

Trends in alcohol consumption and
alcohol-related harms among females
in New Zealand

Research report commissioned by the
Health Promotion Agency

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COMMISSIONING CONTACT'S COMMENTS

HPA commission was managed by Dr Craig Gordon, Senior Researcher.

Health Promotion Agency (HPA) recognises the importance of developing a gendered approach to discussing and understanding alcohol consumption and associated harms. As part of this, HPA (previously the Alcohol Advisory Council of New Zealand) wanted to better understand changes that have occurred over time in women's drinking in New Zealand.

HPA commissioned the Social and Health Outcomes Research and Evaluation group (SHORE) from Massey University in July 2011 to examine changes over time in alcohol drinking patterns and alcohol-related harm for women. A final report from the authors, Dr Taisia Huckle, Li Chia Yeh, Dr Judy Lin and Victoria Jensen (SHORE) was received in May 2013. The report has not undergone peer review.

This report presents a series of analyses summarising trends over time for alcohol consumption of women from a series of national alcohol-related surveys undertaken by SHORE between 1995 and 2011. It also presents information on trends for selected alcohol-related harm (alcohol-attributable hospitalisation and death, and alcohol involved motor vehicle crashes and prosecutions) over a similar time period. The information is supported by a review of New Zealand research on women's drinking and associated harm.

This report contributes to our understanding of changes in women's drinking patterns and alcohol-related harm. The focus of the report is on describing whether statistically significant changes have occurred over time, rather than interpreting why or providing in-depth understanding of any changes observed. Care should therefore be exercised when considering the findings of the report.

REVIEW

The report has not undergone external peer review.

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Trends in alcohol consumption and alcohol-related harms among females in New Zealand

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Executive summary

The Project

This report was commissioned by the Health Promotion Agency (HPA) to understand trends in alcohol consumption and alcohol-related harm among females over time in New Zealand (covering the time period 1995 to 2011).

A review of literature (including survey reports) was conducted on drinking patterns and alcohol-related harm among females in New Zealand.

The main focus of the project, however, was to undertake new analyses to understand changes in drinking patterns and alcohol-related harms over time among females in New Zealand, and by ethnic group (Maori, Pacific and Asian), covering the period from 1995 to 2011.

Methods

Literature review

The aim of the literature review was to locate and review existing evidence and knowledge about females, their drinking and related harm in New Zealand. A list of the databases searched, key words and other details can be found in Chapter 2.

Survey data

Comparable national alcohol surveys were utilised to assess trends in drinking patterns among females in New Zealand in 1995, 2000, 2004, 2008 and 2011. The surveys, collectively known as the National New Zealand Alcohol Surveys, were carried out by researchers at the SHORE and Whariki Research Centre and included the National New Zealand Alcohol Surveys 1995 and 2000, the Health Behaviours Survey 2004, the Harm to Others Survey 2008 and the International Alcohol Control Study 2011.

Separate comparable national surveys were available to assess drinking patterns among Maori females (in 2000, 2004 and 2011) and Pacific females (in 2003 and 2011).

The surveys used the same sampling design, the same questions and the same data collection methods over time so were directly comparable.

For the survey data, which provided consumption measures, age groups assessed were: 16-24, 25-34, 35-44, 45-54, 55-65 years (there was a slight variation on these age groups for Pacific females).

Routinely collected data

Routinely collected harms data were obtained annually covering the years 1995 to 2011 (years in which data available varied across datasets) from agencies that collect these data

as part of their routine practices. The routinely collected data were comparable over time unless otherwise stated.

Data were available for females in the New Zealand population (including all ethnicities) and for Maori, Pacific and Asian females.

The routinely collected harms data for the New Zealand population were disaggregated into the following age groups: 14-17, 18-24, 25-34, 35-44, 45-64, 65-84, 85+ years.

For analysis of Maori, Pacific and Asian data, wider age bands were required to be used due to smaller numbers in the datasets (14-24, 25 -44, 45-64, 64-84, 85+ years).

Measures

Measure	Definition
Prevalence of drinking	The proportion of females who consumed alcohol in past 12 months
Frequency of drinking	Number of drinking occasions in the past 12 months
Typical occasion quantity	Quantity consumed on a typical drinking occasion in the past 12 months
5+ drinks at least once a week	Respondents were grouped into: a) those who consumed 5 or more drinks at least once a week in the past 12 months; and b) those who did not. A drink was defined as 15ml absolute alcohol (the equivalent of 12.5 gm of absolute alcohol).
Volume of consumption	Total volume of alcohol consumed by male and female drinkers in the past 12 months <i>[This measure reflects the volume consumed by females relative to the volume consumed by males. It does not reflect the absolute volume of alcohol consumed among females].</i>

The National New Zealand Alcohol Survey Series uses a drink size of 15ml absolute alcohol. The 15ml drink size is based on previous empirical research about size of the drinks New Zealanders were consuming (and has been retained through time to ensure comparability with previously published work).

The New Zealand standard drink, however, is a smaller measure of 10g or 12.5ml of absolute alcohol. So, for example, the measure of 5+ drinks at least once a week used in this study would be 6 drinks at least once a week using the standard drink definition.

Routinely collected alcohol-related harm measures:

Routinely collected harms data were obtained annually covering 1995 to 2011 (years in which data available varied across datasets). The following data were obtained:

Alcohol-involved vehicle crashes (drivers) (injury and fatal) - 1990 to 2010

Numbers of alcohol-involved vehicle crashes (injury and fatal) where the driver had been drinking were obtained from Ministry of Transport, New Zealand. Injury crashes included all crashes resulting in serious or minor injury.

Prosecutions for driving with excess alcohol - 1980 to 2011

Prosecuted cases for driving with excess alcohol were obtained from the Research and Evaluation Unit of the Ministry of Justice. Data excluded cases where the offender was prosecuted for driving under the influence of drugs.

Admissions to hospital - 1996 to 2011

Data on hospitalisations were obtained from the National Minimum Dataset (Analytical Services, Ministry of Health). In 1999 the ICD-9 coding system was replaced by the ICD-10 coding system. In order for data to be comparable across these two coding systems, categories/conditions were defined in both ICD-9 and in ICD-10 and data were used across the two periods (before and after 1999).

Data on hospitalisations were obtained for conditions that are wholly attributable to alcohol including: alcoholic liver cirrhosis, alcohol poisoning, alcoholic cardiomyopathy (where alcohol weakens the heart muscle), alcoholic gastritis (inflammation of the lining of the stomach caused by excessive alcohol use), alcoholic poly neuropathy (damage to the nerves that results from excessive drinking of alcohol) and alcoholic psychosis (any of the various psychoses that result from alcoholism and involve organic brain damage).

Data on conditions partially attributable to alcohol were also obtained including female breast cancer, assault (age \geq 15) and suicide. These data, however, included both alcohol-related and non-alcohol-related hospitalisations (and are reported in Appendix Four as contextual data).

Deaths/mortality 1996 to 2009

Data on mortality from 1996 to 2009 were obtained from the Analytical Services, Ministry of Health (there is a time lag on availability of these data). Data on deaths were obtained for the same health conditions as for admissions to hospital.

Disorder offences, assault and fighting in public 1994 to 2011

Police statistics (disorder, assault and fighting in public places) included both alcohol-related and non-alcohol related offences. These data provide context for the other alcohol-attributable harms assessed in this study (and are included as Appendix 4 to this report).

Calls to the Alcohol Drug Helpline

Calls made to the Alcohol Drug Helpline operated by the Alcohol Drug Association New Zealand (ADANZ) were available for analysis for the years 1996 to 2011; data were also available by ethnicity.

Analysis

Analysis of survey data

Determining if a change over time is statistically significant allows us to say whether a change reflects a pattern rather than just chance. In other words, if a statistically significant result is found ($pvalue < 0.05$), it means that we can be 95% certain that there has been a change in behaviour over time. Assessing the direction and size of the statistically significant change reveals if the change is increasing/decreasing and small or large.

General Linear Models were utilised to undertake trend analysis over time on survey measures of consumption. A trend line was fitted using the data points from the surveys and to determine whether there had been a statistically significant change over time.

Statistical testing was also undertaken using the first and last data points of the surveys to see where females were positioned relative to when comparable data collection started. As survey years varied depending on ethnicity, the comparison points were: 1995 with 2011 for females in the general population; 2000 with 2011 for Maori females, and 2003 with 2011 for Pacific females.

Analyses of routinely collected data

For the routinely collected harms data, count data were analysed using Poisson regression with an identity link function and the model allowed for over dispersion. Population change over time was controlled for in the models. Data are presented as rates per 100,000 population (females).

Broken stick models were sometimes utilised to allow slopes to differ in direction within a long term trend (the data for which broken stick models were used and specific breakdown of years can be found on page 20 of the executive summary).

As years varied more markedly across the routinely collected harms datasets than they did for the survey data, no 'first year of data versus last year of data' comparison is made.

Results

Literature review

The review of literature focused on two main areas: a) drinking patterns; and b) alcohol-related harms. Studies were reviewed if they were cross-sectional and/or if they analysed trends over time. The following is a summary of key findings from the literature reviews on alcohol consumption and drinking patterns (see Appendix 2) and alcohol-related harm (see Appendix 3).

Drinking patterns (cross-sectional)

Females in New Zealand drink less on a typical drinking occasion than males (and females drink less frequently than males).

Sixty percent of female secondary school students consume alcohol. A third of female secondary school students, who are drinkers, consume 5+ standard drinks per session. A drink was defined as a standard drink (10g absolute alcohol).

Sixty percent of female tertiary students drink hazardously as defined by the Alcohol Use Disorders Identification Test (AUDIT) with a cut off score of 8+. The prevalence of hazardous drinking was lower among females than males¹.

Young females in New Zealand consume higher quantities than older females, but drink less frequently.

Fewer Maori and Pacific females consume alcohol compared to non-Maori/Pacific females. However of drinkers, Maori and Pacific females consume more on a drinking occasion than non-Maori/Pacific females.

Asian females are less likely to consume alcohol than females in the general population (Ministry of Health, 2009). Asian females are less likely to drink enough to feel drunk and to have consumed more than four standard drinks in at least one drinking session (Ministry of Health, 2009).

More same sex/both sex-attracted females consumed alcohol and drank more often than once over the last year than hetero-sexual identified females.

Trends over time

There were several changes in nationwide drinking patterns for females documented by the National New Zealand Alcohol Surveys between 1995 and 2000: increases in typical occasion quantities were found among most age groups of females. Younger females increased by around one drink on a typical occasion and older females increased by around half a drink (a drink was defined as 15ml absolute alcohol).

¹ The Alcohol Use Disorders Identification Test, AUDIT, is a screening tool for excessive drinking and asks about recent alcohol use, alcohol dependence symptoms and alcohol-related problems (Babor et al 2001).

An increase in the proportions of females consuming 5+ drinks on a typical occasion occurred for female drinkers aged 20-24 years (from 40% to 59%) and 30-39 years (from 8% to 15%) (a drink was defined as 15ml absolute alcohol). Among female drinkers aged 25-29 and 30-39 years, gender convergence occurred for typical occasion quantity between 1995 and 2000 (where females' consumption increased and moved towards that of males').

The New Zealand Health Survey found no change in the prevalence (% yes) of females in New Zealand consuming alcohol hazardously 1996/97, 2002/03 and 2006/07, defined by an AUDIT score of 8+.

The Alcohol and Drug Use Survey 2007/08, using the same AUDIT data from the New Zealand Health Survey, found no change in the prevalence (% yes) of hazardous drinking among females aged 18-24 years 1996/97, 2002/03, 2006/07 (AUDIT score of 8+).

There was a decline in the proportion of secondary school students (Youth2000 and Youth2007 surveys) and teenagers in the wider New Zealand population (National New Zealand Alcohol Surveys) consuming alcohol during the 2000s.

Among secondary school students, binge drinking (defined as 5+ standard drinks in 4 hours) increased among drinkers between 2001 and 2007 from 49% to 57%. By age 15 males were more likely to be binge drinkers than females (Youth2000 & Youth2007 surveys)

From 2009 to 2011, the ALAC Annual Alcohol surveys found a decrease in binge drinking (defined as 7+ standard drinks in past four weeks) among females aged 18+ years (from 23% to 17%).

Alcohol-related harm

Alcohol-related harm is experienced by females in New Zealand, but levels of harm among females are generally lower than those experienced by males.

Alcohol is implicated in a wide range of harms among females in New Zealand.

There is very little research assessing population trends in routinely collected data on harms for females.

There is very little research available on alcohol-related harm for Maori, Pacific and Asian females (including research over time).

SHORE/Whariki Survey data and routinely collected data on harms

Table 1 presents a cross-section of drinking patterns among females in the general population, Maori and Pacific females in 2011 (Asian n/a).

Drinking patterns among females varied by age and ethnicity.

Table 1: Drinking patterns in 2011 among females in general population, Maori and Pacific females

Measure	General population	Maori	Pacific
Drinkers in last 12 months (% yes)			
16-65 years	83.1	84.6	57.2
16-24 years	83.3	92.5	65.7
25-34 years	82.8	80.2	56.6
35-44 years	84.2	88.6	60.2
45-54 years	82.7	82.8	52.8
55-65 years	82.2	65.2	30.2
Frequency of drinking (times p.a)			
16-65 years	81.6	56.6	57.2
16-24 years	58.3	59.8	60.5
25-34 years	78.0	49.9	43.8
35-44 years	81.7	52.6	31.5
45-54 years	84.3	69.2	37.6
55-65 years	109.6	52.9	15.8
Typical occasion quantity (mls)			
16-65 years	37.7	57.8	67.2
16-24 years	56.0	84.0	90.6
25-34 years	42.7	62.8	79.4
35-44 years	38.2	46.9	51.6
45-54 years	30.6	42.6	46.5
55-65 years	28.4	34.9	34.5
5+ drinks (15ml) at least once a week (% yes)*			
16-65 years	11.5	24.7	28.9
16-24 years	28.3	41.3	43.9
25-34 years	14.3	24.8	30.8
35-44 years	9.9	11.2	19.1
45-54 years	5.7	20.8	12.9
55-65 years	2.8	5.9	7.4

* A drink is defined as 15ml absolute alcohol (and in all tables following).

Gender breakdown of volume consumed in the general population 1995 to 2011

The following measure reflects the volume of alcohol consumed by females relative to the volume of alcohol consumed by males. It does not reflect the absolute volume of alcohol consumed by females.

Overall Trend (1995, 2000, 2004, 2008, 2011)

Analysis undertaken on SHORE/Whariki comparable national alcohol surveys in 1995, 2000, 2004, 2008 and 2011 found that of all the alcohol consumed in New Zealand by drinkers (as documented by the surveys), males consumed the vast majority - around two thirds in each survey year (a figure of results is available in Chapter 4).

Comparison between 1995 and 2011

In 2011 females consumed 33% of the total volume of alcohol consumed in New Zealand, as documented by the surveys, compared to 30% in 1995. This was not a statistically significant change.

Trends in drinking patterns among females in the general population 1995 to 2011

The 'trend over time' column in Table 2 reports the direction of different consumption measures over all survey years 1995, 2000, 2004, 2008 and 2011. Statistically significant trends are referred to as either increasing or decreasing. Where data are reported as no change, this means there has been no statistically significant change over time.

The '1995 v 2011' column reports if there has been an increase, decrease or no change in 2011 as compared to 1995 (i.e. using only 2 surveys, 1995 versus 2011). "Increased" is when the measure has statistically significantly increased and "Decreased" is when the measure has statistically significantly decreased. If no statistically significant change has occurred, then this is referred to as no change. Details of the size of the changes can be found in Chapter 4.

Table 2: Trends in drinking patterns among females in the general population aged 16-65 years

Measure	Age group	Trend	1995 v 2011
		1995,2000,2004,2008,2011	
Drinkers in last 12 months (% yes)	16-65 years	Decreasing	Decreased
	16-24 years	No change	No change
	25-34 years	No change	No change
	35-44 years	Decreasing	Decreased
	45-54 years	Decreasing	Decreased
	55-65 years	No change	No change
Frequency of drinking (times p.a.)	16-65 years	Increasing	Increased
	16-24 years	No change	No change
	25-34 years	Increasing	Increased
	35-44 years	Increasing	Increased
	45-54 years	No change	No change
	55-65 years	Increasing	Increased
Typical occasion quantity (mls)	16-65 years	Increasing	Increased
	16-24 years	Increasing	Increased
	25-34 years	Increasing	Increased
	35-44 years	Increasing	Increased
	45-54 years	Increasing	Increased
	55-65 years	Increasing	Increased
5+ drinks (15ml) at least once a week (% yes)	16-65 years	Increasing	Increased
	16-24 years	Increasing	Increased
	25-34 years	Increasing	Increased
	35-44 years	Increasing	No change
	45-54 years	No change	No change
	55-65 years	No change	No change

Table 2 shows that statistically significant increases were found among females aged 16-65 years for three out of the four measures analysed. There was variation by age group.

Trends in drinking patterns among Maori females 2000, 2004, 2011

The 'trend over time' column in Table 3 refers to the direction of the trend using all survey years, 2000, 2004 and 2011 for Maori females. The '2000 v 2011' column reports the 2000 v 2011 comparison.

Table 3: Trends in drinking patterns among Maori females aged 16-65 years

Measure	Age group	Trend 2000,2004,2011	2000 v 2011
Drinkers in last 12 months (% yes)	16-65 years	Increasing	No change
	16-24 years	Increasing	Increased
	25-34 years	No change	Decreased
	35-44 years	No change	No change
	45-54 years	No change	No change
	55-65 years	No change	No change
Frequency of drinking (times p.a.)	16-65 years	No change	No change
	16-24 years	No change	No change
	25-34 years	No change	No change
	35-44 years	No change	No change
	45-54 years	No change	No change
	55-65 years	No change	No change
Typical occasion quantity (mls)	16-65 years	No change	No change
	16-24 years	No change	No change
	25-34 years	No change	No change
	35-44 years	No change	No change
	45-54 years	No change	No change
	55-65 years	No change	No change
5+ drinks (15ml) at least once a week (% yes)	16-65 years	No change	No change
	16-24 years	No change	No change
	25-34 years	No change	No change
	35-44 years	No change	No change
	45-54 years	Increasing	Increased
	55-65 years	No change	No change

Among Maori females, there were few statistically significant changes in drinking patterns over time (Table 3).

Change over time in drinking patterns among Pacific females 2003 and 2011

As only two surveys were available to assess drinking patterns among Pacific females (in 2003 and 2011) there is no 'trend over time' column in Table 4.

Table 4: Drinking patterns among Pacific females 2003 and 2011 aged 15 to 65 years

Measure	Age group	2003 v 2011
Drinkers in last 12 months (% yes)	15-65 years	Increased
	15-23 years	No change
	24-34 years	No change
	35-44 years	No change
	45-54 years	No change
	55-65 years	No change
Frequency of drinking (times p.a.)	15-65 years	Increased
	15-23 years	No change
	24-34 years	No change
	35-44 years	No change
	45-54 years	Increased
	55-65 years	No change
Typical occasion quantity (mls)	15-65 years	No change
	15-23 years	No change
	24-34 years	No change
	35-44 years	No change
	45-54 years	No change
	55-65 years	No change
5+ drinks (15ml) at least once a week (% yes)	15-65 years	No change
	15-23 years	No change
	24-34 years	No change
	35-44 years	No change
	45-54 years	No change
	55-65 years	No change

There were few changes in drinking patterns over time among Pacific females (Table 4).

Routinely collected alcohol-related harms data among females

A range of comparable annual routinely collected alcohol-related harm data (non-survey based quantitative data) were analysed for females in the general population and Maori, Pacific and Asian females. Trends over time are reported but as years vary across the datasets no 'first year of data versus last year of data' comparison is made. Further details can be found in Chapter 6.

Trends in admissions to hospital among females in the New Zealand population 1996 to 2011

Alcohol-attributable conditions are those entirely caused by alcohol consumption. Hospitalisation data for seven alcohol-attributable conditions were obtained (see p6). Alcohol use disorders were excluded, however, as they were not comparable over the time period.

Six alcohol-attributable hospitalisations/conditions were aggregated for analysis. Conditions were also considered for analysis separately. Of the alcohol-attributable conditions, alcoholic cardiomyopathy and alcoholic neuropathy could not be analysed separately and were excluded due to very small numbers ($n < 10$ hospitalisations in each year). This meant that four conditions could be analysed separately.

Trends in hospitalisations were analysed from 1996 to 2011 for females 15+ years and were not disaggregated further by age. Full results, including levels of rates for the conditions below, can be found in Chapter 6.

Table 5: Trends in alcohol-attributable hospitalisations for females 15+ years 1996 to 2011

	Conditions	Age group	Trend 1996 to 2011
Alcohol attributable	Alcohol-attributable hospitalisations overall	15+ years	Increasing
	Alcoholic psychosis (alcohol causes organic brain damage)	15+ years	Increasing
	Alcoholic Liver Cirrhosis	15+ years	Increasing
	Alcoholic Gastritis (alcohol inflames the lining of the stomach)	15+ years	Increasing
	Alcohol poisoning	15+ years	No change
	Alcoholic cardiomyopathy (alcohol damages heart)	15+ years	n/a
	Alcoholic neuropathy (alcohol damages nerves)	15+ years	n/a

There was a statistically significant increasing trend in alcohol-attributable hospitalisations (overall) among females aged 15+ years (from 1996 to 2011). This trend was driven by statistically significant increasing trends in alcoholic psychosis, alcoholic liver cirrhosis and alcoholic gastritis (in that order). No statistically significant change was found for alcohol poisoning.

Trends in alcohol-attributable mortality/deaths among females (1996 to 2009)

As there is a time lag with the mortality dataset the most recent data available was for 2009. The same number and types of conditions were obtained from the mortality dataset as from the hospitalisation dataset (see page 6 for these) (see Chapter 6 for detail).

Seven alcohol-attributable deaths were combined and analysed (and each was considered for analysis separately). Of the alcohol-attributable deaths, only alcoholic liver cirrhosis had sufficient numbers to undertake separate analysis. Numbers of deaths for the other alcohol-attributable conditions were very low among females ($n = < 10$ deaths each year).

Table 6: Trends in rates of mortality/deaths due to alcohol among females (1996 to 2009)

	Deaths	Age group	Trend 1996 to 2009
Alcohol-attributable	Alcohol - attributable deaths overall	15+ years	No change
	Alcoholic Liver Cirrhosis	15+ years	No change

There was no change in alcohol-attributable deaths (overall) among females aged 15+ years from 1996 to 2011.

There was no change in deaths due to alcoholic liver cirrhosis from 1996 to 2011 among females aged 15+ years.

Trends in alcohol-involved crashes (drivers) and prosecutions for driving with excess alcohol among females in the general population

In Table 7, the 'trend over time' column reports the direction of different traffic related alcohol-related harms. Statistically significant trends are referred to as either increasing or decreasing. Where data are reported as no change, this means there has been no statistically significant change over time.

Specific time periods (pre and post 2008/2009) were analysed using different slopes (broken stick regression) in order to reflect the data trends accurately. For further detail please see the Methods section in Chapter 2. Full results can be found in Chapter 6.

Table 7: Trends in alcohol-involved crashes (drivers) and prosecutions for driving with excess alcohol among females in the general population

Measure	Age group	Trend 2000-2007	Trend 2008-2010
Alcohol-involved crashes (injury and fatal)	14+ years	Increasing	Decreasing
	14-17 years	Increasing	No change
	18-24 years	Increasing	No change
	25-34 years	Increasing	No change
	35-44 years	Increasing	Decreasing
	45-64 years	Increasing	No change
	65-84 years	No change	No change
	85+ years	-	-
	Prosecutions for driving with excess alcohol	Trend 1980-2008	Trend 2009-2011
14+ years		Increasing	No change
14-17 years		Increasing	Decreasing
18-24 years		Increasing	No change
25-34 years		Increasing	No change
35-44 years		Increasing	No change
45-64 years		Increasing	No change
65-84 years		Increasing	No change
85+ years		-	-

Alcohol-involved crashes (1999 to 2007) and prosecutions for driving with excess alcohol (1980-2008) increased statistically significantly for females overall (14+ years), and among almost all specific age groups of females analysed (excluding some older females). Numbers of 85+ females were too low to run the model.

Following 2008/09, decreases in alcohol-involved crashes were found overall (14+ years) and for females 35-44 years. Drink driving decreased among females aged 14-17 years.

Alcohol-related harm by ethnicity

Hospitalisations

Alcohol-attributable conditions for Maori, Pacific and Asian females were combined for analysis due to smaller numbers in the hospitalisation dataset for these groups. Six alcohol-attributable conditions were combined (using the same process as was used for the analysis of hospitalisations among the general population). Data on partially alcohol-attributable

conditions were also obtained and analysed separately. Full results, including findings for partially alcohol-attributable conditions, can be found in Chapter 6.

Table 8: Alcohol-attributable hospitalisations among females aged 15+ years by ethnicity

Ethnic group	Measure	Age group	Trend 1996 to 2011
Maori	Alcohol-attributable hospitalisations overall	15+ years	Increasing
Pacific	Alcohol-attributable hospitalisations overall	15+ years	No change
Asian	Alcohol-attributable hospitalisations overall	15+ years	No change

A statistically significant increasing trend in alcohol-attributable hospitalisations (overall) was found for Maori females aged 15+ years, 1996 to 2011. There was no change for Pacific or Asian females.

Alcohol-attributable mortality by ethnicity

There was no change in alcohol-attributable mortality (overall) for Maori, Pacific or Asian females, 1996 to 2009 (for further detail please see Chapter 6).

*Alcohol-involved crashes where the driver had been drinking (2002-2010)
 Prosecutions for driving with excess alcohol (2002 - 2011)*

Asian peoples are not specifically identified in prosecutions for driving with excess alcohol.

Table 9: Prosecutions for driving with excess alcohol and alcohol-involved crashes by ethnicity

Measure	Age group	Trend 2002-2007	Trend 2008-2010	
Alcohol-involved crashes (all and fatal)	<i>Maori females</i>			
	14+ years	Increasing	Decreasing	
	14-24 years	Increasing	Decreasing	
	25-44 years	Increasing	Decreasing	
	45-64 years	No change	No change	
	65-85 years	-	-	
	85+ years	-	-	
	<i>Pacific and Asian females *</i>			
	14+ years	No change	No change	
	14-24 years	No change	No change	
	25-44 years	No change	No change	
	45-64 years	No change	No change	
	Prosecutions for driving with excess alcohol		Trend 2002-2008	Trend 2009-2011
<i>Maori females</i>				
14+ years		Increasing	Decreasing	
14-24 years		Increasing	Decreasing	
25-44 years		Increasing	No change	
45-64 years		Increasing	Decreasing	
65-85 years		Increasing	No change	
85+ years		No change	No change	
<i>Pacific females</i>				
14+ years		Increasing	No change	
14-24 years		Increasing	No change	
25-44 years		Increasing	No change	
45-64 years		Increasing	No change	
65-85 years	-	-		
85+ years	-	-		

*Pacific and Asian females were analysed separately, however as no change over time was found for either group they are reported together.

Prosecutions for driving with excess alcohol increased statistically significantly among Maori and Pacific females between 2002 and 2008. From 2009 to 2011 prosecutions decreased among Maori females overall (14+ years), and among Maori females aged 14-24 years and 45-64 years. No change occurred for Pacific females between 2009 and 2011.

For alcohol-involved crashes where the driver had been drinking numbers of Maori females increased statistically significantly between 2002 and 2008 (and decreased from 2009). Numbers of older Maori females were too low to run the model.

