



**TEN to
MEN**

The Australian Longitudinal
Study on Male Health

tentomen.org.au

Men's alcohol use and harm prevention across the life course

Ten to Men Snapshot Series – #3

Supplementary materials

Supplementary materials

Measures

In this research, data from Waves 1, 2, 3 and 4 of the *Ten to Men* study were used. Wave 1 data were collected from October 2013 to July 2014, Wave 2 data from November 2015 to May 2016, Wave 3 data from July 2020 to February 2021, and Wave 4 data from August to December 2022. The following section includes details of the specific measures used in this research. Further information on the study design, questionnaires, statistical considerations, data files and other data resources are available via the *Ten to Men Data User Guide*.¹

Alcohol

Frequency of alcohol use

In each wave, frequency of alcohol use in the past 12 months was assessed using an item from the World Health Organization's Alcohol Use Disorders Identification Test (AUDIT; Babor et al., 2001). Participants were asked, 'How often did you have more than a sip or taste of alcohol of any kind in the past 12 months?', with response options ranging from 1 = *Every day* to 8 = *Never in the last 12 months*.

In each wave, young males were also asked, 'Have you ever had an alcoholic drink of any kind?', with the response options of 0 = No; 1 = Yes; 2 = Yes, but just a sip or taste.

Frequency of alcohol use was categorised as 0 = Never (including young males who reported just having a sip or taste); 1 = Monthly or less; 2 = 2 to 4 times a month; 3 = 2 to 3 times a week; 4 = 4 or more times a week.

Standard drinks on single occasion

In each wave, number of standard drinks on a drinking day was assessed using another item from the AUDIT (Babor et al., 2001). Participants were asked, 'How many standard drinks do you typically have on a day when you are drinking alcohol?' with response options ranging from 0 = *One or two* to 4 = *Ten or more*.

Standard drinks on a single occasion were categorised as 0 = Non-drinker (i.e. those who were categorised as 0 = Never on the frequency of alcohol use measure described above); 1 = 1 or 2 standard drinks; 2 = 3 or 4 standard drinks; 3 = 5 or 6 standard drinks; 4 = 7 to 9 standard drinks; 5 = 10 or more standard drinks.

Age of first drink

In Wave 1, respondents were asked, 'How old were you when you first drank more than just a sip or taste of alcohol?' Respondents were able to enter their age in years into a free-text field. Young males were categorised as '0 = Non-drinkers', '1 = <15 years old' if they reported having their first drink at 14 years of age or earlier, or '2 = 15-17 years old' if they reported having their first drink between the ages of 15 and 17 years. Men were categorised as '0 = Non-drinkers', '1 = <18 years old' if they reported having their first drink before turning 18 years of age, or '2 = >18 years old' if they reported having their first drink after turning 18.

Socio-demographic and other predictors

All socio-demographic and other predictors were drawn from Wave 1.

Age

Age was coded into 4 categories: 1 = 10-17 years 'young males'; 2 = 18-29 years 'young adults'; 3 = 30-44 years 'early middle adults'; 4 = 45+ years 'late middle adults'.

¹For analytic purposes, data include men only (i.e. does not include young males aged 10-17 years).

Region

An indicator of region was generated using the Australian Statistical Geography Standard (ASGS) that defines geographical locations in terms of remoteness, based on the 2011 Census of Population and Housing. Detailed information about the Remoteness structure may be sourced from the [Australian Bureau of Statistics \(ABS\) website](#). For the current analyses, categories were coded as 0 = Major cities; 1 = Regional (including inner regional, outer regional, remote, and very remote).

Indigenous status

Indigenous status was measured with the question 'Are you of Aboriginal or Torres Strait Islander origin?' Response options were: 1 = *No*; 2 = *Aboriginal*; 3 = *Torres Strait Islander*; 4 = *Both*. A binary variable for whether someone identified as 'Aboriginal or Torres Strait Islander origin' was generated, coded as '1 = Not Indigenous' for men who responded with 'No' and '2 = Indigenous' for those that responded with 'Aboriginal', 'Torres Strait Islander' or 'Both'.

Area-level socio-economic disadvantage

Disadvantage was measured with SEIFA, a measure developed by the ABS that ranks geographical areas of Australia according to relative socio-economic advantage and disadvantage. The 2011 SEIFA measure used in the current research is based on information from the Index of Relative Socio-Economic Disadvantage (IRSD). Detailed information about SEIFA may be sourced from the [ABS website](#). For the current analyses, a 3-category indicator of disadvantage was generated using the 2011 SEIFA percentage variable and coded as 1 = High disadvantage (bottom 25%); 2 = Middle disadvantage; and 3 = Low disadvantage (top 25%).

Culturally and linguistically diverse background

Using measures from Wave 1, a binary indicator of cultural and linguistic diversity among respondents was generated, using the following measures:

- What language do you mainly speak at home?
- In which country were you born?
- In which country was your mother born?
- In which country was your father born?

Respondents were coded as '1 = Culturally and linguistically diverse background' if their main language spoken at home was anything other than English, if they were born outside of Australia or if either their mother or father was born outside of Australia. All other respondents, including those who identified as either Aboriginal or Torres Strait Islander, were coded as '0 = No cultural and linguistically diverse background'.

Disability status

Using the Washington Group Short Set of Questions on Disability (Washington Group on Disability Statistics, 2006), respondents aged 15 years and older were asked to select 'Yes' or 'No' as to whether they have difficulty:

- Seeing, even if wearing glasses?
- Hearing, even if using a hearing aid?
- Walking or climbing steps?
- Remembering or concentrating?
- With self-care such as washing all over or dressing?
- Understanding or being understood while using your usual (customary) language?

Parents of young males aged 10–14 years old were asked, 'Does your son have a disability?', with response options of 0 = No; 1 = Yes.

An indicator of disability status was generated, coded as '0 = Without disability' for those who responded 'No' to all of the WG-SS questions or parent report and '1 = With disability' for those who responded 'Yes' to any of the WG-SS questions or parent report.

