THE UNIVERSITY OF SYDNEY

Alcohol and Farm Workplace Project

Research Report

An activity of the Australian Centre for Agricultural Health and Safety, funded by the Alcohol Education and Rehabilitation Foundation Ltd

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1. Executive Summary

The relationship between alcohol use and injury in the general community (road trauma, interpersonal violence etc), is well recognised in Australia. While there is increasing research on the impacts of alcohol use in occupational settings, to date there has been relatively little attention given to the role of alcohol use in respect to agricultural activities. The Alcohol and the Farm Workplace project sought to investigate the hypothesis that the alcohol consumption behaviour of farmers and farm workers, including attending work after a period of heavy drinking i.e. with a hangover, leads to an increased risk of injury in the farm workplace.

The project consisted of two specific components:

1. A literature review examining other research and reports of alcohol consumption and the impact in the farming population of Australia;
2. Review NSW Health Survey Data for people resident on farms for the past 12 months in relation to alcohol consumption

Literature Review
The literature review sought to determine current knowledge relating to alcohol consumption in the workplace, specifically in the farm workplace in Australia, and its potential effect on injury rates.

A systematic review of the literature using several well established databases, plus relevant "grey" literature was completed. The review initially considered the results of studies undertaken in Australia, and thence widened to consider findings from the international literature. Key search terms were: alcohol, Australia, farm, rural, agriculture, workplace, injury, accident, death and hangover.

Within the review, two distinct concepts emerged. The first related to the prevalence and patterns of alcohol consumption in specific populations, including farmers and farm workers. The second, assessed the relationship between alcohol consumption and injury in the workplace, including the farm workplace.

The results of the review indicate:

1. That there is essentially no literature relating to levels of consumption or use of alcohol in the farming population in Australia
2. That there is no evidence relating to the role that alcohol may be a predictor of injury risk.

Whilst some of the studies show potentially alarming results worthy of further investigation, there are limitations to the generalisations that can be applied to the farming sector overall.

NSW Health Population Health Survey

To use the NSW Health Survey data for the period April 2008 to March 2009 to:

1. Determine the level of alcohol consumption of people resident on farms in NSW from April 2008-March 2009 in comparison to the wider NSW population

In 2008, the NSW Department of Health, completed the seventh year of the New South Wales Population Health Survey - a continuous survey of the health of people of New South Wales using computer assisted telephone interviewing (CATI) of about 12,000 people from all over NSW. Several questions relating to personal alcohol consumption were contained within the survey. Additionally, calculation of a Kessler 10 score (K10 is an indicator of psychological distress), was completed as part of the survey.

Due to decreasing sample sizes with cross-tabulation, sufficient data were not available to statistically compare alcohol consumption amongst those in psychological distress, between farm and nonfarm groups. Notwithstanding this limitation, the relationship between alcohol consumption patterns (risk and high-risk) and K10 scores, has the potential to be an important health determinant. As such, this issue requires further investigation into the future and will need to draw on a suitable sample size to enable valid comparisons.

Survey respondents were also asked a question - Do you live on a farm or rural property? (defined as a rural holding with estimated value of agricultural operations (EVAO) of $5000 per annum or more). The percentage of persons in each group who engaged in a selected behaviour, were then compared between FARM and NONFARM groups, by sex, for the selected variables based on 95% Confidence Intervals. Age-group comparisons were also made for some variables.

The comparison of farm and nonfarm groups indicated:

- There were no significant differences in the frequency of alcohol consumption for males or females between farm and nonfarm respondents
- There were no significant differences in the patterns of alcohol consumption for males or females between farm and nonfarm groups
- There were no significant differences for males or females between farm and nonfarm respondents, with regard to binge drinking behaviour.
- Overall 7.4% of farm men reported high or very high psychological distress, compared with 8.3% of nonfarm men, this difference was not significant.
- A total of 13.5% of farm women reported high or very high psychological distress, compared to 12.3%, this difference was not significant.
- Insufficient data were available to statistically compare alcohol consumption amongst those in psychological distress.

Recommendations

Following this analysis, it is recommended that:

1. The farming population would benefit from being included in alcohol programs and interventions that are targeted to the broader NSW population
2. Further research be conducted by way of a qualitative study, included in broader health studies, to examine the way that farmers use alcohol

Dissemination of Results

Dissemination of these results for consideration and future action will include publication as a brief report in a suitable peer reviewed journal, presentation at the National Farmers Health Conference (Oct 11-13) and the NSW Rural & Remote Health Conference (Nov 4-5).

The information will be of direct relevance to the national Farm and Fishing Workers Drug and Alcohol Use Research Advisory Group, on which the Australian Centre for Agricultural Health and Safety is a member.

Results will also be made available to the newly established Medicare locals (Local Primary Health Care Organisations) in rural areas, being developed as part of the National Health reforms. This will increase the potential for adoption of the projects results, ensuring the farming population is considered in broader population health activities addressing alcohol consumption. Finally, approaches will be made with suitable agencies to identify resources to assist in the conduct of a qualitative study to further define how the farm population uses alcohol and its associated impact.

2. Introduction

The Alcohol and the Farm Workplace project sought to investigate the hypothesis that the alcohol consumption behaviour of farmers and farm workers, including attending work after a period of heavy drinking i.e. with a hangover, leads to an increased risk of injury in the farm workplace.

The project consisted of two specific components:

1. A literature review examining other research and reports of alcohol consumption and the impact in the farming population of Australia;
2. Review NSW Health Survey Data for people resident on farms for the past 12 months in relation to alcohol consumption.

3. Alcohol consumption in the farm workplace and the potential effect on injury rates: A literature review

3.1 Aim

The purpose of the literature review was to determine current knowledge relating to alcohol consumption in the workplace, specifically in the farm workplace in Australia, and its potential effect on injury rates.

3.2 Method

The Medline®, Informit Online®, Embase®, Web of Science® and ProQuest® databases were searched using the search terms; alcohol, Australia, farm, rural, agriculture, workplace, injury, accident, death, and hangover. Literature was also sourced from the reference lists of relevant articles. The review initially considered the results of studies undertaken in Australia, and thence widened to consider findings from the international literature.

A large amount of literature was found relating to alcohol consumption and mental health, suicide, motor vehicle accidents and youth. These studies have been excluded from this review unless they examined the farming population specifically, as were studies looking at alcohol interventions and their effectiveness.

3.2 Results

Two distinct concepts emerged as the review proceeded. First, the prevalence and patterns of alcohol consumption within certain populations, including farmers and farm workers. Second, the relationship between alcohol consumption and injury in the workplace, including the farm workplace. Literature reviews had been previously published investigating both of these concepts. In 1997 a review was conducted examining alcohol consumption prevalence and patterns amongst occupational and industry groups[1], Webb et al (1993) reviewed the current body of literature examining the relationship between alcohol consumption and injury[2], and in 2006 a review examining alcohol consumption and resulting harms, including injury and death was conducted[3]. All of these reviews will be discussed further, however in an attempt not to replicate work already completed, the current review will focus on works after these dates.

