Sexually Transmitted Infections in New Zealand

Annual Surveillance Report 2001

Prepared by

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Summary

Most sexually transmitted infections (STIs) are not notifiable in New Zealand. Therefore, surveillance of STIs in New Zealand has traditionally been based on data from specialist sexual health clinics (SHCs). Although sexual health clinics see only a portion of the population with STIs, their data continue to provide the most comprehensive source of information on the epidemiology of STIs in New Zealand. Since 1998, STI surveillance has been expanded to include data from family planning clinics (FPCs), student and youth health clinics (SYHCs), and laboratories in Waikato, Bay of Plenty and Auckland.

KEY POINTS

- *Chlamydia* infections (the commonest bacterial STI in New Zealand) are still increasing and may soon overtake genital warts as the most common infection in sexual health clinic patients.
- Notifications of *C trachomatis* by participating laboratories increased during 2001 to 8668 cases representing a rate of 502.7 per 100 000 population which is five times higher than that reported in Australia during the same period. Similarly, rates of *N gonorrhoeae*, at 53.2 per 100 000 population almost doubles that of Australia.
- Groups at higher risk, by STI, are:

Chlamydia:	• Maori and Pacific peoples; • Young people aged <25
Gonorrhoea:	• Maori and Pacific peoples • Males aged <20
Genital herpes:	• Maori and Europeans • All age-groups
Genital warts:	• All ethnic groups • Young people aged <25

- In 2001, a total of 3238 infections due to chlamydia and 533 due to gonorrhoea were reported to ESR from Sexual Health Clinics. Reporting laboratories from the Auckland, Waikato and the BOP regions, confirmed 8668 cases of chlamydia and 916 cases of gonorrhoea, while FPCs reported 1135 cases of chlamydia and 209 of gonorrhoea, and SYHCs 304 cases and 24 cases respectively. These cases represent a large number of potentially curable infections. Of sexual health clinic patients diagnosed with confirmed gonorrhoea, 222 (41.7%) were diagnosed with concurrent infections.

- The number of cases of genital herpes simplex virus (HSV) reported at sexual health clinics has been steadily declining since 1996, with a 10% decrease between 2000 and 2001. Cases of genital herpes in 2001 were associated with European ethnicity, and equally distributed between sexes. Genital warts is the most commonly diagnosed STI at SHCs, with 3304 first diagnoses reported in 2001. For males and females, highest rates are found in the 20 to 24 year age group, with comparable rates across all ethnic groups.

- The majority of STIs were in teenagers and young adults, with about two-thirds of gonorrhoea, chlamydia and genital warts cases in people aged less than 25 years. Young people were also more likely to be diagnosed with concurrent infections. Rates of chlamydia and gonorrhoea at sexual health clinics and family planning clinics were considerably higher in Maori and Pacific peoples than in Europeans.

Introduction

This report summarises the epidemiology of sexually transmitted infections (STIs) for the year 2001, and examines trends since 1995. Using data from sexual health clinics, family planning clinics, student and youth health clinics and diagnostic laboratories, this report covers the STIs which are of public health importance, including chlamydia, gonorrhoea, genital herpes, genital warts, and syphilis. Possible factors underlying the observed distribution and trends in STIs are discussed.

As most STIs are not notifiable in New Zealand, the surveillance of STIs in New Zealand has traditionally been based on data from specialist sexual health clinics. Sexual health clinics provide a free and confidential sexual health service. Although sexual health clinics see only a portion of the population with STIs, their data provides the most comprehensive source of information on the epidemiology of STIs in New Zealand.

Since mid-1998, surveillance has been progressively expanded to include data from family planning and student and youth health clinics to give a more comprehensive picture of the disease burden in New Zealand. Family planning clinics provide sexual and reproductive health services. University and polytechnic health centres provide general health services for students and staff, including sexual health services. Youth health clinics often operate as drop-in centres and provide general and/or specialist health services for youth.

STI cases reported through the clinic-based surveillance system underestimate the true burden of disease in New Zealand because a substantial percentage of STIs are diagnosed by other health providers, particularly general practitioners (GPs). Laboratories do however provide a useful, complementary source of STI data because they receive specimens from all health providers. Therefore, for STIs that rely on laboratory confirmation for the diagnosis, laboratory data can be used to estimate infection rates for the general population.

Laboratory-based surveillance has been operating since 1998 in the Waikato and Bay of Plenty, and in Auckland since 2000. All laboratories report chlamydia and gonorrhoea data.

Methods

Data collection

Clinics

Clinics record anonymous data on the age, sex and ethnicity of all cases meeting one or more of the STI surveillance case definitions on all clinic attendees. Each month clinics send completed case report forms and clinic visit forms either directly to ESR or to a regional co-ordinator. Data are either entered directly onto the national STI surveillance database (Microsoft Access) by ESR staff or entered onto a regional STI surveillance database by a regional co-ordinator. Data from regional STI surveillance databases are sent electronically to ESR each month, where they are merged with data on the national STI surveillance database.

Laboratories

Laboratories in Waikato and Bay of Plenty record anonymous data on laboratory confirmed cases of chlamydia and gonorrhoea by age and sex, as well as the total number of specimens and/or patients tested. Laboratories in Auckland record anonymous data on laboratory confirmed cases of chlamydia and gonorrhoea by age and sex, as well as the total number of specimens and/or patients tested for chlamydia. Each month laboratories send data either directly to ESR, or to a regional co-ordinator who forwards the data to ESR. Laboratory data are entered onto a database (Microsoft Access) by ESR staff.

Case Definitions

The list of sexually transmitted infections under clinic-based surveillance and the case definitions for these infections have varied over time. They were most recently revised in 1998, when STI surveillance was expanded to include data from clinics other than sexual health clinics. The infections currently under surveillance are shown in Table 1 and the case definitions are presented in Appendix B.

Table 1. STIs under clinic-based surveillance

Infection	Category or criteria	Site (for confirmed infections)
Chlamydia	Confirmed or probable (1^{st} diagnosis per month)	Uncomplicated lower anogenital, PID/Epididymitis, other site
Gonorrhoea	Confirmed or probable (1^{st} diagnosis per month)	Uncomplicated urogenital or anorectal, PID/Epididymitis, pharynx, other site
Genital warts	1^{st} diagnosis at reporting clinic	
Genital herpes	1^{st} diagnosis at reporting clinic	
Infectious syphilis	Primary, secondary or early latent	
Non-specific urethritis (NSU)	Males only	
Chancroid	Confirmed or probable	
Granuloma inguinale (GI)	Confirmed or probable	
Lymphogranuloma venereum (LGV)	Confirmed or probable	

STI rates

Clinic-specific rates

The denominator data collected for the calculation of clinic-specific infection rates is defined as the total number of clinic visits per month for any reason. This denominator includes all new and follow-up visits made by clinic attendees, whether for sexual or other health reasons. For specialised youth centres (one-stop shops), denominator data do not include non-clinical visits such as career advice and counselling. Clinic-specific STI rates were calculated by dividing the number of reported cases by the total number of clinic visits.

General population rates

Infection rates for the general population have been calculated in those regions where laboratory data on gonorrhoea and chlamydia are available, using the 2001 Census Population as the denominator.

Data Limitations

Data completeness

All 32 sexual health clinics provided STI surveillance data to ESR for the period January to December 2001.

Thirty-five Family Planning Association (FPA) clinics, including some outreach clinics based in schools or tertiary institutions provided STI surveillance data for January to December 2001. Two FPA clinics closed permanently during the year. Two family planning clinics not affiliated with FPA provided data for January to December 2001. Clinics based in schools or tertiary institutions were closed during school holidays.

Twenty-one student and youth health clinics provided STI surveillance data to ESR during 2001. For various reasons, not all participating student and youth clinics could provide a full 12 months data, some could not provide clinic visits by age and/or ethnicity, and one could not provide denominator data (total clinic visits).

For January to December 2001, all seven laboratories in the Waikato and Bay of Plenty and all four laboratories in Auckland reported gonorrhoea and chlamydia data to ESR.

Generalisability

Clinics participating in STI surveillance are located in cities and some larger rural towns. Most other rural towns and isolated populations have limited or no access to the services offered by sexual health and family planning clinics. University and polytechnic student health clinics provide services to only those students and staff who attend their institution.

While STIs are diagnosed and treated by a range of health providers including GPs, sexual health clinics diagnose a substantial proportion of the total number of STIs, and their data provide an alert for changes occurring in the wider population.

Because not all student and youth health clinics in New Zealand provide STI surveillance data and some provide incomplete data, data presented for these clinics, particularly analysis by age group and ethnicity, may not be representative of all student and youth health clinics.

Valid comparisons between infection rates at different clinic types are not possible due to differences in the range of services provided, and therefore differences in the denominator (total clinic visits) used to calculate infection rates. Sexual health clinics provide mainly STI-related sexual health services, family planning clinic provide mainly non-STI sexual and reproductive health services, and student and youth health clinics provide mainly general health services. Therefore, sexual health clinics will see fewer people than family planning clinics and student and youth clinics but diagnose more STIs, and as a result STI rates at sexual health clinics are higher than STI rates at other clinic types.

Comparison with previous years

It is not possible to directly compare STI rates at sexual health clinics from 1998 onwards with rates from previous years, as a different denominator (the number of new clinic patients, defined as patients first attending the sexual health clinic and patients re-attending after ≥3 months had elapsed) was used prior to 1998.

Sexual Health Clinics

Overview

In 2001, the 32 sexual health clinics reported 8785 confirmed STI cases. Of all sexual health clinics attendees, 11.5% were diagnosed with an STI. Genital warts was the most commonly reported STI, followed by confirmed chlamydia, NSU in males, genital herpes, confirmed gonorrhoea and syphilis (Table 2). No cases of chancroid, granuloma inguinale or lymphogranuloma venereum were reported during 2001. A further 615 probable cases of chlamydia and 63 probable cases of gonorrhoea were reported, so that the total number of STI cases (confirmed and probable) reported in 2001 was 9463.

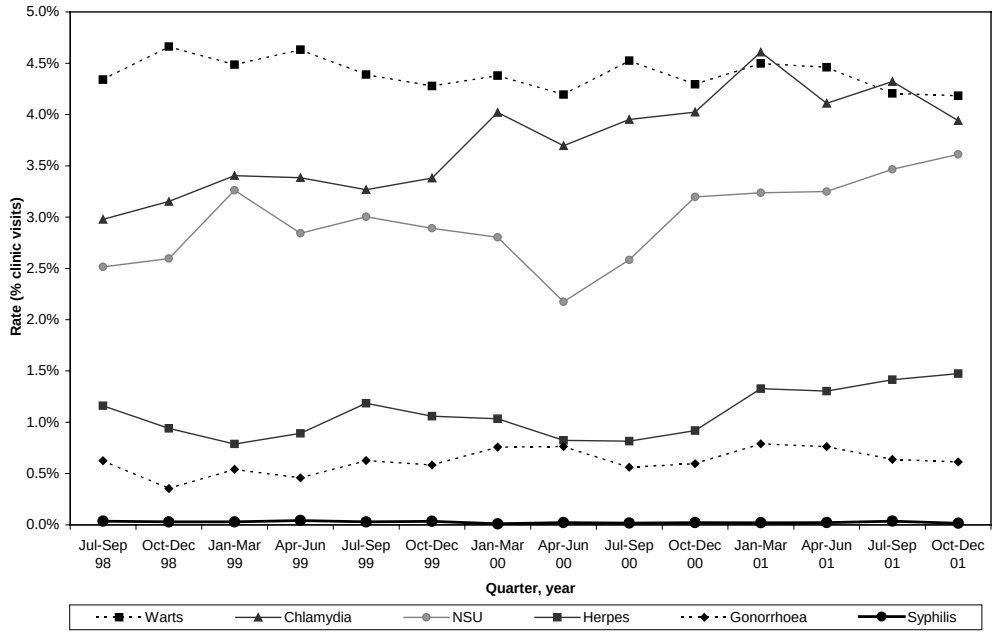
Table 2. Confirmed STI rates and age comparisons at sexual health clinics: 2001

Infection	Cases	Rate[1]	Mean age	Median age	Age range
Chlamydia	3238	3.8%	22.5	21	13-69
Gonorrhoea	533	0.7%	24.6	22	13-60
Genital herpes	638	0.8%	28.9	27	15-64
Genital warts	3304	4.3%	24.8	22	13-81
Syphilis	18	0.0%	36.2	34	22-72
NSU (males only)	1053	3.4%	29.6	27	13-66
Total STI cases	**8785**	**11.5%**	**24.8**	**23**	**13-81**
Total clinic visits	76,257				

[1]Number of cases divided by total number of clinic visits. For NSU, number of cases divided by number of male clinic visits (31039).

Figure 1 shows infection rates for the six main STIs reported by sexual health clinics by quarter from July 1998, when the denominator used for calculating rates changed. During this 42 month period, genital warts was the most commonly reported STI, followed by confirmed chlamydia, NSU in males, genital herpes, confirmed gonorrhoea, and syphilis. If probable cases are included in the total, then chlamydia becomes the most commonly reported STI.

Figure 1. Trends in confirmed STI rates at sexual health clinics: July 1998 - December 2001



Because the denominator used for calculating rates changed in 1998, rate comparisons between the years 1998 to 2001 and the years 1995 to 1997 are not possible. Therefore, Table 3 shows the annual number of confirmed STI cases from 1996 to 2001. During this period the number of clinic visits, however they were defined, were relatively stable. Figure 2 shows the percentage increase or decrease in the number of STI cases for 1996 to 2001 compared with the number of STI cases in 1996.

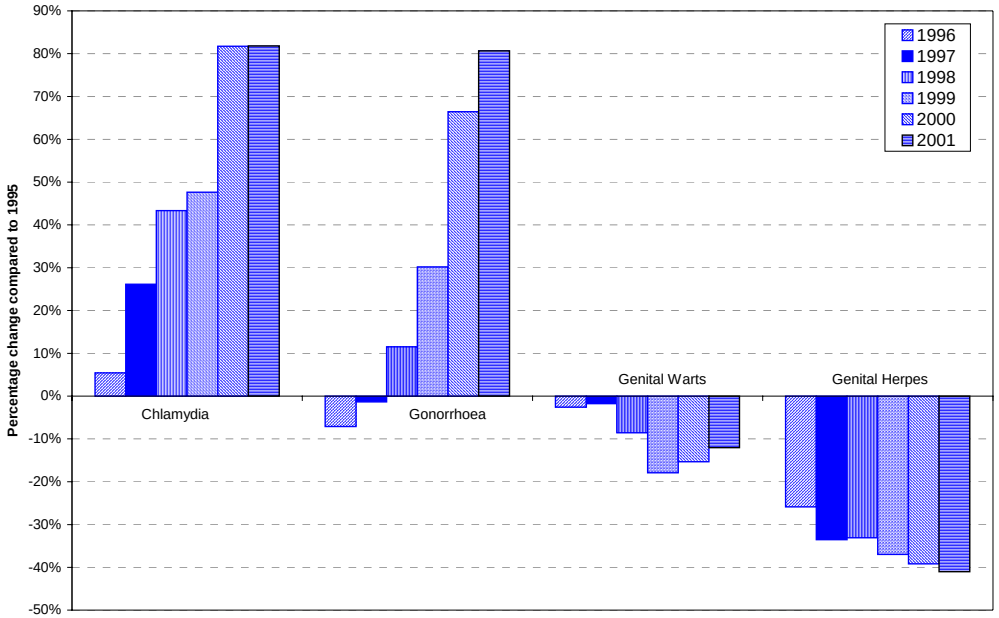
Table 3. Number of confirmed STI cases at sexual health clinics, 1996-2001

	1996	1997	1998	1999	2000	2001
Chlamydia	1665	1992	2263	2331	2870	3238
Gonorrhoea	274	291	329	384	491	533
Genital Herpes	802	719	724	682	658	638
Genital Warts	3660	3691	3434	3083	3181	3304
Syphilis	23	27	24	23	13	18
NSU (males only)	-	-	830[1]	874	825	1054

[1]Annualised, based on July to December 1998 data.

