

# The drinking patterns of older New Zealanders: National and international comparisons

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Any queries regarding this report should be directed to HPA at the following address:

Health Promotion Agency

PO Box 2142

Wellington 6140

New Zealand

[www.hpa.org.nz](http://www.hpa.org.nz)

[research@hpa.org.nz](mailto:research@hpa.org.nz)

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## COMMISSIONING CONTACT'S COMMENTS

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# The Drinking Patterns of Older New Zealanders: National and International Comparisons



Report 1 of 3

A report for the Health Promotion Agency



UNIVERSITY OF NEW ZEALAND

COLLEGE  
OF HEALTH  
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THE UNIVERSITY OF  
AUCKLAND  
Te Whare Wānanga o Tamaki Makaurau  
NEW ZEALAND

**MEDICAL AND  
HEALTH SCIENCES**  
CENTRE FOR ADDICTION RESEARCH

The authors of this report are:

Dr Andy Towers (School of Health Science, Massey University)

Professor Janie Sheridan (School of Pharmacy and Centre for Addiction Research,  
University of Auckland)

Dr David Newcombe (School of Population Health and Centre for Addiction Research,  
University of Auckland)

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## Executive summary

Very little is known about the role of alcohol in older people's lives over the lifespan, patterns of alcohol use over older adulthood, and how the drinking patterns of older New Zealanders compare with patterns in older adults in other countries.

Using data from the New Zealand *Health, Work & Retirement Longitudinal Study* (NZHWR), the current report explores the patterns of drinking in older New Zealanders at a national level and in an international context. Specifically, this report presents:

- a review of drinking patterns in older adults
- a comparison of drinking in older Māori and non-Māori New Zealanders
- an international comparison of the alcohol use patterns in older New Zealanders and older adults in eight other countries.

### Patterns of drinking in New Zealand older adults

In this report, the term 'older adults' refers to individuals aged 50 years and over. This was because the report includes comparisons with developing countries,<sup>a</sup> and because many of the world's leading longitudinal studies of ageing use samples aged 50 years and over (eg, the World Health Organization (WHO)'s Study on Global Ageing and Adult Health).

#### *Drinking frequency, drinking quantity & binge drinking: Māori & non-Māori patterns*

In New Zealand, Māori<sup>b</sup> are a population that is at high risk of experiencing alcohol-related harm. Given that Māori are at high risk and constitute a significant proportion of the older New Zealand population, a comparison of potential differences in alcohol use patterns between older Māori and non-Māori was warranted. Using a short-form of the WHO's *Alcohol Use Disorders Identification Test* (the AUDIT-C) included in the 2010 NZHWR dataset, we compared the frequency of alcohol use, the average quantity consumed, and instances of binge drinking<sup>c</sup> in older Māori and non-Māori. This comparison revealed that:

- older Māori (23%) were more likely to abstain than older non-Māori (14%)
- older Māori drank alcohol *slightly* less frequently than older non-Māori
- older Māori consumed a *slightly* higher quantity of alcohol per occasion than older non-Māori

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<sup>a</sup> WHO acknowledges that those aged 50 and over constitute an 'older adult' in developing countries or cohorts with shorter life expectancies (1) 1. World Health Organization. (2016) Proposed working definition of an older person in Africa for the MDS Project. Vol. 2016, World Health Organization1. World Health Organization. (2016) Proposed working definition of an older person in Africa for the MDS Project. Vol. 2016, World Health Organization1. World Health Organization. (2016) Proposed working definition of an older person in Africa for the MDS Project. Vol. 2016, World Health Organization1. Organization, W. H. (2016) Proposed working definition of an older person in Africa for the MDS Project. Vol. 2016, World Health Organization1. Organization, W. H. (2016) Proposed working definition of an older person in Africa for the MDS Project. Vol. 2016, World Health Organization1. Organization, W.H. *Proposed working definition of an older person in Africa for the MDS Project*. 2016 [cited 2016 23 November]; Available from: <http://www.who.int/healthinfo/survey/ageingdefnolder/en/>. (Organization, 2016)(1)(Organization, 2016)(Organization, 2016)(1)(Organization, 2016)

<sup>b</sup> In this report, Māori ethnic identity was a prioritised, dichotomised ethnicity indicator based on self-report of ethnic identity where the reporting of Māori descent automatically counts that individual as 'Māori', even where the participant indicates descent from multiple ethnic groups.

<sup>c</sup> 'Binge drinking reflects 'the consumption of six or more drinks on a single occasion' as per the WHO's *Alcohol Use Disorders Identification Test*.

- older Māori and non-Māori shared a similar binge drinking frequency.

Statistical analysis showed that the differences observed between older Māori and non-Māori were very small. However, there were significant gender differences in drinking frequency, average quantity consumed, and binge drinking. Specifically:

- older men drank alcohol far more frequently than older women
- older men consumed much more on typical occasions when drinking alcohol than older women
- older men were far more likely to binge drink than older women.

### **Patterns & predictors of hazardous drinking**

We then used the AUDIT-C screening score to assess the prevalence of 'hazardous drinking'.<sup>d</sup> Our comparison illustrates that older Māori and non-Māori shared similar hazardous drinking rates:

- Overall, 37% of older Māori and 43% of older non-Māori were hazardous drinkers.
- 26% of older Māori women and 30% of older non-Māori women were hazardous drinkers.
- 52% of older Māori men and 55% of older non-Māori men were hazardous drinkers.

Second, we undertook a statistical analysis to assess whether self-reported ethnicity was related to scores on the AUDIT-C scale over and above the influence of known demographic, physical health, psychosocial and economic determinants of drinking. The results of this analysis revealed that:

- hazardous drinking scores in older New Zealanders were higher in men, those with good economic living standards, and those in good physical health
- self-reported Māori ethnicity had no relationship with the hazardous drinking score.

This analysis provided the researchers with strong rationale for combining older Māori and non-Māori alcohol use data for the comparison with international counterparts.

### **An international comparison of older adult drinking patterns**

An international collaboration led by the New Zealand researchers identified datasets from four studies that were all collected in 2010:

1. The New Zealand *Health, Work & Retirement Longitudinal Study (NZHWR)*.
2. The *English Longitudinal Study of Ageing* in England.
3. The United States *Health and Retirement Study*.
4. The World Health Organization's *Study on Global Ageing and Adult Health*.

All studies included alcohol use questions which reflect older adult alcohol use patterns in nine countries: New Zealand, England, the United States, South Africa, China, Mexico, Ghana, India, and the Russian Federation. The questions from each study were not directly comparable, but cross-study harmonisation of these questions resulted in the following set of comparable alcohol use variables from each country:

- Proportion of past-year drinkers.

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<sup>d</sup> Hazardous drinking reflects drinking patterns that raise the risk of immediate harm (ie, injury, falls, assaults) or the risk of developing alcohol-related health issues in future (ie, chronic health conditions, addiction).

- Frequency of weekly drinking.
- Quantity consumed on typical drinking occasion.
- Frequency of heavy drinking.

### ***Past year drinking across countries***

The initial analysis compared the proportion of current drinkers across countries overall, and split by gender. The results showed that:

- New Zealand had the second highest proportion of older drinkers (83%) behind only England (87%), and considerably more than other OECD countries such as the United States (62%) and Mexico (56%)
- approximately 88% of older men and 79% of older women in New Zealand were drinkers, a gender gap similar to that in older English adults. This gap was much smaller than seen in most other countries such as the Russian Federation (87% vs. 66%) and China (56% vs. 11%).

### ***Frequency of weekly drinking***

The harmonisation of drinking frequency questions across studies allowed us to compare the frequency of weekly drinking in older adults using the following thresholds: 0 days, 1 day, 2-3 days, and 4 or more days per week. The results of this cross-country comparison revealed that:

- older New Zealanders showed a tendency towards 'frequent' drinking
- 60% consume alcohol on two or more days per week on average which was similar to England (60%) and India (57%), but more frequent than other countries
- 34% of older NZ drinkers consume four or more days per week which is lower than China (64%), similar to England (32%), but higher than the United States (23%), the Russian Federation (11%) and Mexico (8%)
- older NZ men and women tend to drink at a frequency more similar to one another than seen in other countries where women tend to drink a lot less frequently than men (eg, the Russian Federation, Mexico, India).

### ***Quantity of drinks consumed on a typical drinking occasion***

The typical drinking quantity question from each study was harmonised to produce standardised responses reflecting the average quantity of alcohol consumed on *typical drinking occasions*, and grouped as follows: up to 2 drinks, 3-4, 5-6, 7-9, and 10 or more drinks. The results of this cross-country comparison showed that:

- 64% of older New Zealand drinkers typically consumed up to two drinks which was a slightly greater proportion than in some countries (eg, England, the Russian Federation), but lower than in other countries (eg, the United States, Ghana)
- there were far more older New Zealand women drinkers (82%) than men (46%) who typically consumed up to two drinks
- 16% of older New Zealand drinkers consumed five or more drinks on a typical occasion. The proportion of older New Zealand male drinkers who typically consumed five or more drinks on each occasion (26%) was four times the proportion of New Zealand women (6%), and one of the highest for men across all countries.

### *Frequency of heavy drinking*

Using a definition of heavy drinking frequency developed by WHO experts,<sup>e</sup> we identified heavy drinkers (defined as five or more drinks for men and three or more drinks for women) in each country whose alcohol consumption was frequent (two-three days per week) or very frequent (four or more days per week). The results revealed that:

- New Zealand (18%) had a higher proportion of *frequent* or *very frequent* heavy drinkers compared with all other countries except China (31%) and South Africa (23%)
- this 18% of older NZ heavy drinkers consumed either frequently (6%) or very frequently (12%)
- the proportion of older NZ men (22%) who were either frequent or very frequent heavy drinkers was much greater than the proportion of older NZ women (14%)
- there were considerable gender differences across countries in the proportion of heavy drinking and the frequency of heavy drinking. In New Zealand, older men who were heavy drinkers were more likely to drink very frequently compared to older women, while in England, older women were more likely to drink very frequently.

### *Factors potentially explaining cross-country differences in drinking patterns*

Using data provided by the 2015 *Global AgeWatch Index*, we explored the relationships between the proportion of older adults in each country who drank and four key indicators of social and economic wellbeing in older adults:

1. *Gross National Income (GNI) per capita.*
2. *Healthy life expectancy at 60 (HALE60).*
3. *Proportion of older adults with education at secondary-level or above.*
4. *Proportion of older adults identifying as socially connected.*

The results of this cross-country comparison indicated that:

- the proportion of older drinkers was highest in countries with higher relative wealth, higher levels of education in their older adult population, and where older adults felt greater social connectedness
- there was little relationship between the proportion of older adults who drank in each country and that country's healthy life expectancy at 60 years of age.

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<sup>e</sup> The definition of frequent and very frequent heavy drinking was suggested by WHO experts involved in the classification of alcohol use patterns in developing countries (see Section 3.0 for specific details and reference), and confirmed upon consultation with the international collaborators. However, this suggested classification has had to be slightly modified in order to fit the harmonised alcohol use categories used in this cross-national comparison.

# 1.0 Literature overview: Measuring older adults' drinking internationally

## 1.1 Population ageing and the rise of the older drinker

### 1.1.1 Global population ageing trends

Significant advances in healthcare combined with reduced infant mortality and fertility resulted in a steadily ageing global population throughout the 20<sup>th</sup> century.<sup>(2)</sup> Between 1950 and 2013, the global population of older adults increased by 400% (from 202 million to 841 million). By 2050 this number is expected to triple once more, exceeding 2 billion people.<sup>(2)</sup> For the first time in human history, those aged 65 years and over around the world will soon outnumber those aged under 5.<sup>(3)</sup>

Population ageing is now a key factor influencing the economic, social and health policies of developed and developing countries around the world, and New Zealand is no exception. The population of older New Zealand has doubled since 1980, and is expected to double again by the year 2036 when approximately 24% of the population will be aged 65 years and over.<sup>(4)</sup>

Population ageing places increased strain on healthcare systems that were never designed to address needs of a burgeoning older population.<sup>(5)</sup> There is now an increased need to understand both the patterns of, and factors determining, health behaviours in older adults in order to develop healthcare systems that maintain health and reduce reliance on care.

### 1.1.2 Alcohol use in older adults

Alcohol use is the world's third leading cause of morbidity and the primary cause in 4% of deaths worldwide.<sup>(6, 7)</sup> While problem drinking is traditionally construed as a youth problem, research now indicates that up to 40% of older adults aged 65 years and over may be categorised as hazardous drinkers.<sup>(8)</sup>

This statistic is especially alarming given that, in comparison with younger drinkers, older adults have higher physiological sensitivity to alcohol,<sup>(9, 10)</sup> more co-morbid health conditions and use of medication that alcohol can interfere with,<sup>(11-15)</sup> a higher risk of alcohol-linked mental health issues,<sup>(16-18)</sup> and a greater likelihood of alcohol-related injuries and death.<sup>(19, 20)</sup>

Despite decades of debate concerning the presence of a potential 'beneficial health effect' of alcohol, recent research suggests these proposed benefits were the result of poorly analysed data,<sup>(21)</sup> and that alcohol provides no positive health effects for older adults.<sup>(22)</sup>

A growing awareness of the increased sensitivity that older adults have to the effects of alcohol has led international health bodies to classify older adults as an at-risk population for alcohol use. The World Health Organization (WHO)<sup>(23)</sup> notes that older adults are at an increased risk of alcohol-related harm, and in New Zealand, older adults have been identified as an at-risk population of drinkers for over 15 years.<sup>(24)</sup>

### 1.1.3 Consequences for the health system

A projected growth in the number of older drinkers is already presenting issues for the planning of alcohol-related healthcare services in the United States. For example, Gfroerer et al<sup>(25)</sup> found that a noticeably larger percentage of substance-abusing older adults (86%)

are dependent on or abuse alcohol than older adults who are dependent on or abuse illicit drugs (10%). Furthermore, they projected that the number of older adults potentially in need of substance abuse treatment services in the United States will increase from 1.7 million in 2000 and 2001 to 4.4 million in 2020.

Similarly, Savage <sup>(26)</sup> notes that, although many older adults do not meet the diagnostic criteria for a substance abuse disorder, a large proportion will still require intervention in order to address the adverse consequences of at-risk drinking.

Reducing the rates of drinking in a rapidly expanding older adult population requires an understanding of the patterns of such drinking, how such patterns might differ across countries, and how such differentiation across countries might reveal policy approaches that are effective at reducing alcohol use and related harm.

## **1.2 Lack of focus on older adults' drinking**

Despite increased awareness of the dangers of excessive alcohol use in a growing older adult population, the issue of drinking in this population is largely ignored both by health professionals and health researchers.<sup>(27)</sup> Unsurprisingly, the issue of older adult drinking has been referred to as a 'silent epidemic'.<sup>(28)</sup>

The approach adopted by the wider health sector that results in active discounting of alcohol issues in older adults is perhaps best defined by Benschhoff et al <sup>(27)</sup> who noted that "the substance abusing elderly individual may be seen as a nice little old man/lady who could not possibly have a drug or alcohol problem" (p.45). This perspective may result in healthcare professionals being less alert to the issue of older adults and their alcohol consumption,<sup>(28)</sup> with very few older adults able to recall being asked by their General Practitioner (GP) or other healthcare professionals about their alcohol use.<sup>(29)</sup>

### **1.2.1 Problems with misattribution**

A lack of enquiry regarding alcohol use in older adults may contribute to the misattribution of physiological and psychological problems. Dufour and Fuller <sup>(30)</sup> observed that presentation of a drinking problem is often similar to the presentation of other disorders and illnesses related to ageing.

