

New Zealanders' alcohol consumption patterns across the lifespan

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New Zealanders' alcohol consumption patterns across the lifespan



Report 3 of 3

A report for the Health Promotion Agency

Massey University-the University of Auckland
Research Collaboration on Older Adults Drinking



UNIVERSITY OF NEW ZEALAND

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MEDICAL AND
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Executive summary

Alcohol consumption over the lifespan

Hazardous drinking increases the risk of alcohol-related harm for older drinkers because they are more sensitive to the effects of alcohol, and more likely to have chronic health conditions or use medications that alcohol can interfere with [1]. One way to effectively prevent alcohol-related harm in later life is to better understand the early- and mid-life factors and life events that trigger hazardous drinking.

An individual's alcohol use at any point in the lifespan is influenced by a range of environmental and personal factors [2, 3]. Environmental influences include social norms around drinking [4, 5], availability and price of alcohol [6], or opportunities for alcohol consumption [7]. Personal influences include biological markers and genetic vulnerabilities [2, 3], individual differences in personality or temperament [8, 9], or socio-demographic characteristics (e.g., gender, marital status) [10]. Protective (i.e., skills, resources or attributes that eliminate or mitigate risk) and risk factors might be present at different stages of life and influence drinking behaviour. Over the course of the lifespan, people experience different events that might prompt them to increase or decrease their drinking.

Aims of this study

This study aimed to answer the following questions:

Question 1: Initiation of alcohol use

- What key demographic factors and early childhood life events were associated with early initiation of alcohol use in the current cohort of New Zealanders aged 60 years or older?

Question 2: Patterns of alcohol use over the lifespan

- What are the main patterns of alcohol use of older New Zealanders over the lifespan?
- What are the key demographic factors and early childhood life events associated with lifespan drinking trajectories of older New Zealanders?

Question 3: Transitioning from hazardous to non-hazardous drinking

- What are the key life events and life transitions that created a context for the development of hazardous alcohol use in older New Zealanders?

Methods

The data for this study were drawn from the Life Course History (LCH) Interview Study embedded in the New Zealand Health, Work and Retirement Longitudinal Study (NZHWR). A total of 801 NZHWR participants completed interviews.

The LCH interviews were 1-2 hour-long computer-assisted telephone interviews, and collected information from participants regarding key early- and mid-life events and circumstances likely to influence their health, wealth and social stability in older adulthood.

Results of the study

Question 1: Initiation of alcohol use

In an evaluation of the key factors and early childhood life events that were associated with initiation of alcohol use during adolescence and young adulthood in this cohort of older New Zealanders, we found that:

- 68% had their first drink between the age of 14 and 18, and the majority (88%) before the age of 23
- only 4% of the sample were lifetime abstainers (i.e., never consumed alcohol)
- 82% of men had started drinking by 18 years of age compared to only 56% of women
- *increased* likelihood of earlier drinking initiation was related to:
 - higher childhood socioeconomic status
 - having a parent that smoked
 - being of Māori descent
- *reduced* likelihood of early initiation was related to having better self-reported educational achievement
- overall, when all predictor variables were considered together, only gender, socioeconomic status and parents' smoking behaviour influenced early initiation. This suggests that any differences in education and ethnicity are likely attributable to underlying differences in socioeconomic status.

Question 2: Patterns of alcohol use over the lifespan

When we explored the alcohol use patterns (frequency of use and quantity typically consumed on each occasion) of this cohort of older New Zealanders, we found three distinct groups of men and two distinct groups of women who shared common drinking patterns across their lifespan.

The three groups of male drinkers were made up of:

1. those who drank alcohol **infrequently** in **moderate-to-low quantities** over their lifespan (36%)
2. those who drank alcohol **frequently** in **moderate-to-low quantities** over their lifespan (51%)
3. those who drank alcohol **frequently** and in **high quantities** over the lifespan (13%).

The two groups of female drinkers were made up of:

1. those who drank alcohol **infrequently** and consumed **low quantities** at each occasion (48%)
2. those who drank **frequently** in **moderate-to-low quantities** over the lifespan (52%).

An investigation of the factors associated with these lifespan drinking trajectories found that:

- men who were frequent drinkers consuming low-to-moderate quantities were more likely to have initiated alcohol use earlier and had better school performance at the age of 10 than infrequent male drinkers
- women who were high frequency drinkers and consumed low quantities per occasion initiated alcohol use at an earlier age and had more affluent childhood socioeconomic status than infrequent female drinkers

- men who were high frequency drinkers consuming high quantities per occasion initiated alcohol use earlier, had poorer socioeconomic status, and were much more likely to have a heavily drinking parent than infrequent male drinkers.

Question 3: Transitioning from hazardous to non-hazardous drinking

In terms of the nature of hazardous drinking levels across the lifespan of this cohort of older New Zealanders:

- drinking patterns were largely stable across lifespan, with long periods of hazardous or non-hazardous drinking being the norm
- one-third of participants (36%) became hazardous drinkers as adolescents or young adults, and remained hazardous drinkers throughout the lifespan
- only a small proportion (14%) were life-long (i.e., from adolescence onwards) non-hazardous drinkers
- transition into or out of hazardous drinking was not common (less than 10% in each decade); when it occurred, it was usually a singular event in the lifespan (i.e., no further transitions occurred).

Transitioning in and out of hazardous drinking was linked to three key life events:

- Unemployment prior to mid-life (i.e., before 40s) was associated with increased likelihood of developing hazardous drinking habits, which, in turn, was associated with further difficulties with finding employment.
- Relationship breakdown in mid-life was associated with an increased likelihood of hazardous drinking. However, hazardous drinking was not associated with an increased probability of future divorce or separation.
- Development of a chronic health condition in young adulthood and mid-life was associated with an increased likelihood of transitioning from hazardous to non-hazardous drinking.

Conclusion

In a sample of over 800 older New Zealanders, initiation of alcohol use during adolescence (from 14 to 18 years of age) was common, more likely in men, and a hallmark of frequent drinking in later life. In men, early initiation was more likely in households with parents that smoked, while in women it was more likely in higher socioeconomic households.

For men, better educational performance in childhood was associated with frequent but lower quantity drinking across adulthood, whereas a childhood of economic disadvantage and the presence of heavy-drinking parents was linked to high frequency and high quantity drinking patterns later in life. For women, a childhood of economic advantage predicted high frequency but low quantity drinking.

Thirteen percent of the sample were hazardous drinkers across the lifespan. Change from hazardous to non-hazardous drinking (or vice versa) was uncommon (i.e., less than 10% in each decade). If it did occur, further transitions were unlikely. The stability of drinking in this cohort suggests that, once established, a pattern of drinking (whether hazardous or non-hazardous) is unlikely to be modified and becomes a stable trait. This indicates that the likelihood of normalising hazardous drinking patterns is at the point of initiation in adolescence and early adulthood, and thus the critical point of intervention to reduce alcohol-related harm.

Only a small minority of participants showed movement between hazardous and non-hazardous drinking patterns across their lives, which appeared to be indicative of key early- to mid-life events. Unemployment between ages 20 and 40 and loss of a relationship between ages 30 and 50 increased the risk of changing from a non-hazardous to a hazardous drinker. Conversely, developing a chronic health condition before 50 years of age increased the likelihood of transitioning from hazardous to non-hazardous consumption.

These results indicate that middle adulthood (from 30 to 50) is the period when change in drinking behaviour may occur and for very specific reasons. This is the time when people experience the most financial challenges (e.g., raising children, paying off mortgage) and greatest responsibilities, both in their personal (looking after children and ageing parents) and professional lives (career development). Separation and unemployment present major financial strains, which have been found to predict hazardous drinking [11]. At the same time, when people acquire chronic diseases earlier in life, they might be more motivated to make positive lifestyle changes. Middle adulthood (from 30 to 50) is an age-group that is rarely considered to be at risk, and therefore, rarely targeted by interventions or policies.

Overall, drinking behaviour in old age mirrors drinking habits developed in young adulthood. While alcohol consumption is generally stable over the lifespan, difficult life events experienced mid-life are likely to prompt significant changes in alcohol use. This highlights the importance for policies to promote low-risk alcohol drinking and reduction of use across the lifespan and for health care providers to pay particular attention to individuals experiencing difficult life transitions so that targeted interventions can take place if needed.

1.0 Literature overview: Alcohol consumption over the lifespan

The World Health Organization (WHO) states that hazardous drinking “is a pattern of alcohol consumption that increases the risk of harmful consequences for the user or others. Hazardous drinking patterns are of public health significance despite the absence of any current disorder in the individual user” (p. 1) [12]. Research shows that over one-third of New Zealanders aged 55 years or older are hazardous drinkers, and that they drink more frequently and in higher quantities than older adults in many other countries [13]. Hazardous drinking increases the risk of alcohol-related harm for older drinkers because they are more sensitive to the effects of alcohol, and more likely to have chronic health conditions or use medications that alcohol can interfere with [1]. One way to effectively prevent alcohol-related harm in later life is to better understand the early- and mid-life factors and life events that trigger hazardous drinking.

An individual’s alcohol use at any point in the lifespan is influenced by a range of environmental and personal factors [2, 3]. Environmental influences include social norms around drinking [4, 5], availability and price of alcohol [6], or opportunities for alcohol consumption [7]. Personal influences include biological markers and genetic vulnerabilities [2, 3], individual differences in personality or temperament [8, 9], or socio-demographic characteristics (e.g., gender, marital status) [10]. Protective (i.e., skills, resources and attributes that mitigate or eliminate risk) and risk factors might be present at different stages of life and influence drinking behaviour. Over the course of the lifespan, people experience different events that might prompt them to increase or decrease their drinking.

1.1. Critical life events predictive of alcohol consumption

1.1.1. *Childhood and adolescence*

Knowledge of a person’s early experiences with alcohol is crucial to understanding drinking behaviour later in life. Adverse childhood experiences, such as parental alcohol abuse, parental divorce or physical abuse, have been linked, not only to early onset of alcohol use [14-16], but also to hazardous drinking later in life [17]. For example, using retrospective life history interviews in the British Whitehall II study, Leung, Britton, and Bell [18] found that exposure to multiple adverse life experiences (e.g., parental divorce, parental mental health/alcohol problems, physical abuse) was associated with a greater likelihood of hazardous drinking in mid- and late-life. Further research highlights wider risk factors for the early onset of alcohol use, such as poor educational achievement [19-21] and parental health behaviours [22]. The effect of childhood socioeconomic status is inconclusive. Systematic reviews have found little robust evidence for any association between childhood socioeconomic status and alcohol use during adolescence [23, 24] or adulthood [25].

Numerous longitudinal and retrospective studies highlight that early onset of drinking significantly increases the odds of alcohol abuse and dependence in adulthood [26-30]. However, Guttmanova et al. [31] suggested that the impact of early onset of alcohol use on later life alcohol consumption patterns might reflect other individual, family and social risk factors that make people vulnerable for adult alcohol problems. Their analyses using 25-year longitudinal data from the United States Seattle Social Development Project showed that early onset of drinking was associated with dependence in young adulthood, but there was no relationship with lifelong alcohol use patterns after controlling

for socio-demographic characteristics and other substance use. In this respect, while there is compelling evidence for a link between early age of drinking onset and later life drinking patterns, such a relationship is likely founded on the existence of wider social and environmental risk factors.