As shown in Table 3 and Figure 2, the number of confirmed chlamydia cases at sexual health clinics increased each year from 1996 to 2001, with an overall increase of 95%. The number of confirmed gonorrhoea cases has increased from 1996 to 2001. The overall increase in gonorrhoea from 1996 to 2001 was 95%. The number of genital herpes cases decreased between 1996 and 1997, but remained relatively stable from 1997 onwards. The number of genital warts cases was similar from 1996 to 1997, decreased in 1998 and 1999, and increased in 2000 and 2001. There was little change in the number of syphilis cases between 1996 and 1999, but case numbers dropped considerably from 1999 to 2001. NSU reporting began in 1998 with little change in the number of NSU cases in males between 1998 and 2000, but with a 27% overall increase from 1998 to 2001.

Figure 2. Percentage change in the number of STI cases for 1996 to 2001 compared with 1995



Clinic attendee demographics

Comparison of general population demographics with those of sexual health clinic attendees and cases was restricted to people aged 15-44 years because this is the age range that accounts for the vast majority (92%) of sexual health clinic attendees. Please note that longitudinal trends in ethnicity data must be interpreted with caution because ethnicity classification within the census and by health professionals has changed over time.

When sexual health clinic attendance data for 2001 are compared with 2001 census data, it is apparent that sexual health clinics see a higher proportion of persons aged 15-19 years (22.7% vs 16.4%), 20-24 years (27.3.% vs 14.9%), and 25-29 years (18.0% vs 15.3%) than were in the general population (Table 4). In comparison to clinic attendance patterns, chlamydia, gonorrhoea, and genital warts were more common among those aged 15-19 years and 20-24 years, while genital herpes was more common among those in the older age groups (25-44 years).

In 2001, sexual health clinics saw a higher proportion of females than were in the general population (59.3% vs 48.8%). Compared to clinic attendance patterns, all four STIs, particularly gonorrhoea, were less commonly diagnosed among females.

In comparison to their distribution in the general population, Europeans and Maori attended sexual health clinics slightly more frequently (72.4% vs 69.9% for European, 18.1% vs 14.1% for Maori) and Pacific peoples attended less frequently (3.4% vs 5.4%). Compared to clinic attendance patterns, chlamydia and gonorrhoea were much more common among Maori and Pacific peoples, while genital warts and genital herpes were more common among Europeans.

Table 4. Demographic comparison: general population, sexual health clinic attendees and STI cases (aged 15-44 years only)

	Census (2001)	Total visits (2001)	Chlamydia	Gonorrhoea	Genital Herpes	Genital Warts
Age group						
15-19 years	16.4%	24.7%	38.6%	30.8%	14.9%	27.4%
20-24 years	14.9%	29.7%	35.6%	33.8%	28.4%	36.0%
25-29 years	15.3%	19.7%	14.9%	16.2%	22.5%	18.9%
30-34 years	17.3%	12.4%	5.9%	9.3%	15.7%	9.6%
35-39 years	18.4%	8.3%	3.8%	6.7%	10.3%	5.0%
40-44 years	17.7%	5.2%	1.3%	3.2%	8.3%	3.2%
Sex						
Female	48.8%	59.3%	54.0%	44.3%	53.9%	51.6%
Male	51.2%	40.7%	46.0%	59.7%	46.1%	48.4%
Ethnicity						
European	69.9%	72.4%	50.1%	37.9%	77.4%	77.3%
Maori	14.1%	18.1%	38.4%	41.3%	13.9%	14.8%
Pacific peoples	5.4%	3.4%	7.5%	14.3%	0.9%	3.0%
Other	6.6%	5.3%	3.6%	6.4%	6.74%	4.4%
Unknown	4.0%	0.7%	0.5%	0.19%	0.9%	0.4%

Chlamydia

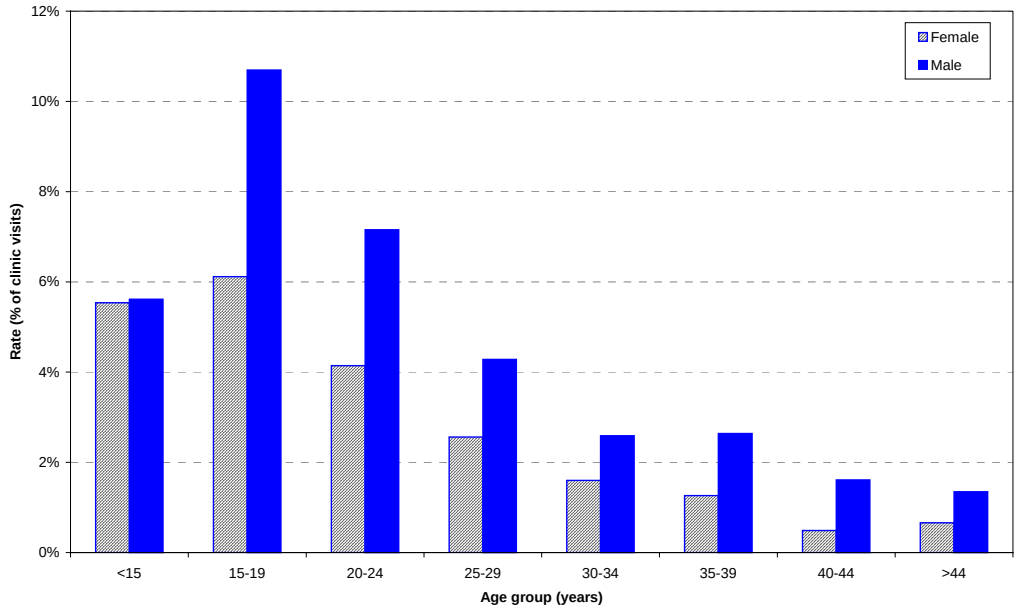
Infections caused by *Chlamydia trachomatis* are the most commonly reported bacterial STI in New Zealand. Symptoms may include vaginal discharge and/or dysuria in females and urethral discharge and/or dysuria in males. Chlamydia is also implicated in females who present with sterile pyuria. However, up to 80% of chlamydial infections in females and up to 50% in males are asymptomatic, which means that the true number of infected people is likely to be much higher than the cases reported. Infection in females may progress to pelvic inflammatory disease (PID), which is a major cause of chronic pelvic pain, infertility, and ectopic pregnancy. In men, infection can progress to epididymitis and in some instances, infertility. Another important but uncommon complication that occurs mainly in males is Reiters syndrome (reactive arthritis, conjunctivitis and urethritis). Infants born vaginally to infected mothers can be infected during delivery, resulting in neonatal ophthalmia or pneumonia.

A total of 3238 confirmed chlamydia cases were reported by sexual health clinics in 2001, 13% more than the 2870 cases reported in 2001. The rate of confirmed chlamydia in 2001 was significantly higher than the rate in 2000 (4.2% vs 3.9%; p=0.0017). A further 615 probable cases of chlamydia were reported by sexual health clinics in 2001. Overall, 16% of all chlamydia cases reported by sexual health clinics during 2001 were classified as probable. If these are included in the total, chlamydia becomes the most commonly diagnosed STI at sexual health clinics.

The majority (73%) of confirmed chlamydia cases at sexual health clinics were aged less than 25 years. The mean age of chlamydia cases was 22.5 years and the median age was 21 years (range 13-69 years). The mean age of female cases was significantly younger than that of male cases (mean age 20.6 vs 24.8 years; $p < 0.0001$).

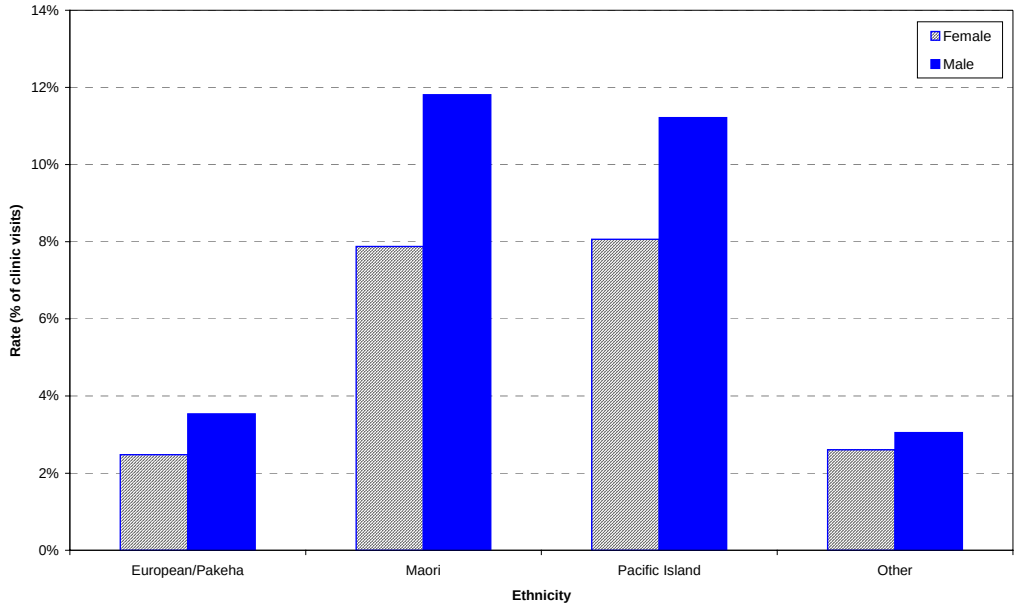
The number of confirmed chlamydia cases at sexual health clinics was highest in the 15-19 year-old age group (36%), followed by the 20-24 year-old age group (34%). Rates of chlamydia were highest in sexual health clinic attendees aged 15-19 years (10.7%), followed by those aged 20-24 years (7.2%) (Figure 3).

Figure 3. Rates of confirmed chlamydia at sexual health clinics by age group and sex: 2001



Of the 3238 sexual health clinic attendees diagnosed with confirmed chlamydia, 1621 (50%) were European, 1244 (38%) were Maori and 243 (8%) were Pacific peoples. However, as shown in Figure 4, rates of chlamydia at sexual health clinics were considerably higher in Pacific peoples (9.4%) and Maori (9.0%) than in Europeans (2.9%).

Figure 4. Rates of confirmed chlamydia at sexual health clinics by ethnicity and sex: 2001



Chlamydia: site of infection

Of the 3238 confirmed chlamydial infections at sexual health clinics in 2001, 3127 (96.6%) were uncomplicated lower anogenital infections, 103 (3.2%) were complicated infections (PID in females and epididymitis in males), and 10 (0.3%) were uncomplicated extra-genital infections. Three sexual health clinic attendees were diagnosed with confirmed chlamydial infections at multiple sites (lower anogenital and other site).

Of the 103 sexual health clinic attendees with complicated chlamydial infections, 75 (73%) were females diagnosed with PID and 28 (27%) were males diagnosed with epididymitis. Eighty percent of clinic attendees diagnosed with PID or epididymitis were aged less than 25 years. Europeans accounted for 40% of complicated chlamydia cases, Maori 45% and Pacific peoples 12%. There was a significant difference in the mean age of sexual health clinic attendees with complicated chlamydial infections versus uncomplicated chlamydial infections (21.1 vs 22.6 years; p=0.0289).

Chlamydia: trends 1996-2001

The number of confirmed chlamydia cases reported by sexual health clinics increased each year from 1996 to 2001, with an overall increase of 95%. As shown in Table 5, the increase in chlamydia cases between 1996 and 2001 occurred in all age, sex and ethnic groups. During this period, the percentage of total chlamydia cases in each age, sex and ethnic group remained relatively constant, suggesting that the increase was similar across all groups.

Table 5. Chlamydia trends at sexual health clinics by age group, sex and ethnicity: 1996-2001

	1996[1]		1997		1998		1999		2000		2001	
	No	***%*[2]**	**No**	***%***	**No**	***%***	**No**	***%***	**No**	***%***	**No**	***%***
***Age group*[3]**												
<15 years	14	*1*	22	*1*	22	*1*	27	*1*	35	*1*	64	*2*
15-19 years	611	*37*	665	*33*	776	*34*	770	*33*	977	*34*	1204	*37*
20-24 years	640	*38*	769	*39*	871	*38*	833	*36*	1040	*36*	1108	*34*
25-29 years	184	*11*	297	*15*	320	*14*	399	*17*	455	*16*	464	*14*
30-39 years	156	*9*	189	*9*	214	*9*	239	*10*	273	*10*	301	*10*
40+ years	60	*4*	50	*3*	60	*3*	62	*3*	90	*3*	97	*3*
Sex												
Female	852	*51*	977	*49*	1206	*53*	1239	*53*	1540	*54*	1747	*54*
Male	813	*49*	1015	*51*	1061	*47*	1092	*47*	1330	*46*	1491	*46*
***Ethnicity*[3]**												
European	880	*53*	1028	*53*	1186	*52*	1211	*52*	1451	*51*	1621	*50*
Maori	525	*32*	644	*33*	781	*35*	843	*36*	1041	*36*	1244	*38*
Pacific peoples	131	*8*	167	*9*	152	*7*	150	*6*	226	*8*	243	*8*
Other	65	*4*	77	*4*	108	*5*	94	*4*	111	*4*	115	*4*
Total	**1665**		**1992**		**2263**		**2331**		**2870**		**3238**	

[1]Age and ethnicity were not available prior to July 1996, but have been estimated for the year based on data from July-December 1996.

[2]Percentage of total cases in each age, sex and ethnic group.

[3]Because unknown age and ethnicity are not shown, the number of cases may not equal the total number of cases.