This inability to clearly differentiate alcohol-related and ageing symptoms poses difficulty for healthcare professionals in identifying drinking problems in older adults, and likely explains why the identification of alcohol-related harm and disorders in older adult populations is significantly under-estimated.<sup>(31)</sup>

### **1.2.2 Problems with screening**

Difficulty in identifying alcohol misuse in older adults can also be attributed to a lack of appropriate screening tools. Common alcohol screening tools, such as the AUDIT and AUDIT-C for hazardous and harmful drinking, have been found to perform well in older adult populations. However, reduced cut-off points for older adults have been suggested.<sup>(32)</sup>

There are concerns that important factors such as medication-alcohol interactions, lower tolerance to alcohol due to ageing, and pre-existing chronic illnesses are not taken into account by these tools. The Alcohol-Related Problems Survey (ARPS) <sup>(33)</sup> and the Comorbidity Alcohol Risk Evaluation Tool (CARET) <sup>(34)</sup> have attempted to take these issues into consideration, although the former requires a computer programme for its use.



Savage <sup>(26)</sup> also notes that popular screening tools tend to focus on current drinking patterns, thereby discounting the impact that heavy drinking in early life has on health in later-life. As a consequence, older adults often do not meet the standardised criteria for alcohol abuse or dependence despite the threat that their consumption of alcohol may pose to their health.<sup>(35)</sup> Cognitive decline may result in misunderstanding of questions and issues with recall, whilst stigma associated with alcohol abuse may have an impact on sensitivity,<sup>(36)</sup> although the degree to which this is different for older adults remains to be determined.

### **1.3 Current evidence on the prevalence of older adult drinking**

Compared with younger age groups, there is a paucity of data regarding the prevalence of risky drinking in older adults. A consequence of the lack of data, and of the use of a variety of different screening tools in literature that does exist, is that researchers have been unable to agree on the prevalence of drinking (particularly risky or hazardous) in older adults.

#### **1.3.1 Current estimates**

Estimates of risky or hazardous drinking in older adult populations vary around the world. For example, in Belgium it was found that only 10% of adults over the age of 65 were at-risk drinkers,<sup>(37)</sup> while in the United States 15% of older drinkers were consuming above the recommended guidelines.<sup>(38)</sup> In another United States-based study, 36% of older men and 17% of older women drank above the recommended guidelines for risky drinking.<sup>(39)</sup>

The New Zealand Health Survey 2015/16 indicated that the vast majority of older New Zealanders drank alcohol including 70% of those aged 75 and over, yet only 10% or less of this population drink at hazardous levels.<sup>(40)</sup> However, alternative data from New Zealand's Health, Work and Retirement Longitudinal Study (NZHWR) found that hazardous drinking occurred in 45% of those aged 55-70 years old.<sup>(41)</sup>

#### **1.3.2 Differences in measurement**

It is difficult to determine whether differences in drinking prevalence reported both within and between countries can be attributed to real differences in drinking patterns or to differences in methodology used.

For example, Wilson et al. <sup>(38)</sup> measured the prevalence of older adults drinking harmfully using the National Health and Nutrition Examination Survey (NHANES). They applied a risk classification algorithm that assessed hazardous drinking by considering the quantity and frequency of alcohol consumption in relation to each of 63 risk factors for older drinkers, including medication use and pre-existing medical conditions.<sup>(38)</sup>

This contrasts with the approach by Hoeck and van Hal <sup>(37)</sup> who used an alcohol consumption questionnaire which included questions from the 4-item CAGE screening questionnaire,<sup>(42)</sup> as well as with Blazer and Wu <sup>(39)</sup> who compared consumption against United States-based drinking guidelines for risky drinking.

Such variation in approaches to identifying drinking patterns in older populations undermines efforts to identify evidence for international or within country prevalence estimates. In order to make comparisons between countries about the prevalence of older adults' drinking, and more specifically, the prevalence of hazardous drinking, it is fundamental to maintain methodological consistency across international samples.

## 1.4 The need for cross-national evaluation of older adults' drinking patterns

Collaborative global studies that apply the same measurement to assess drinking rates in older adults offer a solution to the problem of accurate estimation; however, there is a lack of such studies.

Lang et al. <sup>(43)</sup> used data from the English Longitudinal Study of Ageing and the United States Health and Retirement Study to compare alcohol use and mortality risks for older adults in England and the United States. They found that English older adults were more likely than United States older adults to drink above recommended drinking limits.<sup>(43)</sup>

Similarly, researchers have used the alcohol use questions employed in the WHO's Study of Global Health and Ageing (SAGE) <sup>(44)</sup> to explore variation in older adults' alcohol use in China, South Africa, Ghana, India, Mexico and the Russian Federation. For example, Clausen, Martinez, Towers, Greenfield, and Kowal <sup>(45)</sup> showed that rates of lifetime abstaining varied considerably across countries and by gender, from only 13% of Russian Federation men to 98% of Indian women.<sup>(45)</sup>

Despite this significant advance in international comparative analysis using common alcohol use questions, SAGE still only represents older adults from six countries with a clear focus on developing nations. Attempts at a collaborative global approach to studying the prevalence of alcohol use amongst older adults requires the inclusion of a greater number of countries, thus reflecting a wider range of developed and developing economies.

Furthermore, such expanded comparisons require the use of common alcohol use questions across countries or systems for harmonising alcohol use questions, in order to provide comparable data with which to explore older adult drinking patterns across borders.

## 2.0 Aims of the current study

The aims of the current study were twofold:

1. To assess the patterns of drinking in New Zealand older adults, and specifically compare drinking in Māori and non-Māori older adults.
2. To compare the patterns of drinking found in older New Zealanders with those found in older adults from other countries.

The two aims of this study noted above were approached as two separate projects.

For the first project, the New Zealand research team of Dr Andy Towers (Massey University), Professor Janie Sheridan (University of Auckland) and Dr David Newcombe (University of Auckland) used data from the 2010 data collection wave of the NZHWR in order to first assess the patterns of older New Zealanders drinking.

For the second project, the New Zealand research team worked with a team of international collaborators to compare alcohol use responses from studies of older adults around the world (including the New Zealand study).

Under an existing grant for longitudinal data harmonisation from the United States National Institute on Aging,<sup>f</sup> alcohol use, age and gender data from the 2010 NZHWR data collection wave were combined with the 2010 data from three sister studies: The English Longitudinal Study of Ageing; the United States Health & Retirement Study; and the WHO Study of Global Health and Ageing.

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<sup>f</sup> United States *National Institute on Aging* grant R21AG034263: "Harmonizing health outcomes and determinants across longitudinal studies on aging"

## 3.0 Patterns of drinking in New Zealand older adults

Prior to exploring the drinking patterns of older New Zealanders in an international context, it is important to review key patterns of drinking within the older New Zealand population itself. Given that Māori are at high risk of alcohol-related harm and constitute a significant proportion of the older New Zealand population, a comparison of potential differences in alcohol use patterns between older Māori and non-Māori is warranted.

It should be noted that the Māori ethnic identifier used in this analysis is a prioritised, dichotomised ethnicity indicator. This is based on self-report of ethnic identity where the reporting of Māori ethnicity automatically counts that individual as 'Māori', even where the participant indicates descent from multiple ethnic groups. In this respect, the Māori/non-Māori descent indicator should be considered, at best, an unsophisticated indication of ethnic identity, and patterns observed based on such an indicator warrant considerable scrutiny.

### 3.1 The NZHWR study

This report used data from New Zealand's largest study of healthy ageing: the New Zealand Health, Work and Retirement Longitudinal Study (NZHWR).<sup>9</sup>

The Massey University-based NZHWR is a government-funded study following thousands of New Zealanders aged 55-70 across multiple waves of data collection, which began in 2006.

The NZHWR is designed to understand factors that determine health and independence in older adults on a biennial basis, and aims to assess current health, wealth, social, working and demographic status of older New Zealanders. The collection of data for the NZHWR relies on both a postal survey of the sample, as well as face-to-face interviews of a subsample of participants.

Data from the NZHWR covers four main domains: determinants of mental and physical health in later life; living standards of older adults; quality of life; and ethnicity and aging. For the 2010 data collection wave, the NZHWR expanded its age range to cover New Zealanders aged 50-90, thus offering comprehensive coverage of older adults in New Zealand.<sup>(46)</sup>

### 3.2 The NZHWR 2010 sample

The data presented in this report have been weighted (post stratification) to reflect the appropriate age, gender and Māori/non-Māori breakdowns of the New Zealand older adult population as at 2010. The NZHWR was specifically designed to oversample older Māori, and weighting is therefore required to ensure that any analyses between older Māori and non-Māori adequately reflect population level trends.

Please note the data used in this report only reflects the data from the 2010 NZHWR data collection wave (ie, it is cross-sectional and does not necessarily reflect pre- or post-2010 trends).

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<sup>9</sup> Dr Andy Towers (report co-author) is a member of the Massey University team managing the NZHWR study. Access to the NZHWR data by the collaboration authoring this report was facilitated through Dr Towers.

Information concerning the NZHWR methodology can be found on page 18 of this report and has been reported in more detail by Towers et al.<sup>(46)</sup>

Table 1 illustrates the characteristics of the Māori and non-Māori NZHWR 2010 sample, both in their unweighted and weighted status. Applying post-stratification weighting to this sample ensures that the Māori oversample is statistically controlled for.

Table 1: Characteristics of the NZHWR 2010 sample by Māori and non-Māori sub-samples						
	Unweighted		Weighted		Difference $\chi^2$ (df)	
	Māori	Non-Māori	Māori	Non-Māori		
<b>Demographics</b>						
N	1238	2067	303	3003	-	
Mean age (SD)	65.2 (7)	64.0 (8)	63.3 (8)	63.7 (8)	-	
% Female	55.7%	54.7%	58.1%	51.5%	4.8(1)*	
<b>Employment status</b>						
Working	50.0%	55.0%	53.0%	56.8%	11.2(2)*	
Retired	35.9%	35.7%	32.2%	34.0%		
Other	14.1%	9.2%	14.5%	9.3%		
<b>Marital Status</b>						
Married/partnered	65.9%	77.2%	66.1%	77.8%	28.6(3)**	
Divorced/separated	12.4%	8.6%	12.1%	8.5%		
Widow/widower	13.6%	10.0%	13.4%	9.0%		
Single/never married	8.1%	4.3%	8.4%	4.4%		
<b>Educational qualifications</b>						
No qualification	40.9%	24.0%	43.8%	24.0%	54.9(3)**	
High School	20.3%	25.0%	19.4%	24.8%		
Post-High School/Trade	26.8%	33.6%	23.7%	33.8%		
Tertiary	11.9%	17.3%	13.1%	17.4%		

Note:  $\chi^2$  reflects Chi Square test for proportional differences; \*p<.05; \*\*p<.01.

### 3.3 The measurement of alcohol use in NZHWR 2010

The WHO's 10-item *Alcohol Use Disorders Identification Test (AUDIT)*<sup>(47)</sup> is one of the world's most well-validated screening tool of risky or hazardous drinking.

The AUDIT has been a key alcohol use screen for previous New Zealand alcohol use surveys (eg, Ministry of Health, 2013), is appropriate for use in older adults,<sup>(12)</sup> and is recommended for use in New Zealand primary health care settings.<sup>(48, 49)</sup>

In 2010 the NZHWR used the AUDIT-C,<sup>(50)</sup> a 3-item brief version of the AUDIT which specifically focuses on 'consumption' indicators: the frequency and typical quantity of alcohol use; and the frequency of 'binge' drinking (six or more drinks on one occasion).

The 3-item AUDIT-C is equivalent to the 10-item AUDIT in identifying hazardous drinkers across a range of populations,<sup>(51)</sup> is recommended for use in primary health care by the United States National Institute on Alcohol Abuse and Alcoholism,<sup>(52)</sup> and has already been used in New Zealand older adult population surveys.<sup>(8)</sup>

Prior research<sup>(53)</sup> illustrates that an AUDIT-C score of  $\geq 4$  out of 12 provides an adequate hazardous drinking threshold both for older men and older women.

The AUDIT-C items are as follows:

The questions from the AUDIT-C	
1.	<b>Frequency:</b> <i>How often do you have a drink containing alcohol?</i>
2.	<b>Quantity:</b> <i>How many drinks containing alcohol do you have on a typical day when drinking?</i>
3.	<b>Binge drinking:</b> <i>How often do you have six or more drinks on one occasion?</i>

### 3.4 Understanding and interpreting the data

The statistical analyses conducted in this section test for the any differences in patterns of drinking between Maori and non-Maori older adults. Specifically, we have utilised Chi-Square ( $\chi^2$ ) to explore the potential difference in proportions of Maori and non-Maori older adults drinking at difference levels of frequency, quantity and bingeing. Conventional statistical testing employs p-values where a value *less than* 0.05 indicates a 95% probability that the difference between groups in this sample reflects actual differences in the wider population.

In order to provide more clarity to this standard approach we also employed an 'effect size' indicator for Chi-Square called the 'Phi' coefficient ( $\Phi$ ). Phi values of 0.1 and below indicate that any statistical difference found between Maori and non-Maori in this pattern of drinking is quite small; values around 0.3 indicate medium sized differences, and values around 0.5 indicate a large difference between groups.

The combination of p-values and effect size measures allow us to assess whether a statistical differences exists and, if it does, whether it is of sufficient size for us to identify it as 'meaningful'. In this context a 'meaningful' difference between groups is a statistically significant result that is of medium or large effect size.

