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Alcohol Use & Sexually Transmitted Infections in young people attending a Sexual Health Clinic

A dissertation submitted to the University of Otago in partial
fulfillment of the requirements for a Master of Public Health.

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ABSTRACT

Background

Hazardous alcohol use and in particular binge drinking has become a significant problem for New Zealand youth and results in considerable harm. The burden of Sexually Transmitted Infections (STIs) is also disproportionately high in this group. Both of these issues are of considerable public health significance. Previous research supports a link between increasing levels of alcohol use and increasing rates of STIs.

Aims

This research aimed to determine if young people (aged 16-24 years) attending an urban New Zealand Sexual Health service for STI screening differ from the wider New Zealand population in the same age group with respect to rates of hazardous alcohol use and diagnosed STIs. The study also aimed to investigate the relationship between hazardous alcohol use and diagnosed STIs.

Methods

A quantitative cross sectional design was used. All 16-24 year old attendees at the Christchurch Sexual Health Centre between 5 November 2010 and 3 June 2011 were asked to participate. Participants were asked to complete an anonymous written questionnaire which included demographics, the Alcohol Use Disorder Identification Test (AUDIT), STI risk factors and other drug use. Questionnaires contained a unique identifier which linked them to STI screening test results for each participant.

Results

Data from 255 attendees were included in the analysis, the response rate was 47%. AUDIT scores revealed hazardous alcohol consumption in 71.4% of the participants, with binge drinking common (34% binged weekly and 31% monthly). Highest rates were observed in young males. Comparisons with other New Zealand population based surveys showed younger initiation to alcohol and more hazardous consumption patterns in the study sample. A significant association was observed between hazardous alcohol use and both cannabis ($p<0.001$) and other drug use ($p<0.001$). The prevalence of chlamydia and/or gonorrhoea in this study was 13.5%. Significant associations were found between a confirmed chlamydia and/or gonorrhoea diagnosis and increasing number of sexual partners ($p=0.04$) and inconsistent condom use with new partners ($p=0.03$). No significant association was demonstrated between AUDIT scores and diagnosed STIs ($p=0.66$). Nearly half of participants (48.8%) confirmed having unprotected sexual intercourse related to alcohol in the past 12 months, and 13.4% usually or always consumed alcohol before sexual intercourse with a new partner. Attendance at the clinic was identified by 20% of participants to be related in some way to alcohol.

Conclusion

Youth attending the Christchurch Sexual Health Centre have high rates of hazardous alcohol consumption that warrant screening and preventative strategies. This study did not find a direct association between AUDIT scores and STI diagnosis, however there were high rates of alcohol consumption prior to sexual intercourse and unprotected intercourse related to alcohol. The results indicate targeting alcohol use in this population is important to overall sexual health care and prevention of STIs.

PREFACE

During this research, on 22 February 2011 Christchurch suffered a 6.3 magnitude earthquake and a civil defence state of emergency was declared. Residents were told to remain at home for approximately two weeks. The Christchurch Sexual Health Centre remained closed for two days and reopened on 25 February 2011. At this time data collection for this project was well underway; however, this event impacted the timing required for data collection and subsequent response rates due to significant decreases in clinic attendance.

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LIST OF ABBREVIATIONS

ACCESS	The Australian Collaboration for Chlamydia Enhanced Surveillance
AIDS	Acquired Immune Deficiency Syndrome
ALAC	Alcohol Advisory Council of New Zealand
AOR	Adjusted Odds Ratio
AUDIT	Alcohol Use Disorders Identification Tool
CDC	Centres for Disease Control
CI	Confidence Interval
DHB	District Health Board
DSM-IV	Diagnostic and Statistical Manual of Mental Disorders, Edition 4
EIA	Enzyme Immunoassay
ESPAD	The European School Survey Project on Alcohol and Other Drugs
ESR	Environmental Science and Research
FAST	Fast Alcohol Screen Test
GUM	Genitourinary medicine
HIV	Human Immunodeficiency Virus
IC	Intercourse
NAAT	Nucleic Acid Amplification Test
NHS	National Health Service
NZDep	New Zealand Deprivation Index
OR	Odds Ratio
RR	Relative Risk

SES	Socioeconomic Status
SHC	Sexual Health Clinic
STI	Sexually Transmitted Infection
TOP	Termination of Pregnancy
UPSI	Unprotected Sexual Intercourse
UK	United Kingdom
USA	United States of America
WHO	World Health Organisation

CHAPTER 1: BACKGROUND

Alcohol related health and social harms cost New Zealand billions of dollars each year (Alcohol Advisory Council of New Zealand, 2008). It is assumed that much of the harm and costs associated with alcohol use would be preventable if it was consumed in a less risky way. This is a significant public health issue and is one of thirteen priority areas identified by the government in the New Zealand Health Strategy (Ministry of Health, 2000). The National Drug Policy (Ministerial Committee on Drug Policy, 2007) and National Alcohol Strategy (Ministry of Health & ALAC, 2001) are the documents that outline how action might be achieved. The goal of the National Alcohol Strategy is “to minimise alcohol related harm to individuals, families/whanau, the community and New Zealand society”.

New Zealand statistics from the past decade show young drinkers drinking more heavily, more frequently and at a younger age (Kalafatelis, McMillen, & Palmer, 2003). Binge drinking in particular is identified as a significant problem in New Zealand. The New Zealand Alcohol and Drug Use Survey 2008 (Ministry of Health, 2009) showed eight in ten 18-24 year olds who had consumed alcohol in the preceding 12 months had been binge drinkers. Consistent with international trends there has been an increase in binge drinking especially in young females in New Zealand (Ministry of Health, 2009). Hazardous drinking is widely considered to be a serious problem for New Zealand youth. The liberalization of supply policies in the 1980s and 1990s, including reducing the minimum age for alcohol purchase from 20 to 18 years, has come under scrutiny with groups advocating for changes to the liquor licensing laws over recent years. In response to this the government contracted The Law Commission to review alcohol policy, and in July 2009 their report paper ‘Alcohol In Our Lives’ was released. Following public consultation a further report was released in April 2010, ‘Alcohol in Our Lives: Curbing the Harm’, and subsequent to this the government introduced the Alcohol Reform Bill which implements the government’s decision to reform alcohol legislation, concentrating mainly on purchase age, alcohol displays and improving the licencing system (NZ Parliament, 2011). This has had a second reading in parliament however is unlikely to become law until after the general election in November 2011.

Sexually transmitted infections (STIs) are another widespread public health problem with serious health consequences. With a transmission rate of 30-50% per unprotected sexual act (Ministry of Health, 2008a) chlamydia is the most common bacterial sexually transmitted infection in New Zealand (ESR, 2011). Similarly gonorrhoea has a transmission efficiency of 20-60% per sexual exposure (Morse, Ballard, Holmes, & Moreland, 2003). Sexually transmitted infections such as chlamydia and gonorrhoea have the potential to cause significant long-term complications for an individual and costs to society. Pelvic inflammatory disease in females can lead to chronic pain, ectopic pregnancy and infertility; in males epididymo-orchitis is associated with infertility; these infections can also cause reactive arthritis and facilitate transmission of other STIs including HIV (Monga, 2006). The government has made a commitment to “improving the sexual and reproductive health of all New Zealanders” which is outlined in the Sexual and Reproductive Health Strategy (Ministry of Health, 2001). This document focuses on two priority areas, the increasing rate of STIs and high levels of unintended/unwanted pregnancy.

The burden of high rates of STIs and alcohol related harms falls disproportionately on young people in New Zealand. Those of Maori and Pacific ethnicity and individuals in lower socioeconomic groups are also at higher risk (ESR, 2011; Ministry of Health, 2008b, 2009).

Evidence supports a link between increasing levels of alcohol use and increasing rates of STIs (Bowden, Fergusson, & Horwood, 2011; Chesson, Harrison, & Kessler, 2000; Hutton, McCaul, Santora, & Erbeling, 2008; Standerwick, Davies, Tucker, & Sheron, 2007). Two explanations for this link have been proposed, firstly the acute intoxicating effects of alcohol increase impulsivity and cause disinhibition altering normal patterns of sexual behaviour and contraceptive use. And alternatively, individuals with a general predisposition to engage in risk taking impulsive behaviour may also increase their alcohol intake and behaviours that increase the risk of acquiring an STI. Regardless of the mechanism, this link means sexual health clinics are a potential setting to target both risks (Pittrof & Goodburn, 2010), as evidence shows attendees at these clinics are typically at high risk of hazardous alcohol consumption as well as STIs (Cook & Clark, 2005; Crawford, Lowe, Greene, & Brookings, 2004; Hutton, et al., 2008; Standerwick, et al., 2007).

Recently in the United Kingdom it has been suggested that genitourinary medicine (GUM) clinics should provide a more holistic service (Pittrof & Goodburn, 2010). Pittrof and Goodburn (2010) identified the existing approach to sexual health promotion (including increased clinic access, sexual health advice and condom promotion and provision) is not addressing many of the root causes of STI transmission as evidenced by the increasing rates of STIs. Specialist sexual health services being free, accessible and confidential are well placed to address other underlying risk factors for poor sexual health. Problem drinking, depression, smoking and domestic violence, known to be prevalent among clients of GUM clinics (Pittrof & Goodburn, 2010), have been identified as independent harmful risk factors for STIs which should be targeted in this setting.

Enquiries about alcohol consumption in hospital wards and outpatient clinics are often not structured and can lead to questions that are inappropriate and do not give adequate information (Pulford et al., 2007). Validated questionnaires have been developed to screen for hazardous alcohol use (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001). Screening and brief intervention programmes have been shown to be effective in reducing hazardous drinking lasting at least 6-12 months among people not specifically seeking treatment (Moyer, Finney, Carolyn, Swearingen, & Vergun, 2002). Screening and brief intervention for hazardous alcohol use has been found to be acceptable to both clients and clinicians in sexual health clinics in the UK and Australia (Crawford, et al., 2004; Lane, Proude, Conigrave, de Boer, & Haber, 2008). In New Zealand computerised screening in primary care among university students has been shown to be well accepted and provided access to a large number of individuals drinking at hazardous levels (Kypri et al., 2005).

To date research in New Zealand exploring hazardous alcohol use and STIs or sexual risk taking has been conducted on selected groups (Bowden, et al., 2011; Cashell-Smith, Connor, & Kypri, 2007; Fergusson & Lynskey, 1996; Ramrakha, Caspi, Dickson, Moffitt, & Paul, 2000). Sexual health clinic attendees in the public health system are a potentially high risk group which warrant further investigation. The proposed research for this dissertation therefore complements the existing evidence in New Zealand but looks in more detail at characteristics of young sexual health clinic attendees.

Records show a Sexual Health service has been operating at the Christchurch Public Hospital since the 3rd January 1931. The department now operates as an outpatient Sexual Health Centre and has been at the current site, 33 St Asaph Street, since 7th August 1992. The current clinic opening hours are 11am to 8pm on Wednesday and 9am to 5pm on the remaining weekdays, it is closed weekends and public holidays. The clinic operates via booked appointment times and accepts self-referrals as well as referrals from other primary and secondary care services. There is also some capacity for same day/emergency appointments. Annual clinic figures for 2010 revealed a total of 8473 patient visits, there was an equal male to female ratio, patients were predominantly European ethnicity (71%) with 9% recording Maori ethnicity, and 13% of patients were aged 15 to 24 years.

This study aims to determine if young people (aged <25 years) attending this urban New Zealand Sexual Health clinic for STI screening differ from the wider New Zealand population with respect to rates of hazardous alcohol use and diagnosed STIs. The study will also explore whether a relationship exists between those with hazardous alcohol use and diagnosed STIs.

The following chapter reviews the existing literature surrounding hazardous alcohol use and STIs in young people. A detailed account of the methods employed in this study is presented in Chapter 3. The results, a discussion of findings and conclusions will then follow in subsequent chapters.

CHAPTER 2: LITERATURE REVIEW

This chapter provides a comprehensive review of the national and international literature surrounding alcohol use and sexually transmitted infections.

2.1 Alcohol Use

It is important to examine the literature and understand the trends of alcohol use and the evidence surrounding the age of commencement of alcohol consumption and the levels of binge drinking. International evidence may also provide relevant information for New Zealand.

Alcohol is the most commonly used recreational drug in New Zealand, with the majority of New Zealanders consuming alcohol at least occasionally (Alcohol Advisory Council of New Zealand, 2008). New Zealand's average per capita consumption rates in 1997-2005 were below that of European countries but higher than the USA and Canada. Over the same time period average per capita consumption levels have risen in New Zealand, Canada, USA, the United Kingdom and Ireland but declined sharply in European countries including France, Switzerland and Germany (Alcohol Advisory Council of New Zealand, 2008).

The Alcohol Advisory Council of New Zealand (ALAC) (Alcohol Advisory Council of New Zealand, 2008) has identified a number of problems with New Zealand's culture of drinking, they report:

- Many New Zealanders tolerate drunkenness. In 2003, 41% of those surveyed indicated they believed it was OK to get drunk as long as it is not every day, and almost 1 in 10 drinkers admitted they drink to get drunk (Alcohol Advisory Council of New Zealand, 2008).

- Many drinkers appear to exercise little self-control.
- Many adults who currently drink do not appear concerned about their physical or mental wellbeing as a result of their drinking.
- Many parents do not know much about their children's drinking.
- Drinkers view alcohol as a social lubricant and relaxant. The 2004 New Zealand Health Behaviours Survey found 42% of drinkers indicated when they consumed alcohol it made it easier to meet and get to know people and 67% indicated alcohol helped them to wind down and relax (Ministry of Health, 2007).

Heavy episodic drinking or binge drinking appears to be the most significant and common aspect of New Zealand's culture of drinking, ALAC's 2008 draft national annual attitudes survey found 25% of all adult New Zealanders identify as binge drinkers (Alcohol Advisory Council of New Zealand, 2008). ALAC advises that for men, three standard drinks per day or 21 per week and for women two standard drinks per day or 14 per week, are safe drinking limits. On any one drinking occasion, men should drink no more than six standard drinks and women should drink no more than four standard drinks (Alcohol Advisory Council of New Zealand, 2008). Drinking above the recommended limit increases the risk of alcohol related harm, individual variability should be taken into account and it should be remembered that there is no specific safe amount of alcohol for everyone, all of the time (Alcohol Advisory Council of New Zealand, 2008). Table 1 below illustrates a lack of international agreement which is further complicated by alcohol serve size and standard drink definitions.

Table 1: Recommended maximum alcohol intake (maximum number of drinks per day and per week) in New Zealand and some other Western Countries.

Country	Source	Men	Women	Standard drink size
New Zealand	ALAC	3 drinks/day 21 drinks/week	2 drinks/day 14 drinks/week	10g alcohol
Australia	National Health and Medical Research Council	2 drinks/day 14 drinks/week	2 drinks/day 14 drinks/week	10g
United Kingdom	Department of Health	3-4 drinks/day 21 drinks/week	2-3 drinks/day 14 drinks/week	8g
USA	National Institute on Alcohol Abuse and Alcoholism (NIAAA)	4 drinks/day 14 drinks/week	3 drinks/day 7 drinks/week	14g

(International Centre for Alcohol Policies, 2010b).

The World Health Organisation recommends the assessment of harmful alcohol use is made via the Alcohol Use Disorders Identification Test (AUDIT) which covers the volume and frequency of alcohol consumed, alcohol related problems and abnormal drinking behaviour. This is an internationally validated tool with a standardised scoring system, the accepted international definition of hazardous drinking is an AUDIT score ≥ 8 . A score above 8 represents an established pattern of drinking that carries a high risk of future damage to physical or mental health, but may not yet have resulted in significant adverse effects (Babor, et al., 2001).

In most Western countries, alcohol consumption and heavy episodic drinking tend to be higher during young adulthood than at any other time across the lifespan (Alcohol Advisory Council of New Zealand, 2008). There is general international agreement that drinking patterns associated with rapid intoxication, such as binge drinking, have the potential for significant harm; but there also appears to be an increase in binge-drinking and drinking to intoxication by young people internationally (World Health Organization, 2004). There is however no single definition for binge drinking used in the literature (International Centre for Alcohol Policies, 2010a). Quantitative definitions with the number of drinks consumed on one occasion have varied limits set; the duration of an “occasion” is often unknown as are

drink sizes and strengths. In the ALAC alcohol monitors, binge drinking is defined as consuming 7 or more drinks on one occasion for adult drinkers (over 18 years) or 5 or more drinks for youth (Palmer, Fryer, & Kalafatelis, 2009).

The 2003 ALAC youth drinking monitor of young people 12-17 years found 22% reported drinking at least once every two weeks; binge drinking with friends during weekends and holidays tended to maintain camaraderie, a sense of belonging and boosted confidence levels (Kalafatelis, et al., 2003). The Youth 2007 survey showed that 60 percent of secondary school students currently drink alcohol. About one-third of students reported they had engaged in binge drinking in the last four weeks (Adolescent Health Research Group, 2008). These results are similar to the findings of the Youth 2000 survey. According to the Youth 2007 survey, among students who regularly drink alcohol, substantial numbers of students reported problems from drinking alcohol such as unsafe sex (14%), unwanted sex (7%), and/or injuries (22%). Almost one third of students reported they had been driven by someone who had been drinking (Adolescent Health Research Group, 2008).

In 12-17 year olds surveyed, access to alcohol did not appear to be a problem for most young people:

- 70% report that getting hold of alcohol is not a problem
- 24% report they can afford as much alcohol as they want
- 32% report they make no attempt to limit the amount of alcohol they drink
- 30% report they make no attempt to try not to drink so much that they forget what they were doing or what happened
- many claim that it is OK to get drunk; 59% report that it is OK to get drunk as long as it is not every day
- 61% disagree that it is never OK to get drunk
- 42% report they have a drink at least once every two weeks (25% at least once every week)
- 58% have consumed five or more drinks on at least one occasion

(Alcohol Advisory Council of New Zealand, 2008).

Certain subgroups of youth have elevated risk of hazardous drinking. Tertiary students at universities, polytechnics and teachers' colleges in New Zealand have a reputation for this. A study of students living in halls of residence in Dunedin in 2000 found 60% of men and 58% of women exceeded the ALAC per occasion guidelines at least twice per week (Kypri, Langley, McGee, Saunders, & Williams, 2002). Extreme levels of drinking were also reported; 33% of males and 7% of females had exceeded 16 drinks in a single episode in the preceding four weeks. It is known that hazardous drinking is associated with a range of negative consequences, in this study 23% of males and 14% of females reported they or someone else had been injured in the last year as a result of their drinking. Over a third of students reported blackouts and nearly one in five had difficulty concentrating. The mean AUDIT scores were high, 10.9 for men and 7.6 for women (Kypri, et al., 2002).

Evidence has suggested young people in home environments that have permissive attitudes to alcohol use and who are introduced to alcohol at a young age may be more vulnerable to alcohol related problems in adolescents, and socioeconomic background is also thought to be important. The longitudinal Christchurch Health and Development Study found that after controlling for other factors, children who were introduced to alcohol before the age of 6 years were 1.9 to 2.4 times more likely to report frequent, heavy or problematic drinking at age 15 years (Fergusson, Lynskey, & Horwood, 1994b). The Dunedin Multidisciplinary Health and Development Study has linked adolescent alcohol consumption at age 15 with father's occupation, those adolescents from the lowest occupational group had almost twice the odds of being a large consumer of alcohol (OR adjusted for sex was 1.85, 95% CI 1.32-2.60) (Droomers, Schrijvers, Casswell, & Mackenbach, 2003). This association was explained by a higher prevalence of familial alcohol problems, friends approving of alcohol consumption, lower intelligence scores and lower parental attachment among adolescents from lower occupational groups (Droomers, et al., 2003). While alcohol may be a singular problem behaviour for some adolescents, the Christchurch Health and Development Study also found links between early childhood conduct problems and depression with later adolescent substance abuse (Fergusson, Lynskey, & Horwood, 1994a; Lynskey & Fergusson, 1995). Strong associations were also found between levels of alcohol consumption and other adolescent problems including daily cigarette smoking, cannabis use, early onset of sexual activity and police contact (Fergusson, et al., 1994a).

The Dunedin cohort was examined at a later stage and drinking patterns were examined with respect to socioeconomic indicators of educational achievement, occupation and income. Both men and women demonstrated an increase in the frequency of drinking to age 26 but the quantities consumed peaked at age 21 years. The frequency of drinking was influenced by income with the higher income participants drinking more often, this also persisted over time. Quantity of drinking was most influenced by educational achievement with the less well educated drinking significantly more during a drinking occasion at all ages ($p < 0.0001$) (Casswell, Pledger, & Hooper, 2003).