Gonorrhoea

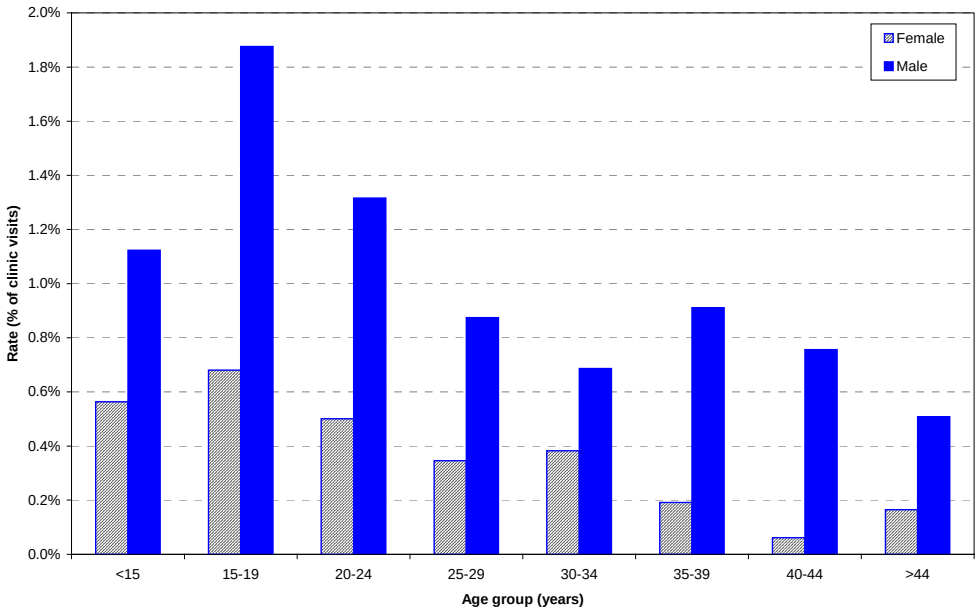
Infections due to the bacterium *Neisseria gonorrhoeae* have been increasing since the lowest annual number was reported to ESR in 1996. Symptoms may include vaginal discharge and/or dysuria in females and urethral discharge and/or dysuria in males. Infection is asymptomatic in up to 50% of females, compared with only 10% of males. Gonococcal infections may be associated with long term complications, with ascending infection a cause of PID in females, and less frequently epididymitis in males. Genital gonococcal infection is commonly accompanied by genital chlamydial infection.

A total of 533 confirmed gonorrhoea cases were reported by sexual health clinics in 2001, 9% more than the 491 cases reported in 2000. The rate of confirmed gonorrhoea at sexual health clinics in 2001 was the same as the rate in 2000 (0.7%; p=0.0518). A further 63 probable cases of gonorrhoea were reported by sexual health clinics in 2001. Overall, 11% of all gonorrhoea cases reported by sexual health clinics during 2001 were classified as probable.

The majority (61%) of confirmed gonorrhoea cases at sexual health clinics were aged less than 25 years. The mean age of gonorrhoea cases was 24.6 years and the median age was 22 years (range 13-60 years). The mean age of female cases was significantly younger than that of male cases (mean age 21.6 vs 26.7 years; $p < 0.0001$).

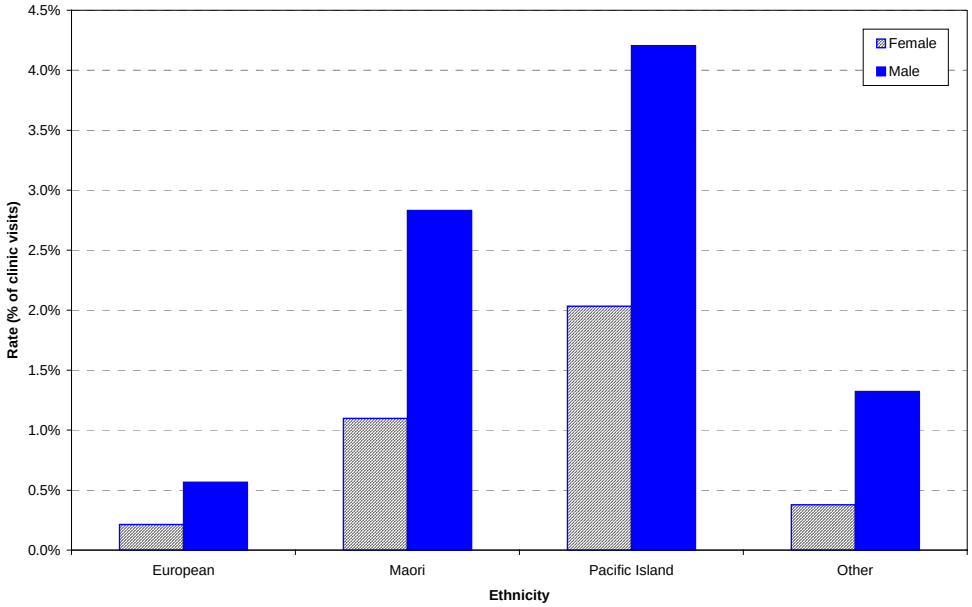
The number of confirmed gonorrhoea cases at sexual health clinics was highest in the 20-24 year-old age group (32%), followed by the 15-19 year-old age group (29%). Rates of gonorrhoea were highest in sexual health clinic attendees aged 15-19 years (0.9%%), followed by those aged 20-24 years (0.8%) (Figure 5).

Figure 5. Rates of confirmed gonorrhoea at sexual health clinics by age group and sex: 2001



Of the 533 sexual health clinic attendees diagnosed with confirmed gonorrhoea, 220 (41.2%) were Maori, 202 (38%) were European and 76 (14%) were Pacific peoples. However, as shown in Figure 6, rates of gonorrhoea at sexual health clinics were highest in Pacific peoples (2.9%), followed by Maori (1.6%) and Europeans (0.4%).

Figure 6. Rates of confirmed gonorrhoea at sexual health clinics by ethnicity and sex: 2001



Gonorrhoea: site of infection

Of the 533 confirmed gonococcal infections at sexual health clinics in 2001, 31 (6%) were complicated infections (PID in females and epididymitis in males) and the remainder were uncomplicated infections: 473 (89%) were urogenital, 32 (6%) were anorectal, 17 (3.2%) were pharyngeal, and one (0.2%) was extra-genital. Eighteen sexual health clinic attendees had gonococcal infections at multiple sites. Anorectal infections were more common among males (23/32, 72%) than females, as were pharyngeal infections (14/17, 82%).

Of the 31 sexual health clinic attendees with complicated gonococcal infections, 23 (74%) were females diagnosed with PID and 8 (26%) were males diagnosed with epididymitis. The majority (58%) of sexual health clinic attendees with complicated gonococcal infections were aged less than 25 years. Twenty-six percent of clinic attendees with complicated gonococcal infections were European, 45% were Maori, and 19% were Pacific peoples. There was no significant difference in the mean age of sexual health clinic attendees with complicated gonococcal infections versus uncomplicated gonococcal infections (24.2 vs 24.6 years; $p = 0.7706$).

Gonorrhoea: trends 1996-2001

Between 1995 to 2001, the number of confirmed gonorrhoea cases at sexual health clinics increased by 67%, from 295 to 492 (Table 6). The number of gonorrhoea cases reported in 2000 was 80% higher than the number reported in 1996, the year when the lowest annual number of cases was reported to ESR. The increase in gonorrhoea cases occurred in all age, sex and ethnic groups. However, the percentage of total gonorrhoea cases in each ethnic group varied over time, and suggests that the increase in gonorrhoea was greater among Maori and Pacific peoples than among Europeans.

Table 6. Gonorrhoea trends at sexual health clinics by age group, sex and ethnicity: 1996-2001

	1996[1]		**1997**		**1998**		**1999**		**2000**		**2001**	
	No	***%[2]***	**No**	***%***			**No**	***%***	**No**	***%***	**No**	***%***
Age group[3]												
<15 years	1	*0.3*	5	*2*	3	*1*	10	*3*	5	*1*	7	*1*
15-19 years	51	*17*	98	*34*	115	*35*	128	*33*	180	*37*	156	*29*
20-24 years	39	*14*	91	*31*	98	*30*	126	*33*	154	*31*	171	*32*
25-29 years	25	*9*	48	*16*	45	*14*	60	*16*	72	*15*	82	*15*
30-39 years	12	*4*	37	*13*	42	*13*	36	*9*	58	*12*	81	*15*
40+ years	10	*4*	12	*4*	26	*8*	24	*6*	22	*4*	36	*7*
Sex												
Female	46	*17*	125	*43*	147	*45*	172	*45*	220	*45*	215	*40*
Male	92	*34*	166	*57*	182	*55*	212	*55*	271	*55*	318	*60*
Ethnicity[3]												
European	46	*17*	104	*36*	97	*29*	100	*26*	140	*29*	202	*38*
Maori	49	*18*	124	*43*	169	*51*	204	*53*	245	*50*	220	*41*
Pacific peoples	28	*10*	39	*13*	40	*12*	55	*14*	78	*16*	76	*14*
Other	4	*1*	12	*4*	19	*6*	19	*5*	18	*4*	34	*6*
Total	**274**		**291**		**329**		**384**		**491**		**533**	

[1]Age and ethnicity were not available prior to July 1996, but have been estimated for the year based on data from July-December 1996.

[2]Percentage of total cases in each age, sex and ethnic group.

[3]Because unknown age and ethnicity are not shown, the number of cases may not equal the total number of cases.

Genital herpes (1st diagnosis)

Genital herpes can result from infection with either herpes simplex virus type 1 (HSV-1) or type 2 (HSV-2). HSV-2 is traditionally regarded as the primary cause of genital infections, and HSV-1 is mainly associated with oral infection. However, over recent years HSV-1 has been increasingly associated with genital infection. While asymptomatic transmission is common, symptomatic primary episodes may present as painful anogenital blistering lesions. Recurrent ulcerative episodes are common but are usually milder. For females who acquire genital herpes in pregnancy, there is a risk of potentially fatal neonatal infection.

A total of 638 genital herpes cases were reported by sexual health clinics in 2001, 46 less than the 684 cases reported in 2000. The rate of genital herpes at sexual health clinics in 2001 was not significantly different from the rate in 2000 (0.8% vs 0.9%; p = 0.041906). The mean age of genital herpes cases at sexual health clinics in 2001 was 29 years and the median age was 27 years (range 15-64 years). The mean age of female cases was significantly younger than that of male cases (mean age 27.0 vs 31.0 years; p < 0.0001).

Almost half (47%) of all genital herpes cases at sexual health clinics were aged 20-29 years. However, the highest rates of genital herpes at sexual health clinics were found in people aged 30-39 years (1.1%) or 40 years and over (1.1%) (Figure 7). Of the 638 sexual health clinic attendees diagnosed with genital herpes, 494 (77%) were European, 89 (14%) were Maori and six (0.9%) were Pacific peoples. Rates of genital herpes were considerably higher in Europeans (0.9%) than in Maori (0.6%) and Pacific peoples (0.2%).

Figure 7. Rates of genital herpes at sexual health clinics by age group and sex: 2001

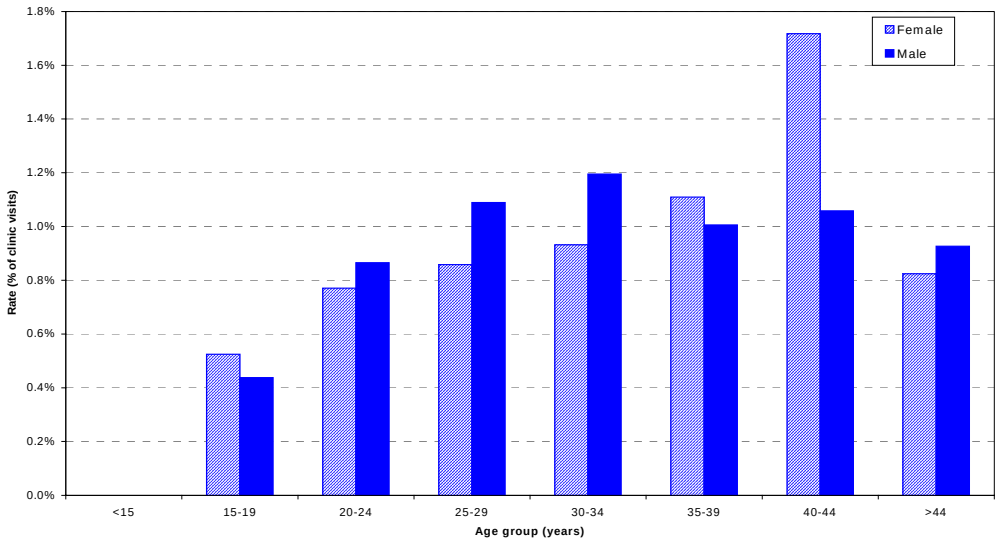
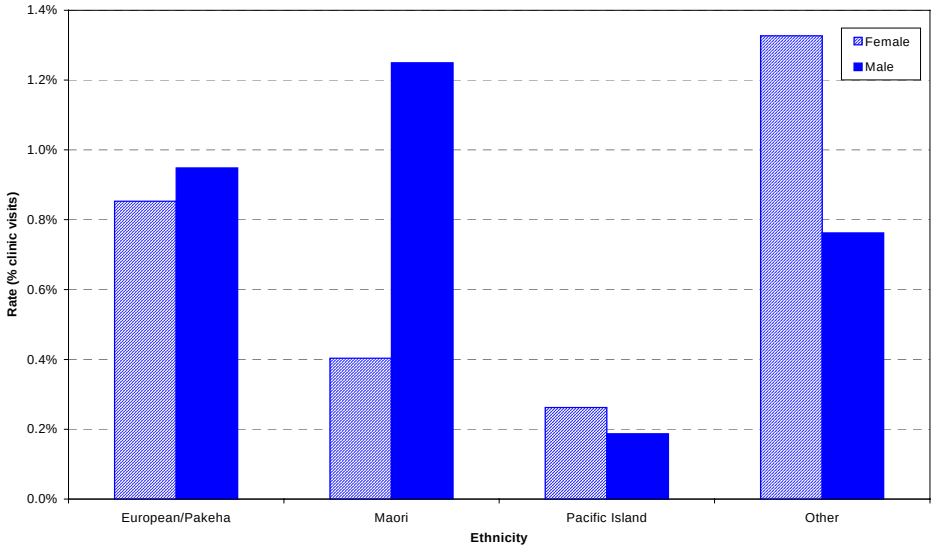


Figure 8. Rates of genital herpes at sexual health clinics by ethnicity and sex: 2001



Genital herpes: trends 1996-2001

Between 1996 to 2001, the number of genital herpes cases reported by sexual health clinics decreased by 20%, from 802 to 638 (Table 7). Most of this decrease occurred between 1996 and 1997, after which the number of genital herpes cases was similar each year. The decrease in genital herpes cases occurred in people aged less than 30 years, in both sexes, and in European and Pacific peoples. Between 1996 and 2001, the percentage of total genital herpes cases in people aged 30-39 years and 40 years and older increased.