There were no changes over time among Pacific or Asian females with respect to alcohol-involved crashes over time. Numbers of older Pacific and Asian females were too low to run the model.

Conclusion

While females drink less than males, among female drinkers in the general population increases were found for those aged 16-65 years in three of the four measures of drinking pattern analysed over time (quantity, frequency and 5+ drinks at least once a week). There was also variation by age group.

As shown by the data considered in this report there were overall increases in drink driving, alcohol-involved crashes and alcohol-attributable hospitalisations among females in the general population over a similar time period. Of the alcohol-attributable harms overall, drink driving was the most commonly experienced followed by alcohol-attributable hospitalisations.

There were no changes in overall rates of alcohol-attributable deaths over time and there was a decrease in alcohol-involved vehicle crashes from 2008, but rates of crashes still remained higher than they had been earlier in the 2000s.

Overall the results for females in the general population show that there have been increases in more measures of consumption and harm, than not. Females in general are drinking more and experiencing more alcohol-related harm which is of concern from a public health perspective.

However, with respect to gender convergence in drinking among the general population, the volume of consumption among females was not even close to catching up to that of males (when 1995 and 2011 data were compared). More detailed analysis of gender convergence would be required to confirm such a finding including, by age group and for different measures such as quantity and frequency of consumption.

When data were investigated by ethnicity more Maori and Pacific women consumed 5+ drinks at least once a week, compared to females in the general population but showed fewer changes in drinking patterns over time. Maori females however showed increases in more serious harms (Pacific females did not). Asian females have low levels of consumption and showed no change in alcohol-attributable hospitalisations or alcohol-involved crashes over time.

1.0 Introduction

This report was commissioned by the Health Promotion Agency (HPA) with the primary aim of the project being to build up an evidence base on female drinking patterns and associated harms.

The specific aims of the project were:

- (i) To understand a range of consumption measures including prevalence, volume, frequency and quantity of drinking (drinking patterns) among females in New Zealand.
- (ii) To understand the harms, if any, associated with females' drinking in New Zealand.
- (iii) To understand changes over time in females' drinking and associated harms in New Zealand.

While females traditionally consume less alcohol than males, there are a number of reasons for looking more closely at women and their consumption and related harm. Females in Western countries are drinking more alcohol than ever before (Lyons & Willott, 2008). Females may be more vulnerable to the effects of alcohol than males, with a number of factors that can contribute including body size and composition, age and genetics. There are also some very specific health risks associated with heavy drinking by females, including breast cancer and risks to those other than the drinker, especially fetal alcohol spectrum disorder (FASD) in babies born to women who drank during their pregnancies.

There are additional risks for young females as evidence suggests that alcohol disrupts neuromaturation in adolescence. Binge drinking can damage the forebrain, which drives impulse inhibition, paying attention, making decisions and goal setting (Monti et al., 2005). Furthermore, in New Zealand, the burden of alcohol-related mortality and morbidity is disproportionately experienced by younger people aged 15-29 years (Connor et al., 2005).

This project comprised a literature review to understand past research about drinking patterns and alcohol-related harm among females in New Zealand. However, the main focus of this project was to analyse trends in drinking patterns and related harm among females in New Zealand covering the time period of 1995 to 2011.

It was anticipated that this study would add to the New Zealand research evidence base in several ways, by:

- a) extending/updating long term national trends for drinking patterns among females in the general population
- b) providing trend analysis of a range of alcohol-related harms for females, which has not previously been done in New Zealand
- c) providing trend analysis for Maori, Pacific and, where possible, Asian females which has been very limited in the past (with respect to both drinking patterns and harms).

Drinking patterns from national alcohol survey data and routinely collected (non-survey based) alcohol-related harms data were obtained and analysed for females in New Zealand (and by ethnic group) for the period 1995 to 2011.

The report is structured in the following way: 1. Introduction; 2. Methods; 3. Drinking patterns literature review summary; 4. Drinking patterns - analyses; 5. Alcohol-related harms literature review summary; 6. Alcohol-related harm – analyses; 7. Contextualisation of findings/discussion.

Appendices: 1. Population estimates; 2. Drinking patterns among females in New Zealand full literature review; 3. Alcohol-related harm among females full literature review; and 4. Police apprehension results.

2.0 Methods

Literature review

The aim of the literature review was to locate and review existing evidence and knowledge about females, their drinking and related harm in New Zealand (including trends over time). The literature review was split into two main areas: drinking patterns and alcohol-related harms. Full literature reviews can be found in Appendices 2 and 3. The summaries are found in Chapters 3 and 5.

The databases Scopus, Medline and the Social Science Citation Index were searched using the following key search string: ((female* or women or adolescen*) and (alcohol or drinking)), in various combinations with the keywords: pattern* OR consumption OR harm* OR trend*. Specific searches were also run by combining the terms Maori, Pacific and Asian with the key search string. Other terms used included gender convergence; socioeconomic status; alcohol policy/policies; traffic crash*/ road accident*.

Results from a range of national alcohol surveys were identified from reports (identified based on the authors' knowledge of the field).

Other studies were identified through citations found in articles retrieved in the course of the literature search and we also accessed unpublished literature reviews.

The literature review covered the years from 1995 to 2012.

SHORE/Whariki surveys

SHORE/Whariki comparable national alcohol surveys were utilised to assess trends in drinking patterns among females (in the general population) in 1995, 2000, 2004, 2008 and 2011. The surveys, collectively referred to as the National New Zealand Alcohol Survey Series, were carried out by researchers at the SHORE and Whariki Research Centre and included the National New Zealand Alcohol Surveys 1995 and 2000, the Health Behaviours Survey 2004, the Harm to Others Survey 2008 and the International Alcohol Control Study 2011.

These surveys were carried out using random digit dialling and computer assisted telephone interviewing. Phone numbers included both published and unpublished phone numbers.

Table 1: Survey descriptives

Survey	Year	Population	Sample sizes	Response rates
National New Zealand Alcohol	1995	General	4232	75%
National New Zealand Alcohol	2000	General	5113	73%
Health Behaviours Survey	2004	General	5759	59%
Harm to Others Survey	2008	General	3008	64%
International Alcohol Control Study	2011	General	2014	60%
National New Zealand Alcohol	2000	Maori	1991	86%
Health Behaviours Survey	2004	Maori	3151	63%
International Alcohol Control Study	2011	Maori	1000	68%
Pacific Alcohol, Drug and Gambling Survey	2003	Pacific	1103	66%
International Alcohol Control Study	2011	Pacific	900	58%

Survey measures

The National New Zealand Alcohol Survey Series uses a within location, beverage specific measure to collect alcohol consumption data. This measure has been shown to account for high levels of the alcohol available for consumption documented by Statistics New Zealand (Casswell et al., 2002) (over 90% in each survey conducted). This shows that the surveys have good validity at the population level. The following measures were derived from the within location, beverage specific measure:

Measure	Definition
Prevalence of drinking	The proportion of females who drank alcohol in past 12 months
Frequency of drinking	Number of drinking occasions in the past 12 months
Typical occasion quantity	Quantity consumed on a typical drinking occasion in the past 12 months
5+ drinks at least once a week	Respondents were grouped into: a) those who consumed 5 or more drinks at least once a week in the past 12 months; and b) those who did not. A drink was defined as 15ml absolute alcohol (the equivalent of 12.5 gm of absolute alcohol).
Volume of consumption	Total volume of alcohol consumed by male and female drinkers in the past 12 months <i>This measure reflects the volume of alcohol consumed by females relative to the volume of alcohol consumed by males. It does not reflect the absolute volume of alcohol consumed among females.</i>

The National New Zealand Alcohol Survey Series uses a drink size of 15ml absolute alcohol. The 15ml drink size was based on previous empirical research about the size of the drinks New Zealanders were consuming.

The New Zealand standard drink, however, is a smaller measure of 10g or 12.5ml of absolute alcohol. So, for example, the measure of 5+ drinks at least once a week used in this study would be 6 drinks at least once a week using the standard drink definition.

Caveats

There are several limitations of the survey measures as highlighted below; in summary the survey measures (and methods) used in this study are more likely to underestimate consumption than overestimate consumption.

Asking for respondents' drinking patterns by location means that the data does not provide a measure of a respondent's drinking at more than one location on a single drinking occasion.

Therefore underestimation of how much individuals drink during the one occasion may occur (Casswell et al., 2002). This may be more likely to affect findings for young people as available data suggests that this group drink at more than one location in a night in New Zealand (or preload)² (Huckle & Erhat, 2005).

The response rates are good by national and international standards, but have declined over the time of the surveys. Recent evidence from a postal survey of New Zealand electors found that the heavy drinkers were more likely to be late responders (Meiklejohn et al., 2012). This suggests that heavier drinkers are also more likely to be non-responders. While the response rates for the survey series used in this study have declined over time, the amount of alcohol available for consumption the surveys account for has not, as documented by comparison with Statistics New Zealand data. Consistently high coverage of the alcohol available for consumption (90+%) suggests that heavier drinkers are still being included in these survey samples. However, there is still the possibility of bias when response rates decrease, as harder to reach sub-groups may be under-represented.

The National New Zealand Alcohol Survey Series surveys collect data via the landline telephone therefore cell phone only respondents and those with no phone are excluded. Cell phone only respondents have been increasing in the population more recently (Household Economic Survey, data supplied by Statistics New Zealand), and have been found to drink larger amounts than non-cell phone only respondents in New Zealand (Harding et al., 2011). The exclusion of this group is of growing concern and may lead to an underestimation of levels of alcohol use and measures of heavier drinking.

Where samples are obtained from the electoral roll, people not on the electoral roll are excluded. Those not on the electoral roll may differ from those on the electoral roll with respect to consumption behaviour.

Survey analysis

For all analyses statistical significance was declared at the 5% significance level (p value < 0.05). Determining if a change over time is statistically significant allows us to say whether a change reflects a pattern rather than just chance, or, in other words, if a statistically significant result is found it means that we can be 95% certain that there has been a change in behaviour over time. Assessing the direction and size of the statistically significant change reveals whether the change is increasing/decreasing and small or large.

Statistical testing was carried out as: a) *the overall trend* 1995, 2000, 2004, 2008 and 2011 using generalised linear models where a best fit line was fitted through the data points; and b) *a comparison using the 2011 data point compared with 1995 only* to see where females were positioned relative to when comparable data collection started. The same type of analysis was undertaken for the Maori and Pacific samples (but the years in which the survey data were first available differed).

² Preloading is where drinkers consume alcohol at unlicensed locations, such as at home or someone else's home, before going out to consume alcohol at on-premises such as bars or nightclubs.

The responses for typical occasion quantity and frequency of drinking data were logarithmically transformed as this data is skewed and bounded by zero. This was done to reduce the influence of more extreme values on the average.

Appropriate weighting was utilised and this included adjusting for unequal probability of respondent selection and, in some instances, weighting the survey demographic variables to Census demographic data.

The plots reported in the results section are of least squares averages from the models back-transformed to their original scale. For quantity of alcohol consumed on a typical drinking occasion and frequency of drinking they are geometric means; for the other measures they are proportions.

Age groups

Respondents included in the analyses for the general population and Maori analyses were aged 16-65 years. Analysis was also undertaken by age: 16-24, 25-34, 35-44, 45-54 and 55-65 years. The 16-24 year group for young people was utilised due to smaller numbers in the 2008 and 2011 data points. A wider youth age group ensured robust numbers for statistical testing.

For the Pacific data, respondents were aged 15-65 years and the age groups used for analysis were: 15-23, 24-34, 35-44, 45-54 and 55-65 years. Data on the prevalence of drinking in the last 12 months included drinkers and non-drinkers. All other measures included only drinkers in the last 12 months.

Routinely collected alcohol-related harm data

Several types of routinely collected alcohol-related harms data were obtained and analysed.

Hospitalisation data 1996 to 2011

Data on hospitalisations for public hospitals were obtained from the National Minimum Dataset (Analytical Services, Ministry of Health).

In 1999 the ICD-9 coding system was replaced by the ICD-10 coding system. In order for data to be comparable across these two coding systems, categories/conditions were defined in both ICD-9 and in ICD-10 and data were used across the period. A previously established protocol was utilised to undertake this task (Centers for Disease Control and Prevention, no date). Data were extracted at the primary diagnosis/external cause level. Same day stay patients and short stay emergency department patients were excluded from the data extract. The short stay emergency department patients were excluded to protect the comparability of the trend. Short Stay ED patients could not be requested as a separate database as primary diagnoses were not available.

Hospitalisation data were obtained for conditions that are wholly attributable to alcohol including: alcoholic liver cirrhosis, alcohol poisoning, alcoholic cardiomyopathy (where

alcohol weakens the heart muscle), alcoholic gastritis (inflammation of the lining of the stomach caused by excessive alcohol use), alcoholic poly neuropathy (damage to the nerves that results from excessive drinking of alcohol) and alcoholic psychosis (any of various psychoses that result from alcoholism and involve organic brain damage).

Data on alcohol use disorders (including abuse and dependence) were obtained but not used as a change in data reporting practice meant that comparability over time was not achieved. The Salvation Army Bridge facilities stopped reporting to the National Minimum Dataset in 2005. Salvation Army Bridge facilities provide mostly drug and alcohol treatment so removing those facilities had a large effect on the alcohol data. Numbers for alcoholic cardiomyopathy and neuropathy were very small $n = <10$ in each year.

Data on partially alcohol-attributable conditions were also obtained, including female breast cancer, assault (assault includes all people who suffered injuries that were purposely inflicted by another individual with intent to injure or kill (with the exception of law enforcement and war)) and suicide (Pers com. Lewis 2013). These conditions, however, included both alcohol-related and non-alcohol-related hospitalisations. Depending on the age group and gender, up to 30% of deaths from suicide and self-inflicted injury are estimated to be attributable to alcohol (New Zealand Law Commission, 2009). Hospitalisations for breast cancer, assault and suicide are contextual data only and are included in Appendix Four.

Data on ethnicity were also obtained from 1996 onwards.

Mortality data 1996 to 2009

Data on mortality were obtained from the Analytical Services, Ministry of Health 1996 to 2009 (these data have a time lag). Deaths were obtained for the same conditions/external causes as for hospitalisations.

Copies of coronial reports are supplied to the Analytical Services and coders use that information to assign the cause of death according to World Health Organization coding rules.

Alcohol-involved traffic crashes (where the driver had been drinking) 1990 to 2010

Alcohol involved vehicle crashes (injury and fatal) where the driver had been drinking were obtained from Ministry of Transport, New Zealand.

Prosecutions for driving with excess alcohol 1980 to 2011

Prosecuted cases for driving with excess alcohol were obtained from the Research and Evaluation Unit of the Ministry of Justice. Data excluded cases where the offender was prosecuted for driving under the influence of drugs.

These data are collected via a national computer system that records all prosecutions. If a prosecution was initiated by Police, it is in the data.

Police data (assault, fighting in public places and disorder) 1994 to 2011

In 2007/08 the percentage of females who consumed alcohol before offending was 18% in New Zealand (New Zealand Police, 2009). As the majority of offending by females does not occur while they are under the influence of alcohol, Police apprehensions are useful as contextual data only and can be found in Appendix 4.

Alcohol Drug Helpline data 1996 to 2011

Calls made to Alcohol Drug Helpline, operated by Alcohol Drug Association New Zealand (ADANZ), were available for analysis. These are contextual data only and are included in Appendix Four.

Caveats

Hospitalisation and mortality data

Analysis was undertaken for females 15+ years (not disaggregated by age). Analysis was also undertaken by ethnicity.

Alcohol-involved traffic crashes (drivers)

Not all alcohol-involved crashes may be accurately identified. In the case of non-fatal crashes a breath test is obtained to determine the involvement of alcohol in the crash. In some cases drivers who are likely to be over the legal limits leave the scene of the crash and cannot be breath-tested; they are not included in this data. There is therefore likely to be some underestimation of non-fatal alcohol-involved crashes.

For injury crashes (minor and serious injury crashes combined) there may be driver alcohol levels available from hospital blood tests or police administered breath tests, or in some cases police simply record that alcohol was suspected but do not provide an alcohol level.

In the case of fatal crashes a blood test is obtained at autopsy. For fatal crashes post mortem blood alcohol levels are available for about 80% of the drivers who die. In some cases police simply record that alcohol was suspected but do not provide an alcohol level.

Traffic crash data, with ethnicity attached, were available from 2002 onwards. However, these data may be limited as the attending officer may make an assessment of the ethnicity of the driver (as opposed to it being self-reported).

Prosecutions for driving with excess alcohol

For prosecutions for driving with excess alcohol, there were large numbers of people with unknown ethnicity, particularly earlier in the data series. Therefore, ethnicity data were analysed from 2002 onwards as the numbers of unknowns were low from that point on. However these data may be limited as the attending officer may estimate the ethnicity of the driver (as opposed to it being self-reported). Also, Asian peoples are not specifically identified in these data.

The legal breath alcohol limit for driving in New Zealand is 400mcg/l for people aged 20 years and over and in 1993 a limit of 150mcg/l was introduced for people aged under 20

years. From May 1999 drivers were required to produce their driver licence at the request of an officer. This meant that drivers under 20 years old, who had a lower legal limit, were more effectively identified and the testing equipment was more likely to be correctly set to the level of their legal limit. In 2011, a zero limit was set for those under 20 years and tests to obtain a driver licence were made more difficult.

Prosecutions for drink driving offending may be a function of the level and location of police enforcement activity, as well as indicating the numbers of those drinking and driving.

Analysis

Count data were analysed using Poisson regression with an identity link function and the model allowed for over dispersion. Population change over time was controlled for in the models as analysing counts, without taking into effect population numbers, may be misleading. National resident population estimates were obtained from Statistics New Zealand. Further information can be found in Appendix 1, including calculation of Maori, Pacific and Asian population estimates. Graphs present rates of events per 100,000 population (females) (using New Zealand population estimates). Rates were utilised so that findings may be directly compared across age and ethnic groups.

Broken stick models were sometimes utilised to allow slopes to differ in direction within a long term trend (when a change, or changes, in direction occur within the long term trend). Broken stick models were used to analyse alcohol-involved crashes so instead of analysing a trend from 1990 to 2010 it was analysed as: 1990-1999, 2000-2007 and 2008-2010. Prosecutions for driving with excess alcohol were analysed for the time periods 1980-2008, 2009-2011.

Trends over time are reported but as years vary across the datasets no 'first year versus last year' of data comparison is made.

For prosecutions for driving with excess alcohol and alcohol-involved crashes there was year-to-year variation in the numbers of people where their age was unknown. To check whether the unknowns had an effect on the parameter estimates, the unknowns were split among the age or ethnicity groups according to: 1. The proportion of prosecutions that age group had; and 2. How large the population of that age group was. In both cases, these changes had very little effect on the significant parameters.

Statistical significance is declared at the $p < 0.05$ level.

Age Groups

For the New Zealand population, age groups analysed were: 14-17, 18-24, 25-34, 35-44, 45-64, 65-84 and 85+ years. Due to smaller numbers, the age groups analysed for ethnic groups were: 14-24, 25-44, 45-64, 65-84 and 85+ years.

3.0 Literature review of studies assessing drinking patterns among females in New Zealand

A full literature review on drinking patterns in New Zealand 1995 to 2012 can be found in Appendix 2. The full literature review contains more detailed explanations of the research reviewed, the data used and more of the figures and statistics reported in the studies. The summary below is intended to convey main points that emerged from the literature.

The literature review focused on the drinking patterns of various groups of females within the New Zealand population: secondary school students, tertiary students, tertiary sports people, young and older females in the general population, Maori females, Pacific females, Asian females and same sex/both sex attracted females. Studies assessing drinking patterns at one point in time are grouped under “drinking patterns” and studies making comparisons over time are grouped under “trends over time”. Studies are ordered from earliest to most recent by the date when data for the study were collected, not when the study was published. This process of ordering is repeated for both the “drinking patterns” and “trends over time” sections separately under each heading.

Secondary school students

Drinking patterns

The Youth2007 survey found that most female secondary students consumed alcohol (Ameratunga et al., 2011).

The Youth2007 survey found that most female secondary students consumed alcohol at least once in the past four weeks in 2007 (Ameratunga et al., 2011).

The Youth2007 survey found that around 33% of female drinkers consumed 5+ drinks per session in 2007 (a drink was defined as a standard alcoholic drink 10gm) (Ameratunga et al., 2011).

The Youth2007 survey found that ten percent of females reported that they usually drank 10 or more standard drinks per session (Ameratunga et al., 2011).

The Youth2007 survey found that the prevalence of binge drinking increased with age among females. By 17 years or older, 61% of females were binge drinkers (defined as 5+ standard drinks in one session within four hours) (Ameratunga et al., 2011).

Trends over time

The Youth2000 and Youth2007 surveys found that there was a statistically significant decline in the proportion of female secondary school students who were drinkers between 2001 and 2007 (from around 70% to 61%) (Ameratunga et al., 2011).

The Youth2000 and Youth2007 found that fewer students were current drinkers in 2007, but of those who drank more were binge drinkers (around an 8% increase). Female drinkers were less likely to be binge drinkers by age 15 years than males (Ameratunga et al., 2011).

Tertiary students

Drinking patterns

In 2002, 59% of Otago tertiary student females (who were drinkers) consumed 5+ drinks on a typical drinking occasion (a drink was defined as a standard drink of 10g absolute alcohol). For males this proportion was 69%, however 42% of males consumed 10+ drinks on a typical occasion, whereas for females the figure was 17% (Kypri et al., 2005).

In 2005, survey data from five New Zealand universities found that 60% of female tertiary students who were drinkers consumed alcohol at hazardous levels (using the Alcohol Use Disorders Identification Test (AUDIT) with a cut off score of 8+ to define hazardous drinking). In 2005, fewer females drank hazardously than males. The Alcohol Use Disorders Identification Test (AUDIT) is a screening tool for excessive drinking and asks about recent alcohol use, alcohol dependence symptoms and alcohol-related problems (Babor et al 2001).

In 2005, survey data from five New Zealand universities found that female students drank about 35% less alcohol per drinking day and about 50% less alcohol per week than did males (Kypri et al., 2010).

No studies were identified that analysed trends in consumption among tertiary students over time.

Tertiary sportspeople

Drinking patterns

There was very little difference in drinking behaviour between male and female tertiary sportspeople in 2004. However, fewer females reported binge drinking than males, 41% v 57% (binge drinking was defined as 7+ standard 10gm drinks in a drinking session). Coping motives predicted hazardous drinking for females (O'Brien et al., 2008).

Young females in the general population (12 to 24 years of age)

Drinking patterns

Young females in the New Zealand population reported consuming higher typical occasion quantities than older females, but reported drinking less frequently in 2004 (National New Zealand Alcohol Survey 2004) (Huckle et al., 2011).

Proportions of females reporting consuming 5+ drinks (defined as 15ml absolute alcohol) on a typical occasion were also higher among younger than older females in 2004 (National New Zealand Alcohol Survey 2004) (Huckle et al., 2011).

In 2011, the ALAC Annual Alcohol Survey reported seven standard drinks as the number consumed on the last drinking occasion by females aged 12-17 (Research New Zealand, 2012).

In 2011, 48% of females aged 12-17 years reported consuming 7+ standard 10gm drinks at least once in the last 4 weeks (Research New Zealand, 2012).

Trends over time

In Auckland, between 1990 and 2000, increases in typical occasion quantities were found for females aged 14-19 and 20-24 years (of around one drink for those aged 14-19 years and slightly less for those aged 20-24 years). A drink was defined as 15ml absolute alcohol (Auckland Annual Alcohol Surveys 1990 to 2000) (Huckle et al., 2012).

Increases in typical occasion quantities were found among female drinkers aged 18-19 and 20-24 years between 1995 and 2000 nationally (an increase of 1.3 and 1.1 drinks, respectively) (National New Zealand Alcohol Surveys 1995 and 2000) (Huckle et al., 2011).

An increase in the proportion of 20-24 year old females consuming 5+ drinks on a typical occasion was found between 1995 and 2000 nationally (from 40% to 59%). A drink was defined as 15ml absolute alcohol (National New Zealand Alcohol Surveys 1995 and 2000) (Huckle et al., 2011).

Gender convergence in the quantity of alcohol consumed on a typical occasion was found for females aged 20-24 years between 1995 and 2000 nationally (where females' consumption increased and moved towards that of males') (McPherson et al., 2004). Females aged 20-24 years increased consumption from three drinks on a typical occasion (defined as 15ml absolute alcohol) to four drinks between 1995 and 2000 while males consumed five and a half drinks in both 1995 and 2000 (National New Zealand Alcohol Surveys 1995 and 2000) (McPherson et al., 2004).

Between 2000 and 2004 nationally, decreases in the proportions of young females who were drinkers occurred in the past 12 months; from 69% to 55% among those aged 14-15 years and from 84% to 74% for females aged 16-17 years (National New Zealand Alcohol Surveys 2000 and 2004) (Huckle et al., 2011).

The Alcohol and Drug Use Survey 2007/08 analysed AUDIT data from the New Zealand Health Survey for 16-17 and 18-24 year olds. There was no change in the prevalence (% yes) of hazardous drinking among females aged 18-24 years over 1996/97, 2002/03 and 2006/07 (hazardous drinking was defined as an AUDIT score of 8+). Analysis was not disaggregated by gender among the 16-17 year age group (Ministry of Health., 2009).

Older females in the general population (25 years and over)

Drinking patterns

Older females in the New Zealand population drink at higher frequencies than younger females, but consume less on a typical drinking occasion (National New Zealand Alcohol Surveys 1995, 2000 and 2004) (Huckle et al., 2011).

In 2006, females aged 55-70 years had a statistically significantly lower prevalence of binge drinking than males of the same age (binge drinking was defined as more than five standard

10gm drinks in one episode) (Health, Work and Retirement Longitudinal Study 2006) (Towers et al., 2012).

Trends over time

In Auckland, between 1990 and 2000, there was a statistically significant increase in annual drinking frequency among women aged 25-39 years (from 50 occasions to around 90 occasions) (Auckland Annual Alcohol Surveys 1990 to 2000) (Huckle et al., 2012).

Nationally, between 1995 and 2000, there was a statistically significant increase in annual drinking frequency among females aged 30-39 years (from 53 occasions in the past year to 65 occasions) (National New Zealand Alcohol Surveys 1995 and 2000) (Huckle et al., 2012).

Gender convergence, where females' consumption increased and moved towards that of males' was found nationally between 1995 and 2000 for frequency of drinking among females aged 40-49 years and for typical occasion quantity for females aged 25-29 and 30-39 years (National New Zealand Alcohol Surveys 1995 and 2000) (McPherson et al., 2004).

Typical occasion quantities increased for females aged 30-39 and 25-29 years between 1995 and 2000 in New Zealand (by around half a drink defined as 15ml absolute alcohol) (National New Zealand Alcohol Surveys 1995 and 2000) (Huckle et al., 2011).

More females aged 30-39 years consumed 5+ drinks on a typical occasion in 2000 compared to 1995 (8% in 1995 and 15% in 2000) (National New Zealand Alcohol Surveys 1995 and 2000) (Huckle et al., 2011).

The New Zealand Health Survey found no change in the proportion of females consuming alcohol hazardously 1996/97, 2002/03 and 2006/07 (as defined by an AUDIT score of 8+) (around 11%) (Ministry of Health, 2008). More recently the New Zealand Health Survey reported that among female past-year drinkers, the level of hazardous drinking had not changed statistically significantly between 2006/07 (13%) and 2011/12 (12%) (Ministry of Health 2012) (defined as an AUDIT score of 8+).