LGBTQA+ status

In each wave, an indicator of LGBTQA+ status was generated using a combination of measures, one which asked about sexuality and one which asked about current gender identity. Assessments of sexuality and gender identity in each wave are described in Table 1.

People who identified their sexuality as heterosexual and that identified as males were coded as '1 = Heterosexual and cisgender male'. Those who provided other response options to the questions on sexuality or gender identity were coded as '0 = LGBTQA+'.

Table S1: Assessment of sexuality and gender identity in *Ten to Men*

Wave	Item	Response options
Sexuality		
Wave 1	Do you think of yourself as:	1 = Heterosexual; 2 = Bisexual; 3 = Homosexual; 4 = Not sure; 5 = Other
Wave 2	Do you think of yourself as:	1 = Heterosexual/straight; 2 = Bisexual; 3 = Homosexual/gay; 4 = Not sure; 5 = Other
Wave 3	Do you think of yourself as:	1 = Heterosexual; 2 = Bisexual; 3 = Homosexual; 4 = Asexual; 5 = Other; 6 = Pansexual
Wave 4	How do you describe your sexual orientation?	1 = Straight (heterosexual); 2 = Bisexual; 3 = Gay or lesbian; 4 = Asexual; 5 = I use a different term (please specify); 6 = Pansexual; 7 = Queer
Gender identity		
Wave 3	What is your current gender identity?	1 = Male; 2 = Female; 3 = Transgender, male to female; 5 = Gender queer/Gender non-conforming; 6 = Other identity
Wave 4	How would you describe your gender?	1 = Man or male; 2 = Woman or female; 6 = I use a different term (please specify); 7 = Non-binary

Education²

Information on education was collected from respondents by asking 'What is the highest year of secondary school you have completed?', with response options of 1 = *Did not go to school*; 2 = *Year 7 or equivalent*; 3 = *Year 8 or equivalent*; 4 = *Year 9 or equivalent*; 5 = *Year 10 or equivalent*; 6 = *Year 11 or equivalent*; and 7 = *Year 12 or equivalent*, and 'After leaving school, what is the highest qualification you have completed?', with response options of 1 = *Have not completed any additional qualifications*; 2 = *Begun but have not completed any qualifications yet*; 3 = *Trade certificate*; 4 = *Non-trade certificate*; 5 = *Associate diploma*; 6 = *Undergraduate diploma*; 7 = *Bachelor degree*; 8 = *Master's degree, Postgraduate degree or Postgraduate diploma*; 9 = *Doctorate*.

A 4-category indicator of education was generated, coded as '1 = Less than Year 12' for males who provided response options from 1 to 6 for the question on highest year of schooling; '2 = Year 12' for males who provided a response option of '7 = Year 12 or equivalent' for the question on highest year of schooling; '3 = Some qualification beyond Year 12' for males who provided response options from 3 to 6 for the question on the highest completed qualification; '4 = University (undergraduate or postgraduate)' for males who provided response options from 7 to 9 for the question on highest completed qualification.

² For analytic purposes, in the categories of Education, Employment status, Social support, Marital status and Physical activity data include men only (i.e. does not include young males aged 10–17 years).

Employment status

Information on employment status was collected from respondents by asking 'Are you currently: ...' Respondents could select from 1 = *Employed/working for profit or pay*; 2 = *Unemployed and looking for work*; 3 = *Neither working nor looking for work*. Those that selected employed/working for profit or pay were coded as '1 = Employed'. Those that responded with unemployed and looking for work were coded as '2 = Unemployed' and those that indicated they were neither working nor looking for work were coded as '3 = Not in labour force'.

Social support

In Wave 1, social support was measured using the emotional/informational support subscale of the Medical Outcomes Study (MOS) Social Support Survey (Sherbourne & Stewart, 1991). Respondents were asked to select how often each kind of support is available to them if they need it for 8 items:

- Someone you can count on to listen to you when you need to talk.
- Someone to give you good advice about a crisis.
- Someone to give you information to help you understand a situation.
- Someone to confide in or talk to about yourself or your problems.
- Someone whose advice you really want.
- Someone to share your most private worries and fears with.
- Someone to turn to for suggestions about how to deal with a personal problem.
- Someone who understands your problems.

Response options included 1 = *None of the time*; 2 = *A little of the time*; 3 = *Some of the time*; 4 = *Most of the time*; 5 = *All of the time*. The average of the scores for each item was calculated, and then transformed using the formula below into a score out of 100. Social support was used as a continuous variable. Higher scores indicate greater social support.

$$\frac{100 * (\text{observed score} - 8)}{32}$$

Marital status

Respondents were asked, 'What is your present marital status?' Response options included 1 = *Never married*; 2 = *Widowed*; 3 = *Divorced*; 4 = *Separated but not divorced*; 5 = *Married/de facto*. Marital status was coded into 3 categories, '1 = Never married' for those who responded that they were never married; '2 = Relationship' for those who responded that they were married or in a de facto relationship; and '3 = Divorced/separated/widowed' for those who indicated they were either divorced, separated or widowed.

Use of illicit drugs

Men's use of illicit drugs was generated using a combination of measures assessing the use of 6 illicit substances in the past 12 months including marijuana, heroin, opiates other than heroin, amphetamines, ecstasy, and cocaine. An indicator was generated for any illicit drug use in the past 12 months. If respondents selected 'None' for each drug they were coded as '0 = No', and if respondents reported use of any substance they were coded as '1 = Yes'.

Young males' use of illicit drugs was generated using a combination of measures assessing if they had ever used marijuana, drugs other than marijuana and substances other than alcohol. If respondents reported not ever using illicit drugs they were coded as '0 = No', if respondents reported ever using any substance they were coded as '1 = Yes'.

Use of tobacco

Men were asked, 'Do you currently smoke?' with the response options of 'No' and 'Yes'. Men were coded as '0 = Not a current smoker' or '1 = Current smoker'.

