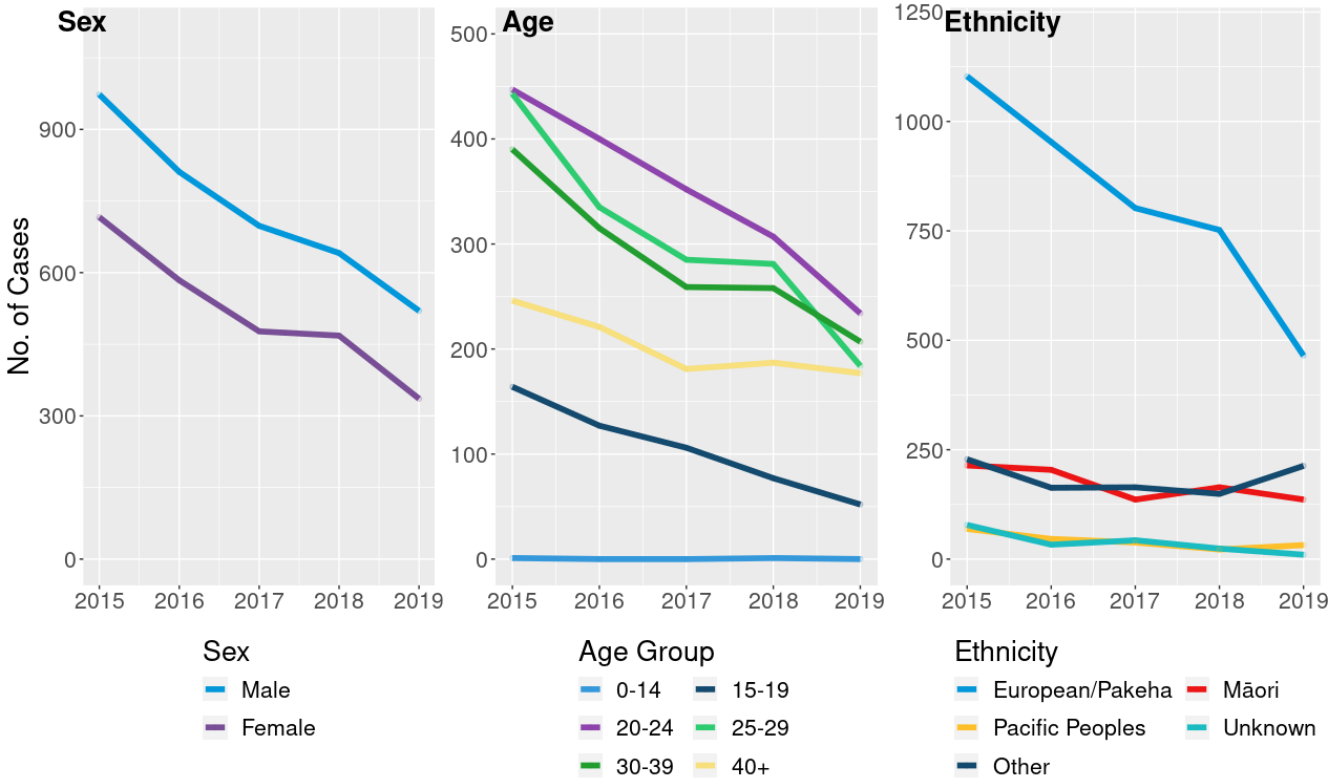
During this reporting period there has been an overall ongoing decline in the number of cases of genital warts, from 1183 in 2017 to 856 in 2019 (28% decrease) [Table 12]. This continues the steady decline observed since 2012, consistent with increasing uptake and impact of vaccination. All geographical regions reported a decrease in genital warts cases, with a greater than 50% decrease seen in the Auckland Region, Bay of Plenty, Hawke's Bay, Mid Central, Waikato, and Wellington.

