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Do women grow out of risky drinking? A prospective study of three cohorts of Australian women

Running head: Australian women's drinking behaviour

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Abstract

Introduction and aims To examine women's drinking behaviour relative to Australian guidelines and identify associated factors over the lifespan.

Design and Methods Data came from three prospective cohorts of the Australian Longitudinal Study on Women's Health aged 18-23 (n=14247), 45-50 (n=13715) and 70-75 years (n=12432) when first surveyed in 1996. The same women were re-surveyed at roughly three-year intervals until 2012. At each survey, four drinking behaviours were based on two guidelines: long-term drinking (no more than two standard drinks per day) and episodic drinking (no more than four standard drinks on an occasion): 1) no risk (within both guidelines); 2) low episodic risk (less than once a month); high episodic risk (at least once a month); long-term risk (more than two drinks per day regardless of episodic drinking).

Results No risk drinking increased with age, low episodic risk drinking remained almost constant between ages 18 and 39, and high episodic risk drinking declined rapidly. Few women drank at long-term risk. Factors associated with risky drinking varied with age, however being a past or current smoker consistently increased the risk, and risks for smokers increased with age. Risky drinking was less likely to be practised by women providing care and needing help with daily tasks, or by pregnant women and those living with children.

Discussion and Conclusions Risky drinking behaviour should be addressed in younger women, and in those who smoke. Interventions to reduce risky drinking, possibly in combination with reducing smoking could be offered through general practice centres.

Introduction

Alcohol guidelines have been developed in many countries in an attempt to reduce risks of alcohol-related harm [1]. Australian guidelines were first developed in 1987 and revised in 1992 [2], 2001 [3] and 2009 [4]. The guidelines are described in ~~terms of Australian~~ standard drinks which contain 10g of ethanol. The 1992 guidelines focussed on the number of standard drinks consumed per week and were broadened to include patterns of drinking in 2001. Guidelines for women were: drink no more than 14 standard drinks per week to reduce long-term risk and drink up to four standard drinks per day on no more than three days per week to reduce short-term risk [3].The 2009 guidelines were based on modelling of absolute risk of harm from drinking. For the first time, guidelines were the same for men and women: drink no more than two standard drinks per day to reduce the lifetime risk of harm from alcohol-related disease or injury, and drink no more than four standard drinks on a single occasion to reduce the risk of alcohol-related injury from that occasion [4]. Australian alcohol guidelines for women have been largely consistent for lifetime risk since 1987 and for episodic risk since 2001.

Although several studies have described the development of drinking guidelines [5-7], and others have examined knowledge of alcohol guidelines [8-10], research is limited on drinking behaviour in relation to alcohol guidelines[11, 12]. Rather than investigating specific at-risk groups, this study used prospective data from the Australian Longitudinal Study on Women's Health (ALSWH) 1996-2012 to investigate drinking behaviour in relation to alcohol guidelines among the wider population of Australian women over the life course.

ALSWH data have been used previously to examine factors related to risky drinking in women aged 18-23 years in 1996 [13] and ~~to examine~~ changes in alcohol consumption over

two or three surveys ~~time points~~[14]. Risky drinkers ~~aged 18-23 years~~ were more likely than low risk drinkers to live in non-urban areas, to be unmarried, to live alone, in shared accommodation, or with parents, and to be past or current smokers [13]. Using 1996-2003 data, Clemens et al. concluded that far fewer women drank at long-term risk than at episodic risk [14]. This study expands on previous work by examining Australian women's drinking behaviour relative to alcohol guidelines and identifying factors associated with ~~these~~ risky drinking behaviour~~s~~ over the lifespan.

Methods

Participants

In 1996, three cohorts of women aged 18-23 years (1973-78 cohort), 45-50 years (1946-51 cohort) and 70-75 years (1921-26 cohort) enrolled in the ~~Australian Longitudinal Study on Women's Health (~~ALSWH~~)~~. ~~W~~The ~~w~~omen were randomly sampled from the national health insurance (Medicare) database with intentional oversampling of women living in rural and remote areas. Response rates were approximately 42% in the 1973-78 cohort, 56% in the 1946-51 cohort and 40% in the 1921-26 cohort [15]. Comparison with the 1996 Australian Census showed that respondents were broadly representative of women of the same age, although more educated women were over-represented and women born outside Australia were under-represented [15]. Further details are available elsewhere [16]. Ethical approval was obtained from the Universities of Newcastle and Queensland (Ethics approvals H0760795 and 2004000224). After the initial mailed survey of all cohorts in 1996, the same women were re-surveyed at roughly three-yearly intervals.

Measures

Unless otherwise stated, all variables were measured at all surveys: six surveys of the 1973-78 cohort in 1996, 2000, 2003, 2006, 2009 and 2012; five surveys of the 1946-51 cohort in 1996, 1998, 2004, 2007 and 2010; and the 1996 survey of the 1921-26 cohort. All variables were collected through self-report.