3.2.1 The Australian context – rural vs non rural

A number of Australian government papers and reports were identified, most notably those reporting results from the Australian Institute of Health and Welfare (AIHW) National Drug Strategy Household Survey (NDSHS) and the Australian Bureau of Statistics (ABS) National Health Survey (NHS). The NDSHS has been running since 1985 with the 2007 survey being the 9th in this series[4]. The ABS NHS has been conducted seven times in the period since 1977, with the most recent in 2007-08. From the sample of approximately 15,800 households, information was collected regarding health status, health related lifestyle choices e.g. diet, alcohol consumption and smoking, use of health services, demographic and socioeconomic data[5].

A number of publications and studies have used these two data sources. Of initial interest to this review, were findings relating to alcohol consumption patterns of those in capital cities compared with those in regional areas. A review of rural and regional research regarding alcohol consumption in Australia, concluded that alcohol use is more prevalent in rural than metropolitan areas[6], as is harm resulting from alcohol use. This information is interesting from a population viewpoint, however it does not allow any conclusions to be drawn about those living and working on farms specifically.

It is important to consider the demographic features of different Australian populations when interpreting population-based statistics. For example, prevalence and patterns of alcohol consumption within Indigenous communities will contribute to a greater extent in rural and remote populations. Indigenous persons make up 13% of populations in remote centres and 26% of other remote areas[7]. Although Indigenous populations and non-Indigenous populations exhibit similar risky alcohol consumption behaviour, the age distribution for males is quite different. Consequently, as Indigenous males between 25-55 years were more likely than non Indigenous males of this age to consume alcohol at risky levels[8], this impacts on the overall prevalence for rural areas.

3.2.2 Published reviews

A review of the published and grey Australian literature examining alcohol consumption prevalence and patterns in the workplace, was undertaken in 1997[1]. A total of 27 studies were identified, looking at different industry and occupation groups in Australia. None of the studies identified looked at the farm workplace specifically or farm workers. The authors concluded that little could be determined from these studies regarding the alcohol consumption patterns of specific occupational or industry groups due to limited scope and methodological flaws.

More recently, a review of predominantly Australian literature was conducted in 2006 examining key literature on alcohol and other drug related harm, including injuries and fatalities in the workplace[3]. The review found no studies that examined either the farm workplace or the agricultural population specifically. The authors concluded that, with regard to injuries and fatalities, alcohol is a contributing factor, however to what extent is not clear. With regard to the prevalence of workplace alcohol use, the authors found, congruent with other reviews[9], that due to the differing methodologies and small sample sizes it is not possible to generalise findings. However, there is enough information to conclude that there is a case for the further investigation of the prevalence of alcohol use in the workplace and its resulting harms, in terms of injury, death and productivity.

Further, the review found that relating harms to the level of consumption is a flawed approach. Instead future research should consider harm in relation to patterns of consumption and resulting impairment. Essentially, drinking seven alcoholic drinks in one sitting may result in more harm than drinking one alcoholic drink every day for seven days.

The conclusions reached in both of the preceding reviews are reflected in the third that reviewed studies examining the relationship between alcohol consumption and work injuries[2]. After reviewing 29 studies from Australia and overseas that addressed alcohol consumption and resulting workplace injury between 1959 and 1993, the authors concluded that "from the available evidence, it is not possible to conclude that alcohol has a causative role in work injuries" ([2], p.438).

The current literature review searched for studies completed after 1997 pertaining to prevalence and patterns of alcohol consumption and after 1993 pertaining to the relationship between alcohol consumption and workplace injury, especially in the agricultural sector. See Attachment 1 for details of each study reviewed.

3.2.3 Recent international literature

There is a large body of work in the international literature relating to the consumption of alcohol and its potential contribution to injury in the workplace. In order to keep this review relevant, only those studies pertaining to the farm workplace have been included.

Prevalence and patterns of alcohol consumption

One study in the USA[10] identified alcohol abuse and binge drinking as risk factors for injury (along with others) and compared farmers with non farmers in an attempt to identify sub groups at highest risk for injury. The study found that the percentage of male farmers aged less than 65 years who reported alcohol abuse (as measured by the CAGE questionnaire), was significantly lower than non farmers. There were no other significant differences between farmers and non farmers with regard to their alcohol consumption patterns, including binge drinking. Also in the USA, 308 farms returned completed surveys in Virginia examining the common causes of agricultural injuries and potential contributing factors[11]. The study found that 62% of farmers consumed alcohol on a regular basis and on average consumed 5.4 drinks per week. This weekly consumption is below the two or three drinks per day identified as a risk factor for farm injuries, in a study of farm households in Colorado[12]. In New Zealand, a study was undertaken examining the general health and lifestyle factors of farmers and injury rates[13]. Although no comparison was made to the general population, the study found that 57.4% of men aged 15-24 years and 39.0% of farm workers scored high enough on the Alcohol Use Disorders Identification Test (AUDIT), to indicate alcohol use disorder (a score of more than 8). No link was made between alcohol use and injury rates for these farmers.

Alcohol consumption as a contributing factor to injury

The overwhelming number of studies addressing the consumption of alcohol and its potential impact on injury rates, have been conducted in the United States of America. The study of households in Colorado[12] examined the relationship between alcohol consumption and farm work related injuries. The results indicated that farm residents who consumed alcohol had an injury rate higher than those who did not, and that the injury rate increased with the amount of alcohol consumed. Those who drank higher quantities more frequently had the highest injury rates[12]. Similarly, a study of 718

Alabama farmers examining agricultural injuries and their potential risk factors, also found a positive relationship between alcohol consumption and injury, although no farmer believed that alcohol was a contributing factor to their injury[14].

This same positive relationship was identified in another study where it was found that white and black farm owner/operators and black farm workers who consumed alcohol, had a higher injury history than those who consumed no alcohol[15]. The amount of alcohol consumed did not however provide a predictor of injury frequency, with black workers who consumed lower amounts being more likely to be injured when compared to those consuming more. These findings however, are contrary to the Virginia study mentioned above which found no correlation between alcohol consumption and increased injury risk[11].