Young males were asked, 'Have you ever smoked even part of a cigarette?' with the response options of 1 = No; 2 = Yes, just a few puffs; 3 = Yes, I have smoked fewer than 10 cigarettes in my life; 4 = Yes, I have smoked more than 10 but fewer than 100 cigarettes in my life; and 5 = Yes, I have smoked more than 100 cigarettes in my life. Young males were coded as '0 = Never smoked' if they reported not ever smoking, or '1 = Smoked' if they reported ever smoking.

Physical activity

Men were asked to estimate their total time spent doing moderate and vigorous physical activity in the past week as per the Active Australia Survey (Australian Institute of Health and Welfare [AIHW], 2003). The Active Australia Survey (2003) guidelines specify that any time spent in vigorous physical activity is doubled as this is more intense and results in greater health benefits.

The total time was classified into 3 categories: '0 = Sedentary' (0 minutes of physical activity per week), '1 = Insufficiently active' (between 1 and 149 minutes of physical activity per week), and '2 = Sufficiently active' (150 minutes or more of physical activity per week).

Data analysis

Statistical analysis was performed using Stata v.18 and Mplus v.8.11.

Research question 1

The weighted prevalence of alcohol use frequency for males who consumed alcohol in the past 12 months was calculated separately for 2013–14, 2015–16, 2020–21 and 2022. Differences in frequency of alcohol consumption over time for different groups of men were also investigated using multigroup latent growth curve analyses, comparing models for group differences with the Wald's test of parameter constraints. The specific groups tested included age, region, Indigenous status, area-level socio-economic disadvantage, culturally and linguistically diverse background, disability status and LGBTQA+ status.

Research question 2

To determine how risky patterns of alcohol use differed over time among different age cohorts of Australian males, 4 Latent Growth Class Analyses (LGCA) were conducted using MPlus v8.11, one each for the 'young males' (those aged 10–17 in 2013–14), the 'young adults' (those aged 19–29 years in 2013–14), the 'early middle adults' (those aged 30–44 years in 2013–14) and the 'late middle adults' (those aged 45–57 years in 2013–14). LGCA are a form of growth mixture modelling that allow for multiple latent classes with different growth trajectories, and they are used to identify distinct subgroups within the sample population based on their growth trajectories. Each class represents a different pattern of change over time. LGCA are generalisable to the sample they are drawn from and although inferences can be made to like populations, it is important that the population of interest is well-defined.

Research question 3

For each age cohort a multinomial logistic regression was then conducted to understand how predictors at Wave 1 (2013–14) were associated with the distinct risky drinking trajectories. For the 'young males' cohort, predictors tested included age, region, Indigenous status, area-level socio-economic disadvantage, culturally and linguistically diverse background, disability status, LGBTQA+ status, use of illicit drugs, tobacco smoking and age of first drink. For the adult male cohorts, predictors tested were age, region, Indigenous status, area-level socio-economic disadvantage, culturally and linguistically diverse background, disability status, LGBTQA+ status, education, employment, social support, marital status, use of illicit drugs, tobacco smoking, age of first drink and physical activity.

Strengths, limitations and data considerations

This *Ten to Men* snapshot has many unique strengths. First, our large sample of Australian males is unique in the existing evidence base, and our findings can be applied to the wider Australian male population. Specifically, as a large longitudinal study of Australian males with rich information on alcohol use, the *Ten to Men* data enabled a comprehensive and robust investigation of trajectories of male alcohol consumption and risky alcohol use across a 9 year period.

Another strength of our study was the application of life course theory to understanding risky alcohol use trajectories across discreet cohorts of males. Although previous research has demonstrated that risky alcohol use differs depending on life stage, these studies are typically focused on a single age group, which does not allow for comparisons across age cohorts. Further, unlike our study, prior research is typically cross-sectional and cannot consider how early factors may shape risky drinking trajectories among Australian males. By taking a life course perspective, our findings can be used to inform policy and practice interventions in ways that are targeted, timely and most relevant for the men they seek to help.

This snapshot also has some limitations. Although a wide variety of questions about alcohol use are collected in *Ten to Men*, our measure of risky drinking could not be exactly matched with the current National Health and Medical Research Council (2020) risky drinking guidelines of 'no more than 10 standard drinks a week and no more than 4 standard drinks on any one day.' Specifically, while we could determine whether males drank more than 4 standard drinks on any one day, a reliable estimation of the number of standard drinks consumed per week could not be produced. Therefore, our measure of risky drinking does not capture whether males consumed more than 10 standard drinks per week.

The measurement of alcohol use will be updated in future waves of *Ten to Men* to better capture the current risky drinking guidelines. Additionally, our measure of risky alcohol use asks males to think of a 'typical' drinking occasion; what is considered typical can vary between individuals and the findings should be interpreted with this in mind.

Further, as in most longitudinal studies, attrition between waves of data collection is common and our sample reduced by around half between Wave 1 ($N = 15,758$) and Wave 4 ($N = 7,050$). However, the sample size at Wave 4 was still considerably large and appropriate for the analyses conducted. Finally, the sample size of males in some priority populations was small and may not fully capture the experience of Australian males belonging to those populations. Recent sample top-up efforts for *Ten to Men* were designed to address these issues moving forward and future waves of *Ten to Men* will include more respondents from priority populations.

Full results

Table S2: Results of multigroup latent growth curve analyses testing between group differences in alcohol frequency between 2013–14 and 2022