Primary outcome

Long-term risk drinking was assessed using a quantity-frequency method where respondents reported their usual quantity and frequency of alcohol consumption [14]. Response options to the frequency item, 'How often do you usually drink alcohol' were 'never drink alcohol', 'less than once a month', 'less than once a week', 'on 1 or 2 days a week', 'on 3 or 4 days a week', 'on 5 or 6 days a week' and 'every day'. Responses to the usual quantity of standard drinks were '1 or 2 drinks per day', '3 or 4 drinks per day', '5 to 8 drinks per day' and '9 or more drinks per day'. Weekly alcohol consumption was calculated as the midpoint of the frequency multiplied by the midpoint of the quantity [14, 17]. Drinking behaviour was classified as consistent with the long-term drinking guideline if women drank an average of no more than two drinks per day. Response options to the question, 'How often do you have five or more standard drinks of alcohol on one occasion' were 'never', 'less than a month', 'about once a month', 'about once a week', and 'more than once a week'. This question was only asked in the 1996 survey of the 1921-26 cohort. Drinking behaviour was classified as consistent with the episodic drinking guidelines if women drank no more than four drinks on one occasion. Four mutually exclusive drinking behaviours were defined as seen in Table 1: no risk, low episodic risk, high episodic risk, long-term risk (Table 1).

Demographic, social and health-related factors

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Unless otherwise stated all explanatory variables were dichotomous. Demographic factors comprised area of residence, education, student status, employment, and monetary stress. Area of residence, ~~was~~ based on the ARIA+ score ~~that measures accessibility to services and~~ was classified as highly accessible, that is living in major centres, or living outside major centres where services were less accessible [18]. Highest educational level ~~achieved~~ had five nominal categories ~~at all surveys for the 1973-78 cohort and in 1996 for the other two cohorts~~: up to 11 years school; 12 years school, apprenticeship or trade; certificate or diploma; or university (all surveys of the 1973-78 cohort and the first survey of the other cohorts). Whether women were employed or not was measured at all surveys of the ~~1973-78 and 1946-51~~two younger cohorts. ~~Monetary stress was measured at all surveys of the 1973-78, 1946-51 and 1921-26 cohorts.~~ Women who reported feeling 'very stressed' or 'extremely stressed' in response to the question, 'Over the last 12 months how stressed have you felt about money', were classed as having major monetary stress. Those who reported 'not at all stressed', 'somewhat stressed' or 'moderately stressed' were classed as not having major monetary stress (all surveys).

Social factors included relationship status, living arrangements, providing care and needing help with daily tasks. Relationship status had five nominal categories: married; living in a de facto relationship; separated or divorced; widowed; and never married. ~~Due to small numbers in some of these categories, widowed was included with separated or divorced in the 1973-78 cohort, and living in a de facto relationship was included with married in the 1921-26 cohort.~~ Living arrangements were classified as living with parents ~~or not~~ (1973-78 and 1946-51 cohorts) and living with children ~~or not~~ (all cohorts). Women reported whether they were providing care for someone because of their long-term illness or disability, and whether they

needed help with daily tasks because of their own long-term illness or disability. Women also reported whether they were currently pregnant (1973-78 cohort).

Health-related factors included ~~smoking status, self-rated health and mental health. Smoking~~ smoking status ~~which~~ had three nominal categories: non-smoker, ex-smoker or current smoker. Women also reported whether they had seen a general practitioner in the last 12 months. ~~Guidelines for general practitioners recommend that women over the age of 15 should be asked about their alcohol intake and those with at-risk patterns of alcohol consumption should be advised to reduce their drinking [19].~~ The first question of the well-validated Medical Outcomes Study Short Form 36 items (SF-36), 'In general, would you say your health is' was used to measure self-rated health [19]. Responses of 'excellent', 'very good', or 'good' indicated good self-rated health and responses 'fair' or 'poor' indicated that self-rated health was not good. The mental health subscale of the SF-36 comprises five items measuring nervousness, low mood, feeling down, feeling calm and peaceful, and being happy. A score of 52 or less on the mental health subscale is indicative of depressive symptoms [19, 20] and was used to measure poor mental health. Experience of partner violence was defined using the question, 'Have you ever been in a violent relationship with a partner or spouse' and was asked at all surveys ~~of the 1973-78 cohort, all but~~except the 1998 survey of the 1946-51 cohort ~~and in the 1996 survey of the 1921-26 cohort. A question on history of violence in the 2007 survey was used to fill in missing data on experience of violence in the 1998 survey of the 1946-51 cohort.~~The missing violence data were filled in using responses to a history of violence question in the 2007 survey of the 1946-51 cohort.

Statistical analysis

All analyses were conducted using SAS version 9.3 [21]. The percentages of women in each drinking behaviour group were calculated for all women who answered any survey and also for women in each cohort who answered all surveys. Percentages were weighted to account for intentional oversampling of women living in rural and remote areas of Australia. Drinking behaviour data for women who answered all surveys were used as validation that the decline in drinking outside the guidelines was not due to risky drinkers dropping out of the longitudinal study. All subsequent analyses used data from women who answered any survey.