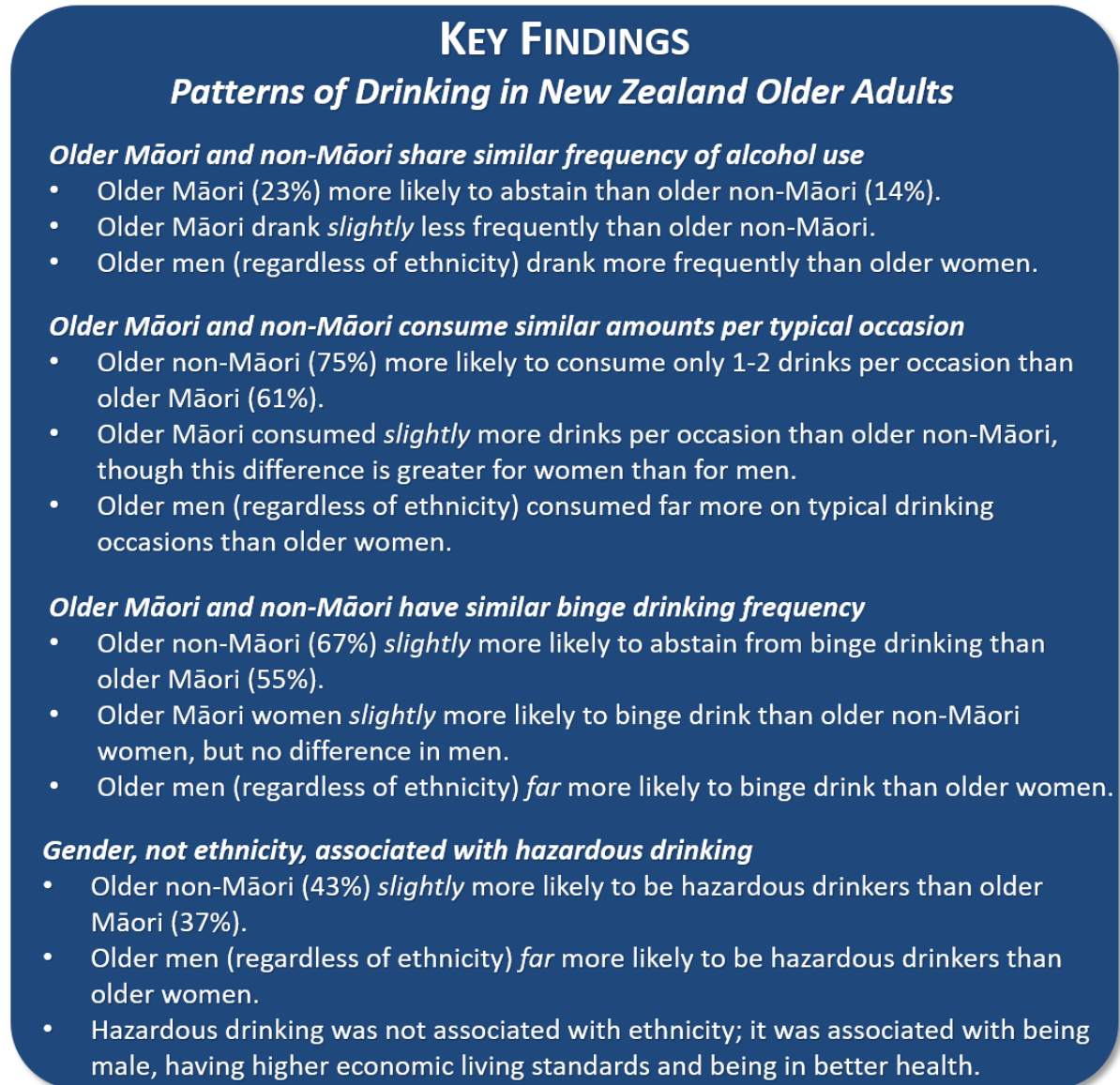
When interpreting the data presented in this section of the report, it is important to note that neither the reported associations nor any of the apparent trends infer cause and effect.

The data used are cross-sectional, which offers indications of point-in-time associations between alcohol use and other related factors for older New Zealanders.

However, cross-sectional data does not facilitate the investigation for predictors of change over time in alcohol use - this requires the use of longitudinal data.

### 3.5 Key findings: Patterns of drinking among New Zealand older adults

Figure 1 below provides the key findings from our analysis of the patterns of drinking in New Zealand older adults.

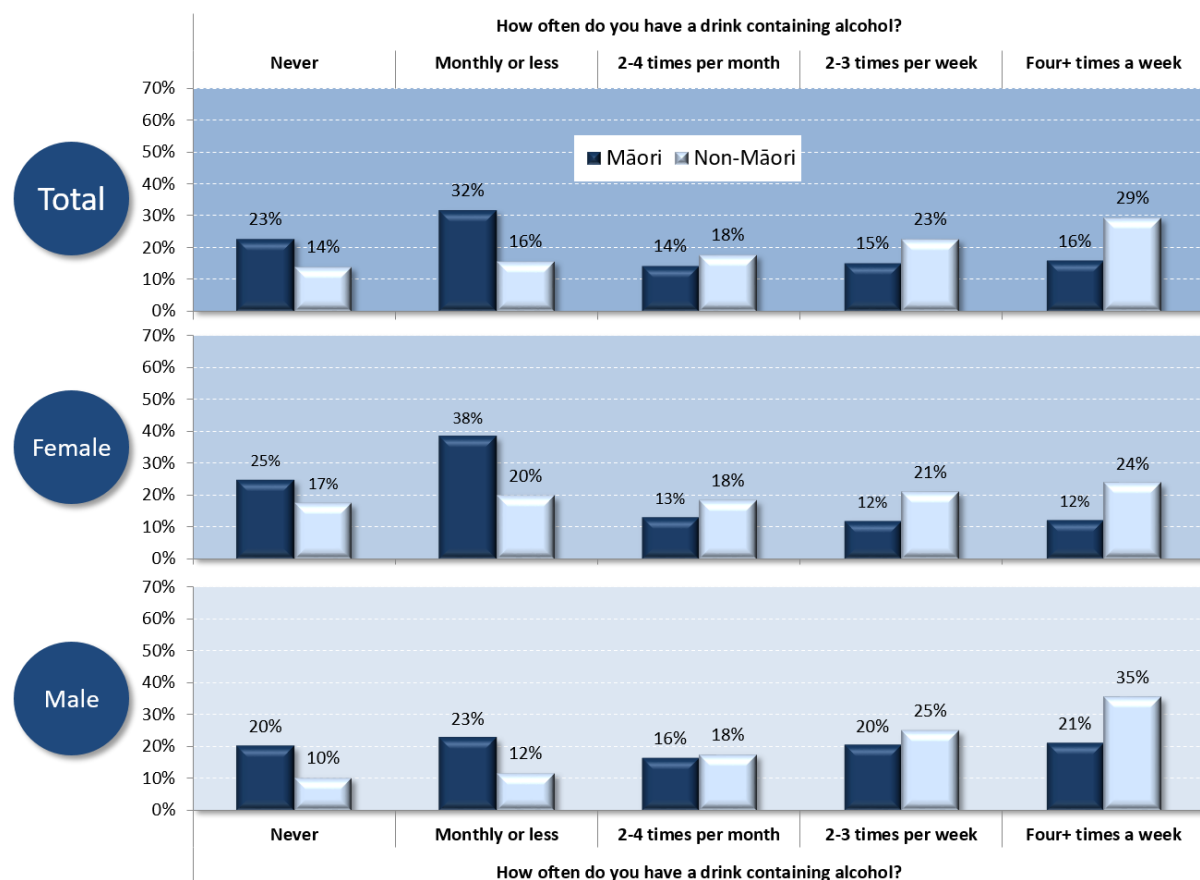


**Figure 1: The key findings concerning the pattern of drinking in older New Zealanders**

### 3.6 The frequency of alcohol use in older New Zealanders

Figure 2 illustrates the pattern of drinking frequency in Māori and non-Māori older New Zealanders overall, and broken down by gender. Both sub-populations illustrated a broad range of drinking frequency, with no more than 32% of either falling into a single drinking frequency category.

However, there was a pattern of more frequent drinking in non-Māori. Older non-Māori were statistically likely to drink *more frequently* than older Māori, though this distinction was statistically quite small.<sup>h</sup> This result reflects the broader findings of a literature review by Hodges and Maskill indicating that older Māori were less likely to drink than older non-Māori.<sup>(54)</sup>



**Figure 2: The frequency of alcohol use in Māori and non-Māori older New Zealanders overall and by gender**

Both older Māori men and women were statistically likely to drink *less* frequently than their non-Māori counterparts. Specifically, older Māori women<sup>i</sup> and men<sup>j</sup> had almost twice the proportion of abstainers or monthly-or-less drinkers than their non-Māori counterparts indicating that older non-Māori men and women tended to drink more frequently than their Māori counterparts.

<sup>h</sup> Chi square results:  $\chi^2$  (df 4)= 80.38,  $p < .001$ ,  $\Phi = .16$

<sup>i</sup> Chi square results:  $\chi^2$  (df 4)= 46.80,  $p < .001$ ,  $\Phi = .17$

<sup>j</sup> Chi square results:  $\chi^2$  (df 4)= 28.68,  $p < .001$ ,  $\Phi = .14$

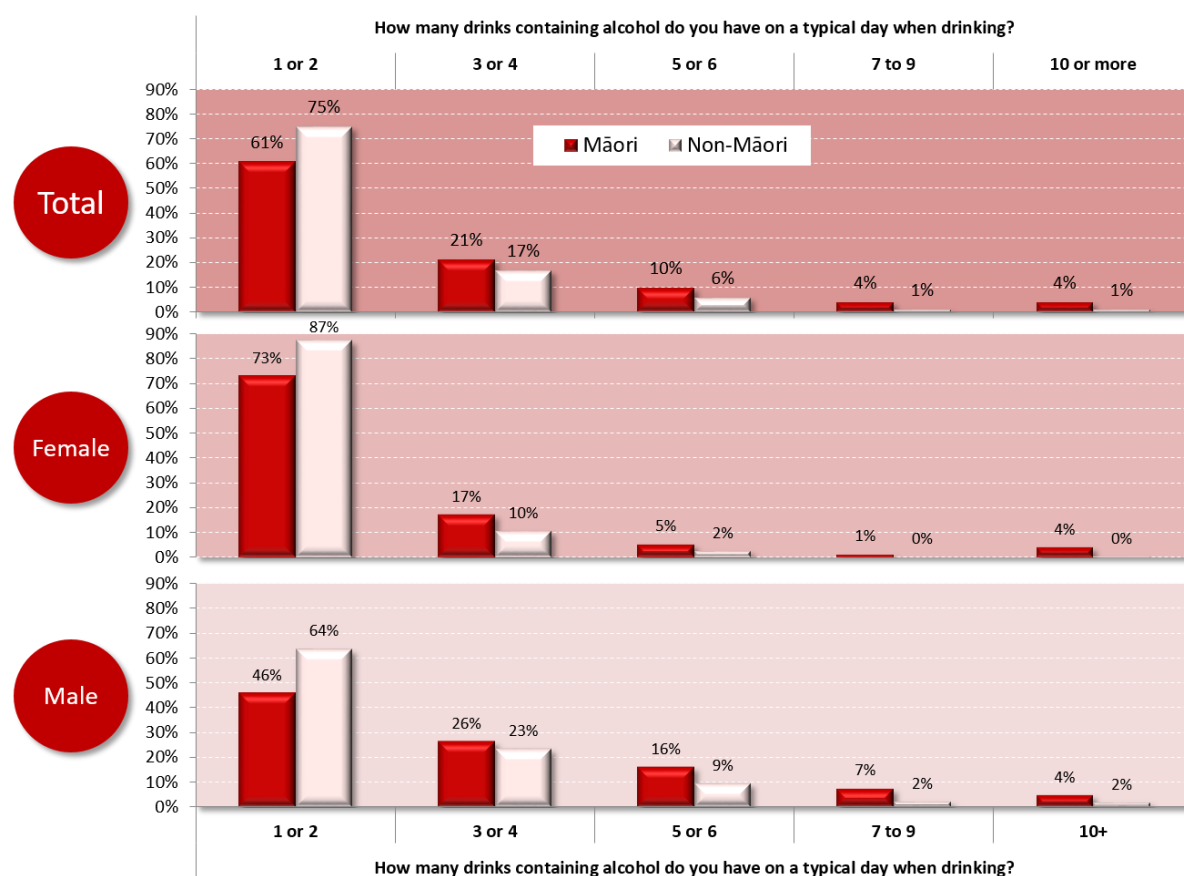


However, effect size indicators<sup>k</sup> suggest that these were relatively small differences in drinking frequency, indicating that ethnicity itself was not strongly related to drinking frequency in older adults.

Figure 2 also shows that, regardless of ethnicity, a greater proportion of males drank with high frequency (two-three times per week or more) than females.<sup>l</sup>

### 3.7 The typical quantity of alcohol use in older New Zealanders

In addition to understanding the frequency with which older New Zealanders consume alcohol, it is important to also understand the quantity of alcohol consumed on a typical drinking occasion (ie, a day when drinking). Figure 3 illustrates this for Māori and non-Māori older New Zealanders overall, and by gender.



**Figure 3: The quantity of alcohol consumed on a typical drinking occasion by older Māori and non-Māori New Zealanders overall and by gender**

Older Māori and non-Māori had broadly similar patterns in typical quantities consumed on occasions when they drank. While older Māori overall were statistically likely to drink *more* than older non-Māori on occasions when drinking, our results suggested that this difference was not very large.<sup>m</sup>

<sup>k</sup> See page 8 for description of small, medium and large effect sizes for Phi ( $\Phi$ ) coefficient

<sup>l</sup> Chi square results:  $\chi^2$  (df 4)= 117.31,  $p < .001$ ,  $\Phi = .19$

<sup>m</sup> Chi square results:  $\chi^2$  (df 4)= 50.26,  $p < .001$ ,  $\Phi = .13$

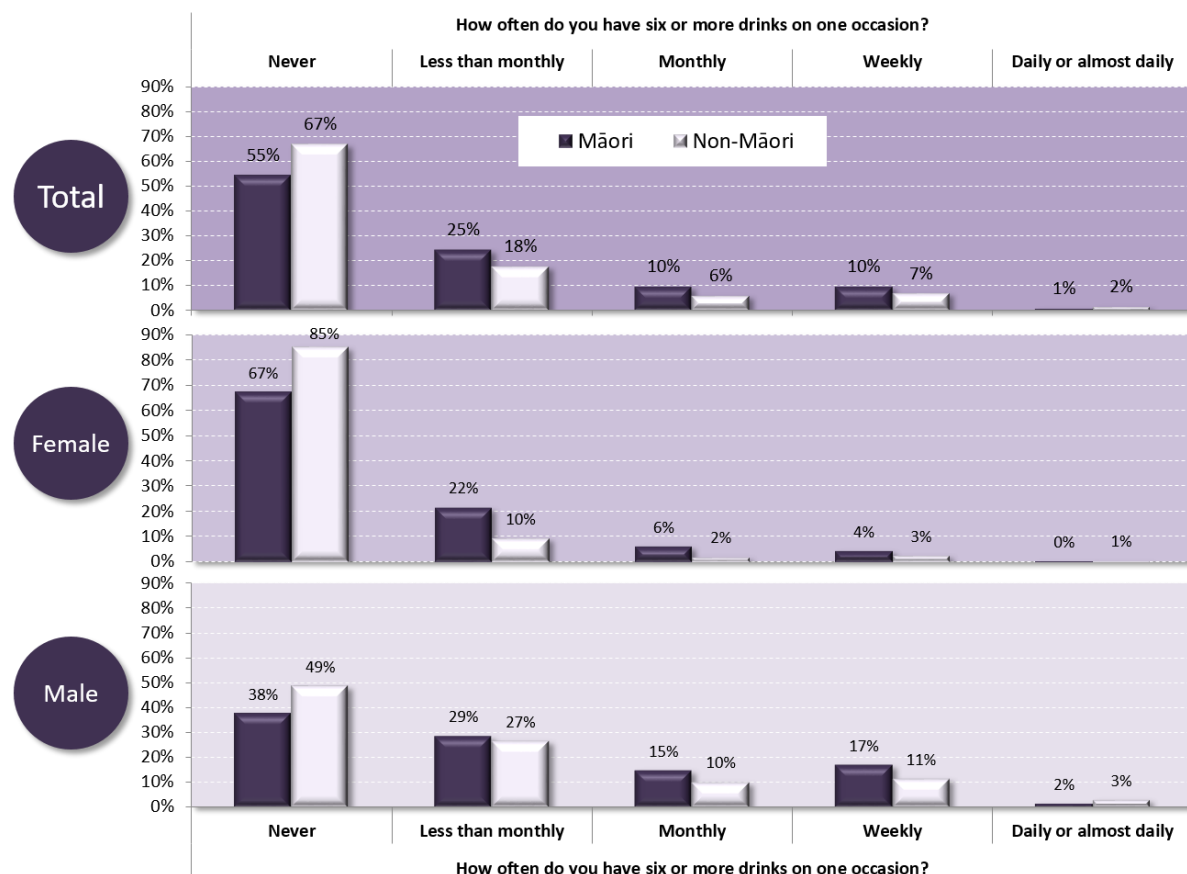
When male and female patterns were considered separately, it was clear that older Māori women<sup>n</sup> and men<sup>o</sup> consumed more on a typical drinking occasion than older non-Māori, though this ethnic difference was larger for women than it was for men.