1.1.2. Adulthood

Stressful life events are important factors influencing drinking behaviour over the course of adulthood [32, 33]. Job loss, for example, is considered a major catalyst of negative health behaviours. Research in multiple countries and in workers of various ages indicates that hazardous drinking is much more likely to occur after losing employment [34-36], in some cases increasing that likelihood by up to four times [37]. A systematic review of published literature on unemployment and substance use also indicates that employment reduces the likelihood of being a hazardous drinker [38]. In general, this research suggests a bidirectional relationship, such that hazardous drinking increases the likelihood of job loss, whereas unemployment acts as a risk factor for hazardous drinking. Another stressful life event commonly investigated in relation to hazardous drinking is divorce or separation. Numerous studies link divorce to an increased risk of heavy or hazardous drinking [39-42], although the effect might vary by gender [43]. Research findings regarding the direction of the effect are less conclusive, with some studies suggesting that heavy drinking is not only a consequence of but also a contributing factor to divorce [44].

While some life events increase the risk of hazardous drinking, others may prompt individuals to reduce their drinking. For example, the onset of illness or poor health is often reported as a major reason to stop or reduce alcohol consumption [45-47]. Across Europe and the United States, the development of medical conditions (e.g., cancer) and acute health events (e.g., joint aches) [48] or poor self-rated health [34] predicted abstinence or a reduction in alcohol use in older adulthood. In sum, research suggests that the relationship between life transitions and alcohol consumption is complex, with some events (e.g., unemployment) enhancing risk of hazardous drinking, while others (e.g., acquisition of illnesses) lead to reduced consumption.

1.2. The life course approach to studying alcohol consumption

The life course perspective provides a useful framework for investigating key life events and stage transitions that influence alcohol consumption in older New Zealanders. Life course history studies can capture period and cohort effects. For example, Grant [49] demonstrated that in 'young adults' born in the United States before World War II, fewer than 50% reported that they consumed alcohol. In contrast, 75% of 'young adults' born after the Vietnam era (1961-1975) were drinkers. Further, life course studies allow researchers to identify sensitive periods of alcohol use and the potentially harmful impact of drinking on health over time.

New Zealand currently lacks the large-scale, birth cohort studies with samples of sufficient age with which to assess the effects of early- and mid-life events on alcohol use trends in later life. When such longitudinal data are not available from early childhood, the only way to gather information about lifespan experiences is through retrospective data collection using life course history interviews. Life course history interviews elicit and record information about a range of factors, which may affect health and wellbeing during the lifespan. Structured life course history interviews have been developed for other studies of ageing, including the English Longitudinal Study on Ageing (ELSA), which administered interviews face-to-face, and the Australian 45 and Up Study, which administered interviews over the telephone.

2.0 Aims of the current study

The objective of the present study was to investigate how exposure to critical life events affects alcohol use over the lifespan and later life health outcomes in older New Zealanders. Using the Life Course History (LCH) Interview Study embedded in the New Zealand Health, Work and Retirement Longitudinal Study (NZHWR), this study aimed to answer the following questions:

Question 1: Initiation of alcohol use

- What key demographic factors and early childhood life events were associated with early initiation of alcohol use in the current cohort of New Zealanders aged 60 years or older?

Question 2: Patterns of alcohol use over the lifespan

- What are the main patterns of alcohol use of older New Zealanders over the lifespan?
- What are the key demographic factors and early childhood life events associated with lifespan drinking trajectories of older New Zealanders?

Question 3: Transitioning from hazardous to non-hazardous drinking

- What are the key life events and life transitions that created a context for the development of hazardous alcohol use in older New Zealanders?

3.0 Life Course History Interview Study: Method and measures

3.1 The NZHWR – Life Course History Interview Study: Sample and design

The NZHWR's LCH Study is an initiative of Massey University's Health & Ageing Research Team (HART). The LCH interviews were based on the content and protocols utilised in the Survey of Health, Ageing and Retirement in Europe [50], which was conducted to better understand the lifetime determinants of health and wellbeing in later life in 19 countries across Europe.

Interview participants for the LCH Project were drawn from existing participants in the NZHWR, a national survey of healthy ageing in New Zealanders aged 55 and over. NZHWR participants were first recruited in 2006 and have been surveyed by post on a biennial basis [51].

Appendix 1 provides a comprehensive overview of the design of the LCH interviews used in this study. Briefly, these were 1-2 hour-long computer-assisted telephone interviews using a standard protocol to collect information from participants regarding key early- and mid-life events and circumstances likely to influence their health, wealth and social stability in older adulthood.

A total of 1,133 NZHWR participants who were still active in the study in 2014 were approached to be interviewed in the LCH study. Of these, 236 declined and 96 were unable to be contacted during the follow-up, resulting in 801 completed interviews. Participant ages ranged from 61 to 81 ($M = 72$, $SD = 4.5$). Approximately 40% of respondents were of Māori descent, and a bit more than half of the sample were female (52%).

3.2 Measurement of alcohol use

The LCH interview schedule included a 'retrospective alcohol life-grid' [34] originally employed in the Whitehall II study of British civil servants to ascertain the patterns of drinking frequency, quantity and bingeing in each decade of the lifespan. Professor Annie Britton of University College London (Primary Investigator on the Whitehall II study and author of the life-grid) was an advisor on the use of this life-grid in the NZHWR LCH and in the analysis of the alcohol data.

The life-grid comprised two specific components. First, a question identifying whether the participant had ever consumed alcohol, and – if so – a further question identifying the age of first consumption. Second, participants' pattern of drinking frequency, quantity and binge drinking were assessed with the AUDIT-C items modified for the LCH study to assess alcohol use across decades of life (Table 1). Research from the British Whitehall II study shows that this retrospective alcohol life-grid offers a reliable assessment of alcohol use across the lifespan for older adults [34].

Specifically, participants were requested to identify the typical frequency of alcohol use, the typical quantity of use per occasion, and the typical regularity of consuming 6-or-more alcoholic drinks on any single occasion for the following time periods up until their current decade of life: 16-19 years, 20-29 years, 30-39 years, 40-49 years, 50-59 years, 60-69 years, 70-79 years, 80+ years. As per standard scoring for the AUDIT-C [52], a composite score was created by summing responses on the three indicators to provide a total ranging from 0-12. A score of 3 or higher for women and a score of 4 or higher for men indicated hazardous levels of drinking.

Table 1. AUDIT-C questions modified for the LCH study.

1. **Frequency:** How often did you have a drink containing alcohol when you were ... years old? (0 = Never, 1 = Monthly or less, 2 = 2-4 times per month, 3 = 2-3 times per week, 4 = 4+ times per week)
2. **Quantity:** How many drinks containing alcohol did you have on a typical occasion when you were ... years old? (0 = 1-2 drinks, 1 = 3-4 drinks, 2 = 5-6 drinks, 3 = 7-9 drinks, 4 = 10+ drinks)
3. **Binge drinking:** How often did you have six or more drinks on one occasion when you were ... years old? (0 = Never, 1 = Less than monthly, 2 = Monthly, 3 = Weekly, 4 = Daily or almost daily)

3.3 The measurement of predictors of alcohol use

What follows is a brief indication of the range of measures of childhood and mid-life predictors of alcohol use utilised in this study. Appendix 2 offers a more comprehensive overview of these measures. Descriptive statistics for the early- and mid-life predictors are reported in Table 2 and Table 3 respectively.

3.3.1 Potential early-life predictors of alcohol initiation and use

- **Childhood material wellbeing:** The LCH study used items adapted from the New Zealand Deprivation Index. These items assessed specific aspects of material wellbeing in the participant's life at the age of 10, including living conditions and household facilities, family ownership of household items, the type of school attended, opportunities for social participation, and access to food. A childhood socioeconomic status index was created with a range of 0 to 23 (*Median* = 19). Higher scores indicate better economic wellbeing. The total score was further divided to indicate low (0-12), medium (13-18), and high (19-23) childhood socioeconomic status (SES).
- **Childhood health history:** Participants were asked to indicate whether they had any of a range of illnesses or health conditions during childhood, including polio, asthma, allergies (other than asthma), or infectious diseases. A composite health score was created by summing all items (range: 0-9; *Median* = 2). Higher scores indicate more chronic health conditions in childhood.
- **Adverse childhood experiences:** Based on research by Leung et al. [18], participants were asked about stressful life events experienced during childhood:
 - physical abuse,
 - sexual abuse,
 - hospitalisation for four weeks or longer,
 - parental divorce,
 - parental alcohol abuse,
 - and having a parent with mental health problems.

A composite score was created by summing all items (range: 0-5; *Median* = 1). Higher scores indicate more adverse childhood experiences. Particular events, such as parental alcohol abuse, were investigated separately in some analyses.

- **Parents' smoking behaviour:** Participants indicated whether during their childhood, any of their parents or guardians smoked (Yes/No).

- **Childhood educational performance:** Participants were asked to think back to their time in school when they were 10 years old and rate their performance in English compared to other children in their class. Responses were divided into two categories: 1) same as or better than peers, and 2) worse than peers.

3.3.2 Potential mid-life predictors of alcohol use

- **Employment history:** Employment history was mapped onto each decade of life starting from the teenage years up until the 70s by differentiating between continuous employment (a period of 6-months or longer) and unemployment. This allowed us to identify whether and in which decade of life a person became unemployed for at least six months.
- **Adult health history:** Participants were asked to describe periods of ill health or disability that lasted for more than a year, or serious illnesses that lasted less than one year but influenced daily life for more than a year (e.g., cancer).
- **Relationship history:** Participants indicated how many times they have been married or lived unmarried with someone else as a couple. For each past relationship, participants were asked to report the year in which they separated from their partner.

3.4 Analytic plan

3.4.1 Research question 1: Initiation of alcohol use

Survival analysis was used to estimate the probability of initiating alcohol use between the age of 10 and 23. Time to initiation was measured in years and multivariate, discrete-time hazard regression analysis was used to model predictors of the progression to alcohol initiation. Predictor variables tested were gender, ethnicity, childhood socioeconomic status, childhood health conditions, childhood adverse experiences, parental health behaviours (i.e., smoking and alcohol use), and childhood educational performance.

3.4.2 Research question 2: Patterns of alcohol use over the lifespan

We used Growth Mixture Modelling to test the second research question. This data analytic technique aims to identify subgroups of individuals who demonstrate similar change trajectories over time [53]. We modelled changes in quantity and frequency of drinking over the lifespan based on consumption levels reported for each decade from adolescence (16-19 years of age) through to old adulthood (70s). We conducted the analysis for men and women separately to explore alcohol use trajectories specific to each gender.

3.4.3 Research question 3: Transition from hazardous to non-hazardous drinking

Cross-lagged analysis was performed to examine whether changes in employment, adult health and relationship status were predictive of transitioning in and out of hazardous drinking over the lifespan. Transitions were measured decade by decade, starting with the adolescent years up until the late 60s. This model estimated bi-directional, causal influences between hazardous drinking and the three life events (i.e., unemployment, relationship breakdown, and acquisition of chronic health conditions) over time. The model also provided information about the stability of these relationships over the lifespan.

Table 2. Descriptive statistics of early life predictors for the total sample and by gender.

	Total sample		Female		Male	
	N	%	N	%	N	%
Gender						
Female	404	53	-	-	-	-
Male	365	47	-	-	-	-
Māori descent						
Not of Māori descent	457	60	231	58	226	62
Māori descent	308	40	171	43	137	38
Childhood SES						
Low to mid	262	37	127	34	135	42
High	440	63	250	66	190	59
No. of chronic illnesses						
None	31	4	13	3	18	5
One	286	37	153	38	133	37
Two or more	450	59	238	59	212	58
No. of adverse childhood experiences						
None	379	49	194	48	185	51
One	265	35	145	36	120	33
Two or more	125	16	65	16	60	16
Physical abuse before the age of 10						
No	763	99	400	99	363	99
Yes	6	1	4	1	2	1
Sexual abuse before the age of 10						
No	752	98	390	96	362	99
Yes	17	2	14	4	3	1
Hospitalisation for >4 weeks						
No	605	79	326	81	279	77
Yes	159	21	75	19	84	23
Parental alcohol abuse						
No	595	78	314	78	281	77
Yes	172	22	90	22	82	23
Parental mental illness						
No	671	87	345	85	326	90
Yes	96	13	59	15	37	10
Parental divorce						
Parents together	662	86	345	85	317	88
Divorced	104	14	59	15	45	12
Parental smoking						
No	157	20	87	22	70	19
Yes	610	80	317	78	293	81
Educational performance						
Same as or better than peers	653	87	365	92	288	81
Worse than peers	101	13	32	8	69	19

Table 3. Descriptive statistics of mid-life predictors.