When considering specific agents of injury, results from an investigation of machinery related injuries to Iowa farmers[16] found a relationship between these injuries and problem drinking, as defined by a high CAGE score. Similarly, a study conducted in West Virginia examining alcohol use and fatal all-terrain vehicle crashes (quad bikes) found alcohol to be a risk factor in all types of accidents[17]. The relevance of this study to the current review is limited due to the fact that there is no description of the type of activity for which the quad bikes were being used i.e. work or recreation. However, the use of quad bikes on farms for both work and recreation, re-emphasises the unique characteristics of farms that make them not only a place of work, but also a place for leisure and recreation, sometimes resulting in a blurring of the line between the two. Importantly, it has been identified that non work related fatalities involving alcohol occur in higher numbers than work related fatalities on Australian farms[18]. Consequently, while workplace alcohol policies may have a role in the agriculture sector, they also need to complement the broader policies adopted in rural communities.

Outside the United States, a study conducted in a north-eastern province in China found that the risk of agricultural work related injuries increased with the amount of alcohol consumed per day, the frequency of alcohol consumed (number of days on which alcohol was consumed) and the period over which alcohol was consumed (number of years)[19]. However, a Canadian study found that alcohol use was associated with a lower risk for farm injury, although this was not statistically significant[20]. Another interesting result from a study of wheat thresher injuries in India[21] found a significant number of contributing factors, one of which was fatigue where workers were using alcohol to overcome and to improve work performance. In Croatia, alcohol was found to present in the blood or urine of 73% of tractor fatalities over the 4 year period from 2001 to 2005[22] - 82% of these had readings of 0.5mg/ml or greater.

A brief note should be made regarding the studies that have been conducted into the unique farm worker population in the United States, made up of large numbers of migrant workers housed in labour camps. Whilst the living conditions of this population may result in higher alcohol consumption and subsequent higher incidence of injury, the injury often stems from conflict and interpersonal violence in addition to workplace incidents[23-25]. Notwithstanding this there has been some reporting of alcohol consumption at work amongst this population and a resulting increase in the risk of workplace injury[26]. This farm worker population does not exist to the same extent in Australia, however there is also a unique farm worker group in Australia made up of casual labour

supplied by travellers ("backpackers"), migrants and indigenous persons. This group of farm workers has not been studied in Australia in relation to alcohol consumption and farm injury.

3.2.4 Recent Australian literature

Prevalence and patterns of alcohol consumption

Two studies of note were found that considered the prevalence and patterns of alcohol consumption in the agriculture industry and amongst workers in agriculture[9, 27]. Both studies presented results from secondary analysis of data from the 2001 NDSHS. Using the definition of hazardous drinking from the 2001 NHMRC Guidelines (See Attachment 2), they found that the agricultural industry employed the largest percentage of workers who drank at long term risky levels (i.e. for males - 7 or more standard drinks per day / 43 or more per week; for females - 5 or more standard drinks per day / 29 or more per week). They also found that farm managers were twice as likely to drink at short term risky or high risk levels compared to managers as a whole. Additionally, skilled agriculture and horticulture workers were more than twice as likely to drink at long term risky levels compared to skilled workers as a whole.

Alcohol consumption as a contributing factor to injury

Four studies were found examining workplace injuries and deaths in Australian agriculture investigating alcohol as a possible contributing factor. In keeping with the findings of the reviews discussed above, the results are mixed. Two studies into farm fatalities, one work related and the other non work related, found that 6.7% of those tested for alcohol in work related[28] and 32.5% of those tested for alcohol in non work related farm fatalities[18], had a blood alcohol concentration (BAC) greater than 0.05% (the Australian legal limit for driving a motor vehicle), concluding that the deceased's BAC was probably a contributing factor. These fatalities were examined further according to age group, specifically young adults 15-24 years and those 55 years or older[29]. The authors found that of those fatally injured on farms in Australia between 1989-92, younger adults were almost twice as likely to have a BAC greater than 0.05% when compared to older adults. However, whether this contributed to the accident or not was not reported. Another study examining injured and deceased farmers and farm workers in Victoria[30] found that there was little evidence suggesting a link between alcohol consumption and an increased risk of injury.

Studies examining the contribution of alcohol to road traffic accidents have made some noteworthy findings that may relate to alcohol use within the farm setting and its potential effect on safety. A review of the literature[31] found that alcohol negatively impacts on brake reaction time, speed control, capacity to drive along a designated path, and the ability to perform skills where attention is divided (all essential skills for the performance of farm work). When coupled with fatigue, a condition often present in farming, the effects of alcohol were magnified[31]. When examining the farming population as a sector of the rural population, the propensity for those living in rural areas to be involved in traffic accidents and their poor outcomes compared to their urban counterparts (predominantly due to high speeds of vehicles involved in rural accidents), requires consideration[32].

Post alcohol effects

An important workplace implication for those who consume alcohol at risky to high risk levels, is that those who drink large amounts may not allow enough time between when they stop drinking to when they start work, for the alcohol to completely leave their bloodstream (the amount of time it takes to eliminate alcohol from the body varies from person to person[33]). They may then be attending work with a positive blood alcohol reading. In addition, there is some suggestive evidence indicating that the 'hangover' or residual effects of alcohol consumption, may effect a person's ability to work safely even after the BAC has returned to zero[34-40]. Work regarding the actual impact of post alcohol consumption effects has been undertaken in Australia as well as overseas in a variety of industries, however no study has looked specifically at farming as an industry or farm owners, managers or workers as an occupational group.

3.3 Conclusion

When examining alcohol prevalence there is great variation in how data is collected as well as what data is collected. There appears to be a need for standardisation of definitions of risk alcohol consumption, and relevant measures to relate risk alcohol consumption to injury – specifically injury in the workplace. The literature review was made difficult in that those studies that have been conducted using the old NHMRC guidelines as the measure of hazardous alcohol consumption, will not be comparable with future studies using the new guidelines.

This review of the literature review has found:

1. That there is essentially no literature relating to levels of consumption or use of alcohol in the farming population in Australia
2. That there is no evidence relating to the role that alcohol may be a predictor of injury risk.

Whilst some of the studies show potentially alarming results worthy of further investigation, there are limitations to the generalisations that can be applied to the farming sector overall.

At a very fundamental level the collection of data relating to alcohol use is fraught with problems. Asking people to recall activities that may have a potentially negative impact on their working life may be prejudicial and pose a threat to the target population. Future studies must be carefully and sensitively planned.

4. Comparison between the prevalence and patterns of alcohol use of rural farm residents and nonfarm residents in NSW

4.1 Aim

To use the NSW Health Survey data for the period April 2008 to March 2009 to:

1. Determine the level of alcohol consumption of people resident on farms in NSW from April 2008-March 2009 in comparison to the wider NSW population

4.2 Method

In 2008, the NSW Department of Health, in conjunction with the eight area health services, completed the seventh year of the New South Wales Population Health Survey - a continuous survey of the health of people of New South Wales using computer assisted telephone interviewing (CATI) of about 12,000 people from all over NSW each year. The main aims of the survey are to learn more about the health of people in NSW, factors that affect health, use of health services and people's attitudes to health services and policies. Detailed survey methodology is described elsewhere [41].