2.1.1 The New Zealand Health Survey 2006/2007

The largest survey of New Zealanders health to date is the New Zealand Health Survey, conducted by the Ministry of Health in October 2006 to November 2007 on more than 17,000 New Zealanders (Ministry of Health, 2010). The AUDIT questionnaire was administered to adult participants if they had consumed an alcoholic drink in the past 12 months.

The results showed 74% of 15-17 year olds, and 85% of 18-24 year olds had drunk alcohol in the past 12 months. Hazardous drinking (using the internationally agreed definition of $AUDIT \geq 8$) for both men and women was highest in the 18-24 year age group (men 59.3%, 95% CI 52.6-65.9; women 36.7%, 95% CI 31.1-42.3) (Ministry of Health, 2008b).

Analysis of the data by ethnicity found Maori and Pacific people aged 16-64 years carry the greatest burden of hazardous drinking. Unadjusted prevalence rates were 17.7% (95% CI 16.6-18.7) for European, 32.9% (95% CI 30.9-35.0) for Maori, 23.0% (95% CI 19.8-26.2) for Pacific and 5.6% (95% CI 3.8-7.4) for Asian ethnic groups (Ministry of Health, 2008b).

Analysis using the New Zealand Deprivation Index (NZDep2006), an index of socioeconomic deprivation, showed hazardous drinking was more prevalent in the most

deprived areas. The pattern was particularly strong for women where the age standardised prevalence more than doubled from quintile one to five (Table 2).

Table 2: Hazardous drinking prevalence for men and women by NZDep quintiles in the New Zealand Health Survey 2006/2007

NZDep quintiles		Hazardous drinking prevalence
1 (least deprived)	Men	29.2%
	Women	11.8%
5 (most deprived)	Men	38.5%
	Women	25.4%

(Ministry of Health, 2008b).

When looking at hazardous drinking by District Health Board area, Canterbury rates appear similar to the national averages (Ministry of Health, 2008b).

2.1.2 The New Zealand Alcohol and Drug Use Survey 2007/2008

The New Zealand Alcohol and Drug Use Survey collected information from 6784 New Zealanders aged 16-64 years in August 2007 to April 2008 (Ministry of Health, 2009). This was a large population survey but a number of limitations are worth considering. Calibrated survey weights were used to adjust for nonresponse in certain age, gender and ethnic groups ensuring the estimates were representative of the population in the 2006 census. Given the response rate was low at 60%, and only 94% of the population was sampled (those in permanent private dwellings) it is possible this sample is not representative of the general population. Some of the questions in the survey also rely on accurate recall (e.g. age at first drink); it is possible this recall bias is greater for those in the older age groups. Age standardisation using the World Health Organisation (WHO) standard population was used to ensure age did not confound ethnic differences for Maori. Changes were also made in the way this survey was conducted meaning time trend data is not reliable (Ministry of Health, 2009).

New Zealand has no legal drinking age but the minimum legal age for alcohol purchase is 18 years. Therefore minors are allowed to be supplied with alcohol in certain circumstances but are unable to purchase it. This survey found approximately 87% of 16-17 year olds have ever consumed alcohol. All people were asked the age at which they first tried alcohol, the median was 16 years. Overall approximately one in three people first tried alcohol when aged 14 years or younger (31.9%, 95% CI 30.3-33.4). It appears that the proportion of those first consuming alcohol at an age less than 14 years may be increasing. This is an important finding as it has been identified adolescents who initiate alcohol use at a young age are more likely to experience problems with school performance and display delinquent behaviour as well as being at greater risk of developing alcohol dependency later in life (Hingson, Heeren, & Winter, 2006; Peleg-Oren, Saint-Jean, Cardenas, et al., 2009). The median age of first consuming a large amount of alcohol (more than six standard drinks for men or more than four standard drinks for women) was 17 years, with one in seven (13.9%, 95% CI 12.7-15.1) of those surveyed reported first consuming a large amount of alcohol when aged 14 or under. Age standardised rate ratios (RR) indicate significant ethnic differences with Maori men and women being more likely to consume alcohol at age 14 years or younger compared to the total population (RR 2.02 men, 1.6 women) (Ministry of Health, 2009).

A key finding of this survey was that among those who reported drinking alcohol in the past 12 months, the 18 to 24 year age group consumed large amounts of alcohol on a typical drinking occasion and on a per week basis, the rates were higher than any other age group (Table 3). Although young people aged 16-17 years are significantly less likely than all other age groups to have consumed alcohol in the last 12 months, of those who did drink during that period, approximately two in five consumed a large amount of alcohol on a typical drinking occasion (the second highest proportion of any age group). Within the 16-17 age group there were more females than males who drank excessively (Table 3). Analysis of data from those who have consumed a large amount of alcohol on at least one drinking occasion in the past 12 months and those who consume a large amount of alcohol at least weekly show higher rates in the most deprived areas (NZDep quintile five).

Table 3: Percentage of young people in the NZ Alcohol & Drug Use survey who consumed large amounts of alcohol at least once and at least weekly.

		Consumed a large amount of alcohol at least weekly	Consumed a large amount of alcohol on at least one occasion in the past 12 months
16-17 years	Male	9%	65.4%
	Female	16.4%	77.2%
18-24 years	Male	33.8%	80.7%
	Female	18.8%	80.5%

(Ministry of Health, 2009)

2.1.3 The New Zealand Mental Health Survey 2003/2004

Fieldwork for the New Zealand Mental Health Survey was carried out in 2003 and 2004. This large survey included 12,992 interviews conducted on people aged over 16 years living in permanent private dwellings (Oakley Browne, Wells, & Scott, 2006). It is considered a nationally representative sample with oversampling of Maori and Pacific to improve precision in these groups. The response rate was 73.3%. Overall 4,823 people who had consumed alcohol in the past 12 months also answered the AUDIT questionnaire. Limitations identified with this survey include no sampling of institutionalised or homeless people, no translation into other languages and possible non-response bias (Oakley Browne, et al., 2006).

Almost everyone (94.6%) had used alcohol at some time and differences between age groups were small. Apart from those born prior to 1939, the age of first use was almost always before 25 years with the steepest rise in onset being in mid-adolescence. Ethnic differences in onset of alcohol use in this survey showed Maori and the composite Other ethnic group (including NZ European) had similar risk and Pacific people had lower risk (Wells, McGee, Baxter, et al, 2009).

A further report on substance use disorders has also been produced taking data from the Mental Health Survey and subjecting it to further analysis (Wells, Baxter, & Schaaf, 2007). This provides a population based understanding of the prevalence of substance use disorders in New Zealand. The AUDIT questionnaire was used to measure the prevalence of hazardous drinking. The overall prevalence of hazardous drinking in the past 12 months was 20%, with 13.8% of the population predicted to meet the DSM IV criteria for a substance use disorder at some time in their lives. The majority of those developing a substance use disorder (75%) did so by the age of 25 years.

The prevalence of hazardous drinking (AUDIT score ≥ 8) was higher for males, more than double that for females; an age gradient was evident with highest rates in the 16-24 age group (Table 4). Higher rates were also evident in more deprived groups (as measured by NZDep2001) and Maori and Pacific groups (Wells, et al., 2007).

Table 4: Hazardous drinking by individual characteristics in the New Zealand Mental Health Survey.

Characteristic:	% with Hazardous drinking
Male	28.0% (26.0-30.2)
Female	12.5% (11.2-13.9)
Age 16-24 years	38.3% (34.1-42.8)
Maori	29.6% (26.4-32.8)*
Pacific	18.1% (14.8-21.3)*
All other ethnicities	18.6% (17.1-20.1)*
NZDep2001: Decile 9 &10	25.3% (22.2-28.6)
Decile 1 & 2	13.7% (11.3-16.5)

*adjusted for age, sex, education, income (Wells, et al., 2007).

As expected participants with higher AUDIT scores were more likely to meet the DSM IV criteria for an alcohol use disorder. The prevalence of alcohol abuse was 2.6% and alcohol dependence 1.3% (Wells, et al., 2007). Given the primary purpose of the AUDIT survey is to

identify hazardous drinking with a cut off score of ≥ 8 this also detected others with hazardous and harmful drinking not meeting DSM IV criteria.

2.1.4 International Evidence

The World Health Organisation Global Status Report (2004) states young people in many countries are beginning to drink at earlier ages. Research in developed countries has found that the earlier young people start drinking the more likely they are to experience alcohol related injury and alcohol dependence later in life. The National Longitudinal Alcohol Epidemiologic Study in the USA was a large study that demonstrated young people who began drinking before age 14 were significantly more likely to develop alcohol dependence later in life (Grant & Dawson, 1997; Hingson, et al., 2006).

Data suggests that a culture of sporadic heavy or “binge” drinking among young people is widespread in many developed countries and it may spread from developed to developing countries (World Health Organization, 2004). The WHO Mental Health Surveys show globally alcohol use is not distributed evenly. Alcohol has been consumed by most people in the Americas (Colombia, Mexico, United States), Europe (Belgium, France, Germany, Italy, Netherlands, Spain, Ukraine), Japan and New Zealand, with smaller proportions in China, the Middle East and Africa (Israel, Lebanon, Nigeria, South Africa) (Degenhardt et al., 2008). The median age of onset of alcohol use was 16-19 years in all countries except for South Africa (20 years). Alcohol use by age 15 was more common in European countries than Middle East and African countries. By age 21 the majority of youth in European countries (76-99%), Japan (92%), New Zealand (94%), Americas (78-93%) had begun using alcohol; estimates were lower in Middle East and African countries (40-63%) (Degenhardt, et al., 2008). Globally trends are not static. With the increasing involvement of youth, alcohol use will continue to change; in most countries the period of risk of initiation is in the mid-late teenage years. There is also a general shift across all countries with traditional sex differences (males being higher) becoming less pronounced.

Since the 1990s alcohol use data has been collected on European students. The European School Survey Project on Alcohol and Other Drugs (ESPAD) was designed to collect comparable data on substance use among European students to monitor trends within and between countries. A report looking at students aged 17-18 years in 2007 found countries with high frequent alcohol consumption (Greece, Italy) had quite a low prevalence of intoxication (Hibell et al., 2009). This trend was also seen in the younger 15-16 year old cohort, although the frequency of intoxication was not as high. The tobacco, alcohol and drug use pattern among students varied a great deal between the European countries, but the data does indicate students often use or have tried more than one of these substances. Frequent use of alcohol, defined as 10 or more times in the last 30 days, was more prevalent in Greek students (23%) and Italian students (18%), but least frequent in Swedish students (4%). The country with the highest proportion of students reporting binge drinking three or more times in the past 30 days, was Sweden (26%), the next highest rate was in Poland (23%) and France had the lowest rate (17%). Frequent drunkenness behaviour showed a similar pattern with 25% of Swedish students reporting this and approximately 7% of students in France and Greece (Hibell et al., 2009).

The Information Centre for Health and Social Care, part of the National Health Service (NHS) in the United Kingdom, collates all national alcohol statistics and reports are produced annually. Data from the General Household Survey (2005) reported young people were more likely to drink heavily, 48% of men and 39% of women aged 16-24 were drinking above the daily recommendations. Binge drinking (defined as two times the recommended daily benchmark – eight units for men and six units for women, on at least one day in the past week) was highest in the 16-24 year age group with 33% of men and 24% women meeting these criteria (The NHS Information Centre, 2010).

Young Australians are also starting to drink at an earlier age and most are drinking in a way that puts their health and that of others at risk. Approximately 90% of Australians have tried alcohol by the age of 14, and most have consumed a full serve by age 16 (Australian Medical Association, 2009). By the age of 18, about half of these young people are drinking at risky levels, but the majority of these drinkers classify themselves as ‘social drinkers’ and do not perceive their consumption patterns to be a problem (Roche et al., 2007). The rate of binge

drinking among teenagers (14-19 years of age) was high in 2007 at 39.2% (Australian Medical Association, 2009). Teenagers are not the group among whom binge drinking is highest in Australia. People in their twenties are one and a half times more likely to binge drink than teenagers, and one in seven people aged 20-29 engaged in binge drinking at least once a week in 2007 (Australian Medical Association, 2009). Data from 1990 to 2002 found approximately 15% of Australian young people died from alcohol attributable injury and disease due to high risk drinking, the most common causes were road injury, suicide and violence (Chikritzhs & Pascal, 2004).

2.1.5 Other Drug Use

Young people often use or have tried more than one substance including alcohol (Hibell, et al., 2009). There is additional concern that some types of drug use which themselves may be considered low risk, may escalate into types of drug use which are potentially high risk (Kandel, Simcha-Fagan, & Davies, 1986).

New Zealand National Drug Surveys of approximately 5,500 people aged 15-45 in 1998 and 2001 showed multiple drug use is relatively frequent. The most common combination of substances tried by approximately one in four people in both 1998 and 2001 was alcohol, tobacco and marijuana (25% in 1998 and 23% in 2001) followed by alcohol, tobacco, marijuana and another drug (16% and 17.6% respectively) (Wilkins, Casswell, Bhatta, & Pledger, 2002). In 2001 7.5% of those surveyed reported using alcohol, tobacco and marijuana and 5.1% used alcohol, tobacco, marijuana and another drug, in the past 12 months (Wilkins, et al., 2002). The use of three or more illegal drugs in the past 12 months increased from 6% in 1998 to 8% in the 2001 sample, rates were highest among males and in the 18-24 age range (Wilkins, et al., 2002).

The 2006 National Drug Survey indicates that the pattern of drug use may be changing in New Zealand. There was a lower proportion of the sample reporting cannabis use in the past

12 months (17.9% in 2006 vs. 20.3% in 2001, $p<0.05$) and a general trend towards increases in the use of amphetamines, crystal methamphetamine and ecstasy in New Zealand (Wilkins & Sweetsur, 2007). There was a relative increase in the level of amphetamine use in 2006 compared with 2003 (2.4% vs. 2.0%, $p<0.05$) and an increase in the level of crystal methamphetamine use over the same time period (2.5% vs. 1.7%, $p<0.05$). A higher proportion of the sample had used ecstasy in the past year in 2006 compared with 1998 (3.95 vs. 1.5%, $p<0.05$) (Wilkins & Sweetsur, 2007).

2.1.6 Summary

Recent New Zealand surveys show consistent trends in hazardous alcohol consumption with highest rates in males and youth, as well as clear ethnic patterns and gradients across deprivation levels. Other developed countries have similar trends in current youth alcohol consumption. The age of first alcohol consumption appears to be lowering and both hazardous alcohol use and binge drinking are highest in young age groups, 15-17 years and 18-24 years. These trends pose significant risks to the health of young people as well as being associated with other adolescent problems, other drug use and alcohol dependence later in life. Alcohol use needs to be considered along with use of other illicit drugs, because of the prevalence of consumption of alcohol with other drugs among some young people. The weight of evidence indicates an association between binge drinking and risk taking behaviours.

2.2 Sexually Transmitted Infections

As potentially preventable communicable diseases, sexually transmitted infections are an important public health issue. New Zealand has largely avoided the HIV/AIDs epidemic however it does have a comparatively high prevalence of other sexually transmitted infections, particularly chlamydia and gonorrhoea. International comparisons are difficult because of differing surveillance methods used. This section summarises these surveillance

methods, reviews the evidence on STIs in New Zealand including how prevalence in New Zealand compares with other western countries.

2.2.1 Sexually Transmitted Infections in New Zealand

STI surveillance data in New Zealand is incomplete. The Institute of Environmental Science and Research (ESR) collects data voluntarily from sexual health clinics, family planning clinics, youth health clinics and laboratories. Laboratory surveillance relies on fewer reporting sources and is less prone to selection bias as it includes data from all health care providers, but ethnicity data is not recorded and no measure can be made of clinical diagnoses such as genital herpes or genital warts. Laboratory surveillance does not cover all areas of New Zealand, for example, no data is collected in Canterbury. There are also differences in the diagnostic test used for chlamydia in New Zealand, some labs use NAAT (Nucleic Acid Amplification Testing) and others EIA (Enzyme Immunoassay) and these tests have different sensitivity and specificity (Ministry of Health, 2008a). Clinic surveillance collects demographic data which allows trends to be monitored. Sexual health clinics diagnose a high proportion of the total number of STIs therefore this data can often give an alert for changes occurring in the wider community. Because a large number of diagnoses are made outside of the surveillance clinics this can, however, underestimate the overall disease burden. Clinics are generally located in cities and larger rural towns resulting in selection bias. Caution also needs to be taken when looking at the calculated rates; the total number of clinic visits including all new and follow-up visits plus visits for other health reasons is used as the denominator. Sexual health clinic rates appear higher for this reason as those attending are more likely to have STI testing compared to family planning and youth health clinics which generally have a greater number of visits for other health reasons. The total clinic visits denominator can also underestimate sexual health clinic rates as a proportion of the total clinic visits will be for the same individuals attending for follow-up treatments; a more accurate measure may be to look at the positivity rate of testing. In areas where data is collected from both clinics and laboratories, the laboratories reported approximately four times the number of cases of chlamydia and three times the number of gonorrhoea cases compared to the clinic surveillance (ESR, 2011). This gives some idea of

the underrepresentation of the disease burden when just looking at clinic surveillance data, but this estimate may also vary region by region in New Zealand.

According to ESR data in 2010, chlamydia was again the most commonly reported STI. Data from 15 District Health Boards (DHBs) gave a calculated New Zealand national chlamydia rate of 782 per 100,000 (ESR, 2011). This national rate has increased 13.1% between 2007 and 2010. Those aged less than 25 years accounted for over 70% of chlamydia cases (ESR, 2011). The highest national age specific rates were in males aged 20-24 years, at 2.5 times the national rate (1848 per 100,000 population) and females aged 15-19 years, over 8 times the national rate (6514 per 100,000), these trends were also evident in the clinic surveillance data (ESR, 2011).

Ethnicity data from sexual health clinic surveillance showed the highest proportion of positive chlamydia cases were in European (44.0%) clinic attendees followed by Maori (39.0%); this reflects the demographic of those attending the clinics, with 64.1% recorded European ethnicity and 21.7% Maori ethnicity (ESR, 2011).

STIs are one of the leading causes of preventable illness in New Zealand young people (Craig, Anderson, & Jackson, 2008). Rises in the rates of chlamydia and gonorrhoea are of particular concern as these STIs can lead to the development of serious sequelae such as pelvic inflammatory disease, ectopic pregnancy and infertility as well as facilitating transmission of HIV (Monga, 2006). Complicated chlamydia infections were reported in 5.4% of sexual health clinic cases in 2010 (ESR, 2011). Young people were overrepresented with 50% of epididymitis cases in those aged less than 25 years (European 51.9%, Maori 24.1%), and 70.5% of pelvic inflammatory disease cases aged less than 25 years (Maori 44.5%, European 41.4%) (ESR, 2011).

New Zealand research suggests that between 8-30% of young people have had sexual intercourse by the time they reach 15 years of age, with the figures increasing to over 50% by

16-17 years (Dickson, Paul, Herbison, & Silva, 1998; Fenwicke & Purdie, 2000; Lynskey & Fergusson, 1993). Early sexual intercourse appears to be associated with:

- Being female (Dickson, et al., 1998; Lynskey & Fergusson, 1993)
- Being Maori (Fenwicke & Purdie, 2000)
- A background of socioeconomic disadvantage (Lynskey & Fergusson, 1993)
- Sexual abuse in childhood (Fergusson, Horwood, & Lynskey, 1997)
- Alcohol misuse in early adolescence (Fergusson, et al., 1994a).

The most recent youth survey has found approximately 15% of sexually active students don't use or only sometimes use condoms and/or contraception (Adolescent Health Research Group, 2008).

Recent studies (since 2002) on selected groups of the New Zealand population has shown chlamydia infection rates of between 2 to 15.8% in those aged less than 25 years. Significant associations have been found with Maori and Pacific ethnicity, a history of previous STIs or chlamydia infection, partner change within the past three months and an inverse relationship with condom use. Table 5 summarises these studies and the relevant findings.

Table 5: New Zealand Studies since 2002 demonstrating Chlamydia Trachomatis prevalence & significant associations.