	Intercept				Slope			
	β	B	95% CI	p-value	β	B	95% CI	p-value
Region (N = 13,778)	<i>Wald test = 120, p = 0.000</i>				<i>Wald test = 3.17, p = 0.08</i>			
Regional	2.08	2.49	2.46, 2.53	0.000	.	.	.	.
Major City	1.88	2.25	2.22, 2.27	0.000	.	.	.	.
Indigenous (N = 13,675)	<i>Wald test = 16.41, p = 0.000</i>				<i>Wald test = 0.19, p = 0.67</i>			
Indigenous	1.94	2.07	1.95, 2.21	0.000	.	.	.	.
Not Indigenous	1.95	2.36	2.33, 2.28	0.000	.	.	.	.
CALD (N = 13,780)	<i>Wald test = 34715, p = 0.000</i>				<i>Wald test = 3.84, p = 0.05</i>			
CALD	1.71	2.12	2.09, 2.16	0.000	.	.	.	.
Not CALD	2.22	2.53	2.50, 2.56	0.000	.	.	.	.
Disability (N = 13,609)	<i>Wald test = 12.11, p = 0.001</i>				<i>Wald test = 6.42, p = 0.01</i>			
With Disability	2.20	1.66	2.11, 2.29	0.000	-0.23	-0.02	-0.04, -0.01	0.000
Without Disability	2.36	1.98	2.34, 2.38	0.000	-0.09	-0.01	-0.01, -0.01	0.000
LGBTQA Status (N = 13,427)	<i>Wald test = 162.21, p = 0.000</i>				<i>Wald test = 12.50, p = 0.0004</i>			
LGBTQA	1.45	1.86	1.78, 1.95	0.000	0.08	0.01	-0.002, 0.02	0.000
Not LGBTQA	2.04	1.39	1.36, 1.43	0.000	-0.12	-0.01	-0.01, -0.008	0.000
Disadvantage (N = 13,780)	<i>Many significant group differences see notes for Wald test</i>				<i>No significant group differences see notes for Wald test</i>			
Low	1.71	2.12	2.08, 2.16	0.000	.	.	.	.
Middle	1.96	2.38	2.35, 2.41	0.000	.	.	.	.
High	2.31	2.55	2.51, 2.59	0.000	.	.	.	.
Age (N = 15,889)	<i>Many significant group differences see notes for Wald test</i>				<i>Many significant group differences see notes for Wald test</i>			
10–17	0.55	0.36	0.33, 0.39	0.000	1.48	0.19	0.19, 0.20	0.000
18–29	1.99	2.01	1.97, 2.05	0.000	0.08	0.01	0.00, 0.01	0.044
30–44	1.96	2.37	2.33, 2.40	0.000	-0.09	-0.01	-0.01, -0.005	0.000
45+	2.04	2.58	2.53, 2.61	0.000	-0.22	-0.02	-0.02, -0.015	0.000

Notes: 95% CI = 95% confidence interval. Wald test is a test of whether there are significant group differences in alcohol use frequency at both Wave 1 (the intercept) and over time (the slope).

Intercept comparisons Wald test results:

- Low disadvantage cf. moderate disadvantage = 90.61, $p = 0.000$; low disadvantage cf. high disadvantage = 199.61, $p = 0.000$; moderate disadvantage cf. high disadvantage = 43.98, $p = 0.000$.

- Age 10–17 years cf. 18–29 years = 4426.22, $p = 0.000$; 10–17 years cf. 30–44 = 7834.70, $p = 0.000$; 10–17 years cf. 45+ = 7998.68, $p = 0.000$; 18–29 years cf. 30–44 years = 190.97, $p = 0.000$; 18–29 years cf. 45+ = 414.17, $p = 0.000$; 30–44 years cf. 45+ = 63.94, $p = 0.000$.

Slope comparisons Wald test results:

- Low disadvantage cf. moderate disadvantage = 0.56, $p = 0.454$; low disadvantage cf. high disadvantage = 1.46, $p = 0.227$; moderate disadvantage cf. high disadvantage = 0.42, $p = 0.517$.

Age 10–17 years cf. 18–29 years = 1203.68, $p = 0.000$; 10–17 years cf. 30–44 = 1709.34, $p = 0.000$; 10–17 years cf. 45+ = 1887.32, $p = 0.000$; 18–29 years cf. 30–44 years = 16.74, $p = 0.000$; 18–29 years cf. 45+ = 46.35, $p = 0.000$; 30–44 years cf. 45+ = 11.93, $p = 0.001$.

Source: *Ten to Men* data, Waves 1–4

Table S3: Model building results to determine optimal number of classes for risky drinking trajectories between 2013-14 and 2022, among different cohorts of Australian males

	Loglikelihood	AIC	SS-BIC	Entropy	VLMR	LMR
10-17 year olds in 2013-14 (N = 2096)						
1 Class	-9126.73	18267.46	18284.75	1	.	.
2 Classes	-7961.56	15945.12	15972.30	0.96	<.00	<.00
3 Classes	-7556.88	15143.77	15180.83	0.92	<.00	<.00
4 Classes ^a	-6633.14	13304.28	13351.22	0.99	<.00	<.00
5 Classes ^b	-5828.34	11702.68	11759.50	0.99	0.03	0.03
18-29 year olds in 2013-14 (N = 3311)						
1 Class	-13439.68	26893.36	26913.85	1	.	.
2 Classes	-12571.80	25165.59	25197.79	0.74	<.00	<.00
3 Classes	-12395.55	24821.10	24865.02	0.78	<.00	<.00
4 Classes ^a	-12206.01	24450.03	24505.65	0.71	<.00	<.00
5 Classes	-12103.15	24252.29	24319.63	0.71	<.01	<.01
30-44 year olds in 2013-14 (N = 5725)						
1 Class	-24524.06	49062.11	49086.44	1	.	.
2 Classes	-22141.99	44305.99	44344.22	0.80	<.00	<.00
3 Classes	-21449.49	42928.99	42981.11	0.73	<.00	<.00
4 Classes ^a	-21188.25	42414.50	42480.52	0.73	<.00	<.00
5 Classes	-20954.17	41954.34	42034.26	0.76	0.02	0.03
45-57 year olds in 2013-14 (N = 4532)						
1 Class	-20505.38	41024.75	41047.44	1	.	.
2 Classes	-18015.20	36052.40	36088.05	0.83	<.00	<.00
3 Classes	-17131.71	34293.41	34342.03	0.80	<.00	<.00
4 Classes	-16685.12	33408.24	33469.83	0.81	<.00	<.00
5 Classes ^a	-14897.35	29840.71	29915.26	0.89	<.00	<.00
6 Classes ^b	-14808.10	29670.21	29757.72	0.89	<.01	<.01