The Australian Centre for Agricultural Health and Safety submitted a proposal for inclusion of a set of farm-related questions, for the 2008 NSW Population Health Survey. This was to create a subset of people who lived on farms or rural properties, to enable comparison of a range of health indicators and behaviours, including alcohol use, between people 'who live on farms or rural properties', and those who do not (i.e. the rest of NSW). The essential question added to the survey to enable this comparison was:

Q. Do you live on a farm or rural property? (Defined as a rural holding with estimated value of agricultural operations (EVAO) of $5000 per annum or more)

Data analysis was carried out on the survey data using SAS System for Windows version 9.1.3. This was to establish if there is a difference in the patterns of alcohol use between people who live on NSW farms and those who do not.

The percentage of persons in each group (with confidence intervals) who engaged in a selected behaviour, was compared between FARM and NONFARM groups, by sex, for the variables listed in Table 1. Age-group comparisons were also made for some variables. Not all respondents were asked nor answered every question so those not giving a valid response have been excluded from numerator and denominator.

Table 1. Variables for comparison between people who DO and DO NOT live on a farm or rural property.

ALC1	How often do you have an alcoholic drink?
ALC1A	How often do you have an alcoholic drink? (record days per week)
ALC2	On a day when you drink alcohol, how many standard drinks do you usually have?
ALC2A	Usual number of standard drinks per day (record number of drinks)
ALC3	In past 4 weeks have you had more than 4 (if male) / 2 (if female) drinks in a day?
ALC4	In past 4 weeks have you had more than 11 (if male) / 7 (if female) drinks in a day?
ALC4A	More than 11 (if male) / 7 (if female) drinks in a day (record number of times)
ALC5	In past 4 weeks have you had 7-10 (if male) / 5-6 (if female) drinks in a day?
ALC5A	7-10 (if male) / 5-6 (if female) drinks in a day (record number of times)
I_ALCOHOL1	Risk alcohol drinking (definition provided)*
I_ALCOHOL2	High risk alcohol drinking (definition provided)**
I_K10	High and very high psychological distress (K10 score of 22 or above) (definition provided) ***

Risk alcohol drinking* was defined as drinking which exceeded:

- guideline 1 of the 2009 NHMRC Australian Alcohol Guidelines [42] (ie. drink more that 2 standard drinks on any day), or
- guideline 1 of the 2001 NHMRC Australian Alcohol Guidelines [9] (ie consumed alcohol every day, consumed on average more than [4 if male/2 if female] standard drinks, consumed more than [6 if male/4 if female] on any 1 occasion or day'.

High risk alcohol drinking** was defined as 'those who consume alcohol and have had [11 or more if male/7 or more if female] drinks in a day in the past 4 weeks. The questions used to define the indicator were: How often do you usually drink alcohol? In the last 4 weeks how often have you had [11 or more if male/7 or more if female] drinks in a day'.

K10 score*** derived from the 10 individual Kessler 10 questions which measure psychological distress. High and very high psychological distress is defined as a K10 score or 22 or greater. The relationship between risk alcohol consumption and K10 measures were to be assessed, however these could not be completed for either males or females due to sample size limits.

For each variable, the frequencies generated were 'weighted' through application of the 'WGT' variable and stratified by health area of residence 'ARHSRES'. This enabled an annual 'weight' to be applied, based on the varying probability of selection and for differences between the age and sex structure of the sample and the population (age*sex*health area).

The resulting 'weighted percentage' and confidence intervals of persons engaging in any particular behaviour are more likely to reflect actual population percentages, than use of 'sample percentages' alone. Comparison of the 'percentage' confidence intervals between groups was the main tool used for testing statistical significance in results between groups. However, chi-squared analysis was also used to assess statistical significance for some variables. This included assessment of possible relationships between 'high and very high' levels of psychological distress and 'risk' and 'high risk' alcohol use.

4.3 Results

4.3.1 Demographics

The total number of survey respondents in the 2008 NSW Population Health Survey was n= 10296. There were 1117 respondents who reported living on a farm. Table 1.1 shows the breakdown.

*Table 1.1 Frequency of persons reporting living on a farm or rural property***

Do you live on a farm or rural property?**	Frequency	Weighted percentage
Yes	1117	8.0
No	8773	87.5
Refused	10	0.1
Don't know	18	0.1
Not asked	378	4.3
TOTAL	**10,296**	**100.0**

****The definition of farm or rural property is a property having an estimated value of agricultural output (EVAO) of greater than $5,000 per annum**

For ease of explanation, from here on, those who live on a farm will be referred to as 'farm men' or 'farm women' and those who do not live on a farm referred to as 'nonfarm men' or 'nonfarm women'. The age and gender profiles of farm and nonfarm groups are shown in Table 1.2.

The breakdown of respondents by gender shows no differences. The age distribution of both men and women varies between farm and nonfarm. Overall, 54% of farm men were aged 45-74 years compared to 29% of nonfarm men (almost 30% of nonfarm men were aged 30-44 years). The majority of farm women were aged 30-59 years (64%), whereas there was a much greater spread in age distribution of nonfarm women.

*Table 1.2 - Age-group and gender of those who DO and DO NOT live on a farm, 2008 NSW Population Health Survey**

Gender	Age (yrs)	FARM					NONFARM				
		Freq	Weighted percentage	Std Error of %	95% Confidence Limits for %		Freq	Weighted percentage	Std Error of %	95% Confidence Limits for %	
Male	15-29	46	22.0	3.40	15.3	28.7	436	25.4	1.18	23.1	27.8
	30-44*	60	19.3	2.84	13.8	24.9	603	29.5	1.18	27.2	31.8
	45-59*	180	33.9	2.92	28.2	39.7	963	24.4	0.90	22.6	26.1
	60-74*	159	20.2	1.96	16.4	24.1	957	14.2	0.56	13.1	15.3
	75+	44	4.5	0.79	3.0	6.1	515	6.5	0.34	5.8	7.2
	Total	***489***	***47.4***	***2.16***	***43.2***	***51.7***	***3474***	***49.4***	***0.76***	***48.0***	***50.9***
Female	15-29	53	18.1	2.87	12.5	23.8	611	24.0	0.95	22.1	25.8
	30-44*	124	35.3	2.89	29.6	41.0	863	27.6	0.90	25.8	29.4
	45-59	224	29.0	2.27	24.6	33.5	1426	24.6	0.74	23.1	26.0
	60-74	184	14.0	1.28	11.5	16.5	1575	14.8	0.45	13.9	15.7
	75+*	43	3.6	0.67	2.3	5.0	824	9.1	0.38	8.3	9.8
	Total	***628***	***52.6***	***2.16***	***48.3***	***56.8***	***5299***	***50.6***	***0.76***	***49.1***	***52.1***
All	**TOTAL**	**1117**	**8.4**	**0.34**	**7.7**	**9.0**	**8773**	**91.7**	**0.34**	**91.0**	**92.3**

***Statistically significant difference between farm and nonfarm groups (95%CL)**

4.3.2 Male Responses

Frequency of alcohol consumption

A total of 403 farm and 2871 nonfarm males indicated how often they have an alcoholic drink. Table 2.1.1 shows the proportion of males who drink alcohol, more or less than one day per week

Of the 403 farm male respondents, 101 (23.4%) indicated that they do not drink alcohol and a similar proportion of nonfarm males indicated the same. Therefore, approximately three quarters of all men drink alcohol at least sometimes; and around 60% of all men have alcohol on one or more days per week (Table 2.1.1).