GENITAL WARTS BY SEX, AGE AND ETHNICITY

More cases of genital warts were seen in males than females throughout the reporting period, with a similar decline noted (26% for males and 30% for females). Case numbers decreased over the reporting period in all age groups except for those aged 40+ among whom case numbers were stable [**Error! Reference source not found.**]. The greatest decrease was seen in the 15–19 group (51% from 2017 to 2019), followed by 25–29 and 20–24-year-olds (34% and 35% respectively).

While case numbers were highest throughout the reporting period among those of European/Other ethnicity, this was the only ethnic group among whom case numbers substantially declined during the reporting period, by 42% from 2017 to 2019. Case numbers among Pacific people decreased slightly (16%), and case numbers among Māori were the same in 2017 and 2019 with an increase in 2018.

Figure 20: Genital warts cases by age, sex, and ethnicity: 2015–2019



CLINIC SURVEILLANCE OF LYMPHOGRANULOMA VENEREUM (LGV)

No cases of LGV were reported in 2017 or 2018, and seven cases were reported in 2019. These seven cases were all in males and all were reported in the Auckland region in the following age groups: 25–29 (2 cases), (30–34) (1 case), (35–39) (2 cases), and 40+ (2 cases). Six cases were of European/Pakeha ethnicity and one case of “Other’ ethnicity.

INEQUITIES ANALYSIS

Inequities are differences in health that are avoidable, unfair, and unjust. “Equity recognises different people with different levels of advantage require different approaches and resources to get equitable health outcomes.” (Ministry of Health, 2019)

Health inequities in STIs in Aotearoa New Zealand are particularly experienced by Māori, Pacific, young people, and MSM. Describing inequities is a crucial first step to eliminating them. Inequities are likely to reflect different access to sexual health care and differences in sexual network characteristics rather than sexual behaviour alone. In communities in which there is higher prevalence of a particular STI, with each sexual encounter there is a greater chance of contact with someone with an infection than in lower-prevalence communities (CDC, 2019). Differences persist because access to quality, culturally safe STI prevention and treatment has not been equitably distributed. Higher rates of STIs in ethnic groups known to have inequitable access to the determinants of health, including health care access, are observed around the world, including in African American communities and Aboriginal Australians (CDC, 2019) (The Kirby Institute, 2018).

In New Zealand, the Waitangi Tribunal has concluded that persistent health inequities experienced by Māori across every disease state are the consequence of the failure to apply the principles of Te Tiriti o Waitangi at the structural, organisational, and service delivery levels of the health and disability system (Waitangi Tribunal, 2019). Unmet need for health care has been consistently more common among Māori and Pacific than European and other people in New Zealand Health Surveys (Ministry of Health 2019 and 2020) and youth health surveys and has recently increased for young Māori for sexual and reproductive health services (Clark, 2020). The draft Aotearoa New Zealand Sexually Transmitted and Blood Borne Infection Strategy 2022–2032 gives effect to the principles of Te Tiriti o Waitangi as a legal requirement and takes an equity first approach to address these ongoing disparities (Ministry of Health, 2021).

This report demonstrates that rates of gonorrhoea, chlamydia, and syphilis were all higher among Māori and Pacific peoples across the reporting period than in those of European/Other ethnicity. Almost all cases of congenital syphilis were among Māori and Pacific infants (9 and 3 out of 14, respectively), and the most common missed prevention opportunity across this reporting period was late or absent antenatal care. The highest number of cases of chlamydia conjunctivitis was also reported in Māori and Pacific infants, and of gonorrhoea conjunctivitis in Māori infants. While information is not available to assess missed prevention opportunities for infant chlamydia and gonorrhoea conjunctivitis, it is likely that lack of access to antenatal care is a contributing factor. These infections in infants demonstrate inequitable access to appropriate antenatal care as well as sexual health care for Māori and Pacific people.

Likewise, while an ongoing decline in cases of first presentations with genital warts was seen among European/Other people during the reporting period, the same was not observed for Māori or Pacific people. As HPV vaccination is believed to be the primary driver of reduction in genital warts seen in many countries with vaccination programmes, this is likely to reflect inequitable vaccination coverage for Māori and Pacific peoples.