The relative risk of each of the three risk drinking behaviours compared with no risk drinking behaviour was calculated using Poisson regression. The GENMOD procedure in SAS was used to fit repeated measures of drinking behaviour and explanatory variables obtained at each of the six surveys of the 1973-78 cohort and at each of the five surveys of the 1946-51 cohort. These models are appropriate for longitudinal data as they account for the correlated data within individuals. As data were only available for the 1996 survey of the 1921-26 cohort, the adjusted relative risks of the three risk drinking behaviours compared with no risk drinking were calculated for that survey. The level of significance was set at 0.05.

Results

Participants

In 1996, 14247 women in the 1973-78 cohort, 13715 women in the 1946-51 cohort and 12432 women in the 1921-26 cohort completed the first survey, representing 2%-3% of women of the same age in Australia. Sixty-six women in the 1973-78 cohort, and 74 in the 1946-51 cohort provided no alcohol data at any survey and were excluded from further analyses. Drinking behaviour was only available for the first survey of the 1921-26 cohort (n=11707 women were included in cross-sectional analyses only). Descriptive characteristics

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of the cohorts ~~are~~ shown in Table 2. Across the cohorts, 12%, 16% and 4% of women had tertiary education. Women were less likely to experience major monetary stress with age (26%, 14% and 3%) and had different relationship status (for example, 8%, 75% and 56% married). ~~The youngest cohort was most likely to be living with parents and the 1946-51 cohort was most likely to have children living with them.~~ Current smoking was most common in the 1973-78 cohort (31%) and ex-smoking ~~most common~~ in the other two cohorts (28% and 30%). ~~More than~~Over 90% of all cohorts had visited a general practitioner in the last 12 months. ~~Mental health improved and physical health deteriorated with age. Around 20% of 45-50 and 70-75 year olds provided care, and 8% of 70-75 year olds needed help with daily tasks.~~

Seventy-four percent of the 1973-78 cohort and 85% of the 1946-51 cohort responded to three or more surveys. ~~Similar patterns were seen for women who had answered one or two surveys compared with those who had answered three or more.~~ Less consistent respondents had lower socio-economic status (7% versus 13% tertiary education; 29% versus 24% major monetary stress in the 1973-78 cohort; 10% versus 15% tertiary education; 20% versus 13% major monetary stress in the 1946-51 cohort), and were more likely to be smokers (39% versus 29% in the 1973-78 cohort; 28% versus 17% in the 1946-51 cohort).

Prevalence of drinking behaviours

A~~Most women provided data on a~~lcohol consumption was available for at least one survey, with a subset of women answering all surveys ~~for their cohort~~. The prevalence of the four drinking behaviours among women who answered any survey differed by less than 2% from those who answered all surveys. ~~Figure 1 shows the four drinking behaviours over the lifespan of women~~. No risk drinking was reported by 27% at 18-27 years, 48% at 34-39

years, 66% at 45-50 years, 76% at 59-64 years and 90% at 70-75 years (Figure 1).

Non-drinkers comprised approximately 30% of the no risk drinking group in the 1973-78

cohort, 20% in the 1946-51 cohort and 40% in the 1921-26 cohort. Low episodic risk

drinking fluctuated between 34% and 38% between 18 and 39 years, and declined from 19%

at 45-50 years to 12% at 59-64 years and 4% at 70-75 years. High episodic risk drinking

declined from 33% at 18-23 years to 14% at 34-39 years, 10% at 45-50 years, 5% at 59-64

years and 3% at 70-75 years. Long-term risk drinking was reported by 3%-5% of women

between 18 and 39 years, 5%-8% of women between 45 and 64 years and 4% of 70-75 year

old women. Long-term risk drinking was strongly related to drinking at episodic risk, with at

least 98% doing so in the 1973-78 cohort, between 82% and 95% in the 1946-51 cohort, and

69% in the 1921-26 cohort.

Factors associated with risky drinking behaviour in 18-39 year old women

~~The relative risks of drinking at low episodic risk, high episodic risk and long-term risk~~

~~compared with no risk are shown for the 1973-78 cohort in Table 3. Protective factors~~Factors

that reduced risky drinking were living in major cities, living with parents, living with

children or being pregnant, as well as providing care or needing help with daily tasks (Table

3). All factors had stronger protective effects for long-term risk than episodic risk~~, for~~

~~example there was a 40% reduction in risk of long-term risk drinking, a 38% reduction in risk~~

~~of high episodic risk drinking and a 23% reduction in risk of low episodic risk drinking for~~

~~women living with children~~. Risky drinking was more common among employed, unmarried

women and ~~among~~ current or past smokers. The relative risk (RR) of long-term risk drinking

~~relative to no risk~~ was ~~almost three times as~~ high among ex-smokers (RR=2.8), and ~~five times~~

~~as~~very high among current smokers (RR=4.9).