Table 7. Genital herpes trends at sexual health clinics by age group, sex and ethnicity: 1996-2001

	1996[1]		1997		1998		1999		2000		2001	
	No	***%*[2]**	**No**	***%***	**No**	***%***	**No**	***%***	**No**	***%***	**No**	***%***
***Age group*[3]**												
<15 years	0	*0*	3		2	*0*	1	*0*	2	*0*	0	*0*
15-19 years	119	*15*	113	*16*	69	*10*	67	*10*	79	*12*	88	*14*
20-24 years	249	*31*	198	*28*	221	*31*	184	*27*	177	*27*	168	*26*
25-29 years	177	*22*	172	*24*	171	*24*	155	*23*	136	*21*	133	*21*
30-39 years	181	*23*	161	*22*	172	*24*	176	*26*	176	*27*	154	*25*
40+ years	77	*10*	72	*10*	89	*12*	99	*15*	88	*13*	95	*18*
Sex												
Female	401	*50*	353	*49*	338	*47*	330	*50*	339	*52*	344	*54*
Male	401	*50*	366	*51*	386	*53*	343	*50*	319	*48*	294	*46*
***Ethnicity*[3]**												
European	687	*86*	591	*82*	580	*80*	547	*80*	527	*80*	494	*77*
Maori	76	*9*	69	*10*	93	*13*	73	*11*	80	*12*	89	*14*
Pacific peoples	21	*3*	11	*2*	13	*2*	13	*2*	8	*1*	6	*1*
Other	17	*2*	22	*3*	27	*4*	38	*6*	34	*5*	43	*7*
Total	**802**		**719**		**724**		**682**		**658**		**638**	

[1]Age and ethnicity were not available prior to July 1996, but have been estimated for the year based on data from July-December 1996.

[2]Percentage of total cases in each age, sex and ethnic group.

[3]Because unknown age and ethnicity are not shown, the number of cases may not equal the total number of cases.

Genital warts (1st diagnosis)

Human papillomavirus (HPV) is the most commonly reported STI in New Zealand. Most HPV infections are sub-clinical and asymptomatic. While clinical manifestations are usually as benign visible skin lesions, these can cause substantial discomfort and psychological distress. There are over 80 HPV types, with most visible anogenital warts caused by HPV types 6 and 11. However, patients may also be infected with oncogenic "high risk" HPVs such as types 16 and 18, which are associated with cervical cancer.

A total of 3304 genital warts cases were reported by sexual health clinics in 2001, 3% more than the 3198 cases reported in 2000. The rate of genital warts at sexual health clinics in 2001 was not significantly different to the rate in 2000 (4.3% vs 4.4%; p = 0.704713). The majority (62%) of genital warts cases were aged less than 25 years. The mean age for genital warts cases was 24.7 years and the median age was 22 years (range 13-81 years). Female cases were significantly younger than male cases (mean age 22.7 vs 26.9 years; p < 0.0001).

The number of genital warts cases at sexual health clinics was highest in the 20-24 year-old age group (35%), followed by the 15-19 year-old age group (27%). Rates of genital warts were highest in sexual health clinic attendees aged 20-24 years (5.5%), followed by those aged 15-19 years (5.1%) (Figure 9). Of the 3304 sexual health clinic attendees diagnosed with genital warts, 2555 (77%) were European, 492 (15%) were Maori and 98 (3%) were Pacific peoples. Rates of genital warts were similar in Europeans (4.6%), Pacific peoples (3.8%), and Maori (3.6%) (Figure 10).

Figure 9. Rates of genital warts at sexual health clinics by age group and sex: 2001

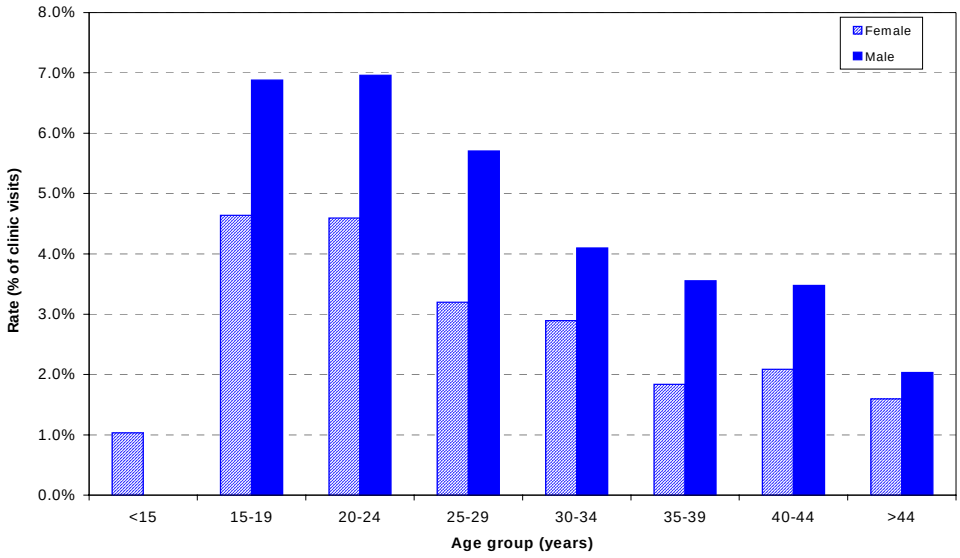
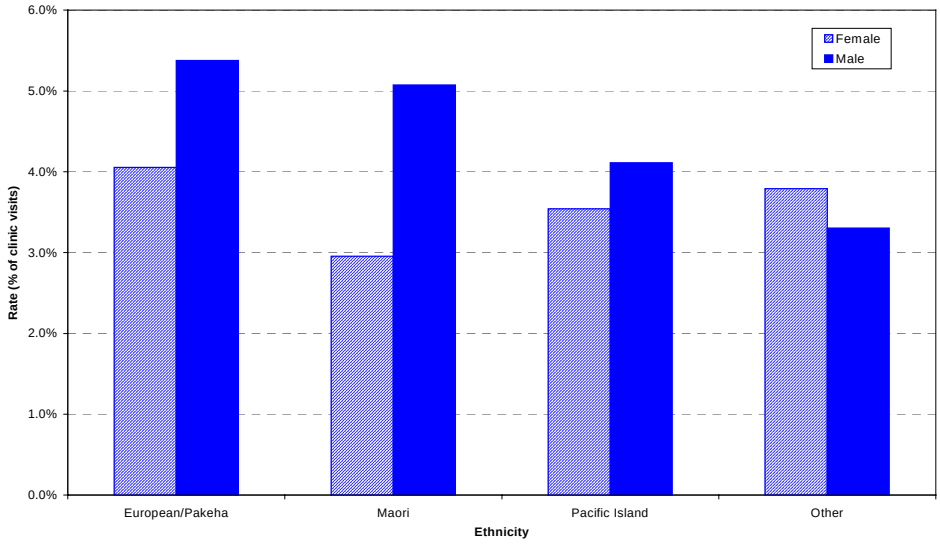


Figure 10. Rates of genital warts at sexual health clinics by ethnicity and sex: 2001



Genital warts: trends 1996-2001

Between 1996 to 2001, the number of genital warts cases at sexual health clinics decreased by 11%, from 3660 to 3304. However, case numbers have been increasing over the 2000-2001 period; an increase of 3% was noted in 2000 (compared to 1999) and 4% in 2001 (compared to 2000).

As shown in Table 8, the overall decrease in genital warts cases occurred in both sexes, in all age groups (except 40 years and older), and in Europeans and Maori. Between 1996 and 2001, the percentage of total genital warts cases in people aged 40 years and older increased.

Table 8. Genital warts trends at sexual health clinics by age group, sex and ethnicity: 1996-2001

	1996[1]		1997		1998		1999		2000		2001	
	No	***%***[2]	**No**	***%***	**No**	***%***	**No**	***%***	**No**	***%***	**No**	***%***
Age group[3]												
<15 years	8	*0*	10	*0*	12	*0*	10	*0*	10	*0*	11	*0*
15-19 years	964	*26*	909	*25*	842	*25*	758	*25*	794	*25*	874	*26*
20-24 years	1446	*40*	1488	*40*	1315	*38*	1166	*38*	1143	*36*	1149	*35*
25-29 years	638	*17*	665	*18*	654	*19*	573	*19*	623	*20*	603	*18*
30-39 years	464	*13*	471	*13*	463	*13*	418	*14*	411	*13*	467	*14*
40+ years	140	*4*	148	*4*	147	*4*	155	*5*	200	*6*	200	*6*
Sex												
Female	1869	*51*	1842	*50*	1666	*49*	1533	*50*	1619	*51*	1706	*52*
Male	1791	*49*	1848	*50*	1768	*51*	1550	*50*	1562	*49*	1598	*48*
Ethnicity[3]												
European	2828	*77*	2821	*76*	2623	*76*	2344	*76*	2391	*75*	2555	*77*
Maori	549	*15*	536	*15*	522	*15*	453	*15*	495	*16*	492	*15*
Pacific peoples	107	*3*	105	*3*	108	*3*	89	*3*	102	*3*	98	*3*
Other	79	*2*	87	*2*	84	*2*	115	*4*	135	*4*	145	*4*
Total	**3660**		**3691**		**3434**		**3083**		**3181**		**3304**	

[1]Age and ethnicity were not available prior to July 1996, but have been estimated for the year based on data from July-December 1996.

[2]Percentage of total cases in each age, sex and ethnic group.

[3]Because unknown age and ethnicity are not shown, the number of cases may not equal the total number of cases.

Infectious syphilis

Syphilis is transmitted by the spirochaete *Treponema pallidum*. The first stage of the disease presents as an ulcerative infection that spontaneously heals. If untreated, secondary syphilis will develop in two to eight weeks, and one-third of cases will progress to tertiary syphilis some years later. Untreated early syphilis during pregnancy may result in perinatal death and, if acquired during the four years preceding pregnancy, may lead to infection of the foetus. Only cases of infectious syphilis (primary, secondary and early latent) are reported by clinics for surveillance purposes.

A total of 18 syphilis cases were reported by sexual health clinics in 2001, five (28%) more than were reported in 2000. The rate of syphilis at sexual health clinics in 2001 was not significantly different to the rate in 2000 (0.02% vs 0.02%; p = 0.4343).

The mean and median ages of syphilis cases were 36.2 and 34 years, respectively (range 22-72 years). Of the 18 syphilis cases reported in 2001, nine (50%) were male and nine (50%) were female. Out of the nine male cases three were aged 35-39 years and two were aged 25-29 years. Of the nine females with syphilis, three were aged 20-24 years, three were aged 45 or older years, and two were aged 25-29 years. There was no significant difference in the mean age of male and female syphilis cases (51.6 vs 43.0 years; p = 0.0286).

Of the nine male sexual health clinic attendees with syphilis two were European, two were Pacific peoples and five had their ethnicity classified as Other. Of the nine females with syphilis, one was European, four were Pacific peoples, and four had their ethnicity classified as Other.

NSU (males only)

For surveillance purposes, non-specific urethritis is reported in males only, and is defined as the presence of a urethral discharge where a laboratory confirmed or probable diagnosis of chlamydia or gonorrhoea has been excluded.

A total of 1053 cases of NSU in males were reported by sexual health clinics in 2001, 22% more than the 826 cases reported in 2000. The rate of NSU at sexual health clinics in 2001 (3.4%) was slightly higher than the rate in 2000 (2.7%). The mean and median ages for NSU cases were 29.6 and 27 years, respectively (range 13-66 years). Rates of NSU were similar in all age groups, ranging from 3.2% to 4.5%. NSU rates at sexual health clinics were similar in Europeans (3.4%), Maori (3.8%), and Pacific peoples (3.6%)

Multiple infections

Some sexual health clinic attendees are diagnosed with more than one STI during the same year. Multiple STIs can be diagnosed at the same time (ie, in the same month) or at different times (ie, in two or more months of the same year). Multiple STIs that are diagnosed at the same time are referred to as concurrent infections (eg, both gonorrhoea and chlamydia in March). Multiple STIs that are diagnosed at different times are referred to as subsequent infections. Subsequent infections can be the same as the initial infection (eg, chlamydia in May and again in September) or different (eg, chlamydia in June and then genital warts in August). Some clinic attendees are diagnosed with both concurrent and subsequent infections.

To be identified as having multiple STIs, cases must have the same ID number, age, sex and ethnicity. If any of these details are recorded incorrectly or inconsistently, people with multiple STIs may not be identified. The data presented below underestimate the true number of multiple infections, particularly subsequent infections, due to inconsistent recording of a patient's details during different visits and because they do not take into account diagnoses made in a different year.

Concurrent infections

If a patient has concurrent infections it means they have been diagnosed with more than one STI in the same month. In 2001, 6.2% of Sexual Health Clinic attendees were diagnosed with concurrent infections. Of those with concurrent infections, 506 (6.1%) were diagnosed with two infections in the same month, and nine (0.1%) were diagnosed with three infections in the same month.

Of sexual health clinic patients diagnosed with confirmed chlamydia, 413 (12.8%) were diagnosed with more than one infection: 405 (12.5%) had two infections and eight (0.2%) had three infections (Table 9). Gonorrhoea and genital warts were the most common STI diagnosed in combination with chlamydia.

Table 9. Confirmed chlamydia with other STIs at sexual health clinics: 2001

Combinations	Number of cases	Percent of total
Chlamydia only	2,825	87.2%
Chlamydia/Gonorrhoea	194	6.0%
Chlamydia/Genital herpes	14	0.4%
Chlamydia/Genital warts	194	6.0%
Chlamydia/Syphilis	1	0.0%
Chlamydia/NSU	2	0.1%
Chlamydia/Gonorrhoea/Genital warts	7	0.2%
Chlamydia/Genital herpes/Genital warts	1	0.0%
Total Chlamydia (confirmed)	**3,238**	**100%**

Of sexual health clinic patients diagnosed with confirmed gonorrhoea, 222 (41.7%) were diagnosed with more than one infection: 215 (40.3%) had two infections and seven (1.3%) had three infections (Table 10). Chlamydia was the most common STI diagnosed in combination with gonorrhoea.

Table 10. Confirmed gonorrhoea with other STIs at sexual health clinics: 2001

Combinations	Number of cases	Percent of total
Gonorrhoea only	311	58.3%
Gonorrhoea/Chlamydia	194	36.4%
Gonorrhoea/Genital herpes	5	0.9%
Gonorrhoea/Genital warts	14	2.6%
Gonorrhoea/NSU	2	0.4%
Gonorrhoea/Chlamydia/Genital warts	7	1.3%
Total Gonorrhoea (confirmed)	**533**	**100%**

Of sexual health clinic patients diagnosed with genital herpes, 48 (7.5%) were diagnosed with more than one infection: 46 (7.2%) had two infections and two (0.3%) had three infections (Table

11). Genital warts was the most common STI diagnosed in combination with genital herpes, followed by chlamydia.