This report also demonstrates marked inequities in rates of infectious syphilis for MSM compared to MSW. Of the clinical notifications for gonorrhoea, the largest group were likewise reported to be MSM, and a study of STI rates calculated from 2019 notification data has further demonstrated markedly higher rates of gonorrhoea for MSM compared to other groups (Saxton, 2021). Sexual behaviour information is not currently available for other STIs. There are known barriers to gay and bisexual men accessing sexual health care, with many reporting being unable to discuss sexual health concerns, or their sexual orientation, with their GPs (Ludlam, 2015).

Young people continue to suffer higher rates of STIs, with the 20–24-year age group having the highest rates of syphilis, gonorrhoea, and chlamydia. Encouragingly, in the 15–19-year age group, chlamydia rates declined in this reporting period. The Youth 19 survey found secondary school students reporting ever having had sex had declined and the age of initiating sexual activity had increased between 2012 and 2019, which may account for these findings (Clark, 2020).

REFERENCES

CDC. (2019). *Sexually transmitted Disease Surveillance 2019*. Retrieved from National Overview - Sexually Transmitted Disease Surveillance, 2019: https://www.cdc.gov/std/statistics/2019/overview.htm

Clark, T. L. (2020). *Youth19 Tangatahi Smart Survey, Initial Findings: Sexual and reproductive health of New Zealand secondary school students.* The University of Auckland and Victoria University of Wellington, The Youth19 Research Group. Retrieved from https://static1.squarespace.com/static/5bdbb75ccef37259122e59aa/t/5fbac2c9b41d97178886e285/1606075090004/Youth19+Sexual+and+Reproductive+Health+Report.pdf

Hammerschlag, M. (2011). Chlamydial and gonococcal infections in infants and children. *Clinical infectious diseases, 53*(Suppl 3), S99-S102.

Ludlam, A. S. (2015). General practitioner awareness of sexual orientation among a community and internet sample of gay and bisexual men in New Zealand. *J Prim Health Care, 7*, 204-12.

Ministry of Health. (2019, October). *Ministry of Health: Achieving Equity*. Retrieved from The definition: https://www.health.govt.nz/about-ministry/what-we-do/work-programme-2019-20/achieving-equity

Ministry of Health. (2019). *Sexual Orientation: Findings from the 2014/15 New Zealand Health Survey.* Retrieved from https://www.health.govt.nz/system/files/documents/publications/sexual-orientation-findings-from-the-2014-15-new-zealand-health-survey-jan20.pdf

Ministry of Health. (2021). draft: Aotearoa New Zealand Sexually Transmitted and Blood Borne Infection Strategy 2022 - 2032 Ngā Pokenga Paipai me Ngā Pokenga Huaketo mā te Toto: Te Rautaki o Aotearoa.

Ministry of Health. (2021). *HPV Immunisation Programme*. Retrieved from Immunisation: https://www.health.govt.nz/our-work/preventative-health-wellness/immunisation/hpv-immunisation-programme

New Zealand Sexual Health Society. (2020, September). *Syphilis in Pregnancy: Antenatal Management Guidelines for maternal and congenital syphilis.* Retrieved from The New Zealand Sexual Health Society Incorporated: https://www.nzshs.org/docman/guidelines/management-of-sexual-health-conditions/syphilis/syphilis-in-pregnancy/397-syphilis-in-pregnancy-v1-sep-2020/file

Saxton, P. M. (2021). Population rates of HIV, gonorrhoea and syphilis diagnoses by sexual orientation in New Zealand. *Sex Transm Infect*. doi:10.1136/sextrans-2021-055186

The Kirby Institute. (2018). *National update on HIV, viral hepatitis and sexually transmissible infections in Australia 2009 - 2019.* Retrieved from https://kirby.unsw.edu.au/report/national-update-hiv-viral-hepatitis-and-sexually-transmissible-infections-australia-2009-2018

Waitangi Tribunal. (2019). *Hauora; Report on Stage One of the Health Services and Outcomes Kaupapa Inquiry.* Legislation Direct. Retrieved from https://forms.justice.govt.nz/search/Documents/WT/wt_DOC_152801817/Hauora%http://www.dermnetnz.org/bacterial/granuloma-inguinale.html. Accessed August.

