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SEXUALLY TRANSMITTED INFECTIONS IN NEW ZEALAND: SUPPLEMENTARY ANNUAL SURVEILLANCE REPORT 2021

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Disclaimer

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ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Description
AMR	Antimicrobial resistance
DHB	District Health Board
HIV	Human immunodeficiency viruses
LGV	Lymphogranuloma venereum
MELAA	Middle Eastern, Latin American, and African
MSM	Men who have sex with men
MSW	Men who have sex with women
NHI	National Health Index
PrEP	Pre-Exposure Prophylaxis
STIs	Sexually transmitted infections
WSM	Women who have sex with men

INTRODUCTION

The ‘Sexually transmitted infections in New Zealand: Supplementary Annual Surveillance Report’ summarises additional epidemiology of sexually transmitted infections (STIs) for 2021 (the reporting period) not shown on the dashboard, with findings from 2017 to 2020 included for comparison and context, where possible. This report presents findings from clinical notifications for syphilis and gonorrhoea, with a summary table for each disease followed by further detail on notifications by sexual behaviour, and for certain populations. It presents laboratory surveillance data for perinatal gonorrhoea and chlamydia infections. Additional clinical details for syphilis and gonorrhoea are presented in Appendix 1. For other key trends in syphilis, gonorrhoea, and chlamydia, please refer to the annual dashboard.

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 data are described in this report. Data on other STIs are also available on request.

The COVID-19 pandemic response affected behavioural patterns, access to healthcare, and availability of testing in 2020 and 2021, therefore all data from 2020-2021 should be interpreted with caution.

A full description of methodology can be found in Appendix 2.

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 Eastern, Latin American, and African), 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 2021 supplementary annual report with data from 2017 to 2020 generally reported to provide context and trends. Clinical notification data for gonorrhoea is only presented from 2019 to 2021 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 (first presentation genital warts, first presentation genital herpes, non-specific urethritis, lymphogranuloma venereum (LGV), chancroid and granuloma inguinale). As noted above, only first presentation genital warts and LGV data are described in this report. Data on these other STIs are available on request.

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

INFECTIOUS SYPHILIS

From 2013 to late 2018 syphilis data was reported via voluntary sentinel surveillance from sexual health clinics. In 2017, syphilis became notifiable, and an interim notification system was available from late 2018. The change in notification procedure may have increased the number of cases reported and influenced trends.

CHARACTERISTICS OF ALL SYPHILIS CASES

Table 1: Infectious syphilis cases by year and sexual behaviour, age-group, ethnicity, and region: 2017–2021

	2017, n = 476[1]	2018, n = 628[1]	2019, n = 723[1]	2020, n = 513[1]	2021, n = 442[1]
Sexual Behaviour					
MSM	319(67.0%)	415(66.1%)	455(62.9%)	290(56.5%)	225(50.9%)
MSW	87(18.3%)	113(18.0%)	143(19.8%)	113(22.0%)	97(21.9%)
WSM	61(12.8%)	87(13.9%)	91(12.6%)	90(17.5%)	90(20.4%)
Other	4(0.8%)	3(0.5%)	4(0.6%)	2(0.4%)	4(0.9%)
Unknown	5(1.1%)	10(1.6%)	30(4.1%)	18(3.5%)	26(5.9%)
Age Group (years)					
0-14	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)
15-19	14(2.9%)	13(2.1%)	16(2.2%)	19(3.7%)	13(2.9%)
20-24	63(13.2%)	93(14.8%)	119(16.5%)	79(15.4%)	71(16.1%)
25-29	100(21.0%)	122(19.4%)	154(21.3%)	111(21.6%)	82(18.6%)
30-39	133(27.9%)	176(28.0%)	225(31.1%)	162(31.6%)	145(32.8%)
40+	166(34.9%)	224(35.7%)	209(28.9%)	142(27.7%)	131(29.6%)
Unknown[2]	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)
Ethnicity					
European/Other	268(56.3%)	338(53.8%)	399(55.2%)	241(47.0%)	183(41.4%)
Māori	96(20.2%)	151(24.0%)	144(19.9%)	112(21.8%)	136(30.8%)
Pacific	29(6.1%)	41(6.5%)	56(7.7%)	53(10.3%)	53(12.0%)
Asian	63(13.2%)	70(11.1%)	81(11.2%)	63(12.3%)	53(12.0%)
MELAA	17(3.6%)	24(3.8%)	33(4.6%)	31(6.0%)	14(3.2%)
Unknown	3(0.6%)	4(0.6%)	10(1.4%)	13(2.5%)	3(0.7%)
Geographical Region					
Auckland	261(54.8%)	321(51.1%)	279(38.6%)	217(42.3%)	216(48.9%)
Canterbury	24(5.0%)	53(8.4%)	98(13.6%)	54(10.5%)	29(6.6%)
Wellington	66(13.9%)	52(8.3%)	95(13.1%)	79(15.4%)	61(13.8%)
Waikato	14(2.9%)	45(7.2%)	49(6.8%)	46(9.0%)	40(9.0%)
Southern	17(3.6%)	12(1.9%)	49(6.8%)	32(6.2%)	13(2.9%)
Bay of Plenty	25(5.3%)	44(7.0%)	48(6.6%)	23(4.5%)	20(4.5%)
Lakes	17(3.6%)	17(2.7%)	21(2.9%)	18(3.5%)	9(2.0%)
MidCentral	14(2.9%)	20(3.2%)	15(2.1%)	10(1.9%)	16(3.6%)
Hawkes Bay	11(2.3%)	9(1.4%)	18(2.5%)	6(1.2%)	4(0.9%)
Taranaki	7(1.5%)	14(2.2%)	12(1.7%)	5(1.0%)	3(0.7%)
Whanganui	9(1.9%)	13(2.1%)	16(2.2%)	5(1.0%)	6(1.4%)
Nelson Marlborough	4(0.8%)	9(1.4%)	4(0.6%)	5(1.0%)	5(1.1%)
Northland	2(0.4%)	10(1.6%)	13(1.8%)	6(1.2%)	18(4.1%)
Tairawhiti	4(0.8%)	7(1.1%)	3(0.4%)	4(0.8%)	0(0.0%)
West Coast	0(0.0%)	1(0.2%)	3(0.4%)	1(0.2%)	0(0.0%)
South Canterbury	1(0.2%)	1(0.2%)	0(0.0%)	2(0.4%)	2(0.5%)

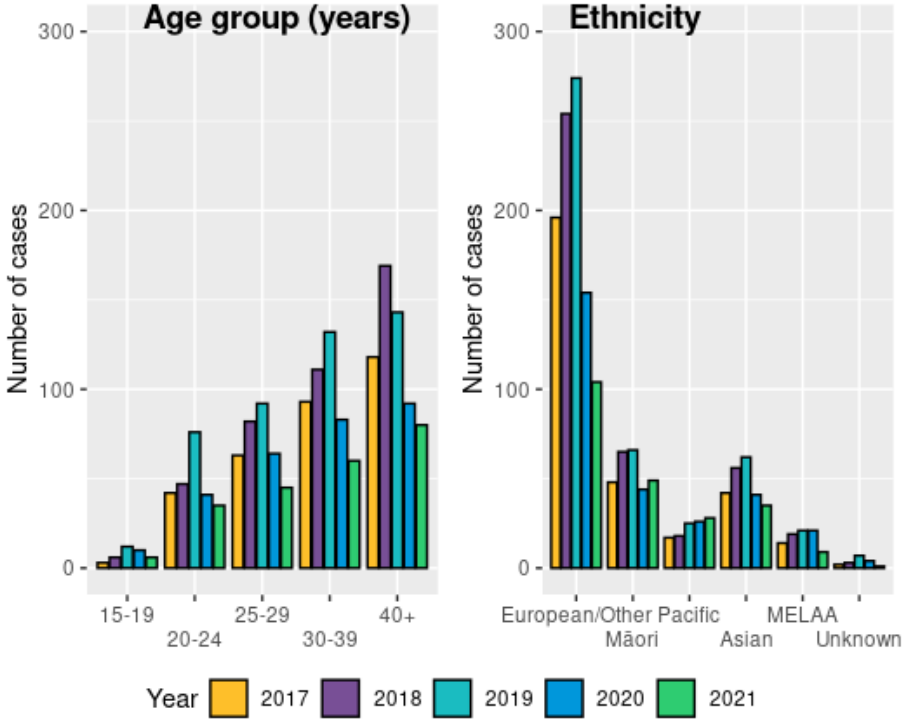
[1] n(%)
[2] Individuals with unknown ages were excluded from the denominator when calculating the proportion of syphilis cases.
[3] Percentages may not total 100% due to rounding infectious syphilis cases in different risk groups

MSM by age-group & ethnicity

Key findings

- Infectious syphilis cases among men who have sex with men (MSM) of Māori ethnicity increased between 2020 and 2021 (44 to 49 cases), and case numbers among MSM of Pacific ethnicity remained stable (26 to 27 cases). Cases among MSM decreased in other ethnicity groups, with a 32% decrease in cases among MSM of European/other ethnicity.
- Cases decreased across age-groups of MSM, the largest of which occurred for 15–19 years (40% decrease), followed by 25-29 years (30% decrease).
- Of all infectious syphilis cases among MSM in 2021, 104 cases (46%) were European/Other, 49 (22%) were of Māori ethnicity, 27 (12%) were Pacific, 35 (16%) were of Asian ethnicity, 9 (4%) were of MELAA ethnicity, and one case was of unknown ethnicity.
- The number of reported infectious syphilis cases among MSM decreased across most age-groups and geographic regions in 2021 compared to 2020. The majority of MSM cases continue to be seen in the 30–39 and 40+ age groups.
- The highest number of cases by ethnicity and age group in 2021 were reported amongst those of European/Other ethnicity aged 40+ (45/225 cases). A high number of cases were also reported for European/Other for age groups 30–39 (22 cases) and 25–29 (20 cases), and for Māori aged 40+ (18 cases) and Asian aged 30–39 (17 cases),
- Of infectious syphilis cases among MSM, 73% were reported in the 'larger urban areas' (Auckland, Wellington and Canterbury regions) in 2021. In 2021 119 cases (53%) were reported in Auckland, 24 (11%) in Wellington, 23 (10%) in Canterbury and 23 (10%) in Waikato.
- Southern reported the largest decrease in infectious syphilis cases among MSM compared to 2020 (86%, 21 to 3 cases) and Wellington decreased 43% (42 to 24 cases).