AUTHOR YEAR OF PUBLICATION	SAMPLE POPULATION SAMPLE SIZE (<i>n</i>)	CHLAMYDIA PREVALENCE in those aged <25 years	CONDOM USE	ETHNIC COMPARISONS (prevalence rates)	SIGNIFICANT ASSOCIATIONS with CHLAMYDIA POSITIVITY (Odds Ratio)
(Corwin et al., 2002)	Christchurch high school students 16-18 years <i>n</i> =1133	2%	Always 44% Mostly 26% Sometimes 22% Never 8%	<i>Not provided</i>	<i>No information</i>
(Sparrow et al., 2007)	Wellington Family Planning attendees <25yrs <i>n</i> =2533	8%	Always 4% Usually 35% Sometimes 34% Never 16%	Maori 14% Pacific 16% European 7%	Maori ethnicity (OR 2.32, 1.66-3.24) Pacific ethnicity (OR 2.76, 1.71-4.45) Partner change in past 3 months (OR 2.22, 1.65-2.99) Sex with >2 partners in past 12 months (OR 2.58, 1.88-3.55)
(Baker et al., 2005)	Female University students 18—25yrs Wellington <i>n</i> =718	2.7%	Always 24% Sometimes 43% Occasionally 23% Never 9%	Maori 4.1% Pacific 13.3% European 1.9%	Previously testing + for an STI (OR 3.19, 1.18-8.16) Previous Chlamydia infection (OR 4.89, 1.54-15.48) Non-European ethnicity (OR 3.69, 1.45-9.37) Inverse association with regularity of condom use (Chi-squared test for trend $p<0.05$)
(Lawton et al., 2004)	Pregnant women Wellington <i>n</i> =6614 (985 aged <25yrs)	12.2%	<i>No information</i>	Maori 15.2% Pacific 12.5% NZ European 2%	Odds ratios not given but significant association with chlamydia positivity and: non-European ethnicity ($p<0.0001$)
(Rose, Lawton, Brown, Goodyear-Smith, & Arroll, 2005)	Women for Termination of Pregnancy (TOP) Wellington <i>n</i> =1001 (535 aged <25yrs)	11.2%	<i>No information</i>	Maori 12.9% Pacific 18.6% NZ European 4.4%	Odds ratios not given but significant association with chlamydia positivity and: non-European ethnicity ($p<0.001$) marital status (i.e. single/never married/widowed or divorced) ($p<0.05$)
(Morgan & Bell, 2009)	All those tested for chlamydia in Waikato area <i>n</i> =21104 (10847 aged <25yrs)	15.8%	<i>No information</i>	Maori 24.2% Non-Maori 12.5% ($p<0.05$)	Odds ratios not given but significant association with chlamydia positivity and: Maori ethnicity ($p<0.001$)

2.2.2 Sexually Transmitted Infections Internationally

Because there is no universal method for collecting STI surveillance data, and individual countries' testing methods influence rates, it is difficult to determine accurately how New Zealand compares internationally.

STI surveillance in England is similar to New Zealand with data collection from microbiology laboratories and Genitourinary Medicine (GUM) clinics. A new electronic data collection system has been introduced to improve the surveillance information, this collects information on area of residence, age, sexual orientation, ethnic group and country of birth for all patients attending GUM clinics; improving the public health utility of the data and facilitating assessment of local service needs.

In the USA physicians are required to report STI diagnoses of chlamydia, gonorrhoea and syphilis to the Centre for Disease Control and Prevention (CDC). It is, however, recognised that the CDC data may underestimate the true disease burden due to incomplete diagnosis and reporting of STIs.

In Australia the National Notifiable Diseases Surveillance System includes the STIs chlamydia, gonorrhoea and syphilis. Data is obtained via passive reporting of cases to Health Departments by doctors or laboratories. Problems including bias from testing patterns and incomplete notification data including indigenous status in several jurisdictions lead to a trial of a Sentinel Surveillance system, ACCESS (The Australian Collaboration for Chlamydia Enhanced Surveillance). A two year evaluation report concluded that ACCESS has considerable potential to support a better understanding of long-term trends in chlamydia notifications and to support policy and programme development (Guy et al., 2010).

Comparison of data from these surveillance systems shows New Zealand's chlamydia rate is considerably higher than the US, England and Australia; the gonorrhoea rate is higher than

both England and Australia but lower than that seen in the USA (Table 6). However, as noted above, caution should be used when making these comparisons, and they need to be considered in the light of varying reporting systems and coverage found in different countries.

Table 6: National chlamydia and gonorrhoea rates for New Zealand, Australia, England and the USA based on data from the individual countries surveillance systems.

COUNTRY	Chlamydia rate per 100,000 population*	Gonorrhoea rate per 100,000 population*
New Zealand (ESR, 2011)	782.0	64.0
Australia (National Notifiable Diseases Surveillance System, 2009)	286.4	36.8
USA (CDC, 2010)	409.2	99.1
England (Health Protection Agency, 2009)	366.4	27.7

*rates per 100,000 population, includes all ages

Similar to New Zealand, both the USA and Australia demonstrate ethnic and age disparities in STI rates. In the USA young black women aged 15-24 years have the highest rates of both chlamydia and gonorrhoea infection followed by young Hispanic men and women (CDC, 2010). In Australia, Aboriginal and Torres Strait Islander people also carry a disproportionate disease burden. Surveillance data shows chlamydia and gonorrhoea rates are highest in the 20-24 year age group followed by those aged 15-19 years (National Notifiable Diseases Surveillance System, 2009). A study of a remote Aboriginal community in central Australia consisting of over 1000 participants, showed the incidence of chlamydia and gonorrhoea infections of 15.8 per 100 person-years and 21.3 per 100 person-years respectively (Miller, Law, Torzillo, & Kaldor, 2001). That these incidence rates are considerably higher than the surveillance data demonstrates the difficulty in relying on surveillance data alone which can underestimate burden of infections in these populations.

2.2.3 Summary

Despite limitations in data collection ESR data show high rates of chlamydia and gonorrhoea, and the associated complications, in New Zealand youth. Difficulties in collecting accurate STI statistics is a problem experienced by other developed countries but New Zealand still ranks high when comparing these statistics. Indigenous people and low socioeconomic groups are overrepresented in STI rates in New Zealand and internationally.

2.3 Alcohol use and Sexually Transmitted Infections - Evidence of an Association

2.3.1 International Evidence

Sexual health clinic attendees have been identified as a high risk population for both STIs and harmful alcohol use (Cook & Clark, 2005; Crawford, et al., 2004; Hutton, et al., 2008; Standerwick, et al., 2007). Since participation in one potentially risky behaviour is likely to be correlated to participation in other risky behaviours, e.g. drinking and unprotected sexual intercourse (UPSI), it is difficult to determine causation rather than association.

Studies have examined the evidence for an association between alcohol misuse and STIs in sexual health clinic populations. Standerwick et al (2007) performed a questionnaire based study of 520 genitourinary clinic attendees in South England who were matched with subjects from the general household survey. The clinic attendees reported higher levels of alcohol consumption compared with the general household survey ($p < 0.001$), the median usual drinking night for clinic attendees was 13.4 units and a heavy night 26 units. Twenty-nine percent had a bacteriologically diagnosed STI and those with a confirmed STI drank 40% more on a weekly basis and binged more heavily ($p < 0.003$). For females there was a

significant correlation between the number of sexual partners and both frequency of drinking days ($p<0.001$), weekly intake ($p<0.001$) and binge drinking ($p<0.001$). There was also a significant association between binge drinking and unwanted pregnancy ($p<0.007$). For males, number of sexual partners was significantly correlated with weekly alcohol intake ($p<0.007$) and high daily intake was significantly associated with UPSI ($p<0.002$). Only 14% of males and 18% of females surveyed reported always using condoms with new sexual partners, 77% reported drinking alcohol before sex with new partners and 65% were usually or occasionally very drunk. This study lacked any event specific alcohol use information from which causation might be inferred. The authors identified that the majority of typical STI clinic attendees were heavy binge drinkers and attributed their infections at least partially to heavy drinking in approximately one third of cases (32% of participants felt alcohol played a role in their clinic attendance) (Standerwick, et al., 2007).

The association between binge drinking and risky sexual behaviour was examined in 671 patients attending a Baltimore sexual health clinic (Hutton, et al., 2008). Participants were tested for STIs and undertook an audio computer-assisted-self-interview. Binge drinking was reported by 42% of men and 30% of women. After controlling for other drug use, binge drinking in women was associated with risky sexual behaviours including receptive anal intercourse (AOR 2.6, 95% CI 1.2-5.6), having multiple sexual partners (AOR 2.8, 95% CI 1.3-6.0) and having a diagnosis of gonorrhoea (AOR 5.3, 95% CI 1.4-21.0). For men rates of risky sexual behaviour and STIs were high but did not differ by alcohol use. The authors felt because the participants had a full clinical examination, a STI diagnosis (an irrefutable marker of risky sexual behaviour) this supplemented the self-report behavioural data to increase its validity (Hutton, et al., 2008).

Cook et al (2006) specifically looked at young people aged 15-24 attending an urban sexual health clinic in Pittsburg, USA. They found substance use disorders (alcohol or marijuana) were more common than confirmed STIs. Overall 42.9% had an alcohol or marijuana use disorder (DSM-IV diagnosis) and 30.6% had a confirmed STI (defined as laboratory confirmed diagnosis of chlamydia, gonorrhoea, trichomonas, syphilis, genital herpes or clinical diagnosis of genital warts). Participants with a substance use disorder were significantly more likely to have multiple sexual partners (OR 2.3, 95% CI 1.5-3.4), to be

inconsistent condom users (OR 3.1, 95% CI 1.5-6.3) and have an STI diagnosis (OR 1.7, 95% CI 1.1-2.6). Over a third of participants perceived that in the past year alcohol use had resulted in sexual behaviour that would not have happened in the absence of alcohol (Cook et al., 2006).

These cross-sectional studies are only able to determine a global association between alcohol use and STIs, this general relationship does not connect these two behaviours in time. The associations could be a result of a direct effect of alcohol on risky sexual behaviour or because they could both be related to a third factor such as a personality trait that is related to risky behaviours in general (Cook et al., 2006; Kalichman, Cain, Zweben, & Swain, 2003).

Chesson et al (2000) aimed to determine causation rather than association between alcohol use and STIs. They explored STI rates (in particular crude gonorrhoea and syphilis incidence) in 50 US states and the District of Columbia around the time of state alcohol policy changes (alcohol taxation and drinking age requirements) over the time period 1981 to 1995. Higher alcohol taxes were associated with lower STI rates, a doubling of the federal excise tax on beer in 1991 corresponded with a nationwide reduction STI rates in 1991 compared with 1990. Gonorrhoea rates decreased 10% and syphilis rates almost 30%. This time period coincided with much publicity about HIV/AIDS and the need to use condoms to prevent infection, these public health messages are a likely confounding factor and a possible explanation for the changes in disease prevalence. A rise in the drinking age to 21 was followed by a reduction in gonorrhoea incidence in the 15-19 year age group but did not affect the 20-24 year age group. It was felt if confounding factors were present it would be expected the rates in the older age group would also decline. The authors concluded this study supported alcohol as a causal factor in risky sexual behaviour at least for a fraction of the population at risk of acquiring an STI, and changes in alcohol policy could have substantial public health benefits by decreasing STIs (Chesson, et al., 2000). Evidence also exists in Western Australia of lower STI rates when alcohol restrictions were introduced (Bangor-Jones et al., 2011). The remote communities of Fitzroy Crossing and Halls Creek in the Kimberley region have high rates of both alcohol related health and social problems and STI rates, especially in the Aboriginal population. Alcohol restrictions, including prohibiting sale of packaged liquor exceeding 2.7% ethanol, were imposed in 2007 in Fitzroy Crossing

and 2009 in Halls Creek. In Fitzroy Crossing there was a significant decline in both gonorrhoea (>50%) and chlamydia (30%) for the two years post compared to two years pre restrictions (Bangor-Jones, et al., 2011). Time series analysis from 2007 to 2010 showed a statistically significant decrease in STI notification rates after the intervention in both communities ($p=0.005$ Fitzroy Crossing, $p=0.012$ Halls Creek) (Bangor-Jones, et al., 2011).

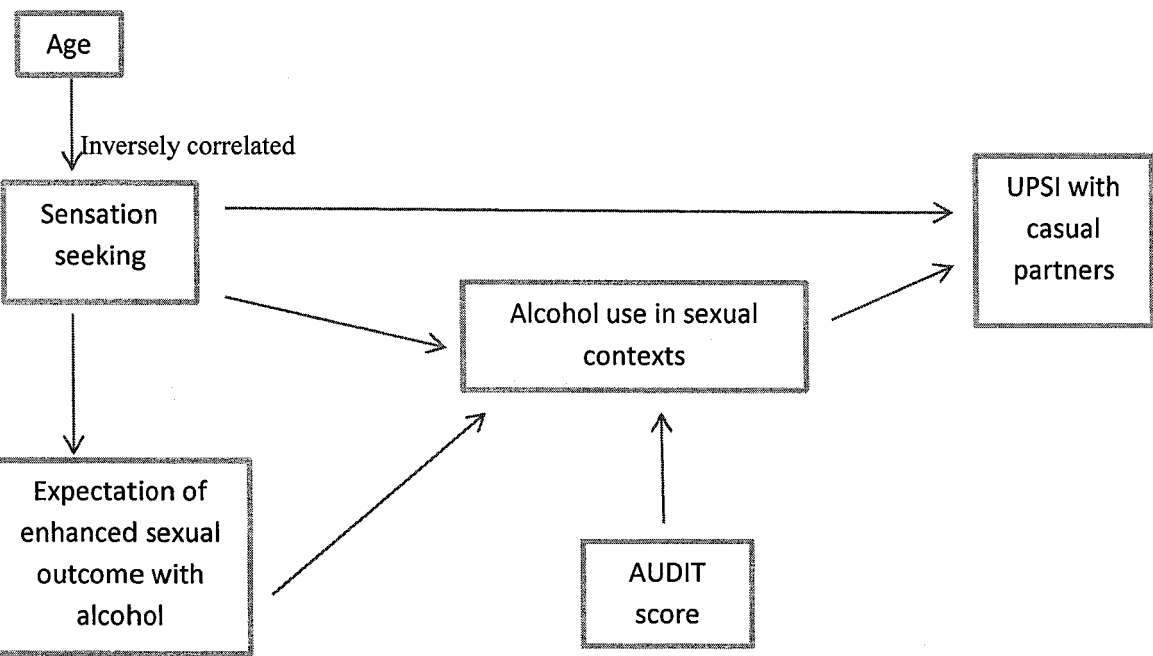
A number of studies have examined the association between alcohol and other markers of sexual risk, not necessarily a STI diagnosis, with inconsistent findings. Some studies have shown alcohol use to be significantly associated with UPSI (Castilla, Barrio, Belza, & de la Fuente, 1999; Crawford, et al., 2004; Kalichman, Simbayi, Jooste, & Cain, 2007; Kennedy & Roberts, 2009; Scott-Sheldon et al., 2009; Strunin & Hingson, 1992), others have shown the opposite with alcohol use being associated with condom use with casual partners (Corbin & Fromme, 2002; Leigh et al., 2008) and some studies have shown no associations at all between alcohol and condom use (Morrison et al., 2003). Alcohol use has been linked to increasing number of sexual partners (Castilla, et al., 1999; Kalichman, et al., 2007), and increased likelihood of having sexual intercourse that may not have otherwise taken place (Crawford, et al., 2004; MacDonald, Fong, Zanna, & Martineau, 2000; Strunin & Hingson, 1992). Please refer to Appendix 1 for a summary of the significant findings from these studies.

All of the studies presented above rely on self-reported behaviour; it has been demonstrated that errors in the measurement of alcohol use and sexual behaviour can affect estimates of the relationship and this may depend on the frequency of the behaviour or characteristics of the population (Leigh, Gillmore, & Morrison, 1998; Leigh, Morrison, Hoppe, et al., 2008). A small study comparing retrospective reports and daily diary accounts found them to be highly correlated with a few discrepancies; more frequent drinking was reported on the diary than the retrospective measure ($p<0.01$), with the discrepancy being larger for the more frequent drinkers (Leigh, et al., 1998). In a larger sample of 604 participants fewer than two thirds of participants were accurate in their recollection of drinking and condom use; teenagers and men who have sex with men were more likely to overestimate the negative effect of alcohol on condom use. Those that always or never use condoms were most accurate, leading the authors to conclude that when recalling recent condom use people may be reporting their

rules rather than actually recalling and counting their behaviours (Leigh, Morrison, et al., 2008).

Kalichman et al (2003) examined sensation seeking personality traits and found these to be correlated with sex-related alcohol use and sexual risk behaviours (Figure 1). This study was conducted on 350 men from a Milwaukee inner city sexual health clinic which limits the generalisability of the findings but highlights the possibility that personality traits can mediate associations between risky alcohol use and sexual behaviours.

Figure 1: Significant correlations between sexual risk behaviours, alcohol use and sensation seeking variables, modified from Kalichman et al (2003)



Contextual factors surrounding alcohol use can also confound associations (Chersich & Rees, 2010). Studies have demonstrated seasonal and situational variations in alcohol use and sexual risk behaviour. An increase in alcohol related sexual events was demonstrated on Friday and Saturday nights and during summer in an adolescent population (Fortenberry, Orr, Zimet, & Blythe, 1997). In Australia ‘Schoolies Week’ where young people travel to Surfers Paradise to celebrate the end of their school careers for a week sometime in November or December has been associated with high levels of alcohol and drug use and sexual risk taking

(Smith & Rosenthal, 1997). A study of 1796 young people attending schoolies week in 1995 showed two thirds of young men and one third of young women expected to have sex and 80% of those expected to use condoms. Most young people expected to be drunk most or every night of their holiday, and 17-27% expected to be stoned most or every night. In practice 75% of males and 60% of females reported getting drunk most or every night. Forty percent of participants reported sexual intercourse, of those over a third had sex with only casual partners. Those that used condoms inconsistently had a history of inconsistent use, the authors concluded although one might expect the end of year celebrations to be an opportunity to engage in risky behaviour, the activities of most risk takers were an extension of their usual practice (Smith & Rosenthal, 1997). A study of 827 British University students behaviour over the summer break indicated those that travelled abroad were 1.6 times more likely to have consumed alcohol (95% CI 1.17-2.16), been drunk more frequently and used cannabis (Vivancos, Abubakar, & Hunter, 2010). More people reported having sex (RR 1.25, 95% CI 1.09-1.57) and sex with a new partner (RR 1.36, 95% CI 1.15-1.63) if they travelled abroad, and rates of UPSI were also higher but not statistically significant (RR 1.31, 95% CI 0.98-1.76) (Vivancos, Abubakar, & Hunter, 2010).

2.3.2 New Zealand Evidence

There have been studies on selected groups of the New Zealand population that have looked at associations between alcohol use and sexual risk behaviours but few have specifically looked at STI rates.

A recent study of 1564 Otago University students aged less than 30 years explored the harmful effects of alcohol on sexual behaviour in this population (Cashell-Smith, et al., 2007). In the preceding three months 11% of women and 15% of men reported UPSI as a result of drinking alcohol; 6% of women and 7% of men reported having sex that they were not happy about at the time, and 15% women and 19% of men reported sex they later regretted. Positive aspects of drinking reported by the participants included 'drinking makes sex better' (6%), increased confidence in approaching people they were attracted to (30-40%)

and decreased inhibitions (30-35%). Hazardous drinkers (AUDIT score 8-14) were over 5 times more likely than moderate drinkers (AUDIT score 1-7) to experience risky sexual behaviour as a result of drinking alcohol (AOR 5.35, 95% CI 3.28-8.73) and harmful drinkers (AUDIT score 15+) were 14 times more likely (AOR 14.22, 95% CI 8.65-23.36). This study had a high response rate of 82% but some of the confidence intervals remain wide. University students also represent a unique population, often characterised by high alcohol consumption, meaning this data cannot be generalised to the wider New Zealand population.

Two New Zealand prospective cohort studies have provided further evidence for causal links between alcohol misuse and sexual risk taking. The Dunedin Multidisciplinary Health and Development Study looked at associations between risky sexual intercourse and STIs with a range of psychiatric disorders including substance use disorders (alcohol or marijuana or both) (Ramrakha, et al., 2000). After adjustment for sex, socioeconomic status and sexual behavioural variables participants with a diagnosed substance use disorder were 2.4 (95% CI 1.8-3.3) times more likely to have engaged in risky sexual intercourse in the past year; 2.6 (95% CI 1.7-4.0) times more likely to have been diagnosed with an STI; and 2.1 (95% CI 1.7-2.6) times more likely to have had sexual intercourse before age 16 (Ramrakha, et al., 2000).