Notes: AIC = Akaike information criterion. SS-BIC = Sample size adjusted Bayesian information criterion. VLMR = Vuong-Lo-Mendell-Rubin likelihood ratio test. LMR = Lo-Mendell-Rubin adjusted test. For the 10-17 year old cohort (in 2013-14), analyses were conducted using a latent growth curve including a quadratic curve as determined by a nested chi-square comparison with a linear change only model ($\chi^2 [3] = 84.29, p < .001$). For the 18-29 year old cohort (in 2013-14), analyses were conducted using a latent growth curve including a quadratic curve as determined by a nested chi-square comparison with a linear change only model ($\chi^2 [4] = 32.30, p < .001$). For the 30-44 year old cohort (in 2013-14), analyses were conducted using a latent growth curve including a quadratic curve as determined by a nested chi-square comparison with a linear change only model ($\chi^2 [1] = 9.03, p < .01$). For 45-57 year old cohort (in 2013-14), analyses were conducted using a latent growth curve with a linear slope as determined by a nested chi-square comparison because the quadratic factor did not improve the model ($\chi^2 [4] = 3.59, p = 0.42$).

a = final accepted class solution for each age cohort. **b** = analyses were discontinued due to a local solution.

Source: *Ten to Men* data, Waves 1-4

Table S4: Multinomial logistic regression predicting membership to different risky alcohol use trajectories among the 'young male' cohort (those aged 10–17 years in 2013–14)

	Moderate risk			High risk			Increasing risk		
	aRR	95% CI	<i>p</i>	aRR	95% CI	<i>p</i>	aRR	95% CI	<i>p</i>
Age (ref = 10–14 years)									
15–17 years	21.10	[5.56, 80.02]	<.01	18.48	[4.59, 74.32]	<.01	2.35	[1.12, 4.94]	0.02
Age of first drink									
<15 years	7.44	[4.00, 13.87]	<.01	12.07	[6.07, 23.98]	<.01	8.55	[4.71, 15.52]	<.01
Region (ref = major cities)									
Regional	1.04	[0.68, 1.61]	0.84	1.89	[1.11, 3.21]	0.02	1.96	[1.34, 2.86]	<.01
Socio-economic disadvantage (ref = high disadvantage)									
Middle disadvantage	0.93	[0.56, 1.55]	0.78	1.41	[0.76, 2.59]	0.28	1.01	[0.64, 1.58]	0.97
Low disadvantage	1.54	[0.87, 2.73]	0.13	0.90	[0.41, 2.00]	0.80	1.31	[0.78, 2.20]	0.31
LGBTQA+ status (ref = heterosexual and cisgender male)									
LGBTQA+	0.60	[0.31, 1.16]	0.13	0.73	[0.33, 1.61]	0.43	0.57	[0.32, 1.03]	0.06
Indigenous status (ref = not Indigenous)									
Indigenous	1.80	[0.70, 4.66]	0.22	0.68	[0.18, 2.55]	0.57	1.17	[0.45, 3.06]	0.75
Disability status (ref = without disability)									
With disability	0.82	[0.33, 2.03]	0.66	0.64	[0.23, 1.80]	0.40	0.81	[0.36, 1.85]	0.62
Culturally and linguistically diverse background (ref = no)									
Yes	0.67	[0.43, 1.05]	0.08	0.59	[0.34, 1.04]	0.07	0.73	[0.49, 1.08]	0.12
Use of tobacco (ref = never smoked)									
Smoked	5.72	[3.37, 9.73]	<.01	11.75	[6.22, 22.19]	<.01	3.41	[2.03, 5.72]	<.01
Use of illicit drugs (ref = no)									
Yes	5.10	[2.72, 9.58]	<.01	8.66	[4.33, 17.32]	<.01	2.39	[1.22, 4.68]	0.01

Notes: aRR = adjusted risk ratio; 95% CI = 95% confidence interval. *n* = 1,014

Table S5: Multinomial logistic regression predicting membership to different risky alcohol use trajectories among the 'young adult' cohort (those aged 18–29 years in 2013–14)

	Moderate risk			Decreasing risk			High risk		
	aRR	95% CI	<i>p</i>	aRR	95% CI	<i>p</i>	aRR	95% CI	<i>p</i>
Age (ref = 26–29 years)									
18–25 years	0.91	[0.73, 1.15]	0.43	1.71	[1.25, 2.33]	<.01	1.25	[0.84, 1.86]	0.27
Age of first drink									
<18 years	3.02	[2.45, 3.71]	<.01	4.85	[3.56, 6.62]	<.01	4.38	[2.85, 6.71]	<.01
Region (ref = major cities)									
Regional	0.93	[0.75, 1.15]	0.51	1.09	[0.83, 1.42]	0.54	0.79	[0.56, 1.14]	0.21
Socio-economic disadvantage (ref = high disadvantage)									
Middle disadvantage	0.86	[0.68, 1.07]	0.18	0.96	[0.72, 1.29]	0.79	0.85	[0.58, 1.24]	0.39
Low disadvantage	1.04	[0.78, 1.38]	0.80	0.98	[0.67, 1.41]	0.89	0.85	[0.52, 1.39]	0.52
LGBTQA+ status (ref = heterosexual and cisgender male)									
LGBTQA+	0.84	[0.62, 1.14]	0.27	0.75	[0.50, 1.12]	0.16	0.66	[0.37, 1.16]	0.15
Indigenous status (ref = not Indigenous)									
Indigenous	0.90	[0.51, 1.59]	0.72	1.16	[0.60, 2.23]	0.66	1.38	[0.62, 3.09]	0.43
Disability status (ref = without disability)									
With disability	0.69	[0.45, 1.06]	0.09	1.10	[0.67, 1.80]	0.70	1.28	[0.70, 2.35]	0.42
Culturally and linguistically diverse background (ref = no)									
Yes	0.64	[0.52, 0.79]	<.01	0.61	[0.47, 0.79]	<.01	0.57	[0.40, 0.82]	<.01
Use of tobacco (ref = not a current smoker)									
Current smoker	1.57	[1.17, 2.11]	<.01	1.70	[1.20, 2.40]	<.01	2.21	[1.45, 3.37]	<.01
Use of illicit drugs (ref = no)									
Yes	2.05	[1.58, 2.66]	<.01	3.53	[2.62, 4.76]	<.01	2.82	[1.92, 4.13]	<.01
Education (ref = not University educated)									
University educated	0.63	[0.50, 0.80]	<.01	0.40	[0.28, 0.58]	<.01	0.47	[0.29, 0.76]	<.01
Employment status (ref = not employed)									
Employed	1.41	[1.12, 1.79]	<.01	1.25	[0.93, 1.69]	0.13	1.69	[1.12, 2.56]	0.01
Social support	1.00	[1.00, 1.01]	0.30	1.01	[1.00, 1.01]	0.02	1.01	[1.00, 1.01]	0.10
Marital Status (ref = not married)									
In a relationship	1.04	[0.82, 1.31]	0.75	0.75	[0.55, 1.03]	0.08	0.62	[0.41, 0.96]	0.03
Physical activity (ref = sedentary)									
Insufficiently active	1.29	[0.88, 1.89]	0.19	1.18	[0.72, 1.93]	0.52	0.90	[0.48, 1.67]	0.73
Sufficiently active	1.57	[1.13, 2.19]	0.01	1.55	[1.01, 2.38]	0.04	1.14	[0.67, 1.93]	0.63