ALAC Annual Alcohol Surveys found a decrease in binge drinking at least once in the past four weeks, for females aged 18+ (from 23% to 17%) from 2009 to 2011 (Research New Zealand, 2012). Binge drinking was defined as consuming 7+ standard 10gm drinks in the past 4 weeks.

Maori females

Drinking patterns

During the 1990s Maori females were less likely to be drinkers (Bramley et al., 2003). Bramley et al. used a combination of surveys including the New Zealand Health Survey 1997, Sleep Survey 1999, Fletcher Challenge/University of Auckland Survey 1992, Diabetes Survey 1988-1990, NZ Blood Donors Health Study 1998-1999 and Workforce Diabetes Survey 1988-1990.

Maori females who were drinkers consumed 35%-42% more alcohol on a typical drinking occasion than non-Maori female drinkers (Bramley et al., 2003). Drinking frequency was lower among Maori females who were current drinkers compared to non-Maori female drinkers (Bramley et al., 2003). These drinking patterns combined in such a way that average consumption per day among Maori and non-Maori was similar (Bramley et al., 2003).

In 2004/05 Maori females reported high levels of binge drinking (defined as more than 6 standard drinks on one drinking occasion) at the monthly, weekly and daily levels compared to other ethnic groups, including Pacific people (Wave Three SoFIE 2004/05) (Jatrana et al., 2011).

No trends over time were identified.

Pacific females

Drinking patterns

Pacific females who drink, consume alcohol less frequently than non-Pacific females (Huakau et al., 2005; Sundborn et al., 2009) (Pacific Alcohol, Drug and Gambling Survey 2003; Diabetes Heart and Health Study (DHAHS) 2002-2003).

Pacific females consumed more on a typical drinking occasion than non-Pacific or European females (Pacific Alcohol, Drug and Gambling Survey 2003) (Huakau et al., 2005; Sundborn et al., 2009).

Pacific females consumed on average 5.4 drinks on a typical occasion compared to European women at 2.9 drinks (Diabetes Heart and Health Study (DHAHS) 2002-2003) (Sundborn et al., 2009).

Among Pacific students (aged 13-17 years) 33.0% of females reported binge drinking in the last four weeks (5+ standard drinks in one session within 4 hours) (Youth2007) (Teevale et al., 2012).

Trends over time

There was a statistically significant decline in the proportion of Pacific females who were binge drinkers (defined as consuming 7+ standard drinks in the past 4 weeks) among Pacific females 18+ in the ALAC Annual Alcohol Surveys (40% to 36%).

Asian females

Drinking patterns

A lower proportion of Asian females drank hazardously in 2006/07 compared to females in all other ethnic groups (European, Maori and Pacific). Hazardous drinking was defined as an AUDIT score of eight or more. The exact percentage of Asian females drinking hazardously was not reported however (New Zealand Health Survey 2006/07) (Ministry of Health, 2008).

The Youth2007 survey found that Asian secondary school students reported drinking less often than other ethnic groups (Ameratunga et al., 2011). Around a third of Asian students

who were current drinkers reported that they drank only one drink per occasion. Asian students are the least likely to binge drink compared to other ethnicities.

The proportion of females that consumed alcohol in the last 12 months was lower among Asian females compared to the general population in the Alcohol and Drug Use Survey 2007/08. The proportion of Asian females who were drinkers in the past 12 months was not reported (54.8% both genders) (Ministry of Health, 2009).

No trends over time were identified.

Same sex/both sex attracted females

Drinking patterns

In 2003/04 females with a lesbian or bisexual identity reported lower rates of abstention from alcohol over the last year than heterosexual-identified females (Health Behaviours Survey 2003/04) (Pega & Coupe, 2007).

In 2003/04 females identifying as lesbian or bisexual were more likely to have drunk alcohol regularly over the last year than heterosexual-identified females (Health Behaviours Survey 2003/04) (Pega & Coupe, 2007).

In 2003/04 females with a lesbian or bisexual identity reported consuming alcohol once or more per week over the last year, at higher rates than women with a heterosexual identity (Health Behaviours Survey 2003/04) (Pega & Coupe, 2007).

A longitudinal study (the Christchurch Health and Development Study) (Fergusson et al., 2005) found that young sexual minority women were more likely to be alcohol dependent than exclusively heterosexual sexual minority women.

Socioeconomic status

Drinking patterns

In 1995, 2000 and 2004, females of low income (below-average) and no education consumed higher typical occasion quantities than those who had higher levels of education or average/above average income (National New Zealand Alcohol Surveys 1995, 2000 and 2004) (Huckle et al., 2010).

In 2004/05 the frequency of binge drinking increased among females as educational level declined (Wave 3 SoFIE 2004/05) (Jatrana et al., 2011).

Wider influences

The introduction of wine for sale into grocery outlets and supermarkets in 1990 was found to be more relevant for females than males. Women, in particular, felt more comfortable purchasing wine from the supermarket as part of the groceries, as compared to any stigma they felt when visiting a specialised alcohol outlet/bottle store (Wyllie et al., 1993).

A study, conducted using 2004 National New Zealand Alcohol Survey data, found that wine was the beverage of choice among older females (Huckle et al., 2008).

The 2004 National New Zealand Alcohol Survey found that female drinkers aged 14-17 and 18-24 years were the largest consumers of RTDs (with over 60% in both groups consuming RTDs) (Huckle et al., 2008). Female RTD consumers aged 14-17 years consumed 70 percent of their annual volume of alcohol as RTDs (Huckle et al., 2008) (it was not known how the RTDs were obtained by the young people e.g. via own purchase or supply from parents or friends).

RTDs predicted heavier drinking among females aged 14-17 years in New Zealand better than any other beverage (beer, wine or spirits) (Huckle et al., 2008).

Conclusion

Drinking patterns

- Females in the New Zealand population drink less alcohol on a typical drinking occasion and drink less frequently than males.
- Around 60% of female secondary students consume alcohol. A third of female secondary school students, who are drinkers, consume 5+ standard drinks per session.
- Female tertiary students had a high prevalence of hazardous drinking based on an AUDIT score of 8+ (but the female prevalence was lower than the prevalence among males).
- Young females in New Zealand consume higher quantities than older females, but drink less frequently.
- Maori and Pacific females consume more on a drinking occasion than non-Maori/Pacific females.
- Asian females are less likely to have consumed alcohol in the past year and young Asian females drink low quantities.
- More same sex/both sex attracted females consumed alcohol and drank once or more over the last year than hetero-sexual identified females.

Trends over time

There were several changes in drinking patterns for females between 1995 and 2000:

- Increases in typical occasion quantities were found among most age groups of females; the greatest increases were found among females aged 18-19 and 20-24 years.
- Increases in the proportions consuming 5+ drinks on a typical occasion were found among females aged 20-24 and 30-39 years.

- Among females aged 25-29 and 30-39 years, gender convergence occurred for typical occasion quantity between 1995 and 2000 (where females' consumption increased and moved towards that of males').
- There was a decline in the proportion of secondary school students and teenagers in the wider New Zealand population that consumed alcohol during the 2000s.
- Among secondary school students who were drinkers (male and female), binge drinking (consuming 5+ standard drinks in one session within four hours) increased between 2001 and 2007 (by age 15 years, fewer female drinkers were binge drinkers than males).
- No change was found in the proportion of females in New Zealand consuming alcohol hazardously 1996/97, 2002/03 and 2006/07 (as defined by an AUDIT score of 8+).
- No change was found in the proportion of females aged 18-24 years drinking hazardously 1996/97, 2002/03 and 2006/07 (as defined by an AUDIT score of 8+).
- From 2009 to 2011, there was a decrease in binge drinking (7+ 10g drinks in past 4 weeks) among females aged 18+ years (from 23% to 17%) (Research New Zealand, 2012).

Direct comparisons between the studies reviewed in Chapter 3 are not possible due to different age ranges, samples and measures used across the studies.

4.0 Drinking patterns among females: new analyses of survey data

4.1 Introduction

In this chapter, drinking patterns were analysed cross-sectionally (to provide a snapshot of drinking patterns in 2011) and over time by age, gender and ethnicity (Maori and Pacific) using comparable national surveys. Detailed information of the methodology of the surveys and analysis techniques can be found in Chapter 2.

4.2 Results

Cross sectional drinking patterns in 2011

The following table presents a cross-section of drinking patterns among females in the general population, and Maori and Pacific females in 2011 (using the International Alcohol Control Survey 2011 (part of the National New Zealand Alcohol Survey Series).

Fewer Pacific females consumed alcohol in 2011 than females in the general population or Maori females.

Female drinkers in the general population consumed alcohol more frequently than Maori or Pacific female drinkers.

Of drinkers, Pacific females consumed more on a typical drinking occasion than Maori females. Maori females consumed more on a typical occasion than females in the general population.

Of drinkers, higher proportions of Maori and Pacific females consumed 5+ drinks at least once a week than females in the general population.

Young female drinkers (regardless of ethnicity) had higher typical occasion quantities and more consumed 5+ drinks at least once a week than older female drinkers (a drink was defined as 15ml absolute alcohol).

Of drinkers, older females consumed alcohol more frequently than younger females, with one exception found for Pacific drinkers (where young females consumed alcohol more often than older Pacific females).

Table 10: Cross sectional drinking patterns in 2011

Measure	General population	Maori	Pacific
Drinkers in last 12 months (% yes)			
<i>16-65 years</i>	83.1	84.6	57.2
<i>16-24 years</i>	83.3	92.5	65.7
<i>25-34 years</i>	82.8	80.2	56.6
<i>35-44 years</i>	84.2	88.6	60.2
<i>45-54 years</i>	82.7	82.8	52.8
<i>55-65 years</i>	82.2	65.2	30.2
Frequency of drinking (times p.a.)			
<i>16-65 years</i>	81.6	56.6	57.2
<i>16-24 years</i>	58.3	59.8	60.5
<i>25-34 years</i>	78.0	49.9	43.8
<i>35-44 years</i>	81.7	52.6	31.5
<i>45-54 years</i>	84.3	69.2	37.6
<i>55-65 years</i>	109.6	52.9	15.8
Typical occasion quantity (mls)			
<i>16-65 years</i>	37.7	57.8	67.2
<i>16-24 years</i>	56.0	84.0	90.6
<i>25-34 years</i>	42.7	62.8	79.4
<i>35-44 years</i>	38.2	46.9	51.6
<i>45-54 years</i>	30.6	42.6	46.5
<i>55-65 years</i>	28.4	34.9	34.5
5+ drinks (15ml) at least once a week (% yes)			
<i>16-65 years</i>	11.5	24.7	28.9
<i>16-24 years</i>	28.3	41.3	43.9
<i>25-34 years</i>	14.3	24.8	30.8
<i>35-44 years</i>	9.9	11.2	19.1
<i>45-54 years</i>	5.7	20.8	12.9
<i>55-65 years</i>	2.8	5.9	7.4

General population

Volume of alcohol consumed by gender

This measure reflects volume of alcohol consumed by females relative to the volume of alcohol consumed by males. It does not reflect the absolute volume of alcohol consumed by females.

Drinkers only were included in this analysis.

Figure 1: National New Zealand Alcohol Surveys: % of volume consumed among drinkers aged 16-65 years in the past 12 months by gender



Figure 1 shows the proportion of total volume consumed by drinkers in each survey year. Of the alcohol consumed by drinkers in New Zealand (as documented by the surveys), males consumed the majority - around two thirds in each survey year.

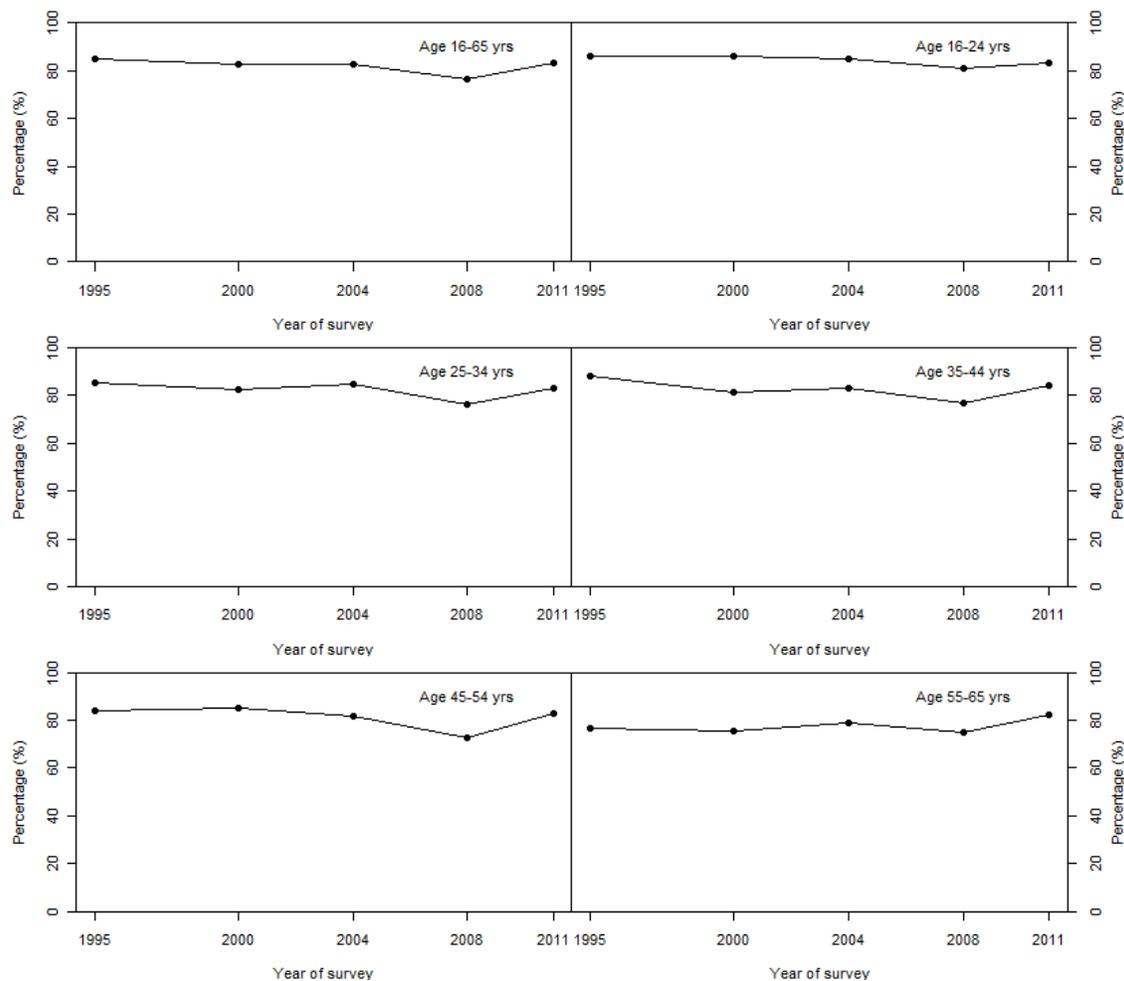
Comparison of 1995 and 2011

In 2011 females consumed 33% of the total volume of alcohol consumed in New Zealand, as documented by the surveys, compared to 30% in 1995. This was not a statistically significant change.

Prevalence of drinking

Drinkers and non-drinkers were included in this analysis.

Figure 2: National New Zealand Alcohol Surveys: prevalence of drinking in the past 12 months, females



Overall trend (1995, 2000, 2004, 2008, 2011)

A statistically significant decreasing trend in the prevalence of drinking in the past 12 months was found for females aged 16-65 years (that is, a reduction in the proportion of females who drink in New Zealand) (Figure 2).

When disaggregated by age, older females aged 35-44 and 45-54 years were found to have statistically significant decreasing trends.

Comparison of 1995 and 2011

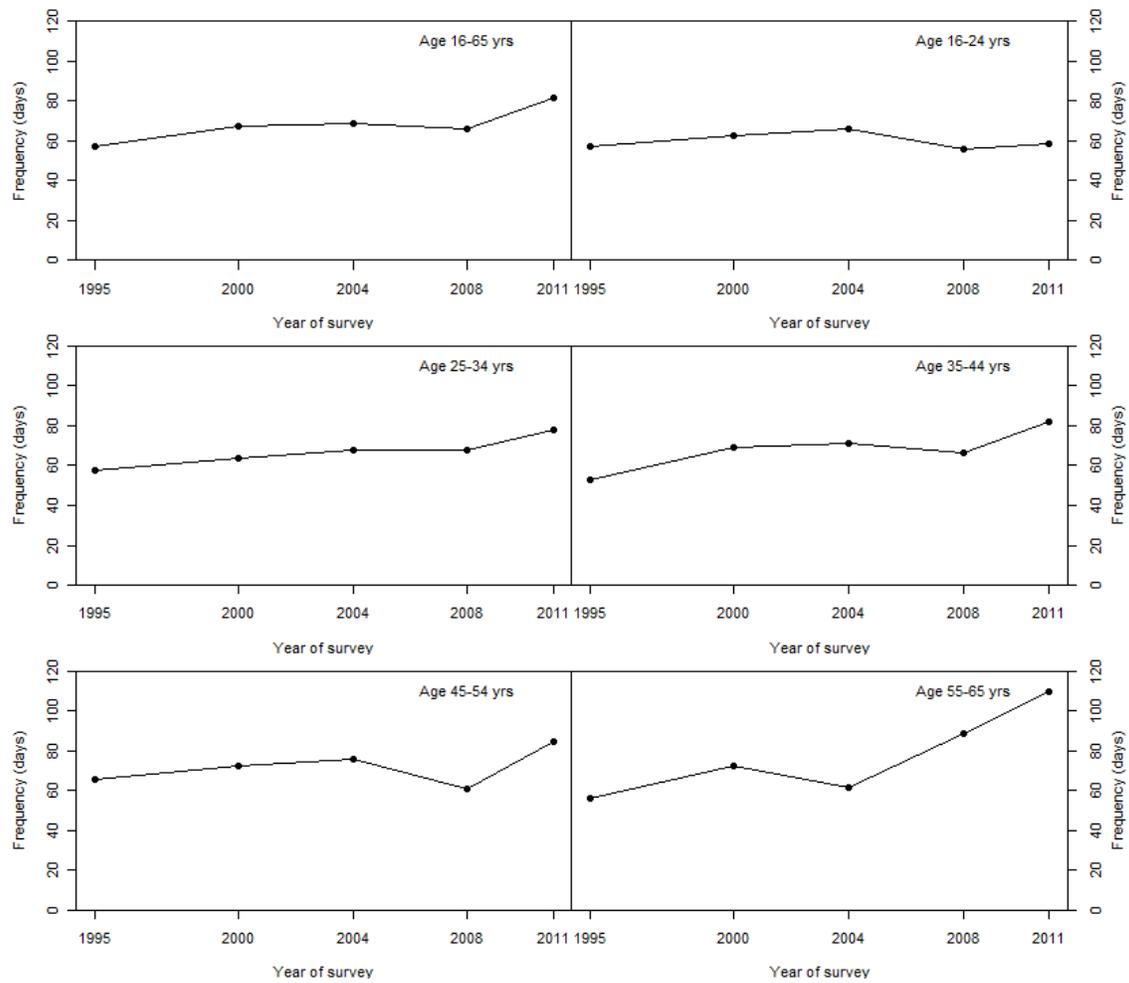
The prevalence of drinking among females aged 16-65 years in 2011 was 83% which was statistically significantly lower than in 1995 (85%).

For females aged 35-44 and 45-54, the corresponding figures were 85% and 81% in 1995 and 80% and 78% in 2011 respectively (and these were statistically significant decreases for both age groups). There was no change in any other age group when 1995 figures were compared with 2011.

Frequency of drinking

Drinkers only were included in this analysis.

Figure 3: National New Zealand Alcohol Surveys: frequency of drinking in the past 12 months, females



Overall trend (1995, 2000, 2004, 2008, 2011)

A statistically significant increasing trend in the frequency of drinking in the past 12 months was found over the surveys for females aged 16-65 years (Figure 3).

There was variation by age with statistically significant increasing trends in the frequency of drinking found for those aged 25-34, 35-44 and 55-65 years.

Comparison of 1995 and 2011

In 1995 the average frequency of drinking in the past 12 months was 57 times; in 2011 this average was 82 times (and this was a statistically significant increase comparing only the 1995 and 2011 surveys) (Figure 3).

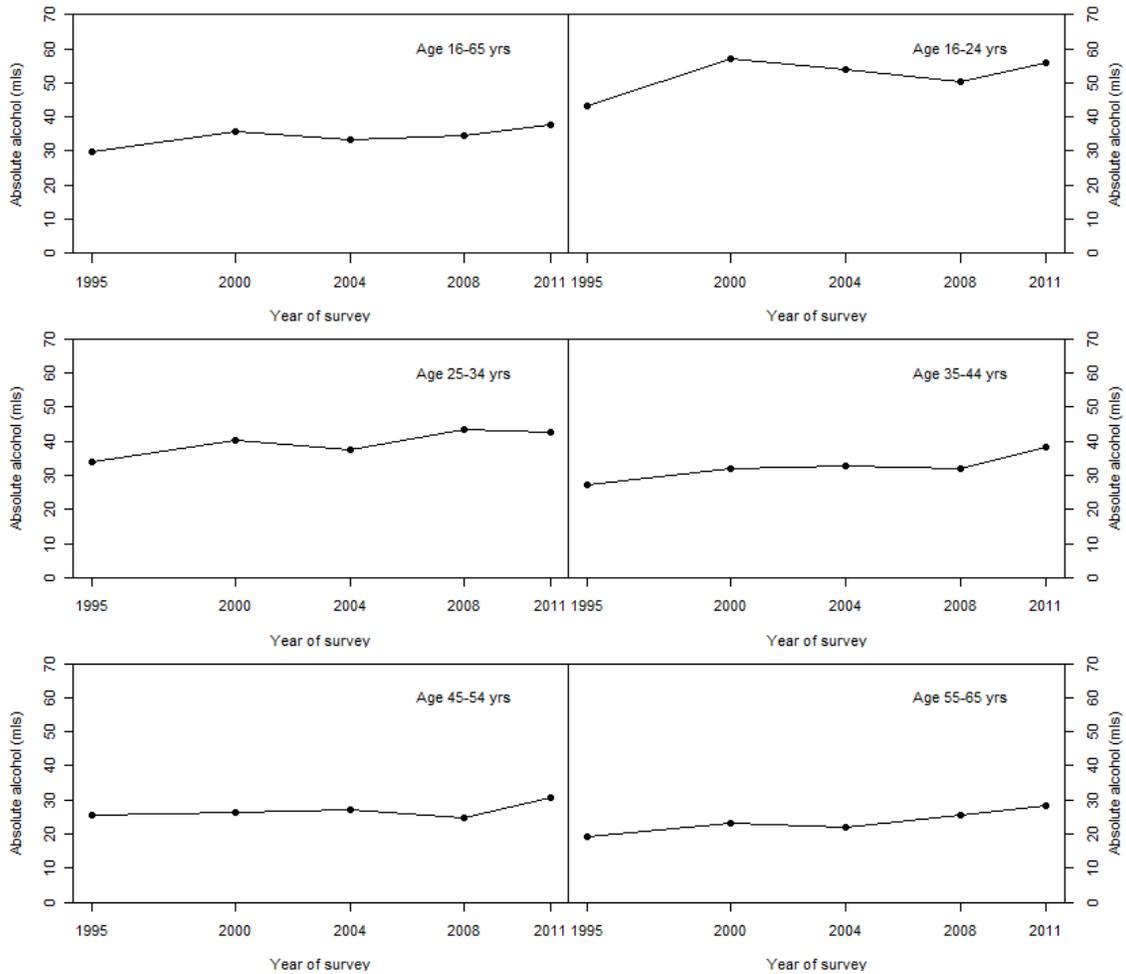
Among age groups, the rate of increase was greatest among the oldest females, 55-65 years, where their drinking frequency almost doubled from 56 occasions in 1995 to 110 occasions in 2011 (Figure 3). This was a statistically significant increase (when comparing only 1995 and 2011).

For those aged 25-34 and 35-44 years there were statistically significant increases in drinking occasions; from 58 drinking occasions in 1995 to 78 occasions in 2011 for those 25-34 years; and 53 drinking occasions in 1995 to 82 occasions in 2011 for those aged 35-44 years. There was no statistically significant change among the younger age groups.

Typical occasion quantity

Drinkers only were included in this analysis.

Figure 4: National New Zealand Alcohol Surveys: typical occasion quantity in the past 12 months, females



Overall trend (1995, 2000, 2004, 2008, 2011)

A statistically significant increasing trend in typical occasion quantity was found for female drinkers aged 16-65 years over the surveys (Figure 4).

When disaggregated by age, all age groups of drinkers had statistically significant increasing trends in typical occasion quantity over the time of the surveys.

Comparison of 1995 and 2011

In 1995, the average typical occasion quantity for female drinkers aged 16-65 years was two drinks (using a 15ml drink); in 2011 this average was 2.5 drinks (a statistically significant increase).

Female drinkers aged 16-24 years statistically significantly increased their typical occasion quantity by almost one drink between 1995 and 2011 (from 3 drinks to 4 drinks using a drink size of 15ml absolute alcohol). However, most of this increase occurred between 1995 and 2000. When the average frequency of drinking in this age group was taken into account along with average typical occasion quantity, i.e. a volume calculation, an average increase of one drink on a typical occasion added around 900mls absolute alcohol in 2011 as compared with 1995 (the equivalent of around two 1125mls spirit bottles). Average frequency of drinking was around 58 times per year in both 1995 and 2011 for females aged 16-24 years.

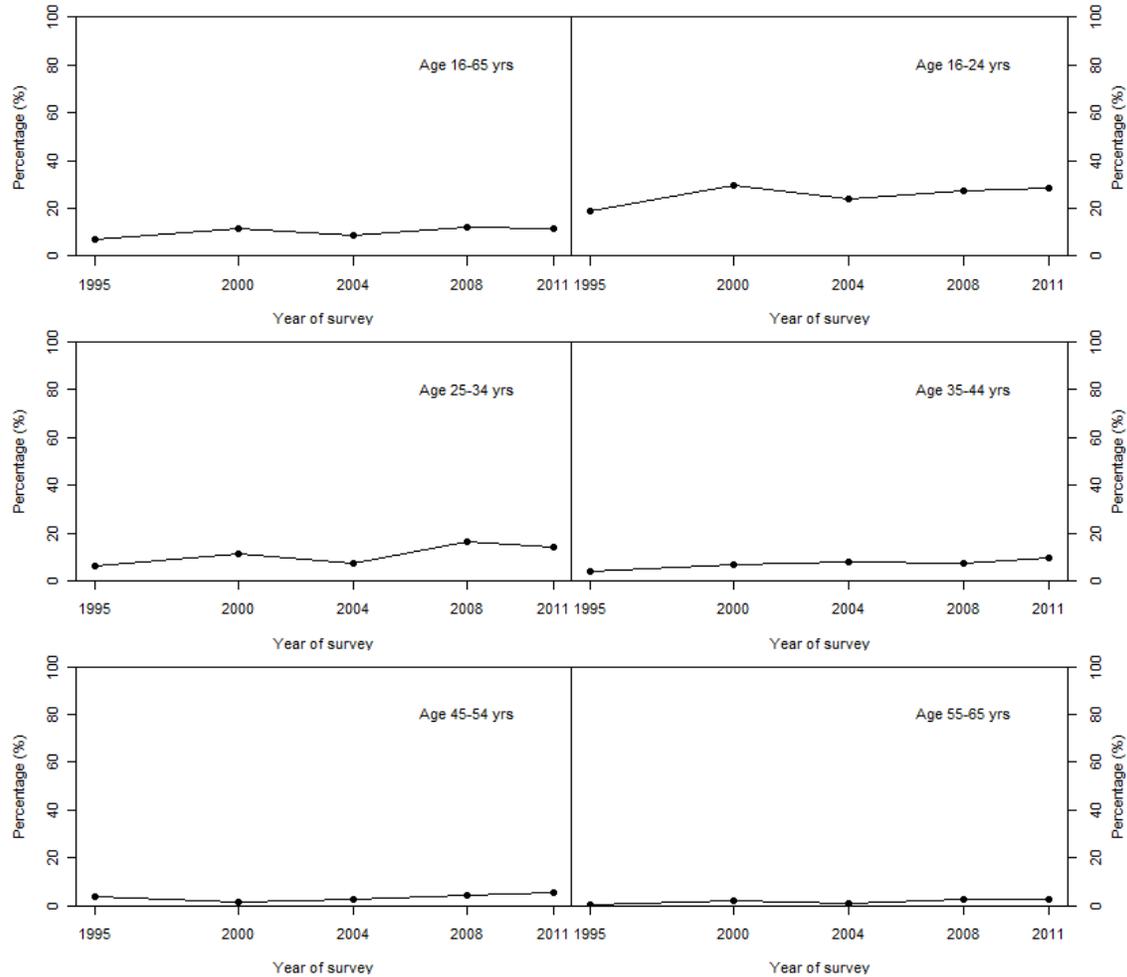
In 2011, typical occasion quantity was statistically significantly higher among all other age groups than in 1995 but the increase in quantity was lower, at around half a drink in each age group between 1995 and 2011 (Figure 4).