The Christchurch Health and Development Study established an association between alcohol misuse at age 16 and teenage sexual activity and risk taking (Fergusson & Lynskey, 1996). Both boys and girls who misused alcohol reported higher rates of sexual intercourse, were more likely to have multiple partners and had higher rates of UPSI. The odds ratios ranged from 6.1 to 23 ($p < 0.001$). Gender differences were evident with alcohol use and early intercourse higher for girls (OR 23, 95% CI 6.8-78.1) and the association between UPSI and alcohol higher for boys (OR 18.1, 95% CI 7.4-44.0). Rather than a simple cause and effect relationship these factors were thought to be correlated risk factors. Significant predictors of alcohol misuse included family social position ($p < 0.05$), novelty seeking behaviours ($p < 0.001$) and affiliations with delinquent peers ($p < 0.001$), in addition to these predictors exposure to childhood adversity was also a significant predictor of adolescent sexual risk taking ($p < 0.01$). Not all of the association between alcohol misuse and teenage sexual conduct could be explained in terms of these correlated factors and after adjustment alcohol

misuse was associated with higher rates of early sexual intercourse (AOR boys 2.9, 95% CI 1.4-6.0; girls 6.2, 95% CI 1.6-23.4) and UPSI (AOR boys 6.9, 95% CI 2.5-18.9; girls 4.5, 95% CI 1.7-11.9) but not with multiple partners (Fergusson & Lynskey, 1996). A further marker of sexual risk taking is unplanned pregnancy, in the same cohort by age 21, 24% of the young women had become pregnant. In those who became pregnant there were significant associations with conduct disorder ($p<0.0001$), educational underachievement ($p<0.0001$), early sexual intercourse ($p<0.0001$) and family adversity ($p<0.0001$) (Woodward, Horwood, & Fergusson, 2001).

Alcohol is considered to make social situations more relaxed and give teenagers more confidence to embark on sexual activity (Lynskey & Fergusson, 1993). A qualitative study of a sample of year 10 (13-14 year old) students in a decile eight Christchurch high school found students spoke of disinhibition as a positive aspect of drinking alcohol which reduced barriers between peer networks and increased sociability. Having sexual intercourse whilst drunk was generally accepted as permissible and sometimes inevitable (Abel & Plumridge, 2004).

The most recent evidence of a link between alcohol use and STIs is from the Christchurch Health and Development Study, a 30 year prospective longitudinal study (Bowden, et al., 2011). Alcohol use was linked with an increased risk of STI diagnosis from age 14-30. A wide range of other variables were controlled for and the results remained statistically significant, suggesting some evidence of a causal association, although the authors did accept the observed association could be an overestimate due to the complex nature of both alcohol use and STI risk and the adequacy of the statistical methods and modelling used. In this study those with the highest alcohol consumption had rates of STI diagnosis 2.5 times those with the lowest alcohol consumption (Bowden, et al., 2011).

2.3.3 Summary

Studies in US and UK sexual health clinic attendees indicate an association between alcohol misuse and diagnosed STIs. This is also supported by studies showing relationships between alcohol use and other sexual risk markers (including UPSI, increasing number of sexual partners). This association does however appear to be complex and can also involve other influences including personality traits and contextual factors.

New Zealand studies have demonstrated associations between alcohol use and sexual risk behaviours in selected population groups. The most recent evidence from a local large longitudinal study provides some evidence of a causal association between increasing alcohol use and diagnosed STIs in young people born in Christchurch.

CHAPTER 3: RESEARCH DESIGN & METHODOLOGY

This chapter provides a detailed account of the research methods including the study design, literature review process, development of the questionnaire, ethical approval process, selection of participants and collection of data. Data entry and statistical analysis are also described.

3.1 Study Design

This study utilised a quantitative cross sectional design.

A cross sectional survey is considered to have the advantages of being cheap, quick and allows information to be gathered on many variables (Mann, 2003). This design was considered most appropriate for meeting the aims of this project within the time and budget constraints.

A cross sectional study using a written survey was deemed easy to administer to young sexual health clinic attendees and had the advantage of no follow-up. As this population group can be relatively mobile a study requiring follow-up could be problematic and hindered by missing data.

The design of this study has both descriptive and analytic components.

Descriptive statistics generated from measurements taken at a single point in time, allows prevalence estimates to be calculated. Prevalence rates for the study population can be compared with other published New Zealand and international data. The distribution of

hazardous alcohol use and STI diagnoses can also be looked at in relation to demographic variables (e.g. gender, age, ethnicity, SES).

The design also makes it possible to explore if a simple association exists between hazardous alcohol use and STIs. Because of the absence of temporal order information it is however unable to determine a cause and effect association.

3.2 Literature Review Objectives and Methods

The literature review aimed to describe the current situation regarding alcohol use and sexually transmitted infections in young people aged 16 – 24 years. These factors were examined separately and then evidence of an association discussed. Both national and international evidence was explored.

This literature review was conducted using the University of Otago Library databases including MEDLINE, EMBASE, PsychINFO and the Cochrane Library as well as internet searching using PUBMED and google. New Zealand websites including the Ministry of Health, Alcohol Advisory Council of New Zealand (ALAC) and Environmental Science and Research (ESR) were also used to obtain statistical data for New Zealand.

Bibliographies of the literature located in the original searches were also used to identify additional articles.

Refer to Appendix 2 for the search strategies used.

3.3 Ethical Approval

This study obtained ethical approval from the Upper South B Regional Ethics Committee; ethics reference number URB/10/10/035.

Participants were provided with an information sheet (Appendix 3) and were required to sign a written consent form (Appendix 4) before progressing to completion of the questionnaire (Appendix 5) for the study.

A key aspect in the ethical approval process was ensuring anonymity and confidentiality for all participants. No personally identifying details were recorded on the questionnaires. The Christchurch Sexual Health Centre processes all laboratory specimens under unique clinic identifier numbers (no names are recorded on lab specimens) thus maintaining anonymity for all attendees. Questionnaires were also labelled with this unique clinic identifier number so that laboratory results could be eventually linked to the questionnaires.

The signed consent forms were stored separately from the questionnaires.

All consent forms and questionnaires were stored under secure conditions within the Christchurch Sexual Health Centre during data collection. Following data collection they were stored within the Department of Public Health and General Practice, Christchurch School of Medicine, and will remain in storage for a period of 5 years. This is in keeping with the University of Otago and ethics committee requirements.

3.4 Selection of participants

The Christchurch Sexual Health Centre located at the Christchurch Public Hospital is the sole specialist sexual health clinic servicing the Christchurch urban area. This provided a well-defined sample population. During the data collection period all attendees aged 16-24 years were invited to participate in the study. Posters advertising the study were displayed in the clinic reception and waiting area (Appendix 6); all attendees in the required age range were offered an information sheet explaining the study as they checked-in for their appointment.

Inclusion criteria for the study were age 16-24 years and attendance for a new clinic visit.

Participants were excluded if they were presenting for a follow-up clinic visit (defined as clinic attendance within the preceding six weeks) or had already completed the questionnaire. Females who were currently pregnant were also excluded to avoid any bias this might have on responses to alcohol/drug related questions. Those who were unable to read or write English were only excluded if an appropriate interpreter was not available.

Data collection ran from 5 November 2010 until 3 June 2011.

3.5 Sample size

The sample size was influenced by the timeframe available for the research. Within the time allocated for data collection it was estimated based on usual clinic attendance patterns that a sample size of approximately 220 was achievable.

Previous clinic data was used to calculate what associations could be detected between hazardous alcohol use and a STI diagnosis, with a sample of this size. Previous work at the

clinic had demonstrated that 65% of attendees in this age range met criteria for problematic alcohol use on the CRAFFT questionnaire (Coughlan & Bagshaw, 2009). The CRAFFT questionnaire findings were used to approximate performance of the AUDIT tool which would be used in this study. The percentage of first time attendees with an STI was 15% (Coughlan & Bagshaw, 2009).

Using OpenEpi (<http://www.openepi.com/Menu/OpenEpiMenu.htm>) it was calculated a sample size of 228 would give an ability to detect a difference of 6% versus 20% in STI prevalence between non-hazardous and hazardous drinkers, with 80% power and $\alpha_2=0.05$.

3.6 Data collection

3.6.1 Questionnaire

This section outlines the questionnaire content and basis for questions on key issues.

3.6.1.1 Questionnaire construction

The questionnaire was designed as a self-administered, written series of questions intended for simple responses (minimising any potential for long open-ended responses). It was devised for both ease of comprehension and accuracy of data entry.

A self-administered questionnaire also has the advantage of enhanced anonymity which was hoped would minimise reporting bias. Research suggests young people generally provide reliable estimates of their drinking/drug use (Winters, Stinchfield, Henly, & Schwartz, 1990). A study of Kenyan adolescents demonstrated audio-computer self-interview provided more detailed information on sexual behaviours than face to face interviews, (Hewett, Mensch, &

Erulkar, 2004). Whether this represents a cultural difference unique to Kenyan adolescents is unknown, but it may apply to some groups of the New Zealand population, for example Maori, making an anonymous route of questionnaire delivery preferable. A self-report questionnaire can, however, pose problems for those with poor literacy thus requiring a questionnaire designed for ease of comprehension.

Development of the questionnaire for this study followed a careful review of the relevant literature. All areas of interest were explored and consideration was given to data that would meet the required objectives of the study.

The questionnaire contained questions derived from internationally standardised screening tools, questions used in other New Zealand surveys as well as questions designed specifically for the study.

3.6.1.2 Questionnaire content

The content of the questionnaire included background demographic information, a standardised alcohol screening tool and information about other STI risk factors. Youth often use more than one drug including alcohol, so questions to detect multidrug use were also included.

3.6.1.2.1 Demographics

Question one asked for gender to be specified. A third category of 'other' was included to cover transgendered individuals or others not wanting to specify male or female gender.

Ethnicity data was collected in this survey using the 2006 census ethnicity question, allowing for multiple ethnic affiliations. This is in keeping with the statistical standard for ethnicity (Statistics New Zealand, 2004) developed to ensure consistency in ethnicity data collection in New Zealand. This questionnaire data can therefore be compared with other New Zealand surveys using the same ethnicity data collection methods. Maori were prioritised in this survey with participants included in the Maori group for analysis if this was included as one of two or more ethnic affiliations.

Participants were asked to record a current dwelling address which was used to generate a measure of socioeconomic status. Address details were used to calculate the census area unit, according to 2006 census data, using the Statistics New Zealand online interactive boundary maps. The Atlas of Socioeconomic Deprivation in New Zealand, NZDep2006, was used to convert the census area units into a New Zealand Deprivation Index 2006 (NZDep2006) score for each participant.

All participants were asked if they had sexual intercourse with a male and/or female partner in the past 12 months. A yes/no response was obtained for each question. The questions were designed in this way to establish actual sexual behaviour rather than sexual orientation or identity which may differ.

3.6.1.2.2 AUDIT

A number of alcohol screening tools are used internationally. The AUDIT was developed by the World Health Organisation in 1982 for international use in primary care settings and has been validated cross-nationally. It contains a predefined scoring system for alcohol misuse, and for the following reasons was deemed the most appropriate for use in this study. Comparisons of alcohol screening instruments have demonstrated the AUDIT performs well in the 16-24 year age group. The AUDIT showed greater sensitivity than POSIT, CAGE and CRAFFT among adolescents attending a youth clinic (Knight, Sherritt, Harris, et al., 2003) and was superior to TWEAK and CAGE in differentiating problem drinkers aged <20 years

treated in a US emergency department (Kelly, Donovan, Kinnane, & Taylor, 2002). Cook et al (2005) compared the AUDIT, CRAFFT and CAGE alcohol screening instruments in young people (15-24yrs) attending an urban Pittsburgh Sexually Transmitted Disease Clinic. Both the AUDIT and CRAFFT instruments were superior to CAGE, but the AUDIT performed best overall (Cook, Chung, Kelly, & Clark, 2005).

The AUDIT questionnaire has also been used in national surveys in New Zealand including the New Zealand Household survey, Alcohol and Drug Use survey and Mental Health survey (Ministry of Health, 2008b, 2009). This allowed for comparisons between the study population and the general population from these surveys.

A combined AUDIT score of 8 or more is recommended as indicating hazardous and harmful alcohol use (Babor, et al., 2001), and this definition was used for analysis in this study. The maximum possible AUDIT score is 40 points. AUDIT-C scores were obtained by summing items from the first three AUDIT frequency and quantity questions, with a maximum possible score of 12.

3.6.1.2.3 Sexually Transmitted Infection risk factors

Questions numbered 23-25 were those used by Standerwick et al (2007) in their questionnaire based survey of GU medicine attendees in south England to determine rates of alcohol use and binge drinking prior to sexual activity.

Young age at first intercourse has been associated in other studies with demographic factors and alcohol misuse (Dickson, et al., 1998; Fenwicke & Purdie, 2000; Fergusson, et al., 1997; Fergusson, et al., 1994a; Lynskey & Fergusson, 1993). Question 26 asked age at first intercourse and duration of sexual activity was calculated by deducting age of first intercourse from current age.

Questions 27 and 28 related to condom use and responses always/usually/sometimes/never were chosen to remain consistent with other New Zealand surveys (Baker, et al., 2005; Corwin, et al., 2002; Sparrow, et al., 2007) and allow comparative analysis.

Question 29 asked participants to list any past STIs. It is known that a past history of STIs is a risk factor for future infections (Baker, et al., 2005; Barnett & Brundage, 2001).

Questions 30 and 31 were used to determine a rate of partner change; increasing number of sexual partners has been correlated with increased risk of STIs (Sparrow, et al., 2007).

3.6.1.2.4 Other drug use

Questions 32 to 34 assessed other drug use in this population group, as youth in this age group can often use more than one substance (Hibell, et al., 2009). The same frequency scales as the AUDIT questionnaire were used to maintain consistency. The frequency of cannabis use has also been measured with this question as part of a ten item questionnaire called the CUDIT-R, which was originally modelled on the AUDIT questionnaire (Adamson et al., 2010).

Cannabis, methamphetamine (known in New Zealand as 'P') and intravenous drug use were specifically itemised to obtain an accurate measure of the use of these drugs in this population. The final question allowed participants to specify any other recreational drug use.

3.6.1.3 Questionnaire piloting

The questionnaire was initially piloted on six adults (aged >25 years), who provided feedback on the wording of the questions, layout of the questionnaire and interpretation of the questions. After minor adjustments the questionnaire was then piloted on four young people (aged <25 years) attending the Christchurch Sexual Health Centre. Minor changes were then made to the layout and numbering system.

Coding was piloted and no complications were evident. Data entry and trial analysis were carried out once data collection had begun. No problems were encountered.

3.6.1.4 Questionnaire coding

Each questionnaire was coded with a unique identifier. This was the same number used by the clinic for the participants' lab specimens, allowing test results to be linked to their questionnaire data.

Each question in the questionnaire was numbered. Questions generating continuous data e.g. age, did not require coding and this data was entered directly. Questions generating discrete data were numerically coded for data entry, coding values were recorded on the questionnaires alongside the response boxes (see Appendix 5).

Address details were converted to an NZDep2006 score ranging from 1 (lowest deprivation) to 10 (highest deprivation). Due to the February 22nd earthquake and the substantial displacement of residents especially in the eastern suburbs of Christchurch, the NZDep2006 scores based on current residence following this event may not be accurate.

The ICD-10 classification system was used to code diagnosed sexually transmitted infections.

3.6.2 Sexually Transmitted Infection Screening

3.6.2.1 Sexually transmitted infections examined

The most common bacterial STIs detected at sexual health clinics in New Zealand are Chlamydia trachomatis and Neisseria gonorrhoea; with 4,858 and 774 cases respectively being detected in Sexual Health Clinics in 2009 (ESR, 2011). These infections are confirmed via laboratory testing. Other STIs, such as genital warts, requiring a clinical diagnosis rather than laboratory confirmation were not deemed suitable to examine in this study.

3.6.2.2 Specimen collection & testing methods

All laboratory specimens were collected by trained sexual health clinicians. Participants were not expected to undergo additional testing specifically for the study. If clinical examination and testing was deemed unnecessary by the consulting clinician no testing was undertaken.

Testing from multiple sites, depending on exposure, is known to enhance detection of chlamydia and gonorrhoea (Gunn, O'Brien, Lee, & Gilchick, 2008; Judson & Werness, 1980; Thin & Shaw, 1979). The type of specimens, site of collection and testing techniques used to detect chlamydia and gonorrhoea for both males and females, as well as the sensitivity and specificity of these tests, are outlined in the Table 7. Molecular detection methods for chlamydia are now accepted as gold standard. The gold standard for gonorrhoea detection has been culture, however molecular detection techniques that now detect chlamydia and gonorrhoea simultaneously are being used more frequently. These non-culture methods

eliminate some of the problems with culture including the need for a viable organism and issues with rapid transportation and incubation.

Table 7: Sensitivity and specificity of laboratory tests for *Chlamydia trachomatis* and *Neisseria gonorrhoea**

	Laboratory test	Site of collection	Sensitivity %	Specificity %
Neisseria gonorrhoea	Gram stain	Urethral, symptoms	85-90	95-99
		Urethral, asymptomatic	50-70	85-87
		Endocervix	45-65	90-99
	Culture	Urethral discharge	94-98	>99
		Urethral, asymptomatic	80-85	>99
		Endocervix	85-95	
		Anal canal	70-85	
		Pharynx	50-70	
	NAAT (PCR)	Urethra	>95	>99
		Endocervix	90-95	>99
		Urine	>95	>99
Chlamydia trachomatis	NAAT (PCR)	Endocervix	88-95	>99
		Urine	92-96	>99
		Urethral	90-95	>99

*Adapted from Atlas of Sexually Transmitted Diseases & AIDs, 3rd edition (Morse, et al., 2003)

For this study a diagnosis of chlamydia or gonorrhoea was confirmed via a positive test result from NAAT, gram stain or culture on any of the above specimens.

Canterbury Health Laboratories use the Abbott RealTime CT/NG assay. This is an in vitro PCR assay allowing direct detection of plasmid DNA for chlamydia and genomic DNA of gonorrhoea on endocervical, vaginal or urethral swabs or in urine specimens. The package

insert reports sensitivity of 100% for both chlamydia and gonorrhoea and no cross reactivity with 111 strains of other bacteria, viruses, yeast and fungi. Gonorrhoea culture is via direct inoculation onto Modified Thayer-Martin culture plates which are incubated for up to 72 hours.

3.7 Data Entry

After coding the data was entered chronologically into an Excel spread sheet. This was converted to a SPSS data file for analysis. Any missing data was assigned the coding value of 99. Inspection for potential data entry errors was made by standard research checks, including checking for possible out of range codes and double entry.

3.8 Statistical Analysis

Summary statistics (frequencies, means and standard deviations) were used to describe demographic, alcohol use and sexual risk characteristics by gender. Differences were examined using chi squared statistics (categorical variables) and t-tests (continuous variables).

Chi squared statistics and t-tests were also used to look at associations by AUDIT score and STI diagnosis.

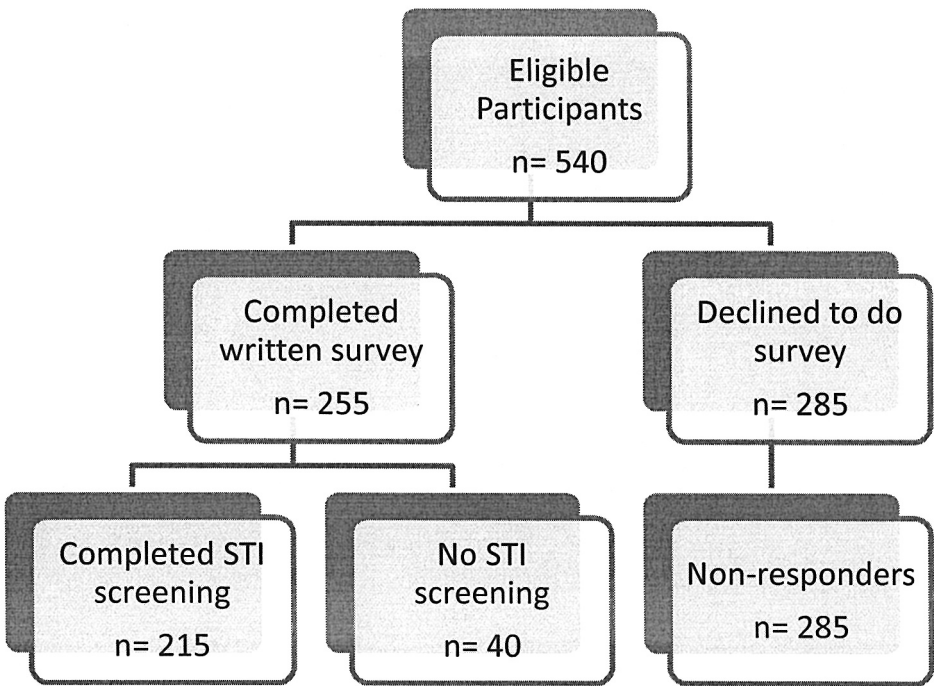
Analyses were conducted using IBM SPSS, version 17.0 (serial number 5053916); with 95% confidence intervals for percentage differences calculated using OpenEpi (<http://www.openepi.com/Menu/OpenEpiMenu.htm>).