APPENDIX 1: ADDITIONAL TABLES

Table 13: Reason for test amongst infectious syphilis cases by sexual behaviour in New Zealand: 2015–2019

Reason for test - MSM	2015	2016	2017	2018	2019	Total
Asymptomatic screening including PrEP	51	71	93	146	139	**500**
Clinical symptoms/suspicion	89	125	171	175	217	**777**
Syphilis Contact	19	28	37	49	51	**184**
Immigration	4	3	2	1	6	**16**
Other	3	4	10	29	24	**70**
Contact of STI/HIV	2	2	4	7	11	**26**
Unknown	1	3	2	8	7	**21**
Reason for test - Heterosexual Male						
Asymptomatic screening including PrEP	2	5	8	10	24	**49**
Clinical symptoms/suspicion	24	33	53	70	71	**251**
Syphilis Contact	3	8	20	22	29	**82**
Immigration	1	4	4	4	4	**17**
Other	1	1		3	10	**15**
Contact of STI/HIV			2	2	1	**5**
Unknown		1		2	3	**6**
Reason for test - Heterosexual Female						
Asymptomatic screening including PrEP	5	5	9	14		**33**
Clinical symptoms/suspicion	7	27	25	30	11	**100**
Syphilis Contact	7	13	25	21	2	**68**
Antenatal screening	5	11	21	16	3	**56**
Immigration			2	1	1	**4**
Other	1	1	4	5		**11**
Contact of STI/HIV		3		1		**4**
Unknown	1	1	1	1		**4**
Mother seropositive				2		**2**
Total	**26**	**61**	**87**	**91**	**17**	**282**

Infectious syphilis cases by ethnicity, country of infection and clinical setting of test: 2017

Table 14: Syphilis cases by ethnicity, country of infection and clinical setting of test in New Zealand: 2017

Ethnicity	MSM	MSF	FSM	Other	Unknown	Total
European/Other	233	49	26	2	5	315
Māori	48	18	29	1		96
Pacific	16	7	3	1		27
Asian	22	13	3			38
Country of Infection						
Australia	11		1		2	14
New Zealand	265	80	58	4	3	410
Other	20	4	1			25
United States	2					2
Unknown	21	3	1			25
Clinical setting of initial syphilis test						
General Practice	56	28	20	1	3	108
ID clinic	8					8
NGO clinic	20	1	3			24
Other	10	2	1		1	14
Sexual Health clinic	225	56	29	3	1	314
Antenatal clinic/midwife			6			6
ED			2			2
Total	**319**	**87**	**61**	**4**	**5**	**476**

Infectious syphilis cases by ethnicity, country of infection and clinical setting of test: 2018

Table 15: Syphilis cases by ethnicity, country of infection and clinical setting of test in New Zealand: 2018

Ethnicity	MSM	MSF	FSM	Other	Unknown	Total
European/Other	300	53	38	1	5	397
Māori	65	41	37	2	5	150
Pacific	16	10	10			36
Asian	32	8	2			42
Unknown	2	1				3
Country of Infection						
Australia	13	1				14
New Zealand	357	99	82	3	5	546
Other	23	11	2			36
United States	3	1				4
Unknown	19	1	3		5	28
Clinical setting of initial syphilis test						
ED	3				1	4
General Practice	94	48	27	3	3	175
ID clinic	23		1			24
NGO clinic	31	1	6			38
Other	9	4	5		2	20
Sexual Health clinic	254	56	39		4	353
Unknown	1					1
Corrections		4	1			5
Antenatal clinic/midwife			8			8
Total	**415**	**113**	**87**	**3**	**10**	**628**

Infectious syphilis cases by ethnicity, country of infection and clinical setting of test: 2019

Table 16: Syphilis cases by ethnicity, country of infection and clinical setting of testing New Zealand: 2019