	From 10s to 20s		From 20s to 30s		From 30s to 40s		From 40s to 50s		From 50s to 60s		From 60s to 70s	
	N	%	N	%	N	%	N	%	N	%	N	%
Employment history												
Continuous	696	86.7%	364	45.3%	433	53.9%	434	54.0%	474	59.0%	426	53.1%
Lost employment	107	13.3%	439	54.7%	370	46.1%	369	46.0%	329	41.0%	377	46.9%
Health history												
No new illness	777	96.8%	762	94.9%	754	93.9%	740	92.2%	692	86.2%	675	84.1%
Acquired an illness	26	3.2%	41	5.1%	49	6.1%	63	7.8%	111	13.8%	128	15.9%
Relationship history												
Remained in relationship	797	99.3%	727	90.5%	697	86.8%	707	88.0%	765	95.3%	791	98.5%
Separated	6	0.7%	76	9.5%	106	13.2%	96	12.0%	38	4.7%	12	1.5%

4.0 Results for question 1: Initiation of alcohol use

4.1 Key findings: Initiation of alcohol use

In an evaluation of the key factors and early childhood life events that were significantly associated with initiation of alcohol use during adolescence and young adulthood, we found that:

- 68% had their first drink between the age of 14 and 18, and the majority (88%) before the age of 23
- only 4% of the sample were lifetime abstainers (i.e., never consumed alcohol)
- 82% of men had started drinking by 18 years of age compared to only 56% of women
- *increased* likelihood of earlier drinking initiation was related to:
 - higher childhood socioeconomic status
 - having a parent that smoked
 - being of Māori descent
- *reduced* likelihood of early initiation was related to having better self-reported educational achievement
- overall, when all predictor variables were considered together, only gender, socioeconomic status and parents' smoking behaviour influenced early initiation. This suggests that any differences in education and ethnicity are likely attributable to underlying differences in socioeconomic status.

4.2 Initiation of alcohol use

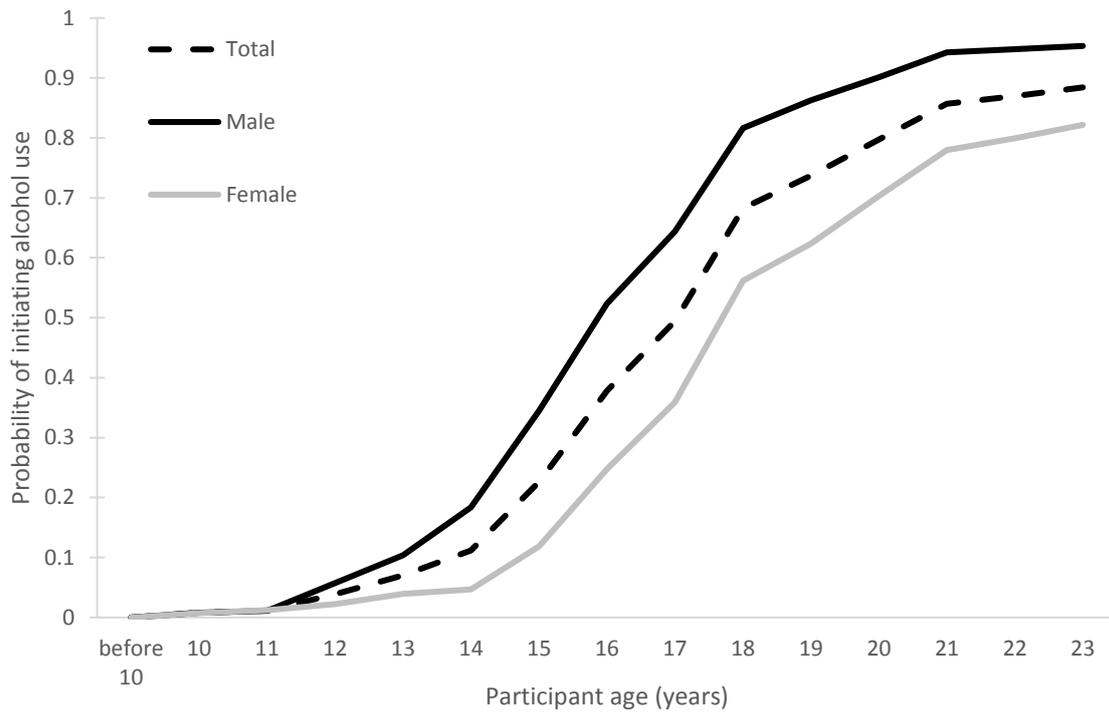
First, we modelled the probability of initiating alcohol use between the age of 10 and 23 in the overall sample and by gender. Next, we examined demographic and early childhood covariates of alcohol use initiations (parameter estimates are reported in Table 9 in Appendix 3).

Figure 1 overleaf illustrates the probabilities of initiating alcohol use for the total sample and by gender. In the total sample, the probability of initiating alcohol use was relatively low until the age of 14 (increasing from 0-7%), at which point there was a steep increase in alcohol use initiation.

By the age of 18, 68% of the sample had consumed their first drink. The probability of initiating alcohol use continued to increase after the age of 18, but at a much slower rate. At the age of 23, 88% of participants reported alcohol use.

Analyses indicated significant gender differences in the initiation of alcohol use. By the age of 14, almost 1-in-5 men had used alcohol compared with less than 1-in-20 women. By 18 years of age, more than 80% of men but only 56% of women had initiated alcohol use. At the age of 23, 5% of men and 18% of women were still abstainers.

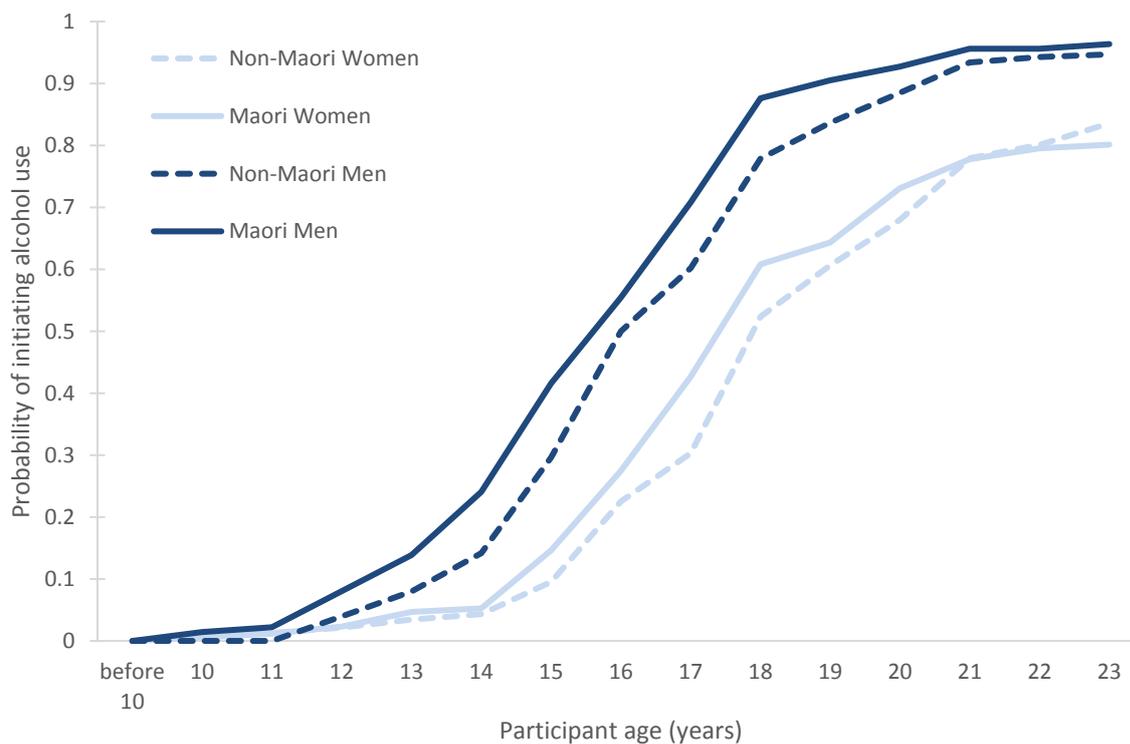
Figure 1. Probability of initiating alcohol use between the age of 10 and 23 years.



4.2.1 Individual predictors of alcohol use initiation

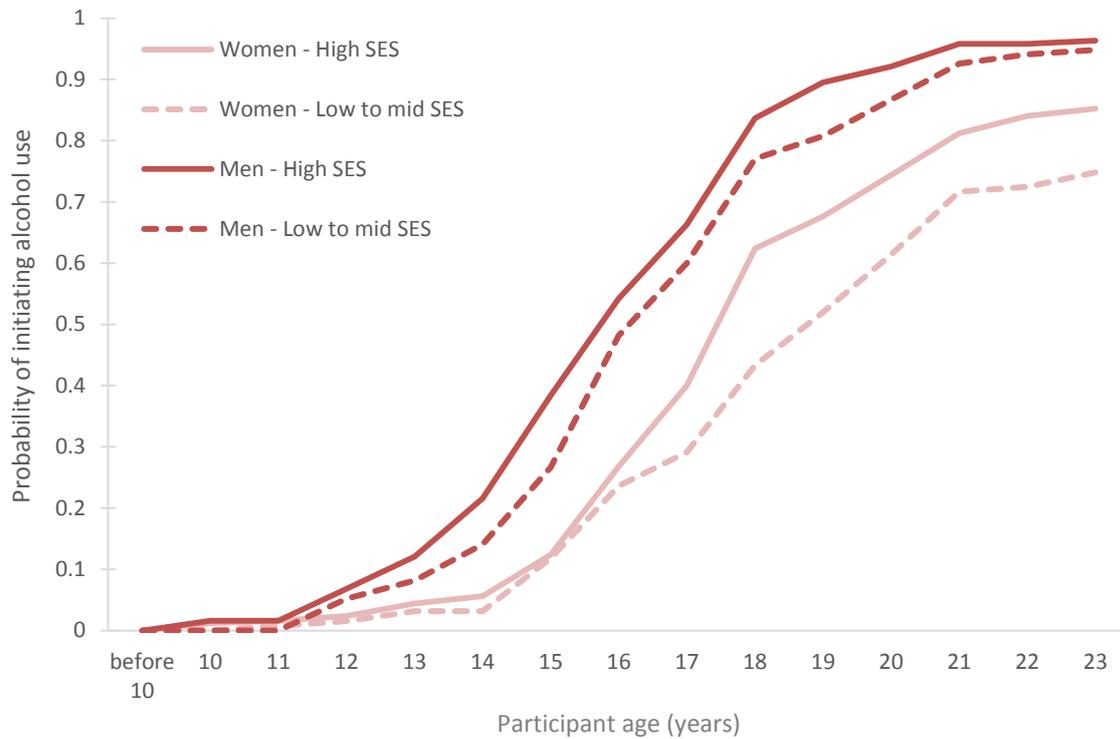
Overall no significant differences were found between participants of Māori and non-Māori descent (Figure 2).