CHAPTER 4: RESULTS

4.1 Comparison of Responders and Non-responders

Altogether 540 sexual health attendees aged 16-24 years of age were approached to participate during the study period, 255 (47%) answered the self-administered questionnaire. The response rate prior to the 22 February 2011 Christchurch earthquake was higher at 55% (195/355) but dropped to 32% (60/185) following this event. Of those who completed the written survey 215 then underwent STI screening (Figure 2).

Figure 2: Flowchart of patients participating.



A statistically significant difference in mean age was observed between responders and non-responders (Table 8), with responders being on average six months younger ($p=0.02$). No significant differences were observed for gender and ethnicity between responders and non-

responders. There were more non-responders from the NZDep 5 quintile group (Table 8), although this was not statistically significant ($p=0.07$).

Table 8: Comparison of non-responders versus responders

	NON-RESPONDERS n= 285	RESPONDERS n= 255	Difference (95% CI)*	Statistical comparison
Age in years Mean SD	20.8 2.4	20.3 2.6	0.5 (0.1, 0.9)	t= 2.4 p= 0.02 df= 517
Sex Male Female	n (%) 137 (48.1%) 148 (51.9%)	n (%) 121 (47.5%) 134 (52.5%)	0.6 (-7.8, 9.1)	$\chi^2 = 0.2$ p= 0.88 df= 1
Ethnicity NZ European Maori Other [missing data]	n (%) 203 (72.8%) 35 (12.5%) 41 (14.7%) [6]	n (%) 185 (72.5%) 44 (17.3%) 26 (10.2%) [0]	0.2 (-7.4, 7.8)	$\chi^2 = 4.2$ p= 0.12 df= 2
NZDep** Quintile 5 Quintile 4 Quintile 3 Quintile 2 Quintile 1 [missing data]	n (%) 81 (30.1%) 76 (28.3%) 34 (12.6%) 44 (16.4%) 34 (12.6%) [16]	n (%) 51 (20.4%) 71 (28.4%) 31 (12.4%) 51 (20.4%) 46 (20.4%) [5]	9.7 (2.3, 17.1)	$\chi^2 = 8.8$ p= 0.07 df= 4

*CIs for means calculated from SPSS, CIs for percentage differences from OpenEpi.

**Quintile 5 = most deprived, Quintile 1 = least deprived.

4.2 Characteristics of the Study Sample

Table 9 below displays the demographic characteristics of the participants. The mean age of the 255 study participants was 20.3 years (standard deviation 2.6 years). More females than male participants were in the 16-21 year age groups and more males in the 22-24 year age group, although this difference was not statistically significant ($p=0.08$). Female participants had a mean age of 20 years, and male participants a mean age of 20 years and 8 months and this difference was statistically significant ($p=0.04$). New Zealand European was the predominant ethnic group (72%), and 17% of participants indicated Maori ethnicity. A

statistically significant difference was observed in NZDep quintile with more females in the most deprived group (quintile 5) and more males in the least deprived (quintile 1) ($p=0.02$). There were 59% of participants in paid employment, 22% studying and 13% unemployed.

Table 9: Demographic characteristics of participants by gender

	MALE n= 121	FEMALE n= 134	Difference (95% CI)*	TOTAL n= 255	Statistical comparison
Age in years Mean SD	20.7 2.6	20.0 2.6	0.7 (0.03, 1.3)	20.3 2.6	$t= 2.1$ $p= 0.04$ $df= 253$
Age group	n (%)	n (%)		n (%)	$\chi^2 = 5.1$
16-18 years	29 (24.0%)	44 (32.8%)	-8.9 (-19.9, 2.1)	73 (28.6%)	$p= 0.08$
19-21 years	37 (30.6%)	47 (35.1%)		84 (32.9%)	$df= 2$
22-24 years	55 (45.5%)	43 (32.1%)		98 (38.4%)	
Ethnicity	n (%)	n (%)		n (%)	$\chi^2 = 3.1$
NZ European	94 (77.7%)	91 (67.7%)	9.8 (-1.1, 20.6)	185 (72.5%)	$p= 0.22$
Maori	17 (14.0%)	27 (20.1%)		44 (17.3%)	$df= 2$
Other	10 (8.3%)	16 (11.9%)		26 (10.2%)	
NZDep**	n (%)	n (%)		n (%)	$\chi^2 = 12.1$
Quintile 5	14 (11.8%)	37 (28.2%)	-16.5 (-26.1,-6.8)	51 (20.4%)	$p= 0.02$
Quintile 4	36 (30.3%)	35 (26.7%)		71 (28.4%)	$df= 4$
Quintile 3	16 (13.4%)	15 (11.5%)		31 (12.4%)	
Quintile 2	25 (21.0%)	26 (19.8%)		51 (20.4%)	
Quintile 1	28 (23.5%)	18 (13.7%)		46 (18.4%)	
[missing data]	[2]	[3]		[5]	
Occupation	n (%)	n (%)		n (%)	$\chi^2 = 6.0$
Paid work	75 (62.0%)	76 (56.7%)	5.2 (-6.8, -17.3)	151 (59.2%)	$p= 0.11$
Studying	31 (25.6%)	26 (19.4%)		57 (22.4%)	$df= 3$
Unemployed	11 (9.1%)	23 (17.2%)		34 (13.3%)	
Other	4 (3.3%)	9 (6.7%)		13 (5.1%)	

*CIs for means calculated from SPSS, CIs for percentage differences from OpenEpi.

**Quintile 5 = most deprived, Quintile 1 = least deprived.

Comparison with 2006 census data is displayed in Tables 10 and 11 below. The study sample contains a higher proportion of 20-24 year olds (60%) compared to the New Zealand population in the 15-24 year age group. The proportion of Maori males (14%) in the study sample was equal to population estimates from census data, but in the study sample Maori females (20%) were proportionally greater than the 14% recorded in the 2006 New Zealand population census. The proportion of the study population who were of New Zealand European ethnicity was also higher in the study sample than identified in the 2006 census.

Table 10: Age specific characteristics from the New Zealand 2006 census*

	MALE n (%)		FEMALE n (%)		TOTAL n (%)	
Age Group						
15-19 years	155283	(52.4%)	151704	(51.3%)	306984	(51.9%)
20-24 years	141078	(47.6%)	143850	(48.7%)	284928	(48.1%)
Ethnicity						
NZ European	1102560	(56.0%)	1183320	(57.4%)	2285877	(56.8%)
Maori	274860	(14.0%)	290469	(14.1%)	565329	(14.0%)
Other	588198	(30.0%)	588537	(28.5%)	1176741	(29.2%)

*source: Statistics New Zealand.

Table 11: Demographic characteristics of participants

	MALE n (%)		FEMALE n (%)		TOTAL n (%)	
Age Group						
16-19 years	41	(33.9%)	59	(44.0%)	100	(39.2%)
20-24 years	80	(66.1%)	75	(56.0%)	155	(60.8%)
Ethnicity						
NZ European	94	(77.7%)	91	(67.7%)	185	(72.5%)
Maori	17	(14.0%)	27	(20.1%)	44	(17.3%)
Other	10	(8.3%)	16	(11.9%)	26	(10.2%)

Table 12 displays sexual behavioural characteristic of participants. Heterosexual contact was reported by the majority of participants with significantly more young males than females (12% verses 1%) reporting same sex partners ($p<0.001$). The age of first intercourse was significantly lower for females in this sample, with the median age being 16 years for males and 15 for females ($p=0.01$). The mean number of years since first sexual intercourse was approximately 4.8 years for both men and women (Table 12). Over 40% of participants reported having between 2 and 4 sexual partners in the past 12 months, and over 30% had more than 5 sexual partners in the past year. There was no significant difference between males and females in terms of the number of sexual partners. Only 27% of participants reported always using condoms with new sexual partners and just over 20% reporting always using condoms with short-term sexual contacts in the past 12 months, there were no statistically significant differences in condom use observed between males and females.

Table 12: Reported sexual behaviour of participants by gender

	MALE n= 121	FEMALE n= 134	Difference (95% CI)*	TOTAL n= 255	Statistical comparison
Sexual behaviour past 12 months	n (%)	n (%)		n (%)	
Heterosexual	98 (81.7%)	123 (92.5%)	-10.8 (-19.1, -2.6)	221 (87.4%)	$\chi^2 = 6.7^a$ p<0.001 df= 1
Same sex partner	15 (12.5%)	1 (0.8%)		16 (6.3%)	
Bisexual [missing data]	7 (5.8%) [1]	9 (6.8%) [1]		16 (6.3%) [1]	
Age of first intercourse					
Mean (years)	15.9	15.1	0.7 (0.2, 1.2)	15.5	t= 2.9 p= 0.01 df= 239
Median	16	15		15	
SD	2.1	1.9		2.0	
Range	11-22	10-22		10-22	
Duration of sexual activity (years) ^b					
Mean	4.9	4.8	0.4 (-0.7, 0.8)	4.8	t= 0.11 p= 0.91 df= 239
Median	5	4		5	
SD	2.7	2.9		2.8	
Range	0-13	0-12		0-13	
Number sexual partners in past 3 months	n (%)	n (%)		n (%)	
0	6 (5.0%)	3 (2.2%)	-4.9 (-17.2, 7.3) ^c	9 (3.5%)	$\chi^2 = 3.2^c$ p= 0.20 df= 2
1	54 (44.6%)	70 (52.2%)		124 (48.6%)	
2-4	46 (38.0%)	53 (39.6%)		99 (38.8%)	
5 or more	15 (12.4%)	8 (6.0%)		23 (9.0%)	
No. sexual partners in past 12 months	n (%)	n (%)		n (%)	
0-1	21 (17.4%)	39 (29.1%)	-11.8 (-22.0, -1.5)	60 (23.5%)	$\chi^2 = 5.2$ p= 0.16 df= 3
2-4	57 (47.1%)	55 (41.0%)		112 (43.9%)	
5-7	24 (19.8%)	20 (14.9%)		44 (17.3%)	
8 or more	19 (15.7%)	20 (14.9%)		39 (15.3%)	
Condom use with a new sexual partner	n (%)	n (%)		n (%)	
Always	36 (30.8%)	31 (23.5%)	7.3 (-3.8, 18.3)	67 (26.9%)	$\chi^2 = 2.0$ p= 0.57 df= 3
Usually	42 (35.9%)	52 (34.9%)		94 (37.8%)	
Sometimes	30 (25.6%)	35 (26.5%)		65 (26.1%)	
Never [missing data]	9 (7.7%) [4]	14 (10.6%) [2]		23 (9.2%) [6]	
Condom use with short-term ptrns past 12mos	n (%)	n (%)		n (%)	
Always	27 (23.1%)	26 (19.5%)	3.5 (-6.7, 13.7)	53 (21.2%)	$\chi^2 = 6.5$ p= 0.17 df= 4
Usually	34 (29.1%)	40 (30.1%)		74 (29.6%)	
Sometimes	33 (28.2%)	26 (19.5%)		59 (23.6%)	
Never	11 (9.4%)	14 (10.5%)		25 (10.0%)	
No short-term contacts [missing data]	12 (10.3%) [4]	27 (20.3%) [1]		39 (15.6%) [5]	

*CIs for means calculated from SPSS, CIs for percentage differences from OpenEpi.

^a Same sex partner and bisexual groups combined for analysis

^b Age – Age of first intercourse

^c 0 and 1 sexual partners grouped for analysis

In summary, the participants had been sexually active for an average of 4.8 years, with the majority reporting multiple sexual partners but only 21% reporting that they always used condoms.

4.3 Alcohol Use

4.3.1 Alcohol Use Frequency and Patterns

Ninety-nine percent of the study sample reported having at least one alcoholic drink in their lifetime (excluding small tastes or sips). The median age of first alcohol use for both males and females was 14 years (Figure 3). No significant difference was observed in the mean age of first alcohol use between males and females ($p=0.56$). The median age of first consuming six or more drinks on one occasion was 15.5 years for males and for females 16 years (Figure 3). The mean age of first drinking a large amount of alcohol did not differ between males and females ($p=0.78$).

Figure 3: Boxplots: Age of first alcohol use & Age of first consuming six or more drinks on one occasion.

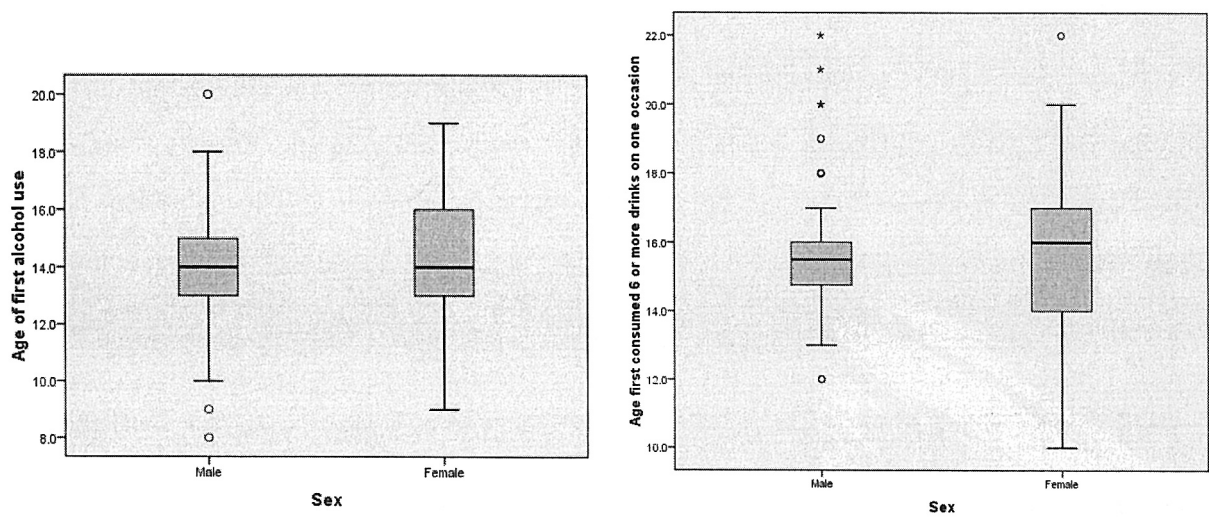


Table 13 displays the participants AUDIT responses by gender. No statistically significant difference was observed in drinking frequency between males and females ($p=0.08$). There was also no overall statistically significant difference in typical drinking quantity between males and females ($p=0.30$), but a slightly higher proportion of males reported consuming 10 or more drinks on a typical drinking occasion (27% versus 17%). Males reported higher frequency of consuming six or more drinks on one occasion (significant at $p=0.05$). A number of problems due to alcohol were experienced at least monthly by participants in this study including: failing to do what was normally expected (15.7%), feelings of guilt or remorse (18.5%) and being unable to remember the night before (23.9%). Significantly more males (35.5%) reported that they were unable to stop drinking once they started, with this occurring monthly or more often ($p=0.04$) (Table 13). More males also reported that a relative, friend, or health worker had suggested they cut down their drinking in the past 12 months ($p=0.02$). Over 20% of study participants reported their drinking had resulted in their own or someone else's injury in the past year (Table 13).

Overall the mean AUDIT scores were significantly higher for males ($p=0.01$), whose scores were on average 2.5 points higher (Table 13). Over 80% of males meet the criteria for harmful or hazardous drinking with an AUDIT score of greater than or equal to 8. Nearly half of males in this sample reached an AUDIT score of more than 13 indicating more alcohol related problems compared with females ($p<0.01$), however 35% of females also had AUDIT scores greater than 13. The range of AUDIT scores indicates some participants in this sample had near to the maximum possible AUDIT score of 40 points.

AUDIT-C scores with a maximum possible score of 12, indicate high levels of drinking for some participants in this sample. Again a statistically significant difference was observed with males having scores on average 0.88 points higher than females ($p=0.01$) (Table 13).

Table 13: Distribution of AUDIT item responses by gender

AUDIT item	MALE n= 121	FEMALE n= 134	Difference (95% CI)*	TOTAL n= 255	Statistical comparison
Drinking frequency	n (%)	n (%)		n (%)	
≥4 times week	8 (6.6%)	6 (4.5%)	2.1 (-3.5, 7.8)	14 (5.5%)	$\chi^2 = 6.8^a$ p= 0.08 df= 3
2-3 times week	51 (42.1%)	38 (28.4%)		89 (34.9%)	
2-3 times month	40 (33.1%)	56 (41.8%)		96 (37.6%)	
Monthly or less	20 (16.5%)	31 (23.1%)		51 (20.0%)	
Never	2 (1.7%)	3 (2.2%)		5 (2.0%)	
Typical occasion quantity (g ethanol)					
≥10 (>100g)	33 (27.3%)	22 (16.5%)	10.7 (0.6, 20.9)	55 (21.7%)	$\chi^2 = 4.9$ p= 0.30 df= 4
7 to 9 (70-90g)	29 (24.0%)	31 (23.3%)		60 (23.6%)	
5 or 6 (50-60g)	27 (22.3%)	38 (28.6%)		65 (25.6%)	
3 or 4 (30-40g)	20 (16.5%)	26 (19.5%)		46 (18.1%)	
1 or 2 (<20g)	12 (9.9%)	16 (12.0%)		28 (11.0%)	
[missing data]	[0]	[1]		[1]	
Frequency of drinking ≥60g (≥6 drinks)					
Daily/almost daily	1 (0.8%)	2 (1.5%)	10.4 (-1.3, 22.1) ^b	3 (1.2%)	$\chi^2 = 7.7^b$ p= 0.05 df= 3
Weekly	48 (39.7%)	38 (28.6%)		86 (33.9%)	
Monthly	41 (33.9%)	38 (28.6%)		79 (31.1%)	
Less than monthly	26 (21.5%)	45 (33.8%)		71 (28.0%)	
Never	5 (4.1%)	10 (7.5%)		15 (5.9%)	
[missing data]	[0]	[1]		[1]	
Experienced the problem monthly or more often					
Unable to stop drinking once you had started	43 (35.5%)	32 (23.9%)	11.6 (0.5, 22.8)	75 (29.4%)	$\chi^2 = 4.16$ p= 0.04 df= 1
Failed to do what was normally expected from you	19 (15.7%)	21 (15.8%)	-0.1 (-9.1, 8.9)	40 (15.7%)	$\chi^2 = 0.00$ p= 0.99 df= 1
Needed a first drink in the morning to get yourself going after a heavy drinking session	12 (9.9%)	6 (4.5%)	5.4 (-0.9, 11.8)	18 (7.1%)	$\chi^2 = 2.87$ p= 0.09 df= 1
Had a feeling of guilt or remorse after drinking	24 (20.0%)	23 (17.2%)	2.8 (-6.8, 12.4)	47 (18.5%)	$\chi^2 = 0.34$ p= 0.56 df= 1
Unable to remember what happened the night before due to drinking	31 (25.6%)	30 (22.4%)	3.2 (-7.3, 13.7)	61 (23.9%)	$\chi^2 = 0.37$ p= 0.55 df= 1

*CIs for means calculated from SPSS, CIs for percentage differences from OpenEpi.

^a Never + monthly or less categories combined for analysis

^b Daily/almost daily + weekly categories combined for analysis

Table 13 continued: Distribution of AUDIT item responses by gender

AUDIT item	MALE n= 121	FEMALE n= 134	Difference (95% CI)*	TOTAL n= 255	Statistical comparison
<i>Experienced the problem in the past year</i>					
You or someone else been injured as a result of your drinking	32 (26.7%)	26 (19.5%)	7.1 (-3.3, 17.5)	58 (22.9%)	$\chi^2 = 1.8$ p= 0.18 df= 1
A relative, friend, doctor, or other health worker been concerned about your drinking or suggested that you should cut down	22 (17.6%)	11 (8.2%)	9.4 (1.2, 17.7)	32 (12.6%)	$\chi^2 = 5.1$ p= 0.02 df= 1
<i>AUDIT & AUDIT-C scores</i>					
Mean AUDIT score (SD) Range	13.5 (7.2) 0-32	11.0 (6.9) 0-35	2.5 (0.8, 4.2)	12.2 (7.1) 0-35	t= 2.8 p= 0.01 df= 253
Proportion with AUDIT score 13+ 8-12 <8	58 (47.9%) 41 (33.9%) 22 (18.2%)	47 (35.3%) 35 (26.3%) 51 (38.3%)	12.6 (0.6, 24.7)	105 (41.2%) 77 (30.2%) 73 (28.6%)	$\chi^2 = 12.4$ p< 0.01 df= 2
Mean AUDIT-C score ^c (SD) Range	6.9 (2.4) 0-11	6.0 (2.5) 0-11	0.9 (0.3, 1.5)	6.4 (2.5) 0-11	t= 2.8 p= 0.01 df= 253

*CIs for means calculated from SPSS, CIs for percentage differences from OpenEpi.