Ethnicity	MSM	MSF	FSM	Other	Unknown	Total
European/Other	333	84	46	1	18	482
Māori	66	35	33	2	8	144
Pacific	20	15	9	1	2	47
Asian	30	6	2	0	2	40
Unknown	6	2	1	0	0	9
Country of Infection						
Australia	11	7	1	0	0	19
New Zealand	390	118	79	4	12	603
Other	14	6	2	0	1	23
United States	4	1	0	0	0	5
Unknown	36	10	9	0	17	72
Clinical setting of initial syphilis test						
Corrections	4	9	2	0	3	18
ED	5	2	1	0	1	9
General Practice	131	50	37	2	17	237
ID clinic	14	1	0	0	0	15
NGO clinic	22	2	7	0	0	31
Other	23	10	7	0	0	40
Sexual Health clinic	256	67	31	2	8	364
Unknown	0	1	1	0	1	3
Antenatal clinic/midwife	0	0	4	0	0	4
Obstetric Ward	0	0	1	0	0	1
Total	**455**	**142**	**91**	**4**	**30**	**722**

Infectious syphilis co-infections by sexual behaviour: 2017

Table 17: Infectious syphilis cases and co-infections by sexual behaviour: 2017

	MSM	MSF	FSM	Other	Unknown	Total
Chlamydia	52	10	13	2	0	77
Gonorrhoea	37	5	1	0	0	43
Trichomoniasis	0	1	5	0	0	6
Genital Herpes	2	3	0	0	0	5
Genital Warts	2	0	0	0	0	2
Mycoplasma genitalium	0	0	0	0	0	0
NSU	1	0	0	0	0	1
LGV	0	0	0	0	0	0

Infectious syphilis co-infections by sexual behaviour: 2018

Table 18: Infectious syphilis cases and co-infections by sexual behaviour: 2018

	MSM	MSF	FSM	Other	Unknown	Total
Chlamydia	80	16	15	2	1	114
Gonorrhoea	56	6	4	0	1	67
Trichomoniasis	1	0	7	0	0	8
Genital Herpes	8	1	5	0	0	14
Genital Warts	3	1	0	0	0	4
Mycoplasma genitalium	0	0	0	0	0	0
NSU	0	0	0	0	0	0
LGV	2	0	0	0	0	2

Infectious syphilis co-infections by sexual behaviour: 2019

Table 19: Infectious syphilis cases and co-infections by sexual behaviour: 2019

	MSM	MSF	FSM	Other	Unknown	Total
Chlamydia	87	22	8	0	5	122
Gonorrhoea	48	9	7	0	4	68
Trichomoniasis	0	0	8	0	1	9
Genital Herpes	6	2	2	1	1	12
Genital Warts	2	1	0	0	0	3
Mycoplasma genitalium	1	1	0	0	0	2
NSU	2	1	0	0	0	3
LGV	1	0	0	0	0	1

Infectious syphilis: number of partners in past 3 months by sexual behaviour: 2017/2018/2019

Table 20: Number of partners in past 3 months by sexual behaviour of case and sex of partner: 2017/18/19

	2017				2018				2019			
	MSM	MSF	FSM	Total	MSM	MSF	FSM	Total	MSM	MSF	FSM	Total
No. of male partners												
0	19	35	1	55	19	35	1	55	17	75	0	92
1	101	0	57	158	101	0	57	158	111	3	60	174
2–4	140	0	23	163	140	0	23	163	186	9	19	214
5–9	65	0	3	68	65	0	3	68	64	1	2	67
10–15	41	1	2	44	41	1	2	44	37	1	2	40
>15	24	0	0	24	24	0	0	24	24	1	4	29
Unknown	25	77	1	103	25	77	1	103	16	52	4	72
No. of female partners												
0	11	3	2	16	125	4	19	148	242	19	49	310
1	14	50	1	65	28	52	2	82	24	65	1	90
2–4	5	21	0	26	16	40	1	57	23	43	0	66
5–9	0	5	0	5	1	11	0	12	2	0	0	2
10–15	0	2	0	2	0	3	0	3	1	2	0	3
>15	0	0	0	0	2	0	0	2	0	0	0	0
Unknown	289	6	58	353	243	3	65	311	163	13	41	217