Table 11. Genital herpes with other STIs at sexual health clinics: 2001

Combinations	Number of cases	Percent of total
Genital herpes only	590	92.5%
Genital herpes/Chlamydia	14	2.2%
Genital herpes/Gonorrhoea	5	0.8%
Genital herpes/Genital warts	20	3.1%
Genital herpes/NSU	7	1.1%
Genital herpes/Genitalwarts/ Chlamydia	1	0.2%
Genital herpes/Genital warts/NSU	1	0.2%
Total Genital herpes	**638**	**100%**

Of sexual health clinic patients diagnosed with genital warts, 290 (8.7%) were diagnosed with more than one infection: 281 (8.5%) had two infections and nine (0.3%) had three infections (Table 12). Chlamydia was the most common STI diagnosed in combination with genital warts.

Table 12. Genital warts with other STIs at sexual health clinics: 2001

Combinations	Number of cases	Percent of total
Genital warts only	3,014	91.2%
Genital warts/Chlamydia	194	5.9%
Genital warts/Gonorrhoea	14	0.4%
Genital warts/Genital herpes	20	0.6%
Genital warts/NSU	53	1.6%
Genital warts/Chlamydia/Gonorrhoea	7	0.2%
Genital warts/Chlamydia/Genital herpes	1	0.0%
Genital warts/ Genital herpes /NSU	1	0.0%
Total Genital warts	**3,304**	**100%**

Of sexual health clinic patients diagnosed with syphilis, one (5.6%) was also diagnosed with chlamydia (Table 12).

Table 13. Syphilis in other STIs at sexual health clinics: 2001

Combinations	Number of cases	Percent of total
Syphilis only	17	94.4%
Syphilis/Chlamydia	1	5.6%
Total Syphilis	**18**	**100%**

Of sexual health clinic patients diagnosed with NSU, 65 (6.2%) were diagnosed with more than one infection: 64 (6.1%) had two infections and one (0.1%) had three infections (Table 14). Genital warts was the most common STI diagnosed in combination with NSU.

Table 14. NSU in other STIs at sexual health clinics: 2001

Combinations	Number of cases	Percent of total
NSU only	988	93.8%
NSU/Chlamydia	2	0.2%
NSU/Genital herpes	2	0.2%
NSU/Genital warts	53	5.0%
NSU/Gonorrhoea	7	0.7%
NSU/Genital herpes /Genital warts	1	0.1%
Total NSU (males only)	**1,053**	**100%**

As shown in Table 15, sexual health clinic patients diagnosed with two or more infections were more likely to be aged less than 20 years than patients diagnosed with only one infection.

Table 15. Number of STIs at sexual health clinics by age group: 2001

Age group	Number (%) of STI infections			
	One		Two or more	
<15 years	70	0.9%	8	1.6%
15-19 years	2,013	26.0%	211	41.0%
20-24 years	2,526	32.6%	175	34.0%
25-29 years	1,368	17.7%	62	12.0%
30-34 years	740	9.6%	31	6.0%
35-39 years	455	5.9%	12	2.3%
40-44 years	268	3.5%	6	1.2%
45+ years	305	3.9%	10	1.9%
Total	**7,745**	**(100%)**	**515**	**(100%)**

Compared to sexual health clinic patients with one infection, female patients were slightly more likely to be diagnosed with two or more STIs than male patients (Table 16) 6.5% versus 6.0% (Chi-square, p=0.32).

Table 16. Number of STI infections at sexual health clinics by sex: 2001

Sex	Number (%) of STI infections			
	One		Two or more	
Female	3,525	(45.5%)	246	(47.8%)
Male	4,220	(54.5)	269	(52.2%)
Total	**7,745**	**(100%)**	**515**	**(100%)**

Compared to sexual health clinic patients with one infection, patients diagnosed with two or more infections were more likely to be Maori or Pacific peoples (Table 17). Multiple infection rates are Maori 9.4% vs Pacific Island 14.5% vs European 4.5% vs Other 5,5%.

Table 17. Number of STI infections at sexual health clinics by ethnicity: 2001

Ethnicity	Number (%) of STI infections			
	One		Two or more	
European	5,186	67.0%	247	48.0%
Maori	1,814	23.4%	188	36.5%
Pacific peoples	348	4.5%	59	11.5%
Other	358	4.6%	21	4.1%
Unknown	39	0.5%	0	0.0%
Total	**7,745**	**(100%)**	**515**	**(100%)**

Subsequent infections

Of the 7815 sexual health clinic patients diagnosed with an STI in 2001, 400 (5.1%) were diagnosed with an STI in more than one month. Of those with subsequent infections, 365 (4.7%) were diagnosed with STIs in two different months, 29 (0.4%) were diagnosed in three different months, 5 (0.1%) were diagnosed with STIs in four different months and 1 (0.01%) was diagnosed in five different months.

Subsequent infections were more common among females, young people and among Maori and Pacific Island peoples. Subsequent infections were diagnosed in 5.5% of female cases, compared to 4.8% of male cases. Subsequent infections were diagnosed in 13.6% of STI cases aged less than 15 years and 7.3% of cases aged 15-19 years, compared with 3.7% of cases aged 25 years and older. Subsequent infections were diagnosed in 5.5% of Pacific peoples with an STI and 6.4% of Maori, compared with 4.6% of European.

Family Planning Clinics

Clinic attendee demographics

From January to December 2001, the 37 Family Planning Association (FPA) clinics and three non-FPA clinics reported 202 325 clinic visits. Almost all (96%) family planning clinic attendees were female and 63% were aged less than 25 years. Clinics were unable to provide ethnicity data for 15% of clinic attendees. Where ethnicity information was provided, 77% of clinic attendees were European, 7% were Maori, 4% were Pacific peoples, and 12% were other ethnic groups.

STI data

From January to December 2001, the 40 participating family planning clinics reported 2011 confirmed STI cases. Overall, 1% of all attendees were diagnosed with an STI. Chlamydia was the most common diagnosis made at family planning clinics, followed by genital warts, gonorrhoea and genital herpes (Table 18).

Comparisons between family planning clinics and sexual health clinics are problematic as the differences observed primarily reflect differences in attendance patterns, service provision and screening practices. The majority of clients at family planning clinics are female, and the treatment of STIs is only one of a range of sexual and reproductive health services family planning clinics provide.

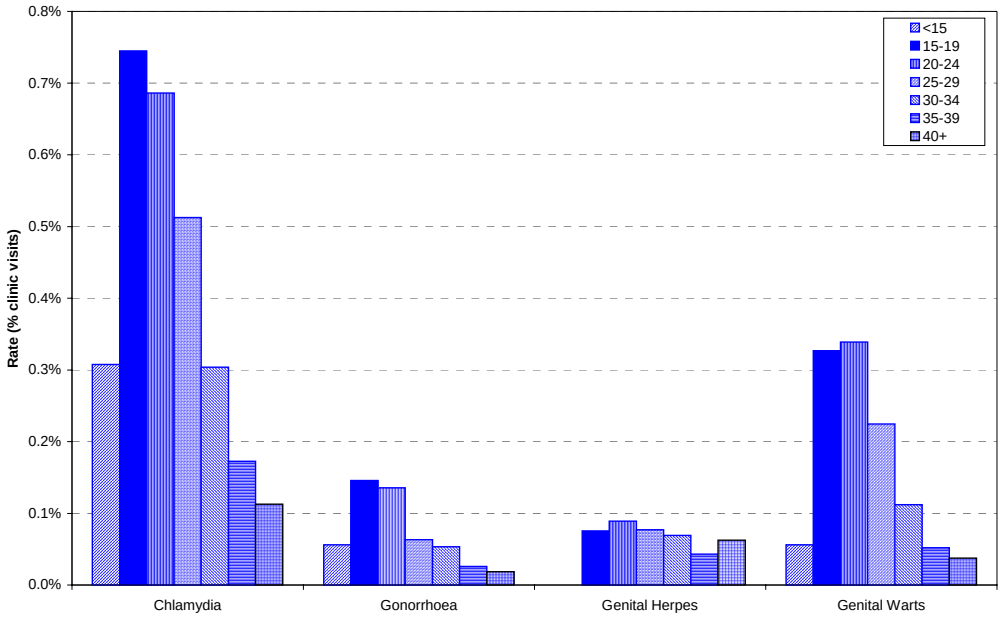
Table 18. Confirmed STI rates and age comparisons at family planning clinics: January-December 2001

Infection	Cases	Rate[1]	Mean age	Median age	Age range
Chlamydia	1135	0.56%	21.7	20	14-74
Gonorrhoea	209	0.10%	21.3	20	14-56
Genital herpes	151	0.07%	24.0	21	15-52
Genital warts	508	0.25%	21.5	20	14-46
Syphilis	2	<0.01%	19.5	19.5	17-22
NSU (males only)	6	0.08%	21.2	20.5	17-26
Total STI cases	**2011**	**1.0%**			
Total clinic visits	202 325				

[1]Rate= (number of cases/number of clinic visits) x 100. For NSU, number of male clinic visits was used as rate denominator (7452).

For chlamydia and gonorrhoea, case numbers and rates (Figure 11) were highest in the 15-19 year-old age group, followed by the 20-24 year-old age group. For genital herpes and warts, the highest number of cases and rates were found in attendees aged 20-24 years.

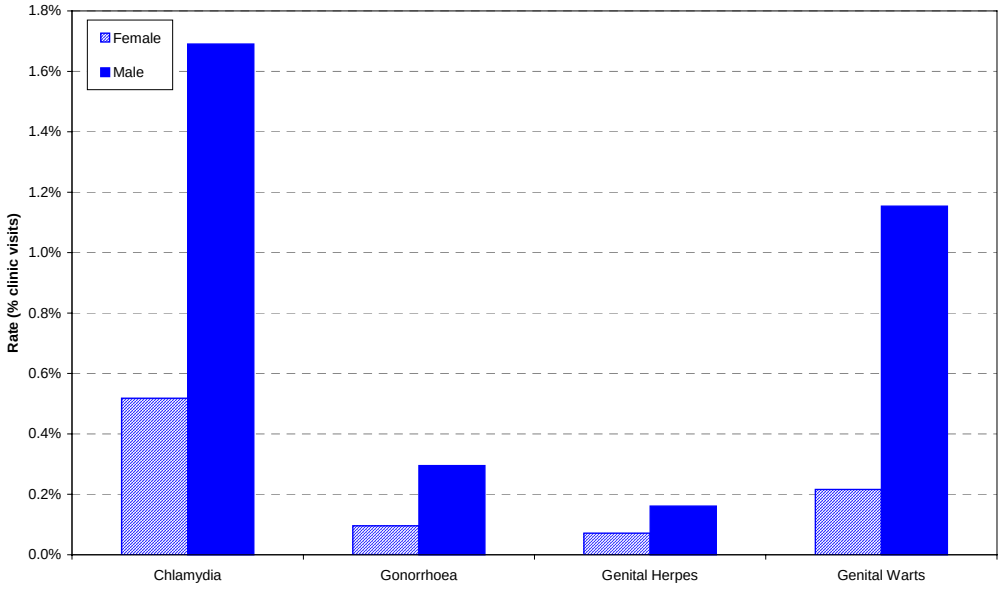
Figure 11. Rates of confirmed STIs at family planning clinics by age group: January-December 2001



Over 80% of all chlamydia, gonorrhoea, genital herpes and genital warts cases were female. However, rates of all STIs were higher in males than females (Figure 12).

The higher STI rates in males than in females probably reflects the fact that STI screens in males attending family planning clinics are often carried out following the diagnosis of an STI in a female partner who attended the clinic.

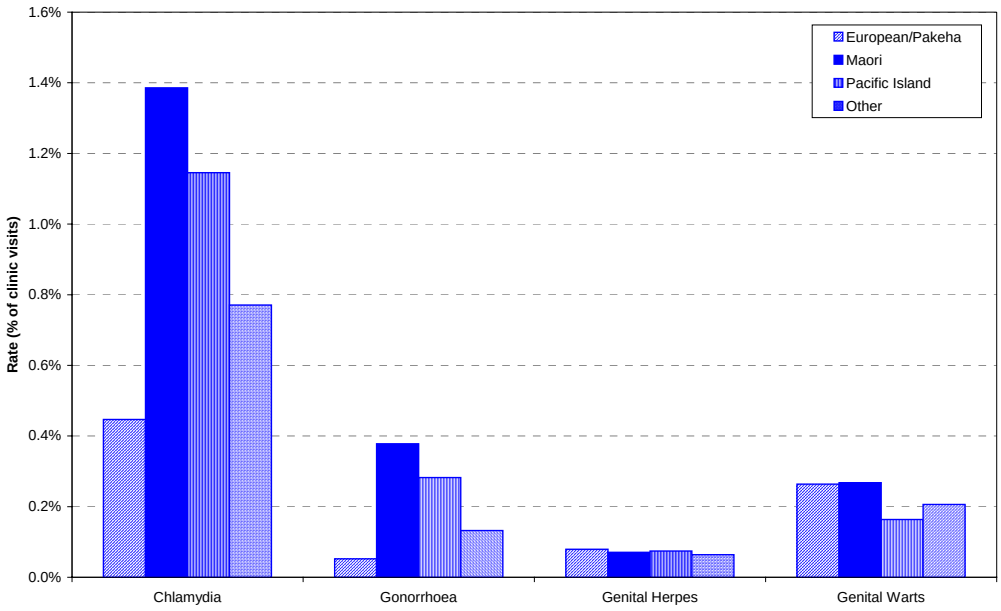
Figure 12. Rates of confirmed STIs at family planning clinics by sex: January-December 2001



Fifty-two percent of confirmed chlamydia cases at family planning clinics were European, 16% were Maori and 7% were Pacific peoples. However, rates of chlamydia were highest in Maori, followed by Pacific peoples (Figure 13). For gonorrhoea, 33% of cases were European, 23% were Maori and 9% were Pacific peoples. Rates of gonorrhoea were highest in Maori, followed by Pacific peoples. For genital herpes, the number of cases and rates were highest in Europeans. Europeans accounted for 69% of all genital warts cases, with highest rates in Europeans and Maori.

STI rates by ethnicity should be interpreted with caution, as ethnicity was not provided for 15% of family planning clinic attendees.

Figure 13. Rates of confirmed STIs at family planning clinics by ethnicity: January-December 2001



Student and Youth Health Clinics

Clinic attendee demographics

Student and youth health clinic reported 147 385 clinic visits during 2001, 70% of which were by females. Many clinics were unable to provide age and ethnicity data for clinic attendees: age was not provided for 53% of clinic attendees and ethnicity was not provided for 57% of clinic attendees. This is because these clinics do not routinely collect this information, or because they are non-computerised and collating this information manually for surveillance purposes is time-consuming. Where age and ethnicity information were provided, 65% were aged less than 25 years, 64% were Europeans, 19% were Maori, 3% were Pacific peoples and 14% were other ethic groups.