^a Never + monthly or less categories combined for analysis

^b Daily/almost daily + weekly categories combined for analysis

^c Calculation of AUDIT-C outlined on page 41

4.3.2 Correlates of AUDIT Scores

The correlates of AUDIT scores are shown in Table 14. A current STI or past history of STI were unrelated to AUDIT scores but cannabis use and other drug use were more common among those with hazardous drinking patterns (p<0.001). The most common “other drugs” used by participants in the past 12 months included ecstasy (5.5%), methamphetamine (4.7%) and LSD/acid (4.7%). Four participants (1.6%) also reported injecting drugs in the past 12 months. As discussed in the previous section hazardous drinking was more common among

male participants, no significant differences were seen for ethnicity or NZDep quintiles. A younger age of first alcohol consumption and age of first consuming more than six drinks on one occasion was found in those with an AUDIT score of ≥ 8 , the patterns observed were statistically significant ($p < 0.001$). Analysis with finer breakdown of the AUDIT scores (0-7, 8-12, 13+) also confirmed these findings (Table 15). The finer breakdown did however demonstrate a greater proportion of Maori participants with an AUDIT score of more than 13 ($p = 0.02$).

Table 14: Correlates of AUDIT scores

AUDIT score	< 8 n=73	≥ 8 n=182	Difference (95% CI)*	TOTAL n= 255	Statistical comparison
STI screen Positive Negative [Not tested]	n (%) 7 (11.5%) 54 (88.5%) [12]	n (%) 22 (14.3%) 132 (85.7%) [28]	-2.8 (-12.5, 6.9)	n (%) 29 (13.5%) 186 (86.5%) [40]	$\chi^2 = 0.3$ p= 0.66 df= 1
Past history of STI Yes No [Uncertain]	 32 (48.5%) 34 (51.5%) [7]	 87 (54.4%) 73 (45.6%) [22]	-5.9 (-20.2, 8.4)	 119 (52.7%) 107 (47.3%) [27]	$\chi^2 = 0.7$ p= 0.47 df= 1
Cannabis** Yes No	27 (37.0%) 46 (63.0%)	117 (64.3%) 65 (35.7%)	-27.3 (-40.4, -14.2)	144 (56.5%) 111 (43.5%)	$\chi^2 = 15.8$ p< 0.001 df= 1
Other drugs** Yes No	1 (1.4%) 72 (98.6%)	37 (20.3%) 145 (79.7%)	-18.9 (-25.4, -12.5)	38 (14.9%) 217 (85.1%)	$\chi^2 = 15.8$ p< 0.001 df= 1
Age group 16-18 years 19-21 years 22-24 years	21 (28.8%) 18 (24.7%) 34 (46.6%)	52 (28.6%) 66 (36.3%) 64 (35.2%)	0.2 (-12.1, 12.5)	73 (28.6%) 84 (32.9%) 98 (38.4%)	$\chi^2 = 3.9$ p= 0.14 df= 2
Sex Male Female	22 (30.1%) 51 (69.9%)	99 (54.4%) 83 (45.6%)	-24.3 (-37.0, -11.5)	121 (47.5%) 134 (52.5%)	$\chi^2 = 12.3$ p< 0.001 df= 1
Ethnicity NZ European Maori Other	52 (71.2%) 12 (16.4%) 9 (12.3%)	133 (73.1%) 32 (17.6%) 17 (9.3%)	-1.8 (-14.1, 10.4)	185 (72.5%) 44 (17.3%) 26 (10.2%)	$\chi^2 = 0.5$ p= 0.77 df= 2
NZDep Quintile 5 Quintile 4 Quintile 3 Quintile 2 Quintile 1 [missing data]	16 (22.5%) 23 (32.4%) 7 (9.9%) 12 (16.9%) 13 (18.3%) [2]	35 (19.6%) 48 (26.8%) 24 (13.4%) 39 (21.8%) 33 (18.4%) [3]	3.0 (-8.3, 14.3)	51 (20.4%) 71 (28.4%) 31 (12.4%) 51 (20.4%) 46 (18.4%) [5]	$\chi^2 = 1.9$ p= 0.76 df= 4
Age at first alcohol Mean SD	15.2 1.9	13.8 1.8	1.3 (0.8, 1.9)	14.2 1.9	t= 5.0 p< 0.001 df= 237
Age consumed 6 or more drinks Mean SD	16.6 2.2	15.3 1.7	1.3 (0.7, 1.8)	15.6 1.9	t= 4.5 p< 0.001 df= 233

*CIs for means calculated from SPSS, CIs for percentage differences from OpenEpi.

**Use in the past 12 months

Table 15: Correlates of AUDIT scores

AUDIT score	0-7 n=73	8-12 n=77	13+ n=105	Statistical comparison
STI screen	n (%)	n (%)	n (%)	$\chi^2 = 1.6$
Positive	7 (11.5%)	7 (10.6%)	15 (17.0%)	p= 0.44
Negative	54 (88.5%)	59 (89.9%)	73 (83.0%)	df= 2
[Not tested]	[12]	[11]	[17]	
Past history of STI				$\chi^2 = 1.3$
Yes	32 (48.5%)	35 (50.7%)	52 (57.1%)	p= 0.52
No	34 (51.1%)	34 (49.3%)	39 (42.9%)	df= 2
[Uncertain]	[7]	[8]	[14]	
Cannabis Use*				$\chi^2 = 22.4$
Yes	27 (37.0%)	41 (53.2%)	76 (72.4%)	p< 0.001
No	46 (63.0%)	36 (46.8%)	29 (27.6%)	df= 2
Other drug use*				$\chi^2 = 25.2$
Yes	1 (1.4%)	8 (10.4%)	29 (27.6%)	p< 0.001
No	72 (98.6%)	69 (89.6%)	76 (72.4%)	df= 2
Age group				$\chi^2 = 4.0$
16-18 years	21 (28.8%)	22 (28.6%)	30 (28.6%)	p= 0.41
19-21 years	18 (24.7%)	27 (35.1%)	39 (37.1%)	df= 4
22-24 years	34 (46.6%)	28 (36.4%)	36 (34.3%)	
Sex				$\chi^2 = 12.4$
Male	22 (30.1%)	41 (53.2%)	58 (55.2%)	p<0.01
Female	51 (69.9%)	36 (46.8%)	47 (44.8%)	df= 2
Ethnicity				$\chi^2 = 12.0$
NZ European	52 (71.2%)	56 (72.7%)	77 (73.3%)	p= 0.02
Maori	12 (16.4%)	8 (10.4%)	24 (22.9%)	df= 4
Other	9 (12.3%)	13 (16.9%)	4 (3.8%)	
NZDep				$\chi^2 = 2.9$
Quintile 5	16 (22.5%)	16 (21.3%)	19 (18.3%)	p= 0.94
Quintile 4	23 (32.4%)	20 (26.7%)	28 (26.9%)	df= 8
Quintile 3	7 (9.9%)	8 (10.7%)	16 (15.4%)	
Quintile 2	12 (16.9%)	17 (22.7%)	22 (21.2%)	
Quintile 1	13 (18.3%)	14 (18.7%)	19 (18.3%)	
[missing data]	[2]	[2]	[1]	
Age at first alcohol				F= 14.4
Mean	15.2	14.1	13.6	p< 0.001
SD	1.9	1.9	1.8	df= 2
Age of 6 or more drinks on one occasion				F= 14.3
Mean	16.6	15.8	15.0	p< 0.001
SD	2.2	1.8	1.6	df= 2

*Use in the past 12 months

Analysis for binge drinking ‘at least monthly’ and ‘at least weekly’ (Table 16 and Table 17) shows similar associations to those observed with the AUDIT scores.

Table 16: Correlates of binge drinking ‘at least monthly’

BINGE DRINKING	No Binge (n=86)	Binge monthly or more often (n=166)	TOTAL n= 252*	Statistical comparison
STI screen Positive Negative [Not tested]	n (%) 7 (9.6%) 66 (90.4%) [13]	n (%) 22 (15.7%) 118 (84.3%) [26]	n (%) 29 (13.6%) 184 (86.4) [39]	$\chi^2 = 1.5$ p= 0.22 df= 1
Past history of STI Yes No [Uncertain]	 35 (46.1%) 41 (53.9%) [10]	 83 (56.5%) 64 (43.5%) [19]	 118 (52.9%) 105 (47.1%) [29]	$\chi^2 = 2.2$ p= 0.14 df= 1
Cannabis Use Ever Never	 40 (46.5%) 46 (53.5%)	 102 (61.4%) 64 (38.6%)	 142 (56.3%) 110 (43.7%)	$\chi^2 = 5.1$ p= 0.02 df= 1
Other drug use Yes No	 4 (4.7%) 82 (95.3%)	 33 (19.9%) 133 (80.1%)	 37 (14.7%) 215 (85.3%)	$\chi^2 = 10.5$ p< 0.01 df= 1
Age group 16-18 years 19-21 years 22-24 years	 29 (33.7%) 22 (25.6%) 35 (40.7%)	 43 (25.9%) 60 (36.1%) 63 (38.0%)	 72 (28.6%) 82 (32.5%) 98 (38.9%)	$\chi^2 = 3.3$ p= 0.2 df= 2
Sex Male Female	 31 (36.0%) 55 (64.0%)	 90 (54.2%) 76 (45.8%)	 121 (48.0%) 131 (52.0%)	$\chi^2 = 7.5$ p= 0.01 df= 1
Ethnicity NZ European Maori Other	 63 (73.3%) 13 (15.1%) 10 (11.6%)	 121 (72.9%) 29 (17.5%) 16 (9.6%)	 184 (73.0%) 42 (16.7%) 26 (10.3%)	$\chi^2 = 0.4$ p= 0.82 df= 2
NZDep Quintile 5 Quintile 4 Quintile 3 Quintile 2 Quintile 1 [missing data]	 18 (21.4%) 26 (31.0%) 9 (10.7%) 14 (16.7%) 17 (20.2%) [2]	 32 (19.6%) 44 (27.0%) 22 (13.5%) 37 (22.7%) 28 (17.2%) [3]	 50 (20.2%) 70 (28.3%) 31 (12.6%) 51 (20.6%) 45 (18.2%) [5]	$\chi^2 = 2.0$ p= 0.74 df= 4
Age at first alcohol Mean SD	 14.9 1.9	 13.9 1.9	 14.2 1.9	t= 3.5 p< 0.01 df= 234
Age consumed 6 or more drinks Mean SD	 16.2 2.0	 15.4 1.8	 15.6 1.9	t= 2.7 p= 0.01 df= 230

*Binge drinking data missing for 3 participants.

Table 17: Correlates of binge drinking 'at least weekly'

BINGE DRINKING	No Binge (n=164)	Binge weekly or more often (n=88)	TOTAL n= 252*	Statistical comparison
STI screen	n (%)	n (%)	n (%)	$\chi^2 = 2.3$
Positive	15 (10.9%)	14 (18.4%)	29 (13.6%)	p= 0.13
Negative	122 (89.1%)	62 (81.6%)	184 (86.4)	df= 1
[Not tested]	[27]	[12]	[39]	
Past history of STI				$\chi^2 = 1.2$
Yes	75 (50.3%)	43 (58.1%)	118 (52.9%)	p= 0.27
No	74 (49.7%)	31 (41.9%)	105 (47.1%)	df= 1
[Uncertain]	[15]	[14]	[29]	
Cannabis Use				$\chi^2 = 9.2$
Ever	81 (49.4%)	61 (69.3%)	142 (56.3%)	p< 0.01
Never	83 (50.6%)	27 (30.7%)	110 (43.7%)	df= 1
Other drug use				$\chi^2 = 20.3$
Yes	12 (7.3%)	25 (28.4%)	37 (14.7%)	p< 0.001
No	152 (92.7%)	63 (71.6%)	215 (85.3%)	df= 1
Age group				$\chi^2 = 4.4$
16-18 years	49 (29.9%)	23 (26.1%)	72 (28.6%)	p= 0.11
19-21 years	46 (28.0%)	36 (40.9%)	82 (32.5%)	df= 2
22-24 years	69 (42.1%)	29 (33.0%)	98 (38.9%)	
Sex				$\chi^2 = 3.2$
Male	72 (43.9%)	49 (55.7%)	121 (48.0%)	p= 0.07
Female	92 (56.1%)	39 (44.3%)	131 (52.0%)	df= 1
Ethnicity				$\chi^2 = 5.6$
NZ European	118 (72.0%)	66 (75.0%)	184 (73.0%)	p= 0.06
Maori	24 (14.6%)	18 (20.5%)	42 (16.7%)	df= 2
Other	22 (13.4%)	4 (4.5%)	26 (10.3%)	
NZDep				$\chi^2 = 5.1$
Quintile 5	35 (21.9%)	15 (17.2%)	50 (20.2%)	p= 0.28
Quintile 4	51 (31.9%)	19 (21.8%)	70 (28.3%)	df= 4
Quintile 3	18 (11.3%)	13 (14.9%)	31 (12.6%)	
Quintile 2	29 (18.1%)	22 (25.3%)	51 (20.6%)	
Quintile 1	27 (16.9%)	18 (20.7%)	45 (18.2%)	
[missing data]	[4]	[1]	[5]	
Age at first alcohol				t= 4.2
Mean	14.6	13.5	14.2	p<0.001
SD	1.9	1.8	1.9	df= 234
Age consumed 6 or more drinks				t= 3.2
Mean	15.9	15.1	15.6	p= 0.002
SD	1.9	1.8	1.9	df= 230

*Binge drinking data missing for 3 participants.

Testing the consistency of AUDIT-C (with a cut off score of ≥ 4) against the established AUDIT test scores for participants gave a Kappa value of 0.467 indicating some agreement. The sensitivity of the AUDIT-C was 98.9% but specificity was only 39.7%.

4.3.3 Alcohol & Sexual Activity

Overall one fifth (20%) of participants surveyed reported the sexual encounter leading to their recent attendance at the Christchurch Sexual Health Centre was related to alcohol. The reported rates were however higher for males compared to female attendees (26.7% and 13.6% respectively, $p=0.01$). Those whose attendance was related to alcohol ($n=50$) were asked to list how it was related. Responses included:

- Unprotected sexual intercourse secondary to alcohol (35.9%)
- Sex that otherwise would not have happened (28.2%)
- Unable to make decisions secondary to alcohol (5.1%)
- Drunk when had sex (2.7%)
- Other reasons (2%).

In the past 12 months, 38.2% of participants reported never drinking before sex with a new partner, 48.4% reported occasionally drinking before sex with a new partner and 13.4% usually or always drinking before sex with a new partner. Again variation was observed with gender, males were more likely to report always/usually drinking before sex with a new partner (18.2%, twice the rate observed for females) and 44% of females reporting never drinking before sex with a new partner ($\chi^2= 6.944$, $p= 0.03$, $df=2$). Of those drinking before sex with a new partner in the past 12 months, 13.8% were very drunk, 37.3% occasionally very drunk and 48.8% never very drunk.

The following cases illustrate the association between sexual activity and alcohol. Participant number 176, a 16 year old female, identified her clinic visit was related to alcohol: “one night stand due to amount of alcohol consumed”. In the past 12 months she reported occasionally

drinking prior to sex, and being very drunk if she had been drinking before sex with a new partner. She also reported never using condoms with new or short term sexual contacts over the preceding 12 months and having more than 10 partners in the past year. Participant number 241, a 24 year old male, stated his clinic attendance was related to alcohol and an “overseas boy’s trip”. He reported usually or always drinking before sex with new partners and occasionally being very drunk. He would usually use condoms with new sexual partners and short term contacts of which he had 2-4 in the past 3 months and 5-7 in the past 12 months.

In the past 12 months nearly half (48.8%) of the study participants confirmed having UPSI related to alcohol consumption. There was no pattern observed with respect to gender, age, ethnicity or deprivation index.

4.4 Sexually Transmitted Infections

The prevalence of chlamydia infection in this study was 12.6% (n=27) and gonorrhoea was 1.9% (n=4). Two participants had dual infection giving an overall rate of infection of 13.5% (n=29) in those screened.

4.4.1 Sexually Transmitted Infection Correlates

Minor variations in age at first intercourse and duration of sexual activity were observed between the groups, but these did not reach statistical significance. There was also no relationship between a STI diagnosis and any demographic variables including age, gender, ethnicity or NZDep quintiles (Table 18).

Table 18: Demographic & sexual activity variables by sexually transmitted infection diagnosis

	Confirmed STI n= 29	STI screen negative n= 186	Difference (95% CI)*	TOTAL n= 215	Statistical comparison
Age group	n (%)	n (%)		n (%)	$\chi^2 = 1.8$
16-18 years	12 (41.4%)	54 (29.0%)	12.4 (-6.7, 31.4)	66 (30.7%)	p= 0.40 df= 2
19-21 years	8 (27.6%)	60 (32.3%)		68 (31.6%)	
22-24 years	9 (31.0%)	72 (38.7%)		81 (37.7%)	
Gender					$\chi^2 = 0.04$
Male	13 (44.8%)	87 (46.8%)	-2.0 (-21.4, 17.5)	100 (46.5%)	p= 0.85 df= 1
Female	16 (55.2%)	99 (53.2%)		115 (53.3%)	
Ethnicity					$\chi^2 = 1.4^a$
NZ European	18 (62.1%)	135 (72.6%)	-10.5 (-29.3, 8.3)	153 (71.2%)	p= 0.50 df= 2
Maori	7 (24.1%)	31 (16.7%)		38 (17.7%)	
Other	4 (13.8%)	20 (10.8%)		24 (11.2%)	
NZDep					$\chi^2 = 2.07^b$
Quintile 5	9 (32.1%)	38 (20.9%)	11.3 (-7.0, 29.5)	47 (22.4%)	p= 0.72 df= 4
Quintile 4	6 (21.4%)	48 (26.4%)		54 (25.7%)	
Quintile 3	4 (14.3%)	23 (12.6%)		27 (12.9%)	
Quintile 2	5 (17.9%)	39 (21.4%)		44 (21.0%)	
Quintile 1	4 (14.3%)	34 (18.7%)		38 (18.1%)	
[missing data]	[1]	[4]		[5]	
Age at first intercourse (years)					
Mean	14.9	15.4	0.5 (-0.3, 1.3)	15.5	t=0.9 p= 0.38 df= 30.5
SD	2.9	1.8		2.0	
Median	14	15		15	
Range	10-22	11-21		10-22	
Duration of sexual activity (years)					
Mean	4.7	4.8	0.1 (-1.0, 1.3)	4.8	t= 0.2 p= 0.84 df= 203
SD	3.1	2.8		2.8	
Median	4	5		5	
Range	0-13	0-12		0-13	

*CIs for means calculated from SPSS, CIs for percentage differences from OpenEpi.

^a1 cell (16.7%) have expected count less than 5, the minimum expected count is 3.24.

^b1 cell (10%) have expected count less than 5, the minimum expected count is 3.60.

In the screened sample, the number of partners in the past 12 months and condom use was significantly associated with a positive STI diagnosis (Table 19). Participants with eight or more sexual partners in the past 12 months were nearly 20% more likely to test positive for a STI (risk difference 19.43%, 95% CI 1.38-37.47). A STI diagnosis was also more common in those with five or more sexual partners in the past three months (17% compared to 9%)

however this did not reach statistical significance. Never or only sometimes using condoms with new sexual partners was also 20% more likely to screening positive for an STI (risk difference 21.12%, 95% CI 1.75-40.5).

The following are two example cases that illustrate these associations. Case number 3, a male 18 year old with positive chlamydia infection, recorded sometimes using condoms with new or short-term sexual partners in the past 12 months, 2-4 partners in the past 3 months and 5-7 partners in the past 12 months. He also reported usually or always drinking before sex with a new partner and recorded an AUDIT score of 20. Case number 170, a 17 year old female with dual chlamydia and gonorrhoea infection, recorded 2-4 sexual partners in the past 12 months and sometimes using condoms with new partners. She also reported being unable to remember the night before due to drinking on a weekly basis and had an AUDIT score of 28.