When examined by gender, it is clear that, regardless of ethnicity, females were statistically likely to drink at much *lower levels* (eg, only one-two drinks on a typical occasion) as compared to male counterparts who were likely to consume more.<sup>p</sup> In general, these results suggested that gender was much more strongly associated with the typical quantity consumed on drinking occasions by older drinkers than ethnicity.

### 3.8 The frequency of binge drinking in older New Zealanders

Figure 4 illustrates the pattern of binge drinking (ie, consuming six or more drinks on a single occasion) for older Māori and non-Māori overall, and by gender.

Our analysis indicated that, while older Māori were statistically more likely to binge than older non-Māori, the difference was small enough to suggest that there was little practical difference in the frequency of binge drinking between these groups (ie, older Māori and non-Māori effectively binge at the same frequency).<sup>q</sup>



**Figure 4: The frequency of binge drinking by Māori and non-Māori older New Zealanders overall and by gender**

<sup>n</sup> Chi square results:  $\chi^2$  (df 4)= 59.37,  $p < .001$ ,  $\Phi = .20$

<sup>o</sup> Chi square results:  $\chi^2$  (df 4)= 26.61,  $p < .001$ ,  $\Phi = .14$

<sup>p</sup> Chi square results:  $\chi^2$  (df 4)= 225.20,  $p < .001$ ,  $\Phi = .28$

<sup>q</sup> Chi square results:  $\chi^2$  (df 4)= 21.72,  $p < .001$ ,  $\Phi = .09$

The greater proportion of older binge drinkers did so less than monthly, and there were almost no daily binge drinkers for either Māori or non-Māori. Our analysis indicated that older Māori and non-Māori men had statistically similar frequency of binge drinking, but older Māori women binged statistically more frequently than older non-Māori women, though the difference in frequency was very small.<sup>r</sup>

When analysed by gender only (regardless of ethnicity), our results showed that older men were statistically far more likely to be binge drinkers than older women.<sup>s</sup> These findings suggested that gender, rather than ethnicity, was the greater driver of binge drinking in older New Zealanders.

### 3.9 Clarifying the factors associated with drinking patterns in older New Zealanders

The patterns of drinking frequency, quantity, and bingeing between older Māori and non-Māori were broadly similar.

There were patterns for older non-Māori of both genders to drink more frequently than their Māori counterparts, while conversely older Māori tended to consume slightly more than their non-Māori counterparts on the typical days when they drank. However, our statistical analysis indicated that these differences

However, there are two key reasons why we are very cautious about drawing any conclusions about the role of ethnicity in underpinning potentially risky drinking patterns, and these are outlined below.

#### 3.9.1 Drinking frequency or typical quantity alone do not equal hazardous drinking

An individual's frequency of drinking or their typical quantity consumed are not, in isolation, necessarily reflective of drinking patterns that a health professional would consider hazardous or harmful to the individual's health. However, drinking frequency, quantity and binge drinking are key indicators used in a *combined* AUDIT-C assessment of the hazardousness of someone's drinking pattern, both in primary healthcare settings and in health research.

Given the subtle differences between older Māori and non-Māori in drinking frequency, quantity and binge drinking, we undertook a comparative analysis of Māori and non-Māori AUDIT-C scores to identify whether these subtle differences manifested in distinct rates of 'hazardous drinking' as detected by the AUDIT-C.

By summing scores on the frequency, quantity and binge items of the AUDIT-C, the individual's drinking pattern can be scored on a 12-point scale from 0 (least hazardous drinking pattern) to 12 (most hazardous drinking pattern).

Current research<sup>(55)</sup> suggests that older men and women scoring below four can be considered non-hazardous drinkers, while those scoring four or above are hazardous drinkers. Furthermore, we delineated specific non-drinking groups (lifetime abstainers versus

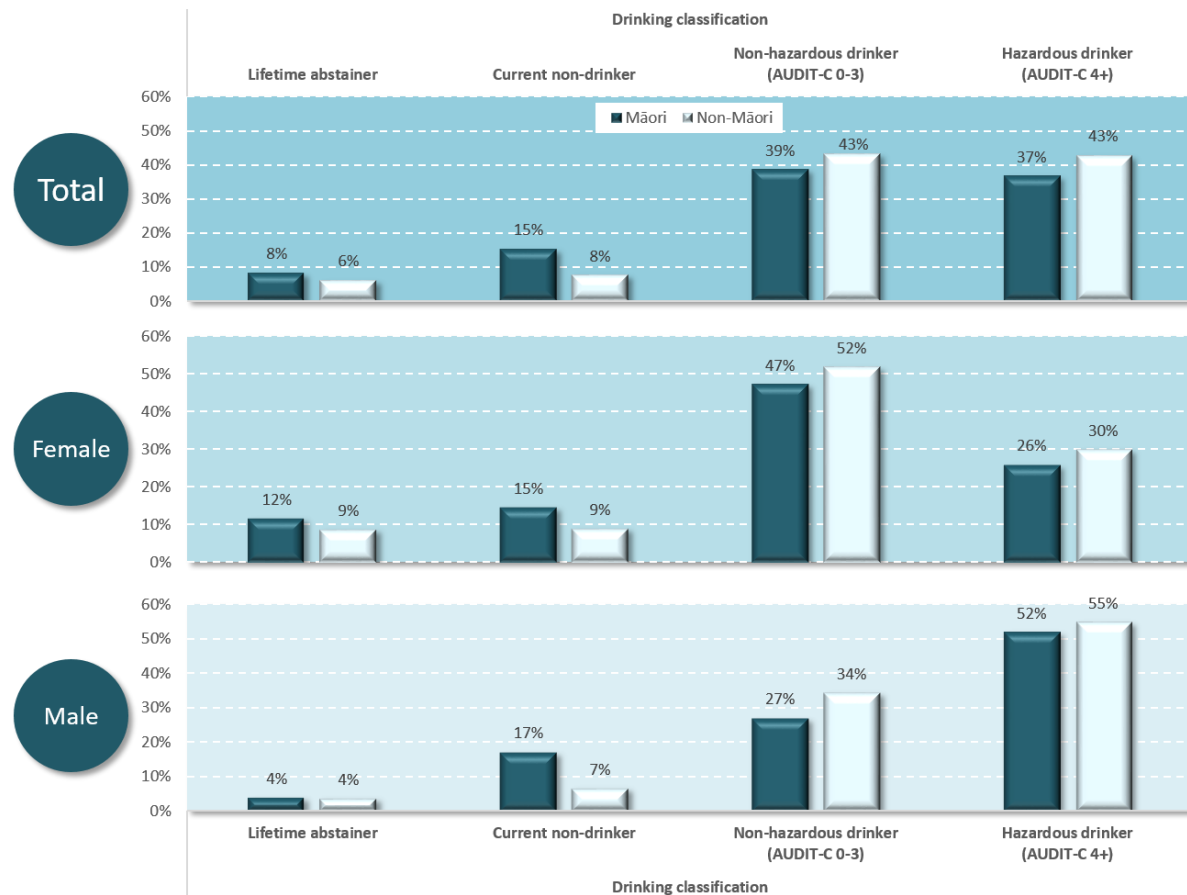
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<sup>r</sup> Chi square results:  $\chi^2$  (df 4)= 34.94,  $p < .001$ ,  $\Phi = .15$

<sup>s</sup> Chi square results:  $\chi^2$  (df 4)= 431.26,  $p < .001$ ,  $\Phi = .38$

current non-drinkers) by asking those who indicate that they never drink to indicate whether they ever did in the past.

Figure 5 illustrates the proportion of older Māori and non-Māori (overall and by gender) who were classified into these four drinking-related groups: Lifetime abstainer; current non-drinker; non-hazardous drinker; and hazardous drinker.



**Figure 5: The proportion of Māori and non-Māori older New Zealanders classified into each drinking-related group overall and by gender**

Overall, our analysis showed that, while hazardous drinking was statistically more prevalent in older non-Māori (43%) than in older Māori (37%), this difference was very small (i.e., it had a very small effect size).<sup>†</sup> This indicates that differences in the proportion of older Maori and non-Maori who drink hazardously are sufficiently small for us to suggest that ethnicity is not a meaningful determinant of differences in hazardous drinking at the population level.

When split by gender, there was no statistical differences in the proportion of older Māori and non-Māori women across drinking categories. However, older non-Māori men were more likely than their Māori counterparts to be classified as hazardous drinkers, though – again – the difference between these groups was small.<sup>‡</sup>

<sup>†</sup> Chi square results:  $\chi^2$  (df 3)= 22.64,  $p < .001$ ,  $\Phi = .08$

<sup>‡</sup> Chi square results:  $\chi^2$  (df 3)= 18.66,  $p < .001$ ,  $\Phi = .11$

When analysed by gender, our results indicated that, regardless of ethnicity, older men (55%) were statistically *far more likely* than older women (30%) to be classified as hazardous drinkers.<sup>v</sup>

Our results thus suggest that Māori ethnicity itself appeared to have little influence on the proportion of hazardous drinking rates in the older adult population, and gender was the greater driver of hazardous drinking in older New Zealanders.

### **3.9.2 Historical inequalities, not ethnicity, as drivers of drinking differences**

The second reason we are cautious concerning the identification of ethnicity as a driver of drinking patterns is because our simple analysis has not included any comprehensive statistical controls.

The Māori/non-Māori variable used in the analysis is a blunt, prioritised-ethnicity indicator which illustrates very little about actual level of Māori community connection, engagement or belonging. However, it is very likely that this dichotomous indicator still reflects the considerable historical inequities that continue to exist between Māori and non-Māori (eg, socioeconomic advantage, physical and mental health, and educational attainment) that we know influence drinking patterns.<sup>(8)</sup> In this respect, any differences in drinking illustrated in our graphs between Māori and non-Māori may actually reflect the influence of these inequities.

In order to assess the statistical influence of ethnicity and gender on drinking patterns in older Māori and non-Māori, we undertook a two-step linear regression to explore whether gender and ethnicity were directly related to AUDIT-C scores before and after, controlling for key variables reflective of inequity between Māori and non-Māori and also known to influence drinking. The results of this analysis are presented in Table 2 on the following page.

In step one of this analysis, we entered gender and ethnicity into a linear regression model to explore how much influence they individually had on AUDIT-C scores. The results suggest that gender, but not ethnicity, was significantly associated with AUDIT-C scores. In step two, we entered socioeconomic status, physical health, mental health, and education level into the regression model to explore whether these initial relationships (or lack of) were stable when controlling for the influence of these known drinking-related factors.

The results of step two showed that while socioeconomic status and physical health were also related to AUDIT-C scores, the influence of gender remained stable as did the lack of association between ethnicity and AUDIT-C scores.

Our conclusion is that, while ethnicity appeared to have a minor influence on the individual patterns of drinking frequency, quantity and binge drinking, a comprehensive analysis of hazardous drinking levels illustrated that gender (not ethnicity) was a primary factor that influences patterns of hazardous drinking in older New Zealanders.

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<sup>v</sup> Chi square results:  $\chi^2$  (df 3)= 215.71,  $p < .001$ ,  $\Phi = .26$

Table 2: Results of the Linear Regression exploring the impact of gender and ethnicity on AUDIT-C scores before and after key confounding factors

		Step 1	Step 2
		$\beta$	$\beta$
<b>Demographic Factors</b>			
	Gender <sup>A</sup>	-.30*	-.29*
	Ethnicity <sup>B</sup>	.03	.01
<b>Key Confounders</b>			
	Economic Living Standard <sup>C</sup>	-	.08*
	Physical Health	-	.09*
	Mental Health	-	.01
	Education: Secondary vs. None	-	.01
	Education: Post-Secondary vs. None	-	.00
	Education: Tertiary vs. None	-	.00
<b>Model summary</b>			
	$R^2$	.09	.11
	Adjusted $R^2$	.09	.11
	$R^2 \Delta$	.09*	.02*

$\beta$ : Reflects standardised Beta. This facilitates direct comparison of the influence of each variable on AUDIT-C hazardous drinking scores. The  $\beta$  value indicates the change that a one-unit change in the predictor has on AUDIT-C scores.

\* $p < .001$ ;

A: Male = 1; Female = 2. Negative scores (that are significant) imply males are more likely to drink hazardously.

B: Māori = 1; non-Māori = 2. Negative scores (that are significant) imply Māori are more likely to drink hazardously.

Please go to Appendix 1 for a more comprehensive review of the measurement involved in this statistical analysis of the influence of ethnicity (Māori/non-Māori) on risk of hazardous drinking score.

## 4.0 An international comparison of older adult drinking patterns

Having established the patterns of drinking in older New Zealanders, our aim was then to compare these patterns found in older New Zealanders with those found in older adults from other countries. From this point forward and based on the findings from the previous section, the New Zealand alcohol use data reflect the combined Māori and non-Māori sample from the NZHWR data collection from 2010.

Working with a team of international collaborators who were either embedded in longitudinal studies of ageing around the world and/or experts on older adults drinking, we reviewed a range of government-funded longitudinal studies of ageing from countries around the world to identify those we could use to compare alcohol use patterns with older New Zealanders from the NZHWR.

Specifically, we aimed to identify studies with alcohol frequency and quantity questions that could be harmonised with NZHWR questions, and studies that shared a common year of data collection in order to compare alcohol use patterns within a common timeframe.

We identified three longitudinal studies covering eight countries (England, United States, China, Ghana, India, Mexico, the Russian Federation and South Africa) whose alcohol use questions facilitated harmonisation with the NZHWR questions, and who shared a common data collection wave (2010) with the NZHWR. Figure 6 below illustrates the location of countries covered by our harmonised data comparison.



**Figure 6: World map showing the locations of the nine countries with study data included in this project**

## 4.1 Methods

Following is an overview of the studies included in this harmonised analysis, our data harmonisation approach, and the resulting alcohol use variables used for comparison across countries.

### 4.1.1 The studies included in this project

There were four studies included in this international comparison and, combined, they provided coverage of the patterns of drinking in older adults in nine countries around the world. Each provided data on alcohol use (frequency of use, quantity of typical drinking) from their 2010 data collection wave. Following is a brief description of each study, including an indication of the countries that they focus on.

#### New Zealand Health, Work & Retirement Longitudinal Study (NZHWR)



The New Zealand Health, Work and Retirement Longitudinal Study (NZHWR) is a government-funded study that has been following a sample of approximately 6,657 New Zealanders aged 55-70 across multiple waves of data collection which began in 2006.

The NZHWR is designed to understand factors that determine health and independence in older adults on a biennial basis, and aims to assess current health, wealth, social, working and demographic status of older New Zealanders. The collection of data for the NZHWR relies on both a postal survey of the sample, as well as face-to-face interviews of a subsample of participants.

Data from the NZHWR covers four main domains: determinants of mental and physical health in later life; living standards of older adults; quality of life; and ethnicity and aging. For the 2010 data collection wave, the NZHWR expanded its age range to cover New Zealanders aged 50-90, thus offering comprehensive coverage of older adults in New Zealand.

#### English Longitudinal Study of Ageing (ELSA)



The English Longitudinal Study of Ageing (ELSA) examines a representative sample of the English population aged 50 years and older across several waves of data collection, which currently covers a period of eleven years. The ELSA includes objective and subjective data relating to health and disability, biological markers of disease, economic circumstance, social participation, networks and wellbeing.