Factors associated with risky drinking behaviour in 45-64 year old women

Fewer factors were consistently associated with risky drinking in the 1946-51 cohort (Table 4). Again, relative risks were more extreme for long-term risk drinking than for episodic drinking (Table 4). Providing care and needing help with daily tasks were consistently protective against risky drinking, and living with children was protective against high episodic risk and long-term risk drinking. Past or current smokers had a three and half3.5 times and five 5.1 times greater risk of drinking at long-term risk. Those women who reported their health as good, very good or excellent also had an increased risk of risky drinking.

Factors associated with risky drinking behaviour in 70-75 year old women

Few women drank at risk in the 1921-26 cohort (Table 5). The risks of long-term risky drinking compared with no risk were substantially increased among past (RR=4.6) and current smokers (RR=8.0) (Table 5). The risks were two to three times for low episodic risk, three to five times for high episodic risk, and four to eight times as high for long-term risk relative to no risk drinking. Again women in self-reported good health were more likely to drink at risk, particularly episodically.

Factors associated with risky drinking behaviour across cohorts

RIn all cohorts, risky drinking behaviours were more common among women who were past and current smokers, and this risk became strongerincreased with age. Across 1973-78 and 1946-51 cohorts, all forms of risky drinking were less likely to be practised by women providing care, needing help with daily tasks or living with children (Tables 3-4). Women in the 1921-26 cohort providing care were less likely to drink at high episodic risk, whereas those needing help with daily tasks had a lower risk of long-term risk drinking. Women who

rated their health as good were more likely to drink at risk across the cohorts, except for long-term risk drinking in the 1973-78 cohort. ~~The influence of relationship status on risky drinking was variable. In the 1973-78 cohort, women were more likely to drink at risk if they were unmarried and if they were living in a de facto relationship in the 1946-51 cohort.~~

Discussion

Longitudinal data ~~on alcohol consumption, demographic, social and health-related variables~~ were used to investigate drinking behaviour in women . ~~Three cohorts of women were followed for up to 16 years, collectively covering~~over most of the ages between 18 and 75. Taking this life course perspective was essential to understanding when women are most at risk of abusing alcohol ~~above recommended levels~~, and identifying the life events and circumstances that either protect against or increase risky drinking. ~~While no risk drinking increased with age, low episodic risk drinking remained almost constant between 18 and 39, while high episodic risk drinking declined rapidly.~~ The use of longitudinal data demonstrated that getting older was one of the strongest factors in reducing the prevalence of episodic risky drinking. Few women drank at long-term risk. Factors associated with risky drinking varied with age, however one factor consistently increased the risk across the three cohorts: being a past or current smoker. Risky drinking was less likely to be practised by women providing care and needing help with daily tasks, or by pregnant women and those who were living with children.

Comparison with other studies is difficult as alcohol is not only measured differently in other countries, but over different time periods and using different drinking guidelines [22]. For example, in a 2009-10 ~~the United States~~American national survey, 89% of 2941 women aged 21 years and older ~~reported~~ recalled drinking no more than one drink (14 grams alcohol) ~~a~~

~~in~~day using the last 24-~~ ~~hour~~s dietary recall in the 2009-10 National Health and Nutrition Examination Survey~~ [23]. ~~Results from t~~The 2004 Canadian Addiction Survey ~~suggest~~ found few women drank more than two drinks a day on average, while 38% of 19-24 year old women and 9% of 40-64 year old women drank more than four drinks a day at least once a month [24], figures that are remarkably similar to those found in this study.

Long-term risk drinking showed little variation across the lifespan. Using similar definitions to the current study, ~~a study of~~ cross-sectional surveys of drinking behaviour in 35 countries found long-term risk drinking in women declined in a third of the countries [25]. An American longitudinal study found that women drank fewer drinks per week as they aged [26], as did two smaller studies of late-middle-aged community residents [27, 28]. A study of Swedish women found that heavy alcohol consumption declined over a five year period [29]. Comparisons of these studies with the current study were difficult because different definitions and measurements were used for long-term risk drinking.

High episodic risk drinking declined rapidly with age. ~~In the United States of~~ American~~,~~ cross-sectional surveys showed episodic drinking was highest in 18-25 year olds and declined with age [30]. A~~In a~~ comparison of drinking behaviours across countries~~,~~ found age related declines in episodic risk drinking ~~were observed~~ in 23 of 33 countries [25], findings that are in line with the current study. Longitudinal studies are limited to younger age groups [31] or restricted samples, such as problem drinkers [32] or college students [33]. Despite differences in definitions of episodic drinking between these studies [31-33] and the current study, all studies found episodic drinking declined with age.

Results from the current study are similar to some previous studies, however they add more information about the way in which women mature out of risky alcohol consumption and clarify issues that ~~are unable to~~ cannot be resolved by cross-sectional surveys. The percentage of women drinking at no risk remains relatively stable ~~between the ages of 18 and~~up to age 30, but then increases as women marry, become pregnant and have children. Clearly, younger women are ~~rapidly~~ reducing their high episodic risk drinking as they move into their ~~late twenties and~~ thirties, whereas occasional episodic drinking has continued and would need to decline for women in their late thirties to reach the levels seen at 45-50 years in the 1946-51 cohort. Some important life stages and behaviours offer potential interventions. Clearly when other people's lives are involved~~,~~ due to marriage, pregnancy, motherhood, or caring)~~such as when a woman marries, becomes pregnant, has children or is caring for, or being cared for by another person~~, women are more likely to practice safe drinking behaviour. The relationship between taking on caring roles and risky drinking needs more investigation to identify the mechanisms of caring that lead women away from risky drinking. This understanding can then be used to shape more targeted interventions.