Figure 1: Infectious syphilis cases amongst MSM by age group and ethnicity: 2017–2021

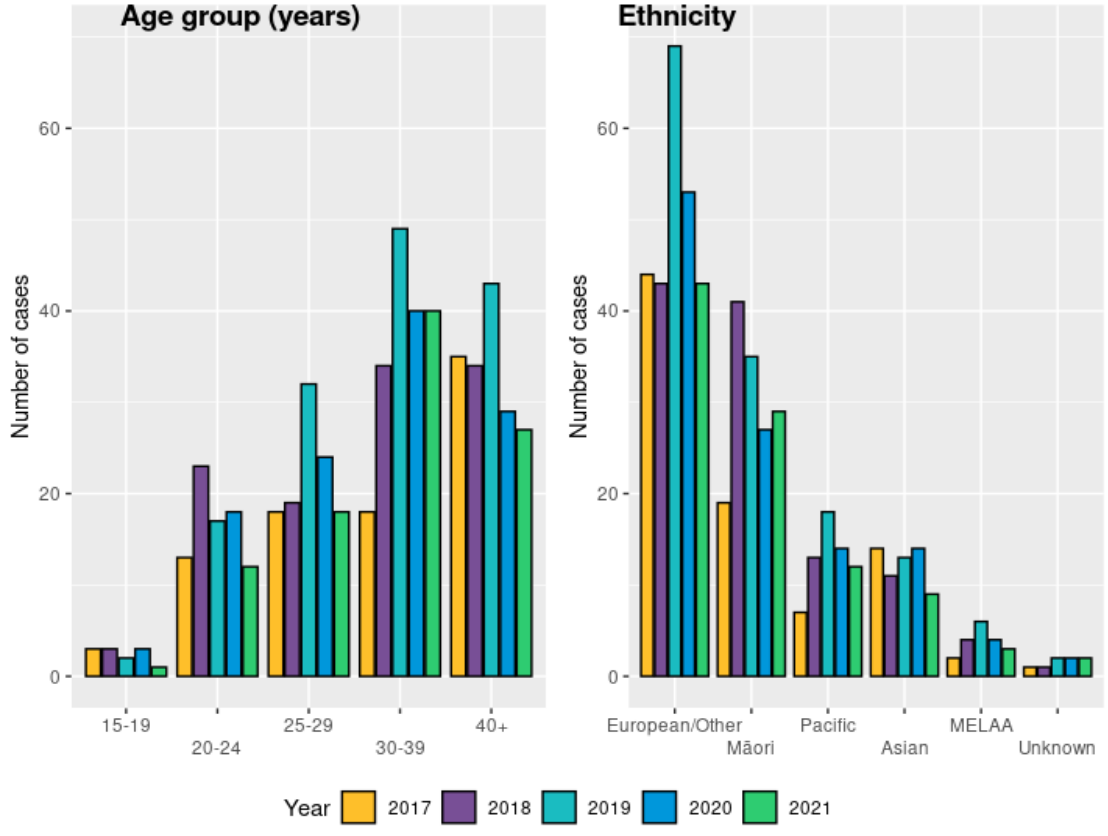


MSW by age-group & ethnicity

Key findings

- The number of infectious syphilis cases among men who have sex with women (MSW) decreased by 14% between 2020 and 2021, a continued decline from the peak in 2019.
- In 2021 the number of infectious syphilis cases among MSW decreased across all ethnicities compared with 2020 except for people of Māori ethnicity among whom case numbers increased by two cases. The highest number of cases were reported among people of European/Other ethnicity, followed by Māori, Pacific, and Asian.
- The proportion of infectious syphilis cases by ethnicity in 2021 remained fairly steady compared with 2020, with those of European ethnicity accounting for 44% of all MSW cases, Māori accounting for 29%, Pacific 12% and Asian 9% of all cases.
- Cases among MSW were predominantly in the 20–40+ year age-groups with only one case reported in the age groups under 20 years of age.
- A decrease in the number of cases was seen across all age groups between 2020 and 2021 except for the 30–39 and 40 years and over age groups, where the number of cases remained stable. The largest decreases were seen in those aged 20–24 (18-12 cases, 33% decrease) and those aged 25–29-years (24 to 18 cases, 25% decrease).
- The highest number of cases by ethnicity and age-group in 2021 were reported amongst those of European/other ethnicity aged 30–39 years and 40+ years (18 and 13 of 97 cases) followed by those of Māori ethnicity aged 30–39 years (10/97 cases).
- Cases among MSW decreased or remained steady across nearly all geographic regions from 2020–2021, except for Northland and MidCentral which both increased by four cases compared to 2020.
- The majority of MSW cases were reported in the Auckland region (43/97 cases) followed by the Wellington region (15/97 cases), Waikato (10/97cases), and Northland (7/97 cases).

Figure 2: Infectious syphilis cases amongst MSW by age-group and ethnicity: 2017–2021