STI data

Student and youth health clinics reported 453 confirmed STI cases in 2001. Of all attendees, 0.3% were diagnosed with an STI. Chlamydia was the most common diagnosis, followed by genital warts, genital herpes, and gonorrhoea (Table 19).

The low infection rate at student and youth health clinics compared with sexual health clinics and family planning clinics occurs because STI diagnosis and treatment is only one of a wide range of health services provided by student and youth health clinics.

Table 19. Confirmed STI rates and age comparisons at student and youth health clinics: 2001

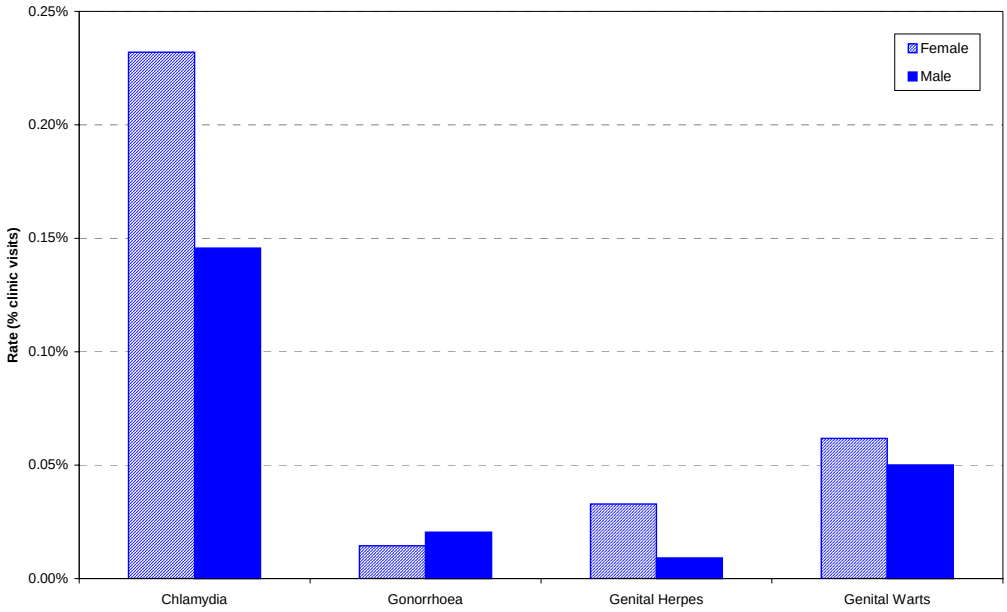
Infection	Cases	Rate[1]	Mean age	Median age	Age range
Chlamydia	304	0.21%	20.7	20	0-44
Gonorrhoea	24	0.02%	22.3	20.5	17-40
Genital herpes	37	0.03%	21.5	21	5-31
Genital warts	86	0.06%	21.2	20	0-48
Syphilis	0	-	-	-	-
NSU	2	<0.01%	19	19	18-20
Total STI cases	**453**	**0.31%**			
Total clinic visits	147 385				

[1]Rate= (number of cases/number of clinic visits) x 100. For NSU, number of male clinic visits was used as rate denominator (43930).

Over 75% of all STI cases at student and youth health clinics were female. Rates of chlamydia, genital herpes and genital warts were higher in females than in males (Figure 14). Rates of gonorrhoea were similar in males and females.

The higher rates of chlamydia, genital herpes and genital warts in females compared with males may reflect more selective screening of females in student and youth health clinics.

Figure 14. Rates of confirmed STIs at student and youth health clinics by sex: 2001

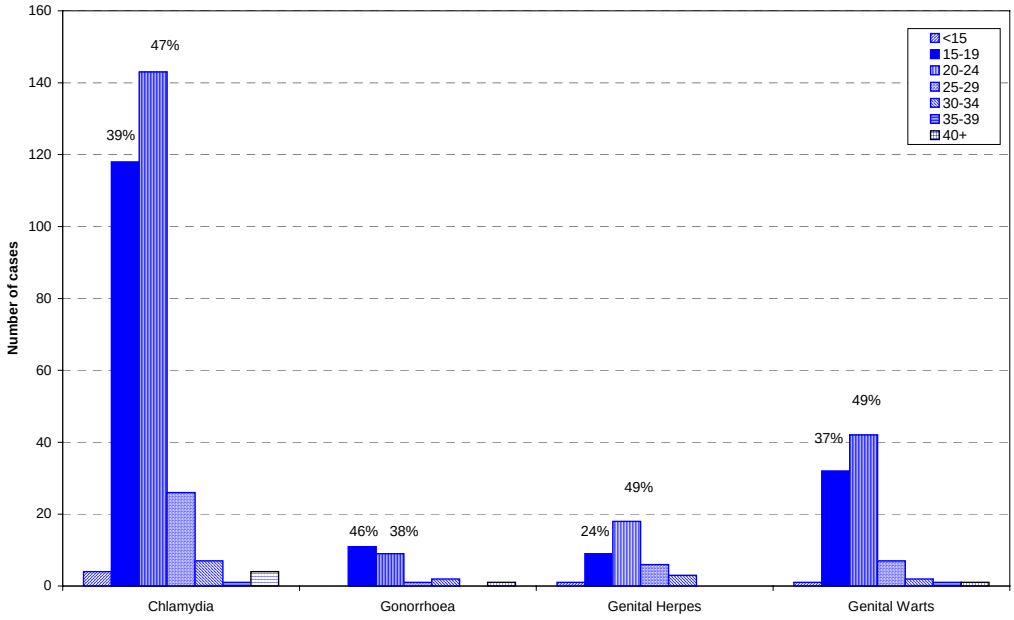


Note: Case numbers, not infection rates, have been presented in Figures 15 and 16. While student and youth clinics almost always provided the age and ethnicity of their cases (the numerator), some could not provide the age and/or ethnicity of all their clinic attendees (the denominator), and therefore STI rates by age and ethnicity would be unreliable.

Figure 15 shows the number and percentage of cases at student and youth health clinics by age group for each STI. For example, of the 293 confirmed chlamydia cases, 48% were aged 20-24 years. For all STIs, over 85% of cases were aged 15-19 or 20-24 years.

The high case numbers in these age groups largely reflects the fact that over two-thirds (68%) of student and youth health clinic attendees of known age are aged 15 to 24 years.

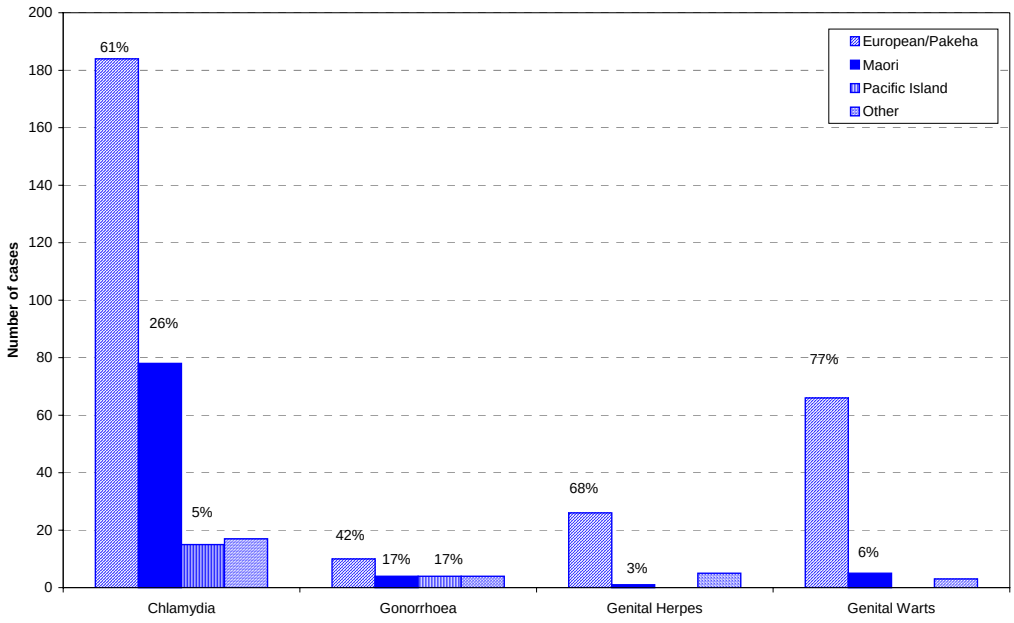
Figure 15. STI cases at student and youth health clinics by age group: 2001



The majority of chlamydia, genital herpes and genital warts cases at student and youth health clinics were European (Figure 16). For gonorrhoea, the majority of cases were Maori or Pacific peoples.

The high case numbers in the European ethnic group reflects the higher attendance for this group, and infection rates will not necessarily follow the same pattern. For example, for chlamydia, while the number of STIs in Maori was approximately half the number in Europeans, only 19% of clinic attendees of known ethnicity were Maori whereas 65% were European. This suggests that chlamydia rates at student and youth health clinics would be higher in Maori than in Europeans.

Figure 16. STI cases at student and youth health clinics by ethnicity: 2001



Laboratory surveillance

Chlamydia

Waikato and Bay of Plenty

During 2001, laboratories in Waikato and Bay of Plenty (BOP) tested 39,283 specimens for chlamydia, and reported 3265 (8.3%) positive cases. Females accounted for 73% of all cases. The mean age of chlamydia cases was 23.2 years (median age 20, range 0-71 years). Over two-thirds (72%) of all chlamydia cases were aged 15-24 years. Ninety seven cases of chlamydia were reported in people aged less than 15 years; of these, 77 were teenagers aged 12 to 14 years, and 20 were infants aged less than 12 months.

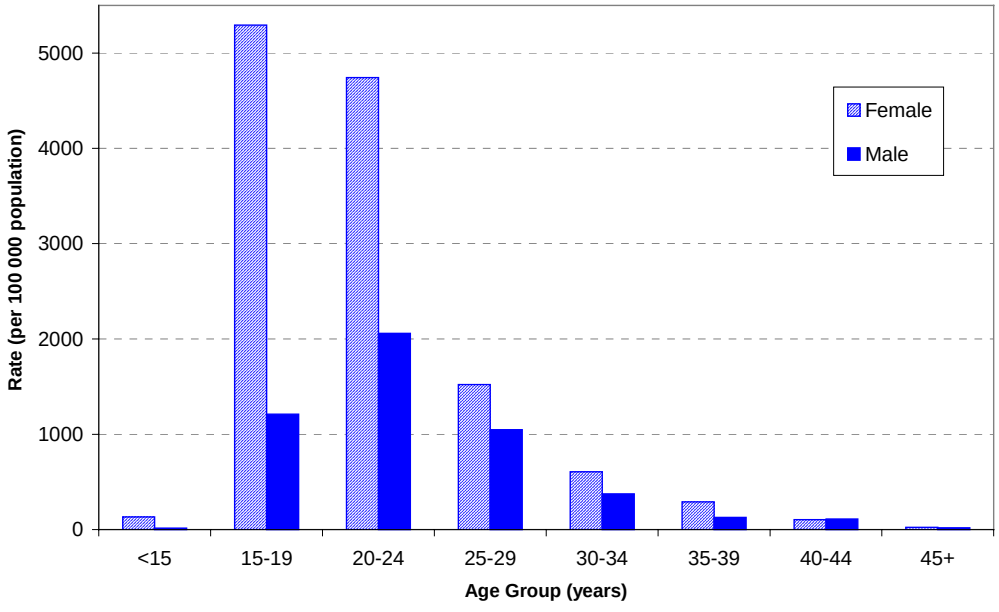
Table 20. Case numbers and rates of chlamydia in Waikato/BOP by age group and sex: 2001

	Number of cases				Rate per 100 000		
Age group	**Female**	**Male**	**Unknown**	**Total**	**Female**	**Male**	**Total**
<15 years	87	10	0	97	129	14	70
15-19 years	1018	247	3	1268	5062	1173	3080
20-24 years	767	331	0	1098	3909	1681	2793
25-29 years	266	168	1	435	1301	882	1101
30-39 years	186	92	0	278	420	222	325
40+ years	46	39	0	85	41	37	39
Unknown	1	0	3	15			
Total	**2371**	**887**	**7**	**3265**	**835**	**320**	**582**

Rates of chlamydia in females in the Waikato and Bay of Plenty were almost three times higher than rates in males (Table 20). The highest rates of chlamydia were in females aged 15-19 years, followed by females aged 20-24 years (Figure 17).

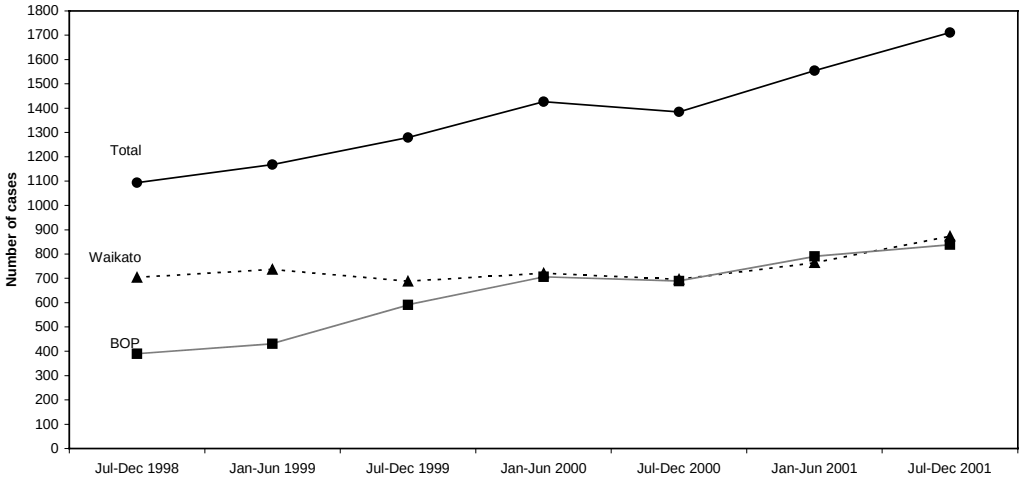
Because the majority of chlamydial infections are asymptomatic, rates calculated using laboratory data reflect the screening practises of clinicians rather than true disease incidence.

Figure 17. Rates of chlamydia in Waikato/BOP by age group and sex: 2001



Although there was a small decrease in cases during the second half of 2000 compared to previous rising figures from July 1998, chlamydia cases continued to increase in number in 2001 (Figure 18). The total number of chlamydia cases reported in 2001 was 16% higher than the number reported in 2000 (3265 vs 2812).

Figure 18. Trends in chlamydia in Waikato/BOP: July 1998 - December 2001



The increase in the number of chlamydia cases from July 1998 to early 2000 occurred almost exclusively in the Bay of Plenty. This increase is primarily due to laboratories in this region gradually moving to more sensitive nucleic acid amplification tests (NAAT). In the Bay of Plenty, the switch to DNA amplification testing occurred mostly in 1999, after which the number of cases reported increased. In the Waikato, where the number of laboratories using NAAT has not changed since data were first collated in mid-1998, there has been no real change in the number of chlamydia cases reported. Some of the increase in chlamydia is explained by an increase in the number of specimens tested, with numbers increasing 17% between 1999 and 2001, from 32,721 to 39,283.