Table 2.1.1 - Responses of MEN who do and do not live on a farm to the question ALC1 "How often do you have an alcoholic drink?"

No. days/week have an alcoholic drink	FARM					NONFARM				
	Freq	*Weighted percentage*	*Std Error of %*	*95% Confidence Limits for %*		*Freq*	*Weighted percentage*	*Std Error of %*	*95% Confidence Limits for %*	
1 or more	244	63.6	3.42	56.9	70.3	1722	59.3	1.28	56.8	61.8
Less than 1 day/wk	58	13.0	2.12	8.8*	17.1*	505	19.9	1.08	17.8*	22.0*
I Don't drink alcohol	101	23.4	3.08	17.4	29.5	644	20.8	1.05	18.8	22.9
Total	***403***	***100.0***				***2871***	***100.0***			

**indicates significant*

Table 2.1.2 shows the proportions of males who drink on one or more days per week by the number of days they drink. Of the farmers who drink on one or more days per week, 42.9% (CL 33.8-51.9%) drink on 5 or more days of the week compared to 32.9% (CL 29.9-35.7%) of nonfarm men. However, differences between groups were not statistically significant.

Table 2.1.2 – Number of days per week farmer and nonfarmer men have an alcoholic drink, of those who drink on one day or more

Days per week have alcohol	FARM					NONFARM				
	Freq	*Weighted percentage*	*Std Err of %*	*95% Confidence Limits of %*		*Freq*	*Weighted percentage*	*Std Err of %*	*95% Confidence Limits of %*	
1 - 4	137	57.10	4.60	48.04	66.17	988	67.15	1.47	64.27	70.02
5 - 7	107	42.90	4.60	33.83	51.96	734	32.85	1.47	29.98	35.73
Total	***244***	***100.0***				***1722***	***100.0***			

Amount of alcohol consumed

This section examines alcohol consumption patterns of farm and nonfarm males. Firstly examining the usual daily consumption patterns and then looking at those occasions when a larger than usual amount of alcohol was consumed in an isolated occasion i.e. an episode of binge drinking.

Usual daily consumption

In terms of usual daily consumption, 302 farm males and 2208 nonfarm males provided data. These results are summarised in Table 2.2.1.

The patterns of drinking between farm and nonfarm males are not significantly different. Around 24.6% of the farm males who drank alcohol, usually consumed 5 or more standard drinks per day - not dissimilar to nonfarm men (26.7%).

Table 2.2.1 - Usual number of standard drinks consumed per day by men

No. of alcoholic drinks/ day	FARM					NONFARM				
	Freq	*Weighted percentage*	*Std Error of %*	*95% Confidence Limits for %*		*Freq*	*Weighted percentage*	*Std Error of %*	*95% Confidence Limits for %*	
1-4	246	75.40	4.10	67.33	83.48	1737	73.29	1.39	70.57	76.02
5 or more	56	24.60	4.10	16.52	32.67	471	26.71	1.39	23.98	29.43
TOTAL	302	100				2208	100			

Consumption in a single episode of drinking

Out of those who drank alcohol (and responded appropriately), there were 68 farm men (64.1%) and 512 nonfarm men (63.9%), who reported having consumed 7-10 standard drinks on one day within the previous 28 day period. The number of days on which they did so, is summarised in Table 2.2.2. Although not statistically significant, 58.3% of these nonfarm men consumed 7-10 drinks at least twice in the past month, compared to 51.4% of farm men. The wide range (5-28 days) in the reported consumption by some males in both cohorts, indicates this level of drinking is a common occurrence for some.

Table 2.2.2 - Number of times men had 7-10 alcohol drinks in a day, in the past 4 weeks

No. of days	FARM					NONFARM				
	Freq	*Weighted percentage*	*Std Error of %*	*95% Confidence Limits for %*		*Freq*	*Weighted percentage*	*Std Error of %*	*95% Confidence Limits for %*	
1	30	48.56	9.72	29.12	68.01	194	41.73	2.89	36.06	47.41
2-28	38	51.44	9.72	31.99	70.88	318	58.27	2.89	52.59	63.94
TOTAL	68	100				512	100.00			

Out of those who drank alcohol (and responded yes or no), there were 38 farm respondents (28.9%) who reported having 11 or more drinks in one day at least once - and 311 nonfarm respondents (39.5%), reporting the same (Table 2.2.3). However, there were no significant differences in the percentage of men drinking more than 11 drinks/day between farmer and nonfarmer groups.

Table 2.2.3 - Number of men who had more than 11 alcohol drinks in a day, at least once in the past 4 weeks

Had 11 drinks+ per day in past 4 weeks	FARM					NONFARM				
	Freq	*Weighted percentage*	*Std Error of %*	*95% Confidence Limits for %*		*Freq*	*Weighted percentage*	*Std Error of %*	*95% Confidence Limits for %*	
Yes	38	28.98	5.72	17.66	40.30	311	39.54	2.22	35.18	43.90
No	88	71.02	5.72	59.70	82.34	593	60.46	2.22	56.10	64.82
TOTAL	126	100				904	100			

'Risk' and 'high risk' alcohol drinking

Enough data was collected from 400 farm and 2826 nonfarm men to determine whether they consume alcohol at a level that is considered 'risk alcohol drinking' or 'high risk alcohol drinking'.

Risk alcohol drinking

Risk alcohol drinking is measured as 'Persons who exceed the current NHMRC guideline 1[42] or previous NHMRC Guideline 1[9] (see method for full explanation). Results for the age distribution of men categorised as undertaking risk drinking, is shown in Table 2.3.1.

Overall, 43.5% (CL 36.2-50.8%) of farm men and 39.1% (CL 37.3-42.3%) of nonfarm men were categorised as risk alcohol drinkers, with differences between groups not significant. The age distributions of farm males and nonfarm males categorised as undertaking risk alcohol drinking are shown in Table 2.3.1. Whilst it appears that slightly more farm men in younger age-groups were categorised as risk drinkers than nonfarm men, again, differences were not statistically significant.