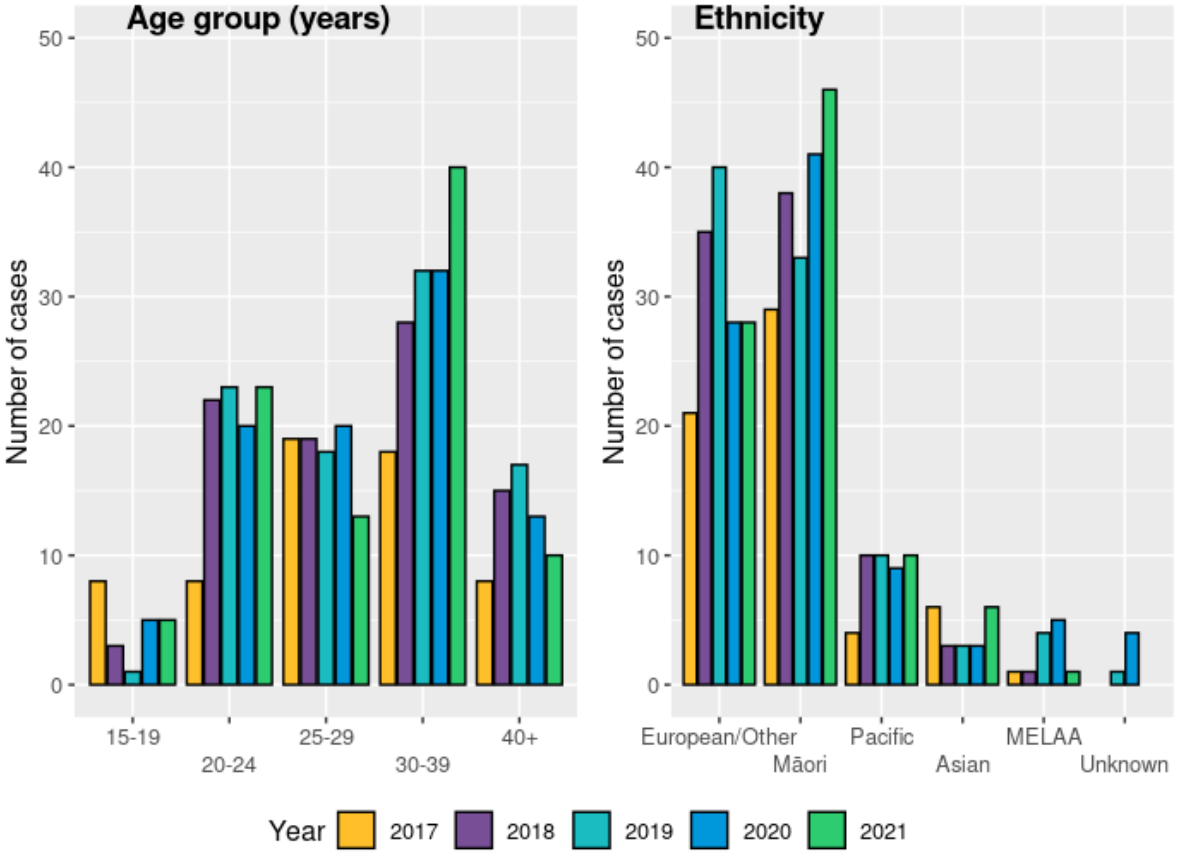


WSM by age-group & ethnicity

Key findings

- Cases of infectious syphilis among women who have sex with men (WSM) remained steady at 90 cases in 2020 and 2021.
- Prior to 2017, most infectious syphilis cases among WSM were of European/Other ethnicity. However, the number and proportion of cases of Māori ethnicity has increased markedly. In 2021, 50% (45/90) of cases reported were of Māori ethnicity, 31% (28/90) cases were European/other, and 11% (10/90) cases were Pacific.
- The vast majority of infectious syphilis cases (>90%) among WSM were of reproductive age (defined by the Ministry of Health as aged 15–44 years (Ministry of Health, 2021)).
- The highest number of cases by ethnicity and age-group in 2021 were reported amongst those of Māori ethnicity aged 30–39 (21/90 cases), followed by those of European/Other ethnicity aged 30–39 (14/90 cases)
- In 2021, 39 of 90 cases (43%) among WSM were reported in Auckland, 15 of the 90 cases (17%) were in Wellington, and nine of the 90 cases (10%) were in the Bay of Plenty region.
- Between 2020 to 2021, cases increased in the Wellington region (from 13 to 15 cases), Auckland region (37 to 39 cases), MidCentral (3 to 8 cases), Northland (1 to 5 cases), Southern (2 to 3 cases), and Waikato (3 to 6 cases). Canterbury saw a decrease of five cases (7 to 2 cases), and the remaining regions saw small decreases of between one and three cases compared to 2020.
- The majority of WSM cases of European/other ethnicity in 2021 were reported in Auckland (13/28). Among cases Māori ethnicity, 14/45 were in Auckland, 9/45 were in the Wellington region and 7/45 were in the Bay of Plenty.

Figure 3: Infectious syphilis cases amongst WSM by age-group and ethnicity: 2017–2021



SPECIAL POPULATIONS WITH INFECTIOUS SYPHILIS

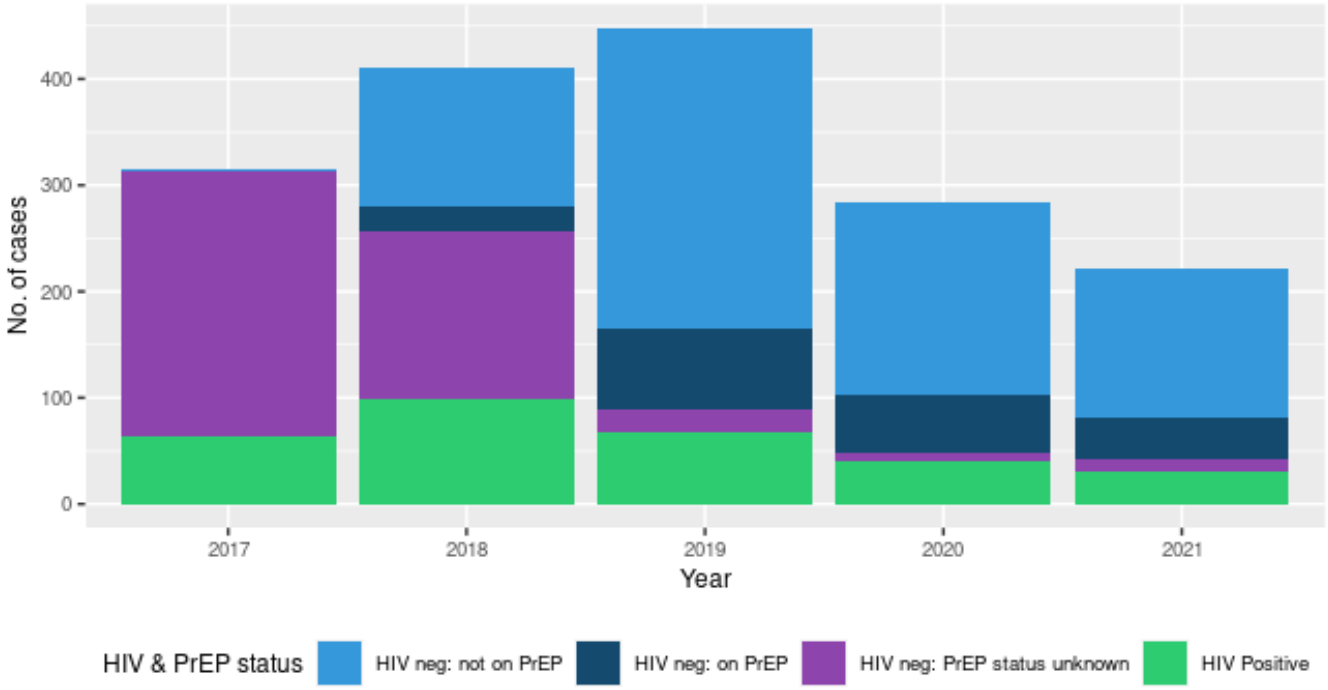
HIV and PrEP status amongst MSM

Pre-Exposure Prophylaxis (PrEP) is a medication for HIV-negative people which significantly reduces the chance of HIV acquisition. 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.

Among the 225 MSM with syphilis in 2021, 31 were living with HIV (14%) [Figure 4]. This is the lowest number and proportion of people with syphilis living with HIV since 2016 (61/236 cases,26%).

Of the 225 MSM with syphilis, 189 had a known HIV negative status. Of these, 178 (94%) had a known PrEP status, with 39 (21%) reporting taking PrEP in 2021.

Figure 4: HIV and PrEP status amongst MSM with syphilis: 2017–2021



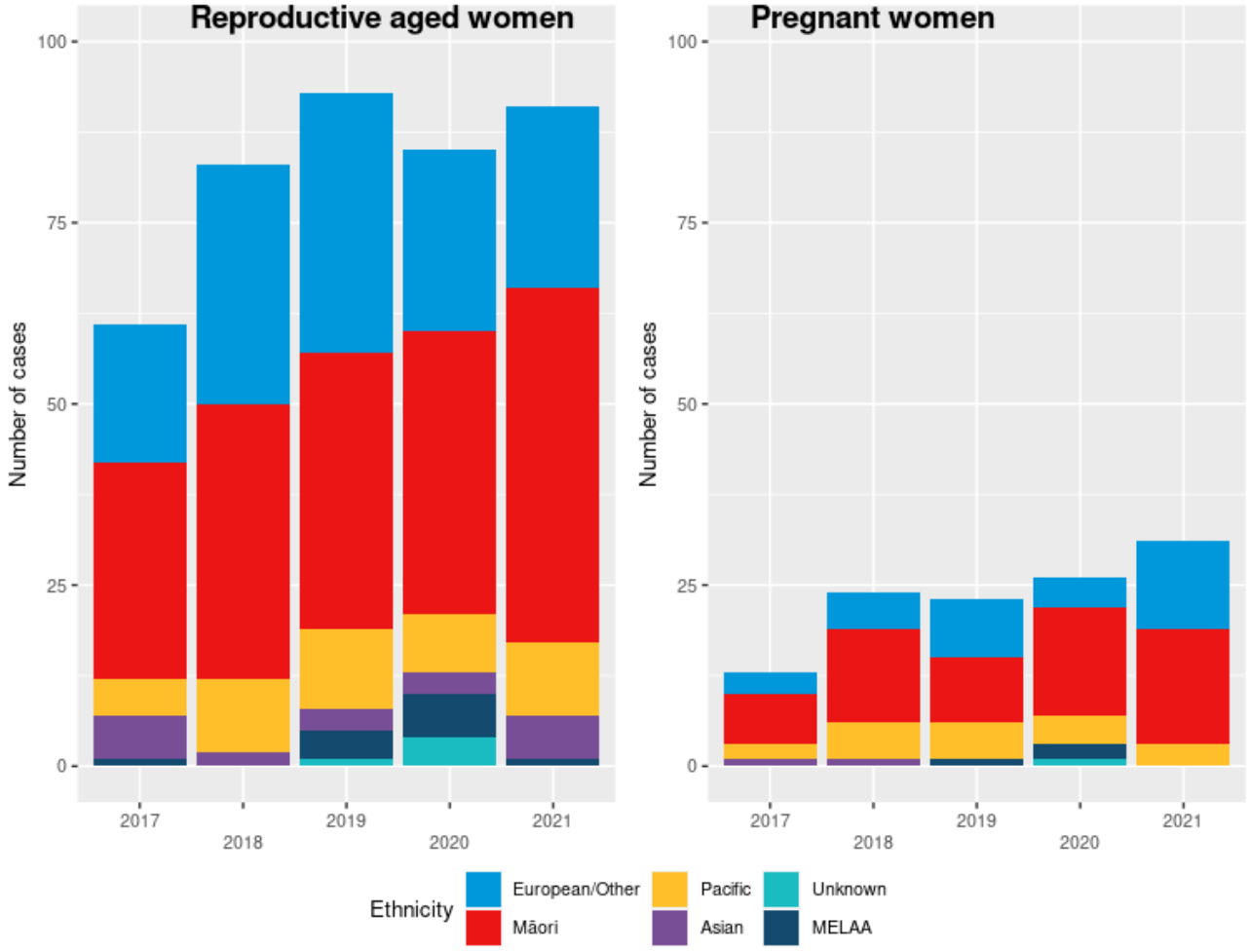
Women of reproductive age and pregnant women

The total number of syphilis cases among women of reproductive age (between 15–44 years) increased by 5cases (85 to 90) compared to 2020. The number of cases in women of reproductive age of European/other ethnicities remained unchanged since 2020 (25 cases), the number of cases increased among Māori (39 to 48 cases), Pacific (8 to 10 cases), and Asian (3 to 6 cases) ethnicities, and decreased among MELAA (6 to 1 case) [Figure 5].