This meant there was a statistically significant increase for all female drinkers with respect to typical occasion quantity in 2011 as compared to 1995.

5+ drinks at least once a week

Drinkers only were included in this analysis.

Figure 5: National New Zealand Alcohol Surveys: % consuming 5+ drinks at least weekly in the past 12 months, females



Overall trend (1995, 2000, 2004, 2008, 2011)

A statistically significant increasing trend in the proportion of female drinkers consuming 5+ drinks at least weekly (using a drink size of 15ml absolute alcohol) was found over the surveys among those aged 16-65 (7%, 12%, 9%, 12%, 11.5%)(Figure 5).

When disaggregated by age, statistically significant increasing trends were found among female drinkers aged 16-24, 25-34 and 35-44 years.

Comparison of 1995 and 2011

In 1995 the proportion of female drinkers aged 16-65 years consuming 5+ drinks at least weekly was 9.5% and in 2011 it was 14.5% (statistically significantly higher than in 1995).

The proportion of young female drinkers consuming 5+ drinks at least once a week increased from 19% to 28% between 1995 and 2011 (and this was a statistically significant increase) (Figure 6). Most of this increase, however, occurred between 1995 and 2000.

For female drinkers aged 25-34 and 35-44 the statistically significant corresponding figures were 7% and 4% in 1995 and 14% and 10% in 2011 respectively.

4.3 Drinking patterns by ethnic group

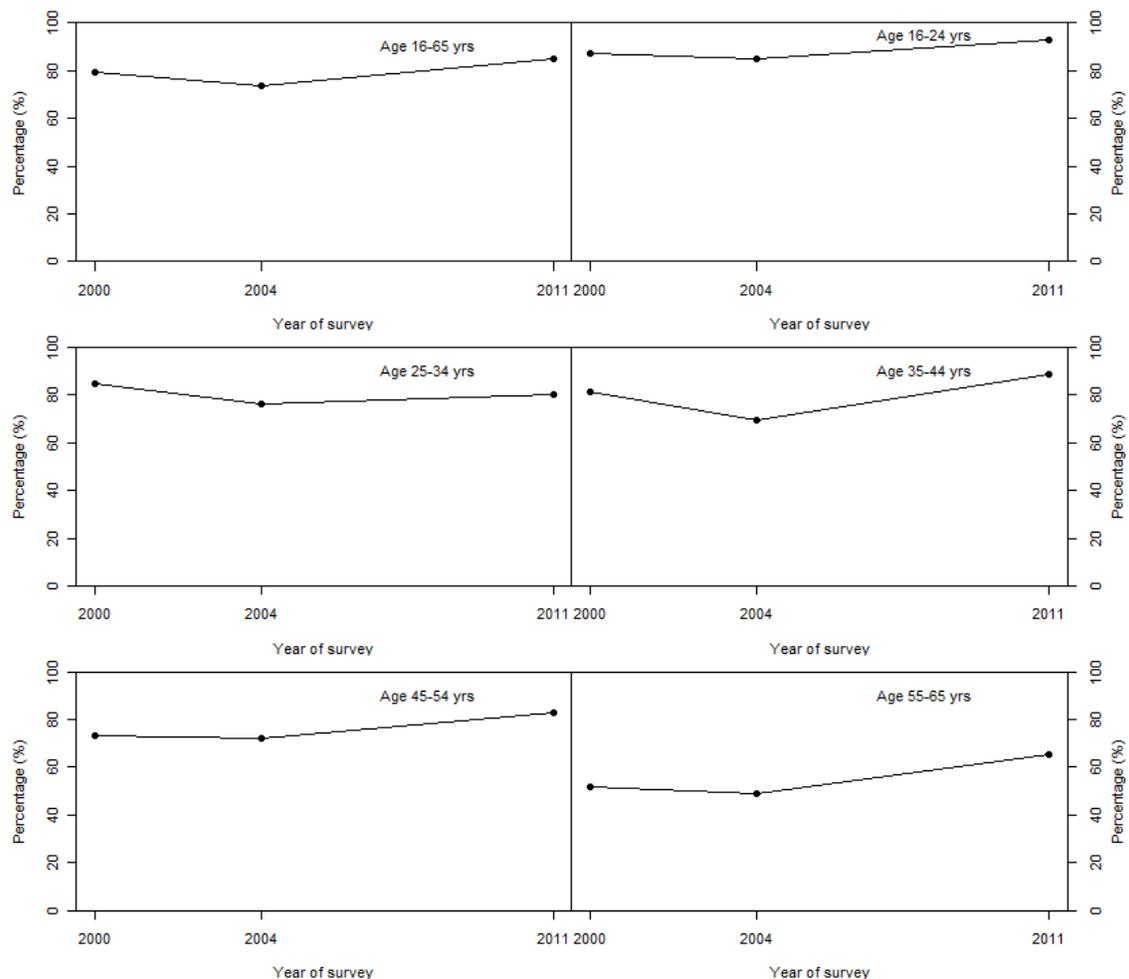
Maori females

Data were available from the National New Zealand Alcohol Surveys for Maori females for the years 2000, 2004 and 2011.

Prevalence of drinking in the past 12 months, Maori

Drinkers and non-drinkers are included in this analysis.

Figure 6: National New Zealand Alcohol Surveys: prevalence of drinking in the past 12 months, Maori females



Overall trend (2000, 2004, 2011)

A statistically significant increasing trend in the prevalence of drinking in the last 12 months was found for Maori females over the surveys (2000, 2004 and 2011) (Figure 6).

When disaggregated by age, young Maori females aged 16-24 years were the only age group to show a statistically significant increasing trend in the prevalence of drinking over the time of the surveys (Figure 6).

Comparison of 2000 and 2011

In 2000 the proportion of Maori females who were drinkers was 79%; in 2011 this proportion was 82% (however, the difference just between these two years was not a statistically significant increase). Therefore there was no change in the prevalence of drinking among Maori females aged 16-65 years (when only the surveys in 2000 and 2011 were considered).

The proportion of young Maori females aged 16-24 years who were drinkers increased statistically significantly from 87% in 2000 to 92.5% in 2011.

Frequency of drinking, Maori

Drinkers only were included in this analysis.

Overall trend (2000, 2004, 2011)

No statistically significant trend in the frequency of drinking was found over time for Maori females aged 16-65 years (or in any specific age groups when further disaggregated).

Comparison of 2000 and 2011

Maori females aged 16-65 years consumed alcohol around 37 times in 2000 and 57 times in 2011. However, this increase did not reach the level of statistical significance.

As no statistically significant changes were found over time results are tabulated (i.e. no visual representation of the data).

Table 11: National New Zealand Alcohol Surveys: frequency of drinking in the past 12 months, Maori females

Age Group	Year of Survey	Mean	95% Lower Confidence Interval	95% Upper Confidence Interval
16-65	2000	37.4	33.7	41.4
16-65	2004	48.2	44.5	52.1
16-65	2011	56.6	50.1	63.9
16-24	2000	47.8	39.4	57.9
16-24	2004	66.0	57.2	76.3
16-24	2011	59.8	46.1	77.7
25-34	2000	37.6	30.7	46.1
25-34	2004	50.6	43.6	58.8
25-34	2011	49.9	38.2	65.2
35-44	2000	38.4	31.9	46.4
35-44	2004	41.5	35.3	48.8
35-44	2011	52.6	41.7	66.3
45-54	2000	29.8	22.6	39.2
45-54	2004	38.9	31.8	47.7
45-54	2011	69.2	55.2	86.9
55-65	2000	23.1	13.7	38.9
55-65	2004	23.2	17.0	31.9
55-65	2011	52.9	36.4	76.9

Typical occasion quantity, Maori

Drinkers only were included in this analysis.

Overall trend (2000, 2004, 2011)

No statistically significant trend in typical occasion quantity was found over time for Maori females aged 16-65 years (or in any specific age groups).

Comparison of 2000 and 2011

Typical occasion quantity among Maori female drinkers aged 16-65 years was four drinks in both 2000 and 2011 (using a 15ml absolute alcohol drink size).

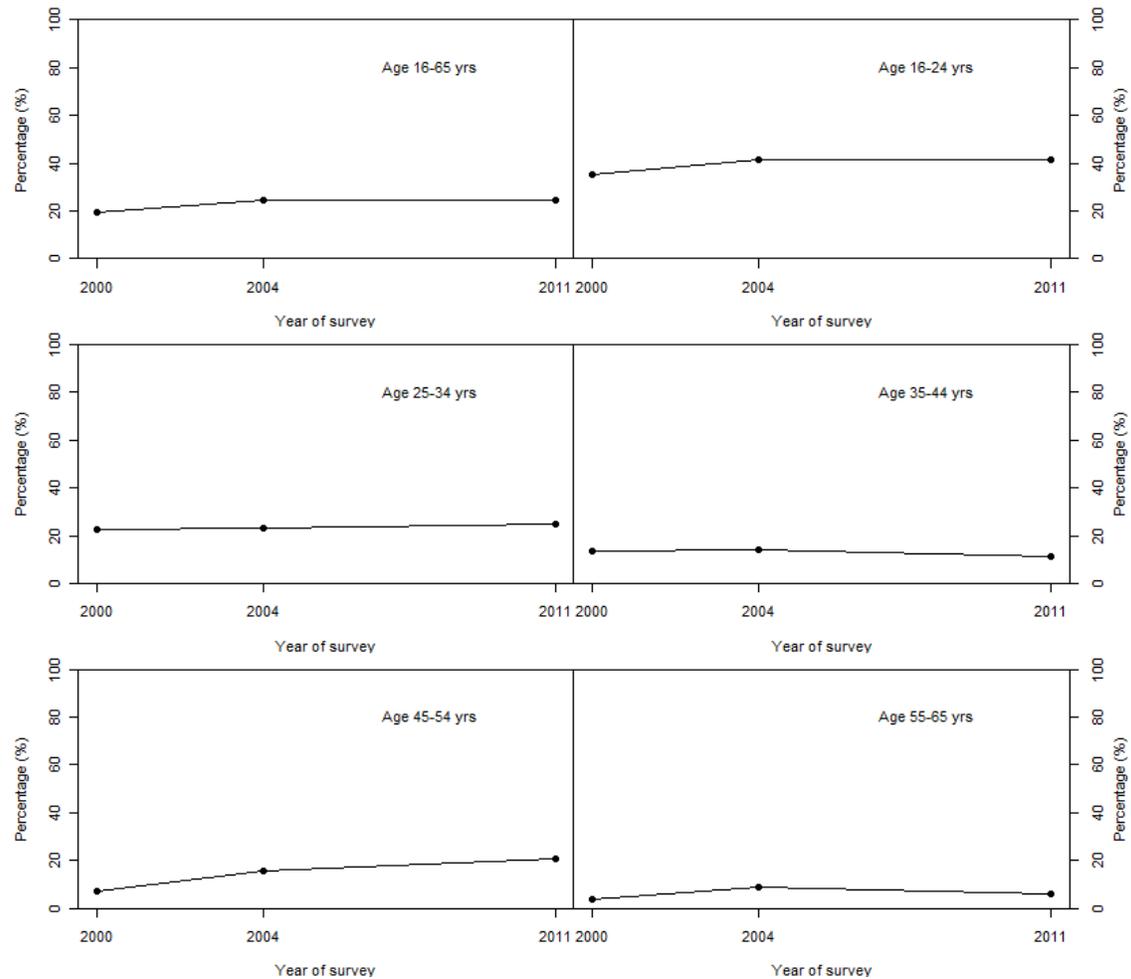
Young Maori female drinkers had the highest typical occasion quantity at six drinks (in both 2000 and 2011). Maori female drinkers aged 55-65 years had the lowest typical occasion quantity, at around 2.5 drinks, in 2000 and 2011. There were no statistically significant changes between 2000 and 2011 (Table 12).

Table 12: National New Zealand Alcohol Surveys: typical occasion quantity in the past 12 months, Maori females

Age Group	Year of Survey	Drinks (15ml)	95% Lower Confidence Interval	95% Upper Confidence Interval
16-65	2000	3.8	3.6	4.0
16-65	2004	4.1	3.9	4.3
16-65	2011	3.9	3.5	4.1
16-24	2000	6.0	5.3	6.7
16-24	2004	5.8	5.3	6.3
16-24	2011	5.6	4.7	6.5
25-34	2000	4.4	3.9	4.8
25-34	2004	4.5	4.0	4.9
25-34	2011	4.2	3.5	4.9
35-44	2000	3.3	2.9	3.7
35-44	2004	3.5	3.1	3.8
35-44	2011	3.1	2.7	3.5
45-54	2000	2.6	2.3	2.9
45-54	2004	2.9	2.6	3.3
45-54	2011	2.8	2.5	3.1
55-65	2000	2.1	1.6	2.5
55-65	2004	2.3	1.9	2.7
55-65	2011	2.3	2.0	2.7

5+ drinks, at least once a week Maori
 Drinkers only were included in this analysis.

Figure 7: National New Zealand Alcohol Surveys: % consuming 5+ drinks at least weekly drinking in the past 12 months, Maori females



Overall trend (2000, 2004, 2011)

There was no statistically significant change found in the proportion of Maori female drinkers aged 16-65 years consuming 5+ drinks (using 15ml absolute alcohol) at least once a week over the surveys (2000, 2004 and 2011) (Figure 7).

For Maori female drinkers aged 45-55 years, however, there was a statistically significant increasing trend (from 7% in 2000, to 16% in 2004, to 21% in 2011).

Comparison of 2000 and 2011

In 2000 the proportion of Maori female drinkers aged 16-65 consuming 5+ drinks at least once a week was 20% and in 2011 it was 25% (this was not a statistically significant change).

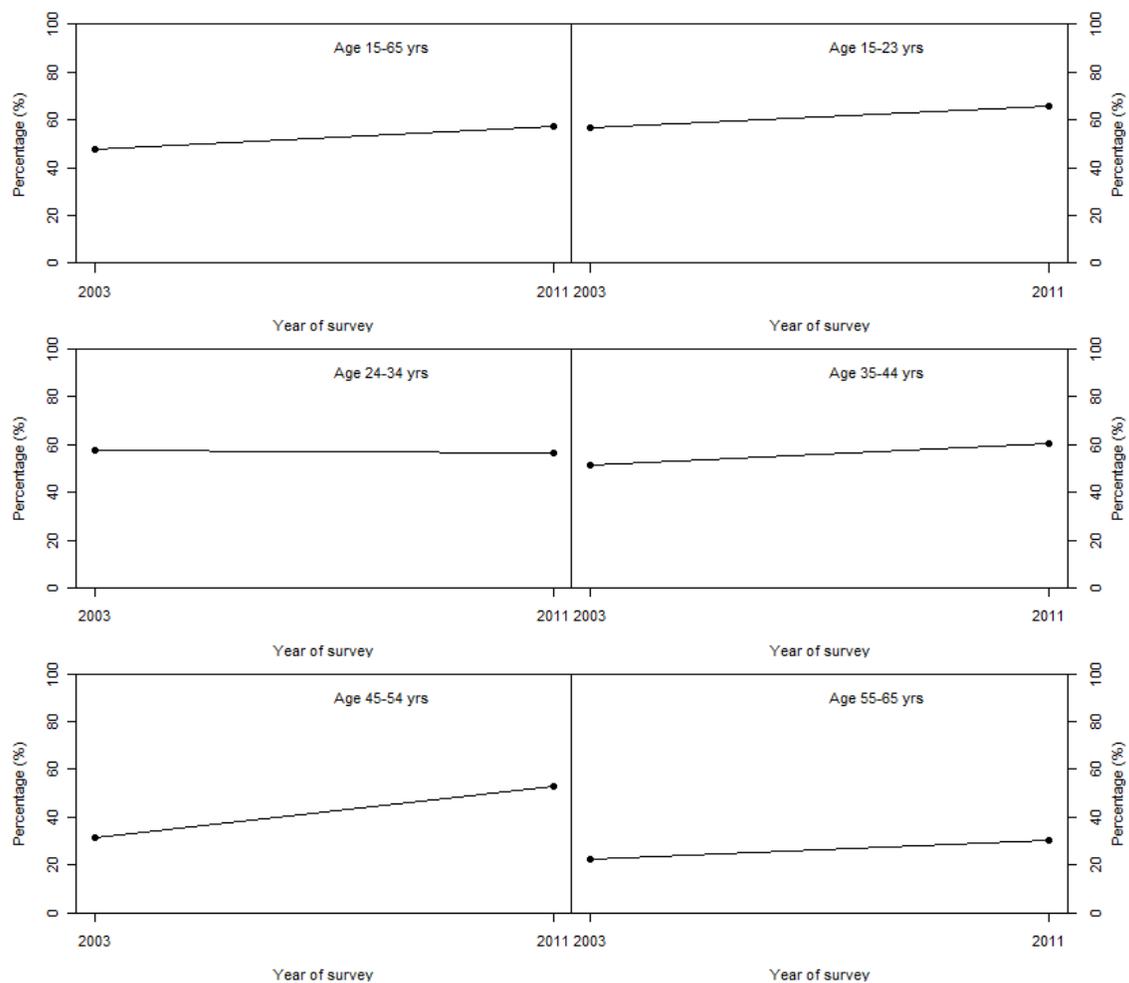
Of Maori females who drank, those aged 16-24 had the highest rate of consuming 5+ drinks at least weekly (35% in 2000 and 41% in 2011) but this also was not a statistically significant increase.

Pacific peoples

Prevalence of drinking, Pacific

Drinkers and non-drinkers were included in this analysis.

Figure 8: National New Zealand Alcohol Surveys: prevalence of drinking in the past 12 months, Pacific females



As only two data points were available for Pacific females results are not reported for an overall trend (Figure 8).

Comparison of 2003 and 2011

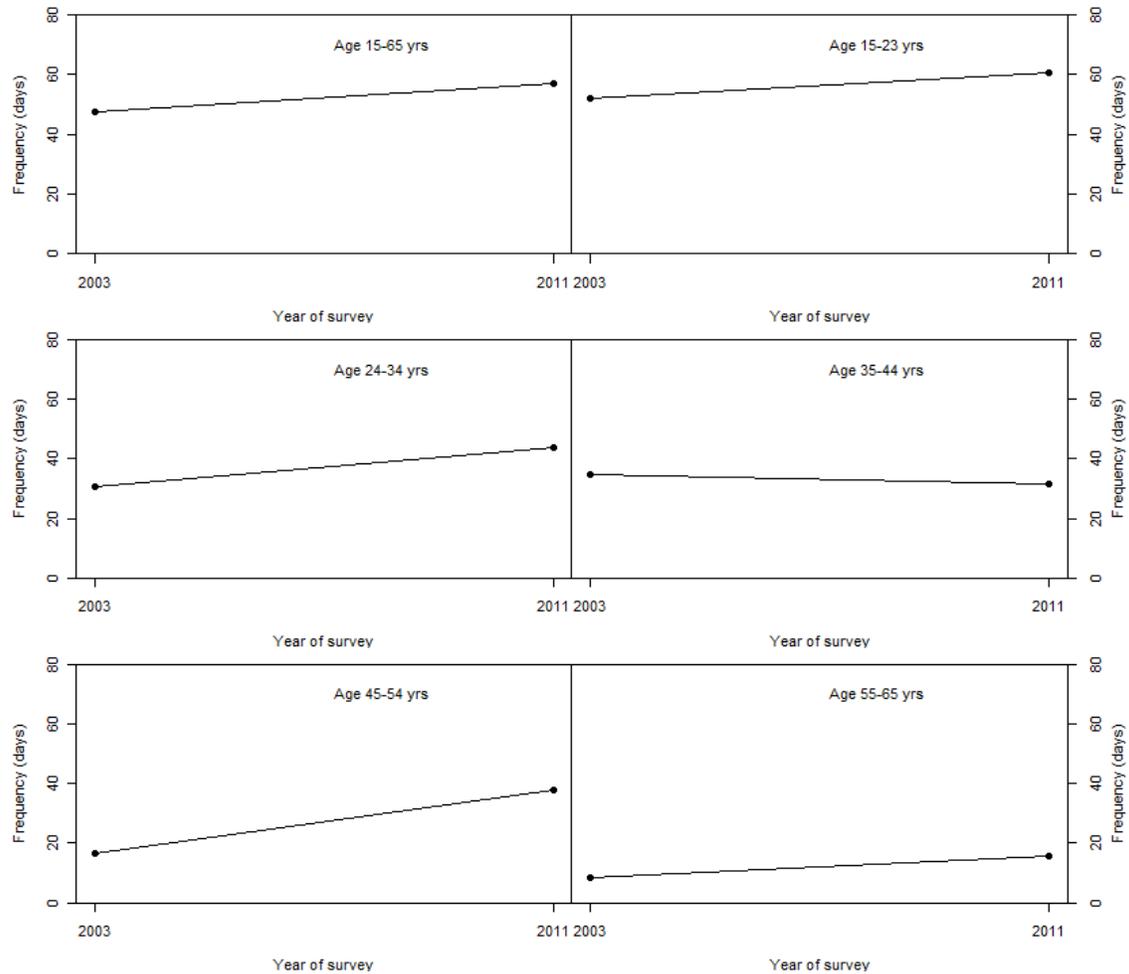
A statistically significant increase in the prevalence of drinking in the past 12 months was found among Pacific females aged 15-65 years between 2003 and 2011 (from 48% to 57%) (Figure 8).

When data were disaggregated by age, for females aged 45-55 years there was a statistically significant increase in prevalence of drinking from 31% in 2003 to 53% in 2011. There was no change in any other age group.

Frequency of drinking, Pacific

Drinkers only were included in this analysis.

Figure 9: National New Zealand Alcohol Survey: frequency of drinking in the past 12 months, Pacific females



Comparison 2003 and 2011

Pacific female drinkers aged 15-65 years showed a statistically significant increase in frequency of drinking in the past 12 months between 2003 and 2011 (from 48 occasions in 2003 to 57 occasions in 2011) (Figure 9).

Pacific female drinkers aged 45-54 years, showed a statistically significant increase in drinking occasions between 2003 and 2011, from 17 to 38 occasions per year (Figure 9). There was no change in the other age groups between 1995 and 2011.

Typical occasion quantity, Pacific

Drinkers only were included in this analysis.

Comparison of 2003 and 2011

There was no statistically significant change in typical occasion quantity among Pacific female drinkers aged 15-65 years between 2003 and 2011 (5 drinks in 2003 and 4.5 drinks in 2011).

For typical occasion quantity, there was no change between 2003 and 2011 in any age group.

Table 13: National New Zealand Alcohol Surveys: typical occasion quantity in the past 12 months, Pacific females

Age Group	Year of Survey	Drinks (15ml)	95% Lower Confidence	95% Upper Confidence
15-65	2003	4.8	4.0	5.6
15-65	2011	4.5	4.0	4.9
15-23	2003	7.3	5.7	9.4
15-23	2011	6.0	5.1	7.1
24-34	2003	5.9	4.4	7.9
24-34	2011	5.3	4.4	6.3
35-44	2003	2.8	1.8	4.3
35-44	2011	3.4	2.8	4.2
45-54	2003	2.7	1.8	4.0
45-54	2011	3.1	2.6	3.6
55-65	2003	2.2	1.2	4.0
55-65	2011	2.3	1.6	3.4

5+ drinks at least weekly, Pacific

There was no statistically significant change in the proportion of Pacific female drinkers aged 15-65 years consuming 5+ drinks at least weekly (25% in 2003 and 30% in 2011). Nor were statistically significant changes found between 2003 and 2011 for any age group (Table 14).

Table 14: National New Zealand Alcohol Surveys: % consuming 5+ drinks at least weekly in the past 12 months, Pacific females

Age Group	Year of Survey	Percentages	95% Lower Confidence Interval	95% Upper Confidence Interval
15-65	2003	24.6	18.5	30.7
15-65	2011	28.9	24.2	33.7
15-23	2003	37.3	25.3	49.3
15-23	2011	43.9	34.5	53.3
24-34	2003	26.0	15.1	36.9
24-34	2011	30.8	21.1	40.4
35-44	2003	17.2	4.1	30.3
35-44	2011	19.1	11.3	27.0
45-54	2003	1.8	0.0	5.6
45-54	2011	12.9	4.9	20.8
55-65	2003	7.4	0.0	20.8
55-65	2011	7.4	0.0	23.3

5.0 Literature review of studies assessing alcohol-related harms among females in New Zealand

A full literature review on alcohol-related harms in New Zealand 1995 to 2012 can be found in Appendix 3. The full literature review contains more detailed explanations of the research reviewed, the data used and more of the figures and statistics reported in the studies. The summary below is intended to convey main points that emerged from the literature.

Alcohol is implicated in an extensive range of harms including violence, traffic crashes, injury, sexual assault, cancer and other chronic alcohol-related diseases such as liver disease (Babor et al., 2010; Connor et al., 2005). The following literature review is broadly disaggregated by type of harm including health harms, crime/violence and assault; drink driving, sexual harms, and harm to others (including fetal alcohol spectrum disorder). The literature review covers the period from 1995 to 2012. Studies are ordered from earliest to most recent by the date of data collection, not when the study was published. This process of ordering is repeated separately under each heading.

Alcohol-attributable death, disease and disability

In 2002, almost 4% of deaths in New Zealand were attributable to alcohol consumption (and this is close to the global average of 3.8%) (Rehm et al., 2009).

The proportion of deaths caused by alcohol was lower among females than males (2.5% v 5.2%). Among Maori females the proportion of deaths caused by alcohol was 3.9%. Injury was the biggest contributor to death and life years lost (life years lost is a measure that accounts for the age at which death occurred) (Connor et al., 2005).

Alcohol and injury

Of 2,581 patients who presented at Christchurch hospital with facial fractures between 1996 and 2006, around 50% were alcohol-related. Females accounted for 12% of these (Lee & Snape, 2008).