Table 2.3.1 - Men categorised as undertaking 'risk alcohol drinking' by age-group

I_ALC1	FARM					NONFARM				
Age group (yrs)	*Freq*	*Weighted percentage*	*Std Err of %*	*95% Confidence Limits for %*		*Freq*	*Weighted percentage*	*Std Err of %*	*95% Confidence Limits for %*	
15-44	44	54.07	7.84	38.46	69.67	378	44.75	2.08	40.66	48.84
45-60	51	41.77	5.85	30.20	53.34	285	34.25	2.04	30.26	38.25
60+	52	29.19	3.95	21.39	37.00	400	33.32	1.56	30.26	36.37
All ages	147	43.48	3.73	36.16	50.81	1063	39.81	1.29	37.27	42.35

**percentage of men categorised as risk drinkers within each age-group, of those who drank alcohol*

High risk alcohol drinking

High risk alcohol drinking for men is measured as 'those who consume alcohol and have had 11 or more drinks in a day in the past 4 weeks. This measure gives an indication of what is commonly termed "binge drinking".

Those categorised as undertaking 'high risk alcohol drinking' will also have met the criteria for 'risk alcohol drinking'.

Overall, 38 or 11.5% (CL 6.9-16.2%) of farm men who drank alcohol, were categorised as high risk drinkers. This compared to 297 or 14.2% (CL 12.3-16.1%) of nonfarm men who drank alcohol, being categorised as high risk drinkers. There was no significant difference between farm and nonfarm men, with regard to binge drinking behaviour.

Psychological distress

Twenty-nine of the 388 farm males who had a K10 score calculated, reported a score of 22 or more, indicating high and very high psychological distress. This represented a weighted percentage of 7.4% of farm males with high psychological distress (CL 4.2-10.6%) compared with 8.3% (CL 6.9-9.7%) of nonfarm males (245). The difference in high K10 scores between farm and nonfarm males was not significant.

Due to decreasing sample sizes with cross-tabulation, sufficient data were not available to statistically compare alcohol consumption amongst those in psychological distress, between farm and nonfarm groups. Notwithstanding this limitation, the relationship between alcohol consumption patterns (risk and high-risk) and K10 scores, has the potential to be an important health determinant. As such, this issue requires further investigation into the future and will need to draw on a suitable sample size to enable valid comparisons.

In summary:

In terms of frequency of alcohol consumption:

- Approximately three quarters of all men drink alcohol at least sometimes (76.6% or farm men and 79.2% of nonfarm men)
- Around 60% of all men have alcohol on one or more days per week (63.6% of farm men and 59.3% of nonfarm men).
- Of those that drink at least one day per week, 42.9% of farm men and 32.6% of nonfarm men drink 5 days a week or more.
- There were no significant differences in the frequency of alcohol consumption between farm and nonfarm men.

In terms of the amount of alcohol consumed (out of the men who drank alcohol):

- Around a quarter reported that they usually consumed 5 or more standard drinks in a session (24.6% of farm men and 26.7% of nonfarm men).
- Approximately two-thirds had consumed 7-10 standard drinks on at least one day within the past month (64.1% of farm men and 63.9% or nonfarm men). Of these, over a half had done so at least twice (51.4% of farm men and 58.3% of nonfarm).
- Around a third of men reported having 11 or more drinks in one day in the past month (28.9% of farm men and 39.5% of nonfarm men).
- Overall, there were no significant differences in patterns of alcohol consumption between farm and nonfarm groups.

In terms of 'risk' and 'high risk' drinking behaviour:

- Around 40% of men who drank alcohol were categorised as risk alcohol drinkers (43.5% of farm men and 39.1% of nonfarm men).
- Around a half of men who drank alcohol in the 15-44yrs age group were categorised as risk alcohol drinkers (54.1% farm men and 44.8% of nonfarm men).
- Around one-eighth of men who drank alcohol, were categorised as high risk drinkers (11.5% of farm men and 14.2% of nonfarm men.
- Overall there were no significant differences between farm and nonfarm men, with regard to binge drinking behaviour.

In terms of psychological distress:

- Overall 7.4% of farm men reported high or very high psychological distress, compared with 8.3% of nonfarm men, this difference was not significant.
- Due to sample limitations, the comparison of K10 scores with risk alcohol consumption was not possible.

4.3.3 Female Responses

Frequency of alcohol consumption

A total of 514 farm and 4388 nonfarm women indicated how often they have an alcoholic drink. Table 3.1.1 summarizes the results.

Around 37% of women did not drink alcohol, with another 37% drinking alcohol at least once per week. There were no differences in the proportions for farm and nonfarm women in each of these frequency categories.

Table 3.1.1 - Responses of WOMEN who do and do not live on a farm to the question ALC1 "How often do you have an alcoholic drink?"

No. days/week have an alcoholic drink	FARM					NONFARM				
	Freq	*Weighted percentage*	*Std Error of %*	*95% Confidence Limits for %*		*Freq*	*Weighted percentage*	*Std Error of %*	*95% Confidence Limits for %*	
1 or more	222	37.7	2.94	31.9	43.5	1688	37.7	0.99	35.8	39.6
Less than 1 day/wk	102	24.5	2.92	18.7	30.2	997	25.7	0.94	23.9	27.5
I Don't drink alcohol	190	37.8	3.12	31.7	44.0	1703	36.6	0.98	34.7	38.6
Total	**514**	**100.0**				**4388**	**100.0**			

Table 3.1.2 shows the proportion of women who drink on 1 or more days a week by the number of days. Twenty-four percent (24.0%) of farm women indicated that they have an alcoholic drink 7 days per week compared to 18.6% of nonfarm women. Whilst differences are suggestive of more frequent drinking amongst farm women, 95% confidence limits (Table 3.1.2) as well as Rao-Scott chi-squared analysis (X^2 =4.64 df=2 p=.098), indicate differences between weekly drinking patterns were not significant.

Table 3.1.2 – Number of days per week farm and nonfarm women have an alcoholic drink, of those who drink at least one day/week

Days per week have alcohol	FARM					NONFARM				
	Freq	*Weighted percentage*	*Std Error of %*	*95% Confidence Limits for %*		*Freq*	*Weighted percentage*	*Std Error of %*	*95% Confidence Limits for %*	
1 to 2	81	39.58	4.30	31.11	48.05	725	49.16	1.64	45.95	52.37
3 to 6	72	36.40	4.50	27.53	45.27	547	32.28	1.52	29.30	35.26
7	69	24.01	3.29	17.51	30.52	416	18.56	1.15	16.31	20.81
Total	**222**	**100.0**				**1688**	**100.0**			

Amount of alcohol consumed

Usual daily consumption

Information relating to usual daily consumption of alcohol was provided by 321 farm and 2661 nonfarm women. This data is summarised in table 3.2.1.