Gonorrhoea: number of partners in past 3 months by sexual behaviour: 2017/2018/2019

Table 21: Number of partners in past 3 months by sexual behaviour of case and sex of partner: 2017/18/19

No. of male partners	MSM	MSF	FSM	Total
0	18	451	6	475
1	167	4	489	660
2–4	345	5	258	608
5–9	209	0	47	256
10–15	119	0	14	133
>15	86	1	23	110
Unknown	35	200	52	287
No. of female partners				
0	771	9	678	1,458
1	51	269	26	346
2–4	26	269	9	304
5–9	9	48	1	58
10–15	2	13	1	16
>15	0	5	1	6
Unknown	120	48	173	341
Total	**979**	**661**	**889**	**2,529**

APPENDIX 2: DESCRIPTION OF STI SURVEILLANCE AND METHODOLOGY

ESR undertakes sexually transmitted infection (STI) surveillance on behalf of the Ministry of Health. The purposes on New Zealand STI surveillance system are:

- to understand the burden of disease (as an input to planning, policy development, prioritisation and resource allocation),
- to monitor inequalities in the burden of disease between population groups,
- to monitor trends in the burden of disease over time,
- to identify emerging problems, and outbreaks or clusters of disease, and
- to evaluate the effectiveness of policies and programmes.

Before the Health (Protection) Amendment Act 2016 came into force, STI surveillance comprised a combination of voluntary sentinel clinic surveillance from Sexual Health and Family Planning Clinics, enhanced syphilis surveillance from these clinics, and laboratory surveillance of chlamydia and gonorrhoea. Significant changes were made to the STI surveillance system after the Health (Protection) Amendment Act 2016 came into force in January 2017, making syphilis, gonorrhoea, HIV and AIDS notifiable to the Medical Officer of Health without identifying information (name, address, and place of work), whereas previously only AIDS was notifiable. Because these diseases were the first to require notification without identifying information, there were substantial administrative difficulties designing and implementing a system which would integrate with the existing notifiable disease database EpiSurv. After significant delays, an interim solution was put in place from November 2018 using REDCap, a secure web application hosted on an ESR server, to collect data for syphilis, gonorrhoea, and HIV in a survey format. This interim system remains in place. Each part of the system is described below.

REDCAP

REDCap is a secure web application hosted on an ESR server to collect notification/enhanced data for syphilis, gonorrhoea, and HIV in a survey format. Sexual health clinic staff have individual logins to REDCap, managed by ESR. This means they can enter data and update information as required.

Gonorrhoea enhanced data can also be entered by non-sexual health clinic staff, such as general practitioners, by entering a generic survey website link which provides one-time access to a REDCap survey. Clinicians are directed to this link along with the positive laboratory result. Once the form is completed, the clinician cannot access the form again.

Gonorrhoea case notifications entered into REDCap can be matched with laboratory data by NHI which provides an indication of how many cases are not notified (underreporting), and by comparing basic demographics, how representative notified cases are.

For syphilis, laboratory results are not automatically notified. Clinicians are directed to notify the case when a reactive laboratory result is received. Clinicians notify either using RedCap (Sexual Health Clinics) or faxing a PDF (all other clinicians). Sexual Health Clinics and Public Health Unites can access all syphilis data in REDCap from within their own region only, without identifying details. Most large Sexual Health Clinics report accessing and auditing cases in REDCap; very few PHU's report accessing data in REDCap for surveillance purposes, although this has changed somewhat in 2021 with support from ESR and reactivation of the syphilis action plan.

Syphilis cases diagnosed by clinicians outside a Sexual Health Clinics are directed from the laboratory result to download a PDF from the ESR website and notify via fax. PDF forms can be completed either digitally or by hand. Faxes are received by ESR reception, automatically converted to an PDF email attachment and forward to a generic ESR Episurv support email; this is then

forwarded to an ESR syphilis surveillance email address after which the PDF is printed, entered into REDCap and filed.