Table 19: Correlates of sexually transmitted infection diagnosis

	Confirmed STI n= 29	STI screen negative n= 186	Difference (95% CI)*	TOTAL n= 215	Statistical comparison
Sexual Behaviour past 12 months	n (%)	n (%)		n (%)	
Heterosexual	27 (93.1%)	160 (86.5%)		187 (87.4%)	
Same sex partner	1 (3.4%)	13 (7.0%)		14 (6.5%)	
Bisexual	1 (3.4%)	12 (6.5%)		13 (6.1%)	
[missing data]	[0]	[1]		[1]	
Number of sexual partners past 3 months					$\chi^2 = 1.8$ p= 0.41 df= 2
5 or more	5 (17.2%)	17 (9.1%)	8.1 (-6.3, 22.5)	(10.2%)	
2-4	11 (37.9%)	78 (41.9%)		89 (41.4%)	
0-1	13 (44.8%)	91 (48.9%)		104 (48.4%)	
Number of sexual partners past 12 months					$\chi^2 = 6.6$ p= 0.04 df= 2
8 or more	10 (34.5%)	28 (15.1%)	19.4 (1.4, 37.5)	38 (17.7%)	
2-7	14 (48.3%)	121 (65.1%)		135 (62.8%)	
0-1	5 (17.2%)	37 (19.9%)		42 (19.5%)	
Condom use with new sexual partner					$\chi^2 = 5.0^a$ p= 0.03 df= 1
Never	3 (10.3%)	15 (8.2%)	21.1 (1.8, 40.5) ^a	18 (8.5%)	
Sometimes	12 (41.4%)	41 (22.4%)		53 (25.0%)	
Usually	9 (31.0%)	77 (42.1%)		86 (40.6%)	
Always	5 (17.2%)	50 (27.3%)		55 (25.9%)	
[missing data]	[0]	[3]		[3]	
Condom use with short- term sexual contacts in the past 12 months					$\chi^2 = 1.8^a$ p= 0.18 df= 1
Never	4 (14.3%)	18 (11.5%)	13.5 (-6.5, 33.5) ^a	22 (12.0%)	
Sometimes	10 (35.7%)	39 (25.0%)		49 (26.6%)	
Usually	8 (28.6%)	60 (38.5%)		68 (37.0%)	
Always	6 (21.4%)	39 (25.0%)		45 (24.5%)	
[No short-term contacts past 12mo]	[1]	[27]		[28]	
[missing data]	[0]	[3]		[3]	
Past history of chlamydia infection					$\chi^2 = 0.2$ p= 0.69 df= 1
Yes	9 (32.1%)	66 (36.1%)	-3.9 (-22.6, 14.7)	75 (35.5%)	
No	19 (67.9%)	117 (63.9%)		136 (64.5%)	
[missing data]	[1]	[3]		[4]	

*CIs for means calculated from SPSS, CIs for percentage differences from OpenEpi.

^a categories never/sometimes and usually/always combined for analysis.

The small number of STIs (n=29) limited the ability to fit a model with multiple correlates, therefore regression analysis was not carried out.

4.5 Earthquake Effect

The February 22nd earthquake undoubtedly affected this research project mainly in that numbers agreeing to participate dramatically reduced following the event and in the month of March. Christchurch was very damaged by collapsed buildings, broken water, sewerage and electricity systems and severe damage to roading with widespread liquefaction. The central city was immediately cordoned off, with central city housing and businesses largely destroyed there was a large exodus of population during March, hence the disruption to this project could be expected, although it was not planned for. Many health services were reduced to emergency services only in the immediate post-quake period, the Sexual Health Centre, however, only closed for two days and reopened on the 25th February. It took until 24th March before further enrolment in the study was achieved, despite approaching 18 eligible participants over this time period.

There were significantly more males who participated in the study after February 22nd, proportionally fewer participants from the more deprived NZDep quintiles and the mean AUDIT scores also tended to be slightly higher after February 22nd but these differences did not reach statistical significance (Table 20).

Table 20: Comparison pre and post February 22nd Christchurch earthquake

	Pre-Feb 22 nd n= 195	Post-Feb 22 nd n=60	Difference (95% CI)*	TOTAL n= 255	Statistical comparison
Gender	n (%)	n (%)		n (%)	$\chi^2 = 5.0$
Male	85 (43.6%)	36 (60.0%)	-16.4 (-30.6, -2.2)	121 (47.5%)	p= 0.03
Female	110 (56.4%)	24 (40.0%)		134 (52.5%)	df= 1
Age group					$\chi^2 = 0.1$
16-18 years	55 (28.2%)	18 (30.0%)	-1.8 (-15.0, 11.4)	73 (28.6%)	p= 0.94
19-21 years	64 (32.8%)	20 (33.3%)		84 (32.9%)	df= 2
22-24 years	76 (39.0%)	22 (36.7%)		98 (38.4%)	
NZDep					$\chi^2 = 2.6$
Quintile 5	41 (21.6%)	10 (16.7%)	4.9 (-6.2, 16.0)	51 (20.4%)	p= 0.63
Quintile 4	57 (30.0%)	14 (23.3%)		71 (28.4%)	df= 4
Quintile 3	22 (11.6%)	9 (15.0%)		31 (12.4%)	
Quintile 2	36 (18.9%)	15 (25.0%)		51 (20.4%)	
Quintile 1	34 (17.9%)	12 (20.0%)		46 (18.4%)	
[missing data]	[5]	[0]		[5]	
AUDIT score					$\chi^2 = 2.9$
0-8	61 (31.3%)	12 (20.0%)	11.3 (-0.8, 23.7)	73 (28.6%)	p= 0.09
8+	134 (68.7%)	48 (80.0%)		182 (71.4%)	df= 1
Binge at least monthly					$\chi^2 = 2.9$
Yes	121 (63.0%)	45 (75.0%)	-12.0 (-24.9, 0.9)	166 (65.9%)	p= 0.09
No	71 (37.0%)	15 (25.0%)		86 (34.1%)	df= 1
[missing data]	[3]	[0]		[0]	
STI screen					$\chi^2 = 0.8$
Positive	24 (14.6%)	5 (9.8 %)	4.8 (-5.0, 14.6)	29 (13.5%)	p= 0.38
Negative	140 (85.4%)	46 (90.2%)		186 (86.5%)	df= 1
[Not tested]	[31]	[9]		[40]	

CHAPTER 5: DISCUSSION & CONCLUSION

In this sample of 255 people aged 16-24 years visiting the Christchurch Sexual Health Centre, 71.4% met the criteria for hazardous alcohol consumption. The overall proportion of young people with hazardous drinking greatly exceeded the proportion with a confirmed STI (chlamydia or gonorrhoea) (13.5%).

The proportion of participants ever consuming alcohol (99%) in the sample was higher than other New Zealand population based surveys (Ministry of Health, 2009; Oakley Browne, et al., 2006). In the New Zealand Mental Health Survey (Wells, Baxter & Schaaf, 2007) 94.6% of people had ever consumed alcohol, and findings from the New Zealand Alcohol and Drug Use Survey (Ministry of Health, 2009) showed 87% of 16-17 year olds had ever consumed alcohol. The median age of first consuming alcohol was younger in this sample than that observed in the New Zealand Alcohol and Drug Use Survey (14 versus 16 years). The proportion of participants who tried alcohol aged 14 years or less was also greater in this sample, nearly 50% in this study compared to just over 30% in the New Zealand Alcohol and Drug Use Survey. Given early initiation of alcohol use is associated with alcohol related problems and alcohol dependency later in life (Hingson, et al., 2006; Peleg-Oren, et al., 2009), a large proportion of these young clinic attendees are at risk.

Binge drinking rates were greater, and the age of binge drinking younger in this study sample compared to the New Zealand Alcohol and Drug Use survey data. The median age of ever consuming a large amount of alcohol was 16 years in the study sample and over 90% of participants had done this. Over 20% had consumed a large amount when aged 14 years or younger. In the New Zealand Alcohol and Drug Use survey the median age of ever consuming a large amount of alcohol was 17 years and rates were greatest in males 18-24 years at 80.4% and lowest in males 16-17 years at 56%, only 13.9% had consumed a large amount when aged less than 14 years. Binge drinking levels for New Zealand sexual health clinic attendees in this sample were also higher than that observed in a US sample of the same age (Cook, et al., 2006). In the current sample 74.4% of males and 58.6% of females reported binge drinking at least monthly whereas Cook et al reported rates of 48% for males

and 39.6% of females. These differences may in some ways be influenced by the age distribution of the study sample, in particular the higher proportion of males in the 22-24 year age groups who are likely to have higher rates of binge drinking.

The proportion of participants drinking at hazardous levels was much greater than expected compared with other population based samples of the same age group. Population estimates from other New Zealand surveys have shown prevalence of hazardous drinking between 38.3% (Oakley Browne, et al., 2006) and 59.3% (Ministry of Health, 2008b). The prevalence rate of hazardous drinking in the study sample was 71.4%. As with other studies the prevalence of hazardous drinking was higher in males, but trends with respect to ethnicity and NZ deprivation index quintiles were less obvious in the study sample compared with other population based surveys. Other surveys have demonstrated higher rates of hazardous alcohol consumption in Maori and those in the least deprived quintiles (Ministry of Health, 2008b; Oakley Browne, et al., 2006). The study sample size may have limited the ability to detect these trends observed in larger population based surveys.

This study has confirmed that young people attending the Christchurch Sexual Health Centre have high rates of hazardous alcohol use; with nearly all participants drinking alcohol, drinking at younger ages and in a hazardous way, including binge drinking. It appears, as was postulated at the start of the study, because of this consumption pattern that the attendees at this clinic are more at risk than other New Zealand youth for alcohol related harm.

Studies on UK SHC clinic attendees of all ages have shown approximately a third of attendees stated clinic attendance was related to alcohol (Crawford, et al., 2004; Standerwick, et al., 2007), in the young people in this sample only 20% felt alcohol played a role in their clinic attendance. The two most commonly reported reasons given, including UPSI and sexual intercourse that otherwise wouldn't have happened, were consistent with other New Zealand (Cashell-Smith, et al., 2007) and international studies (Cook, et al., 2006; Crawford, et al., 2004; Standerwick, et al., 2007).

Nearly half of participants reported having UPSI in the past 12 months related to alcohol, this was slightly lower than the 76% in a UK study of all ages attending a London GU clinic (Standerwick, et al., 2007).

Over 50% of participants used cannabis and 15% used other recreational drugs in the past 12 months. This rate of cannabis use is not unexpected given the New Zealand Mental Health Survey reported rates of ever using cannabis to be 42% in those aged over 16 years (Wells, et al., 2009) and young people aged less than 25 years have the highest rates of illegal drug use (Wilkins, et al., 2002). As with the trends observed in national drug surveys (Wilkins & Sweetsur, 2007) the most common other drugs used by participants were ecstasy, methamphetamine and LSD/acid.

The chlamydia prevalence in this study of 12.6% fits within that observed in other New Zealand studies. The only study reporting a higher rate was a region based study on laboratory specimens for 15-24 year olds tested in Waikato in February to October 2008 where the chlamydia positivity rate was 15.8%. This sample did however have a higher proportion of Maori participants (27.4%) which may account for the higher rate. Previous studies have also predominantly looked at chlamydia rates in females presenting for contraception and pregnancy services. The current study has shown the rates of infection in participants attending an urban sexual health clinic are similar between males and females.

This study was unable to detect any association between hazardous alcohol consumption and diagnosed STIs, unlike a similar US study of young sexual health clinic attendees (Cook, et al., 2006). The small sample size and only 29 positive STI diagnoses, combined with a high proportion of participants recording hazardous drinking patterns, meant it was difficult to observe any significant association. At the onset of the study it was estimated that approximately 65% of participants would be drinking at hazardous levels, based on previous clinic data (Coughlan & Bagshaw, 2009) using the CRAFFT questionnaire. The AUDIT questionnaire used in this study has detected higher rates of hazardous alcohol consumption and is likely to have been more sensitive in detecting hazardous alcohol use. It is unlikely alcohol use patterns have changed in the time between these samples being taken.

At the Christchurch Sexual Health Centre individual clinicians assess alcohol use and there is usually no structured assessment tool used. Those attendees identified as having alcohol or drug use problems, or those requesting help, are generally then seen by trained health advisors at the clinic. Due to resource and time constraints referral is then generally made to other counselling or treatment providers including the Community Alcohol and Drug services at Hillmorton Hospital or the City Mission who both provide free services. The high rate of hazardous alcohol use found in the study indicates a substantial number of referrals would be expected for this group.

The February 22 Christchurch earthquake had a significant impact on this study. Firstly the participation rates fell markedly. At this point when stress levels were high taking extra time to complete a survey in the inner city clinic was probably not a high priority for young people. The earthquake impacted the Christchurch eastern suburbs to the greatest extent and due to the substantial displacement of residents the accuracy of the NZDep scores based on current residence may also be inaccurate. The study did have fewer participants within NZDep quintiles 4 & 5 after February 22nd. Whether these people exited the city or were too busy dealing with earthquake related damage in that area, they did not attend the Christchurch Sexual Health Centre during that time. International research has demonstrated rises in alcohol use and binge drinking after natural disasters (Cerdeira, Tracy, & Galea, 2011; Flory, Hankin, Kloos, Cheely, & Turecki, 2009; Sadock & Sadock, 2005). Following the L'Aquila earthquake in central Italy in 2009, rises in substance use including tobacco, alcohol and cannabis were observed in young people (Pollice, Bianchini, Roncone, & Massimo, 2011). Media reports suggested rises in alcohol use were apparent in Christchurch following the February 22nd event (McGregor, 2011; Stylianou, 2011). The present study also found increased rates of binge drinking and overall AUDIT scores although neither of these reached statistical significance. This could also be confounded by the fact that there were more male participants in the study following the earthquake, as even prior to February 22nd males in this study were demonstrating higher alcohol consumption patterns and hazardous drinking.

Studies of trauma survivors have found higher rates of participation in high risk sexual activity including unprotected sexual intercourse, high numbers of sexual partners and sex with riskier partners (Rheingold, Acierno, & Resnick, 2004). Gonorrhoea rates in high

school students were observed to increase following Hurricane Katrina (Nsuami, Taylor, Smith, & Martin, 2009) and young impoverished women aged 16-24 years were less likely to have access to family planning and other health care services (Kissinger, Schmidt, Sanders, & Liddon, 2007). No observable increase in STI rates was seen in the present study. This may simply reflect the small sample size seen post February 22nd, and had data collection extended beyond three months after the earthquake STI rates may have reflected those seen in studies conducted overseas after natural disasters.

5.1 Limitations of the Study

Due to the cross-sectional design of this study it is not possible to determine any direct causal relationships between hazardous or binge drinking and sexual risk behaviour and sexually transmitted infections. As this was a convenience sample of young people attending the Christchurch Sexual Health Centre, and the response rate was only 47% it is possible the sample obtained is not representative of this population. As with any study conducted at a single site, care should be taken in assuming this sample may be representative of all young sexual health clinic attendees in New Zealand especially if some regions have different ethnic and socioeconomic characteristics. It is unlikely that these results can be generalised to all young people in New Zealand, because individuals attending STI clinics typically engage in riskier sexual behaviour than those who do not attend such clinics (Howards, Thomas, & Earp, 2002).

Response bias is possible in data obtained from self-reported behaviour. Given the sensitive and private nature of some of the questions it is possible some participants felt uncomfortable providing such information and answered erroneously. There is also potential for bias as participants were asked to recall events over the past 12 months. The written questionnaire does provide an anonymous route of answering sensitive questions. However, literacy and comprehension difficulties could have inadvertently excluded some participants.

The study was unable to assess other individual characteristics, such as personality traits that may influence risk taking behaviour, so other confounding variables could have also influenced the results obtained.

A weakness of this study is its inability to account for paired data in the analysis. For example youth may attend for screening with a current sexual partner or could be asked to attend due to a previous sexual partner testing positive for infection (via a contact tracing arrangement). This selective recruitment of potential participants could have influenced the results. Surprisingly in this study only two couples were identified in this situation. In one couple both tested positive for chlamydia and in the other couple one person tested positive and the other negative. Given these were the only couples thought to be included in the analysis it is unlikely the results have been influenced to any great extent by this.

The advantages of the study include the use of a standard definition for hazardous drinking, and one which has been used in other New Zealand population surveys allowing direct comparisons to be made. The clinical examination and testing for STIs provided an irrefutable marker of risky sexual behaviour to supplement the self-reported data.

5.2 Conclusions

This study has successfully examined hazardous alcohol use and diagnosed STIs in a sample of young people attending a sexual health service, key findings include:

- Christchurch Sexual Health Centre attendees 16-24 years have high rates of hazardous alcohol consumption (71.4%).
- Binge drinking is common, with 34% bingeing weekly and 31% monthly.
- One fifth (20%) of new Christchurch Sexual Health Centre visits were related in some way to alcohol.
- In the past 12 months nearly 50% of participants confirmed having unprotected sexual intercourse related to alcohol.

- The rate of chlamydia infection in this sample was high (12.6%).
- Other drug use is common: over 50% used cannabis and 15% used other recreational drugs in the past 12 months.

5.3 Implications

Alcohol disorders in young people are harmful to both the individual and society at large. The findings from this study indicate that the prevalence of hazardous alcohol consumption is higher in youth attending sexual health clinics than in the general population, and up to 20% of clinic attendance in this age group can be directly related to alcohol. It has been suggested that sexual health clinics might be an appropriate setting to instigate formal screening for alcohol and drug problems and address these problems if detected (Pittrof & Goodburn, 2010). This study has also demonstrated a significant association between hazardous alcohol use and other recreational drug use, thus it is vital to screen for other substance use in these young people. Although this study was not able to demonstrate a direct association between hazardous alcohol use and a diagnosis of chlamydia or gonorrhoea, a STI diagnosis was linked to high numbers of sexual partners and a lack of condom use. With nearly half of participants in the study reporting having unprotected sexual intercourse related to alcohol in the past 12 months and over 10% usually or always drinking before intercourse with a new partner, targeting alcohol use appears important. A number of very high AUDIT scores in this study indicates that some of these young people may already be alcohol dependent or at high risk for this. Screening is important to identify, allow referral and treatment for these individuals, though there is little evidence of success with brief intervention in alcohol dependent individuals (Babor & Higgins-Biddle, 2000). Screening and brief intervention has been shown to result in decreases in hazardous alcohol use (Higgins-Biddle, Babor, Mullahy, Daniels, & McRee, 1997; Moyer, et al., 2002), and appears to be acceptable to both clients and clinicians in overseas sexual health clinics (Crawford, et al., 2004; Lane, et al., 2008). It is worth considering the feasibility of screening and brief intervention in sexual health clinics in New Zealand, but further research would be needed to determine if similar positive results could be achieved in youth attending New Zealand sexual health services.

APPENDICES

APPENDIX 1: Alcohol use and other markers of sexual risk

Table 21: Summary of international studies examining alcohol use and other markers of sexual risk

Author Year	Study sample Sample size (n) Study design	Alcohol use associated with:	Summary of key results
(Jonsson, Karlsson, Rylander, Gustavsson, & Wadell, 1997)	Students in Swedish housing area, aged 19-25 years n=611 Retrospective cross-sectional	Self-reported STI	In univariate analysis, self-reported STI significantly associated with: <ul style="list-style-type: none"> • >4 lifetime partners (p<0.001) • IC on 1st date (p<0.001) • Inconsistent condom use (p<0.05) • Alcohol >3 bottles wine/month (OR 4.11, 1.81-9.33) Multivariate analysis, self-reported STI significantly associated with: <ul style="list-style-type: none"> • >4 lifetime partners (OR 7.94, 3.41-18.5) • IC on 1st date (OR 2.9, 1.55-5.778)
(Castilla, et al., 1999)	1996 Spanish national household survey, 18-39 years n=5253 Cross-sectional	>1 sexual partner in past 12/12 >1 sexual partner past 12/12 and failure to use condoms regularly	1 to 11 episodes of drunkenness per year significantly associated with: <ul style="list-style-type: none"> • >1 sexual partner (OR 2.4, 1.7-3.3) • >1 sexual partner & no regular condom use (OR 1.8, 1.2-2.9) ≥1 episode of drunkenness per month significantly associated with: <ul style="list-style-type: none"> • >1 sexual partner (OR 3.5, 2.3-5.3) • >1 sexual partner & no regular condom use (OR 3.6, 2.1-6.2)
(Kalichman, et al., 2007)	Cape Town SHC attendees, median age 25 years n=871 Cross-sectional	UPSI Number of sexual partners	Frequency & quantity scores from AUDIT significantly associated with: <ul style="list-style-type: none"> • Number of sex partners for women (p<0.01) • Protected intercourse for men (p<0.05) Drinking before sex associated with <ul style="list-style-type: none"> • UPSI in men (p<0.01) • Number of sex partners for men and women (p<0.01) For both genders partners drinking before sex associated with <ul style="list-style-type: none"> • UPSI (p<0.01) • Number of sex partners (p<0.01)
(Strunin & Hingson, 1992)	Massachusetts random digit dial survey of 16-19 year olds n= 1152 Cross-sectional	Increased likelihood of having sexual intercourse UPSI	49% reported they were more likely to have sex if they or someone they were interested in sexually had been drinking 17% reported using condoms less often after drinking (p<0.05)

(Morrison, et al., 2003)	Seattle sexually active adolescents, 14-19 years n=112 Prospective daily diary collection over 8 weeks	No associations	Condom use associated with: <ul style="list-style-type: none"> Casual partner (OR 3.84, 2.3-6.41) Another form of birth control used (OR 0.31, 0.18-0.54) Expected sexual intercourse (OR 1.28, 1.04-1.59) No association of condom use with: <ul style="list-style-type: none"> Alcohol use before sex (OR 1.06, 0.60-1.87)
(B. Leigh et al., 2008)	University college students 18-23 years and sexual health clinic attendees in Pacific North West USA n= 312 Prospective daily diary collection over 8 weeks	Condom use with casual partners for women	Drinking was not associated with condom use in either men or women (OR men 1.35, 0.92-2.0; OR women 1.10, 0.79-1.52) Condom use was more common with casual and first time partners ($p<0.05$) and less likely when other contraceptive methods used ($P<0.05$) Women who drank before sex with casual partners were more likely than non-drinking women to use condoms ($p<0.05$)
(Scott-Sheldon, et al., 2009)	New York sexual health clinic attendees aged >18 years n=1419 Cross-sectional	UPSI with casual partner for women	For women, drinking was associated with UPSI but only with a non-primary partner (adjusted OR 0.21, $p<0.01$) Women reporting both they and their non-primary partner drinking before sex were less likely to use condoms (OR 0.16, 0.05-0.56) Alcohol use was not independently associated with condom use
(Crawford, et al., 2004)	London sexual health clinic attendees n=302 Cross-sectional	Sexual contact that would otherwise not have taken place UPSI	40% of those consuming excessive amounts alcohol stated attendance at the clinic was related to alcohol – either being drunk resulted in sexual contact that would not have otherwise taken place, or alcohol use resulted in UPSI.
(MacDonald, et al., 2000)	Male participants in Alberta aged 18-25 years n=65 Placebo controlled experiments	Stronger intentions to have UPSI	Participants in the intoxicated group indicated stronger intentions to have UPSI but later when subtle inhibiting cues were introduced (e.g. signs saying AIDs kills) they were less likely to report the intention to engage in UPSI.