Auckland

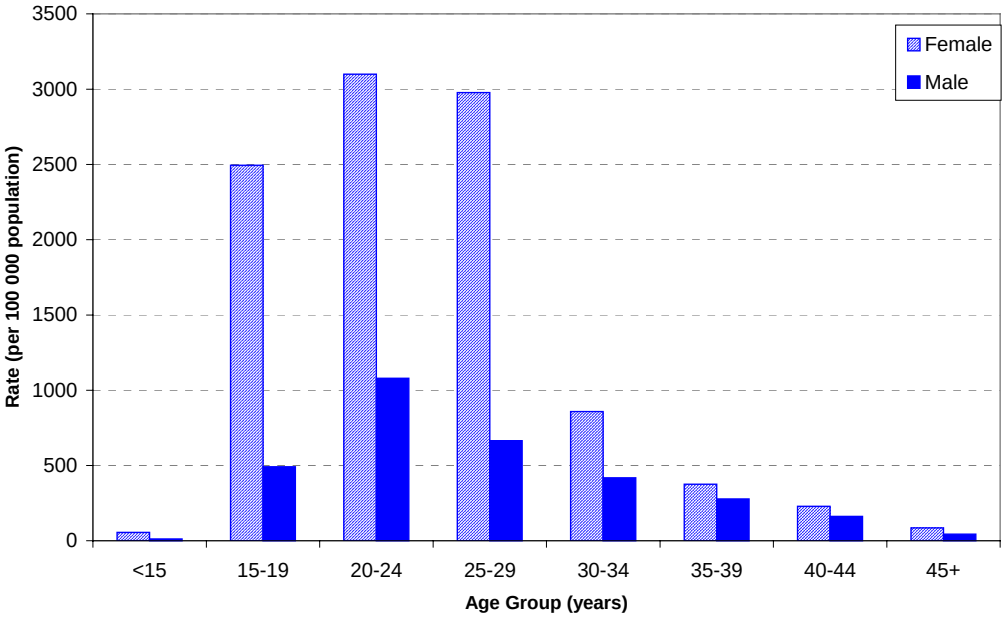
In 2001, laboratories in the Auckland region tested a total of 104,544 specimens for chlamydia, of which 5448 specimens or 5403 patients were positive (Table 21). The mean age of chlamydia cases was 25 years (median age 23 years, range 0-79 years).

Over half (56%) of all chlamydia cases occurred in people aged 15-24 years. Ninety two cases were reported in people aged less than 15 years; of these 51 (57%) were aged between 12 and 14 years and 36 (39%) were infants aged less than 12 months. The remaining five cases were children. Seventy four percent of all cases were females.

Table 21. Case numbers and rates of chlamydia in Auckland by age group and sex: 2001

	Number of cases				Rate per 100 000		
Age group	**Female**	**Male**	**Unknown**	**Total**	**Female**	**Male**	**Total**
<15 years	73	17	2	92	60	13	37
15-19 years	1043	210	1	1254	2670	525	1586
20-24 years	1305	439	4	1748	3019	1066	2071
25-29 years	729	271	2	1002	1560	631	1803
30-39 years	632	324	4	960	676	365	527
40+ years	187	145	0	330	88	77	105
Unknown	13	2	0	15	0	0	0
Total	**3982**	**1408**	**13**	**5403**	**720**	**266**	**564**

Figure 19. Rates of chlamydia in Auckland by age group and sex: 2001



Gonorrhoea

Waikato and Bay of Plenty

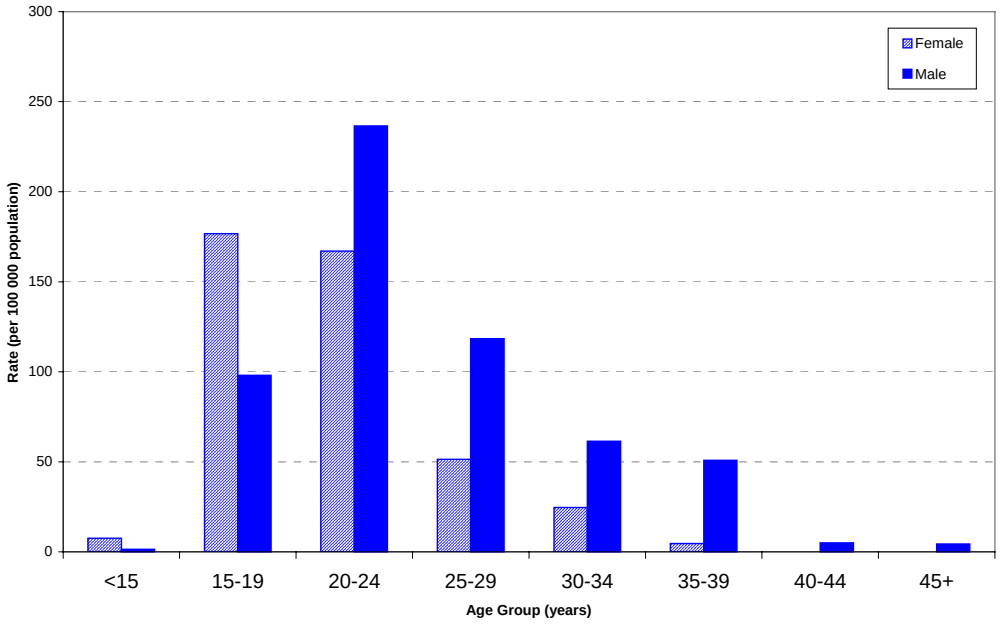
In 2001, laboratories in Waikato and Bay of Plenty reported 186 gonorrhoea cases. Males accounted for 56% of all cases. The mean age of gonorrhoea cases was 23.4 years (median age 21, range 7-53 years). Over two-thirds (64%) of all gonorrhoea cases were aged 15-24 years. Five cases of gonorrhoea were reported in teenagers aged 13-14 years. One case of gonorrhoea was reported in a female child aged 7 years.

Table 22. Case numbers and rates of gonorrhoea in Waikato/BOP by age group and sex: 2001

	Number of cases				Rate per 100 000		
Age group	**Female**	**Male**	**Unknown**	**Total**	**Female**	**Male**	**Total**
<15 years	5	1	0	9	7	1	4
15-19 years	33	20	0	54	169	95	131
20-24 years	27	38	0	65	138	193	165
25-29 years	9	19	0	28	44	100	71
30-39 years	6	21	0	27	15	51	32
40+ years	0	5	0	5	0	5	2
Unknown	2	0	0	2			
Total	**82**	**104**	**0**	**186**	**29**	**38**	**33**

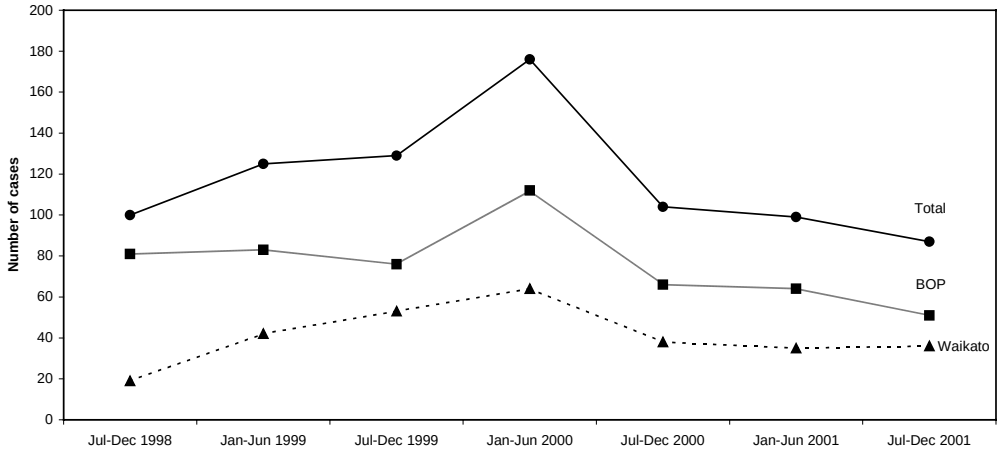
Rates of gonorrhoea in the Waikato and Bay of Plenty were 31% higher in males than in females (Table 22). The highest rates of gonorrhoea were in males aged 20-24 years, followed by females aged 15-19 years (Figure 20).

Figure 20. Rates of gonorrhoea in Waikato/BOP by age group and sex: 2001



The total number of gonorrhoea cases reported by Waikato and Bay of Plenty laboratories in 2001 was 50% lower than the number reported in 2000 (Figure 21). The increase in case numbers that occurred between July 1998 and June 2000 did not continue in the second half of 2000, or both halves of 2001with the case numbers 78% lower for July to December 2001 compared with the same six-month period July to December 2000.

Figure 21. Trends in gonorrhoea in Waikato/BOP: July 1998 - December 2001



Auckland

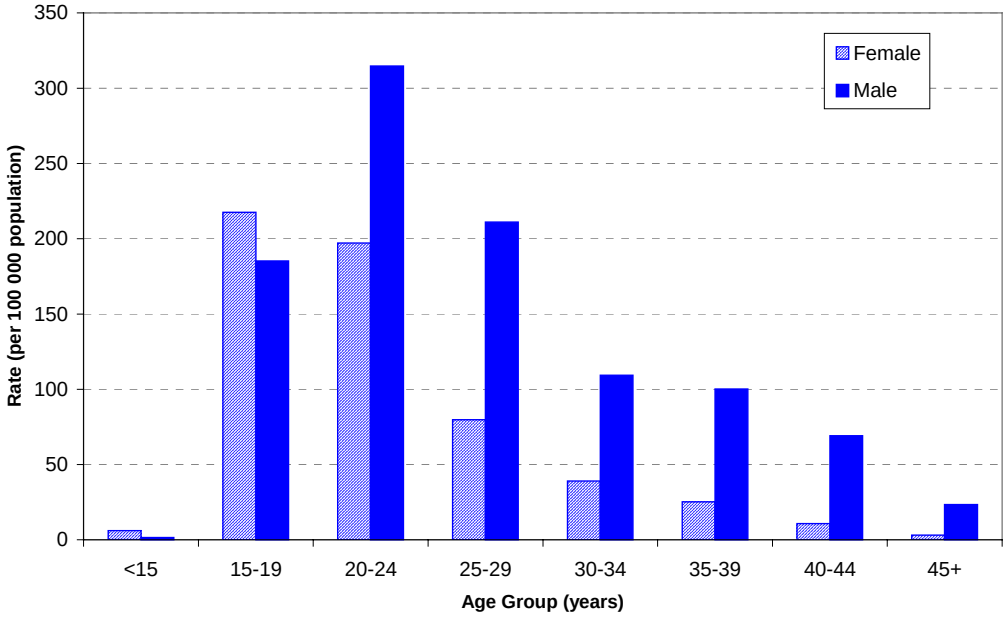
In 2001, laboratories in the Auckland region reported 730 cases of gonorrhoea (Table 23). The majority (63%) of cases in Auckland were male. The mean age of gonorrhoea cases was 24 years (median age 24, range 0-68 years). Fifty two percent of gonorrhoea cases were aged 15-24 years. Eleven cases of gonorrhoea were reported in people aged less than 15 years; of these, 7 were adolescents aged 11-14 years, three were children, and one was an infant aged less than 12 months.

Table 23. Case numbers and rates of gonorrhoea in Auckland by age group and sex: 2001

	Number of cases				Rate per 100 000		
Age group	**Female**	**Male**	**Unknown**	**Total**	**Female**	**Male**	**Total**
<15 years	8	2	1	11	7	2	4
15-19 years	91	79	1	171	233	198	216
20-24 years	83	128	1	212	192	311	251
25-29 years	36	86	0	122	77	200	136
30-39 years	33	98	2	133	35	111	73
40+ years	11	70	0	81	5	37	20
Unknown	0	0	0	0	0	0	0
Total	**262**	**463**	**5**	**730**	**47**	**88**	**67**

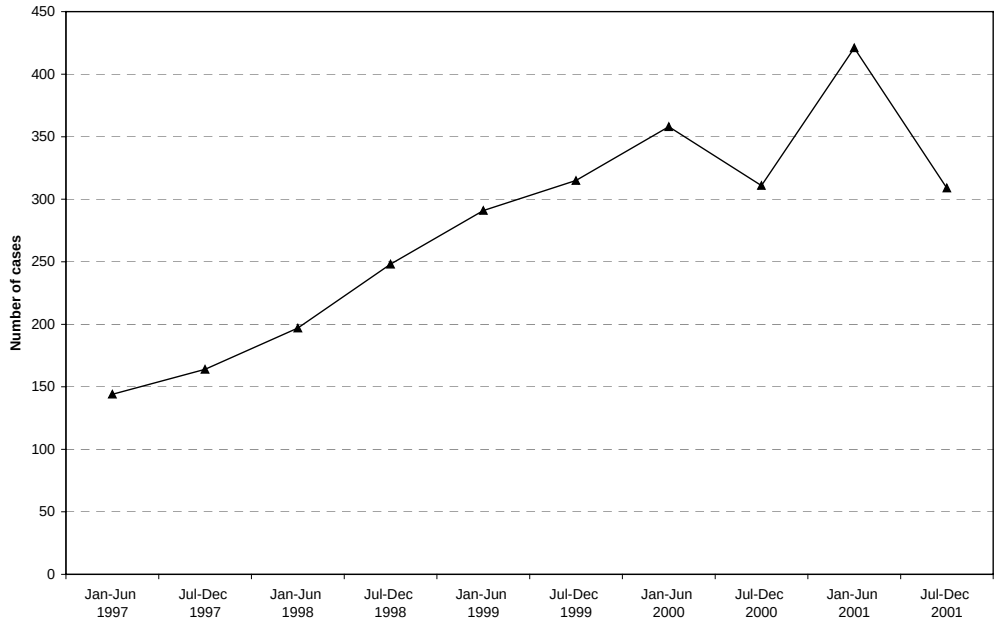
Rates of gonorrhoea in Auckland were 53% higher in males than in females. The highest rates of gonorrhoea were in males aged 20-24 years, followed by females aged 15-19 years (Figure 22).

Figure 22. Rates of gonorrhoea in Auckland by age group and sex: 2001



Following a steady increase in the number of gonorrhoea cases in Auckland since January 1997, there was a decrease in the number of cases reported during the second half of 2000, a sharp rise in numbers for the first quarter of 2001, followed by a return to December 2000 numbers. However, the total number of gonorrhoea cases reported by Auckland laboratories in 2001 was 8% higher than the 669 cases reported in 2000, 17% higher than the 606 cases reported in 1999, 39% higher than the 445 cases reported in 1998, and 58% higher than the 308 cases reported in 1997 (Figure 23).