While many women grow out of risky drinking, current and ex-smokers do not. Past research has demonstrated a consistent association between smoking and risky drinking. However, this study has shown for the first time, the robust nature of this association across time and among three generations of Australian women. Smokers, who were most likely to be risky drinkers, may need extra support not only to give up smoking but also to decrease their drinking. Other studies provide evidence that these behaviours cluster [34, 35] and that targeting both behaviours may be more successful than targeting just one behaviour [36, 37]. Furthermore, the risks for smokers persisted over time and increased with age. While these results highlight the need for effective intervention strategies at younger ages, there is perhaps a need to take a

life course approach, capitalising on critical life stages such as taking on a caring role, as times for behavioural change.

General practitioners are advised by best practice clinical guidelines to ask women about their smoking from the age of 10 and about at-risk-patterns of alcohol consumption from 15 years of age [38]. Given most women in this study had consulted a general practitioner in the last year, general practice centres would be ideally placed to offer interventions for both smoking and risky drinking behaviours, particularly to younger women. Brief interventions provided by general practitioners have been found to be effective in reducing risk drinking [39] and ceasing smoking [40]. Developing national programmes to provide brief interventions, in combination with other highly effective population-based strategies, such as increased pricing and taxation on alcohol, could assist in reducing the overall prevalence of risky drinking among Australian women [41].

As with any study, there are strengths and limitations. A major strength is that this study follows three cohorts of women longitudinally for 16 years, collectively covering most of the ages between 18 and 75. Prospective cohort studies such as this, are considered the best level of evidence where it is not ethical or feasible to randomise participants to groups [42]. ~~Comparison with the 1996 Australian Census showed that respondents were broadly representative of women of the same age, with some over-representation of more educated women and under-representation of women born outside Australia [15].~~ Although the initial response rates were low, the large sample size and variation in responses to a wide range of questions means that the associations between different variables and long-term and episodic drinking behaviour are likely to apply to the population of Australian women [43, 44]. However, increased attrition of smokers and those with ~~lower socioeconomic status~~less

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education may result in more conservative effects of these variables on risky drinking behaviour, particularly among smokers. The effect of education is more difficult to predict as some studies have found increased, and others decreased alcohol consumption among those with lower educational levels [14]. Although other studies have found lower education and smoking were associated with attrition[45-47], comparisons using inverse probability weighting showed there was little effect on estimates of health associated with smoking and problem drinking [46]. In addition all data were self-reported. Alcohol consumption may be under-reported, however data were collected via confidential mailed surveys, which have been shown to elicit reliable reports of risky behaviour [48]. The increase in no risk drinking behaviour with age may have been due to loss of risky drinkers. However this seems unlikely as no risk drinking behaviour was the same for women who answered all surveys and those who answered only some.

This paper has provided information that identifies women most prone to risky levels of drinking, specifically those who are young and those who smoke. Through use of longitudinal data it is possible to see when interventions might be most likely to succeed. In particular, we identified the onset of caring roles as a time when women are likely to decrease risky drinking. The national level data also permitted the identification of who might be best placed to implement interventions; across all age groups and areas, women were found to consult with their general practitioners on a regular basis. Finally, the stability of risky drinking over time suggests that after targeting interventions to those most at risk, a more general education dissemination strategy for women of all ages as to what constitutes risky drinking might be appropriate.

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Acknowledgements

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Table 1. Drinking behaviour groups based on the Australian alcohol guidelines for long-term and episodic risk

	No risk	Low episodic risk	High episodic risk	Long-term risk
Average number of standard drinks per day	0-2	0-2	0-2	More than 2
More than four standard drinks per occasion	Never	Less than once a month	Once a month or more often	Any level of episodic drinking

Table 2. Descriptive characteristics of three birth cohorts of women (1973-78, 1946-51 and 1921-26) at baseline (1996) excludes women missing alcohol data at all surveys