The sample was obtained from respondents to the Health Survey for England (HSE). The collection of data for ELSA relies on both a face-to-face interview every two years, and a nurse assessment every four years.

ELSA has been designed to cover broad range of topics relevant to the ageing process including: health trajectories, disability and healthy life expectancy; determinants of economic position in older age; links between economic position, physical health, cognition and mental health; household and family structure; patterns, determinants and consequences of social, civic and cultural participation; and predictors of wellbeing.



## Health & Retirement Study (HRS)



The Health and Retirement Study (HRS) is a longitudinal study of ageing that surveys a representative sample of approximately 20,000 United States adults over the age of 50 biennially. They have been surveyed across multiple waves of data collection every two years since 1992.

The HRS collects information about income; work, assets; pension plans; health insurance; disability; physical health and functioning; cognitive functioning; and health care expenditures. The study is designed, administered, and conducted by the Institute for Social Research (ISR) at the University of Michigan who work alongside the National Institute on Aging (NIA).

The main objectives of the HRS are to: explain the antecedents and consequences of retirement; examine the relationships among health, income, and wealth over time; examine life cycle patterns of wealth accumulation and consumption; monitor work disability; and examine how the mix and distribution of economic, family, and programme resources affect key outcomes, including retirement, "dissaving", health declines, and institutionalisation.

## The World Health Organization Study on Global Ageing and Adult Health (SAGE)



The World Health Organization (WHO) Study on Global Ageing and Adult Health (SAGE) is a longitudinal study, which collects data across multiple waves of data collection on older adults aged over 50, and a comparative sample of adults between the ages of 18 and 49 from nationally representative samples in China, Ghana, India, Mexico, the Russian Federation, and South Africa. SAGE aims to provide comprehensive longitudinal information on the health and wellbeing of adults moving through the ageing process.

The first wave of SAGE (Wave 0) began in 2002, with Wave 1 completed between 2007 and 2010, and Wave 2 between 2014 and 2015. The first wave of data collection has a total sample size of more than 40,000 participants across the six countries, with over 34,000 of this sample aged over 50.

### 4.1.2 Data harmonisation approach

All surveys in this project (ie, NZHWR, ELSA, HRS, and SAGE) collected information about alcohol consumption within their respective populations, but each used different response sets for their consumption questions. This resulted in directly incompatible alcohol consumption data. In order to compare alcohol consumption patterns directly across studies, a 'harmonisation' process was required.

This harmonisation process entailed:

- an assessment of the specific response sets used in each study
- the identification of key points of correlation between response sets (ie, naturally occurring thresholds for drinking frequency and quantity responses)
- the development of a new dataset within which the raw alcohol use data from each study were transposed to create a new and comparable set of variables.

These harmonised variables are:

- proportion of past-year drinkers
- frequency of weekly drinking
- quantity consumed on typical drinking occasion
- frequency of heavy drinking.

Table 3 illustrates the variables and their specific derivation. The alcohol-related drinking terms used in this section are distinct from those used in Section 2.0. The previous section used terminology reflecting the specific AUDIT-C measure (ie, frequency, quantity, binge and hazardous drinking), but the current section uses terms that best reflect the nature of the alcohol use responses available from a ‘harmonised’ dataset across multiple studies and different measures.

Table 3: Description of the harmonised alcohol use variables derived from an analysis of cross-country study questions concerning alcohol use	
Variable	Description
<b>Abstainer</b>	This identifies the respondents in each study who do not consume alcoholic drinks. A critical point in the harmonisation of this variable is the timeframe adopted in alcohol use questions from the different studies. We defined abstainer in each study as follows: an ELSA respondent who did not drink alcohol in the last 12 months before the interview; an HRS respondent who reported never having consumed alcoholic drinks; a SAGE respondent who reported never having consumed alcoholic drinks; an NZHWR respondent who reported never having consumed alcoholic drinks.
<b>Drinker</b>	This identifies all the respondents in each study who indicated in their alcohol use responses that they had consumed some level of alcohol (ie, they were not identified as abstainers).
<b>Frequency of weekly drinking</b>	The response sets for drinking frequency questions differed across each study. However, the identification of specific thresholds shared between study response sets facilitated a comparable categorisation of the average number of days that drinkers in each country consumed alcohol. These categories were as follows: 0 days, 1 day, 2 to 3 days, and 4 or more days per week.
<b>Quantity consumed on typical days when drinking</b>	Common thresholds between studies were identified which facilitated the development of categories of typical consumption that were directly comparable. These categories were as follows: up to 2 drinks per typical drinking occasion, 3 to 4, 5 to 6, 7 to 9, and 10 or more drinks per occasion.
<b>Frequent heavy drinker</b>	A frequent heavy drinker was defined as a man who consumed five or more standard alcoholic beverages two or three days per week (or in the last 7 days), or a woman who consumed three or more standard alcoholic beverages two or three days per week (or in the last 7 days).
<b>Very frequent heavy drinker</b>	A very frequent heavy drinker was defined as a man who consumed five or more standard alcoholic beverages four or more days per week (or in the last 7 days), or a woman who consumed three or more standard alcoholic beverages four or more days per week (or in the last 7 days).
The definition of frequent and very frequent heavy drinking was suggested by WHO experts involved in the classification of alcohol use patterns in developing countries <sup>(56)</sup> , and confirmed upon consultation with the international collaborators. However, this suggested classification has been slightly modified in order to fit the harmonised alcohol use categories used in this cross-national comparison.	

## Age-standardisation

Each sample was age-standardised in order to remove the influence of age as a confounding factor in cross-country comparisons of drinking pattern. Following Naing's method,<sup>(57)</sup> each sample's age structure was directly standardised to reflect a WHO standard population age structure, reducing cross-country disparity in mean age and proportion across age class (50-64 years, 65-74 years, 75 years and older).

This standardisation procedure was used to compute the percentage distribution of each harmonised variable (eg, number of drinkers, frequency of drinking, typical quantity consumed per occasion) for men and women in each country. These age-standardised variables resulted in alcohol data that could be directly compared between studies without concern over disparities in age ranges between study cohorts.

To reduce the potential influence of sample design across the different surveys, the SAS procedure *proc surveymeans* was used, which includes means to control for variable weights, clusters and strata (ie, population weighting). The sample design of the NZHWR survey did not require prior stratification and clustering; therefore the prevalences are only weighted to directly reflect the age, gender and ethnic distribution of the resident New Zealand older adult population.

Table 4 provides a comparison of the 2010 sample characteristics for each dataset.

Country	Study	Data collection Method in 2010	N	Mean age (SD)	% female
New Zealand	NZHWR	Postal survey	3,212	64.6 (8.0)	55%
England	ELSA	Face-to-face interview	8,715	67.2 (9.6)	55%
United States	HRS	Face-to-face interview	20,335	66.8 (11.3)	57%
China	SAGE	Face-to-face interview	12,927	63.2 (9.4)	53%
Ghana	SAGE	Face-to-face interview	4,289	64.2 (10.7)	48%
India	SAGE	Face-to-face interview	6,558	61.9 (9.0)	50%
Mexico	SAGE	Face-to-face interview	2,199	68.4 (9.5)	60%
Russian Federation	SAGE	Face-to-face interview	3,720	65.0 (10.2)	65%
South Africa	SAGE	Face-to-face interview	3,655	62.7 (9.7)	57%

### 4.1.3 Understanding and interpreting the data

When interpreting the data presented in this section of the report, it is important to note that neither the reported associations nor any of the apparent patterns can be used to infer cause and effect.

Furthermore, given the nature of the distinct alcohol use questions used in each study, there is room for lack of concordance despite our best efforts at harmonisation. For example, the timeframe for the harmonised abstinence variable is not consistent across all studies. Specifically, the ELSA study respondents identified as abstainers constitute those not having consumed alcohol 'within the last 12 months' and all other studies as 'never' having consumed alcohol. This may disproportionately increase the evident level of drinkers in

ELSA in comparison to other countries. Where such concerns over lack of concordance arise, we have been clear to highlight this.

It should be noted that there is considerable discrepancy across every country in this study with regard to the nature of a standard drink. For example, the United States has one of the highest levels of standard drinks in this analysis (14 grams of ethanol), New Zealand slightly lower (10 grams of ethanol), and England lower still (8 grams of ethanol). Other countries, such as India, have no officially recognised standard drink.

This potentially limits the interpretation of the current findings. However, research indicates that drinkers around the world – particularly those drinking outside licenced premises – do not commonly understand or adhere to definitions of standard drinks when they drink.<sup>(1)</sup> Older adults specifically are more likely to drink at home where they pour their own drinks,<sup>(54)</sup> and they have little understanding of standard drinks and/or drinking guidelines.<sup>(58)</sup>

We therefore consider that the inequity in standard drinks between countries will have little meaningful influence on the reported drinking rates in older adults from different countries in this study.

## 4.2 Key findings: An international comparison of older adult drinking patterns

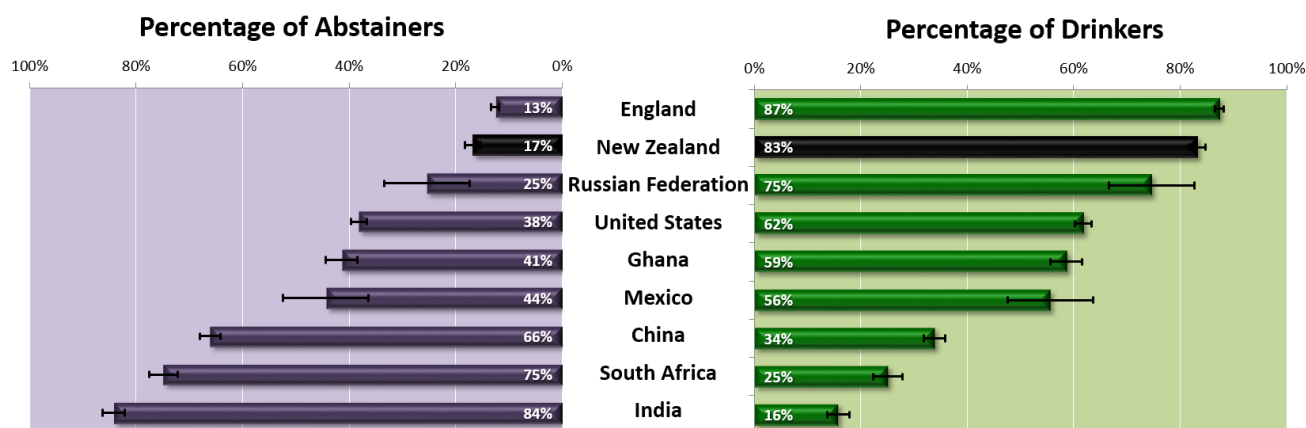
Figure 7 below illustrates the key findings from this report concerning our comparison of New Zealand older adults drinking patterns with international counterparts.



**Figure 7: Key findings concerning an international comparison of older adult alcohol use patterns**

## 4.3 Results

### 4.3.1 Abstainers and past-year drinkers by country



**Figure 8: A comparison of the proportion of abstainers and past-year drinkers between countries**

Figure 8 illustrates the proportion of participants from each country who self-identified as either an abstainer or as having consumed alcohol within the past year. Countries are listed in order (from highest to lowest) of drinking frequency.

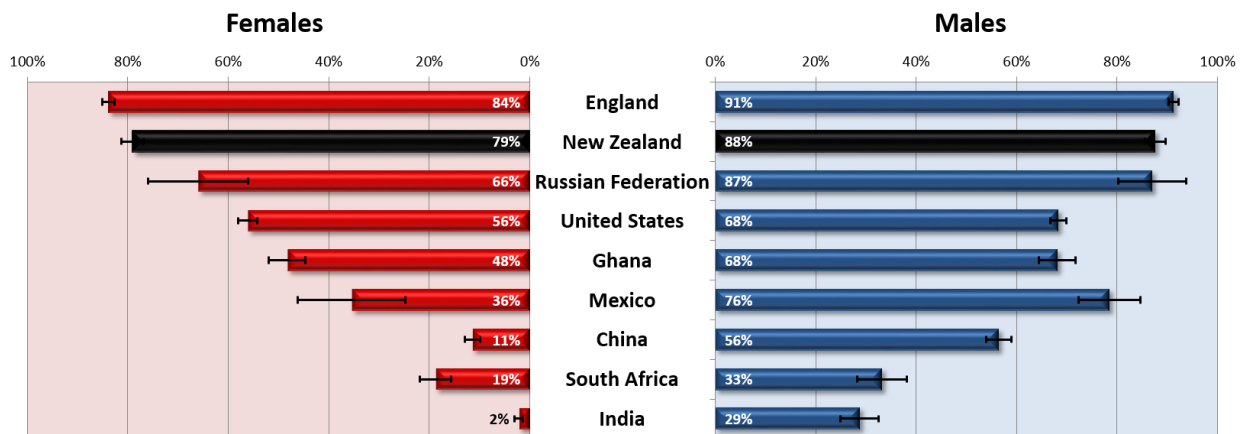
New Zealand had the second highest proportion of past-year older drinkers in comparison to all other countries, falling just behind England. New Zealand had a broadly similar proportion of drinkers to England and the Russian Federation, but a considerably greater proportion (by over 20%) than key OECD counterpart, the United States.

New Zealand had a significantly higher proportion of drinkers than Ghana, Mexico, and China; more than three times the number of South Africa; and more than five times that of India. It is important to note that the timeframe for abstaining from drinking was different for different studies: the data for England reflect abstaining within the last 12 months, and the remaining countries as 'never' having been drinkers. Given this caution, it is possible that we have over-estimated the proportion of older drinkers in England, and that New Zealand in fact had the highest proportion of any country in this analysis.

Figure 9 compares the proportion of drinkers in each country by gender. Again, the proportion of older New Zealand men who drank was similar to that seen in England (91%) and the Russian Federation (87%). The proportion of older New Zealand women who drank also approximated the results for England (84%) but appeared slightly higher than for the Russian Federation (66%), though measurement error makes this difference potentially negligible.

The United States had lower proportions of male (68%) and female (56%) drinkers than New Zealand, indicating potentially large differences in drinking culture between New Zealand and the United States. India, China and South Africa had relatively small proportions of female drinkers (2%, 11% and 19% respectively), and also had the lowest three proportions in males (29%, 56% and 33% respectively).

Whilst having lower proportions of drinkers, China and India had larger differences between males and females than other countries. Mexico reported the fourth highest level of male drinkers (79%) which was more than double the proportion of female drinkers in Mexico (36%). These results indicated that, while a greater proportion of older men drank than older women in New Zealand, the difference in proportion was less than 8% and, in comparison with most other countries in this analysis, this lack of large gender difference is actually remarkable.



**Figure 9: A comparison of the proportion of female and male drinkers between countries**

### 4.3.2 Frequency of weekly drinking

While the response sets for drinking frequency questions used in each study differed, the harmonisation process allowed us to quantify the average number of days per week drinkers in each country consumed alcohol. This was broken down as follows:

- 0 days
- 1 day
- 2-3 days
- 4 or more days per week.

Figure 10 (over) provides a comparison of these frequencies and illustrates the considerable variations in drinking frequency that are evident in these older adult cohorts around the world.