The World Health Organization funded a multi-country Emergency Department study on alcohol-related injury. The Auckland Hospital Emergency Department participated. The odds of becoming injured and presenting at the Auckland Hospital Emergency Department were 7.4 times greater after drinking alcohol. Females in Auckland were not the group most at risk for alcohol-related injury (that was males and the under 30 year old age group) (World Health Organization, 2007).

Suicide/self-inflicted injury

Depending on the age group and gender, up to 30% of deaths from suicide and self-inflicted injury are estimated to be attributable to alcohol (New Zealand Law Commission, 2009).

There are very limited statistics on alcohol-involvement in suicides among females in New Zealand.

Alcohol dependence

In 2000, the proportions of female drinkers experiencing symptoms of alcohol dependence in Auckland varied between 10% and 20% depending on age group (further description of the symptoms of dependence can be found in Appendix 3) (Huckle et al., 2012).

Alcohol poisoning

In 2008, hospitalisations due to ethanol (alcohol) poisoning occurred at a national rate of 8.0 per 100 000 population (Tisch & Slaney, 2009). Numbers of hospitalisations were similar for both males ($n=166$) and females ($n=156$).

Crime and Violence/Assault

Police Alco-Link data have shown that 17% of those that consumed alcohol before offending were female, and 83% were male in both 2005/06 and 2006/07 (New Zealand Police, 2009). In the year 2012, Alco-Link data show that 20% of those that consumed alcohol before offending were female and 80% were male (data supplied by New Zealand Police 2013).

Drink Driving

The number of female drink driving offenders detected has increased by over 50% over the past 10 years, compared to a 20% increase in males for the same offence (n 's not reported) (New Zealand Police, 2009).

Drink driving offences showed a disproportionate number of Maori female arrests compared to Maori males and other females (New Zealand Police, 2009).

Sexual Behaviour

Alcohol has been associated with increased risky sexual behaviour, early onset of sexual behaviour, increased number of sexual partners and unwanted pregnancy among females in New Zealand (Cashell-Smith et al., 2007; Connor et al., 2009; Connor et al., 2010; Dickson et al., 1998; Fergusson & Lynskey, 1996).

In 2007 16% of female secondary school students reported that they had had unsafe sex after drinking (Ameratunga et al., 2011).

Self-reported alcohol-related harm

Meiklejohn et al. (2012), using national survey data from the New Zealand GENACIS (gender alcohol and culture) study in 2007, found that 30% of female electors in the New Zealand population reported experiencing harm from their own drinking (males experienced higher levels of harm than females 39% v 30%).

Harm from others

Research conducted on the effects of alcohol among Otago university students in New Zealand showed that 85% of female respondents and 81% of male respondents experienced at least one harm because of other students' drinking within the month prior to the survey. Harms included being insulted or humiliated, pushed or hit and having to take care of a drunk student (Langley et al., 2003).

It is estimated that in New Zealand 40% of alcohol-related crash injuries were incurred by people who had not themselves been drinking. Gender breakdowns were not available in this study (Connor & Casswell, 2009).

A survey conducted in New Zealand in 2008 (called the Range and Magnitude of Alcohol's Harm to Others) found that one in four participants reported having a heavy drinker in their life. Most of these respondents indicated they had experienced a range of harms because of this person's drinking, and females were more affected for some harms (including feeling emotionally hurt or neglected) (Casswell et al., 2011).

A study by Connor and Casswell, using the Alcohol and Drug Use Survey (06/07), found that the prevalence of self-reported harm from others' drinking was higher than harm from own drinking (18% vs 12% in the past year) and was higher in females and young people (Connor & Casswell, 2012).

Fetal Alcohol Spectrum Disorder (FASD)

The true extent of the incidence and prevalence of fetal alcohol spectrum disorder (FASD) in New Zealand is unknown. FASD is under-recognised by paediatricians (New Zealand Paediatric Surveillance Unit, 2001).

Conclusion

The literature suggests that while alcohol-related harm is experienced by females in New Zealand, levels of harm among females are generally lower than among males (and this fits with what is known of drinking patterns in New Zealand). There were a few exceptions, however, and these tended to be in relation to harms experienced from others' drinking (where females experienced higher levels than males in some instances).

Much of the research that has been undertaken on alcohol-related harm in New Zealand is cross-sectional or longitudinal (on the same participants over time). However, there is very little research assessing population trends in routinely collected harms for females including for more serious harms, such as those requiring hospitalisation or drink driving related crashes.

There is very little research available on alcohol-related harm for Maori, Pacific and Asian peoples and, in particular, females (including research over time).

6.0 Alcohol-related harms: new analysis of routinely collected data

6.1 Introduction

The following chapter undertakes trend analyses of routinely collected harms data (non-survey quantitative data) in New Zealand. Cross-sections of data are also available. Further details of the methodology and analysis can be found in Chapter 2 (including the data sources).

Hospitalisations

The following section presents alcohol-attributable and partially-attributable hospitalisations obtained from the National Minimum Dataset 1996 to 2011. Events in the data represent hospitalisation events, not individual people. Methodological detail, including caveats on the data, can be found in Chapter 2.

Alcohol-attributable conditions are those entirely caused by alcohol consumption.

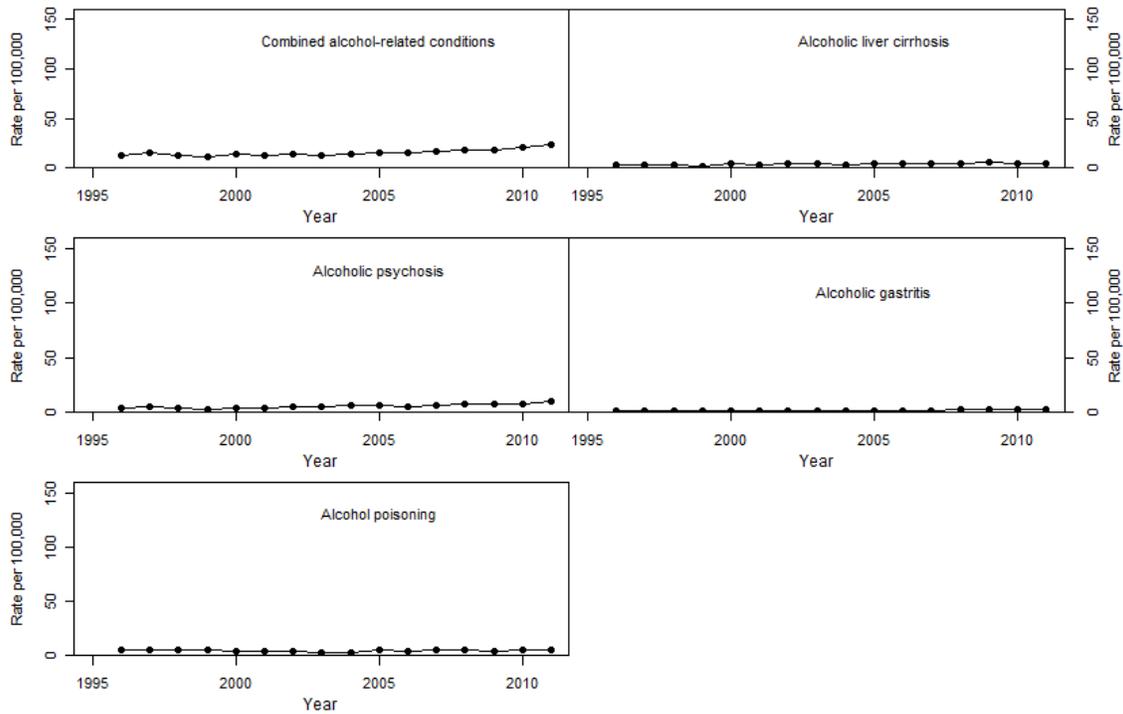
Hospitalisations for seven alcohol-attributable conditions were obtained: alcoholic liver cirrhosis, alcohol poisoning, alcoholic cardiomyopathy (where alcohol weakens the heart muscle), alcoholic gastritis (inflammation of the lining of the stomach caused by excessive alcohol use), alcoholic poly neuropathy (damage to the nerves that results from excessive drinking of alcohol) and alcoholic psychosis (any of various psychoses that result from alcoholism and involve organic brain damage).

Alcohol use disorders were excluded, however, as they were not comparable over the time period.

Six alcohol-attributable hospitalisations/conditions were aggregated for analysis. Conditions were also analysed separately. When conditions were analysed separately alcoholic cardiomyopathy and alcoholic neuropathy were excluded due to very small numbers ($n = < 10$ hospitalisations in each year). This meant that four conditions could be analysed separately.

Trends in hospitalisations were analysed from 1996 to 2011 for females 15+ years and were not disaggregated further by age.

Figure 10: Rates of hospitalisations per 100,000 population, females, (15 years+), 1996-2011



The results are summarised and tabulated below. The 'trend over time' column refers to the trend over the whole time period considered; 1996 to 2011. As all the routinely collected harms data sources covered different periods no statistical comparison was undertaken between the 'first and last year' of available data. However, rates per 100,000 population are reported for 2011 (the most recent year of hospitalisation data available) so that current levels of conditions can be assessed.

Table 15: Summary of results for hospitalisations among females 15+ years

Type of condition	Measure	Age group	Trend 1996 to 2011	Rates per 100,000 pop. in 2011
Alcohol-attributable	Alcohol-attributable hospitalisations overall	15+ years	Increasing	23.2
	Alcoholic psychosis	15+ years	Increasing	9.8
	Alcoholic liver cirrhosis	15+ years	Increasing	5.0
	Alcoholic gastritis	15+ years	Increasing	2.4
	Alcohol poisoning	15+ years	No change	5.7
	Alcoholic cardiomyopathy	15+ years	n/a	
	Alcoholic neuropathy	15+ years	n/a	

There was a statistically significant increasing trend in alcohol-attributable hospitalisations (overall) among females aged 15+ years (from 1996 to 2011). This trend was driven by statistically significant increasing trends in alcoholic psychosis, alcoholic liver cirrhosis and alcoholic gastritis (in that order).

Alcohol poisoning, although the second most commonly experienced reason for alcohol-attributable hospitalisation among females 15+ years from 1996 to 2011, showed no change over time.

Around 23 females aged 15+ years per 100,000 population were hospitalised due to an alcohol-attributable condition in 2011.

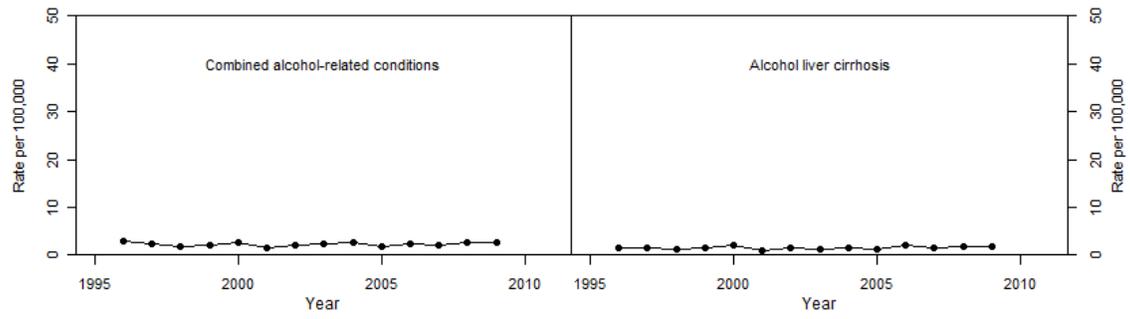
Mortality

The following section presents alcohol-attributable and partially alcohol-attributable deaths obtained from the Analytical Services, Ministry of Health, 1996 to 2009. Methodological detail, including data caveats, can be found in Chapter 2.

As there is a time lag with the mortality dataset the most recent data available was for 2009. Seven causes of alcohol-attributable death were considered in this analysis and these were the same as those obtained for the hospitalisation analysis (see previous section). Alcohol use disorders, which were excluded from the hospitalisation analysis, are included here.

Seven categories of alcohol-attributable deaths were combined and analysed (and each was also analysed separately). Of the alcohol-attributable deaths, only alcoholic liver cirrhosis had sufficient numbers for separate analysis. Numbers of deaths for the other alcohol-attributable conditions were very low among females ($n = < 10$ deaths each year).

Figure 11: Rates of deaths per 100,000 population, females, (15 years+), 1996-2009



The results are summarised and tabulated below.

Table 16: Summary of results for mortality among females 15+ years

Type of condition	Measure	Age group	Trend 1996 to 2009	Rates per 100,000 pop. in 2009
Alcohol-attributable	Alcohol -attributable deaths overall	15+ years	No change	2.7
	Alcoholic Liver Cirrhosis	15+ years	No change	1.7

There was no change in alcohol-attributable deaths (overall) among females aged 15+ years from 1996 to 2011.

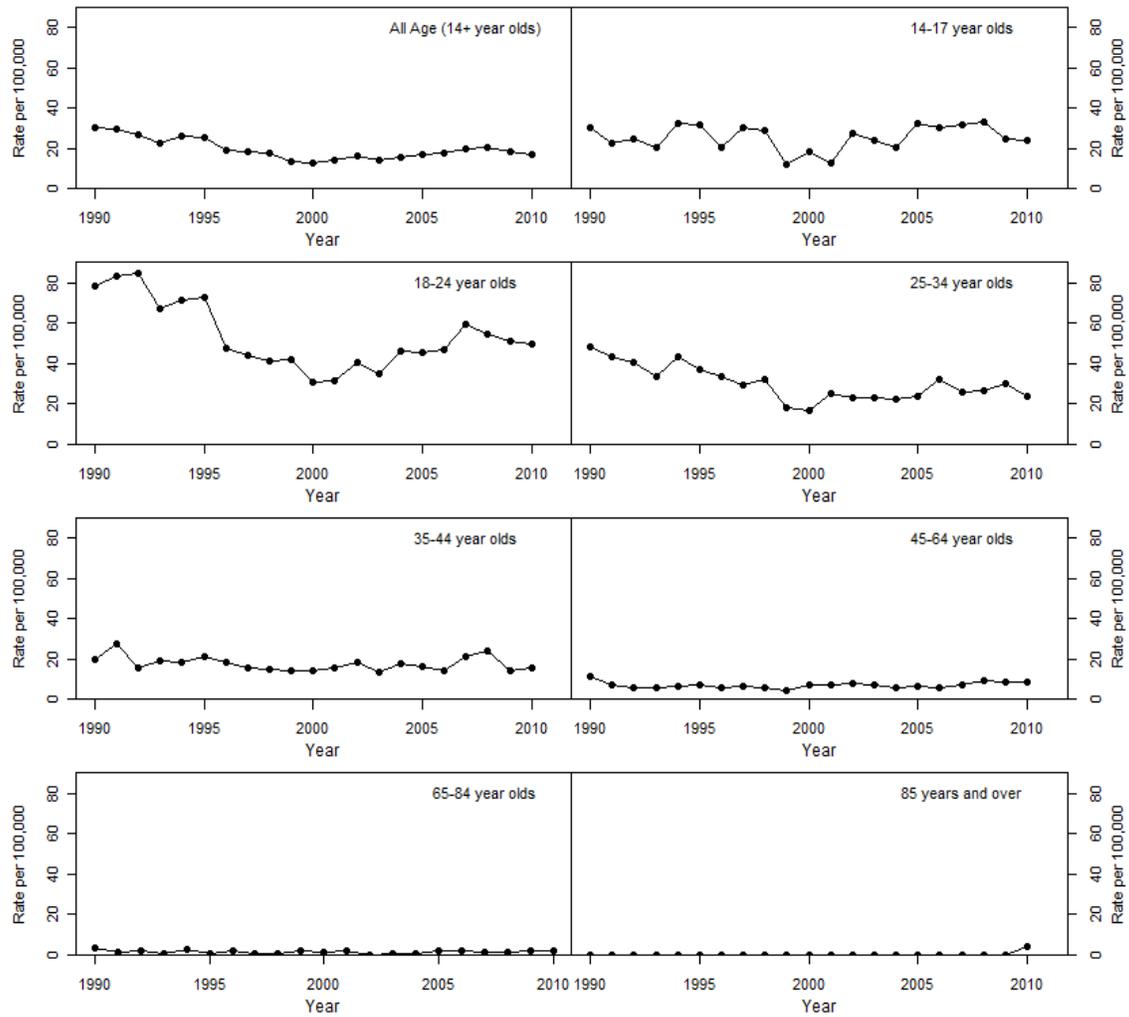
There was no change in deaths due to alcoholic liver cirrhosis from 1996 to 2011 among females 15+ years.

An increasing trend was found for hospitalisations for alcoholic liver cirrhosis (see section above); but there was no change in mortality due to alcoholic liver cirrhosis over a similar time period. It is not clear why this has occurred. If there have been improvements in medical treatment this could help to explain the finding. It is possible that alcohol treatment services have become more available or effective in helping those with cirrhosis to stop drinking, thereby working to increase their length of survival. It is also possible that as alcoholic liver cirrhosis is a chronic disease, it takes longer to see an impact of increased hospitalisations on deaths.

Alcohol-involved crashes (where the driver had been drinking)

The following section presents vehicle crashes where the driver had been drinking that resulted in an injury, whether minor or serious, or death. Data were obtained from the Ministry of Transport, 1990 to 2010. Methodological detail, including caveats on the data, can be found in Chapter 2.

Figure 12: Rates of alcohol-involved crashes injury and fatal per 100,000 population, females, by age group, 1990-2010



The results are summarised and tabulated below.

Table 17: Summary of results for alcohol-involved crashes among females 14+ years

Measure	Age group	Trend 1990-1999	Trend 2000-2007	Trend 2008-2010	Rates per 100,000 pop in 2010
Alcohol-involved crashes	14+ years	Decreasing	Increasing	Decreasing	17.3
	14-17 years	No change	Increasing	No change	23.8
	18-24 years	Decreasing	Increasing	No change	49.9
	25-34 years	Decreasing	Increasing	No change	23.8
	35-44 years	Decreasing	Increasing	Decreasing	15.6
	45-64 years	No change	Increasing	No change	8.9
	65-84 years	No change	No change	No change	2.3
	85+ years	-	-	-	0

For alcohol-involved crashes resulting in injury or death: prior to 1999, statistically significant decreases were found for females overall (14+ years) and among females aged 18-24, 25-34 and 35-44 years (likely related in part to the introduction of compulsory breath testing and other safety campaigns) (Huckle et al., 2006).

Following 1999 (until 2007), statistically significant increases in alcohol-involved crashes were found for females 18-24, 25-34, 35-44 and 45-64 years. The rate of increase was greatest among females aged 18-24 years.

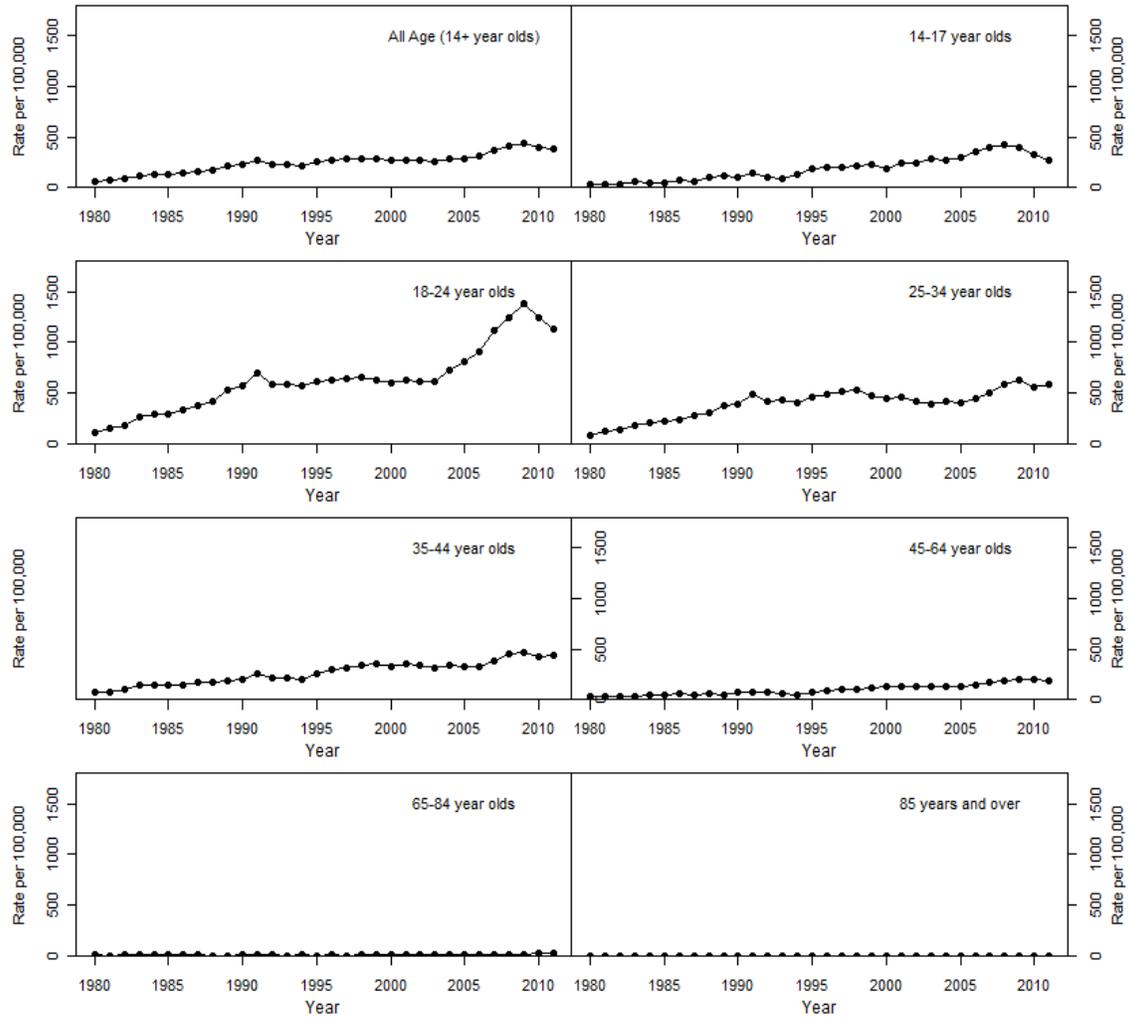
From 2008, a decline was found overall (14+ years) and among females aged 35-44 years. No change occurred in the other age groups.

In 2010, rates of alcohol-related crashes per 100,000 population were highest among the 18-24 year group (49.9 injury or fatal crashes per 100,000 population).

Drink driving

The following section presents prosecutions for driving with excess alcohol obtained from the Ministry of Justice 1980 to 2011. Events in the data represent prosecutions therefore repeat offenders are included in the data. Methodological detail, including caveats on the data, can be found in Chapter 2.

Figure 13: Rates of prosecutions for driving with excess alcohol per 100,000 population, females, by age group, 1980-2011



Results are summarised and tabulated below.

Table 18: Summary of results for prosecutions for driving with excess alcohol among females 14+ years

Measure	Age group	Trend 1980-2008	Trend 2009-2011	Rates per 100,000 pop. in 2011
Prosecutions for driving with excess	14+ years	Increasing	No change	383.9
	14-17 years	Increasing	Decreasing	275.8
	18-24 years	Increasing	No change	1126
	25-34 years	Increasing	No change	590.2
	35-44 years	Increasing	No change	431.6
	45-64 years	Increasing	No change	191.8
	65-84 years	Increasing	No change	22.5
	85+ years	-	-	4.2

Statistically significant increases in prosecutions for driving with excess alcohol were found among almost all age groups of females assessed, excluding the 85+ age group, between 1980 and 2008 (numbers of prosecutions in the 85+ years group were zero in most years so numbers were too low to run the model).

The rate of increase was greatest among females aged 18-24 years.

Prosecutions for driving with excess alcohol decreased among the 14-17 year group following 2009.

The 18-24 year group had the highest rates of prosecutions for driving with excess alcohol in 2011 (1126 prosecutions per 100,000 population).

6.2 Alcohol-related harms by Maori, Pacific and Asian females

Trends over time in hospitalisations among Maori, Pacific and Asian females (1996 to 2011)

Six alcohol-attributable conditions were combined for analysis for Maori, Pacific and Asian females. Hospitalisations for each condition were not analysed separately as the numbers were too small (< 20 in each year). The six alcohol-attributable conditions that were combined are defined at the beginning of this chapter.

Table 19: Summary of results for hospitalisations among Maori, Pacific and Asian females 15+ years

Ethnic group	Type of condition	Measure	Age group	Trend 1996 to 2011
Maori	Alcohol-attributable	Alcohol-attributable hospitalisations overall	15+ years	Increasing
Pacific	Alcohol-attributable	Alcohol-attributable hospitalisations overall	15+ years	No change
Asian	Alcohol-attributable	Alcohol-attributable hospitalisations overall	15+ years	No change

A statistically significant increasing trend in alcohol-attributable hospitalisations (overall) was found for Maori females aged 15+ years 1996 to 2011. There was no change for Pacific or Asian females.

Trends over time in mortality among Maori, Pacific and Asian females (1996 to 2009)

The same number and types of conditions were obtained from the mortality dataset as were obtained from the hospitalisations (see beginning Chapter 6 for detail).

Seven alcohol-attributable deaths were combined and analysed. Numbers of deaths were too small to attempt analysis for types of alcohol-attributable deaths separately.

There was no change in alcohol-attributable mortality among Maori, Pacific or Asian females 1996 to 2009.

Rates of hospitalisation per 100,000 population in 2011 by ethnicity

A cross-section of rates of hospitalisations for 2011 is provided below in Table 21³.

Table 20: Cross section of rates of hospitalisations per 100,000 population, females, by ethnic group, 2011

Measure	2011				
<i>Hospitalisations</i>	Age	Maori	Pacific	Asian	Gen pop.
Alcohol-attributable conditions overall	15+ years	32.6	6.8	1.1	23.2

There was variation in rates of hospitalisations per 100,000 population by ethnic group. Compared to the general population (and Pacific and Asian females), Maori females had higher rates of hospitalisation for alcohol-attributable conditions overall.

Rates of mortality in 2009 by ethnicity

Table 21: Cross section of rates of mortality per 100,000 population, females, by ethnic group, 2009

Measure	2009				
<i>Mortality</i>	Age	Maori	Pacific	Asian	Gen pop.
Alcohol-attributable deaths overall	15+ years	4.8	n/a	n/a	2.7

Compared to the general population, Maori females had higher rates of alcohol-related deaths overall. Numbers were too small to report rates for Pacific or Asian females.

³ Please note that although the rates for the conditions in Table 21 are larger among Maori females, than for females in the general population, actual counts of hospitalisations among Maori females 15+ years were smaller than for the general population.

Trends in alcohol-involved crashes and prosecutions for driving with excess alcohol by ethnicity (2002 to 2010/2011)

Table 22: Summary of alcohol-involved crashes (injury and fatal) where the driver had been drinking and prosecutions for driving with excess alcohol, females, by ethnicity, by age group, 2002-2010

Measure	Age group	Trend 2002-2007	Trend 2008-2010		
Alcohol-involved crashes (all and fatal)	<i>Maori females</i>	14+ years	Increasing	Decreasing	
		14-24 years	Increasing	Decreasing	
		25-44 years	Increasing	Decreasing	
		45-64 years	No change	No change	
		65-85 years	-	-	
		85+ years	-	-	
		<i>Pacific and Asian females*</i>	14+ years	No change	No change
	14-24 years		No change	No change	
	25-44 years		No change	No change	
	45-64 years		No change	No change	
	Prosecutions for driving with excess alcohol	<i>Maori females</i>	14+ years	Increasing	Decreasing
			14-24 years	Increasing	Decreasing
			25-44 years	Increasing	No change
45-64 years			Increasing	Decreasing	
65-85 years			Increasing	No change	
85+ years			No change	No change	
<i>Pacific females</i>			14+ years	Increasing	No change
		14-24 years	Increasing	No change	
		25-44 years	Increasing	No change	
		45-64 years	Increasing	No change	
		65-85 years	-	-	
		85+ years	-	-	

*Analysis was undertaken separately for Pacific and Asian females, as no change over time was found in either group results are reported together.