Figure 23. Trends in gonorrhoea in Auckland: January 1997 to December 2001



Antibiotic resistance for N. gonorrhoeae

The antibiotic resistance for gonorrhoea reported by the laboratories during 2001, is displayed in Table 24. It is worth highlighting the high rate of fluoroquinolone (ciprofloxacin) resistance, almost a 10%. This is important since ciprofloxacin is normally effective against pathogens resistant to the other type of antibiotics displayed in the table, particularly B-lactamase-forming bacteria. At this moment, we lack data on previous years which precludes the possibility of identifying trends. Currently a national survey on gonorrhoea resistance rates is being carried out. We will be monitoring these rates in subsequent years.

Table 24. Antibiotic resistance for *N. gonorrhoeae*. 2001 NZ data.

Antibiotic	Total Tested	Total resistant	NZ Rate
B-lactamase	328	13	3.96%
Fluoroquinolone (ciprofloxacin)	906	88	9.71%
Penicilin	990	63	6.36%
Tetracycline	509	99	19.45%

Discussion

Sexually transmitted infections (STIs) pose a significant threat to the health and wellbeing of many people in New Zealand. Infection with organisms such as *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, and genital herpes facilitate the spread of HIV, whilst the continuing rise in the occurrence of bacterial STIs, is associated with long term sequelae such as infertility, ectopic pregnancy and cancer[1,2]. Their high (and increasing) and links to long term sequelae, and their amenability to effective clinical and population action require that they remain a public health priority[3].

The prevalence of a specific STI in a community depends upon three factors: the duration of infectivity; the probability of sexual transmission occurring; and the rate of sexual partner change. Bacterial STIs, when treated, tend to have a much shorter period of infectivity than viral STIs. This may mean that frequent partner changes are needed to sustain infection, but also that the duration of infectivity varies greatly depending on the availability of, and access to, medical care[4]. As a consequence these bacterial STIs are often limited to sub-groups of the population. By contrast, viral STIs more often produce lifelong infections with prolonged periods of infectivity, and therefore do not require the same level of partner change to maintain endemic levels of infection[5,6].

BACTERIAL STIs

Chlamydia

Genital Chlamydia was the most commonly diagnosed bacterial STI at sexual health clinics in 2001. The number of confirmed chlamydia cases at SHCs rose by more than 100% between 1995 and 2001. While the move to more sensitive nucleic acid amplification tests (NAATs) is a factor in this increase, the number of chlamydia cases has also increased at sexual health clinics not using NAAT. For years, and similarly to most industrialised countries, genital chlamydia has been the most commonly diagnosed bacterial STI.

Regardless of improvements in testing methods, the high level of chlamydial infection represents a considerable burden of disease in New Zealand. The high levels of infection from clinics in this report, are supported by data from Auckland laboratories which show that the percentage of specimens testing positive for chlamydia is 19% in those aged 13-15 years, 13% in those aged 16-20 years, and 5.8% in those aged 21-35 years[7]. Still, the major problem of chlamydia infection is in the 15-24 year age group.

Previous chlamydia infection rates in the general population have been estimated to be between 256 and 777 per 100 000 population[8,9]. For 2001, the laboratory reports for Auckland and the Waikato and Bay of Plenty regions together, suggest a rate of approximately 503 cases per 100 000 of the general population.

Data from laboratories in the Waikato and Bay of Plenty suggest the incidence of chlamydia in the New Zealand population is considerably higher than that in Canada and in those Australian states also using laboratory data for STI surveillance[10]. The chlamydia rate in the Waikato and Bay of Plenty population is over five times higher than rates in Australia and four times higher than the rate in Canada[11]. The rate of 5062 per 100 000 in 15-19-year-old females in Waikato and Bay of Plenty is five times that reported in the UK in the same group[12].

While a higher level of testing, or the use of NAAT carried out in the Waikato and Bay of Plenty laboratories may explain some of the difference in rates between New Zealand and Australia, it does not explain a five-fold difference, particularly given that much of the extra testing in New Zealand, compared to Australia, is not being carried out in those most at risk of infection. Only 13% of tests came from those aged less than 21 years, although they accounted for 31% of all

positive tests[7]. A number of countries have implemented screening guidelines to better ensure that the most at risk groups are tested for chlamydia[13-15].

With the high capability of this organism to produce asymptomatic infection (approximately 80% in females and over 45% in males), a sizeable pool of untreated persons sustains high levels of disease[16], even for individuals not otherwise characterised by patterns of high-risk behaviours[17]. Partner notification is, therefore, crucial for the control of chlamydia infection as treating index cases without treating sexual partners results in a high rate of reinfection. Clinicians need to make this a priority for controlling the spread of infection[9,18].

Rates of chlamydia calculated using laboratory data (which are dominated by GP specimens), appear to be considerably higher in females than in males. However, GPs are more likely to screen females than males, not only because they are more likely to be asymptomatic[19] and are more vulnerable to long term complications, but also because they attend more frequently and can be opportunistically screened during cervical smears and antenatal check-ups. In contrast, at sexual health clinics, where all attendees are universally screened, rates of chlamydia are higher in males than in females. This is partly because males are more likely to be symptomatic and seek treatment, and also because males are less likely to attend for sexual health checks when they are asymptomatic.

Gonorrhoea

Following a sustained decrease from the mid-1970s,[20,21] the number of gonorrhoea cases diagnosed at sexual health clinics has increased each year since 1996, with the largest increase of 28% occurring between 1999 and 2000, and a further increase of over 8% during 2001. The overall increase between 1996 and 2001 was 95%.

The increase in gonorrhoea at sexual health clinics occurred in all age, sex and ethnic groups. The percentage of gonorrhoea cases that were female increased from 1996 to 1997, remained static at 45% between 1998-2000, and dropped to 40% in 2001. Young people aged 15-24 years continue to account for approximately two-thirds of all gonorrhoea cases. In 2000 there appeared to have been an increase in the percentage of gonorrhoea cases diagnosed among Maori and Pacific peoples, but during 2001 the percentage of cases diagnosed in these groups decreased to levels seen in 1997.

The resurgence in gonorrhoea is of concern because gonorrhoea is considered a sensitive marker of unsafe sexual practices, [22] and an increase in gonorrhoea may precede increases in other STIs including HIV.[1] The increase in gonorrhoea was identified in Auckland, Waikato and the Bay of Plenty using surveillance data from both sexual health clinics and laboratories, the latter showing that the increase in gonorrhoea at sexual health clinics also reflects an increase in gonorrhoea in the general population.

The increase in gonorrhoea may reflect failures in safe sex messages and/or the need for more targeted sexual health promotion, shortfalls in contact tracing, or barriers to access of sexual health services. Commentators in New Zealand[23] and other countries that have experienced increases in gonorrhoea have expressed concern at the resurgence of gonorrhoea,[1,24-28] and emphasised the importance of partner notification in the control of this infection[23,29].

The incidence of gonorrhoea in New Zealand is considerably higher compared with other countries that use laboratory data for surveillance. The rate of gonorrhoea in Auckland, Waikato and the Bay of Plenty is three to four times higher than the rate in Canada[11], and twice the Australian rates for the same period[30]. New Zealand's gonorrhoea rate is more than twelve Sweden's[31]. Auckland rates for the 20-24 age group are 75% higher than those in the UK[12].

It is of major concern that 56 babies under the age of 12 months had chlamydia and two babies had gonorrhoea diagnosed at Auckland and Waikato/BOP laboratories. These babies will contracted the infections from their mothers perinatally. This may reflect a failure to screen for STIs in pregnancy and in the provision of adequate antenatal care.

VIRAL STIs

Genital herpes

The number of cases of genital herpes simplex virus (HSV) reported from sexual health clinics has declined steadily since 1996, with a further 10% decrease between 2000 and 2001. This may be partly due to removal of controls on anti-viral prescribing for herpes meaning some patients only go to GPs. Cases of genital herpes in 2001 were predominantly European, and equally distributed between sexes, unlike other countries like the UK where the male to female ratio, seen at comparable clinics, is 1:1.6[12].

Genital herpes can be caused by either herpes simplex virus type 1 (HSV-1) or type 2 (HSV-2), the former is commoner in children and causes mainly oral blisters, while the latter typically affects the genital area in adults. As HSV infection is a lifelong condition, it is more prevalent with increasing age. However, in the UK HSV infection is more prevalent in younger age groups, particularly in young women, with a change in prevalence from HSV-2 to HSV-1 infection in these young age groups. Orogenital sexual contact is becoming an increasingly important transmission route for HSV infection[12].

The reason for higher rates of genital herpes amongst Europeans may lie in socio-economic factors. It is postulated that people in lower socio-economic groups are more likely to be exposed to oral HSV-1 infection as children. People exposed at a young age may be less susceptible to genital HSV-1, and possibly less susceptible to symptomatic genital HSV-2 infection as adults. However, ethnicity differences may simply reflect sexual behaviour patterns, as people tend to choose partners in their own ethnic groups[5].

Genital warts

Genital warts is the most commonly diagnosed STI at Sexual Health Clinics, with 3304 first diagnoses reported in 2001. Highest rates are found in the 20 to 24 year age group, in all ethnic groups. Although genital warts cases exceed other STIs, cases of chlamydia are increasing very rapidly and closing the gap with genital warts. Based on overseas trends[2,32], it seems unlikely that the decline in numbers from 1997 to 1999 reflected a real decrease in disease incidence. This continuing increase from 2000 through 2001 may reflect changes in attendance patterns or service provision.

Genital warts is of particular public health importance because of the association between some types of human papillomavirus (HPV,mainly types 16 and 18[1,2]) and cervical, penile and anal cancers[33]. However, approximately 90% of genital warts are caused by HPV types 6 or 11, which are not associated with cervical cancer[18].

High risk groups

Young age

The majority of STIs were in teenagers and young adults, with over 60% of gonorrhoea, chlamydia and genital warts cases being people aged under 25 years. Young people were more likely to be diagnosed with multiple STIs, with over 75% of concurrent infections. While high STI rates in young people have been reported in many countries[19,34-36], laboratory data suggest the rates in young New Zealanders are considerably higher than in other countries.

Young adults are at higher risk of acquiring STIs for a number of reasons, including behavioural factors, such as the increased likelihood of multiple sexual partners and unprotected intercourse. Early onset of sexual behaviour is associated with low socio-economic status, poverty, and poor educational opportunities, being born to a teenage mother and high rates of unemployment[37]. In addition, young women are biologically more susceptible to STIs such as chlamydia and gonorrhoea due to increased cervical ectopy, and greater permeability of the cervical mucus than in older age groups[1,12,33,38.] The higher prevalence of STIs among young people may also reflect barriers to health services.[1]

Ethnicity

Rates of chlamydia and gonorrhoea at sexual health clinics and family planning clinics are considerably higher in Maori and Pacific people than in Europeans. This finding is consistent with New Zealand studies undertaken in sexual health clinics[39-41] and general practices[42]. Higher rates of bacterial STIs have also been found among ethnic minorities in other countries. In Australia, being Aboriginal appears to be an independent risk factor for infection[43]; in the USA, the gonorrhoea rate in African Americans is approximately 30 times higher than the rate in white Americans[19].

Ethnicity is one of a number of factors that determine sexual behaviour, and defining the relationship between ethnicity and risk of infection has been one of the most difficult areas of STI epidemiology[44]. In the USA, differences in rates between ethnic groups are partly due to a reporting bias, as African Americans are more likely to seek care in public clinics that report STIs more completely than private clinics[19,33,45.] Since it is accepted that there are no known differences in biological susceptibility between ethnic groups[44], other factors clearly play a role in the disparities in STI incidence between ethnic groups. These factors include more fundamental determinants of health status such as poverty, access to health care, health-seeking behaviours, and sexual networks with a high STI prevalence[1,33]. In New Zealand, the sub-optimal use of relevant health services by Maori and Pacific peoples is thought to play a role in their high STI rates[39]. Overseas studies suggest that access to health care may play a bigger role in the distribution of STIs amongst some ethnic and socio-economic groups than life-styles, and sexual behaviour[46].

The combination of youth and Maori or Pacific Island ethnicity appears to place teenagers in these ethnic groups at particularly high risk for STIs. Maori and Pacific peoples have teenage birth rates almost five times higher than Europeans in New Zealand, and three times higher than populations in other OECD countries[48]. Maori appear to have first sexual intercourse at a younger age than non-Maori[49,50], and may be less likely to use contraception[48]. These differences, in combination with possible sub-optimal use of health services by Maori and Pacific peoples[39] may contribute to the higher rates of STIs in young Maori and Pacific peoples.

Conclusion

New Zealand has high and increasing rates of bacterial STIs. The rates for chlamydia and gonorrhoea are five and two times respectively higher than those reported in Australia. The disproportionately high rates of bacterial STIs among young people, especially those of Maori and Pacific peoples are of particular concern. Lack of diagnosis and/or barriers to access to effective treatment have lead to a "hidden epidemic" of a large group of asymptomatic individuals with major health consequences later in life, particularly among women.

Partner notification is critical for the control of these asymptomatic and curable STIs, as is better understanding of different sexual behaviours and lifestyles that put specific populations at a higher risk. Improving and prioritising partner contact tracing is essential in preventing STIs, as is close collaboration between health professionals, in particular sexual health specialists and primary care. Surveillance data are useful for identifying disease trends by age, sex and ethnic group, but both coverage and the quality of the surveillance system need to be improved. Further research is required to estimate accurately the burden of STIs, and to understand the associations between the incidence of STIs and factors such as sex, age and ethnicity in the social and cultural context of New Zealand. Some of the priority areas of further research are outlined in the box below.

KEY AREAS FOR SURVEILLANCE DEVELOPMENT

- Improvement of the surveillance system including effective data quality procedures at different levels of the system (from local clinics to the co-ordinating centre). Once established, the ability to construct data linkage between and within different databases (Sexual Health Clinics, Family Planning Clinics, Student Youth Health Centres and Laboratories) by means of a unique identifier (e.g. NHI numbers) should be considered.
  - ***Recommendation:***
    A feasibility study to disaggregate data, to effectively identify, initial, concurrent and repeated infections.

- Consider options such as opportunistic screening for a curable asymptomatic infection like *Chlamydia*, to clarify true population levels of infection.
  - ***Recommendation*** :
    Evaluation of different modalities of screening amongst those at higher risk, including a full economic evaluation.

- Notifiable status of STIs (both bacterial and viral).
  - ***Recommendation:***
    Explore the consequences, and the perceptions of community and individuals, of introducing such notification.

- The increase in bacterial STIs, in particular gonorrhoea, highlights the impact of health promotion programmes targeted at high-risk groups, particularly stressing the importance of safer sex.
  - ***Recommendation:***
    Research on reasons for these substantial increases, the effectiveness of "safer-sex" campaigns and other health promotion programmes.

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Appendices

Appendix A: Standard tables

Appendix B: Case definitions

Appendix C: Data entry form