Figure 2. Differences in the probability of alcohol use initiation based on gender and Māori descent.



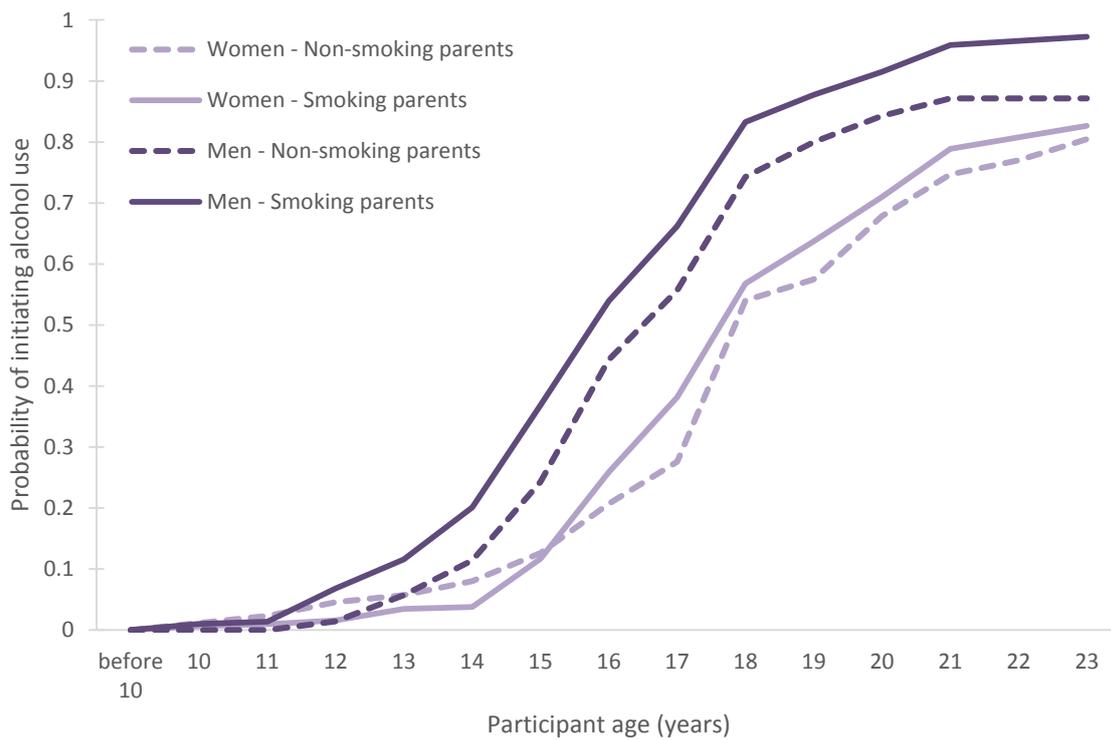
The results in Figure 3 illustrate that childhood socioeconomic status was a significant predictor of alcohol initiation. Specifically, those growing up with better economic conditions were more likely to initiate alcohol use at any age, but especially after the age of 18.

Figure 3. Differences in the probability of alcohol use initiation based on gender and childhood socioeconomic status.



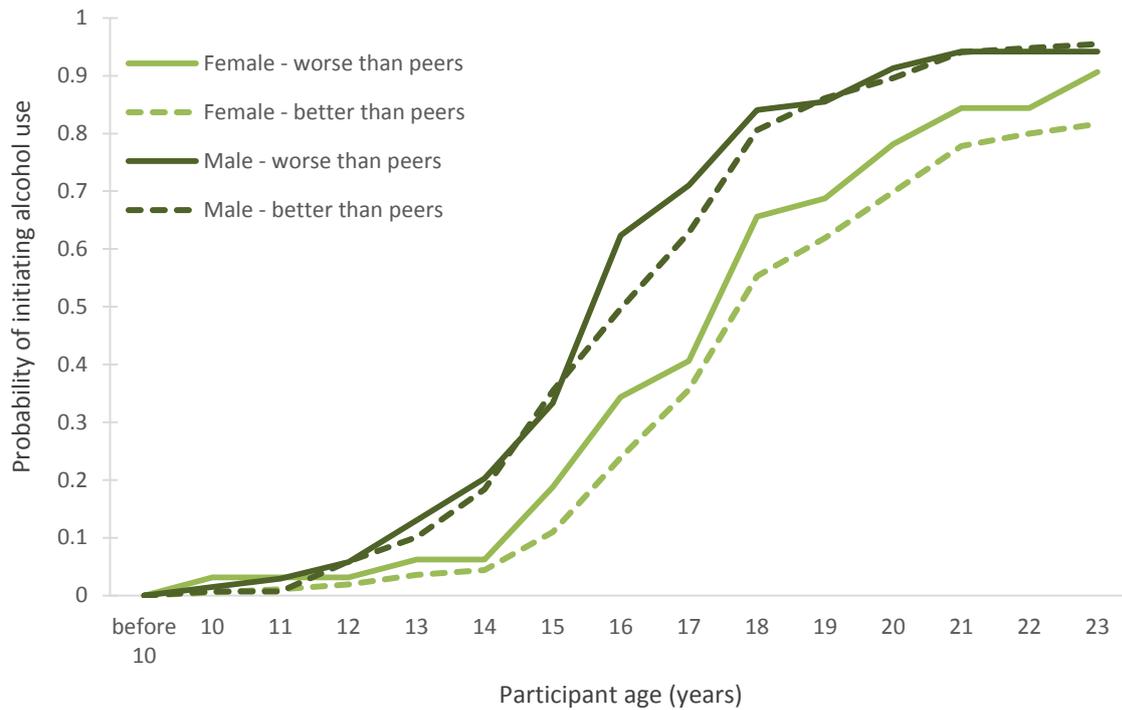
Adverse childhood experiences as predictors of alcohol use initiation were tested individually, but none of the life events had significant effects. Nor did the composite score. This suggests that the accumulation of stressful childhood life events did not significantly influence the onset of alcohol use in this sample. However, significant effects were found based on parents' smoking behaviours. Those with a parent who smoked were more likely to start using alcohol after the age of 16 compared with those whose parents were non-smokers (Figure 4).

Figure 4. Differences in the probability of alcohol use initiation based on gender and parents' smoking behaviour.



Finally, educational performance was examined as a predictor of alcohol use initiation. Results (Figure 5) indicated that better self-reported educational performance functioned as a protective factor. Those who reported worse performance in English than their peers at the age of 10 were more likely to initiate alcohol use at any age.

Figure 5. Differences in the probability of alcohol use initiation based on self-reported primary school performance.



4.2.2 Simultaneous predictors of alcohol use initiation

In a separate analysis, we simultaneously evaluated the effect of early childhood predictor variables on the age of alcohol use initiation. The results indicated that gender, socioeconomic status, and parents' smoking behaviour were all significantly associated with alcohol use initiation. However, self-reported educational performance was no longer a significant predictor when included alongside other predictors.¹ This suggests that differences in educational performance are likely to reflect differences in socioeconomic status.

¹ Critical ratios for the simultaneous predictors of alcohol use initiation: gender ($C.R. = 8.80, p < .001$); socioeconomic status ($C.R. = 3.97, p < .001$); parents' smoking behaviour ($C.R. = 2.03, p = .043$), educational performance ($C.R. = -1.30, ns$).

5.0 Results for question 2: Patterns of alcohol use over the lifespan

5.1 Key findings: Patterns of alcohol use over the lifespan

When we explored the alcohol use patterns of older New Zealanders (frequency of use and quantity typically consumed on each occasion), we found three distinct groups of men and two distinct groups of women who shared common drinking patterns across their lifespan.

The three groups of male drinkers were made up of:

1. those who drank alcohol **infrequently** in **moderate-to-low quantities** over their lifespan (36%).
2. those who drank alcohol **frequently** in **moderate-to-low quantities** over their lifespan (51%).
3. those who drank alcohol **frequently** and in **high quantities** over the lifespan (13%).

The two groups of female drinkers were made up of:

1. those who drank alcohol **infrequently** and consumed **low quantities** at each occasion (48%)
2. those who drank **frequently** in **moderate-to-low quantities** over the lifespan (52%).

An investigation of the predictors of these lifespan drinking trajectories found that:

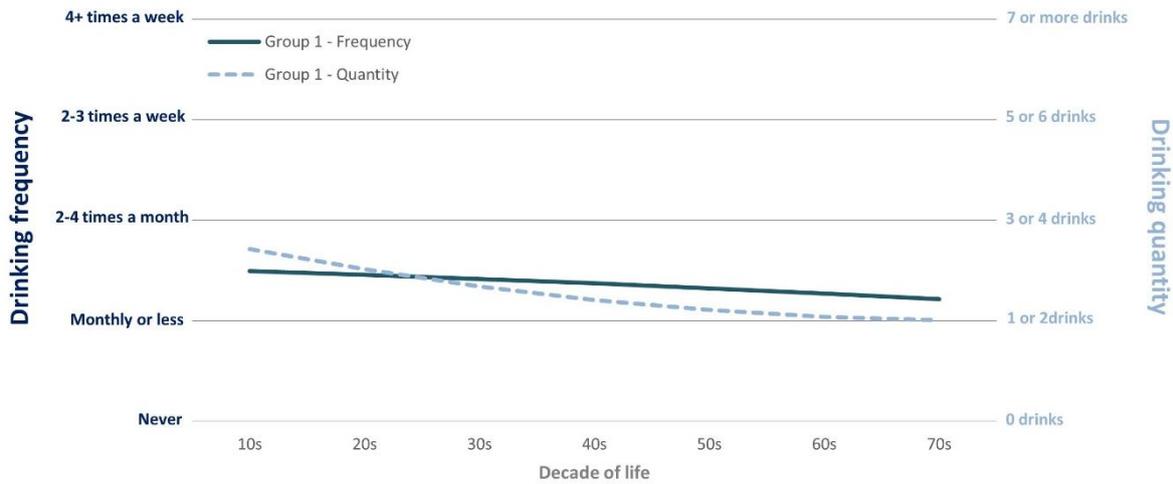
- men who were frequent drinkers consuming low-to-moderate quantities were more likely to have initiated alcohol use earlier and had better school performance at the age of 10 than infrequent male drinkers.
- women who were high frequency drinkers and consumed low quantities per occasion initiated alcohol use at an earlier age and had better childhood socioeconomic status than infrequent female drinkers.
- men who were high frequency drinkers and consuming high quantities per occasion initiated alcohol use earlier, had poorer socioeconomic status, and were much more likely to have a heavily drinking parent than infrequent male drinkers.
- those with a heavily drinking parent were almost five times more likely to become frequent heavy drinkers than infrequent, low quantity consumers, and almost three times more likely to become frequent heavy drinkers than frequent consumers of moderate quantity of alcohol. This finding provides further support for the influence of parents' health behaviours on their children's alcohol use practices [22].

5.2 Lifespan drinking profiles of men

Based on frequency and quantity of alcohol consumption throughout the decades of life, we explored whether there were distinct profiles of men and women who shared the same (or similar) patterns of drinking across the lifespan. Our statistical models (see Tables 10-13 in Appendix 4) identified three distinct trajectories of drinking across the lifespan in men and two distinct trajectories in women.