Alcohol-involved crashes (injury and fatal)

Maori: Between 2002 and 2007 statistically significant increases in alcohol-involved crashes (injury and fatal) were found for Maori females overall (14+ years) and for those aged 14-24 and 25-44 years. Following 2008, statistically significant declines were found for the same groups.

Pacific: There were no statistically significant changes in alcohol-related crashes (injury and fatal) for any age group of Pacific females.

Asian: There were no statistically significant changes found over time in alcohol-related crashes (injury and fatal) for any age group of Asian females.

Prosecutions for driving with excess alcohol

Maori: Statistically significant increases in prosecutions for driving with excess alcohol were found for Maori females overall (14+ years), and among those aged 14-24, 25-44 and 45-64 years, between 2002 and 2008. Following 2009, statistically significant decreases were found for Maori females overall and for those aged 14-24 and 45-64 years.

Pacific: Between 2002 and 2008 statistically significant increases were found for Pacific females for prosecutions for drink driving overall (14+ years), and among those aged 14-24, 25-44 and 45-64 years. Following 2009, there was no change.

Asian people were not specifically identified in this dataset.

Cross-section of alcohol-involved crashes (injury and fatal) where the driver had been drinking in 2010

Table 23: Rates of alcohol-involved crashes per 100,000 population where the driver had been drinking, females, by ethnicity, by age group, 2010⁴

<i>Crashes (all and fatal)</i>	2010			
	Age	Maori	Pacific	Asian
	14+	43.6	11.1	3.7
	14-24	75.6	16.0	7.2
	25-44	42.5	13.0	3.9
	45-64	19.5	3.9	0.0
	65-84	0.0	0.0	0.0
	85+	0.0	0.0	0.0

Rates of alcohol-related crashes were higher among young Maori females in 2010 (compared to Pacific and Asian females).

⁴ Rates for the general population could not be added in to these tables as the age groups for the general population differed.

Cross-section of prosecutions for driving with excess alcohol in 2011

Table 24: Rates of prosecutions for driving with excess alcohol per 100,000 population, females, by ethnicity, by age group, 2011

		<i>2011</i>		
<i>Drink driving</i>	Age	Maori	Pacific	Asian
	14+	1105.5	332.9	n/a
	14-24	1397.8	401.9	n/a
	25-44	1464.3	447.0	n/a
	45-64	552.3	132.6	n/a
	65-84	46.1	12.9	n/a
	85+	0.0	0.0	n/a

Rates of prosecutions for driving with excess alcohol were high among young Maori females in 2011 (compared to Pacific females).

7.0 Summary of trends in drinking patterns and routinely collected harms and contextualisation of findings

The following chapter will summarise and contextualise the results from the analysis of drinking patterns and alcohol-related harms presented in Chapters Four and Six. Table 26 presents the summary of *overall* trends for females by ethnic group

Table 25: Summary table of trends in all measures by ethnic group

Females	Measures	Trend
General population	Prevalence	Since 1995: Decreased
	Frequency of drinking	Since 1995: Increased
	Typical occasion quantity	Since 1995: Increased
	5+ drinks once a week	Since 1995: Increased
	Hospitalisations (overall)	Since 1996: Increased
	Alcohol-involved crashes	Since 1999: Increased Since 2008: Decreased
	Drink driving	Since 1980: Increased Since 2009: No change
	Mortality (overall)	Since 1996: No change
Maori females	Prevalence	Since 2000: No change
	Frequency of drinking	Since 2000: No change
	Typical occasion quantity	Since 2000: No change
	5+ drinks once a week	Since 2000: No change
	Hospitalisations (overall)	Since 1996: Increased
	Alcohol-involved crashes	Since 2002: Increased Since 2008: Decreased
	Drink driving	Since 2002: Increased Since 2009: Decreased
	Mortality (overall)	Since 1996: No change
Pacific females	Prevalence	Since 2003: Increased
	Frequency of drinking	Since 2003: Increased
	Typical occasion quantity	Since 2003: No change
	5+ drinks once a week	Since 2003: No change
	Hospitalisations (overall)	Since 1996: No change
	Alcohol-involved crashes	Since 2002: No change Since 2008: No change
	Drink driving	Since 2002: Increased Since 2009: No change
	Mortality (overall)	Since 1996: No change
Asian females	Prevalence	n/a
	Frequency of drinking	n/a
	Typical occasion quantity	n/a
	5+ drinks once a week	n/a
	Hospitalisations (overall)	Since 1996: No change
	Alcohol-involved crashes	Since 2002: No change Since 2008: No change
	Drink driving	Since 2002: n/a Since 2009: No change
	Mortality (overall)	Since 1996: No change

7.1 Contextualisation

Cross-sectional

Our study identified that cross-sectionally in 2011 drinking patterns among females varied by age and ethnicity. Younger females (16-24 and 25-34 years) consumed higher quantities compared to older females and Maori and Pacific females consumed higher quantities than females in the general population. Similar findings are reported in the literature reviewed in Chapter Three of this report.

Our study identified high rates of alcohol-attributable hospitalisations and mortality (overall), alcohol-involved crashes and prosecutions for drink driving among Maori females (compared to females in the general population, and Pacific or Asian females where available). The New Zealand literature has previously reported that Maori females have high rates of alcohol-related mortality and drink driving (literature reviewed in Chapter Five).

General population

Volume of consumption by gender

Our study found that males consume most of the alcohol in New Zealand. The New Zealand research literature has also reported similar findings when assessing drinking patterns by gender. With respect to gender convergence in the general population, the proportion of volume consumed among females was not close to catching up to that of males (when 1995 and 2011 data were compared).⁵ More detailed gender convergence analysis would be required to confirm this finding including by age group and for different measures such as quantity and frequency of consumption. However, the findings of this study, based on volume of consumption, suggest that females' consumption does not appear to be catching up to that of males in the near future.

Trends over time in drinking patterns

This study found increases in three of the four drinking pattern measures that assessed absolute levels of consumption among females, i.e. consumption levels not relative to males. For females in the general population increases were found in typical occasion quantities and the proportions consuming 5+ drinks (15ml) at least once a week overall and among younger females (for younger females most of this increase occurred between 1995 and 2000). Quantity and frequency of drinking increased among older females (over the whole time period 1995 to 2011). A decrease in the proportion of females who were drinkers in the past 12 months occurred over time.

While our study found an increase in the proportion of females consuming 5+ drinks at least once a week, there were some contrasting results identified in the literature reviewed:

⁵ Volume of alcohol consumption is calculated by multiplying the typical occasion quantity with frequency of drinking for each respondent.

- The ALAC Annual Alcohol Surveys found a decrease in the proportion of females aged 18+ binge drinking (7+ standard 10g drinks in the past 4 weeks) between 2009 and 2011 (from 23% to 17%) (Research New Zealand, 2012).
- The New Zealand Health Survey found no change in the proportion of females aged 15+ years consuming alcohol hazardously over 1996/97, 2002/03, 2006/07 (as defined by an AUDIT score of 8+) (Ministry of Health, 2008).
- A similar result was reported in the Alcohol and Drug Use Survey 2007/08 using the same AUDIT data as the New Zealand Health Survey (as above). This analysis looked at the age groups 16-17 and 18- 24 years and found no change in the prevalence of hazardous drinking (% yes) among young females aged 18-24 years over 1996/97, 2002/03, 2006/07 (Ministry of Health 2009). The trend over time among the 16-17 year age group was not disaggregated by gender.
- More recently the New Zealand Health Survey reported that among female past-year drinkers, the level of hazardous drinking had not changed statistically significantly between 2006/07 (13%) and 2011/12 (12%) (Ministry of Health 2012).

When comparing our findings with the surveys above, direct comparisons with previous studies are more difficult. Different surveys utilise different age ranges, different samples, different measures/methods, have different response rates and are undertaken over different time periods. Trends over time can therefore vary greatly between surveys based on these differences and, as shown above, there are some contrasting findings with respect to the direction of females' heavier consumption patterns in New Zealand.

The AUDIT is a screening tool used to identify those who have or may be at risk for an alcohol use disorder. The AUDIT is not directly comparable with our measures as it asks about alcohol consumption differently, defines what is 'hazardous' differently and includes questions about problems due to alcohol and symptoms of dependence. Therefore we may not expect the trend in the AUDIT measure to match the trend in our measure of heavier drinking (defined as 5+ drinks at least once a week).

We have confidence in our survey findings as our surveys have good coverage of the alcohol available for consumption in New Zealand.

Trends over time in routinely collected harms

Routinely collected data on alcohol-related harms can provide an independent source of data. It is likely that if increases in consumption have occurred, there will be corresponding increases in alcohol-related harm (Babor et al., 2010).

As shown by the data considered in this report, during the 2000s there were overall increases in drink driving, alcohol-involved crashes and alcohol-attributable hospitalisations among females in the general population. There were no changes in overall rates of alcohol-attributable deaths over time and there was a decrease in alcohol-involved vehicle crashes from 2008 (but rates still remained higher than they had been earlier in the 2000s).

There is no research in New Zealand that has analysed trends in routinely collected non-survey based quantitative data among females with which we can compare our study findings.

Maori and Pacific females

For Pacific females, increases in the frequency and prevalence of drinking were found. For harm measures, no changes in alcohol-involved crashes or hospitalisations were found. These results are not necessarily incongruent, however, as increases in the prevalence and frequency of drinking may not be strongly related to the experience of crashes and hospitalisations. The quantity of alcohol consumption is related to the experience of these types of harms.

For Maori females, there were few changes in drinking patterns over time but there were increases in more serious harms including alcohol-attributable hospitalisations (overall) and alcohol-involved crashes from 2002 to 2007 for the two youngest age groups.

If Maori females experience higher levels of inequality than other groups they may be more likely to experience more harm from alcohol. This is because having fewer resources may lead to less opportunity to mitigate the effects of alcohol, including lack of resource to visit a doctor when sick or being unable to take a taxi instead of drink driving (Makela et al 2008). Maori females earned over \$1,000 dollars less per annum during the 2000s than Pacific females and over \$2,000 less than Pakeha females (Census 2006). Maori had higher unemployment rates during the 2000s (these data were not disaggregated by gender) (Social Report 2010).

Asian females

Data were not available to assess drinking patterns among Asian females and very few sources in the literature reviewed reported data for Asian females. The available literature suggests that the quantities they consume are very low.

With respect to alcohol-related harms data that were available to be analysed (alcohol-attributable hospitalisations, alcohol-attributable mortality and alcohol-involved crashes), Asian females showed no change over time consistent with previous reports of their low levels of consumption.

Older females

Older females increased their frequency of drinking and typical occasion quantity, and some older females were caught drink driving. Numbers of alcohol-involved crashes were too small in most instances to produce findings for older females, but these may not be harms that older females are likely to experience, e.g. as opposed to falls for example.

7.2 Conclusion

While females drink less than males, among female drinkers in the general population increases were found for those aged 16-65 years in three of the four measures of drinking pattern analysed over time (quantity, frequency and 5+ drinks at least once a week). There was also variation by age group.

As shown by the data considered in this report there were overall increases in drink driving, alcohol-involved crashes and alcohol-attributable hospitalisations among females in the general population over a similar time period. Of the alcohol-attributable harms overall, drink driving was the most commonly experienced followed by alcohol-attributable hospitalisations.

There were no changes in overall rates of alcohol-attributable deaths over time and there was a decrease in alcohol-involved vehicle crashes from 2008, but rates of crashes still remained higher than they had been earlier in the 2000s.

Overall the results for females in the general population show that there have been increases in more measures of consumption and harm, than not. Females in general are drinking more and experiencing more alcohol-related harm which is of concern from a public health perspective.

However, with respect to gender convergence in drinking among the general population, the volume of consumption among females was not even close to catching up to that of males (when 1995 and 2011 data were compared). More detailed gender convergence analysis would be required to confirm such a finding including by age group and for different measures such as quantity and frequency of consumption.

When data were investigated by ethnicity, more Maori and Pacific women consumed 5+ drinks at least once a week compared to females in the general population but showed fewer changes in drinking patterns over time. Maori females however showed increases in more serious harms, possibly related to socioeconomic status. Asian females have low levels of consumption and showed no change in alcohol-attributable hospitalisations or alcohol-involved crashes over time.

8.0 References

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Appendix 1: Population estimates

National resident population estimates were obtained from Statistics New Zealand from 1980 to 1991 and 1991 to 2011 for years ended 31 December. It was necessary to obtain population estimates to convert counts of events (of harms) into rates. Analysing counts, without taking into effect population numbers, may be misleading.

Population estimates are based on Census counts adjusted by births, deaths and migration (Statistics New Zealand, 2004). The population estimates from 1991 to 2011 are based on the resident population concept. Prior to 1991, population estimates were based on the de facto population concept (these are different ways to estimate the population). This means that the estimates before and after 1991 are not consistent with each other, depending on their use.

Population estimates for the year 1991 were calculated using both the resident population concept and the de facto population concept. We compared these two data points and found that there was a reasonable difference between these two systems of calculation; a difference of about 100,000 people over the total population in 1991. This difference would be smaller, however, when distributed throughout the age groups. Therefore we decided on using a rate of per 100,000 population (females) in this analysis. This relatively large rate should mean that inconsistencies between the two series of population estimates in each age group are required to be larger than 100,000 before they will begin to affect trends over time. This issue did not affect all data; only alcohol-involved crash and drink driving analysis for the general population.

The main reason that population estimates are not made for any other ethnic groups is that there is no international migration data by ethnicity. Migration is a very small component of Maori population change (when compared with births and deaths). However, this is not so for other ethnic groups, and in particular the Asian ethnic group, where migration is the main component of population growth. Therefore obtaining population estimates for this project was not possible for Maori before 1991, or at all for Pacific and Asian ethnic groups.

We were required to develop our own method of estimating these populations over time, described as follows: population estimates were calculated for Maori, Pacific and Asian peoples by gender and age (single year of age, 0-90+), based on Census population counts. To obtain annual population estimates, estimates between Census points were interpolated linearly, using the spline function to smooth the fitted line. Since there has not been a Census since 2006, to calculate estimates through to 2011 we assumed the rate of change in the population to be the same as the rate of population change between 2001 and 2006, i.e. if the population increased 1% each year between 2001 and 2006, we apply a 1% increase from 2006 onwards.

Statistics New Zealand. (2004). Population Estimates. Retrieved 4 December 2004, from <http://www.stats.govt.nz/datasets/population/population-estimates.htm>

Appendix 2: Literature review of studies assessing drinking patterns among females in New Zealand

The literature review presented below is the full literature review on drinking patterns in New Zealand 1995 to 2012. The full literature review contains detailed explanations of the research reviewed, the data used (including sample sizes) and more of the figures and statistics reported in the studies.

The literature review has focused on the drinking patterns of various groups of females within New Zealand: secondary school students, tertiary students, tertiary sportspeople, young and older females in the general population, Maori females, Pacific females, Asian females and same sex/both sex attracted females. Studies assessing drinking patterns at one point in time are grouped under “drinking patterns” and studies making comparisons over time are grouped under “trends over time”. Studies are ordered from earliest to most recent by the date when data for the study were collected, not when the study was published. This process of ordering is repeated for both “the drinking patterns” and “trends over time” sections separately under each heading.

Secondary school students

Drinking patterns

The Youth2007 survey (conducted nationally among over 9,000 secondary school students in 2007) showed that 60% of females were current drinkers (defined as those who have ever drunk, and who drink now). There were no statistically significant differences in the proportions of females and males who were current drinkers in 2007 (Ameratunga et al., 2011).

The Youth2007 survey found that most current drinkers at secondary school had consumed alcohol at least once in the previous four weeks. There were no gender differences in frequency of drinking at younger ages (13 years or less), but males drank more frequently than females as they got older (and by age 17 more males, than females, had consumed alcohol at least once in the previous four weeks) (Ameratunga et al., 2011).

The Youth2007 survey found that of females who were current drinkers, around 23% consumed five to nine drinks per session (a drink was defined as a standard alcoholic drink). Ten percent of females reported that they usually consumed 10 drinks or more per session (Ameratunga et al., 2011).

The Youth2007 survey found that of current drinkers, the proportions of females who were binge drinkers (defined as 5+ standard drinks in one session within four hours) were: 13 years or less - 43%; 14 years - 52%; 15 years - 53%; 16 years - 58%; and 17 years or older - 61% (Ameratunga et al., 2011).

Trends over time

The Youth2000 survey (conducted nationally in 2001 among over 9,000 secondary school students) was compared with the Youth2007 survey (conducted nationally in 2007 among over 9,000 secondary school students). Between 2001 and 2007, there was a statistically significant decline in the proportion of secondary students who were current drinkers, from 70% to 61% (results for females and males were very similar in each year) (Ameratunga et al., 2011).

When the Youth2000 and Youth2007 surveys were compared, there was no statistically significant change in the pattern of drinking with regard to the frequency of alcohol consumption between 2001 and 2007 (among secondary school students who were current drinkers) (Ameratunga et al., 2011).

There was also no statistically significant change in the pattern of drinking with regard to the quantity of alcohol consumed in a drinking session, when the Youth2000 and Youth2007 surveys were compared (Ameratunga et al., 2011). As female drinkers increased in age, fewer drank one to two drinks per session and more drank three to nine drinks per session. Ten percent of females who were current drinkers reported consuming 10 or more drinks per session but this proportion remained stable from age 13 or less through to age 17 or older (whereas the proportion of male drinkers consuming 10 or more drinks per session increased with age) (Ameratunga et al., 2011).

Again reporting results from the Youth2000 and Youth2007 surveys, fewer students were current drinkers in 2007 than in 2001, but of those who drank more were binge drinkers (defined as 5+ standard drinks in one session within four hours):

- When all students (drinkers and non-drinkers) were considered in the analysis, the proportion of students who were binge drinkers significantly decreased from 40% to 34% between 2001 and 2007 with no gender interaction (meaning that the trend over time for males and females did not differ).
- When current drinkers were considered in the analysis, a significant increase in binge drinking was found between 2001 and 2007, up from 49% to 57%. There was an interaction with gender and age where male drinkers were more likely to be binge drinkers than female drinkers by age 15 years (Ameratunga et al., 2011). (See page above for proportions of female binge drinkers in 2007).

Tertiary students

Drinking patterns

Several studies have been undertaken among New Zealand tertiary students aged 17-25 years.

One such study by Kypri et al. (2005) (data collected in 2002 $n = 1424$) found that of tertiary students at Otago University who were drinkers, 59% of females reported consuming 5+ drinks or more on a typical occasion, with 36% consuming 7+ drinks and 17% consuming 10

or more drinks on a typical occasion (a drink was defined as 10g of absolute alcohol) ($n = 1424$).

The same study (using data collected in 2002 from Otago University students) (Kypri et al. 2005) also examined hazardous drinking behaviours. In this study hazardous drinking was defined by the Alcohol Use Disorders Identification Test (AUDIT) (where a cut off score of 8+ was considered hazardous drinking). Around 970 students aged 17-29 years who attended the University of Otago Student Health Service over a period of three weeks were surveyed (Kypri et al., 2005). Results showed that mean AUDIT scores were statistically significantly lower among females compared to males (9.7 vs 12.2); statistically significantly fewer females reported an AUDIT score of 8 or higher than males (60% vs. 73%) (Kypri et al., 2005).

In 2004, tertiary students living in 12 residential halls at the University of Otago ($n = 1614$) reported their drinking in each of the preceding seven days in a web-based, drinking locations diary (Kypri et al., 2007). The proportion of episodes resulting in intoxication (an estimated blood alcohol concentration of $>0.08\text{g}/100\text{ml}$) was lower among females (compared to males) in pubs/bars/nightclubs (57% vs. 64%) and in other locations (30% vs. 47%) (Kypri et al., 2007).

Another study by Kypri et al. (2010) undertaken in 2005 at five of New Zealand's eight universities⁶ ($n = 2548$) found that students consumed an average of 7.1 drinks per drinking day, including 5.4 drinks in pubs/bars/nightclubs, flats/houses, and residential halls, and 3.7 drinks in other locations (such as restaurants, automobiles, private events, and outdoor settings). Although males and females were remarkably similar in terms of their drinking history and drinking locations, females drank about 35% less alcohol per drinking day and about 50% less alcohol per week than did males (in the preceding week). Specifically, females drank less alcohol than males at pubs/bars/nightclubs (4.3 vs 6.0 drinks per occasion), flats/houses (5.1 vs 6.2 drinks per occasion), and other locations such as restaurants (3.4 vs.4.1 drinks per occasion) (a drink was defined as 10gm of absolute alcohol) (Kypri et al., 2010).

Kypri et al. (2009) undertook a national study of tertiary students in New Zealand in 2005 (in five of the eight universities)⁶ ($n = 2548$). The study reported similar levels of binge drinking by gender; once in the last seven days (23.1% females vs. 22.3% males) and twice or more in the last seven days (13.9% females vs 14.5% males). Similar proportions of females (67.9%) and males (68.2%) reported an AUDIT score of 4 or higher (which corresponded to hazardous drinking in this particular study).

Tertiary sportspeople

Drinking patterns

O'Brien et al. (2008) interviewed a convenience sample of 631 tertiary student sportspeople from the University of Auckland, Auckland University of Technology, Massey University and University of Otago in 2004. The measures used in the study were: the AUDIT - both the

⁶ Universities listed in the article included Victoria, Massey (Palmerston North), Lincoln, Waikato (fifth university not named, possibly Otago).

AUDIT total score and proportion of respondents with a score of 8+ (to denote hazardous drinking), a measure of binge drinking (defined as 7+ standard drinks in a drinking session) and the DMM (Drinking Motives Measure) to examine gender differences in drinking behaviours and underlying drinking motives in sportspeople from three New Zealand universities (O'Brien et al., 2008).

This same study (O'Brien et al., 2008) found that there was very little difference in drinking behaviour between male and female sportspeople. There were no statistically significant gender differences in AUDIT scores; (10.7 females v 11.4 males), or in the prevalence of hazardous drinking (AUDIT score of 8+) (65% females v 69% males) Both drinkers and non-drinkers were included in the analyses of AUDIT scores. However, statistically significantly fewer females reported binge drinking than males (40.5% among females v 56.5% among males) (O'Brien et al., 2008).

Reasons for drinking were also assessed in the same study (O'Brien et al., 2008) among drinkers only. Coping motives (drinking to forget about your problems), statistically significantly predicted hazardous drinking among females (but not males). For female sportspeople, social motives (because it improves parties and celebrations), and enhancement motives (to get that high feeling), also predicted hazardous drinking, but to a lesser extent. For males, social and enhancement motives predicted hazardous drinking (O'Brien et al., 2008).

Young females in the general population (12 - 24 years)

Drinking patterns

The National New Zealand Alcohol Survey 2004 ($n = 7201$) showed that younger females in the general population reported consuming higher quantities than older females. Females aged 16-17 years consumed on average four drinks on a typical occasion (defined as 15ml absolute alcohol), those 18-19 years consumed 4.4 drinks on a typical occasion and females aged 20-24 years consumed 3.8 drinks (a drink is defined as 15ml absolute alcohol). Typical occasion quantities were lower among older females; 2.5 drinks for females aged 30-39 years and 2.1 drinks consumed for females aged 40-49 years (Huckle et al., 2011).

The nationwide 2011 ALAC Annual Alcohol Survey found that the number of standard drinks consumed on the last occasion was high among young females aged 12-17 years; around seven drinks in 2011 (when number of standard drinks was averaged across all female respondents aged 12-17 years) (Research New Zealand, 2012).

The ALAC Annual Alcohol Surveys found that the proportion of young females aged 12-17 years consuming 7+ drinks at least once in the last four weeks was 48% in 2011 ($n = 187$) (Research New Zealand, 2012).

Trends over time

Several studies have been undertaken in New Zealand assessing drinking patterns over time among young females (Huckle et al., 2011; 2012; McPherson et al., 2004) and these are described in more detail below.

A study using the Auckland Annual Alcohol Surveys, 11 years of survey data from Auckland 1990 to 2000 ($n =$ approximately 1,000 in each year), found statistically significant increases in typical occasion quantities for young females aged 14-19 and 20-24 years. The greatest rate of increase among females was found among those aged 14-19 years (of around one drink over the decade), although males aged 14-19 years had the greatest rate of increase overall (and higher typical occasion quantities when compared to females) (Huckle et al., 2012).

Using the National New Zealand Alcohol Surveys in 1995 and 2000 (sample sizes 1995 $n =$ 4232 and 2000 $n =$ 5113), a study by McPherson et al. (2004) found gender convergence in the quantity of alcohol consumed on a typical occasion for females aged 20-24 years (where females' consumption increased and moved towards males). For females aged 20-24 years the number of drinks on a typical occasion increased from three (defined as 15ml absolute alcohol) to four, while males consumed five and a half drinks in both 1995 and 2000. (National New Zealand Alcohol Surveys 1995 and 2000) (McPherson et al., 2004)

A study using the National New Zealand Alcohol Surveys 1995, 2000 and 2004 (Huckle et al., 2011) (sample sizes 1995 $n =$ 4232, 2000 $n =$ 5113, 2004 $n =$ 7201) found:

- A significant increase in the proportion of 20-24 year olds females consuming 5+ drinks on a typical occasion between 1995 and 2000 - from 40% to 59% (Huckle et al., 2011).
- Statistically significant increases in typical occasion quantity among almost all age groups of females analysed between 1995 and 2000. The greatest increases were observed among young females aged 18-19 and 20-24 years (an increase of 1.3 and 1.1 drinks, respectively) (Huckle et al., 2011).
- Decreases in the proportions of teenagers who were drinkers and between 2000 and 2004; those who were drinkers among females aged 14-15 years declined from 69% to 55% and from 84% to 74% for females aged 16-17 years (Huckle et al., 2011).

The Alcohol and Drug Use Survey 2007/08 ($n =$ 6784) analysed nationwide AUDIT data from the New Zealand Health Survey for those aged 16-17 and 18- 24 years. There was no change in the prevalence (% yes) of hazardous drinking among young females aged 18-24 years over 1996/97, 2002/03, 2006/07 (hazardous drinking was defined as an AUDIT score of 8+) (Ministry of Health, 2009). The trend over time among the 16-17 year age group was not disaggregated by gender.

Older females (25 years and over)

Drinking patterns

Older females in the New Zealand population drink at higher frequencies than younger females, but consume less on a typical drinking occasion (National New Zealand Alcohol Surveys 1995, 2000 and 2004) (sample sizes 1995 $n = 4232$, 2000 $n = 5113$ and 2004 $n = 7201$) (Huckle et al., 2011).

In 2006, females aged 55-70 years nationwide had a statistically significantly lower prevalence of binge drinking than males of the same age (defined as more than 5 drinks in one episode - whether these were standard drinks or otherwise was not reported) (Health, Work and Retirement Longitudinal Study $n = 6662$) (Towers et al., 2012).

Trends over time

A study using the Auckland Annual Alcohol Surveys (1990 to 2000 $n =$ approximately 1,000 in each year) found that women aged 25-39 years significantly increased their annual drinking frequency (from 60 occasions per year to 90 occasions per year) (Huckle et al., 2011).