Figure 11 (over) illustrates the frequency of drinking for each country broken down by gender

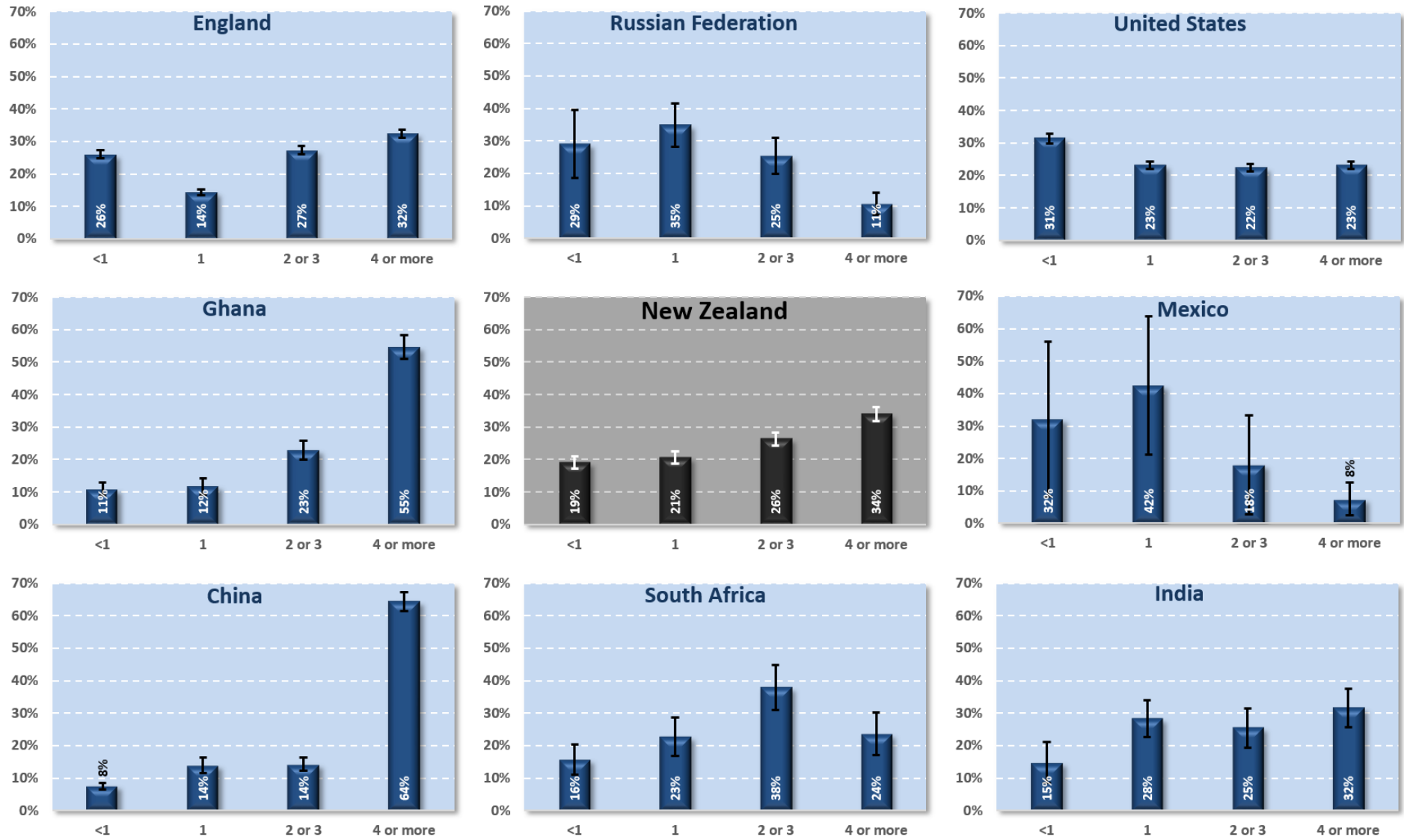


Figure 10: The percentage of drinkers in each country by frequency of drinking (days per week)



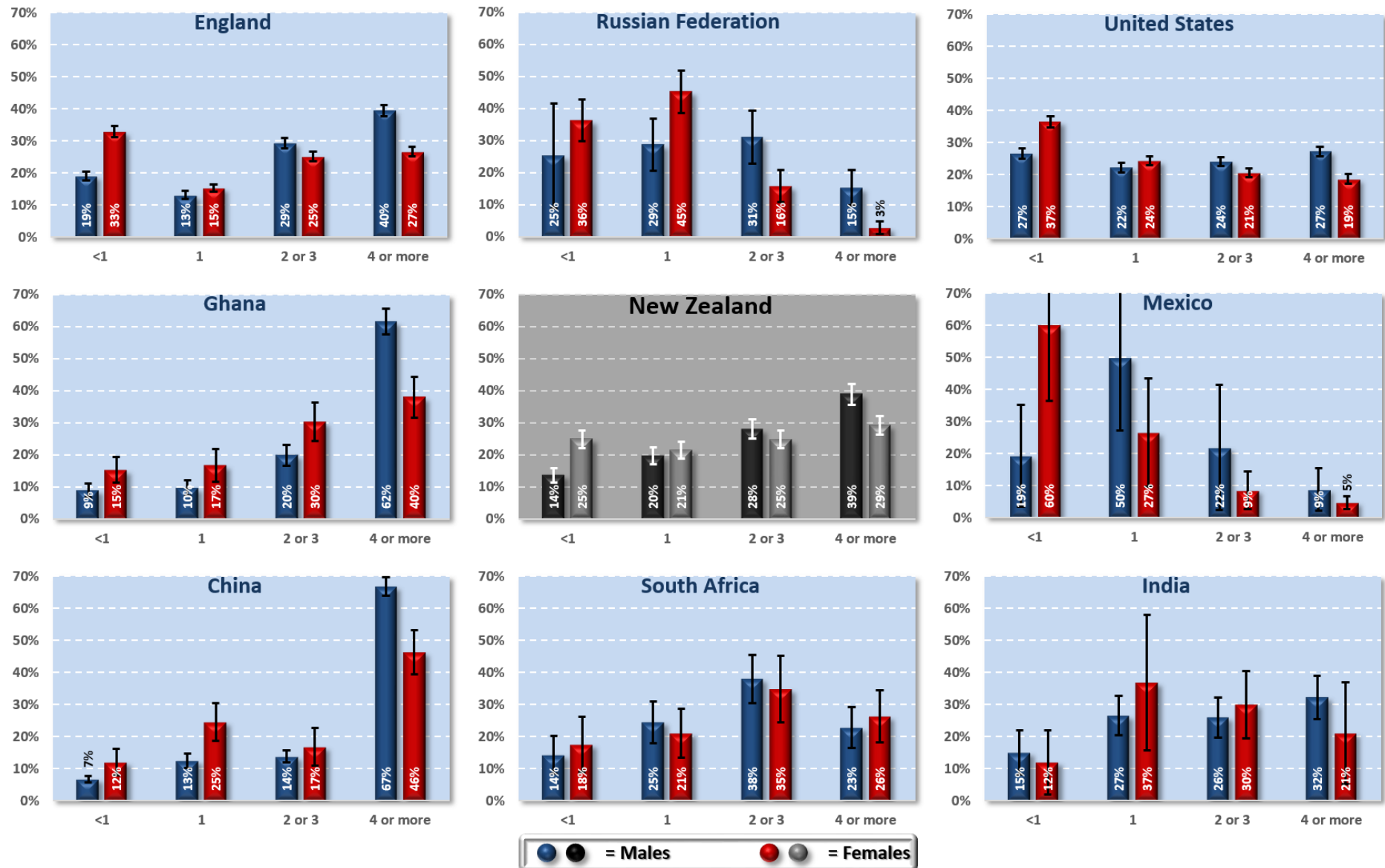


Figure 11: The percentage of male and female drinkers in each country by frequency drinking (days per week)

Two general patterns of drinking frequency can be broadly observed from the graphs in Figure 10: frequent or mixed.

New Zealand's drinking approximated that of the England and India, and can be considered a tendency towards frequent drinking. The majority of drinkers in these countries consumed alcohol two or more times weekly, and approximately a third drank four or more times per week. Ghana and China had fewer past year drinkers than England and New Zealand but among their population that did drink, they also illustrated a trend towards frequent consumption. In fact, older adults in Ghana and China that drank did so with much greater frequency than drinkers in New Zealand. More than half of older drinks in Ghana (55%) and almost two thirds in China (64%) consume drink four or more days per week.

The remaining countries show a generally mixed frequency pattern. The majority of older adults from the Russian Federation and Mexico drank either one day per week or less, while older South Africans drank on two or three days per week. Although one third of older adults in the United States drank less than once a week, the remaining two thirds were relatively evenly split between infrequent and frequent consumption. These findings indicated that older New Zealanders showed a tendency towards frequent drinking (60% consume alcohol on two or more days per week) which - though not as extreme a tendency as witnessed in Ghana and China - is still a tendency not necessarily shared by all other countries.

With the exception of South Africa and India, the initial pattern evident in Figure 11 was for older men to drink more frequently than older women in most countries. This was the case regardless of whether the countries pattern of alcohol use was frequent or mixed. While New Zealand shared this trend, the differences between the genders is one of the smallest of any country suggesting that older New Zealand men and women tended to drink at a frequency more similar to one another, than seen in their international counterparts.

#### **4.3.3 Quantity of drinks consumed on a typical drinking occasion**

The data harmonisation process allowed the identification of common thresholds between studies which we could employ to compare directly the average quantity of alcohol older adults consumed on *typical drinking occasions*. This was broken down as follows:

- up to 2 drinks
- 3-4
- 5-6
- 7-9
- 10 or more drinks per occasion.

Figure 12 (over) compares these quantities between countries, while Figure 13 (over) breaks these quantities down for each country by gender.

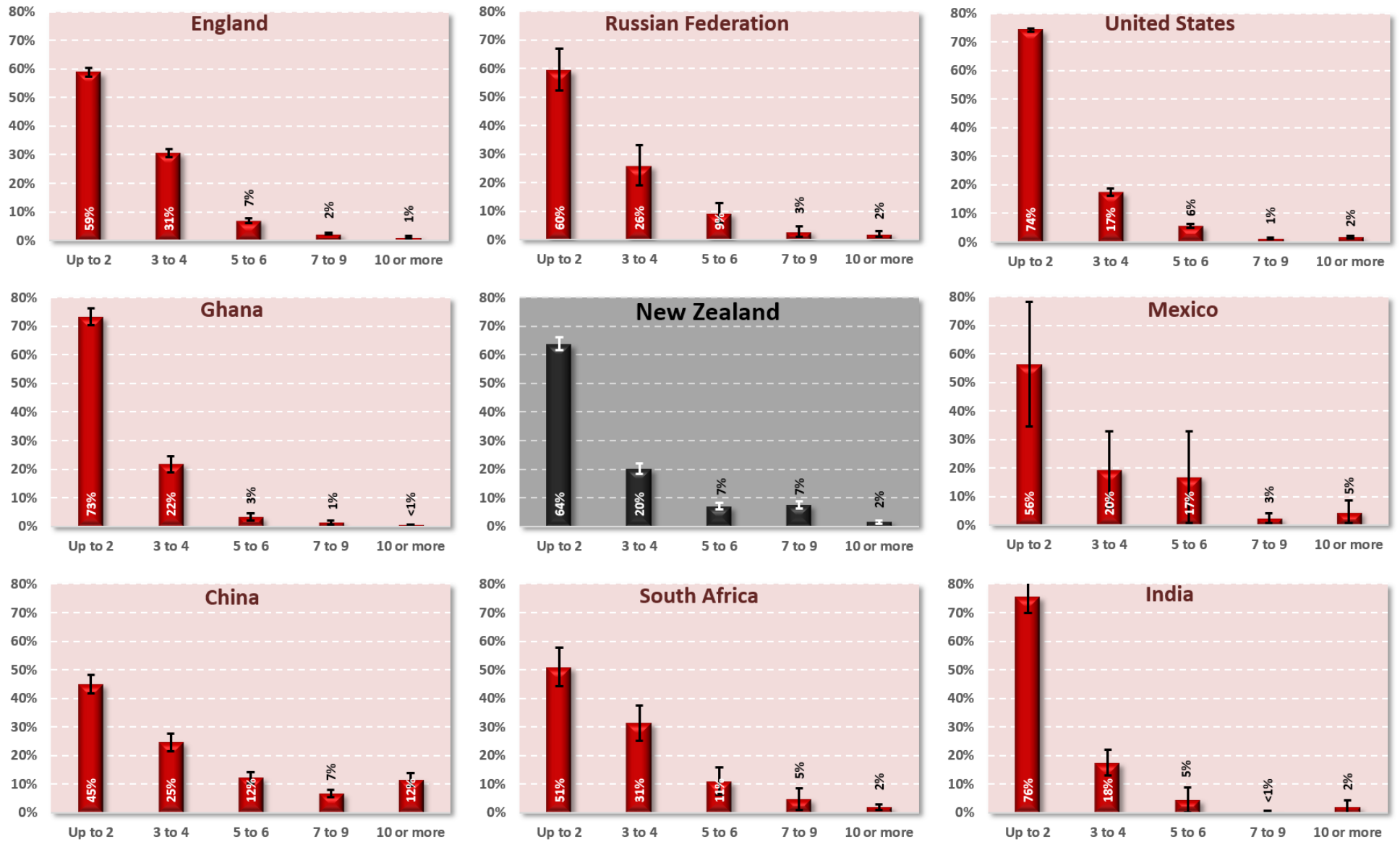


Figure 12: The percentage of drinkers in each country by quantity of alcohol consumed on a typical drinking occasion

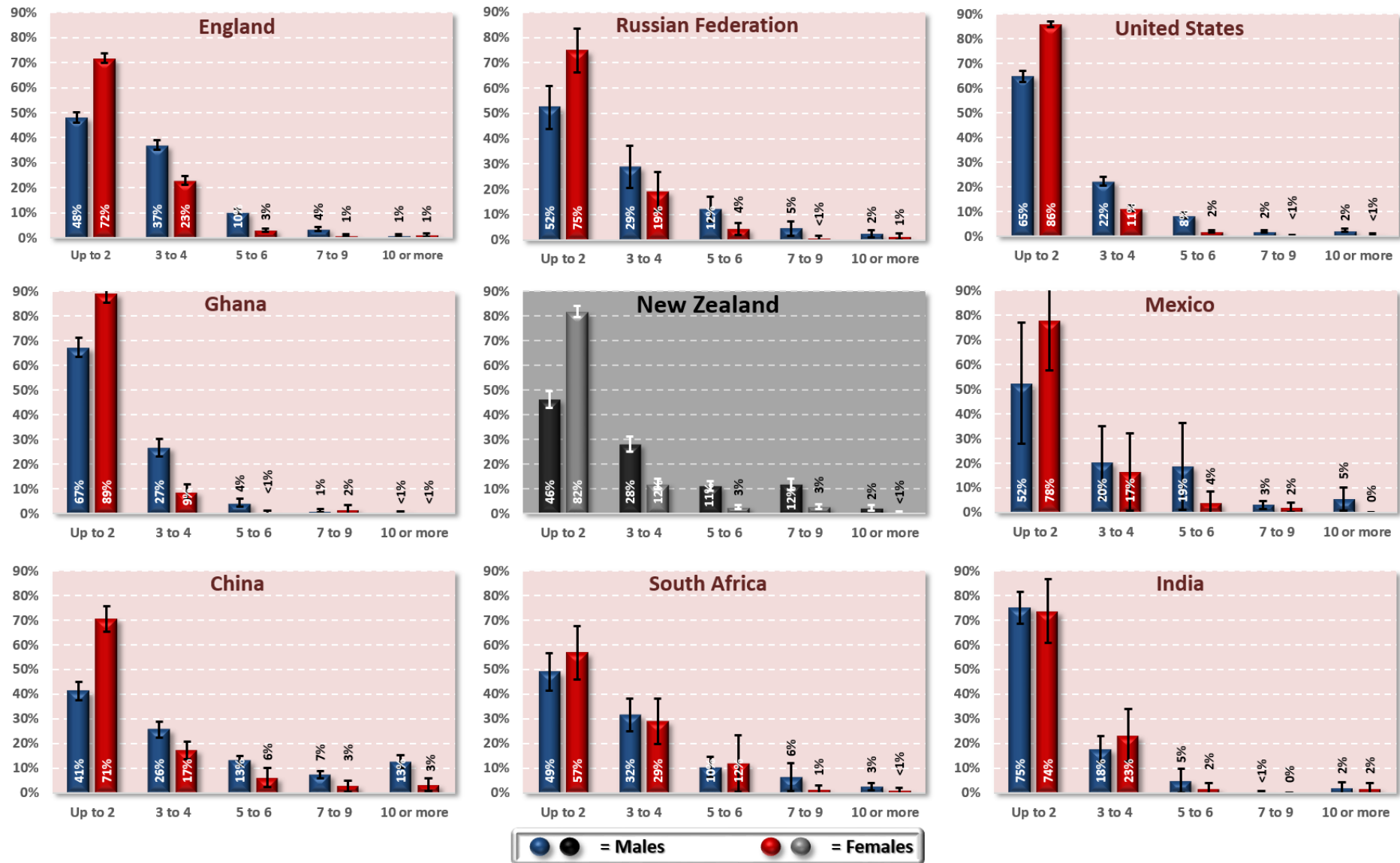


Figure 13: The percentage of male and female drinkers in each country by quantity of alcohol consumed on a typical drinking occasion

Figure 12 shows a prevailing pattern across all countries towards lower quantities consumed per typical drinking occasion. Specifically, in all countries except China (45%), over half of older drinkers consumed only up to two drinks on each occasion when they drank.