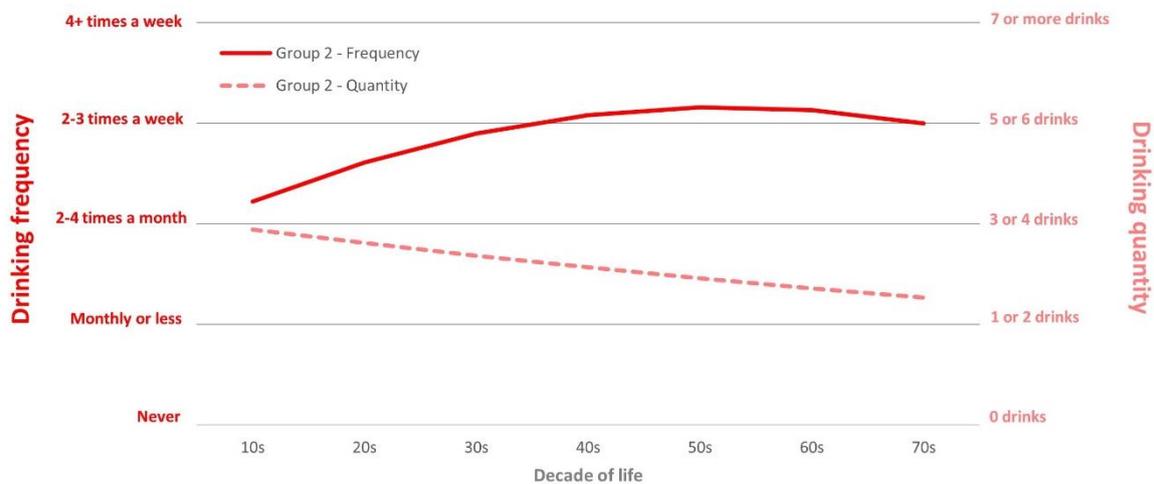
The first group of men (n = 131; 35.8%) was characterised by low frequency drinking throughout the lifespan (i.e., on average consuming alcohol 'monthly or less' or '2-4 times per month'). Quantity of alcohol consumption in this group was the highest in the teenage years (around 3-4 drinks per occasion), and slightly declined over time (Figure 6 over).

Figure 6. Men in Group 1: Low frequency and moderate to low quantity drinking.



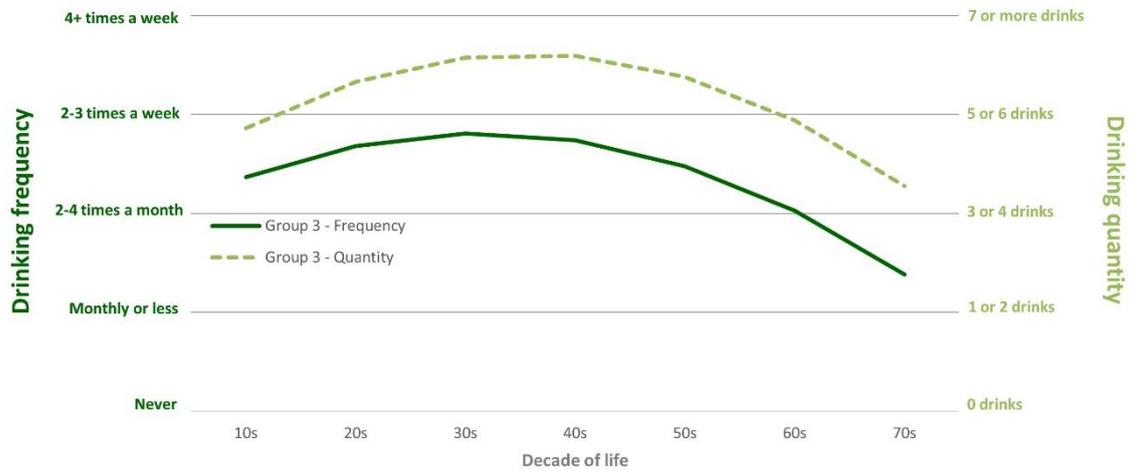
In the second group of men ($n = 188$; 51.4%), frequency of alcohol consumption increased from the teenage years (i.e., 2-4 times a month) until the 50s (2-3 times per week), plateaued between the 50s and 60s, and slightly declined after the 60s. The quantity consumed was at its highest in the teenage years (i.e., 3-4 drinks per occasion), and slightly declined over time (Figure 7).

Figure 7. Men in Group 2: Increasing frequency but moderate quantity slowly reducing across life.



The third and smallest group of men ($n = 47$; 12.8%) displayed patterns of frequent heavy drinking. Frequency of alcohol use increased from the teenage years until the 30s (i.e., from 2-4 times a month to 2-3 times per week), plateaued between the 30s and 40s, and showed a sharp decline after the 40s. Quantity of alcohol consumed at each occasion was already high in the teenage years (i.e., 5-6 drinks per occasion), which further increased until the 30s and remained stable between the 30s and 40s (i.e., between 5-6 and 7-9 drinks per occasion). Although a sharp decline was observed after the 40s, member of this group still reported drinking 3-4 standard drinks per occasion in their 70s (Figure 8 over).

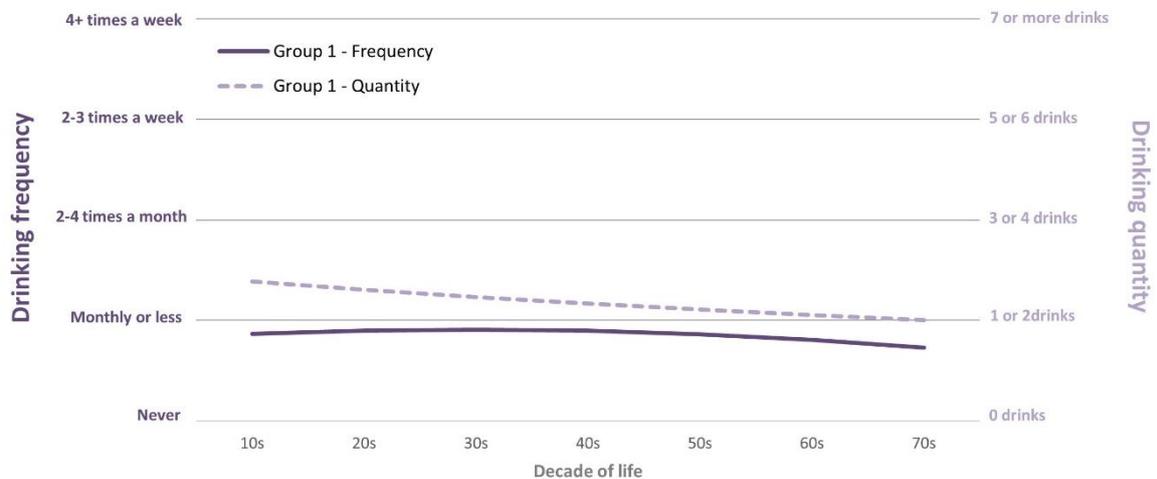
Figure 8. Men in Group 3: Higher frequency and quantity reducing after mid-life.



5.3 Lifespan drinking profiles of women

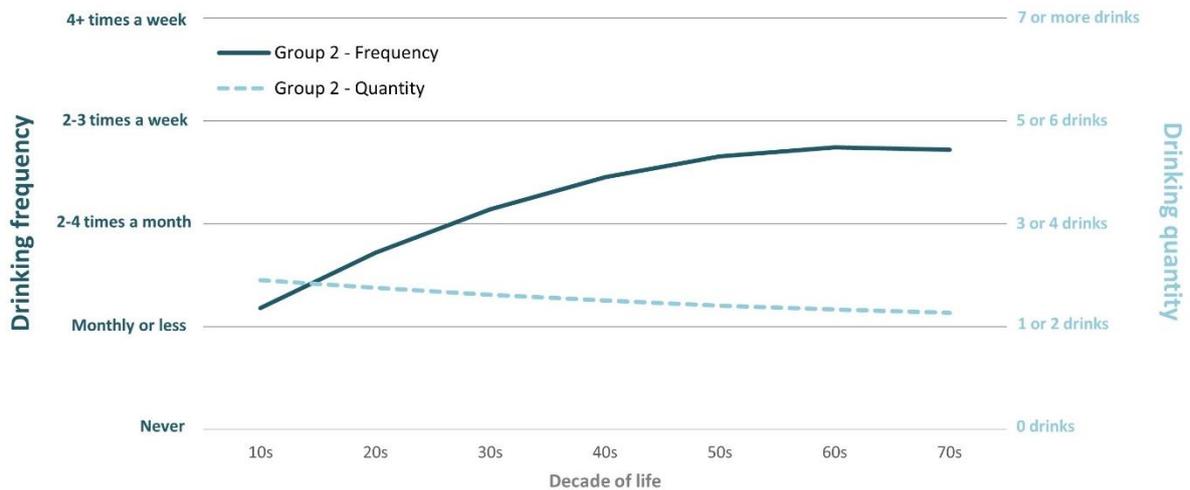
The first group of women ($n = 183$; 47.8%) reported low frequency drinking (i.e., monthly or less) and low quantity per occasion (i.e., 1-2 drinks) drinking throughout the lifespan, with no significant change over time (Figure 9).

Figure 9. Women in Group 1: Low frequency and low quantity drinking.



In the second and slightly larger group ($n = 200$; 52.2%), the frequency of alcohol consumption increased throughout the lifespan (from 'monthly or less' to '2-3 times a week') until the 60s, and remained stable afterwards. The quantity of alcohol consumed on each occasion was moderate to low and slightly decreasing (i.e., between 1-2 drinks per occasion and 3-4 drinks per occasion in the teenage years and early 20s, after which it slowly declined to 1-2 drinks per occasion; Figure 10).

Figure 10. Women in Group 2: High frequency and low quantity drinking.



5.4 Childhood predictors of lifespan drinking profiles

Next, we examined the association between childhood experiences and lifespan drinking patterns of men and women. A multinomial logistic regression analysis was conducted to test predictors of being assigned to one of the three drinking trajectory groups in men. For women, we employed a binomial logistic regression analysis because there were only two trajectory groups.

Predictor variables included in the models were: (1) the age of onset of drinking, (2) childhood socioeconomic status, (3) the number of childhood chronic illnesses, (4) educational performance at the age of 10, (5) hospitalisation for four weeks or longer, (6) a parent who drank heavily, (7) having a parent with mental health problems, and (8) parental divorce. Physical and sexual abuse could not be included as predictor variables because of the low incidence rates.

The demographic and early-life characteristics of each of the three groups for men and the two groups for women are displayed in Table 4 over. The extent to which these characteristics were associated with drinking trajectory groups is displayed in Table 5 over.

Childhood predictors of lifespan drinking profiles of men

- **Comparing Group 2 (Increasing frequency but moderate-to-low quantity) to Group 1 (Low frequency and quantity):** Men in the Group 2 initiated alcohol use earlier, had better self-reported school performance at the age of 10, and were less likely to have a parent with mental health problems than men in Group 1.
- **Comparing Group 3 (High frequency and quantity) to Group 1 (Low Frequency and Quantity):** Men in Group 3 initiated alcohol use earlier, had poorer socioeconomic status, and were much more likely to have a heavily drinking parent than men in Group 1.

- **Comparing Group 3 (High frequency and quantity) to Group 2 (Increasing frequency but moderate-to-low quantity):** Men in Group 3 had poorer socioeconomic status growing up, and were more likely to have a heavily drinking parent than men in Group 2.

Childhood predictors of lifespan drinking profiles of women

- **Comparing Group 2 (High frequency and low quantity) to Group 1 (Low frequency and quantity):** Women in Group 2 initiated alcohol use at an earlier age and had better childhood socioeconomic status than women in Group 1.

Table 4. Early life characteristics of the lifespan drinking trajectory groups.