A study by McPherson et al. (2004) used National New Zealand Alcohol Surveys (1995 and 2000) to assess gender convergence in drinking in New Zealand. When data were disaggregated into specific age groups, females aged 40-49 years showed statistically significant convergence for drinking frequency (where female frequency of drinking moved towards that of males), from 61 to 75 drinking occasions between 1995 and 2000 versus 125 and 111 occasions for males for the same period.

The same study by McPherson et al. (2004) also found gender convergence in the quantity of alcohol consumed on a typical occasion (where females' consumption increased and moved towards that of males'). Statistically significant convergence was found for females aged 25-29 years, from 2.5 drinks to 3.2 drinks (defined as 15ml absolute alcohol) versus 4.2 drinks for males in both 1995 and 2000, and for females aged 30-39 years from 2 drinks to 2.6 drinks versus 3.1 drinks and 3.4 drinks for males in this age group.

A study by Huckle et al. (2011) using the National New Zealand Alcohol Surveys in 1995 ($n = 4232$), 2000 ($n = 5113$) and 2004 ($n = 7201$) found the following:

- Proportions of heavier drinkers (defined as drinking more than five drinks on a typical occasion using a 15ml drink) increased statistically significantly for women aged 30-39 years (from 8% to 15%) between 1995 and 2000 (Huckle et al., 2011).
- Between 1995 and 2000, females aged 30-39 years statistically significantly increased their annual frequency of drinking (from 53 occasions in the past year to 65 occasions). There were no statistically significant changes in frequency of drinking for females (or males) between 2000 and 2004 (Huckle et al., 2011).
- Quantities consumed increased almost across the board for females between 1995 and 2000 in New Zealand (Huckle et al., 2011), including among the 30-39 and 25-29 year age groups who showed an increase of around half a drink on a typical drinking

occasion (a drink was defined as 15ml absolute alcohol). Typical occasion quantity did not change for women between 2000 and 2004 (that is, there were no statistically significant changes) (Huckle et al., 2011).

The ALAC Annual Alcohol Surveys conducted nationwide found a significant decrease in binge drinking at least once in the past four weeks, for females aged 18+ (from 23% to 17%) from 2009 to 2011 (Research New Zealand, 2012).

Maori females

Drinking patterns

Data from five large New Zealand surveys conducted from 1988 to 1999⁷ were re-analysed to investigate relative differences in patterns of consumption between Maori and non-Maori (Bramley et al., 2003). Maori females were shown to have different drinking patterns to females in the general population, as described below:

- Maori females were found to be less likely to be current drinkers and to drink less often than non-Maori females (Bramley et al., 2003).
- While drinking frequency was lower among Maori females who were current drinkers, the quantities consumed were higher. Maori females who were drinkers consumed 35%-42% more alcohol on a typical drinking occasion than non-Maori female drinkers (Bramley et al., 2003).
- These drinking patterns combined in such a way that average consumption per day among Maori and non-Maori was similar.
- Younger Maori females drinkers, aged 18-34 years, were found to consume higher quantities on a typical drinking occasion (57g) compared to all other Maori female age groups (range 18g-40g) (Bramley et al., 2003).

A different study using data from wave three of the Survey of Family of Income and Employment (SoFIE) 2004/05 ($n = 19,255$) (Jatrana et al., 2011) found that compared to other ethnic groups, including Pacific people, Maori females reported high levels of binge drinking (defined as more than six standard drinks on one drinking occasion) at the monthly, weekly and daily levels (but results were not further disaggregated by gender).

Pacific females

Drinking patterns

A study using the 2002/03 Diabetes Heart and Health Study (DHAHS) (a cross-sectional sample of Pacific people ($n = 1101$) from Auckland) found that more than 60% of Pacific

⁷ Surveys utilised were the New Zealand Health Survey 1997, Sleep Survey 1999, Fletcher Challenge/University of Auckland Survey 1992, Diabetes Survey 1988-1990, NZ Blood Donors Health Study 1998-1999 and Workforce Diabetes Survey 1988-1990 (a total of 44,830 respondents).

women drinkers (aged between 35-74 years) consumed alcohol weekly or less than weekly, in contrast with the majority of European women (>60%), who consumed alcohol on two to three days per week or daily (Sundborn et al., 2009). This study also found that, on a typical drinking occasion, Pacific females consumed on average 5.4 drinks compared to European women at 2.9 drinks (Sundborn et al., 2009).

A national survey of Pacific peoples aged between 13 and 65 years conducted in 2003 (Pacific Alcohol, Drug and Gambling Survey 2003, $n = 1103$) also found that Pacific female drinkers consumed alcohol on fewer occasions than those in the general population (Huakau et al., 2005) However, the typical occasion quantity consumed by Pacific female drinkers was 6.4 drinks compared with 3.5 drinks for female drinkers in the general population (Huakau et al., 2005). This study also found that in 2003, about 25% of Pacific female drinkers consumed enough to feel drunk at least weekly in comparison to 6% of females in the general New Zealand population (Huakau et al., 2005).

A study by Teevale et al using Youth2007 data for 974 Pacific students (aged 13-17 years), found 33.0% of females reported binge drinking in the last four weeks (consuming five or more standard alcoholic drinks in one session within four hours). There was no statistically significant difference between the proportions of female and male Pacific students who were binge drinkers (Teevale et al., 2012).

A qualitative study conducted by Gray and Nosa (2009) with nine New Zealand born Niuean women aged 18-45 years living in Auckland found that binge drinking (more than 6 standard drinks on one occasion) was a common drinking behaviour for these women. New Zealand born Niuean women perceived there were fewer limitations on alcohol use and behaviour associated with drunkenness, and that getting wasted was a sign of having a good time. Participants reported a variety of reasons for drinking including to be cool, to fit in with friends and peer groups, to gain confidence, to forget about problems, to have fun or to wind down at the end of the working week. Many participants reported that they would drink more moderately when drinking with family as it was culturally disrespectful to drink to the point of intoxication in the presence of elders, especially parents or older men.

Asian females

Drinking patterns

The New Zealand Health Survey ($n =$ over 7,000 in each year) collects data on the proportion of Asian females drinking hazardously, defined as an AUDIT score of eight or more. The 1996/97 survey did not report the AUDIT results for Asian females. In 2002/03, the proportion of Asian women drinking hazardously was not reported due to low numbers. In 2006/07 the proportion of Asian females drinking hazardously was not reported separately (only combined with males); however it was reported that Asian females had a statistically significant lower proportion drinking hazardously compared to females in all other ethnic groups (European, Maori and Pacific); although the exact percentage was not reported (Ministry of Health, 2008, 2012).

The Youth2007 survey sampling of over 9,000 secondary school students in 2007, found that Asian students reported drinking less often than other ethnic groups; around a third of Asian students who were current drinkers reported that they drank only one drink per occasion. Only 7.0% of Asian current drinkers reported drinking 10 or more drinks per session (compared to Maori 30.5%, Pacific 26.5%, NZ European 13.3% and other 15.3%) (Ameratunga, et al., 2011). Results were not disaggregated by gender.

The Alcohol and Drug Use Survey in 2007/8 found that the proportion of Asian females that consumed alcohol in the last 12 months was lower compared to the general population (Ministry of Health, 2009). Asian females who consumed alcohol in the past 12 months were also less likely to drink enough to feel drunk and to have consumed more than four drinks in at least one drinking session (Ministry of Health, 2009).

Same/both sex attracted

The Christchurch Health and Development Study (Fergusson et al., 2005) found that young sexual minority women were more likely to be alcohol dependent than exclusively heterosexual women (Fergusson et al., 2005).

A study by Pega and Coupe (2007), from the large-scale, population-based New Zealand Health Behaviours Surveys on drug and alcohol use in 2003/2004 ($n = 10,000+$), found that women identifying as lesbian or bisexual were more likely to have drunk alcohol regularly over the last year than heterosexual-identified women. This study also found that women with a lesbian or bisexual identity reported lower rates of abstinence from alcohol over the last year than heterosexual-identified women. Women with a lesbian or bisexual identity reported consuming alcohol once or more per week over the last year at significantly higher rates than women with a heterosexual identity (Pega & Coupe, 2007).

The Youth2007 survey of over 9,000 secondary school students reported findings for same/both sex attracted secondary school students, but not by gender. Same/both-sex-attracted students were significantly more likely to report having ever drunk alcohol and to be current drinkers than opposite-sex-attracted students. Same/both-sex-attracted students reported drinking more frequently than opposite-sex-attracted students did. More same/both sex-attracted students preferred spirits (Ameratunga et al., 2011).

Socioeconomic status

Relationships between socioeconomic status and patterns of drinking have been found among females in New Zealand. Casswell et al. (2003) utilised data from young adults collected as part of the Dunedin Multidisciplinary Health and Development Study ($n =$ approximately 1,000). This study found that frequency of drinking was influenced by income, with the higher income respondents drinking more often (and this was persistent overtime). Quantity of drinking was most influenced by educational achievement. The less well-educated young adult drank significantly more during a drinking occasion and at all ages. Overall, the two different dimensions of drinking, quantity and frequency, operated differently. The findings of higher quantities consumed among those of lower social status

may explain some of the reduced life expectancy found among those with lower socioeconomic status (Casswell et al., 2003).

Huckle et al. (2010) utilised the National New Zealand Alcohol Surveys conducted in 1995, 2000 and 2004 to assess relationships between socioeconomic status and drinking patterns (1995 $n = 4232$, 2000 $n = 5113$, and 2004, $n = 7201$). This study found that females of low income (below-average income as defined by Statistics New Zealand) and those who were uneducated consumed more on a typical drinking occasion than females in average or high income groups (and females with educational qualifications) (Huckle et al., 2010).

Jatrana et al. (2011), using survey data from 2004/05, found that binge drinking was patterned by demographics and socioeconomic position. The study utilised wave three of the SoFIE (Survey of Family, Income and Employment in 2004/05 $n = 19,255$). The study reported that the frequency of binge drinking increased as educational level declined (although the pattern for those with no qualifications was more variable). The pattern by work status was also somewhat mixed, with a tendency for higher frequency of binge drinking among those who were working.

Wider influences on alcohol consumption among females

The introduction of wine for sale into supermarkets and grocery outlets in 1990 was found to be more relevant for females than males. Women, in particular, felt more comfortable purchasing wine from the supermarket as part of the groceries, as compared to any stigma they felt when visiting a specialised alcohol outlet/bottle store (Wyllie et al., 1993).

A study, conducted using 2004 National New Zealand Alcohol Survey data ($n = 7201$), found that wine was the beverage of choice among older females (Huckle et al., 2008).

A study using the 2004 National New Zealand Alcohol Survey ($n = 7201$), found that female drinkers aged 14-17 and 18-24 years were the largest consumers of RTDs (with over 60% in both groups consuming RTDs) (Huckle et al., 2008). Female RTD consumers aged 14-17 years consumed 70 percent of their annual volume of alcohol as RTDs (Huckle et al., 2008) (it was not known how the RTDs were obtained by the young people e.g. via own purchase or supply from parents or friends). RTDs predicted heavier drinking among females aged 14-17 years in New Zealand better than any other beverage (beer, wine or spirits) (Huckle et al., 2008).

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Appendix 3: Literature review of studies assessing alcohol-related harms in New Zealand

The literature review presented below is the full literature review on alcohol-related harms in New Zealand 1995 to 2012. The full literature review contains more detailed explanations of the research reviewed, the data used and more of the figures and statistics reported in the studies.

Alcohol is implicated in an extensive range of harms including violence, traffic crash, injury, sexual assault, cancer and other chronic alcohol-related diseases such as liver disease (Babor et al., 2010; Connor et al., 2005). The review is broadly disaggregated by type of harm including health harms, crime/violence and assault; drink driving, sexual harms, and harm to others (including fetal alcohol spectrum disorder). The literature review covers the period from 1995 to 2012. Studies are ordered from earliest to most recent by the date when data for the study were collected, not when the study was published. This process of ordering is repeated separately under each heading.

Health Harms

Alcohol-attributable death, disease and disability

A study undertaken in 2000 estimated the burden of death, disease and disability attributable to alcohol consumption in New Zealand (Connor et al., 2005). Importantly, this study addressed Maori as well as Non-Maori. Almost 4% of deaths in New Zealand were attributable to alcohol consumption (and this is close to the global average of 3.8% of deaths) (Rehm et al., 2009).

The proportion of deaths caused by alcohol was lower among females than males (2.5% v 5.2%). Among Maori females the proportion of deaths caused by alcohol was 3.9%. Injury was the biggest contributor to death and life years lost (life years lost is a measure that accounts for the age at which death occurred) (Connor et al., 2005).

Alcohol use disorders accounted for around half of all disability adjusted life years with men being more affected (disability adjusted life years are a measure of overall disease burden) (Connor et al., 2005).

Alcohol and injury

Few studies have been undertaken in New Zealand with respect to alcohol and injury. Lee and Snape (2008) reviewed patients who were treated at Christchurch Hospital's specialist Oral and Maxillofacial Surgery Service over an 11-year period. This study found that of the 2,581 patients who presented with facial fractures between 1996 and 2006, almost half of the injuries (49%) were alcohol-related. Females accounted for 12% of these, of whom 52% were aged between 16-30 years.

A 2005/06 study examined the contribution of alcohol to fatal and hospitalised injuries due to unintentional falls at home among working-aged adults. A population-based case-control study was conducted in Auckland between July 2005 and July 2006. Cases were 335 people aged 25-60 years who were admitted to hospital or died as a result of unintentional falls at home. Control subjects were 352 people randomly selected from the same age band as the cases. Approximately 20% of unintentional falls at home among working-aged adults may be attributable to the consumption of two or more alcoholic drinks in the preceding 6 hours. Drinking was strongly associated with unintentional falls at home resulting in admission to hospital or death. A substantial proportion of falls at home among working-age people can be attributed to alcohol consumption (Kool et al., 2008).

In an international study conducted by World Health Organization (2007), the association between alcohol and non-fatal injuries presenting to emergency departments was compared across 12 countries (Argentina, Belarus, Brazil, Canada, China, Czech Republic, India, Mexico, Mozambique, New Zealand, South Africa and Sweden). New Zealand (based on an Auckland site) reported the second highest proportion of alcohol-related injury presenting to an emergency department, after South Africa. This study assessed the role of alcohol in presentations for injury. Thirty five percent of injured patients reported consuming alcohol prior to becoming injured. The odds of becoming injured were 7.4 times greater after drinking alcohol. Females were not the group most at risk for alcohol-related injury (that was males and the under 30 year old age group) (Humphrey et al., 2003; World Health Organization, 2007).

A 2007 analysis of national hospital admission data for 15 to 24 year-olds (where alcohol was mentioned in the first 15 diagnostic codes, or the first 10 external cause codes in the case of an injury) showed a total of 5,413 young people were hospitalised with alcohol-related admissions between 2002 and 2006 (Craig et al., 2007). Admissions were twice as likely to be males as females. These figures likely represent an undercount, as they rely on hospital staff at the time of discharge listing alcohol use as a contributory cause, something which may be reported inconsistently over time and across the country.

Suicide/self-inflicted injuries

Every year in New Zealand, approximately 500 people take their own lives and at least 2500 hospitalisations are due to serious intentional self-harm (Ministry of Health, 2012). Depending on the age group and gender, up to 30% of deaths from suicide and self-inflicted injury are estimated to be attributable to alcohol (New Zealand Law Commission, 2009).

Very few studies have been undertaken in New Zealand with respect to alcohol and suicide or self-inflicted injuries. A 2007 study (Fleming et al., 2007) of 9570 students from 114 secondary schools reported that 10.5% of females had made a suicide attempt within the last 12 months. Alcohol abuse, depressive symptoms, family violence, non-heterosexual orientation and other's suicide attempt were all independently associated with increased rates of suicide attempts.

Dependence/alcohol use disorders

A study using the Auckland Annual Alcohol Surveys 1990 to 2000 (sample sizes around 1,000 in each year) assessed trends in self-reported symptoms of alcohol dependence over time among age and gender groups. Symptoms of dependence were 'stayed intoxicated for

several days', 'had hands shake a lot in the morning after drinking' and 'taken an alcoholic drink first thing in the morning' (Huckle et al., 2012). Between 1990 and 2000 no significant changes in the proportions of females reporting symptoms of dependence were found. Proportions of females experiencing symptoms of dependence varied from 10% to 20% depending on age group, but were higher among young females aged 14-19 and 20-24 years (Huckle et al., 2012).

O'Brien et al. (2008) found no gender differences in dependence symptoms among a convenience sample of 631 tertiary student sportspeople from the University of Auckland, Auckland University of Technology, Massey University and University of Otago collected in 2004.

Alcohol poisoning

In 2008, there were 8571 poisoning hospitalisations throughout New Zealand, of which 322 were due to ethanol (alcohol) poisoning, a national rate of 8.0 per 100 000 population (Tisch & Slaney, 2009). Numbers of hospitalisations were similar for both males (166) and females (156). Slightly more emergency department notifications for ethanol poisoning were male (59.5%) (Tisch & Slaney, 2008).

Crime and Violence/Assault

In 2007/08, there were 19,388 recorded victims of assaults associated with family violence, with the majority of those being female (82%). In 34% of those recorded incidents the alleged offender had consumed alcohol. Of the 489 homicides recorded between 1999 and 2008, 241 of these were classified as family violence-related homicides and 37% involved either a suspect or victim being under the influence of alcohol at the time of the incident.

Police data have shown that 17% of offenders who had consumed alcohol before offending were female, and 83% were male in both 2005/06 and 2006/07. Results were very similar in 2007/08; the percentage of females who consumed alcohol before offending was 18%, with males at 82% (New Zealand Police, 2009). In the year 2012, Alco-Link data show that 20% of those that consumed alcohol before offending were female and 80% were male (data supplied by New Zealand Police 2013).

Drink Driving

A study using data from the Dunedin Multidisciplinary Health and Development Study assessed lifestyle factors as predictors of injuries and crashes among young adults. Behavioural factors, including alcohol consumption, and personality factors were obtained at age 15 and 18 years and used to predict crashes, and crashes that resulted in injury, at age 21 years. Few behavioural factors, including pattern of drinking at age 15 or 18 years, predicted crashes at age 21 years for females or males. However, high substance dependence, as measured by the mental health assessment tool, was the strongest predictor of a non-injury crash (Begg et al., 1999).

In 2005 a survey among 16-29 year old tertiary students found that 3.4% of females reported one or more drink-driving episodes in the prior four weeks. For drink-riding, or being a passenger in a car with a drink driver, 7% of the females in the sample reported doing so.

Females were less likely to be a passenger of a drink driver than males (7% for females versus 11% for males). Students were asked to report how much they thought they could drink in an hour and still be legally allowed to drive (legal limit of 0.08 g/ml). Females were more likely than males to overestimate permissible alcohol consumption levels for legal driving (Kypri & Stephenson, 2005).

Kypri et al. (2006) assessed traffic crashes and hospitalisations for traffic crash injuries separately by gender, following the lowering of the purchase age (using national routinely collected data). Following the lowering of the purchase age, and compared to 20-24 year old females, ratios for crashes were 51% larger for the 18-19 year old females and 24% larger for 15-17 year old females (results were similar for hospitalisations for traffic crash injuries). For males, the percentage increase in ratios for the 18-19 and 15-17 year age groups were significantly larger compared to males aged 20-24 years, but increases were smaller than for the females (and this matches what is known of consumption data following the lowering of the purchase age (Huckle et al., 2011)).

A study from 2008 used data from the Dunedin Multidisciplinary Health and Development Study ($n =$ approximately 1,000) to assess the relationship between adolescent problem behaviours, such as alcohol use, marijuana use, delinquent behaviour, tobacco use and sexual behaviour at age 18 years, and traffic crashes among young adults. The study found that some problem behaviours predicted crash involvement at age 21 years for females but not for males (and at age 26 for the males but not females). However, alcohol use was not among the problem behaviours that predicted crashes; delinquent behaviour was the strongest predictor (Begg & Gulliver, 2008).

The number of female drink driving offenders detected has increased by over 50% over the past 10 years, compared to a 20% increase in male drink driving (numbers not reported) (New Zealand Police, 2009). The same study found that drink driving offences showed a disproportionate number of Maori females arrested compared to Maori males and other females (Alco-Link data) (New Zealand Police, 2009).

Sexual Behaviour

Alcohol consumption is linked with sexual health among females (and males). Heavier consumption of alcohol has been linked to risky sexual behaviour, early onset of sexual behaviour, number of sexual partners and unwanted pregnancy.

Sexually transmitted infections

There may be a correlation between sexually transmitted infection (STI) rates and alcohol use. Findings from the 30 year Christchurch Health and Development Study ($n =$ approximately 1200) show consistent links between increasing levels of involvement with alcohol and rates of STI diagnosis. Increasing levels of alcohol consumption and alcohol disorders were related to increased risk of STI. Data were not disaggregated by gender, so specific relationships for females were not able to be ascertained (Boden et al., 2011).

Risky sexual behaviour

Longitudinal data from New Zealand has been used to assess the relationship between alcohol consumption and risky sexual behaviour. The 30 year Christchurch Health and

Development Study ($n =$ approximately 1200) found that young participants who misused alcohol were more likely to have unprotected sex than those who did not misuse after adjusting for other risk factors. Girls who misused alcohol were 4.5 times more likely to have unprotected sex than girls who did not misuse alcohol. Boys who misused alcohol were 6.9 times more likely to have unprotected sex than boys who did not misuse alcohol (Fergusson & Lynskey, 1996).

The relationship with alcohol and self-reported risky sexual behaviour and harm has been assessed cross-sectionally among tertiary students in New Zealand (Cashell-Smith et al., 2007; Connor et al., 2010).

- The Connor et al. (2010) surveyed 2,548 tertiary students from five of New Zealand's eight Universities (including Victoria, Massey (Palmerston North), Lincoln and Waikato). Around 12% of females reported one or more risky sexual experience related to alcohol, compared to 16% of males, in the past 4 weeks (Connor et al., 2010). An advantage of the study was that it oversampled Maori students. Although results regarding the prevalence of harms were not reported separately for Maori, Connor et al. (2010) found that reporting an episode of unsafe sex was significantly and strongly related to level of current alcohol consumption, being male, Maori and living in shared quarters.
- Cashell-Smith et al. (2007) conducted a survey among 1910 University of Otago students (year of data collection was not found). There were some differences between the genders with respect to reporting of risky sexual behaviour. Females were less likely than males to report regretting sex. The finding that females are less likely to regret sex than males is interesting, but was largely explained by differences between the males and females in drinking patterns, age, ethnicity and type of residence lived in (Cashell-Smith et al., 2007).
- Cashell-Smith et al. (2007) also found for males and females, agreement with statements such as 'drinking gives me confidence to approach people I am attracted to' and 'drinking reduced my inhibitions' predicted risky sexual behaviour.

The Youth2007 nationwide survey of over 9,000 secondary school students found that 16% of female secondary students reported that they had had unsafe sex after drinking (Ameratunga et al., 2011).

Early onset of sexual activity

A study, using the Dunedin Multidisciplinary Health and Development Study (a longitudinal cohort study that began in the 1970s) ($n =$ approximately 1,000), found that young participants who misused alcohol were also more likely to report early onset of sexual activity (before the age of 16 years), after accounting for related risk factors. Here the relationship was stronger for girls than boys. Girls who misused alcohol were 6.2 times more likely to report early onset of sexual activity than girls who did not misuse alcohol. Boys who misused alcohol were 2.9 times more likely to report early onset of sexual activity than boys who did not misuse alcohol (Fergusson & Lynskey, 1996).

Another study using the Dunedin Multidisciplinary Health and Development Study found that for females, alcohol consumption predicted early sexual intercourse (before the age of 16 years) along with maternal work, maternal teenage birth, family structure and functioning, TV watching, school attachment, smoking and age at menarche (Paul et al., 2000).

Number of sexual partners

A study using the Christchurch Health and Development Study (a longitudinal cohort) ($n =$ approximately 1200) found that drinking at age 16 years was significantly associated with the number of sexual partners at ages 16-21 and 21-25 years. The number of sexual partners increased linearly with increasing consumption of alcohol. Factors in addition to alcohol consumption were controlled for including family background, personal characteristics, impulsivity, and whom people drink with and significant relationships between alcohol and sexual behaviour were still found. This may be because alcohol causes individuals to lose their inhibitions and/or because those wanting sexual activity drink in order to obtain it (Wells et al., 2004).

Unwanted pregnancy and alcohol

A study using the Dunedin Multidisciplinary Health and Development Study ($n =$ approximately 1,000) assessed reasons for wanted and unwanted pregnancies before the age of 25 years for females and males (mostly Pakeha participants). By age 25 years, 27% of females and 24% of males had been involved in at least one unwanted pregnancy. An unwanted pregnancy was more likely due to not using contraception, as opposed to failure of contraception. For females and males, the most common reason for not using contraception was not thinking about it, followed by alcohol use (Dickson et al., 2000).

Same/both sex attracted

Currently, no research is available in New Zealand on alcohol-related harm amongst same/both sex attracted women (Pega & McEwan, 2010).

Self-reported alcohol-related harm

Several studies have documented self-reported alcohol-related harm using cross-sectional web surveys among tertiary students.

Kypri et al. (2009) assessed alcohol-related harm among 2548 tertiary students from five of New Zealand's eight universities (including Victoria, Massey, Lincoln and Waikato). McGee et al. (2004) surveyed 1910 students from University of Otago.

- Both studies found relatively consistent results in that the most commonly reported harms by females aged 17 to 25 years were hangovers, vomiting or blackouts (Kypri et al., 2009; McGee & Kypri, 2004).
- Proportions of young females reporting these harms in Kypri et al. (2009) were 55% for hangovers, 21% for vomiting and 33% for a blackout.

- In McGee and Kypri (2004), 68% of young females reported a hangover, 43% reported vomiting and 43% reported experiencing a blackout. The variation in the proportions of young females experiencing these problems between the two studies was likely due to the different time periods harms were reported over, i.e. last four weeks in the Kypri et al. (2009) study, versus the last three months in the other study (McGee & Kypri, 2004). We may expect proportions experiencing problems to be higher when asking about a longer time period. Proportions may also have varied because different universities, from different areas, were included in the studies.
- There were some statistically significant differences in the experience of harm between the genders. More females experienced emotional outbursts when they were drinking (around 12% more females did so than males). However, fewer females reported having unprotected sex, sex they later regretted, theft, vandalism, being removed from a pub/club, physical aggression and drink driving than males. The prevalence levels among females for these harms ranged from 1% to 15% (proportions were higher for males). Females were also less likely to be arrested for drunken behaviour (0.1% of females compared to 2% of males).
- Academic problems related to drinking, that is the extent to which drinking had negatively impacted on students' academic performance or achievement were also asked about (McGee & Kypri, 2004). Around 24% of females reported that they had been late to class, 43% of females had missed a class, 40% had been unable to concentrate in class and 7% had failed to complete an assignment on time. Missing classes and being unable to concentrate were reported commonly by both females and males. There were some statistically significant differences between females and males. Fewer females reported missing a university class compared to males (43% vs. 50% respectively). Respondents were asked to rate the extent that drinking 'negatively impacted on their learning or their grades' (academic performance) on a scale of not at all, a little, quite a lot and a great deal. Overall, females reported significantly less negative impact (McGee & Kypri, 2004).