The greatest proportion of women consumed 1 or 2 drinks per day, being 74.5% of farm women and 66.3% of nonfarm women. This difference was approaching statistical significance using the 95% confidence interval method, so was further analysed using the Rao-Scott Chi-squared test (Table 3.2.2). Chi-squared test results indicate that significantly more nonfarm women drink 3 or more drinks on a day they drink (33.7%), than do farm women (25.57%).

Table 3.2.1 - Usual number of standard drinks consumed per day by women

No. of alcoholic drinks / day	FARM					NONFARM				
	Freq	*Weighted percentage*	*Std Error of %*	*95% Confidence Limits for %*		*Freq*	*Weighted percentage*	*Std Error of %*	*95% Confidence Limits for %*	
1-2	252	74.43	3.53	67.49	81.38	1941	66.3	1.3	63.7	68.8
3 or more	69	25.57	3.53	18.62	32.51	720	33.7	1.3	31.2	36.3
Total	321	100				2661	**100.0**			

Table 3.2.2 – Chi square test of farm vs. nonfarm women for usual number of standard drinks per day, categorised as 1-2 drinks per day vs. 3 or more drinks per day

Rao-Scott Chi-Square Test	
Pearson Chi-Square	6.875
Design Correction	1.655
Rao-Scott Chi-Square	4.1542
DF	1
Pr > ChiSq	0.0415*
F Value	4.1542
Num DF	1
Den DF	3001
Pr>F	0.0416
Sample size	3009

**Significant to .05 level*

Consumption in a single episode of drinking

Data from 134 farm and 1028 nonfarm women was collected to determine how often they consumed 5 or 6 alcoholic drinks on at least one single occasion in the past month. Forty-one or 31.6% of farm women (CL 21.1-42.1%) and 395 or 44.0% of nonfarm women (CL 39.9-48.1%), had

drank 5-6 drinks in a day at least once in the past month. This difference was approaching statistical significance, so was further investigated using Rao-Scott chi-squared test (Table 3.2.3).

Table 3.2.3 – Chi square test of farm vs. nonfarm women for proportion who had 5-6 alcohol drinks per day on at least one occasion in the past month.

Rao-Scott Chi-Square Test	
Pearson Chi-Square	5.4045
Design Correction	1.2335
Rao-Scott Chi-Square	4.3814
DF	1
Pr > ChiSq	0.0363*
F Value	4.3814
Num DF	1
Den DF	1154
Pr>F	0.0366
Sample size	1162

**Significant to .05 level*

Out of the two-thirds of women who drink alcohol at least sometimes, results indicate that the 44.0% of nonfarm women who had 5-6 alcohol drinks in a day in the past month, was a significantly higher proportion than the 31.6% of farm women who did the same.

Not enough data on farm women was available to compare how many times they drank 5-6 drinks in a day in the last month, compared to nonfarm women. Likewise, not enough data was available to compare groups for the percentage who drank 7 or more alcohol drinks at least once in the past month.

'Risk' and 'high risk' alcohol drinking

Risk alcohol drinking

Enough data was collected from 510 farm women and 4352 nonfarm women asked questions about their alcohol use, to determine whether they consume alcohol at a level that is considered at risk or high risk (i.e. exceed current and previous NHMRC Guideline 1[9, 42]). The proportion of women categorised as risk drinkers by particular age-groups, is shown in Table 3.3.1.

Overall, around one quarter of farm women (25.67%) and almost a third of nonfarm women (30.31%), were categorised as risk drinkers. This difference was not statistically significant.

However, there were a significantly higher proportion of farm women (30.35%) categorised as risk drinkers in the 60 years+ age group, compared to nonfarm women (18.75%). Conversely, for the 15-44 year age group, 25.7% of farm women were categorised as risk drinkers compared to 36.9% of nonfarm women – which was a difference approaching statistical significance. Consequently, chi-squared analyses were conducted to further explore these results (Table 3.3.2).

Table 3.3.1 - Women categorised as undertaking 'risk alcohol drinking' by age-group

I_ALC1	FARM					NONFARM				
Age group (yrs)	Freq	Weighted* percentage	Std Err of %	95% Confidence Limits		Freq	Weighted* percentage	Std Err of %	95% Confidence Limits	
15-44	40	25.72	4.36	17.11	34.34	448	36.89	1.66	33.63	40.15
45-59	46	22.91	3.67	15.66	30.16	339	27.75	1.61	24.59	30.92
60+	50	30.35	3.72	23.01	37.69	358	18.75	1.03	16.73	20.78
All ages	136	25.67	2.62	20.52	30.82	1145	30.31	0.99	28.37	32.24

**percentage of women categorised as risk drinkers of those who drank alcohol*

Table 3.3.2 – Chi square test of farm vs. nonfarm women categorised as undertaking 'risk alcohol drinking'

Rao-Scott Chi-Square Test	*15-44 years*	*45-59years*	*60+years*	*All ages*
Pearson Chi-Square	5.7845	1.4705	10.801	3.873
Design Correction	1.2003	1.0777	1.0752	1.5668
Rao-Scott Chi-Square	4.8191	1.3645	10.0458	2.472
DF	1	1	1	1
Pr > ChiSq	0.0281*	0.2428	0.0015**	0.1159
F Value	4.8191	1.3645	10.0458	2.472
Num DF	1	1	1	1
Den DF	1337	1371	2130	4854
Pr>F	0.0283	0.243	0.0015	0.116
Sample size	1345	1379	2138	4862

**Significant to .05 level ** Significant to .01 level*

Chi-squared analyses confirmed that there were a significantly higher proportion of farm women aged 60 years+ categorised as risk drinkers. The analyses also indicated that a significantly higher proportion of younger nonfarm women aged 15-44 years, were categorised as undertaking risk alcohol drinking behaviour.

High risk alcohol drinking (Binge drinking)

Not enough women were classified as undertaking 'high risk alcohol drinking' (binge drinking) in the sample, to enable statistical comparison of this variable between farmer and nonfarmer groups.

Psychological distress

A total of 13.5% of farm women (95%CL 8.7-18.2%) that had a K10 score calculated, reported a score of 22 or more indicating high and very high psychological distress. This compared to 12.3% (95%CL 10.9-13.7%) of nonfarm women. The difference in high K10 scores between farm and nonfarm women was not statistically significant.

As for men, decreasing sample sizes with cross-tabulation for women meant there was not enough data available to statistically compare alcohol consumption amongst those in psychological distress, between farm and nonfarm groups. Further investigation drawing on a larger sample will be important for future research in this area.