	1973-78 cohort N=14181		1946-51 cohort N=13641		1921-26 cohort N=11707	
	N	%	N	%	N	%
Living						
In major centres	7345	51.8	4972	36.5	4920	42.0
Outside major centres	6831	48.2	8666	63.5	6787	58.0
Educational qualifications						
11 years school or less	2075	14.7	6251	46.3	7999	69.8
12 years school, apprenticeship, trade	8163	57.8	2819	20.9	2079	18.1
Certificate or diploma	2131	15.1	2200	16.3	889	7.8
University	1756	12.4	2225	16.5	488	4.3
Employment status						
Working	7152	51.3	9347	69.2	n/a	
Not working	6796	48.7	4155	30.8	n/a	
Monetary stress						
No or some difficulty	10476	74.2	11613	85.8	11111	97.0
Difficult all the time	3633	25.8	1915	14.2	349	3.0
Relationship status						
Married	1162	8.2	10207	75.3	6458	55.5
De facto	1704	12.1	761	5.6	86	0.7
Separated or divorced*	113	0.8	1796	13.2	725	6.2
Widowed	6	0	281	2.1	3995	34.3
Never married	11129	78.9	516	3.8	377	3.2
Living arrangements						
Living with parents	7006	50.0	522	3.9	n/a	
Not living with parents	6999	50.0	12863	96.1	n/a	
Living with children	1025	7.2	8786	65.4	1177	10.7
Not living with children	13121	92.8	4639	34.6	9843	89.3
Pregnancy status						
Currently pregnant	347	2.5	n/a		n/a	
Not pregnant	13704	97.5	n/a		n/a	
Partner violence						
Experienced partner violence	1574	11.2	2100	15.5	787	6.8
Not experienced partner violence	12540	88.8	11442	84.5	10844	93.2
Smoking status						
Non-smoker	7554	54.4	7288	53.7	7039	62.5
Ex-smoker	1980	14.2	3843	28.3	3361	29.8
Current smoker	4361	31.4	2438	18.0	863	7.7
Visited a doctor or general practitioner						
In the last 12 months	13314	93.9	12449	91.2	11145	94.8
Not in the last 12 months	865	6.1	1196	8.8	612	5.2
Self-rated health						
Fair, poor	1683	11.9	1549	11.5	3152	27.6
Excellent, very good, good	12413	88.1	11919	88.5	8253	72.4
Poor mental health						
Poor mental health (MHI <53)	3085	21.8	2183	16.1	1246	10.8
Good mental health	11064	78.2	11365	83.9	10238	89.2
Providing care						

Providing care	1065	7.6	2713	20.1	1985	17.3
Not providing care	12950	92.4	10763	79.9	9494	82.7
Help with daily tasks						
Needing help	147	1.1	355	2.6	940	8.5
Not needing help	13739	98.9	13059	97.4	10117	91.5

Percentages were weighted to account for intentional oversampling of women living in rural and remote areas of Australia

* includes widowed in the 1973-78 cohort

MHI – mental health subscale of the SF-36

Table 3. Multilevel Poisson regression models of risk drinking behaviours versus no risk in the 1973-78 cohort

Number of women with risk drinking behaviour in 1996	Low episodic risk N=4497	High episodic risk N=4742	Long-term risk N=782
	Relative risk and 95% confidence limits		
Age in years			
18-23	reference	reference	reference
22-27	**1.04 (1.01;1.07)**	**0.97 (0.95;0.99)**	**0.85 (0.78;0.92)**
25-30	**1.09 (1.06;1.13)**	**1.03 (1.00;1.06)**	**0.87 (0.80;0.95)**
28-33	1.02 (0.99;1.06)	0.99 (0.95;1.02)	0.96 (0.87;1.06)
31-36	0.97 (0.94;1.01)	0.97 (0.94;1.01)	**1.15 (1.04;1.28)**
34-39	**0.96 (0.92;0.99)**	**0.96 (0.92;0.99)**	**1.19 (1.07;1.34)**
Living			
In major centres	**0.93 (0.91;0.95)**	**0.91 (0.89;0.93)**	**0.80 (0.75;0.86)**
Outside major centres	reference	reference	reference
Educational qualifications			
11 years school or less	reference	reference	reference
12 years school, apprenticeship, trade	**1.10 (1.05;1.14)**	**1.08 (1.04;1.13)**	1.06 (0.96;1.18)
Certificate or diploma	**1.06 (1.02;1.10)**	1.01 (0.96;1.06)	**0.88 (0.79;0.99)**
University	**1.08 (1.04;1.13)**	1.03 (0.98;1.08)	0.98 (0.86;1.11)
Employed			
No	reference	reference	reference
Yes	**1.19 (1.16;1.22)**	**1.20 (1.17;1.24)**	**1.42 (1.32;1.52)**
Very stressed about money			
No	reference	reference	reference
Yes	**1.03 (1.00;1.05)**	**1.04 (1.01;1.06)**	**1.14 (1.08;1.22)**
Relationship status			
Married	reference	reference	reference
De facto	**1.09 (1.06;1.13)**	**1.26 (1.21;1.30)**	**1.31 (1.18;1.46)**
Separated, divorced or widowed	**1.20 (1.15;1.26)**	**1.42 (1.33;1.50)**	**1.34 (1.14;1.56)**
Never married	**1.15 (1.12;1.18)**	**1.44 (1.39;1.49)**	**1.82 (1.65;2.01)**
Living with parents			
No	reference	reference	reference
Yes	**0.89 (0.86;0.91)**	**0.89 (0.87;0.92)**	**0.74 (0.68;0.80)**
Living with children			
No	reference	reference	reference
Yes	**0.77 (0.75;0.80)**	**0.62 (0.60;0.65)**	**0.60 (0.54;0.65)**
Currently pregnant			
No	reference	reference	reference
Yes	**0.72 (0.69;0.75)**	**0.54 (0.50;0.58)**	**0.26 (0.21;0.33)**
Ever experienced partner violence			
No	reference	reference	reference
Yes	**1.03 (1.00;1.06)**	**1.04 (1.01;1.08)**	**1.16 (1.07;1.25)**
Smoking status			
Non-smoker	reference	reference	reference
Ex-smoker	**1.28 (1.25;1.32)**	**1.42 (1.37;1.47)**	**2.78 (2.47;3.13)**
Current smoker	**1.38 (1.34;1.41)**	**1.65 (1.60;1.70)**	**4.91 (4.42;5.45)**
Visited a doctor or general practitioner			
In the last 12 months	**1.09 (1.05;1.14)**	**1.10 (1.06;1.15)**	**1.18 (1.06;1.31)**
Not in the last 12 months	reference	reference	reference
Self-rated health			