A study conducted over three weeks among 1242 Otago University students presenting to student health in 2002 found that between 10%-13% of females reported experiencing each of the following problems monthly or more: unable to stop drinking once you had started; failed to do something normally expected of you; had a feeling of guilt or remorse after drinking; and unable to remember what happened the night before because you had been drinking. Only 1% had needed a drinking first thing in the morning. Almost 20% of females reported that either they or someone else had been injured as a result of their own drinking in the last year. Significantly higher proportions of males reported the same problems (except for needed a drink first thing in the morning, where no significant difference between the genders was found) (Kypri et al., 2005).

Trends over time in self-reported harms have been assessed in the New Zealand population. A study utilised the Auckland Annual Alcohol Surveys 1990 to 2000 to describe alcohol-related problems (n = approximately 1,000 in each year). Problems included: 'told to leave a place because of drinking', 'physical fight because of drinking', 'away from work because of drinking', 'involved in a serious argument after drinking', 'got drunk when there was an important reason to stay sober', 'awakened the next day unable to remember things done

while drinking', 'felt ashamed of something done while drinking', 'felt the effect of alcohol after drinking the night before' and 'felt the effects of alcohol while at work/study/household duties'. Over 60% of females and males in the youngest group, 14-19 years, experienced one or more of the problems listed above in the last 12 months in 1990. By 2000, over 70% of female drinkers (and male drinkers) aged 14-19 years experienced one or more problem - a significant increase for both females and males. Trends in problems among females in the age groups 25-29 and 40-65 years also significantly increased between 1990 and 2000, but at a lower rate compared to those aged 14-19 years. Also, proportions experiencing one or more problems in these older age groups were lower compared to the 14-19 year olds; around 30% for the 25-29 year olds and 25% for the 40-65 year olds (compared to 60-70% of 14-19 year olds).

A study was undertaken assessing gender convergence in alcohol-related problems using the 1995 and 2000 National New Zealand Alcohol Surveys ($n = 4232$, $n=5113$). The aim of this study was to compare female and male self-reported alcohol-related problems in 1995 and 2000, both overall, and among age groups to determine if convergence had occurred (defined as the moving of females towards males) (McPherson et al., 2004). Proportions reporting the experience of three or more of any of 15 problems in the last 12 months were analysed. These ranged from small problems such as hangovers, work performance and arguments to more serious consequences such as getting into fights and car accidents. Results are as follows:

- When the proportions of females and males experiencing three or more problems in the last 12 months was analysed for convergence, and when the whole sample was considered, significant convergence was found. When convergence was considered by age group however only the 25-29 year olds showed significant convergence (for females: from 19% in 1995 to 29% in 2000; for males: 43% in 1995 and 41% in 2000).
- McPherson et al. (2004) also found that in 2000 females (58%) reported higher rates of experiencing alcohol-related problems than males (55%). More females aged 14-15 years reported experiencing three or more alcohol-related problems than their male counterparts in both 1995 (30% female and 24% male) and 2000 (35% female and 28% male). More females aged 16-17 years reported the same in 2000 (58% vs. 42%). The experience of problems reduced after the age 18-19 years.

There is very little research available on alcohol-related harm among Pacific peoples. A study by Huakau et al. (2005) (using the Pacific Alcohol Drug and Gambling Survey 2003) ($n = 1103$) found that, compared to the general population, Pacific females were more likely to be unable to remember actions after drinking, stay intoxicated for several days, and have a physical fight and be ashamed of actions after drinking.

A study by Meiklejohn et al. (2012), using national data from the 2007 GENACIS (gender, alcohol and culture) survey ($n=1924$), found that 30% of female electors reported experiencing harm from their own drinking (males experienced higher levels of harm than females; 39% v 30%).

Harm from Others

Research conducted on the effects of alcohol among Otago university students ($n = 1564$) in New Zealand showed that 85% of female respondents and 81% of male respondents experienced at least one harm because of other students' drinking within the month prior to the survey. Harms included being insulted or humiliated, pushed or hit, had to take care of a drunk student and unwanted sexual advances (Langley et al., 2003). Specifically, 33% of women and 34% of men reported being insulted or humiliated; 13% of women and 18% of men being pushed, hit or otherwise assaulted; and 34% of women and 25% of men reported experiencing unwanted sexual advances as a result of other people's drinking (Langley et al., 2003).

It is estimated that, in New Zealand, 40% of alcohol-related crash injuries were incurred by people who had not themselves been drinking (Connor & Casswell, 2009), and 24% of alcohol-involved fire incidents were suffered by people who lived with, or were in the care of, alcohol affected persons (Miller, 2005). Other injuries have also been related to the effect of others' drinking, with a population survey showing 54% of all the physical assaults and 57% of all sexual assaults reported by 16,480 adult New Zealanders involved a perpetrator who was affected by alcohol (Connor et al., 2009). Results were not further disaggregated by gender, so specific relationships for females were not able to be ascertained.

A national survey conducted in 2008 (Casswell et al., 2011) ($n =$ approximately 3,000) found that one in four participants reported having a heavy drinker in their life. Most of these respondents reported that they had experienced a range of harms because of this person's drinking. Females were more likely to report being emotionally hurt or neglected (51%) or feeling threatened and scared (30%) than males (35% and 22% respectively). Females were more likely to report feeling unsafe waiting for public transport (18%; males 11%) and receiving unwanted sexual attention (18% vs 12%) than men, whereas men were more likely to report being annoyed by vomit and littering (70%; females 59%) and being verbally abused (31%; females 24%) due to the drinking of others (Casswell et al., 2011).

A 2012 study by Connor and Casswell using the 2007/08 Alcohol and Drug Use Survey ($n = 6784$) found that the prevalence of self-reported harm from others' drinking was higher than harm from own drinking (18% vs 12% in the past year), and was higher in women and young people (Connor & Casswell, 2012).

The unborn child and Fetal Alcohol Spectrum Disorder (FASD)

Drinking alcohol at any stage of pregnancy can affect the development of the unborn baby. The range of effects on a child caused by alcohol is called fetal alcohol spectrum disorder (FASD). FASD refers to a spectrum of disorders and includes the diagnostic terms fetal alcohol syndrome (FAS), alcohol-related birth defects (ARBD) and alcohol-related neurodevelopmental disorder (ARND). The number and prevalence of individuals affected by FASD in New Zealand is largely unknown. The accurate diagnosis of FASD conditions is complex with characteristics of the conditions often not evident at birth but emerging as a child develops.

The first study to report the possible prevalence of FAS in New Zealand was carried out in 1993 by Leversha and Marks (1995). Based on a national survey of paediatricians, they estimated there were 63 children (under the age of 10) with FAS in paediatric care in 1993.

Based on the incidence of FAS in overseas studies, Leversha and Marks (1995) estimated the actual number of FAS cases per year to be 20-114 (0.3-1.9:1000) and ARND to be 354 (5.9:1000).

A two-and-a-half year study conducted by the New Zealand Paediatric Surveillance Unit (NZPSU), ending December 2001, found there were 62 valid reports of new cases of definite or suspected FAS, giving an incidence of 2.9 per 100,000 children under 15 years of age per year. They found the majority of affected children were in foster or extended family care (44% and 30% respectively). It was reported that this figure was considerably less than the expected rate from overseas figures. It is unclear whether New Zealand had a lower prevalence of FAS compared to other countries at that time or whether FAS was under-recognised by the paediatricians (New Zealand Paediatric Surveillance Unit, 2001).

Alcohol -consumption during pregnancy (FASD a possible outcome)

A 1994 national study on the drinking habits of the mothers of 4286 children born between July 1990 and June 1991 suggested that 41.6% of women consumed alcohol during pregnancy (Counsell et al., 1994). Of those women who consumed alcohol, 18.7% drank more than once a week.

A 1999 nutrition report on 504 pregnant women showed that 29% continued to drink alcohol when they knew they were pregnant. Of the 24% of women who regularly drank to intoxication before pregnancy, 11% continued to do so throughout pregnancy (Watson & McDonald, 1999).

A 2003 study reported findings from a survey of nearly 500 midwives that found that 82% of teenage mothers and 36% of adult women had consumed some alcohol during their pregnancy (Mathew et al., 2001; Parackal, 2003). Although a majority of drinkers among the clientele of midwives were occasional drinkers, nearly 5% of all pregnant women seen by the midwives were heavy drinkers (usually consumed more than one glass of alcohol a day) and about 10% were occasional or regular binge drinkers (Parackal, 2003).

A study (McLeod et al., 2002) of 665 pregnant women at 24 weeks of gestation reported that 26% of women consumed some alcohol in the preceding seven days (4% of women had consumed alcohol on 3 or more days). The study found that women who had previous pregnancies, women who did not experience nausea, women who were less socio-economically deprived and women who did not smoke were more likely to report having consumed alcohol.

Another study (Ho & Jacquemard, 2009) of 100 women at Taranaki Base Hospital who had just given birth reported that 28% of the women surveyed continued consuming alcohol throughout their pregnancy. Ten percent of the total cohort was drinking more than 2 units per typical day and more than 7 units per week, and 9% of the total cohort reported binge drinking during pregnancy.

A study published the following year by Morton et al. (2010) found that, in unplanned pregnancies, there is a greater chance that pre-pregnancy alcohol consumption will continue

until a pregnancy is recognised or confirmed. Among mothers in the Growing Up in New Zealand study with unplanned pregnancies, one third consumed four or more drinks of alcohol per week prior to pregnancy, and 13% of mothers consumed four or more drinks of alcohol a week in the first trimester. After the first trimester, 5% of mothers with unplanned pregnancies and 3.5% of mothers with planned pregnancies continued to consume at least one drink of alcohol a week.

In 2012 a study was published on a random sample of 1256 women aged 16-40 years; of those who participated 127 were currently pregnant and 425 women had previously been pregnant (Parackal et al., 2012). This study showed that 50% of the currently pregnant women and 37% of the previously pregnant women stopped drinking once pregnancy was confirmed. However, 13% of pregnant women continued to drink some alcohol during pregnancy.

Summary

The literature suggests that alcohol-related harm is experienced by females in New Zealand, but that levels of harms among females are generally lower than those experienced by males (and this fits with what is known of drinking patterns in New Zealand). There were a few exceptions, however, and these tended to be in relation to self-reported harms or harms from others' drinking (where females had higher levels than males in some instances). The literature also suggests that alcohol is implicated in a wide range of harms experienced by females in the New Zealand population.

Much of the research that has been undertaken on alcohol-related harm in New Zealand is cross-sectional or longitudinal (on the same participants over time). However, there is very little research assessing population trends in harms for females, including for more serious harms such as those requiring hospitalisation, or drink driving related crashes. Kypri et al. (2006) assessed alcohol-involved traffic crashes over time among young females, however more recent trends are not known.

There is very little research available on alcohol-related harm for Maori, Pacific and Asian peoples and, in particular, females (including a lack of research understanding trends over time).

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Appendix 4 Contextual data

Apprehensions for assault, fighting in public places and disorder offences came from the New Zealand Police. *These data represent apprehensions for offences and it is possible that one or more offences may have been committed by one person, or multiple persons may have been apprehended for one offence.*

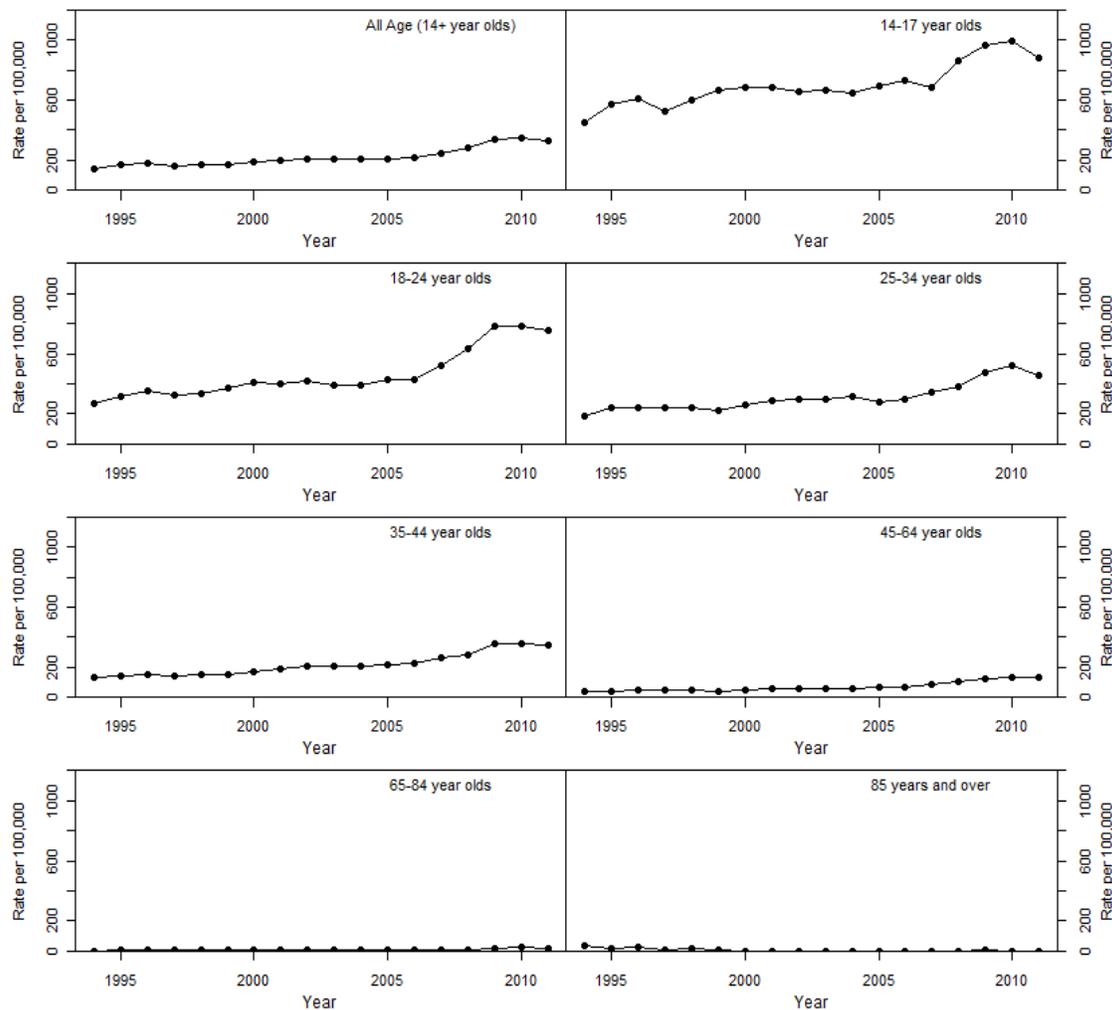
Apprehensions were utilised in this analysis, rather than prosecutions or convictions, as more recently the Police have implemented the '*Policing Excellence*' initiative called '*Alternative Resolutions*', where Police made an active policy decision to resolve many low level offences by formal warnings, rather than prosecution (pers Comm. Lang 2012). This has, in part, resulted in large decreases in prosecutions and convictions from 2009. Apprehensions are less affected.

A broken stick model was used for all Police data analysed. This was due to the change to the Police offence recording system in 2005 which affected the comparability of the data (and increased recorded offences by around 5% to 10%). The trend was tested prior to 2005 and then following. The trend prior to 2005 is not affected by the Police offence recording system change, but the trend following 2005 may be.

Caveats

Data are collected/stored using a national computer system/offence database. Police use the same computer systems across the entire country to manage individual cases. In 2005, however, there was a change to the Police offence database when police implemented a new computer system, which became operational from July 2005. At this point the rate of offence recording increased by approximately five to ten percent. This change in efficiency was largely as a result of the more efficient technology, increasing the emphasis on staff training relating to offence records, and other associated system changes.

Appendix 4_Figure 1: Apprehensions for common assault, females, by age group 1994 to 2011



Common assault: Prior to 2005 statistically significant increases in apprehensions among females for common assault occurred for almost all age groups (excluding those aged 65-84 and 84+ years). The rate of increase was greatest among females aged 14-17 years followed by females aged 18-24 years. Following 2005, statistically significant increases were found for almost all age groups (excluding those 84+ years) with the rate of increase greatest among 18-24 year olds followed by females aged 14-17 years. Some of this increase may, however, be a result of changes noted in the Police offence recording system.

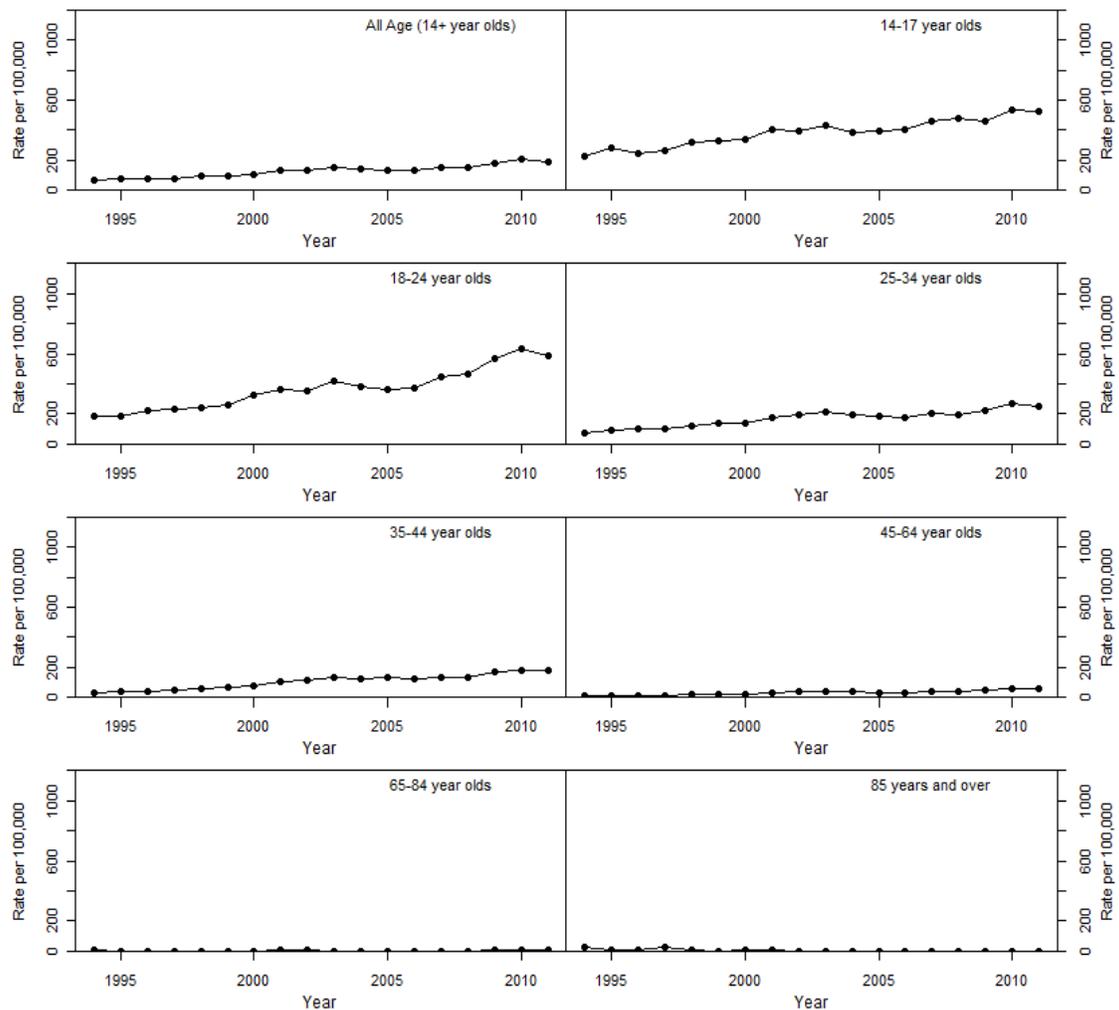
Serious assault resulting in injury: Prior to 2005, statistically significant increases were found among females aged 14-17, 18-24, 25-34, 35-44 and 45-64 years. The rate of increase was greatest among females aged 14-17 years. Following 2005, statistically significant increases were found among females aged 18-24, 25-34, 35-44 and 44-65 years. The rate of increase was greatest among females aged 18-24 years. Some of this increase may, however, be a

result of the changes noted in the Police offence recording system. Trends stabilised for females aged 14-17 years.

Fighting in public: Prior to 2005, statistically significant increases were found for those aged 14-17 through to those aged 45-64 years (there were very few fighting in public offences recorded for females in the age groups 65 and over). The rate of increase was greatest among females aged 14-17 years. Following 2005, statistically significant increases were found for females aged 18-24 years and 35-44 years; all other groups remained stable.

Disorder offences

Appendix 4_Figure 2: Apprehensions for disorder offences, females, by age group 1994 to 2011



Prior to 2005, statistically significant increases in disorder offences were found for females aged 14-17 through to 45-65 years (there were no disorder offences in the oldest age groups). Following 2005, a statistically significant increase was found for females aged 18-24 years, and the rate of increase was high. Some of this increase may, however, be a result of the changes noted to the Police offence recording system.

Police offence data by ethnic group

Common assault: Prior to 2005, statistically significant increases in apprehensions for common assault were found for Maori females aged 14-24, 25-44 and 45-64 years. The greatest rate of increase was among the two youngest age groups.

Following 2005, statistically significant increases were found among Maori females aged 14-24, 25-44, 45-64 and 65-84 years. The rate of increase was greatest among the two youngest age groups. Some of this increase following 2005 may, however, be a result of the Police offence recording system change.

For Pacific females, prior to 2005 no statistically significant trends were identified for common assault. Following 2005, statistically significant increases were found for Pacific females aged 14-24, 25-44 and 45-64 years. Some of this increase may, however, be a result of the Police offence recording system change.

For Asian females, for the most part no trends were identified. One statistically significant increase in common assault was found for females aged 14-24 years prior to 2005. Following 2005 a significant decrease was found for Asian females aged 14-24 years.

Serious assault resulting in injury: Statistically significant increases in apprehensions for serious assault were found for Maori females aged 14-24, 25-44 and 45-64 years prior to 2005. Following 2005, statistically significant increases for assault resulting in injury increases were found for only the two youngest age groups (14-24 and 25-44 years).

For Pacific females, numbers for serious assault resulting in injury were small.

For Asian females, no statistically significant trends were identified prior to or following 2005.

Disorder offending: rates of apprehensions for disorder offences were higher among Maori females compared to Pacific and Asian females. Rates were also higher among Maori than in the general population.

For disorder offending, statistically significant increases were found prior to 2005 for Maori females aged 14-24, 25-44 and 45-64 years, trends stabilised following 2005. The rate of increase was greatest among Maori females aged 14-24 years. Results were identical for fighting in a public place.

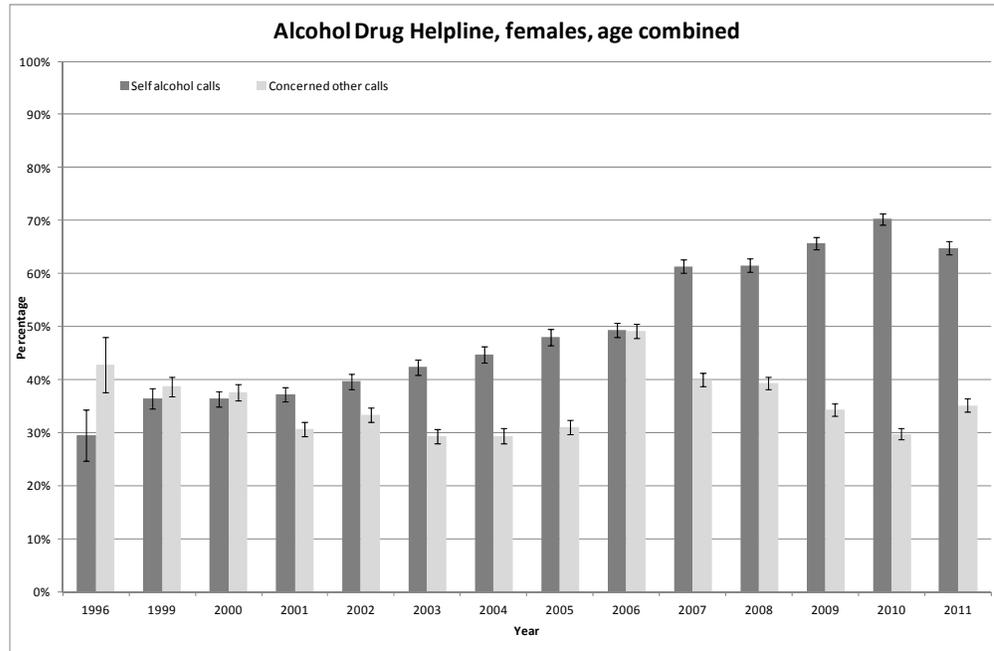
Statistically significant increases were found for Pacific females aged 14-24 years prior to and following 2005.

No statistically significant trends were identified for Asian females.

Alcohol Drug Helpline data calls made by females 1996 to 2011

The following graph presents the number of calls made to the Alcohol Drug Helpline by females, 1996 to 2011. Calls made about own alcohol use, and calls made due to concern about others' alcohol use, were available for analysis.

Appendix 4_Figure 3 Calls made by females to the Alcohol Drug Helpline



In 1996 statistically significantly more calls were made by females due to concern over others' drinking. In 2011, there were approximately 30% more calls made by females over concern about their own drinking (as compared to calls about others' drinking) (Figure 15).

Thirty percent more calls were made to the Alcohol Drug Helpline by females concerned about their own drinking in 2011 as compared to 1996. This could reflect a number of factors: increased willingness among females to call the helpline/ to seek help, increased concern about one's own drinking; increased advertising of the helpline; or an increased capacity of the helpline to take calls.

From 2006, around 70% of calls made by females due to concern about their own drinking were made by European females and around 20% by Maori.

Partially alcohol-attributable hospitalisations and mortality

Hospitalisations for breast cancer, suicide and assault can be partially caused by alcohol consumption (partially alcohol-attributable). These conditions were analysed separately only, as they were not directly comparable with the alcohol-attributable conditions (so could not be combined with them). These data are for contextual purposes only as they are more likely to reflect non alcohol-related events than alcohol-related events (e.g. up to 30% of deaths due to suicide and self-inflicted injury may be alcohol-related in New Zealand; 70% are not).

Assault is defined as injuries purposely inflicted by another with intent to injure or kill (excluding law enforcement and war). This measure therefore reflects the harm caused to a female *by another* (who *may or may not* have been drinking). The female's own drinking may also play a part.

Appendix 4_Table 1: Partially alcohol-attributable hospitalisations 1996 to 2011

Type of condition	Measure	Age group	Trend 1996 to 2011	Rates per 100,000 pop. in 2011
Partially alcohol-attributable	Breast cancer	15+ years	Increasing	134.8
	Suicide	15+ years	Decreasing	85.2
	Assault	15+ years	No change	22.5

Hospitalisations for breast cancer were increasing, suicide was decreasing and there was no change in hospitalisations for assault among females 1996 to 2011.

Appendix 4_Table 2: Partially alcohol-attributable deaths 1996 to 2009

Type of condition	Measure	Age group	Trend 1996 to 2009	Rates per 100,000 pop. in 2009
Partially alcohol-attributable	Breast cancer	15+ years	Decreasing	37.3
	Suicide	15+ years	No change	6.5
	Assault	15+ years	No change	1.4

Deaths due to breast cancer were decreasing (while hospitalisations were increasing). Likely due to population based screening using mammography and the systemic use of adjuvant therapies (Youlden et al., 2012). There were no changes in deaths due to suicide or assault 1996 to 2009.