The number of syphilis cases amongst pregnant women increased from 26 cases in 2020 to 31 cases in 2021. Compared to 2020, the greatest increase in cases was among European/other ethnicities (4 to 12 cases). Māori women accounted for the majority of cases in pregnant women and case numbers remained high (15 to 16). Cases among Pacific, Asian, MELAA and unknown ethnicities decreased by one to two cases or remained unchanged.

Most syphilis cases among pregnant women were in Auckland (8 cases), Wellington (7 cases), MidCentral (4 cases), and Southern (3 cases).

Figure 5: Syphilis cases among women of reproductive age and pregnant women by ethnicity: 2017–2021

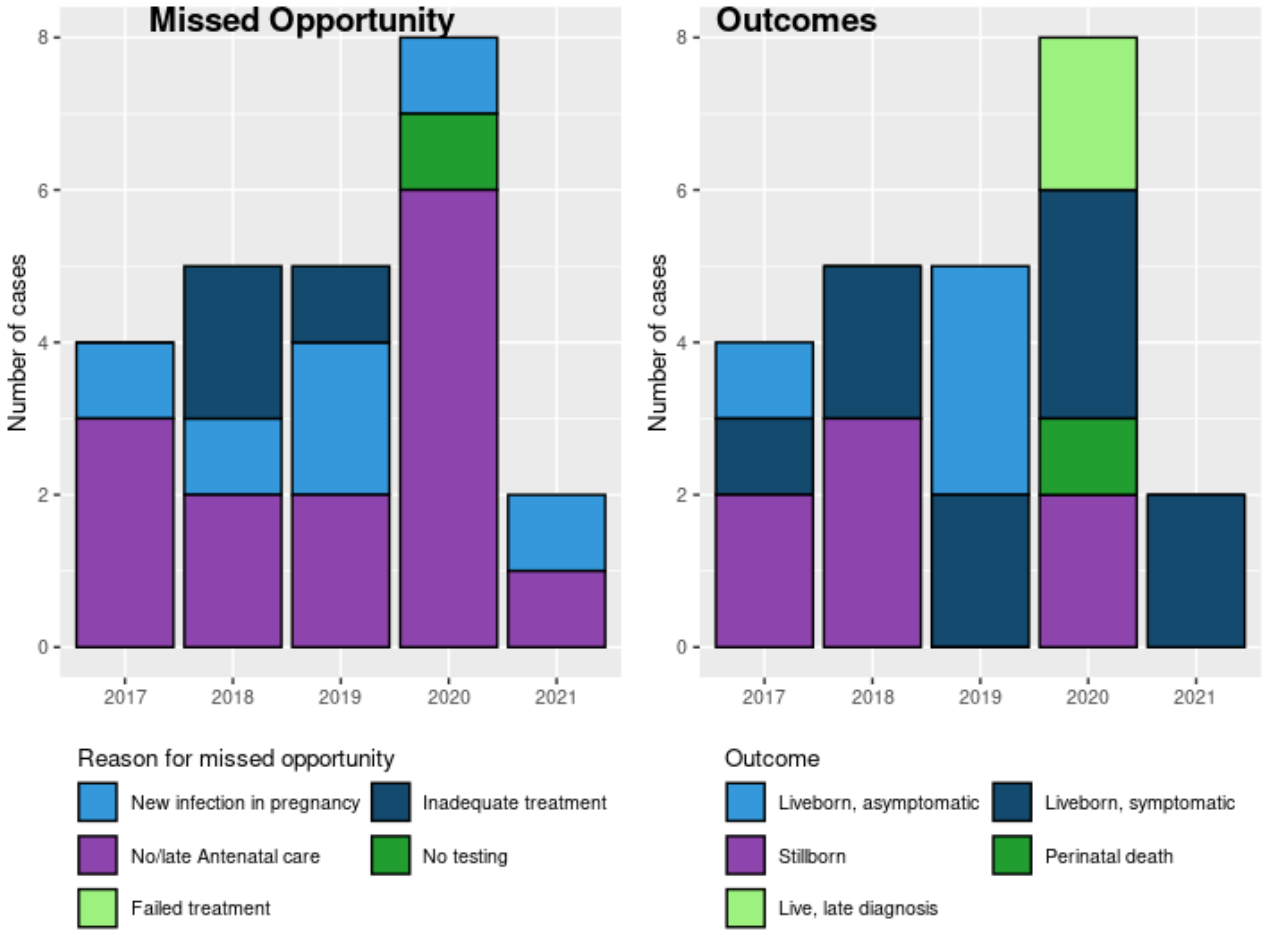


Congenital Syphilis

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. In order 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 four weeks prior to delivery and remain syphilis free at delivery (New Zealand Sexual Health Society, 2020).

There were two cases of congenital syphilis reported in 2021. Both were liveborn with symptoms. The mother of one case received no/late antenatal care, and the other had negative first trimester antenatal screening, and therefore acquired infection later in pregnancy or was incubating infection at the time of the first test.

Figure 6: Congenital syphilis: missed opportunities to identify syphilis in pregnancy and outcomes of congenital syphilis cases: 2017–2021



Sex workers with infectious syphilis

In 2021, 10 people with infectious syphilis reported being sex workers. [Table 2].

In 2021, the majority of cases who reported being sex workers were of European/other or Māori ethnicity, were either MSM or WSM, and were in Auckland. Due to low numbers no further analysis is provided.

Table 2: Sex worker status amongst infectious syphilis cases: 2017–2021

Sex Worker Status	2017	2018	2019	2020	2021
Case is a sex worker	16 (3.4%)	19 (3.0%)	24 (3.3%)	9 (1.8%)	10 (2.3%)
Case is not a sex worker	442 (92.9%)	580 (92.4%)	633 (87.6%)	464 (90.4%)	373 (84.4%)
Unknown	18 (3.8%)	29 (4.6%)	66 (9.1%)	40 (7.8%)	59 (13.3%)
Total	**476 (100.0%)**	**628 (100.0%)**	**723 (100.0%)**	**513 (100.0%)**	**442 (100.0%)**

[1]Percentages may not total 100% due to rounding

CLINICAL NOTIFICATION SURVEILLANCE OF GONORRHOEA 2021

Clinical notifications for gonorrhoea have been collected since late 2018 [Table 3]. In 2021 clinical notifications were received for a subset of laboratory confirmed cases (3608/6458, 56%).

CHARACTERISTICS OF ALL CLINICAL GONORRHOEA NOTIFICATIONS 2021

Table 3: Clinical gonorrhoea notifications by sexual behaviour and age, ethnicity and region: 2021

	MSM n = 1,153[1]	MSW n = 784[1]	Unknown/other n = 762[1]	WSM n = 909[1]	Total n=3608
Age Group					
0-14	0(0.0%)	0(0.0%)	14(1.8%)	4(0.4%)	18(0.5%)
15-19	41(3.6%)	73(9.3%)	105(13.8%)	179(19.7%)	398(11.0%)
20-24	150(13.0%)	165(21.0%)	180(23.6%)	284(31.2%)	779(21.6%)
25-29	279(24.2%)	176(22.4%)	170(22.3%)	159(17.5%)	784(21.7%)
30-39	388(33.7%)	243(31.0%)	194(25.5%)	194(21.3%)	1019(28.2%)
40+	295(25.6%)	127(16.2%)	99(13.0%)	89(9.8%)	610(16.9%)
Ethnicity					
European/Other	650(56.4%)	266(33.9%)	223(29.3%)	273(30.0%)	1412(39.1%)
Māori	214(18.6%)	262(33.4%)	308(40.4%)	437(48.1%)	1221(33.8%)
Pacific	72(6.2%)	153(19.5%)	139(18.2%)	161(17.7%)	525(14.6%)
Asian	164(14.2%)	76(9.7%)	50(6.6%)	23(2.5%)	313(8.7%)
MELAA	34(2.9%)	19(2.4%)	15(2.0%)	9(1.0%)	77(2.1%)
Unknown	19(1.6%)	8(1.0%)	27(3.5%)	6(0.7%)	60(1.7%)
Geographical Region					
Auckland Region	530(46.0%)	346(44.1%)	406(53.3%)	378(41.6%)	1660(46.0%)
Canterbury	142(12.3%)	53(6.8%)	50(6.6%)	57(6.3%)	302(8.4%)
Wellington Region	179(15.5%)	46(5.9%)	72(9.4%)	60(6.6%)	357(9.9%)
Waikato	114(9.9%)	100(12.8%)	49(6.4%)	109(12.0%)	372(10.3%)
Southern	52(4.5%)	25(3.2%)	23(3.0%)	18(2.0%)	118(3.3%)
Bay of Plenty	34(2.9%)	52(6.6%)	32(4.2%)	92(10.1%)	210(5.8%)
Lakes	20(1.7%)	39(5.0%)	27(3.5%)	39(4.3%)	125(3.5%)
MidCentral	40(3.5%)	30(3.8%)	11(1.4%)	32(3.5%)	113(3.1%)
Hawke's Bay	7(0.6%)	11(1.4%)	30(3.9%)	23(2.5%)	71(2.0%)
Taranaki	16(1.4%)	16(2.0%)	16(2.1%)	12(1.3%)	60(1.7%)
Whanganui	2(0.2%)	8(1.0%)	6(0.8%)	9(1.0%)	25(0.7%)
Nelson Marlborough	6(0.5%)	19(2.4%)	16(2.1%)	19(2.1%)	60(1.7%)
Northland	8(0.7%)	30(3.8%)	15(2.0%)	42(4.6%)	95 (2.6%)
Tairawhiti	2(0.2%)	9(1.1%)	7(0.9%)	15(1.7%)	33 (0.9%)
West Coast	1(0.1%)	0(0.0%)	0(0.0%)	1(0.1%)	2(0.1%)
South Canterbury	0(0.0%)	0(0.0%)	2(0.3%)	3(0.3%)	5(0.1%)