Notes: aRR = adjusted risk ratio; 95% CI = 95% confidence interval. *n* = 2,624

Table S6: Multinomial logistic regression predicting membership to different risky alcohol use trajectories among the 'early middle adult' cohort (those aged 30–44 years in 2013–14)

	High risk			Very low risk			Moderate risk		
	aRR	95% CI	<i>p</i>	aRR	95% CI	<i>p</i>	aRR	95% CI	<i>p</i>
Age (ref = 35–44 years)									
30–34 years	0.92	[0.73, 1.16]	0.49	1.17	[0.90, 1.51]	0.24	1.15	[0.98, 1.35]	0.08
Age of first drink									
<18 years	2.98	[2.27, 3.91]	<.01	0.31	[0.24, 0.40]	<.01	2.02	[1.72, 2.38]	<.01
Region (ref = major cities)									
Regional	1.08	[0.87, 1.34]	0.50	0.95	[0.73, 1.24]	0.71	0.99	[0.85, 1.15]	0.85
Socio-economic disadvantage (ref = high disadvantage)									
Middle disadvantage	0.76	[0.60, 0.97]	0.03	0.73	[0.55, 0.95]	0.02	0.94	[0.79, 1.13]	0.53
Low disadvantage	0.61	[0.45, 0.84]	<.01	0.40	[0.27, 0.58]	<.01	1.02	[0.83, 1.27]	0.83
LGBTQA+ status (ref = heterosexual and cisgender male)									
LGBTQA+	0.63	[0.40, 1.01]	0.06	1.01	[0.67, 1.53]	0.96	0.74	[0.54, 1.02]	0.06
Indigenous status (ref = not Indigenous)									
Indigenous	1.48	[0.82, 2.66]	0.19	1.68	[0.57, 4.91]	0.34	0.84	[0.47, 1.48]	0.54
Disability status (ref = without disability)									
With disability	0.92	[0.62, 1.36]	0.66	0.81	[0.46, 1.45]	0.48	0.80	[0.58, 1.10]	0.17
Culturally and linguistically diverse background (ref = no)									
Yes	0.79	[0.63, 0.98]	0.03	1.47	[1.13, 1.90]	<.01	0.78	[0.67, 0.90]	<.01
Use of tobacco (ref = not a current smoker)									
Current smoker	2.02	[1.59, 2.58]	<.01	0.68	[0.45, 1.02]	0.06	1.63	[1.35, 1.98]	<.01
Use of illicit drugs (ref = no)									
Yes	2.27	[1.78, 2.90]	<.01	0.45	[0.27, 0.74]	<.01	1.53	[1.26, 1.86]	<.01
Education (ref = not University educated)									
University educated	0.43	[0.32, 0.57]	<.01	1.08	[0.84, 1.40]	0.53	0.71	[0.60, 0.84]	<.01
Employment status (ref = not employed)									
Employed	0.87	[0.64, 1.18]	0.36	0.62	[0.43, 0.90]	0.01	1.50	[1.14, 1.97]	<.01
Social support	1.00	[0.99, 1.00]	0.53	0.99	[0.99, 1.00]	<.01	1.00	[1.00, 1.00]	0.14
Marital Status (ref = not married)									
In a relationship	0.66	[0.51, 0.84]	<.01	0.96	[0.70, 1.33]	0.82	1.01	[0.83, 1.22]	0.96
Physical activity (ref = sedentary)									
Insufficiently active	1.02	[0.73, 1.41]	0.93	1.34	[0.90, 1.99]	0.15	0.88	[0.69, 1.13]	0.33
Sufficiently active	0.85	[0.63, 1.13]	0.26	1.04	[0.72, 1.49]	0.84	1.00	[0.81, 1.23]	0.97

Notes: aRR = adjusted risk ratio; 95% CI = 95% confidence interval. *n* = 4,645

Table S7: Multinomial logistic regression predicting membership to different risky alcohol use trajectories among the 'late middle adult' cohort (those aged 45+ years in 2013-14)