Fair, poor	reference	reference	reference
Excellent, very good, good	**1.06 (1.02;1.09)**	**1.06 (1.02;1.09)**	0.98 (0.91;1.07)
Poor mental health			
Poor mental health (MHI <53)	reference	reference	reference
Good mental health	0.99 (0.97;1.02)	0.99 (0.96;1.01)	**1.08 (1.01;1.15)**
Providing care			
No	reference	reference	reference
Yes	**0.96 (0.92;0.99)**	**0.94 (0.90;0.97)**	**0.78 (0.70;0.87)**
Needing help with daily tasks			
No	reference	reference	reference
Yes	**0.85 (0.78;0.93)**	**0.81 (0.74;0.89)**	**0.78 (0.62;0.97)**

Significant relative risks shown in bold

Table 4. Multilevel Poisson regression models of risk drinking behaviours versus no risk in the 1946-51 cohort

Number of women with risk drinking behaviour in 1996	Low episodic risk N=2406	High episodic risk N=1360	Long-term risk N=716
	Relative risk and 95% confidence limits		
Age in years			
45-50	reference	reference	reference
47-52	1.02 (0.98;1.05)	**1.07 (1.04;1.11)**	**1.10 (1.03;1.18)**
53-58	**0.82 (0.78;0.86)**	**0.87 (0.82;0.92)**	**1.21 (1.14;1.29)**
56-61	**0.72 (0.68;0.76)**	**0.68 (0.64;0.73)**	**1.09 (1.02;1.17)**
59-64	**0.62 (0.59;0.66)**	**0.49 (0.45;0.54)**	**1.16 (1.08;1.24)**
Living			
In major centres	0.99 (0.94;1.03)	0.95 (0.89;1.01)	1.00 (0.96;1.04)
Outside major centres	reference	reference	reference
Educational qualifications			
11 years school or less	reference	reference	reference
12 years school, apprenticeship, trade	1.01 (0.94;1.09)	0.98 (0.89;1.08)	**1.11 (1.05;1.17)**
Certificate or diploma	0.99 (0.91;1.07)	**0.77 (0.69;0.87)**	0.96 (0.91;1.02)
University	1.04 (0.95;1.13)	**0.81 (0.71;0.91)**	**1.40 (1.32;1.49)**
Employed			
No	reference	reference	reference
Yes	**1.13 (1.09;1.18)**	**1.17 (1.11;1.23)**	1.02 (0.98;1.07)
Very stressed about money			
No	reference	reference	reference
Yes	1.04 (0.98;1.10)	1.02 (0.94;1,10)	**1.32 (1.24;1.41)**
Relationship status			
Married	reference	reference	reference
De facto	**1.24 (1.14;1.36)**	**1.43 (1.27;1.60)**	**1.47 (1.37;1.58)**
Separated or divorced	1.04 (0.97;1.12)	**1.14 (1.05;1.25)**	**0.82 (0.77;0.88)**
Widowed	0.96 (0.85;1.10)	**1.26 (1.10;1.45)**	**0.79 (0.70;0.89)**
Never married	**1.21 (1.06;1.38)**	1.13 (0.93;1.38)	0.97 (0.87;1.10)
Living with parents			
No	reference	reference	reference
Yes	0.96 (0.85;1.07)	1.05 (0.92;1.20)	0.89 (0.77;1.03)
Living with children			
No	reference	reference	reference
Yes	0.97 (0.93;1.01)	**0.93 (0.89;0.98)**	**0.70 (0.67;0.74)**
Ever experienced partner violence			
No	reference	reference	reference
Yes	1.06 (0.99;1.13)	1.06 (0.98;1.14)	**1.16 (1.10;1.23)**
Smoking status			
Non-smoker	reference	reference	reference
Ex-smoker	**1.71 (1.61;1.81)**	**1.91 (1.76;2.06)**	**3.53 (3.36;3.70)**
Current smoker	**1.87 (1.75;2.00)**	**2.64 (2.41;2.88)**	**5.11 (4.83;5.40)**
Visited a doctor or general practitioner			
In the last 12 months	1.00 (0.94;1.06)	0.98 (0.91;1.04)	0.93 (0.86;1.00)
Not in the last 12 months	reference	reference	reference
Self-rated health			
Fair, poor	reference	reference	reference
Excellent, very good, good	**1.21 (1.14;1.29)**	**1.19 (1.11;1.28)**	**1.45 (1.35;1.55)**
Poor mental health			