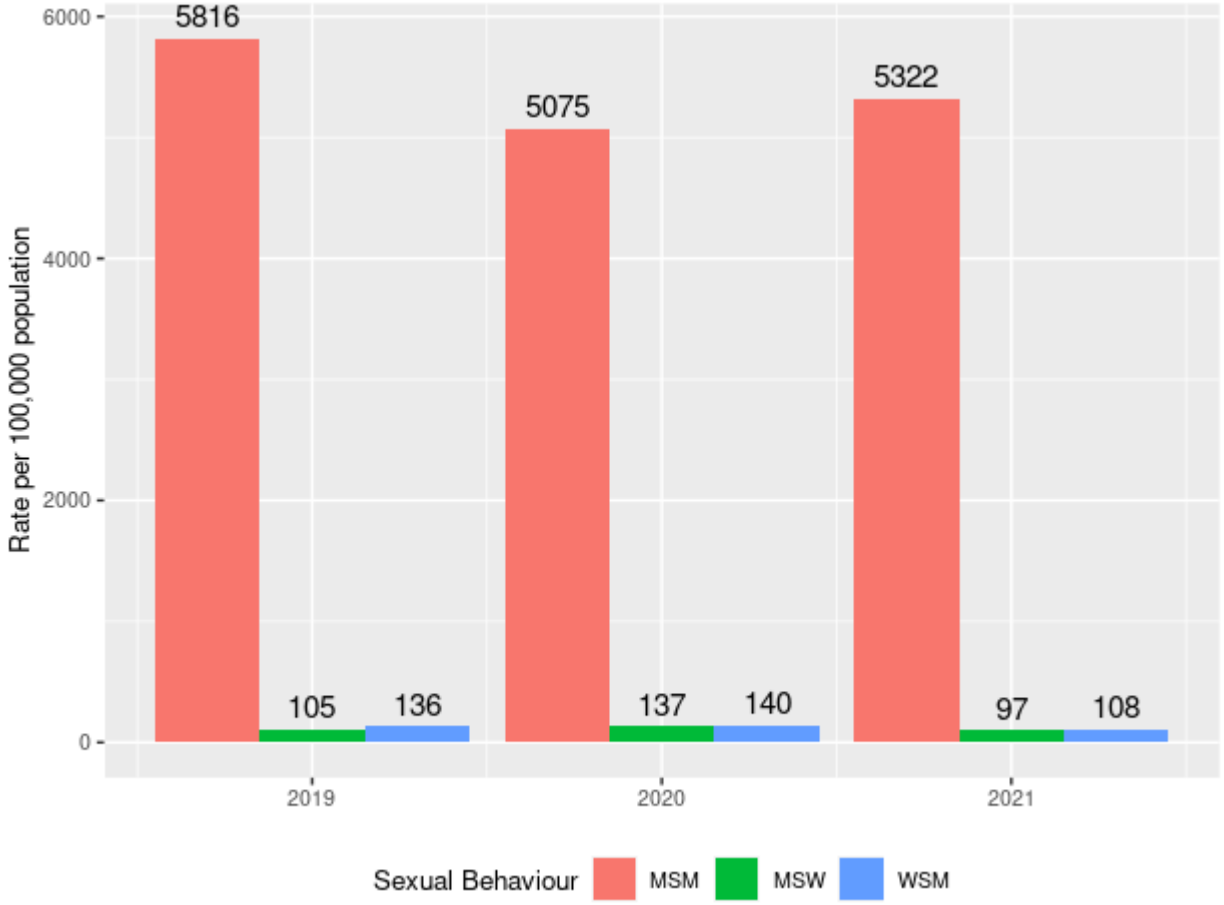
[1] n(%)
[2] Individuals with unknown ages were excluded from the denominator when calculating the proportion of gonorrhoea notifications
[3] Percentages may not total 100% due to rounding

CLINICAL GONORRHOEA NOTIFICATION COUNTS

Estimated rates of gonorrhoea by sexual behaviour

Estimated gonorrhoea rates by sexual behaviour show clear disparities for MSM compared to MSW and WSM. Although MSM rates reduced from 5816 per 100,000 in 2019 to 5075 per 100,000 population in 2020, rates increased again to 5322 per 100,000 population in 2021. Rates for MSW and WSM have remained relatively stable over 2019-2021, with slight but consistently higher rates for WSM than MSW.

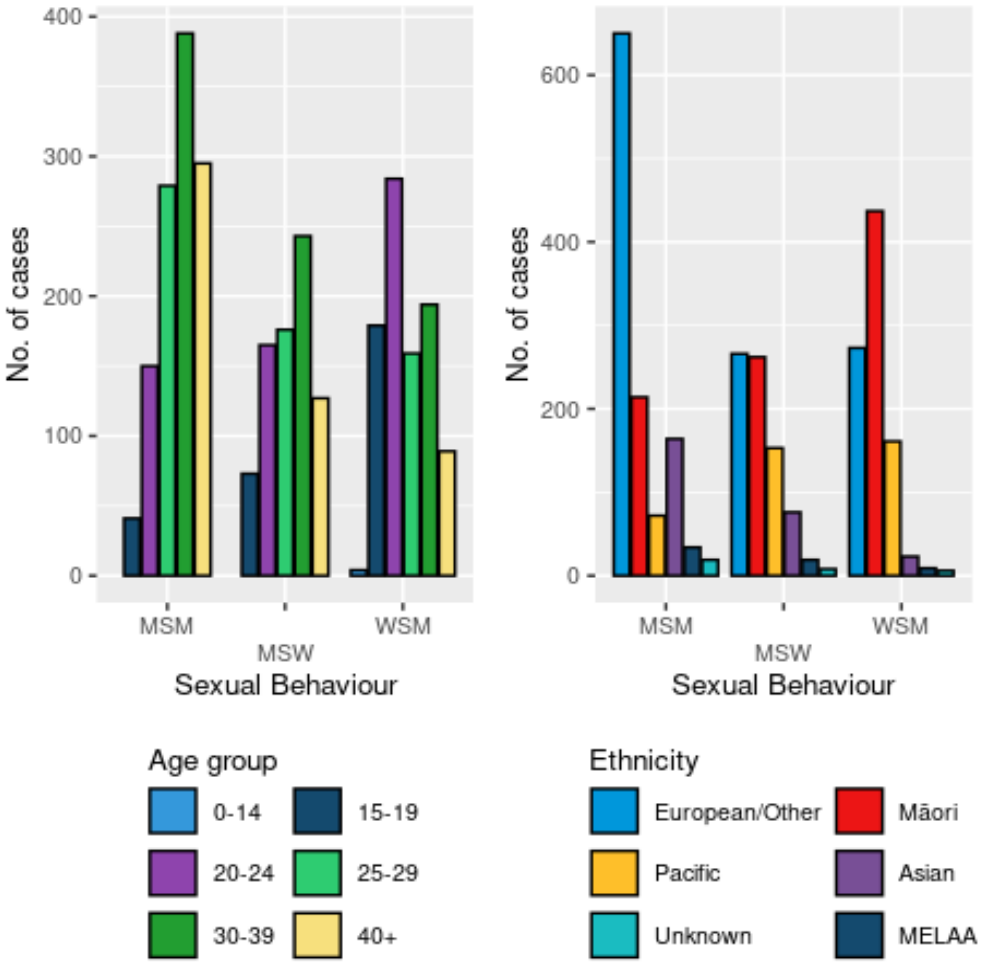
Figure 7. Estimated gonorrhoea rates per 100,000 population by sexual behaviour, 2019–2021



Sexual behaviour by age-group and ethnicity

- Of the clinical notifications for gonorrhoea, 25% were reported to be WSM, 22% MSW and 32% MSM [Figure 8]. Together, women who have sex with women and transgender people account for small numbers of cases (2% of total cases and included in 'other' category in Table 3). For 17% of cases, clinicians reported sexual behaviour as 'unknown'. The 'other' and 'unknown' categories are not included in the following graphs.
- The proportion of notifications reported to be WSM, MSW, and those of unknown sexual behaviour decreased slightly (between 1–4%) compared to 2020. In contrast, the proportion of cases reported to be MSM increased from 25% to 32% between 2020 and 2021.
- By age and sexual behaviour, gonorrhoea cases identified as MSM and MSW were predominantly in the 20–40+ age-groups, with the peak in the 30–39 age-group. Gonorrhoea cases among WSM were predominantly in the 15–39 years age-groups, with the peak in the 20–24 age-group.
- Among MSM, 56% of cases were of European/Other ethnicity, 19% were Māori, 14% were Asian, and 6% were Pacific. In cases among MSW 34% were of European/other ethnicity, 33% Māori and 20% Pacific. The highest number of WSM cases was reported amongst those of Māori ethnicity (48% of cases), followed by European/other (30% of cases) and then Pacific (18% of cases).
- The proportion of cases reported to be of Pacific ethnicity has increased for WSM and MSW but decreased slightly for MSM sexual behaviours in 2021 compared to 2020. The proportion of Māori and Asian cases reporting MSM increased slightly between 2020 and 2021.