	Borderline low risk			Very low risk			High risk			Moderate risk		
	aRR	95% CI	p	aRR	95% CI	p	aRR	95% CI	p	aRR	95% CI	p
Age (ref = 45-49 years)												
50-57 years	0.83	[0.70, 0.97]	0.02	0.85	[0.66, 1.09]	0.19	0.60	[0.46, 0.78]	<.01	0.71	[0.57, 0.88]	<.01
Age of first drink (ref 18+ years)												
<18 years	1.85	[1.57, 2.18]	<.01	0.61	[0.47, 0.78]	<.01	2.98	[2.21, 4.02]	<.01	2.34	[1.85, 2.95]	<.01
Region (ref = major cities)												
Regional	0.91	[0.76, 1.08]	0.27	1.00	[0.77, 1.31]	0.98	0.84	[0.64, 1.10]	0.21	1.02	[0.81, 1.28]	0.88
Socio-economic disadvantage (ref = high disadvantage)												
Middle disadvantage	1.09	[0.87, 1.35]	0.47	1.00	[0.74, 1.36]	0.99	0.90	[0.65, 1.23]	0.50	0.98	[0.74, 1.30]	0.90
Low disadvantage	0.95	[0.74, 1.21]	0.66	0.50	[0.33, 0.75]	<.01	0.56	[0.37, 0.86]	<.01	0.82	[0.58, 1.14]	0.23
LGBTQA+ status (ref = heterosexual and cisgender male)												
LGBTQA+	0.79	[0.56, 1.12]	0.18	1.35	[0.90, 2.03]	0.15	0.66	[0.38, 1.12]	0.12	0.71	[0.45, 1.13]	0.14
Indigenous status (ref = not Indigenous)												
Indigenous	0.73	[0.30, 1.79]	0.50	1.29	[0.45, 3.72]	0.63	2.00	[0.79, 5.07]	0.14	1.95	[0.84, 4.52]	0.12
Disability status (ref = without disability)												
With disability	0.77	[0.55, 1.08]	0.13	1.61	[1.08, 2.38]	0.02	1.06	[0.67, 1.65]	0.82	1.10	[0.74, 1.63]	0.65
Culturally and linguistically diverse background (ref = no)												
Yes	0.79	[0.67, 0.93]	0.01	1.00	[0.77, 1.30]	1.00	0.70	[0.53, 0.92]	0.01	0.72	[0.58, 0.91]	0.01
Use of tobacco (ref = not a current smoker)												
Current smoker	1.38	[1.09, 1.75]	0.01	1.53	[1.09, 2.14]	0.01	2.74	[2.00, 3.75]	<.01	2.26	[1.71, 3.00]	<.01
Use of illicit drugs (ref = no)												
Yes	2.33	[1.75, 3.11]	<.01	0.93	[0.57, 1.52]	0.78	2.71	[1.87, 3.92]	<.01	2.41	[1.72, 3.39]	<.01
Education (ref = not University educated)												
University educated	0.70	[0.58, 0.85]	<.01	0.69	[0.51, 0.93]	0.02	0.41	[0.28, 0.61]	<.01	0.50	[0.37, 0.66]	<.01
Employment status (ref = not employed)												
Employed	1.20	[0.90, 1.61]	0.21	0.56	[0.40, 0.79]	<.01	0.87	[0.59, 1.28]	0.47	1.33	[0.92, 1.94]	0.13
Social support	1.00	[1.00, 1.00]	0.46	0.99	[0.99, 1.00]	0.01	1.00	[0.99, 1.00]	0.45	1.00	[1.00, 1.00]	0.95
Marital Status (ref = not married)												
In a relationship	1.11	[0.89, 1.38]	0.37	0.87	[0.64, 1.18]	0.37	0.65	[0.48, 0.89]	0.01	0.89	[0.68, 1.18]	0.42
Physical activity (ref = sedentary)												
Insufficiently active	0.83	[0.64, 1.09]	0.18	1.10	[0.75, 1.61]	0.63	0.73	[0.49, 1.10]	0.13	0.65	[0.46, 0.92]	0.01
Sufficiently active	0.92	[0.73, 1.15]	0.46	0.86	[0.61, 1.22]	0.40	0.82	[0.58, 1.16]	0.26	0.85	[0.64, 1.14]	0.29