Limitations of REDCap data

Comparison of gonorrhoea laboratory and REDCap notifications have shown that clinical notifications are made only for around 45% of total positive cases (3,138/7,200). Approximately 15% of clinical notifications could not be matched to laboratory notifications, either because no NHI was provided or data entry errors. Analysis has shown that cases in Auckland and cases of Māori and Pacific ethnicity are underrepresented in clinical notifications. Representativeness with regard to sexual behaviour is unknown because this information is not collected for laboratory data.

Manual data entry to the REDCap forms and a large number of fields to complete, is likely to significantly contribute to underreporting.

Likewise, syphilis notifications are often incomplete. Because there is no laboratory reporting of syphilis, the degree of underreporting at a national level is currently unknown but there is no reason to assume this is much different from gonorrhoea notification. There is often requirement for follow-up by ESR to determine the case definition. Long complex case report forms with multiple manual steps for access and data entry are a significant issue for clinicians and for the quality of surveillance data.

Laboratory data

All laboratories in New Zealand have provided all positive and negative test results for chlamydia and gonorrhoea monthly, since 2015. Demographic information, individual identifiers (NHI or provisional individual identifier), and site of infection are provided with the laboratory results. Antimicrobial resistance (AMR) data is received from some but not all laboratories and hence is incomplete. For further information about gonococcal AMR, the latest AMR survey is available here.

Test results are received via excel spreadsheets into a portal, cleaned using R scripts and housed in SQL servers. Once cleaned, they are sent to the Ministry to be matched by NHI for ethnicity. This enables identification of all negative and positive results, duplicate results, testing coverage, proportion positive and reinfections by age, sex, region, and ethnicity. Identification of duplicate results by NHI ensure only one positive result is counted for each episode, and multiple tests and episodes for the same person can be identified over time.

Table 22: Time period to identify duplicate tests to determine one episode/case

Chlamydia	< 6 weeks after a previous positive test
Gonorrhoea	Culture <10 days after previous positive test (it does not matter if previous positive test was a NAAT or culture)
	NAAT >=21 days after the previous positive test (it does not matter if previous positive test was a NAAT or culture)

Limitations of laboratory data

Approximately 7% of laboratory notifications are missing NHI, and therefore cannot be matched to ethnicity. Although all laboratories report chlamydia and gonorrhoea tests and results, only a proportion of laboratories report AMR testing and results for gonorrhoea. ESR has no insight on how the proportion of reported AMR test results has been selected, and no AMR data are available for much of the country. Therefore, information on AMR collected is not generalizable.

SENTINEL CLINIC DATA

On a monthly basis, collaborating Sexual Health and Family Planning clinics manually extract data and provide aggregate data to ESR via excel spreadsheets. This includes the total number of clinic consultations per month and numbers of consultations for a number of 'other STIs' including lymphogranuloma venereum, chancroid, donovanosis, first episode genital warts, first episode genital herpes, and non-specific urethritis), by age, sex, and ethnicity.

In November 2018, sentinel enhanced syphilis surveillance ceased as the notification system using REDCap was implemented, and in January 2019, clinic collection of chlamydia and gonorrhoea ceased.

Table 23: STIs under clinic-based surveillance 2017–2018 and 2019

Infection	Category or criteria	Site (for confirmed infections)	2017–18	2019
Genital warts	1st diagnosis at reporting clinic		Yes	Yes
Lymphogranuloma venereum	Confirmed or probable		Yes	Yes

Generalisability of clinic data

Clinics participating in STI sentinel surveillance are located in cities and some larger rural towns. Most other rural towns and isolated populations have limited or no access to Sexual Health Clinics (SHCs) and Family Planning clinics (FPCs) and rely on other health care providers. While STIs are diagnosed and treated by a range of primary healthcare providers, including general practitioners (GPs), the surveillance data from SHCs and FPCs are a non-random selection, that can provide an alert for changes occurring in the wider population. Notification data by all clinicians would be generalizable if under-notification is low and unbiased.

Limitations of clinic data

From 2017 to 2019, 50 clinics participated, covering all regions. Methods for data extraction and data quality and completeness vary by clinic and will depend on coding completeness. Manual processes for data extraction, aggregation, entry, and transfer using excel spreadsheets and email introduces potential for errors. The representativeness of the data is unknown as there is no sample strategy. Lower-than-expected numbers based on risk groups are sometimes received from large centres which may be due to variations in clinical attendance, coding, or data entry.