Poor mental health (MHI <53)	reference	reference	reference
Good mental health	1.01 (0.96;1.07)	1.00 (0.93;1.06)	**1.25 (1.18;1.33)**
Providing care			
No	reference	reference	reference
Yes	**0.95 (0.91;0.99)**	**0.88 (0.83;0.93)**	**0.84 (0.80;0.88)**
Needing help with daily tasks			
No	reference	reference	reference
Yes	**0.83 (0.72;0.94)**	**0.88 (0.76;1.02)**	**0.66 (0.57;0.76)**

Significant relative risks shown in bold

Table 5. Poisson regression models of risk drinking behaviours versus no risk in 11707 women aged 70-75 years

Women with risk drinking behaviour	Low episodic risk N=495	High episodic risk N=305	Long-term risk N=408
	Relative risk and 95% confidence limits		
Age in years			
70-72	reference	reference	reference
73-75	**0.80 (0.65;0.99)**	1.07 (0.82;1.39)	1.01 (0.89;1.15)
Living			
In major centres	1.03 (0.85;1.26)	0.88 (0.68;1.15)	0.95 (0.83;1.08)
Outside major centres	reference	reference	reference
Educational qualifications			
11 years school or less	reference	reference	reference
12 years school, apprenticeship, trade	**1.36 (1.07;1.73)**	0.85 (0.60;1.21)	1.04 (0.88;1.23)
Certificate or diploma	0.93 (0.64;1.36)	**0.54 (0.29;0.99)**	**0.73 (0.56;0.94)**
University	1.27 (0.81;1.97)	0.95 (0.51;1.80)	**1.70 (1.34;2.16)**
Very stressed about money			
No	reference	reference	reference
Yes	1.09 (0.61;1.95)	0.84 (0.39;1.83)	1.05 (0.72;1.52)
Relationship status			
Married or de facto relationship *	reference	reference	reference
Separated or divorced	0.94 (0.62;1.44)	1.17 (0.73;1.89)	**0.68 (0.51;0.90)**
Widowed	0.86 (0.69;1.08)	0.97 (0.74;1.29)	**0.76 (0.66;0.88)**
Never married	0.88 (0.46;1.66)	0.58 (0.19;1.75)	1.09 (0.76;1.56)
Living with children			
No	reference	reference	reference
Yes	0.98 (0.69;1.41)	0.92 (0.57;1.48)	1.20 (0.97;1.49)
Ever experienced partner violence			
No	reference	reference	reference
Yes	1.28 (0.87;1.89)	**1.72 (1.12;2.66)**	1.25 (0.98;1.60)
Smoking status			
Non-smoker	reference	reference	reference
Ex-smoker	**2.80 (2.26;3.46)**	**3.25 (2.43;4.36)**	**4.60 (3.96;5.35)**
Current smoker	**2.63 (1.86;3.73)**	**4.99 (3.41;7.30)**	**7.98 (6.63;9.61)**
Visited a doctor or general practitioner			
In the last 12 months	1.21 (0.73;1.99)	0.90 (0.52;1.57)	0.83 (0.64;1.08)
Not in the last 12 months	reference	reference	reference
Self-rated health			
Fair, poor	reference	reference	reference
Excellent, very good, good	**1.59 (1.21;2.09)**	**1.54 (1.10;2.17)**	**1.21 (1.03;1.42)**
Poor mental health			
Poor mental health (MHI <53)	reference	reference	reference
Good mental health	0.92 (0.63;1.35)	1.10 (0.69;1.75)	0.90 (0.72;1.14)
Providing care			
No	reference	reference	reference
Yes	0.86 (0.65;1.13)	**0.56 (0.36;0.86)**	0.99 (0.84;1.17)
Needing help with daily tasks			
No	reference	reference	reference
Yes	1.14 (0.77;1.71)	0.76 (0.43;1.37)	**0.72 (0.54;0.96)**

* includes less than 100 women who are living in a de facto relationship
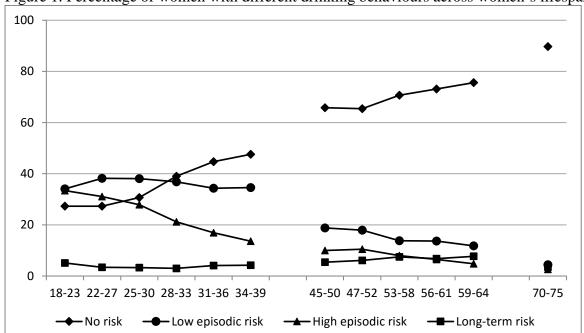
Significant relative risks shown in bold

Figure 1. Percentage of women with different drinking behaviours across women's lifespan