	Men						Women			
	Low Frequency and Quantity		High Frequency and Low Quantity		High Frequency and High Quantity		Low Frequency and Quantity		High Frequency and Low Quantity	
	M (SD)	%	M (SD)	%	M (SD)	%	M (SD)	%	M (SD)	%
Age of onset	17 (4)		16 (2)		16 (3)		21 (8)		18 (4)	
Childhood SES	18.43 (2.90)		18.48 (2.58)		16.79 (4.06)		18.20 (3.12)		19.42 (2.04)	
Number of chronic illnesses	2 (1)		2 (1)		2 (2)		2 (1)		2 (1)	
English Performance										
Worse than peers		24		14		24		8		8
Same as or better than peers		76		86		76		92		92
Hospitalisation >4 weeks										
No		75		79		78		81		82
Yes		25		21		22		19		178
Heavily drinking parent										
No		85		78		51		75		81
Yes		15		22		49		25		19
Parent with mental health problems										
No		87		92		87		84		87
Yes		13		8		13		16		13
Parental divorce										
Divorced		10		15		11		18		11
Not divorced		90		85		8		82		89

Table 5. Early life predictors of lifespan drinking trajectories of men and women.

	Men				Women			
	Group 2 vs. Group 1 ^(Ref)		Group 3 vs. Group 1 ^(Ref)		Group 3 vs. Group 2 ^(Ref)		Group 2 vs. Group 1 ^(Ref)	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Age of onset	0.848**	0.769; 0.937	0.844*	0.722; 0.986	0.995	0.855; 1.156	0.942**	0.904; 0.981
Childhood SES	1.013	0.919; 1.116	0.862*	0.764; 0.973	0.851**	0.759; 0.954	1.215***	1.103; 1.338
Number of chronic illnesses	0.959	0.768; 1.196	1.115	0.815; 1.525	1.163	0.866; 1.562	0.905	0.735; 1.113
Poor English performance	0.498*	0.257; 0.965	0.662	0.256; 1.712	1.330	0.526; 3.359	0.985	0.484; 2.002
Childhood hospitalisation	0.763	0.412; 1.413	0.752	0.290; 1.946	0.985	0.394; 2.459	1.076	0.592; 1.957
Heavily drinking parent	1.659	0.836; 3.292	4.655***	1.952; 11.105	2.807*	1.284; 6.137	1.398	0.589; 3.322
Parent with mental health problems	0.404*	0.166; 0.981	1.024	0.328; 3.203	2.538	0.783; 8.226	1.452	0.829; 2.544
Parental divorce	1.700	0.708; 4.081	0.480	0.111; 2.071	0.282	0.072; 1.107	1.021	0.530; 1.964

Notes:

OR = odds ratio. Values higher than 1 indicate that the odds of the outcome are greater under the particular exposure (e.g., frequent heavy drinking men were 4.655 times more likely to have had a heavily drinking parent compared with infrequent drinkers), whereas values lower than 1 indicate that the odds of the outcome to occur are smaller given the particular exposure (e.g., frequent heavy drinking men were characterized by lower childhood socioeconomic status than infrequent drinkers).

CI = confidence interval of the odds ratio. When the CI includes 0, the effect is considered to be non-significant.

Ref = reference group.

*** $p < .001$; ** $p < .01$; * $p < .05$

6.0 Results for question 3: Transitioning from hazardous to non-hazardous drinking

Given the increased risk of alcohol-related harm to older drinkers (particularly those drinking at hazardous levels), we aimed to identify the prevalence of hazardous drinking rates in this cohort across their lifespan. This knowledge helps to identify potentially critical period(s) of transition into hazardous drinking for New Zealanders.

Understanding the timeframes for transition would facilitate the development of interventions to provide education, screening or support aimed at New Zealanders who may be entering such a critical period in their life.

6.1 Key findings: Transitioning from hazardous to non-hazardous drinking

Key findings regarding the nature of hazardous drinking levels across the lifespan of older New Zealanders showed that:

- drinking patterns are largely stable across life, with long periods of hazardous or non-hazardous drinking being the norm
- one-third of participants (36%) became hazardous drinkers as adolescents or young adults, and remained hazardous drinkers throughout the lifespan
- only a small proportion (14%) were life-long (from adolescence onwards) non-hazardous drinkers
- transition into or out of hazardous drinking was not common (less than 10% in each decade); when it occurred it was usually a singular event in the lifespan (i.e., no further transitions occurred).

In the context for developing hazardous drinking, transition was rare in this cohort but when it did occur:

- Unemployment prior to mid-life (i.e., before 40s) was associated with increased likelihood of developing hazardous drinking habits, which, in turn, was associated with further difficulties with finding employment.
- Relationship breakdown in mid-life also increased the likelihood of hazardous drinking. However, hazardous drinking did not increase the probability of future divorce or separation, which is in line with findings reported by Ostermann, Sloan [54].
- Developing a chronic health condition in young adulthood and mid-life led to a reduction in hazardous drinking and/or transitioning to non-hazardous drinking. However, this effect was no longer significant after the age of 50, which is concerning considering that people are more likely to be diagnosed with chronic conditions as they become older [55].

6.2 Prevalence of hazardous drinking over the lifespan

Table 6 over presents the prevalence of hazardous versus non-hazardous drinkers across six decades of life. During the adolescent years, less than half of the sample (47%) were hazardous drinkers. In their 20s, however, two-thirds of participants (68%) reported drinking alcohol at a hazardous level. The proportion of hazardous drinkers remained relatively stable from the early 20s throughout the lifespan, with a small decline in the 70s.

Table 7 over presents the proportion of participants who transitioned from non-hazardous to hazardous drinking or vice versa from one decade to the next (i.e., from teenage years into their 20s; from their 20's into their 30s...). Other than the increase of hazardous drinkers from adolescence to the 20s, these results illustrate that there was very little transitioning from non-hazardous to hazardous or from hazardous to non-hazardous drinking throughout the lifespan. This strongly suggests that drinking patterns (whether hazardous or non-hazardous) have been largely stable in this cohort since early adulthood.

The eight most frequent life-course drinking patterns are presented in Table 8 over. They have been included because each of these patterns represents at least 20 participants (2.7% of the sample), and altogether they account for 65% of the sample. They have been listed in order from the most stable hazardous drinking pattern (Pattern 1) down to the most stable non-hazardous drinking pattern (Pattern 8). Pattern 1 is the largest group (23%) and included participants who were life-long hazardous drinkers. Pattern 2 (12.8%) reflects the third largest group, and includes those who transitioned into hazardous drinking in their 20s and have remained hazardous since that time.

Smaller groups include hazardous drinkers who have transitioned into non-hazardous drinking in their 70s (Pattern 3; 3.3%), or their 50s (Pattern 4; 2.9%).

Life-time non-hazardous drinkers (Pattern 8) accounted for around 14% of the sample, though a further 8.8% (Patterns 5-7 combined) have remained non-hazardous drinkers since at least their 30s.

These findings suggest that drinking patterns are largely stable across the lifespan. Many New Zealanders have been hazardous drinkers for the vast majority of their lives, while fewer New Zealanders have maintained non-hazardous drinking patterns. Further, transitioning into or out of hazardous drinking was rare and when it happened, further transitions were unlikely. This means that when an individual transitioned into hazardous drinking, they tended to remain hazardous drinkers for the rest of their lives. Similarly, when an individual decided to reduce their drinking to a non-hazardous level, they tended to remain non-hazardous drinkers for the rest of their lives.

Table 6. Prevalence of hazardous versus non-hazardous drinkers in each decade across the lifespan.

	16-19		20-29		30-39		40-49		50-59		60-69		70-79	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Non-hazardous drinkers	399	53	243	32	256	34	272	36	294	39	311	42	242	48
Hazardous drinkers	350	47	506	68	493	66	477	64	455	61	438	58	263	52

Table 7. Prevalence of drinkers transitioning between hazardous and non-hazardous drinking patterns in each decade across the lifespan.

	From teens to													
	20s		From 20s to 30s		From 30s to 40s		From 40s to 50s		From 50s to 60s		From 60s to 70+			
	N	%	N	%	N	%	N	%	N	%	N	%		
Became non-hazardous drinkers	46	6	69	9	56	7	51	7	55	7	44	9		
Became hazardous drinkers	201	27	56	7	40	5	29	4	38	5	17	3		

Table 8. Most frequent patterns of hazardous drinking over the lifespan.

Pattern #	N	%	Men %	Māori %	Decade of Life						
					16-19	20-29	30-39	40-49	50-59	60-69	70-79
1	172	23.0	66.3	39.0	H	H	H	H	H	H	H
2	96	12.8	43.8	37.5	NH	H	H	H	H	H	H
3	25	3.3	76.0	48.0	H	H	H	H	H	H	NH
4	22	2.9	59.1	54.5	H	H	H	H	NH	NH	NH
5	20	2.7	70.0	50.0	H	H	NH	NH	NH	NH	NH
6	25	3.3	48.0	36.0	H	NH	NH	NH	NH	NH	NH
7	21	2.8	38.1	33.3	NH	H	NH	NH	NH	NH	NH
8	104	13.9	35.6	34.0	NH	NH	NH	NH	NH	NH	NH

Note: H = Hazardous drinker; NH = Non-hazardous drinker

6.3 Lifespan predictors of hazardous drinking

Using cross-lagged models, we explored the relationship between three key predictors of alcohol use (employment; health; relationships) and the likelihood of hazardous drinking in each decade across the lifespan. Specifically, we investigated both the direct relationship (i.e., whether a predictor is associated with hazardous drinking or vice versa), as well as the potentially reciprocal relationship (e.g., losing a job may be related to increased likelihood of hazardous drinking, which might be associated with continued unemployment in the following decade).

6.3.1 Employment history

In general, losing employment in one decade of life increased the likelihood of becoming unemployed in the following decade, but this effect became weaker as people aged.

Analyses also indicated a significant two-way relationship between lost employment and hazardous drinking in young and middle adulthood (Figure 11 over). Two pathways were identified. Those who lost employment in their 20s had higher odds of becoming hazardous drinkers in their 30s, which, in turn, was associated with increased odds of becoming unemployed in their 40s. Similarly, becoming unemployed in one's 30s increased the odds of becoming a hazardous drinker in the following decade (40s), which was associated with increased odds of lost employment in their 50s.

6.3.2 Adult health history

Acquisition of a new illness in one decade was predictive of being diagnosed with an additional health condition in the following decade. This effect became weaker as people aged, suggesting that the acquisition of chronic illness early in life increases the risk of acquiring other health conditions over the lifespan.