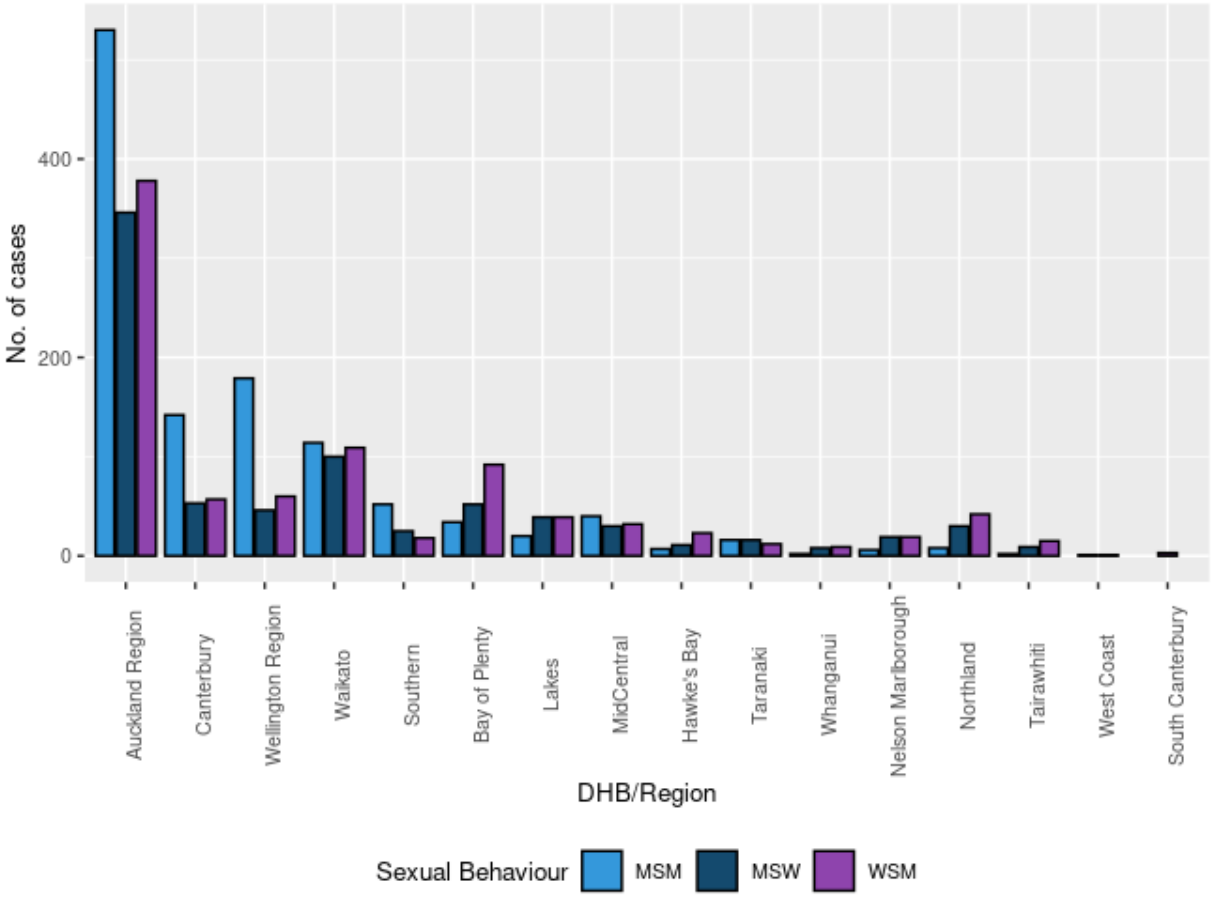
Figure 8: Clinical notifications for gonorrhoea by sexual behaviour and age-group and ethnicity: 2021



Sexual behaviour of cases notified with gonorrhoea in 2021 by DHB/region

In 2021, almost half (46%) the clinical notifications for gonorrhoea were received from the Auckland region [Figure 9]. Auckland, Wellington and Canterbury regions accounted for 74% of all MSM cases, a slight decrease from 78% in 2020. Auckland, Canterbury, Wellington Region, Waikato, Southern, and MidCentral reported a higher proportion of MSM cases compared to other sexual behaviours. Bay of Plenty, Hawke's Bay, Whanganui, Northland, Tairawhiti, and South Canterbury reported more cases amongst WSM than other sexual behaviours.

Figure 9: Clinical notifications for gonorrhoea by sexual behaviour and region: 2021



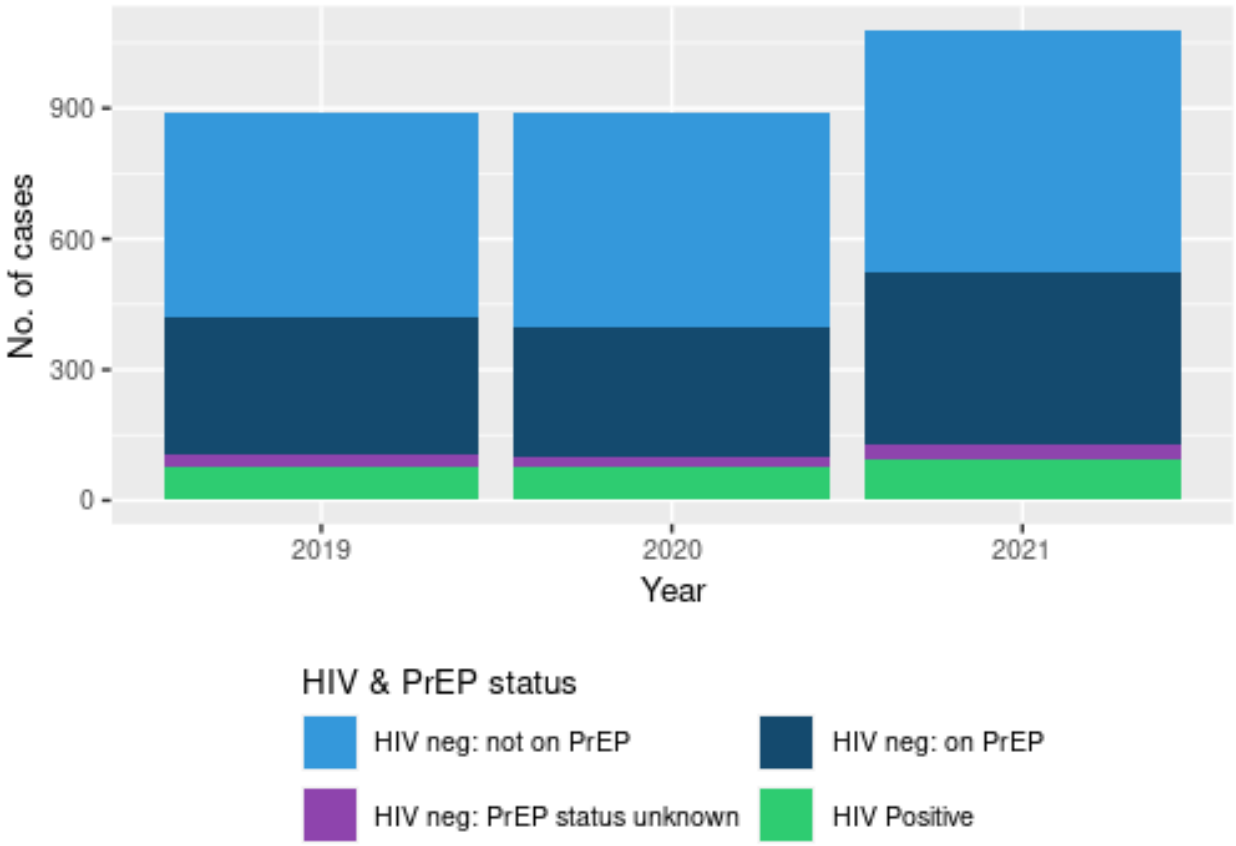
SPECIAL POPULATIONS AMONG CASES NOTIFIED WITH GONORRHOEA IN 2020

HIV and PrEP status amongst MSM

Of the 1,153 MSM with gonorrhoea, 984 (85.4%) were HIV negative and 96 (8.3%) were living with HIV [Figure 10]. HIV status was unknown for 73 cases (6.3%) [Figure 10]. The proportion of MSM with gonorrhoea who were living with HIV remained steady in 2021 (8.3%) compared to 2020 (8.3%).