Notes: aRR = adjusted risk ratio; 95% CI = 95% confidence interval. $n = 3,677$

Key references

- Amos, N., Bourne, A., Hill, A. O., Power, J., McNair, R., Mooney-Somers, J., et al. (2022). Alcohol and tobacco consumption among Australian sexual minority women: patterns of use and service engagement. *International Journal of Drug Policy*, *100*, 103516. doi.org/10.1016/j.drugpo.2021.103516
- Australian Institute of Health and Welfare (AIHW). (2003). *The Active Australia Survey: A guide and manual for implementation, analysis and reporting*. Canberra: AIHW. (modified)
- Australian Institute of Health and Welfare. (2019). *Alcohol and other drug use in regional and remote Australia: consumption, harms and access to treatment 2016–17*. Canberra: AIHW. www.aihw.gov.au/reports/alcohol-other-drug-treatment-services/alcohol-other-drug-use-regional-remote-2016-17/contents/summary
- Australian Institute of Health and Welfare. (2021). *Australian Burden of Disease Study 2018: Interactive data on risk factor burden*. Canberra: AIHW. Retrieved from www.aihw.gov.au/reports/burden-of-disease/abds-2018-interactive-data-risk-factors
- Australian Institute of Health and Welfare. (2024a). *Alcohol, tobacco & other drugs in Australia*. Canberra: AIHW. Retrieved from www.aihw.gov.au/reports/alcohol/alcohol-tobacco-other-drugs-australia
- Australian Institute of Health and Welfare. (2024b). *Alcohol, tobacco and other drug use among people with CALD backgrounds*. Canberra: AIHW. Retrieved from www.aihw.gov.au/reports/culturally-and-linguistically-diverse-australians/alcohol-drug-use-cald
- Australian Institute of Health and Welfare. (2024c). *LGBT people's use of alcohol, tobacco, e-cigarettes and other drugs*. Canberra: AIHW. Retrieved from www.aihw.gov.au/reports/lgbtiq-communities/lgbt-people-alcohol-drugs
- Babor, T. F., Higgins-Biddle, J. C., Saunders, J. B., & Monteiro, M. G. (2001). *AUDIT – The Alcohol Use Disorders Identification Test: Guidelines for use in primary care* (2nd ed.). Geneva: Department of Mental Health and Substance Dependence, World Health Organization.
- Boyd, J., Sexton, O., Angus, C., Meier, P., Purshouse, R. C., & Holmes, J. (2022). Causal mechanisms proposed for the alcohol harm paradox—a systematic review. *Addiction*, *117*(1), 33–56. doi.org/10.1111/add.15567
- Canham, S. L., Mauro, P. M., Kaufmann, C. N., & Sixsmith, A. (2015). Association of alcohol use and loneliness frequency among middle-aged and older adult drinkers. *Journal of Aging and Health*, *28*(2), 267–284. doi.org/10.1177/0898264315589579
- Cook, M., Mojica-Perez, Y., & Callinan, S. (2022). *Distribution of alcohol use in Australia*. Centre for Alcohol Policy Research, La Trobe University. www.latrobe.edu.au/research/centres/health/capr2
- Creery, A., & Davies, E. L. (2024). Drinking and mental health in middle adulthood: Exploring the impact of wellbeing, mental health literacy, and drinking motives on risk of alcohol dependence. *Aging & Mental Health*, 1–8. doi.org/10.1080/13607863.2024.2320134
- Deeken, F., Banaschewski, T., Kluge, U., & Rapp, M. A. (2020). Risk and Protective Factors for Alcohol Use Disorders Across the Lifespan. *Current Addiction Reports*, *7*, 245–251. doi.org/10.1007/s40429-020-00313-z
- Ferris, J. A., Laslett, A. M., Livingston, M., Room, R., & Wilkinson, C. (2011). The impacts of others' drinking on mental health. *Medical Journal of Australia*, *195*, 22–26. doi.org/10.5694/j.1326-5377.2011.tb03261.x
- Friesen, E. L., Bailey, J., Hyett, S., Sedighi, S., de Snoo, M. L., Williams, K. et al. (2022). Hazardous alcohol use and alcohol-related harm in rural and remote communities: a scoping review. *The Lancet Public Health*, *7*(2), e177–e187. doi.org/10.1016/S2468-2667(21)00159-6
- Freyer, C. H., Morley, K. C., & Haber, P. S. (2016). Alcohol use disorders in Australia. *Internal Medicine Journal*, *46*(11), 1259–1268. doi.org/10.1111/imj.13237
- Gardner, L. A., Stockings, E., Champion, K. E., Mather, M., & Newton N. C. (2024). Alcohol initiation before age 15 predicts earlier hazardous drinking: A survival analysis of a 7-year prospective longitudinal cohort of Australian adolescents. *Addiction*, *119*(3), 518–529. doi.org/10.1111/add.16376
- Giskes, K., Turrell, G., Bentley, R., & Kavanagh, A. (2011). Individual and household-level socioeconomic position is associated with harmful alcohol consumption behaviours among adults. *Australian and New Zealand Journal of Public Health*, *35*(3), 270–277. doi.org/10.1111/j.1753-6405.2011.00683.x
- Leggat, G., Livingston, M., Kuntsche, S., & Callinan, S. (2022). Alcohol consumption trajectories over the Australian life course. *Addiction*, *117*(7), 1931–1939. doi.org/10.1111/add.15849
- Lima, F., Sims, S., & O'Donnell, M. (2020). Harmful drinking is associated with mental health conditions and other risk behaviours in Australian young people. *Australian and New Zealand Journal of Public Health*, *44*(3), 201–207. doi.org/10.1111/1753-6405.12978
- Livingston, M. (2014). Socioeconomic differences in alcohol-related risk-taking behaviours. *Drug and Alcohol Review*, *33*(6), 588–595. doi.org/10.1111/dar.12202
- Moore, A. A., Endo, J. O., & Carter, M. K. (2003). Is there a relationship between excessive drinking and functional impairment in older persons? *Journal of the American Geriatrics Society*, *51*(1), 44–49. doi.org/10.1034/j.1601-5215.2002.51008.x

- Moos, R. H., Brennan, P. L., Schutte, K. K., & Moos, B. S. (2010). Older adults' health and late-life drinking patterns: A 20-year perspective. *Aging and Mental Health, 14*(1), 33–43. doi.org/10.1080/13607860902918264
- National Health and Medical Research Council. (2020). *Australian guidelines to reduce health risks from drinking alcohol*. Canberra: National Health and Medical Research Council.
- Reif, S., Karriker-Jaffe, K. J., Valentine, A., Patterson, D., Mericle, A. A., Adams, R. S. et al. (2022). Substance use and misuse patterns and disability status in the 2020 US National Alcohol Survey: A contributing role for chronic pain. *Disability and Health Journal, 15*(2), 101290. doi.org/10.1016/j.dhjo.2022.101290
- Sherbourne, C. D., & Stewart, A. L. (1991). The MOS Social Support Survey. *Social Science & Medicine, 32*(6), 705–714. doi:10.1016/0277-9536(91)90150-b
- Singh, N. K., & Bhattacharjee, D. (2022). Impact of alcohol on family functioning. In *Alcoholism* (pp. 15–34). CRC Press.
- Stephenson, M., Barr, P., Thomas, N., Cooke, M., Latvala, A., Rose, R. J. et al. (2024). Patterns and predictors of alcohol misuse trajectories from adolescence through early midlife. *Development and Psychopathology, 1*–17. doi:10.1017/S0954579424000543
- Szabó, Á., Towers, A., Sheridan, J., & Newcombe, D. (2021). Ten-year trajectories of alcohol consumption in older adult New Zealanders. *The Journals of Gerontology: Series B, 76*(3), 496–506. doi.org/10.1093/geronb/gbz143
- Tscharke, B., Livingston, M., O'Brien, J. W., Bade, R., Thomas, K. V., Mueller, J. F. et al. (2024). Seven-years of alcohol consumption in Australia by wastewater analysis: Exploring patterns by remoteness and socioeconomic factors. *Drug and Alcohol Dependence, 111317*. doi.org/10.1016/j.drugalcdep.2024.111317
- Washington Group on Disability Statistics. (2006). *Washington group short set of questions on disability*. Hyattsville, MD: National Center for Health Statistics, Centers for Disease Control and Prevention.
- Yuen, W. S., Chan, G., Bruno, R., Clare, P., Mattick, R., Aiken, A. et al. (2020). Adolescent alcohol use trajectories: Risk factors and adult outcomes. *Pediatrics, 146*(4). doi.org/10.1542/peds.2020-0440