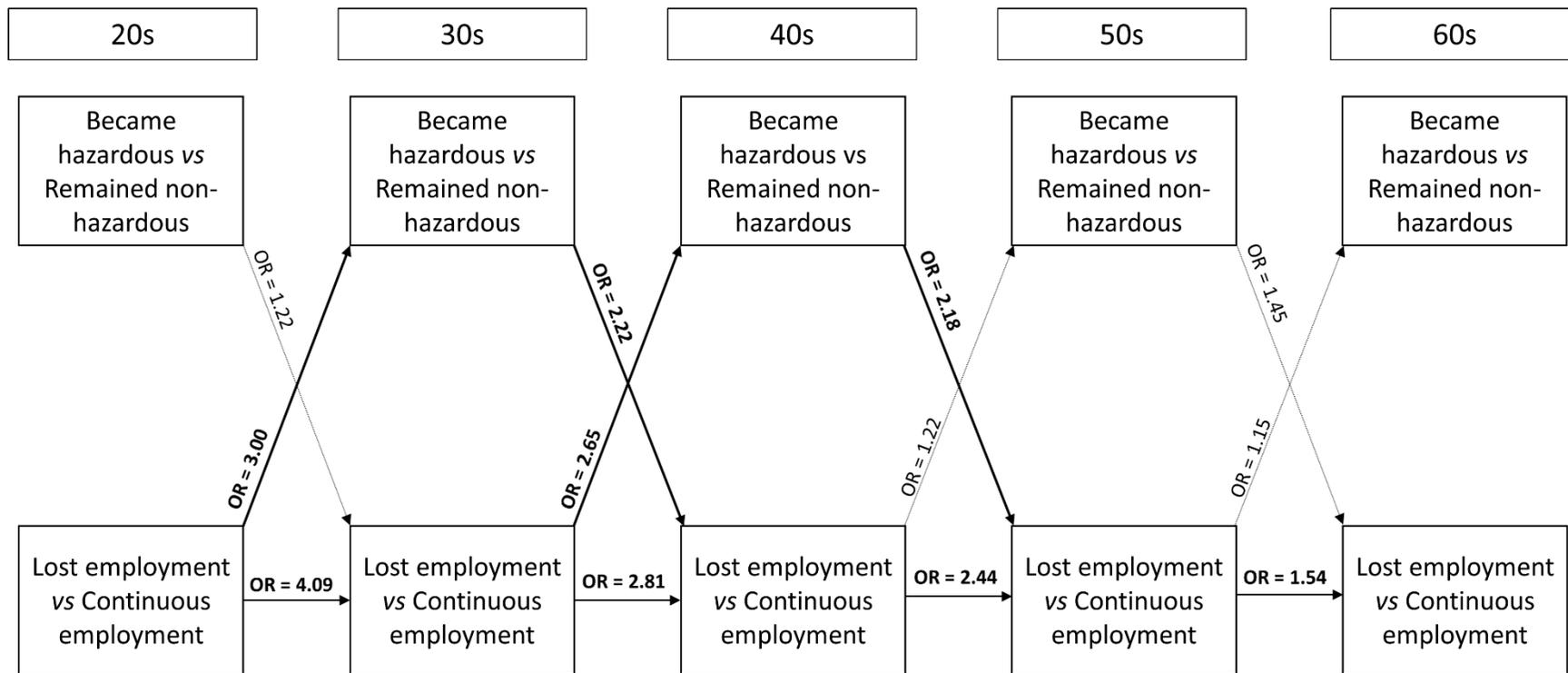
There was also a significant one-way relationship between health and becoming a non-hazardous drinker (Figure 12 over). Specifically, being diagnosed with a chronic illness in their 20s was associated with an increased likelihood of becoming a non-hazardous drinker in their 30s. Similarly, those who acquired a new illness in their 40s had greater odds of becoming non-hazardous drinkers in their 50s.

6.3.3 Relationship history

Separation from a long-term relationship in mid-life was a significant predictor of future hazardous drinking (Figure 13 over). In particular, separation in their 30s and 40s increased the likelihood of becoming a hazardous drinker in the following decade.

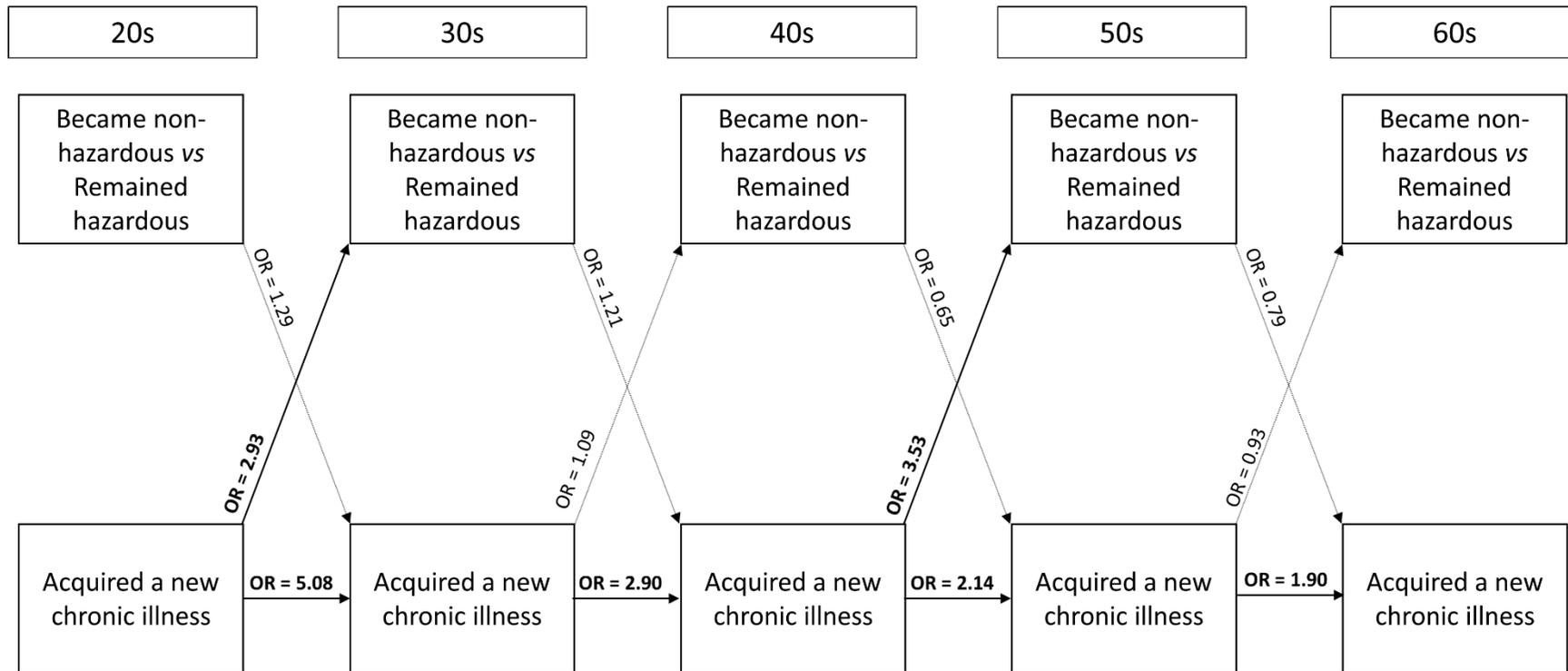
However, hazardous drinking did not increase the chance of getting divorced or separated over time.

Figure 11. Cross-lagged panel model showing reciprocal relationship between employment loss and the likelihood of becoming a hazardous drinker over the lifespan.



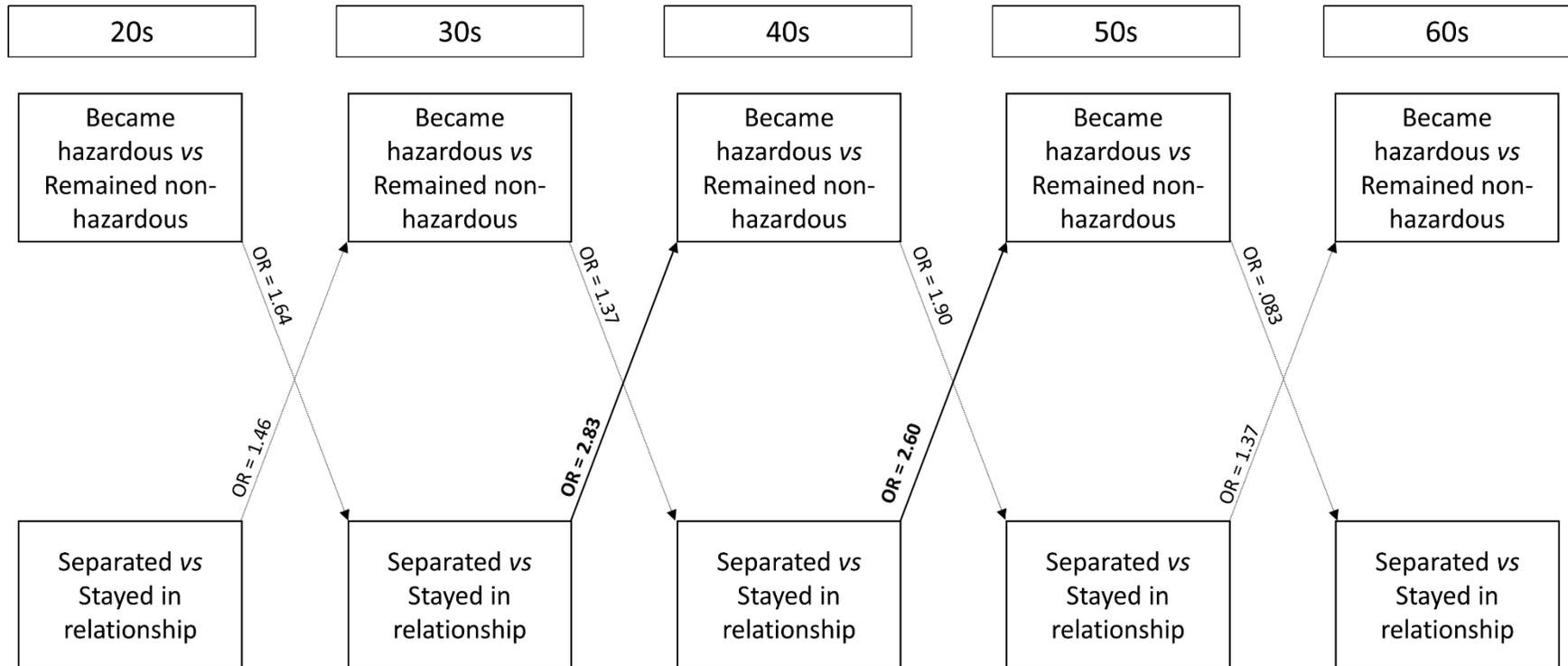
Note: Bolded numbers and lines indicate significant effects.

Figure 12. Cross-lagged panel model showing reciprocal relationship between the development of chronic conditions and the likelihood of becoming a non-hazardous drinker over the lifespan.



Note: Bolded numbers and lines indicate significant effects.

Figure 13. Cross-lagged panel model showing reciprocal relationship between relationship status and the likelihood of becoming a hazardous drinker over the lifespan.



Note: Bolded numbers and lines indicate significant effects.

7.0 Limitations

Selective attrition

LCH interviews were conducted with individuals from the 2006 cohort of the NZHWR study who were still actively participating in the study in 2014. It is possible that participants who remained active in the study for ten years are characterized by better mental and physical health and socioeconomic status than those who dropped out over the course of the study. The survival of these individuals might also reflect differences in lifespan exposure to negative life events, hardship and difficulties, and hazardous drinking.

Types of information available through retrospective interviews

Although retrospective data provide important insights into critical events over the lifespan, they provide limited information in other domains. For example, it is difficult to collect retrospective data on childhood cognitive functioning and behaviours.

Reliability of retrospective data

Many researchers have questioned the reliability and validity of retrospective data, emphasising recall bias as one of the main shortcomings of the method. To address some of the criticisms against retrospective studies, Jivraj, Goodman [56] investigated the relationship between childhood exposure and later life wellbeing using data from a prospective study (i.e., the United Kingdom Natural Child Development Study) and a retrospective study (i.e., English Longitudinal Study of Ageing). Participants in both studies were living in England and were born in the 1950s.

The UK Natural Child Development Study collected information from a large sample from birth onwards, with additional measurement points at ages 7, 11, 16, 23, 33, 42, 44, 46, 50, and 55.

The English Longitudinal Study of Ageing is a panel study of community dwelling older adults aged 50 and over, initiated in 2002. In 2007, participants completed a life course history interview to provide information about their life before they entered the study. They found that childhood socioeconomic status and health conditions were under-reported in the retrospective study.

Associations between childhood exposure and later life outcomes were in the same direction and of same statistical significance in both studies. However, the retrospective study overestimated the magnitude of the effects in certain domains. There was less bias in connection with salient life events, such as parents' separation or childhood hospitalisation.