(Kennedy & Roberts, 2009)	<p>Southern California college women aged 18-24 years</p> <p>n=15</p> <p>Qualitative</p>	<p>UPSI</p> <p>Lack of control in sexual situations</p> <p>“excuse” for high risk sexual behaviour</p>	<p>Alcohol related themes identified in the study:</p> <ul style="list-style-type: none"> Two beliefs why young women engaged in USPI <ol style="list-style-type: none"> “being in the moment” and not being in control of sexual behaviour not remembering what happened secondary to alcohol these beliefs were considered culturally acceptable in their peer groups however the young women knew they were untrue. Alcohol impairs judgement. Peers didn’t question or hold each other accountable for engaging in high risk sexual behaviour if alcohol was involved.
(Corbin & Fromme, 2002)	<p>US college students or recent graduates</p> <p>n=305</p> <p>Cross-sectional</p>	<p>conflicting findings with condom use at situational and event level</p>	<p>This study examined the same participants at a global, situational and event level for alcohol use and condom use, findings:</p> <ul style="list-style-type: none"> At global level, no association between condom use and alcohol At situational level (sex with new partner verses regular partner) – sex with a new partner was more likely to involve alcohol and more likely to include use of condoms ($p<0.05$) At event level (first & most recent event with that partner) – at first intercourse there was an inverse association with condom use ($p<0.05$); for most recent event with a regular partner alcohol was unrelated to condom use, but gender, relationship duration and oral contraceptive use accounted for most of the variance.

APPENDIX 2: Literature Search Strategy

Literature searched up to 5/1/2011

Databases searched:

Ovid MEDLINE(R) 1996 to Present with Daily Update

PsychINFO 2002 to Dec Week 4 2010

EMBASE Classic+EMBASE 1947 to 2010 week 52

PubMed

Themes:

Alcohol use

Sexually transmitted infections

Keywords:

Alcohol screening

AUDIT

Sexually transmitted infections

Chlamydia

Gonorrhoea

Condoms

Youth

Adolescent

New Zealand

Australasia

Sexual health clinics

Search details:

Ovid MEDLINE(R), PsycINFO, EMBASE			
#	Searches	Results	Search Type
1	youth.mp. [mp=ti, ot, ab, nm, hw, ui, tc, id, sh, tn, dm, mf]	68694	Advanced
2	adolescent.mp. [mp=ti, ot, ab, nm, hw, ui, tc, id, sh, tn, dm, mf]	1780162	Advanced
3	young person.mp. [mp=ti, ot, ab, nm, hw, ui, tc, id, sh, tn, dm, mf]	1399	Advanced
4	1 or 2 or 3	1809741	Advanced
5	alcohol screening.mp. [mp=ti, ot, ab, nm, hw, ui, tc, id, sh, tn, dm, mf]	1055	Advanced
6	4 and 5	152	Advanced
7	remove duplicates from 6	105	Advanced
8	from 6 keep 2, 19, 25, 43-44, 48, 50...	9	Advanced

Ovid MEDLINE(R), PsycINFO, EMBASE			
#	Searches	Results	Search Type
1	youth.mp. [mp=ti, ot, ab, nm, hw, ui, tc, id, sh, tn, dm, mf]	68694	Advanced
2	adolescent.mp. [mp=ti, ot, ab, nm, hw, ui, tc, id, sh, tn, dm, mf]	1780162	Advanced
3	young person.mp. [mp=ti, ot, ab, nm, hw, ui, tc, id, sh, tn, dm, mf]	1399	Advanced
4	1 or 2 or 3	1809741	Advanced

5	chlamydia.mp. [mp=ti, ot, ab, nm, hw, ui, tc, id, sh, tn, dm, mf]	36705	Advanced
6	gonorrhoea.mp. [mp=ti, ot, ab, nm, hw, ui, tc, id, sh, tn, dm, mf]	6084	Advanced
7	5 or 6	41488	Advanced
8	4 and 7	6503	Advanced
9	alcohol.mp. [mp=ti, ot, ab, nm, hw, ui, tc, id, sh, tn, dm, mf]	459678	Advanced
10	8 and 9	115	Advanced

Ovid MEDLINE(R), PsycINFO, EMBASE			
#	Searches	Results	Search Type
1	new zealand.mp. [mp=ti, ot, ab, nm, hw, ui, tc, id, sh, tn, dm, mf]	80637	Advanced
2	australasia.mp. [mp=ti, ot, ab, nm, hw, ui, tc, id, sh, tn, dm, mf]	2020	Advanced
3	1 or 2	82142	Advanced
4	alcohol.mp. [mp=ti, ot, ab, nm, hw, ui, tc, id, sh, tn, dm, mf]	459678	Advanced
5	3 and 4	1616	Advanced
6	AUDIT.mp. [mp=ti, ot, ab, nm, hw, ui, tc, id, sh, tn, dm, mf]	53151	Advanced
7	5 and 6	48	Advanced

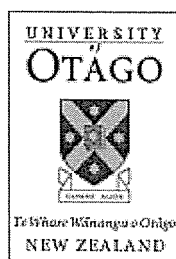
Ovid MEDLINE(R), PsycINFO, EMBASE			
#	Searches	Results	Search Type
1	new zealand.mp. [mp=ti, ot, ab, nm, hw, ui, tc, id, sh, tn, dm, mf]	80637	Advanced
2	sti.mp. [mp=ti, ot, ab, nm, hw, ui, tc, id, sh, tn, dm, mf]	10442	Advanced
3	chlamydia.mp. [mp=ti, ot, ab, nm, hw, ui, tc, id, sh, tn, dm, mf]	36705	Advanced

4	2 or 3	45818	Advanced
5	1 and 4	178	Advanced
6	remove duplicates from 5	118	Advanced
7	from 5 keep 4, 12, 14, 19-20, 28-30, 32-33...	16	Advanced

Ovid MEDLINE(R), PsycINFO, EMBASE			
#	Searches	Results	Search Type
1	sexually transmitted*.mp. [mp=ti, ot, ab, nm, hw, ui, tc, id, sh, tn, dm, mf]	56861	Advanced
2	alcohol.mp. [mp=ti, ot, ab, nm, hw, ui, tc, id, sh, tn, dm, mf]	459678	Advanced
3	1 and 2	2192	Advanced
4	(youth or adolescent).mp. [mp=ti, ot, ab, nm, hw, ui, tc, id, sh, tn, dm, mf]	1809010	Advanced
5	3 and 4	955	Advanced
6	remove duplicates from 5	663	Advanced
7	condoms.mp. [mp=ti, ot, ab, nm, hw, ui, tc, id, sh, tn, dm, mf]	14392	Advanced
8	6 and 7	135	Advanced
9	remove duplicates from 8	135	Advanced
10	from 8 keep 8-10, 29, 42, 53, 55, 59...	18	Advanced

Query Translation:	
<div><div>("ethanol"[MeSH Major Topic] OR "alcohols"[MeSH Major Topic]) AND "sexually transmitted diseases"[MeSH Major Topic] AND ("humans"[MeSH Terms] AND English[lang] AND ("adolescent" [MeSH Terms] OR "young adult"[MeSH Terms]))</div><div>SearchURL</div></div>	
Result:	
41	
Translations:	
alcohol[MeSH Major Topic]	"ethanol"[MeSH Major Topic] OR "alcohols"[MeSH Major Topic]
sexually transmitted infections[MeSH Major Topic]	"sexually transmitted diseases"[MeSH Major Topic]
Humans[Mesh]	"humans"[MeSH Terms]
adolescent[MeSH]	"adolescent"[MeSH Terms]
young adult[MeSH]	"young adult"[MeSH Terms]
Database:	
PubMed	
User query:	
(alcohol[MeSH Major Topic]) AND sexually transmitted infections[MeSH Major Topic] AND (Humans[Mesh] AND English[lang] AND (adolescent[MeSH] OR young adult[MeSH]))	

APPENDIX 3: Participant Information Sheet



PARTICIPANT INFORMATION SHEET

Study Title: Alcohol Use & Sexually Transmitted Infections (STIs) in young people attending a Sexual Health Clinic.

An invitation to participate in a study from the University of Otago:

You are invited to take part in this student research project exploring alcohol use and sexual health. We know that when people use alcohol & other drugs it can affect their behaviour. This means that some people may be more at risk of being unsafe when having sex and therefore more likely to get an infection like Chlamydia. In order to help prevent Chlamydia it has been suggested we should routinely find out more about how much people drink so that we can assist people to control their drinking if it is affecting their lives.

Your participation is entirely voluntary (your choice). You do not have to take part in this study and if you choose not to take part this will not influence the treatment/care you receive at the clinic.

Who can be involved in this study?

All those aged 16-24 years attending the Christchurch Sexual Health clinic for a new clinic visit will be asked to take part. Pregnant women will not be asked to participate.

What is the time span for the study?

Data collection for this study will be between October 2010 & April 2011. If you attend the clinic on more than one occasion in this time, please only complete the survey once.

What will happen during the study?

If you decide you would like to take part, your participation will take about 15 minutes. You are asked to sign the consent form and complete the questionnaire accompanying this information sheet and return them to the boxes at reception. If you have lab tests taken at your visit today these will be linked to the survey results, you will not be asked to take any extra tests for the study. All lab tests at this clinic are processed under a unique patient identifier code so that no identifying details are recorded on the lab samples, this code will also be recorded on the survey, but no identifying details like name or date of birth are recorded so all the results remain confidential. The doctor/nurse you see will also not read your questionnaire.

What are the risks and benefits of the study?

Taking part in this study will take approximately 15 minutes and require you to answer some personal questions related to sex and alcohol/drug use. There are no known risks caused by this study, although if you wish to discuss alcohol/drug use or sexual risks further with a counsellor or health advisor they are available at the clinic at all times.

The results of the study will be totally anonymous and when all the answers are put together no one will know how each person answered, but it will help us make improvements in the service we provide.

When will the results be available?

The results will be available in November 2011 and this clinic will have a summary of the results available for participants, this will be available on request from the reception staff.

Questionnaire forms will be stored in a secure location by the Department of Public Health, University of Otago, it is required that health data is stored for a duration of 10 years.

This study has received ethical approval from the Upper South B Regional Ethics Committee; ethics reference number URB/10/10/035.

Please feel free to contact the researchers if you have any questions about this study.

Principal Investigator: Dr Monica Ford, Christchurch Sexual Health Centre, 33 St Asaph Street, Christchurch, ph 3640485.

Under supervision of Dr Ian Sheerin, University of Otago, Department of Public Health & General Practice

Co-investigator: Dr Edward Coughlan, Christchurch Sexual Health Centre, 33 St Asaph Street, Christchurch, ph 3640485.

APPENDIX 4: Participant Consent Form



Study Title: Alcohol Use & Sexually Transmitted Infections (STIs) in young people attending a Sexual Health Clinic.

CONSENT

- I have read and understand the information sheet for volunteers taking part in the study designed to look at alcohol use and STIs at this sexual health clinic.
- I have had the opportunity to discuss this study. I am satisfied with the answers I have been given.
- I understand that taking part in this study is voluntary (my choice) and that I may withdraw from the study at any time and this will in no way affect my continuing care.
- I understand that my participation in this study is confidential and that no material which could identify me will be used in any reports in this study.
- I consent to the researcher obtaining my laboratory test results for sexually transmitted infections for this visit only from my records.
- I understand I do not have to answer all the questions in the survey and can stop at any time.
- I have had the opportunity to consider whether to take part.
- I know whom to contact if I feel any distress or have any concerns as a result of my participation.

I _____ (print name) hereby consent to taking part in this study.

Date:

Signature:

Name of Principal Researcher: Monica Ford

Contact phone number: 3640485 Christchurch Sexual Health Centre

APPENDIX 5: Participant Questionnaire

Date ____/____/____ Study Number _____

PLEASE FOLLOW THE INSTRUCTIONS CAREFULLY

**OFFICIAL
USE
ONLY**

(Q1) What is your gender?

*Please mark **one box***

- ☐₁ Male
☐₂ Female
☐₃ Other

(Q2) What is your age? _____ *(Please record age in years)*

(Q3) Which ethnic group do you belong to?

*Mark the **box** or **boxes** that apply to you*

- ☐₁ New Zealand European
☐₂ Maori
☐₃ Samoan
☐₄ Cook Island Maori
☐₅ Tongan
☐₆ Niuean
☐₇ Chinese
☐₈ Indian
☐₉ Other (such as Dutch, Japanese, Tokelauan)

Please state: _____

(Q4) What is the address where you live?

Please list street number and name

(Q5) In the job you worked the most hours for, in the past week, which of these best describe you?

*Please mark **one box***

- ☐₁ A paid employee
☐₂ Self employed
☐₃ Looking after children without pay
☐₄ Doing voluntary work
☐₅ Working in a family business without pay
☐₆ Studying
☐₇ Unemployed

(Q6) In the past 12 months, have you had sex with a **male** partner?

*Please mark **one box***

- ☐₁ Yes
☐₂ No

(Q7) In the past 12 months, have you had sex with a **female** partner?

*Please mark **one box***

- ☐₁ Yes
☐₂ No

(Q8) Have you ever had at least one alcoholic drink in your lifetime (not counting small tastes sips)?

☐₁ Yes

☐₂ No if you answered NO to this question please proceed to **page 4** and continue

(Q9) How old were you when you first had an alcoholic drink (not counting small tastes or sips)? _____ (please record age in years)

FOR THE FOLLOWING QUESTIONS, PLEASE CLEARLY MARK THE BOX BELOW YOUR ANSWER:

(Q10) Have you had an alcoholic drink in the past 12 months?

Yes

☐₁

No

☐₂

(Q11) How often do you have a drink containing alcohol?

Never

☐₀

Monthly or
less

☐₁

2 to 4 times
a month

☐₂

2 to 3 times
per week

☐₃

4 or more times
per week

☐₄

(Q12) How many drinks containing alcohol do you have on a typical day when you are drinking?

1 or 2

☐₀

3 or 4

☐₁

5 or 6

☐₂

7 to 9

☐₃

10 or more

☐₄

(Q13) How often do you have 6 or more drinks on one occasion?

Never

☐₀

Less than
monthly

☐₁

Monthly

☐₂

Weekly

☐₃

Daily or almost
daily

☐₄

(Q14) If you have ever had 6 or more drinks on one occasion, at what age did you first consume more than this amount of alcohol? _____ (please record age in years)

(Q15) How often during the last year have you found that you were not able to stop drinking once you had started?

Never

☐₀

Less than
monthly

☐₁

Monthly

☐₂

Weekly

☐₃

Daily or almost
daily

☐₄

(Q16) How often during the last year have you failed to do what was normally expected of you because of drinking?

Never

☐₀

Less than
monthly

☐₁

Monthly

☐₂

Weekly

☐₃

Daily or almost
daily

☐₄

(Q17) How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?

Never	Less than monthly	Monthly	Weekly	Daily or almost daily
<input type="checkbox"/> ₀	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄

(Q18) How often during the past year have you had a feeling of guilt or remorse after drinking?

Never	Less than monthly	Monthly	Weekly	Daily or almost daily
<input type="checkbox"/> ₀	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄

(Q19) How often during the last year have you been unable to remember the night before because you had been drinking?

Never	Less than monthly	Monthly	Weekly	Daily or almost daily
<input type="checkbox"/> ₀	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄

(Q20) Have you or someone else been injured as a result of your drinking?

No	Yes, but not in the last year	Yes, during the last year
<input type="checkbox"/> ₀	<input type="checkbox"/> ₂	<input type="checkbox"/> ₄

(Q21) Has a relative or friend, or a doctor or other health worker, been concerned about your drinking or suggested you cut down?

No	Yes, but not in the last year	Yes, during the last year
<input type="checkbox"/> ₀	<input type="checkbox"/> ₂	<input type="checkbox"/> ₄

(Q22) Was the sexual encounter leading to your attendance at this clinic related to alcohol?

☐₁ No

☐₂ Yes, Please state how it was related:

(Q23) In the past 12 months, how often had you been drinking before sex with a new partner?

☐₁ Usually/always

☐₂ Occasionally

☐₃ Never

(Q24) In the past 12 months, if you had been drinking before sex with a new partner, how drunk were you?

☐₁ Very drunk

☐₂ Occasionally very drunk

☐₃ Never very drunk

(Q25) In the past 12 months, have you had unprotected sex as a result of drinking alcohol?

☐₁ Yes

☐₂ No

(Q26) What age were you when you first had full sexual intercourse? _____ *(please record age in years)*

(Q27) How often do you use condoms with a new sexual partner?

☐₁ Always

☐₂ Usually

☐₃ Sometimes

☐₄ Never

(Q28) How often have you used condoms with short-term sexual contacts in the past 12 months?

☐₁ Always

☐₂ Usually

☐₃ Sometimes

☐₄ Never

☐₅ I have not had any short-term sexual contacts in the past 12 months

(Q29) Have you ever been diagnosed with a sexually transmitted infection?

☐₁ Yes, if you know what infection(s), for example Chlamydia, Gonorrhoea, please record:

☐₂ No

☐₃ Uncertain

(Q30) How many sexual partners have you had in the past 3 months?

☐₁ 0

☐₂ 1

☐₃ 2-4

☐₄ 5-7

☐₅ 8-10

☐₆ more than 10

(Q31) How many sexual partners have you had in the past 12 months?

☐₁ 0

☐₂ 1

☐₃ 2-4

☐₄ 5-7

☐₅ 8-10

☐₆ more than 10

(Q32) How often have you used **cannabis** in the past 12 months? *(mark the box below your answer)*

Never	Monthly or less	2-4 times a month	2-3 times a week	4 or more times a week
<input type="checkbox"/> ₀	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄

(Q33) How often have you used **P** in the past 12 months?

Never	Monthly or less	2-4 times a month	2-3 times a week	4 or more times a week
<input type="checkbox"/> ₀	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄

(Q34) How often have you **injected drugs** in the past 12 months?

Never	Monthly or less	2-4 times a month	2-3 times a week	4 or more times a week
<input type="checkbox"/> ₀	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄

(Q35) Have you used any **other recreational drugs** (e.g. prescription drugs) in the past 12 months?

Please list drugs and approximate frequency of use in the past 12 months

THANK YOU FOR TAKING PART IN THIS STUDY



ATTENTION: ARE YOU AGED 16-24 years?

Are you willing to take part in a study about **Alcohol Use** and **Sexual Health**?

This will involve filling out a survey during your visit today.

Information is available at the reception desk or ask one of the doctors/nurses you see.

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