ANALYTIC METHODS

Numerator data

- Chlamydia laboratory individuals tested: the first result of a chlamydia test per individual per year if NHI available (deduplicated using NHI). All results without NHI included.
- Gonorrhoea laboratory individuals tested: the first result of a gonorrhoea test (regardless of test type) per individual per year if NHI available (deduplicated using NHI). All results without NHI included.
- Gonorrhoea positive cases (episodes): the total number of laboratory-confirmed cases [Table 4] reported after the exclusion of repeat tests for an individual within a defined episode period [Table 22].
- Chlamydia positive cases (episodes): the total number of laboratory-confirmed cases reported after exclusion of repeat tests for an individual within a defined episode period [Table 22].

- Gonorrhoea positive test: the total of all positive results for gonorrhoea regardless of type of test, specimen type or time in-between test (not deduplicated).
- Chlamydia positive test: the total of all positive results for chlamydia regardless of specimen type or time in-between test (not deduplicated).
- Number of syphilis cases by sexual behaviour: the number of cases reported by sexual behaviour.

Denominator data

- Chlamydia laboratory total tests: the total of chlamydia positive and negative test results to calculated positivity [Positivity of chlamydia laboratory testing by sex, age, ethnicity and region Table 8].
- Gonorrhoea laboratory total tests: the total of gonorrhoea positive and negative test results, regardless of type of test (including culture results) to calculate positivity [Table 3].
- New Zealand population by ethnicity: the proportion of people in each ethnic group from the 2018 Census 'usually resident population' applied to the 2020 mid-year population estimates from Statistics New Zealand. Ethnicity is prioritised in the following order: Māori, Pacific peoples, Asian, Middle Eastern/Latin American/African (MELAA), European or Other (including New Zealander) ethnic groups.
- Estimated New Zealand population by sexual behaviour: The denominator for MSM was calculated by multiplying the male population between 16 and 74 years of age (by the proportion of MSM estimated by the health survey 2014/2015 (2.6%). The remaining 97.4% of the male population between 16 and 74 were considered to be MSW, and for women, the entire female population between 16 and 74 was considered WSM.

Rates calculations:

- General: Calculating rates from fewer than five cases produce rates that are unstable for the purpose of comparison and are therefore not calculated. Caution is also advised when interpreting and comparing rates based on fewer than 20 cases. It is important when interpreting the results to consider the size of the risk group in the denominator, since rates calculated in smaller groups can have wide confidence intervals. Prioritised ethnicity is provided by the Ministry of Health using NHI number provided by the laboratories. Where NHI is not provided, ethnicity is described as 'unknown'.
- Testing coverage rates (people tested): the number of people tested based on NHI and patient ID numbers and using the age and location of the individual at the time of the first test of the year. These rates do not include multiple tests within the year for the same individual.
- Test positivity rates: the total number of positive test results divided by the total number of tests completed, multiplied by 100 for a percentage of all tests which were positive.
- Rate of syphilis by sexual behaviour: the reported number of cases by sexual behaviour was divided by the estimated New Zealand population by sexual behaviour and multiplied by 100,000 for a rate of gonorrhoea per 100,000 population.

Limitations in trends analysis

As clinic and laboratory participation vary over time, reporting periods have been selected to provide the longest period of time for a relatively stable set of laboratories or clinics.

A five-year period has been reported for trends.

Age groups

For this publication we have adopted the age groups that are also used by the Kirby Institute to present Australian data: 0–14, 15–19, 20–24, 25–29, 30–39, 40+. Several different age groupings have been used previously across different New Zealand publications. Following the Australian data will allow us to directly compare by age groups to Australia. It provides for more detail at ages for which numbers are much higher. It is limited to six age categories, which gives enough detail and makes the graphs look clearer than with more age categories. However, it does result in loss of detail at higher ages and these data can be requested as needed.

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