Of the 984 MSM cases with a known HIV negative status, 558 (56.7%) were not on PrEP, 395 (40.1%) reported being on PrEP while PrEP status was unknown for 31 (3.2%).

Figure 10: HIV and PrEP status of clinical gonorrhoea notifications amongst MSM: 2019–2021



Sex workers

Table 4: Sex worker status of gonorrhoea cases by sex in 2019–2021

Sex Worker Status	2019	2020	2021
Case is a sex worker	88 (3%)	87 (2%)	60 (2%)
Case is not a sex worker	2512 (81%)	3036 (81%)	2913 (81%)
Unknown	511 (16%)	650 (17%)	635 (18%)
Total	**3111 (100%)**	**3773 (100%)**	**3608 (100%)**

Of all gonorrhoea clinical notifications received in 2021, 60 (2%) reported being sex worker, compared to 87 (2%) in 2020. Among female cases, 42 (3%) were reported to be sex workers compared to 65 cases (4%) in 2020. Among male cases, 16 were reported to be sex workers in 2021 (1%) and 21 were reported in 2020 (1%). In 2021, the sex work status of cases was unknown in 22% of female cases and 15% of male cases.

The highest numbers of gonorrhoea notifications identified as sex workers in 2021 were in Auckland (39 cases), followed by Canterbury (6 cases); though the number of cases in both regions decreased compared to the previous year.

In 2021, most cases amongst sex workers were of European/Other (29/60, 48%) or Māori (17/60, 28%) ethnicity. By sexual behaviour, 33/60 (55%) were WSM, 12/60 (20%) were MSM.

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 maternal treatment.

CHARACTERISTICS OF ALL PAEDIATRIC CHLAMYDIA CASES

The number of cases of chlamydia in infants decreased in 2021 (44 cases) compared to 2020 (61 cases) and was the lowest for the five years reported (Table 5). The site of infection was the eye for all cases for whom a site of infection was reported (35 cases, 80%). The highest number of cases were reported in Māori infants in 2021 (21 cases, 48%), consistent with previous years. Unlike previous years, in 2021, there were fewer cases reported in Pacific Peoples (7 cases) than in European/Other (11 cases). Whilst cases decreased for Māori by 28% and Pacific infants by 53% in 2021 compared to 2020, case totals for Asian, MELAA, European/Other and infants with unknown ethnicity were not as varied between 2021 and 2020.

Table 5: Laboratory reported chlamydia among cases <1 year of age, by ethnicity, sex and site of infection: 2017–2021

	2017	2018	2019	2020	2021
Ethnicity					
Māori	37	25	36	29	21
Pacific	14	14	18	15	7
Asian	5	2	5	3	3
European/Other	11	13	23	10	11
MELAA	1	0	0	2	0
Unknown	25	20	4	2	2
Sex					
Female	46	32	45	29	27
Male	46	42	41	32	17
Site of Infection					
Eye	74	63	73	49	35
Unknown	19	11	13	12	9
Total	**93**	**74**	**86**	**61**	**44**

CHARACTERISTICS OF ALL PAEDIATRIC GONORRHOEA CASES

Paediatric gonorrhoea case numbers during 2021 were low and decreased slightly from 2020. The highest number of cases continue to be reported among Māori infants (7 cases).

Table 6: Laboratory reported gonorrhoea by ethnicity, sex and site of infection: 2017–2021

	2017	2018	2019	2020	2021
Ethnicity					
Asian	0	0	0	2	0
European/Other	0	2	3	1	1
Māori	2	5	6	8	7
MELAA	0	1	0	0	1
Pacific	3	1	0	1	1
Unknown	5	0	0	0	0
Sex					
Female	4	6	4	9	7
Male	5	3	5	3	3
Site of Infection					
Eye	7	9	8	10	8
Unknown	3	0	1	2	2
Total	**10**	**9**	**9**	**12**	**10**

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 vaccination for human papillomavirus (HPV). HPV is implicated in the development of genital warts, ano-genital and 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 aged 12 years from 2017. The HPV vaccine may be offered from 9 years of age but is usually given at age 11–12 years of age. (Ministry of Health, 2021).

Table 7: Characteristics of first presentation genital warts cases by sex, age, ethnicity and region: 2017-2021

Year	2017, n = 1,183[1]	2018, n = 1,111[1]	2019, n = 856[1]	2020, n = 807[1]	2021, n = 667[1]
Sex					
Female	477(40%)	468(42%)	336(39%)	290(36%)	264(40%)
Male	698(59%)	641(58%)	520(61%)	517(64%)	403(60%)
Unknown/Other	8(1%)	2(0%)	0(0%)	0(0%)	0(0%)
Age Group					
0–14	0(0%)	1(0%)	0(0%)	12(1%)	2(0%)
15–19	106(9%)	77(7%)	52(6%)	34(4%)	18(3%)
20–24	352(30%)	307(28%)	234(27%)	215(27%)	156(23%)
25–29	285(24%)	281(25%)	184(22%)	204(25%)	158(24%)
30–39	259(22%)	258(23%)	207(24%)	206(26%)	183(27%)
40+	181(15%)	187(17%)	177(21%)	136(17%)	150(22%)
Unknown	0	0	2	0	0
Ethnicity					
European/Pakeha	802(68%)	752(68%)	465(54%)	498(62%)	412(62%)
Māori	136(11%)	164(15%)	136(16%)	101(13%)	98(15%)
Other	164(14%)	149(13%)	213(25%)	163(20%)	120(18%)
Pacific Peoples	38(3%)	22(2%)	32(4%)	32(4%)	25(4%)
Unknown	43(4%)	24(2%)	10(1%)	13(2%)	12(2%)
Geographical Region					
Auckland region	379(32%)	395(36%)	302(35%)	294(36%)	206(31%)
Bay of Plenty	98(8%)	83(7%)	47(5%)	58(7%)	44(7%)
Canterbury	109(9%)	128(12%)	107(12%)	98(12%)	78(12%)
Hawkes Bay	31(3%)	22(2%)	13(2%)	19(2%)	19(3%)
Lakes	22(2%)	24(2%)	15(2%)	24(3%)	39(6%)
MidCentral	20(2%)	4(0%)	10(1%)	5(1%)	5(1%)
Nelson Marlborough	69(6%)	94(8%)	56(7%)	57(7%)	89(13%)
Northland	9(1%)	11(1%)	18(2%)	7(1%)	7(1%)
South Canterbury	2(0%)	6(1%)	5(1%)	2(0%)	0(0%)
Southern	66(6%)	55(5%)	53(6%)	35(4%)	33(5%)
Tairawhiti	0(0%)	4(0%)	1(0%)	3(0%)	4(1%)
Taranaki	38(3%)	28(3%)	31(4%)	42(5%)	32(5%)
Waikato	163(14%)	116(10%)	94(11%)	102(13%)	71(11%)
Wellington region	163(14%)	126(11%)	94(11%)	51(6%)	27(4%)
West Coast	9(1%)	9(1%)	6(1%)	5(1%)	2(0%)
Whanganui	5(0%)	6(1%)	4(0%)	4(0%)	10(2%)
Unknown	0	0	0	1	1

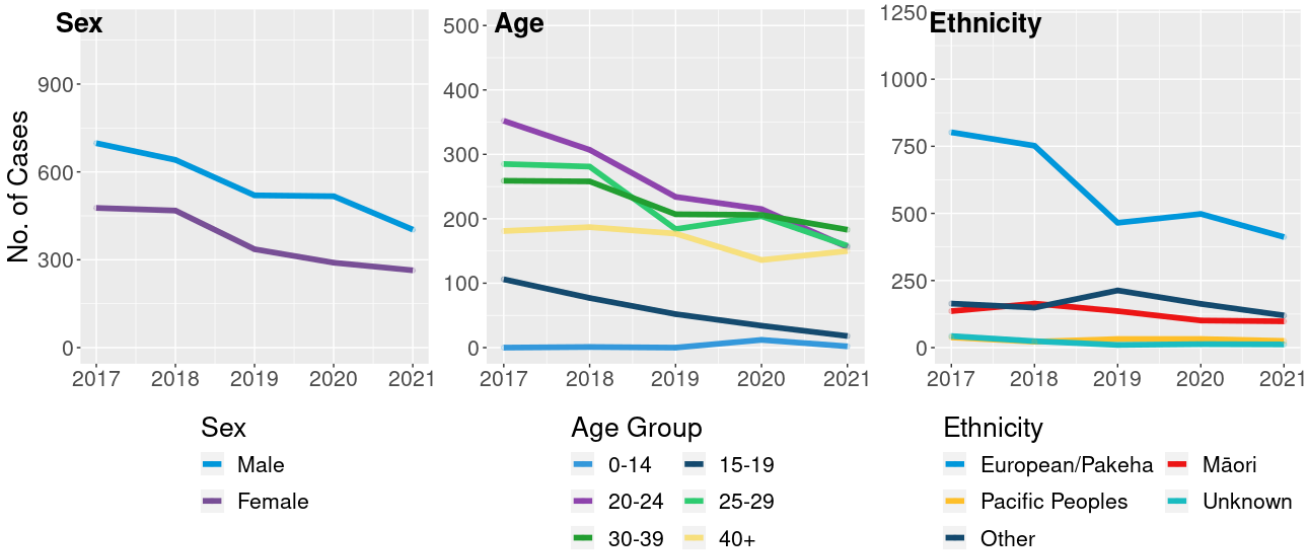
[1] n(%)
[2] Individuals with unknown age were excluded from the denominator when calculating the proportion of genital warts cases by age group

The number of genital warts cases reported in 2021 declined by 140 cases (17.3%) compared to 2020, a more marked decline than seen in the previous year (7.1% in 2020). This decrease extends the downwards trend in genital warts cases observed since 2017, and likely reflects the impact of HPV vaccination among youth. A decrease was observed for the larger urban regions of Auckland (294 to 206), Wellington (51 to 27), Canterbury (98 to 78), and Waikato (102 to 71). All other regions reported lower or similar case numbers, except for Lakes and Nelson Marlborough, where larger increases were observed (23 to 39 cases, and 57 to 89 cases, respectively).