Age of participants

The reliability of retrospective interviews is contingent on the ability to recall information accurately from one's past. Recall bias might be present in all ages but becomes a more critical problem as people get older. Participants in the LHC study were aged 65-75 years old. Considering the age range, it is possible that some participants may have had signs of cognitive decline at the time of data collection, which could have affected how accurately they recalled earlier life events. To counteract the effect of age-related cognitive decline and assist participants in retrieving autobiographical memory, an event history calendar was used. Event history calendars promote retrieval from the autobiographical memory, and increase the completeness and accuracy of retrieved information.

Appendices

Appendix 1. The interview materials and measures

The LCH interviews in this study used a New Zealand adaptation of the computer-assisted telephone interview (CATI) software utilised by the Australian 45 and Up Study, known as Abbey. A standardized interview protocol was developed by the HART team to collect information in a consistent way from participants. All interviewers received appropriate training and were assessed to ensure they had the required skills to conduct structured, standardized telephone interviews. Interviews lasted around 1-2 hours and participants had the option of taking breaks. Participants received a 'life history calendar' which included key dates.

Participants approached for the telephone interview in this study received an invitation package, including the information sheet on the project and a life history calendar (Figure 14 over). The calendar was designed as an aid to assist participants in answering questions during the telephone interview. Participants could use the calendar to familiarize themselves with areas covered in the interview, and it gave them the opportunity to recollect dates and places before the interview. Life history calendars have been shown to increase the reliability and quality of data collected in retrospective interviews by providing a graphical timeline, and allowing participants to anchor responses in relation to important life events [57, 58].

The phone interview consisted of twelve modules:

1. Demographic information about the interviewee.
2. The birth/adoption of any children, including a section on work income during this period (women only).
3. Partners the interviewee may have been in cohabiting or marital relationships with.
4. The nature, quality, and tenure duration of accommodation in childhood and in the interviewee's first independently established household.
5. Childhood household composition, household living standards/income/nutrition, educational attainment.
6. Personal employment history, income and employment conditions.
7. Personal financial investment history.
8. Health, disease and disability during childhood, and adulthood periods of ill health that lasted more than a year.
9. Access to regular health and dental care during life and health behaviours.
10. Use of alcohol.
11. Periods of happiness, stress and persecution and their consequences.
12. Exposure to difficult and traumatic life events.

Figure 14. Example page from life history calendar

Childhood – Teenage Years											
		1945	1946	1947	1948	1949	1950	1951	1952	1953	1954
	Major events that may help you date life events	World War II ends		NZ independent state	Polio epidemic		Korean War began			Tangiwai disaster	Queen Elizabeth crowned
Accommodation	For each dwelling you have lived in for 6 months or more, write the suburb and town in the year you moved there										
Partners	Marriage/de facto relationships: write name in year when you started living together										
Children	Write child's name in year of birth										
Work	Write job title in year when you started each job										

Appendix 2. The measurement of predictors of alcohol use

Early-life predictors of alcohol initiation and use

- **Childhood material wellbeing:** The LCH study used items adapted from the New Zealand Deprivation Index. Focusing on participants' life at the age of 10, the interview asked a wide range of questions about living conditions and household facilities (e.g., having an inside toilet, type of heating and cooking facilities in the home, having cold or hot water supply), ownership of household items (e.g., radio, television), the type of school attended (e.g., private, public/state, religious, native/Māori), opportunities for social participation (e.g., having access to transportation, going on holidays), and access to food (e.g., one meal a day with meat). A childhood socioeconomic status index was created with a range of 0 to 23. This was further divided into three levels reflecting hardship (0-12), comfortable (13-18), and good standard of living (19-23). Only 4.6% ($n = 36$) of respondents fell in the hardship category; therefore, the hardship and comfortable categories were combined for further analytic purposes to indicate low to medium childhood economic wellbeing.
- **Childhood health history:** Participants were asked to indicate whether they had any of the following illnesses or health conditions during childhood: polio; asthma; respiratory problems other than asthma; allergies (other than asthma); infectious disease (e.g., measles); severe diarrhoea; meningitis/encephalitis; chronic ear problems; speech impairment; difficulty seeing even with eyeglasses; severe headaches or migraines; epilepsy, fits or seizures; emotional, nervous, psychiatric issues; broken bones, fractures; appendicitis; childhood diabetes/high blood sugar; heart trouble; leukaemia or lymphoma; cancer or malignant tumour (excluding minor skin cancers). A composite score was created by summing all items (range: 0-9; *Median* = 2).
- **Adverse childhood experiences:** Based on research by Leung et al. (2016), stressful life events experienced during childhood were defined as physical abuse, sexual abuse, hospitalisation for four weeks or longer, parental divorce, parental alcohol abuse, and having a parent with mental health problems. A composite score was created by summing all items (range: 0-5; *Median* = 1). Approximately half of the participants experienced none of these events (49.3%), one third of the sample reported one event (34.5%), and 16.3% experienced two or more events. Frequency of physical and sexual abuse was very low; therefore, these variables could not be used as individual predictors, but were included in the composite score.
- **Parents' smoking behaviour:** Participants indicated whether, during their childhood, any of their parents or guardians smoked (Yes/No).
- **Childhood educational performance:** Participants were asked to think back to their time in school when they were 10 years old, and rate their performance in English compared to other children in their class on the following scale: Much better/Better/About the same/Worse/Much worse/Not applicable: did not go to school. The scale was grouped into two categories: 1) same as or better than peers, and 2) worse than peers.

Mid-life predictors of alcohol use

- **Employment history:** Participants were asked to indicate whether they have ever done any paid work, which lasted for a period of 6 months or more. For each job that lasted for 6 months or longer, they were asked to indicate the start date, the year in which they stopped working and whether there was more than a 6-month gap before starting their next job. Employment history was mapped onto each decade of life starting from the teenage years up until the 70s by differentiating between continuous and lost employment. For example, when a participant reported working in the same job from the age of 19 until the age of 34, after which they were unemployed for 6 months before starting a new job, their employment history indicated continuous employment in the 20s and one lost employment in the 30s. This allowed us to identify whether a person lost employment and in which decade of life they were unemployed for at least 6 months.
- **Adult health history:** Participants were asked to describe periods of ill health or disability that lasted for more than a year, or serious illnesses that lasted less than one year but influenced daily life for more than a year (e.g., cancer). Based on the start and end date of the periods described, for each decade of life, we determined whether a person acquired a new health condition or disability. Every health condition was counted only once. For example, if a participant reported a cancer diagnosis at the age of 38 that lasted until the age of 42, it was determined that they acquired a new health condition in their 30s.
- **Relationship history:** Participants indicated how many times they have been married or lived unmarried with someone else as a couple. For each past relationship, participants were asked to report the year in which they separated from their partner. If a participant reported to be in a relationship from the age of 18 and separated from the partner at the age of 45, it was indicative of a stable relationship status in the 20s and 30s but separation in the 40s.

Appendix 3. Parameter estimates of predictors of alcohol use initiation

Table 9. Parameter estimates of predictors of alcohol use initiation.

	Total Sample			Men			Women		
	<i>b</i>	<i>C.R.</i>	<i>p</i>	<i>b</i>	<i>C.R.</i>	<i>p</i>	<i>b</i>	<i>C.R.</i>	<i>p</i>
Gender	0.837	9.060	<.001						
Māori descent	0.120	1.312	.189	0.305	2.269	.023	0.080	0.627	.531
Childhood SES	0.236	2.506	.012	0.257	1.923	.055	0.385	2.824	.005
Adverse childhood experiences	-0.017	-0.322	.748	0.125	1.661	.097	-0.080	-1.140	.254
Hospitalisation	-0.001	-0.006	.995	0.007	0.040	.968	-0.090	-0.573	.567
Divorce	-0.107	-0.776	.438	0.239	1.309	.191	-0.273	-1.431	.152
Parental alcohol abuse	0.124	1.122	.262	0.241	1.596	.111	0.042	0.263	.793
Parental mental illness	-0.122	-0.913	.361	0.168	0.806	.420	-0.162	-0.931	.352
Smoking parent	0.271	2.520	.012	0.446	2.687	.007	0.134	0.918	.358
Educational performance	-0.364	-2.695	.007	-0.108	-0.634	.526	-0.306	-1.400	.161

Note. Table reports unstandardized estimates (*b*); *C.R.* = critical ratio.

Appendix 4. Fit statistics for longitudinal drinking trajectory analysis

Model	N per group	BIC	aBIC	aLMR-LRT	p	Entropy	PMP
1-group	-	13702.983	13639.531	-	-	-	-
2-group	166; 200	12776.596	12690.935	967.706	<.001	.890	.97-.97
3-group	131; 188; 47	12019.455	11911.586	807.223	.004	.921	.96-.97
4-group	125; 122; 38; 81	11824.328	11694.251	236.445	ns	.888	.93-.98
5-group	55; 15; 118; 104; 74	11510.483	11358.198	279.671	ns	.939	.95-1

Note. Recommended thresholds for indices of model fit:

- LMR-LRT: Model with k number of profiles produces significantly better fit than the model with $k-1$ number of profiles.
- BIC, and AIC: Lower values indicate better fit
- Entropy: Above .80 but closer to 1.0 is best
- Posterior probabilities: Above .80 but closer to 1.0 is best
- N per group: Each group should represent a reasonable proportion (at least 10%) of the total sample

Analysis indicated that the model with three drinking trajectory groups had the best fit to the data. The 4-group model did not have a significantly improved fit compared with the 3-group model.

Group	Frequency			Quantity		
	Intercept	linear slope	quadratic slope	Intercept	linear slope	quadratic slope
Group 1 (n = 131; 35.8%)	20.519***	-0.564	-0.181	19.533***	-3.7073***	2.181*
Group 2 (n = 88; 51.4%)	44.537***	6.971***	-5.327***	41.894***	-3.354**	0.724
Group 3 (n = 47; 12.8%)	19.817***	2.865***	-4.605***	19.519***	4.404***	-4.834***

Note. Values represent critical ratios. *** $p < .001$; ** $p < .01$; * $p < .05$

Model	N per group	BIC	aBIC	aLMR-LRT	p	Entropy	PMP
1-group	-	10846.970	10783.513	-	-	-	-
2-group	183; 200	10012.904	9927.237	875.703	.032	.893	.97-.97
3-group	159; 66; 158	9791.644	9683.767	262.896	ns	.892	.94-.97
4-group	141; 54; 153; 35	9322.717	9192.631	169.711	<.001	.911	.94-.99
5-group	42; 117; 49; 136; 39	9297.690	9145.394	422.445	ns	.918	.94-.96

Note. Recommended thresholds for indices of model fit:

- LMR-LRT: Model with k number of profiles produces significantly better fit than the model with $k-1$ number of profiles.
- BIC, and AIC: Lower values indicate better fit
- Entropy: Above .80 but closer to 1.0 is best
- Posterior probabilities: Above .80 but closer to 1.0 is best
- N per group: Each group should represent a reasonable proportion (at least 10%) of the total sample

The model with two groups had the best overall fit to the data. Although the 4-group model yielded a significant aLMR-LRT, one of the groups represented less than 10% of the total sample.

Group	Frequency			Quantity		
	Intercept	linear slope	quadratic slope	Intercept	linear slope	quadratic slope
Group 1 (n = 183; 47.8%)	27.399***	0.522	-0.699	21.946***	-1.641	0.413
Group 2 (n = 200; 52.2%)	32.309***	8.928***	-3.594***	33.725***	-2.454*	0.920

Note. Values represent critical ratios. *** $p < .001$; ** $p < .01$; * $p < .05$

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