Approximately 64% of older New Zealand drinkers typically only consumed up to two drinks on each drinking occasion which was higher than China, South Africa (51%) and Mexico (56%), similar to England (59%) and the Russian Federation (60%), but far less than Ghana (73%), the United States (74%), and India (76%). This suggests that the proportion of older New Zealanders typically drinking up to two drinks was approximately the international average (ie, higher than some but lower than others).

Evaluating the quantity of typical consumption by gender (Figure 13) shows that men tended to drink more on average than women across all countries, especially in China. In New Zealand, older women 82% typically drank up to two drinks and 94% consumed no more than four drinks on a typical drinking occasion, compared to older men of whom only 46% consumed up to two drinks and 75% consumed no more than four drinks.

Consuming five or more drinks on any one occasion could be considered binge drinking, and is especially concerning for older adults who have reduced capacity to metabolise alcohol. Our results show that 16% of older New Zealand drinkers consumed five or more drinks on a typical day when drinking. This is lower than in China (31%) and Mexico (24%), similar to South Africa (18%) and the Russia Federation (14%), but higher than England (11%), the United States (8%), India (7%), and Ghana (5%).

Broken down by gender, it is clear that the proportion of older New Zealand women consuming five or more on a typical occasion was similar to their international counterparts, but older New Zealand men had one of the highest proportions of such drinking. Specifically, in New Zealand, only 6% of older women consumed five or more on a typical drinking occasion which was lower than South Africa (14%) and China (12%), but the same as the Russian Federation and Mexico, and similar to India (7%) and England (5%), slightly higher than the United States (3%) and India (2%).

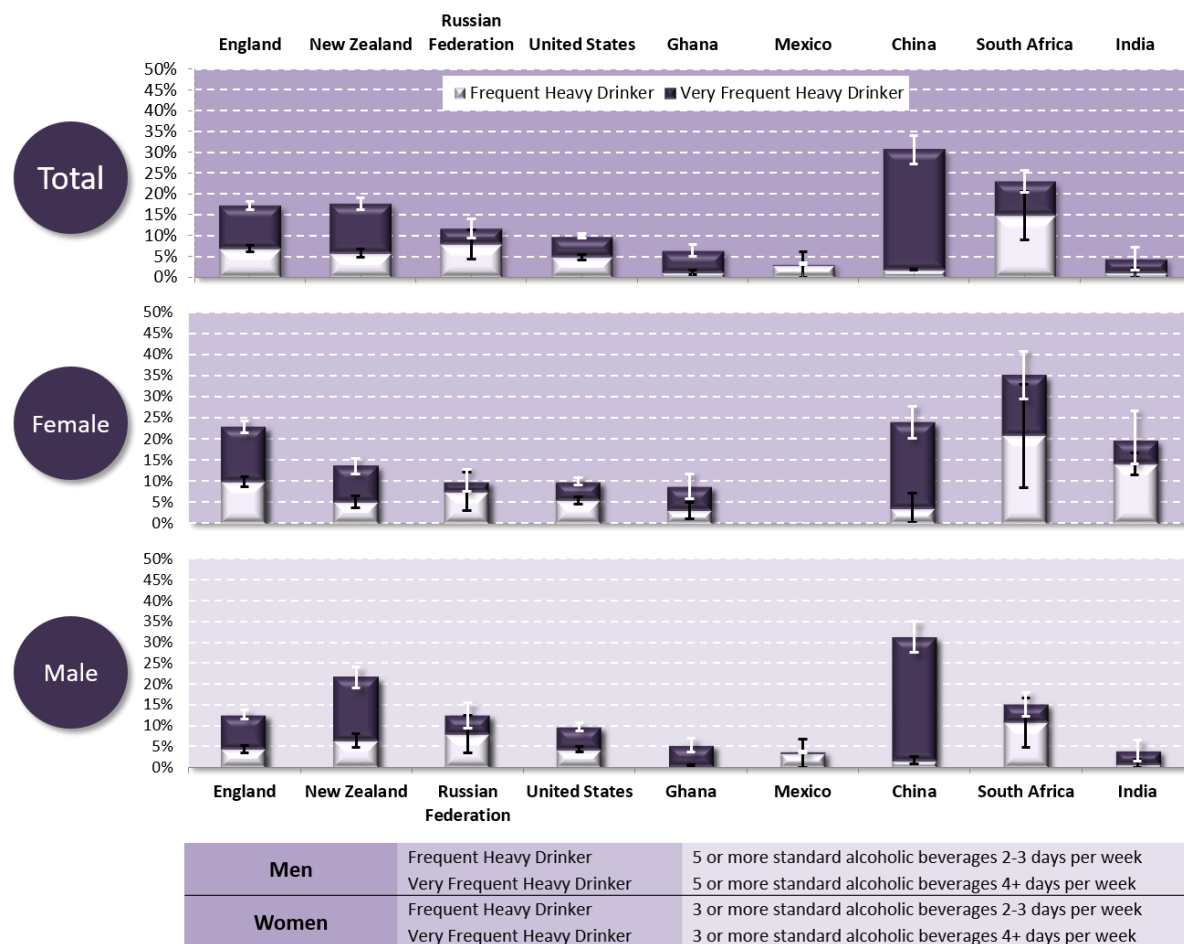
However, 26% of older New Zealand men who drank consumed five or more on a typical occasion which was over four times the rate of older New Zealand women. Furthermore, this rate for men was lower only than China (33%) and Mexico (27%), and considerably higher than all other nations: South Africa and the Russian Federation (19%), England (15%), the United States (13%), India (7%), and Ghana (6%).

These results strongly suggest that, while overall older New Zealand drinkers had typical drinking quantities similar to that seen in other countries in general, this was primarily reflective of female drinkers, the vast majority to whom consumed only up to two drinks on a typical drinking occasion. Over one quarter of older male drinkers in New Zealand typically consumed five or more drinks on occasions that they drank, which was a much greater proportion than seen in almost all other countries.

#### **4.3.4 Frequency of heavy drinking**

Although definitions of heavy drinking were not directly compatible across the country datasets, the available data on frequency and quantity of drinking facilitated the calculation of the number of heavy drinkers in each country and a breakdown by frequency (ie, frequent or very frequent).

Figure 14 illustrates the proportion of the older population in each country classified as heavy drinkers (ie, men who drink five or more per occasion and women who drink three or more per occasion). This can be broken down into whether this consumption was frequent (two-three days per week) or very frequent (four or more days per week). It uses differences in shading within this total to identify the proportion of this drinking cohort who are either frequent or very frequent heavy drinkers.



**Figure 14: Frequency of heavy drinking (5 or more drinkers on an occasion for men; 3 or more drinkers on an occasion for women) in older drinkers in each country**

The results in Figure 14 indicated, of the older population in New Zealand that drank alcohol, approximately 18% of them were either frequent heavy drinkers (6%) or very frequent heavy drinkers (2%).

The total proportion of heavy drinkers in New Zealand was less than in China (31%) or South Africa (23%), but similar to England (17%) and much higher than all other countries. However, because a greater proportion of older New Zealanders drank (83%) compared to China (34%) or South Africa (25%), the results in Figure 14 are concerning; older heavy drinkers would necessarily constitute a larger proportion of the older New Zealand population (14%) than that of China (11%) or South Africa (6%).

Surprisingly there were considerable gender differences across countries in the patterns of frequent and very frequent heavy drinking. For example, in China the sub-population of older male and female heavy drinkers tended to be very frequent heavy drinkers, while in South Africa they tended to be frequent (not very frequent). While New Zealand and England had

relatively equivalent proportions of heavy drinkers in total, there were some gender differences between these two countries. In New Zealand, the total proportion of older male heavy drinkers (22%) was much higher than for female heavy drinkers (14%). Conversely, in England the total proportion of female heavy drinkers (23%) was higher than for male heavy drinkers (12%).

### 4.3.5 Factors potentially underpinning cross-country differences in older adults' drinking

It is important to understand how variations in macro-level influences that differentiate countries from one another (eg, wealth, social policy) might influence the use of alcohol.

HelpAge International ([www.Helpage.org](http://www.Helpage.org)) is a global network of older people's organisations with an aim to support ageing, reduce discrimination, and provide a voice for older adults worldwide. In 2013 and again in 2015, HelpAge International produced a *Global AgeWatch Index* publication ranking countries worldwide on four key determinants of social and economic wellbeing for older adults (see Table 5).

Table 5: HelpAge International's four determinants of healthy ageing			
Income security	Health status	Capability	Enabling environment
<ul style="list-style-type: none"> <li>• Pension coverage</li> <li>• Poverty rate in old age</li> <li>• Relative welfare of older people</li> <li>• GNI per capita</li> </ul>	<ul style="list-style-type: none"> <li>• Life expectancy at 60</li> <li>• Health life expectancy at 60</li> <li>• Psychological wellbeing</li> </ul>	<ul style="list-style-type: none"> <li>• Employment of older people</li> <li>• Educational status of older people</li> </ul>	<ul style="list-style-type: none"> <li>• Social connection</li> <li>• Physical safety</li> <li>• Civic freedom</li> <li>• Access to public transport</li> </ul>

We aimed to explore the potential relationship between the proportion of older drinkers in each of the countries in our report and the scores for each country on four HelpAge International determinants of social and economic wellbeing for older adults.

We identified the corresponding *Global AgeWatch Index* determinant scores (including indicators of each of the four determinants) for each of our nine countries from the freely available 2015 dataset, and merged this data with our existing harmonised dataset.

We then selected one indicator from each of the determinants (ie, income security, health status, capability, and enabling environment) to compare with our trends concerning the proportion of drinkers in each country.<sup>w</sup> We felt that proportion of drinkers was the most appropriate pattern of drinking to model because it reflects the general nature of drinking (ie, abstinence as well as consumption) for all respondents in all countries.

Please note that, while this report uses drinking patterns for England, the *Global AgeWatch* data reflect trends for the United Kingdom as a whole (ie, England, Northern Ireland, Scotland, and Wales), rather than England specifically. In this respect, we advise caution in interpreting the relationships between all of the indicators presented and the proportion of older drinkers in England.

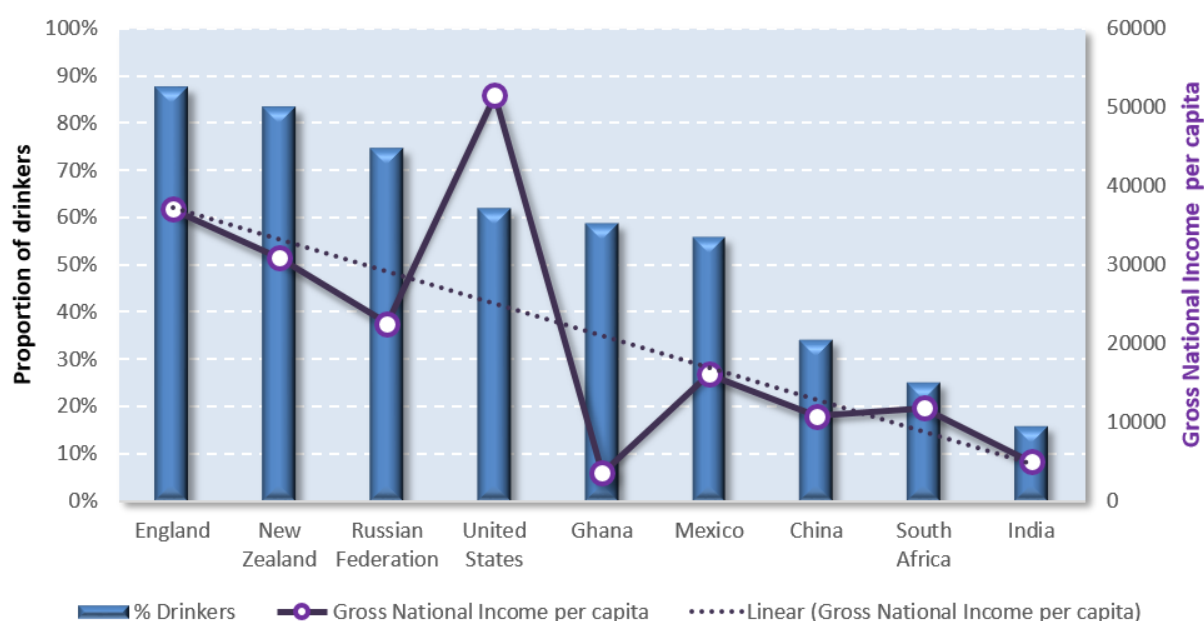
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<sup>w</sup> A rationale for the use of the specific indicators as representative of the wider *Global AgeWatch* determinants is provided in each sub-section.

### Proportion of older drinkers and Gross National Income (GNI) per capita

Gross National Income (GNI) per capita reflects an averaged income per citizen for each country based on the national income divided by the number of citizens. This is often employed internationally as a standardised and comparable cross-country proxy measure of living standards, and it is one of the key indicators of the Income Security determinant used in the Global AgeWatch Index.

Figure 15 illustrates the proportion of drinkers in each country (presented from the highest proportion through to the lowest) as a histogram with the overlaying bold line reflecting the corresponding GNI per capita for each country. The dotted line reflects a simple linear trend concerning the overall relationship between proportion of drinkers and GNI scores.



**Figure 15: Proportion of older drinkers and Gross National Income per capita by country**

With the exception of the United States and Ghana, there appeared to be a strong relationship between the proportion of older drinkers in each country and GNI per capita, reflected most clearly in the linear trend line. This indicates that the proportion of older adults who drank might be reflective of the wealth of each country, such that richer countries had higher proportions of older adults that drank while poorer countries had lower proportions of older adults that drank.