Genital warts by sex, age and ethnicity

- Males continued to be overrepresented in genital warts cases in 2021 (60% of all cases) despite a 22.0% reduction from cases reported in 2020. Total cases reported for females decreased by 9% (Table 7).
- Case numbers decreased for all age groups spanning 0-39 years but increased for the 40+ years group by 10.3%.
- Case numbers declined across all ethnicity groups, with larger reductions occurring for European (17.3%), Other (26.4%), and Pacific (21.9%) ethnicities, and a minimal reduction occurring for Māori (3.0%).

Figure 11: Genital warts cases by sex, age-group and ethnicity: 2017–2021



CLINIC SURVEILLANCE OF LYMPHOGRANULOMA VENEREUM (LGV)

One case of LGV was reported in 2021, this case was from the Auckland region, male, aged 30-–39 and of unknown ethnicity.

Two cases of LGV in 2020 (not previously reported) were identified during preparation of this report. One case was reported from the Wellington region, one from the Auckland region. One case was male, while the sex of the case was unknown. One case was aged 25-29 years, the other aged 30-39 years. The ethnicity of both cases was recorded as other.

No cases of LGV were reported in 2017 or 2018 and 7 in 2019. Please see previous annual reports for further details.

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 evident in the disproportionately high rates observed for Māori, Pacific, young people, and MSM. Describing inequities is a crucial first step to eliminating them. Inequities are likely to reflect differences in access to sexual health care and 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 and 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 a 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 NZ Health Surveys (Ministry of Health 2019 and 2020) and youth health surveys. This unmet need for sexual and reproductive health services has recently increased for young Māori (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, as seen in previous years, rates of gonorrhoea, chlamydia and syphilis continue to be higher among Māori and Pacific peoples than in those of European/other ethnicity. Syphilis cases in Māori increased in 2021 compared to 2020 in all sexual behaviour groups, and amongst women with syphilis 50% were Māori and 11% were Pacific. Among pregnant women 60% of syphilis cases were Māori. The majority of chlamydia and gonorrhoea conjunctivitis cases continue to be reported among Māori infants (48% and 70% respectively), while 16% of cases of chlamydia and 10% of cases of gonorrhoea conjunctivitis were among Pacific infants. While information is not available to assess missed prevention opportunities for infant chlamydia and gonorrhoea conjunctivitis, it is available on congenital syphilis and shows 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. Additionally, while this report documents a considerable decline in genital warts cases overall, only minimal reductions in the number of genital warts cases have been seen among Māori.

This report also demonstrates marked inequities in rates of infectious syphilis for MSM compared to MSW (See dashboard). Additionally, of the clinical notifications for gonorrhoea, the largest group were reported to be MSM. 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).

As seen in the 2017–2019 and 2020 periods, young people continue to experience higher rates of STIs, with the 20–29-year age group having the highest rates of syphilis, gonorrhoea and chlamydia, although rates of syphilis and chlamydia declined in these age groups in 2021 compared to 2020. These inequities may reflect differences in access to sexual health care as well as sexual network characteristics rather than sexual behaviour alone. In communities/sexual networks with a higher prevalence of a particular STI, the risk of acquisition is higher with each sexual encounter compared to those in lower prevalence communities/sexual networks (CDC, 2019).

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APPENDIX 1: ADDITIONAL TABLES

REASON FOR SYPHILIS TEST BY SEXUAL BEHAVIOUR: 2021

Table 8: Reason for test amongst infectious syphilis cases by sexual behaviour in New Zealand: 2021

Reason for test	MSM	MSW	Other	Unknown	WSM
Asymptomatic screening including PrEP	78 (34.67%)	10 (10.3%)	1 (25%)	7 (26.9%)	16 (17.8%)
Clinical symptoms/suspicion	89 (39.56%)	59 (60.8%)	-	6 (23.1%)	15 (16.7%)
Contact of STI/HIV	18 (8.00%)	4 (4.1%)	-	1 (3.8%)	-
Immigration	3 (1.33%)	4 (4.1%)	1 (25%)	-	3 (3.3%)
Other	12 (5.33%)	5 (5.2%)	1 (25%)	5 (19.2%)	5 (5.6%)
Syphilis Contact	20 (8.89%)	15 (15.5%)	1 (25%)	5 (19.2%)	27 (30.0%)
Unknown	5 (2.22%)	-	-	-	-
Antenatal screening	-	-	-	2 (7.7%)	24 (26.7%)

INFECTIOUS SYPHILIS CASES BY ETHNICITY, COUNTRY OF INFECTION AND CLINICAL SETTING OF TEST: 2021

Table 9: Syphilis cases by ethnicity, country of infection and clinical setting of test in New Zealand: 2021

	MSM	MSW	WSM	Other	Unknown	Total
Ethnicity						
European/Other	104	43	28	1	7	183
Māori	49	28	45		14	136
Pacific	27	12	10		4	53
Asian	35	9	6	3		53
MELAA	9	3	1		1	14
Unknown	1	2				3
Country of Infection						
Australia	5	2				7
New Zealand	207	85	85	1	14	392
Other	4	3	1	1		9
Unknown	9	7	4	2	12	34
Australia	5	2				7
Clinical setting of initial syphilis test						
Corrections	1	2	1			4
ED	3	3	3		1	10
General Practice	83	43	31	3	12	172
ID clinic	10	1				11
NGO clinic	6	4	5			15
Other/Unknown	10	10	9	1	7	37
Sexual Health clinic	112	34	32		4	182
Antenatal clinic/midwife			8		1	9
Obstetric Ward			1		1	2
Total	**225**	**97**	**90**	**4**	**26**	**442**

INFECTIOUS SYPHILIS CO-INFECTIONS BY SEXUAL BEHAVIOUR: 2021

Table 10: Infectious syphilis cases and co-infections by sexual behaviour: 2021

	MSM	MSW	WSM	Other	Unknown	Total
Chlamydia	46	11	18	0	2	77
Gonorrhoea	32	7	3	0	0	42
Trichomoniasis	0	2	12	0	3	17
Genital Herpes	0	2	2	0	0	4
Genital Warts	2	0	0	0	0	2
Mycoplasma Genitalium	0	0	0	0	0	0
NSU	0	1	0	0	0	1
LGV	1	0	0	0	0	1

INFECTIOUS SYPHILIS: NUMBER OF PARTNERS IN PAST 3 MONTHS BY SEXUAL BEHAVIOUR: 2021

Table 11: Number of partners in past three months by sexual behaviour of case and sex of partner: 2021

	MSM	MSW	WSM	Total
No. of male partners				
0	16	48	8	72
1	49	3	50	102
2–4	92	5	22	119
5–9	32	1	2	35
10–15	20	0	3	23
>15	3	1	0	4
Unknown	13	39	5	57
No. of female partners				
0	96	10	53	159
1	16	50	1	67
2–4	12	22	0	34
5–9	4	2	0	6
10–15	1	2	0	3
>15	1	1	0	2
Unknown	95	10	36	141

GONORRHOEA: NUMBER OF PARTNERS IN PAST 3 MONTHS BY SEXUAL BEHAVIOUR: 2021

Table 12: Number of partners in past three months by sexual behaviour of case and sex of partner: 2021

	MSM	MSW	WSM	Total
No. of male partners				
0	35	512	11	558
1	200	22	483	705
2–4	437	33	310	780
5–9	225	8	39	272
10–15	139	5	14	158
>15	71	4	17	92
Unknown	46	200	35	281
No. of female partners				
0	875	52	659	1,586
1	59	332	27	418
2–4	48	285	7	340
5–9	9	41	4	54
10–15	4	16	2	22
>15	1	3	2	6
Unknown	157	55	208	420
Total	1,153	784	909	2,846

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 units 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 clinic 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 a PDF email attachment and forwarded 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 in 2021 show that clinical notifications were made for just over half (3608/6458, 56%) of total positive cases. 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 NZ 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 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 13: 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 14: 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	Site recorded	Yes	Yes
Lymphogranuloma venereum	Confirmed or probable	Site recorded	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

- Gonorrhoea positive cases (episodes): the total number of laboratory-confirmed cases [Table 13] reported after exclusion of repeat tests for an individual within a defined episode period.
- 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.
- 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

- 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 was 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 produces 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.
- Rate of syphilis by sexual behaviour: the reported number of cases by sexual behaviour was divided by the estimated NZ 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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