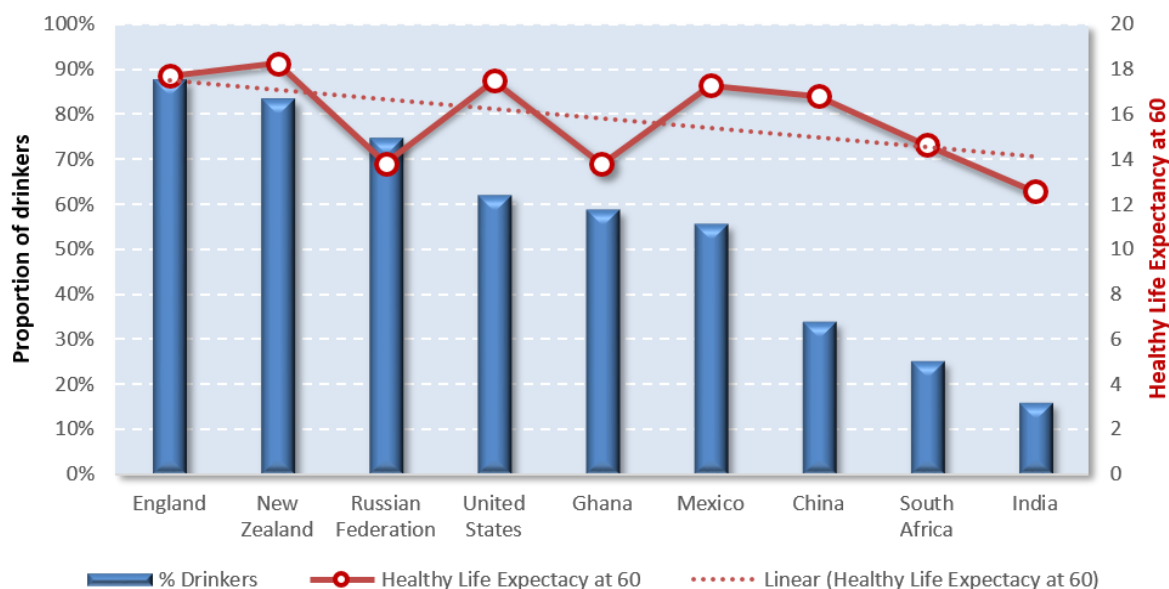
The specific results for the United States and Ghana buck this trend, with both having middling proportions of older adult drinkers despite the United States having the highest GNI and Ghana the lowest. Thus, while there is a strong overall relationship between a country's proportion of older adults that drink and GNI, there are other within-country factors that may strongly influence a country's drinking culture.

### Proportion of older drinkers and Healthy Life Expectancy (HALE) at age 60

Healthy life expectancy (HALE) is a common indicator of population health that combines standard indicators of mortality with indicators of health status for populations at a specific age (eg, at birth, from 18 years of age, over 65). The Global AgeWatch Index uses Healthy Life Expectancy at 60 (HALE60) as a principal indicator of the Health Status determinant.



HALE60 identifies the number of years an older adult is likely to spend in good health beyond the age of 60. This is a key indicator of the likely burden on a country's health system as high life expectancies combined with high HALE60 indicate a large number of older adults in that country who will experience long periods of their older adulthood in good health. Conversely, high life expectancies combined with low HALE60 indicate a large number of older adults in that country who will spend long periods of their older adult lives in poor health.



**Figure 16: Proportion of older drinkers and Healthy Life Expectancy at 60 by country**

Figure 16 illustrates the relationship between the proportion of drinkers and the corresponding HALE60 for each country with the dotted line indicating a simple linear trend between the proportion of drinkers and HALE60.

While the downward trend in the proportion of drinkers across countries corresponded with downward sloping HALE60, this relationship was not strong. HALE60 scores were relatively compressed across these countries (between 12-18 years for all countries), despite the proportion of drinkers varying considerably.

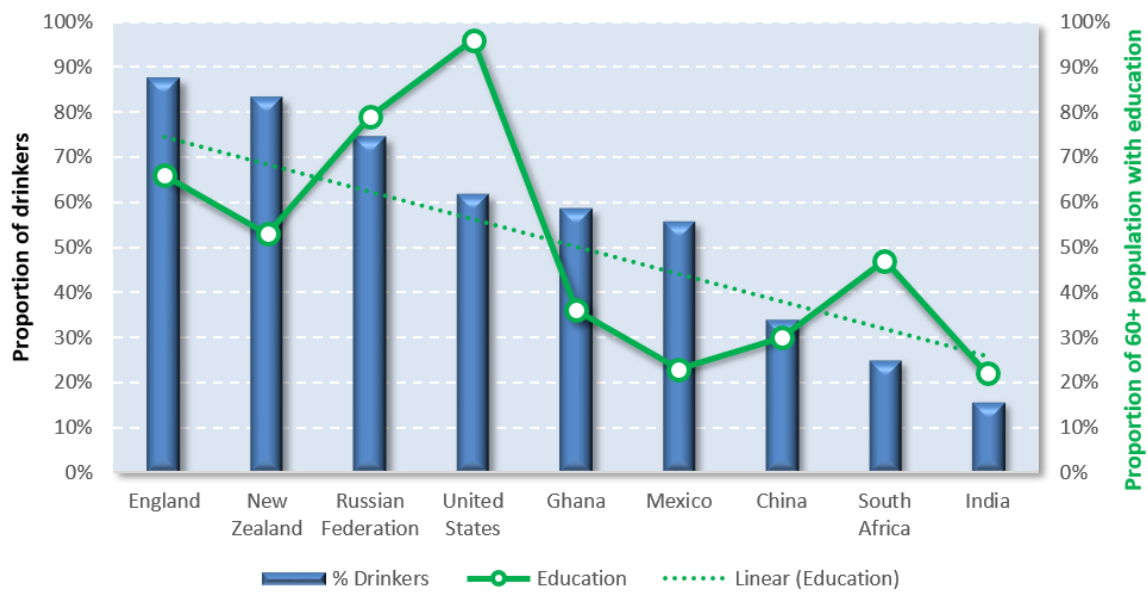
Furthermore, the HALE60 data for the Russian Federation and Ghana were among the lowest across all countries, despite middling-to-high proportions of drinkers in these countries. As only a weak relationship existed between the proportion of drinkers in each country and the years of healthy life expectancy after the age of 60, this suggests that HALE60 is not related to drinking in older adults.

### *Proportion of older drinkers and education level of older adults*

The Global AgeWatch Index's Capability determinant uses the proportion of the 60 years and over population who are educated at or above secondary level as a key indicator of lifelong skill and competency accumulation. The higher the proportion of secondary or post-secondary educated older adults in any country, the greater the inherent skills-base, knowledge and ability of that population to advance themselves and enhance the experience of older adulthood.

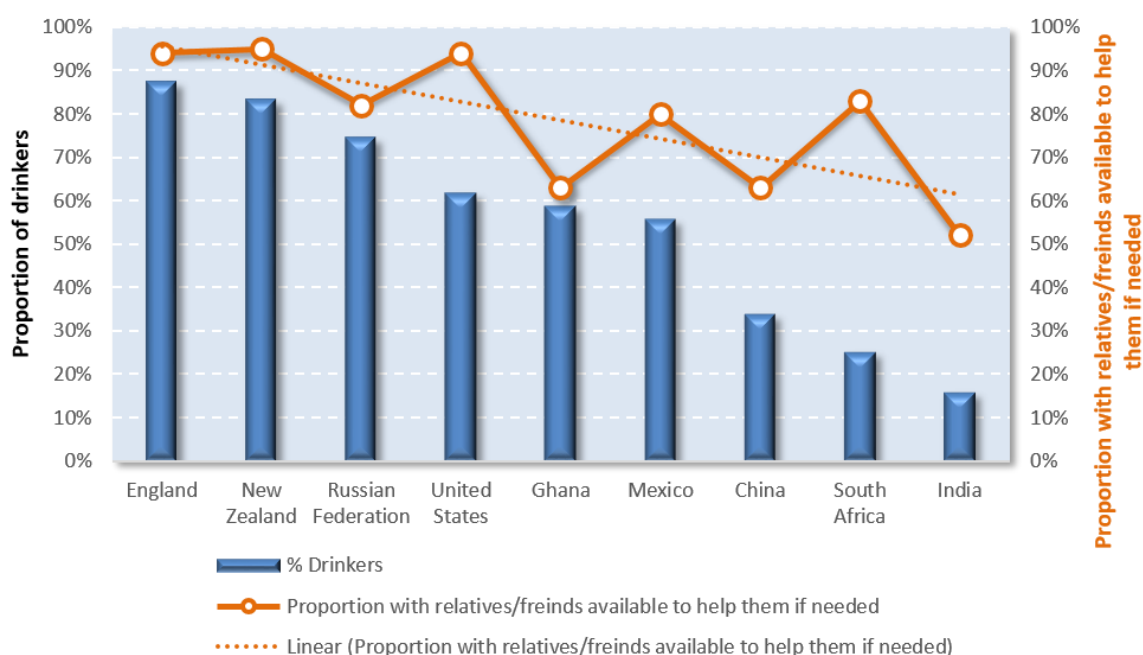
Figure 17 contrasts the proportion of drinkers with corresponding proportions of the 60 years and over population in each country that have attained education at or above secondary level. In general, the proportion of drinkers was higher in countries with more educated older adults and lower in countries with fewer educated older adults. This is an interesting relationship and, we suggest, likely reflects the income potential of this older population (ie, research indicated that higher education was closely associated with higher income, and that people with higher incomes tended to drink more because they could afford it).<sup>(59)</sup>

The data from the United States and Mexico countered this general pattern with little apparent relationship between education level and the proportion of older drinkers in those countries. Again, this suggests significant underlying cultural pressures (other than education level) better explain trends towards drinking or abstaining in these countries.



**Figure 17: Proportion of older drinkers and proportion of 60 years and over population with secondary or higher education by country**

### Proportion of older drinkers and social connectedness



**Figure 18: Proportion of older drinkers and proportion of older adults with relatives/friends available to help them if needed by country**

The Global AgeWatch determinant ‘enabling environments’ comprises indicators of older adults’ ability to engage with, and interact in, their local community. An older adult’s strong sense of social connectedness to their community is a principal indicator of an enabling environment.

Social connectedness is a critical component of the New Zealand Ministry of Development’s Social Report series, which documents the trends in factors underpinning health and social wellbeing, the results of which help guide social policy decisions.<sup>x</sup> The social connectedness indicator used in the Global AgeWatch Index specifically reflects the proportion of older adults in each country aged 50 years and over who answered affirmatively that they had relatives or friends available to help them if they were in trouble.

Figure 18 shows the proportions of drinkers and corresponding proportion of older adults with a positive indication of social connectedness in each country. Overall, countries with higher proportions of older drinkers tended to have slightly higher levels of social connectedness in their older populations.

While this is an interesting pattern, we are cautious about interpreting this finding as social connectedness itself is unlikely to be strongly associated with alcohol use in general. Instead, this potentially reflects the wider social context within which older adults felt they were able to use alcohol (ie, more developed countries with good infrastructure, low crime rates, and good community planning likely provide a social context that facilitates both social connection and the capacity for older adults to afford and consume alcohol).

<sup>x</sup> A copy of the latest ‘Social Report’ is available from the Ministry of Social Development here: <http://socialreport.msd.govt.nz/introduction.html>

## 4.4 Limitations of this report

First, all analyses and direct comparisons presented in this report reflect cross-sectional patterns and are not appropriate for drawing conclusions as to the causal determinants of older adult drinking. Future reports supplied by this research team will specifically target causal mechanisms by modelling trends and predictors of drinking across multiple data collection waves for the NZHWR.

Second, despite the harmonisation process, these data still stem from studies that use different data collection methods (ie, self-report postal surveys versus face-to-face interviews) which are subject to different levels of bias such as social desirability, and this may influence the compatibility of these data.

Third, there was some discrepancy between countries concerning the definition of abstaining. Specifically, an abstainer in every country except England was defined as having never consumed alcohol, while abstainers in the English sample reflected those not drinking with the past 12 months. This may have artificially inflated the number of abstainers in England, and this needs to be taken into account where comparing rates of abstention and drinking between countries.

Fourth, the results of the international comparison indicated surprisingly wide confidence intervals for the data from Mexico. Our international collaborators working on the SAGE project (from which the data from Mexico stems from) have identified that Mexico tends to have very wide 95% confidence intervals for all statistics within this wider harmonised dataset. This is likely a result of the population weights developed to ensure relevance of the data to the respective older adult population in Mexico. Regardless of the origin of the wide confidence intervals, it means that we are very cautious about making interpretations regarding the patterns for Mexico in this report.

Fifth, while it has been advantageous to be able to merge the HelpAge International data from the Global AgeWatch Index with our harmonised dataset to explore potential influences on drinking in older adults, we are very aware that the variables selected reflect only four of a much wider range of possible factors that might possible influence drinking patterns.

We want to make it clear that the use of this HelpAge data in no way implies that we feel these four indicators are the only covariates of population-level drinking in older adults. However, until such time as we can develop an international dataset containing directly compatible data concerning both older adult alcohol use, demographics, health, economic and psychosocial determinants, we are required to rely on available data sources.

# Appendix 1

## Statistical analysis of the influence of ethnicity (Māori/non-Māori) on risk of hazardous drinking score.

### Overview of the analysis

In Table 2, we provided the results of a linear regression for older males and females separately to illustrate the potential influence of ethnic identity (Māori/non-Māori) on scores on the AUDIT-C indicator of hazardous drinking. The AUDIT-C sums the drinking frequency, quantity and bingeing responses for each individual with a final score on the range from 0-12.

### Measures used

The postal survey for the NZHWR 2010 data collection phase contained the measures below which were used in the current analysis.

*Gender:* Participants were asked to identify their gender with 1 being male and 2 being female.

*Ethnicity:* Using traditional Statistics New Zealand ethnicity identity questions, all participants were asked to identify from a specified list (including 'other') which ethnic group or groups they belonged to. In order to develop a dichotomous Māori /non-Māori indicator, all responses to this question were coded using a simple prioritised ethnicity algorithm where any respondent indicating Māori (whether as the only ethnic group or as one of many groups) was identified as Māori. All other respondents were coded as non-Māori.

*Socioeconomic status (SES):* The participants completed the *Economic Living Standard Index-Short Form (ELSI-SF)* <sup>(60)</sup> as a direct measure of SES. The ELSI-SF is a 25-item self-report measure assessing levels of economic consumption capacity; economic-related social activity; material standard of living; and asset ownership. The resulting score was used in the current analysis as a continuous indicator of economic living standard (from low to high).

*Physical and Mental Health:* Participants completed the SF12 v2 <sup>(61)</sup> which is a short-form version of the SF36 v2 and has eight sub-scales reflecting four physical health dimensions and four mental health dimensions. The scores from each sub-scale was combined using principal components analysis to derive coefficients to form a physical health components summary score and a mental health component summary score. Both component summary scores were standardised using New Zealand-developed coefficients to reflect the levels of health present in the current older New Zealand population. Higher scores on both component summary scores reflect better health.

*Education:* All participants in the study indicated their level of educational qualifications on a 4-point scale as follows: (1) No secondary school qualifications; (2) secondary school qualifications; (3) post-secondary/trade qualifications; and (4) tertiary qualifications. This ordinal variable was dummy-coded prior to entry into the analysis reflecting the presence of either secondary, post-secondary, or trade qualifications versus no qualifications.

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