In summary:

In terms of frequency of alcohol consumption:

- Approximately two thirds of women drink alcohol at least sometimes (62.2% or farm women and 63.4% of nonfarm women)
- Over a third of women have alcohol on one or more days per week (37.7% of both farm and nonfarm women).
- Of those who drink at least one day per week, around one-fifth drink alcohol 7 days a week (24.0% of farm women and 18.6% of nonfarm women).
- Overall, there were no significant differences found in the frequency of alcohol consumption between farm and nonfarm women.

In terms of the amount of alcohol consumed (out of the two-thirds of women who drank alcohol):

- Most women usually consumed 2 or less drinks on a day they have alcohol, but significantly more nonfarm women drink 3 or more drinks on a day they drink (33.7%), compared to farm women (25.57%).
- A significantly higher proportion of nonfarm women (44.0%) had 5-6 alcohol drinks in a day in the past month, compared to farm women (31.6%).

In terms of 'risk' and 'high risk' drinking:

- Overall, around one quarter of farm women (25.67%) and almost a third of nonfarm women (30.31%) were categorised as risk drinkers, although this difference was not significant.
- A significantly higher proportion of farm women aged 60 years+ were categorised as risk drinkers (33.4%) compared to nonfarm women (18.8%).
- A significantly higher proportion of nonfarm women aged 15-44 years were categorised as undertaking risk alcohol drinking behaviour (36.9%) compared to farm women (25.7%).

In terms of psychological distress:

- Overall 13.5% of farm women that had a K10 score calculated reported high or very high psychological distress, compared to 12.3% of nonfarm women - this difference was not significant.
- Due to sample limitations, the comparison of K10 scores with risk alcohol consumption was not possible.

5. Conclusion

This report represents the most complete analysis of the farm population with regard to alcohol consumption patterns and prevalence to date. It has been found that the farming population in NSW is not dissimilar to the wider population in the way that they consume alcohol and the amount that they consume, with a few exceptions. Noteworthy points are outlined below:

For the male population

- In terms of the frequency of alcohol consumption, there were no significant differences between farm and nonfarm men. However, around three quarters of all men drink alcohol at least sometimes and approximately 60% of all men have alcohol at least once a week. Of those that drink at least one day per week, 42.9% of farm men and 32.6% of nonfarm men drink 5 days a week or more.
- In terms of usual daily consumption, the patterns of drinking between farm and nonfarm men were not significantly different. However, around a quarter of those who drink alcohol, usually consumed 5 or more standard drinks in a session (24.6% of farm men and 26.7% of nonfarm men).
- In terms of consumption in a single episode of drinking, differences were not significant, but:
    - Around two-thirds of men who drink alcohol had consumed 7-10 standard drinks on at least one day in the past month (64.1% of farm men and 63.9% of nonfarm men).
    - Of these, over a half had done so at least twice (51.4% of farm men and 58.3% of nonfarm men).
    - Around a third of men who drink alcohol, had 11 alcoholic drinks in a day on one occasion in the past 4 weeks (28.9% of farm men and 39.5% of nonfarm men).
- In terms of 'risk and high risk' drinking behaviour, differences were not significant, but:
    - Around 40% of all men who drank alcohol were categorised as risk alcohol drinkers (43.5% of farm men and 39.1% of nonfarm men). In the 15-44yrs age group, 54.1% of farm men and 44.8% of nonfarm men were categorised as risk alcohol drinkers.
    - Around one-eighth of men who drank alcohol, were categorised as high risk drinkers (11.5% of farm men and 14.2% of nonfarm men).
- In terms of psychological distress, 7.4% of farm men that had a K10 score calculated, reported high or very high psychological distress compared with 8.3% of nonfarm men. Again, this difference was not significant.
- Comparative analyses of K10 scores with risk alcohol consumption were not possible due to sample size limits, however this remains an important area for future assessment.

For the female population

- In terms of the frequency of alcohol consumption, two thirds of all women drink alcohol at least sometimes and 37.7% of all women have alcohol on one or more days per week . Of these, 24.0% of farm women and 18.6% of nonfarm women drink alcohol 7 days a week , but differences between groups were not significant.

- In terms of usual daily consumption, most women who drink alcohol have 2 or less drinks / day on a day they have alcohol. However, a significantly higher proportion of nonfarm women drink 3 or more alcohol drinks in a day (33.7%), compared to farm women (25.57%)

- In terms of consumption in a single episode of drinking, a significantly higher proportion of nonfarm women (44.0%) had 5-6 alcohol drinks in a day within the past month, compared to farm women (31.6%).
- In terms of 'risk' drinking, 25.67% of farm women and 30.31% of nonfarm women were categorised as risk drinkers. This difference was not significant. However, there were:
    - A significantly higher proportion of farm women aged 60 years+ that were categorised as risk drinkers (33.4%) compared to nonfarm women (18.8%).
    - A significantly higher proportion of nonfarm women aged 15-44 years were categorised as risk drinkers (36.9%) compared to farm women (25.7%).
- In terms of psychological distress, 13.5% of farm women that had a K10 score calculated, reported high or very high psychological distress, compared to 12.3% of nonfarm women. This difference was not significant.
- Comparative analyses of K10 scores with risk alcohol consumption were not possible due to sample size limits, however this remains an important area for future assessment.

6. Recommendations

Following this analysis it is recommended that:

1. The farming population would benefit from being included in alcohol programs and interventions that are targeted to the broader NSW population
2. Further research be conducted by way of a qualitative study, included in broader health studies, to examine the way that farmers use alcohol

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Attachment 1

Summary of studies relating to the prevalence of alcohol consumption and its potential effect on injuries in the farm workplace

Author	Year	Location	Sample	Study topic	Findings relevant to review	Farm related info
Allsop et al	1997	Australia	Review	27 studies reviewed regarding alcohol consumption prevalence and patterns	Little could be determined from the studies due to limited scope and methodological flaws	No
Breugem et al	2006	Australia	Review	Examined key literature on alcohol and other drug related harm in the workplace	Alcohol is contributing factor to injury and fatality however extent is not clear. Regarding prevalence found that due to differing methodologies and small sample sizes it was not possible to generalise findings.	No
Webb et al	1994	Australia and International	Review	Examine literature regarding work injuries and alcohol consumption	Could not definitively find that alcohol plays a role in workplace injuries	No
Prevalence and patterns of alcohol consumption						
Berry et al	2007	Australia	26744 Australian respondents to the 2001 NDSHS	Secondary analysis of 2001 NDSHS looking at prevalence and patterns of alcohol use in the Australian workforce	Some findings of note regarding agriculture and those employed in agriculture	Some
Pidd et al	2006	Australia	26744 Australian respondents to the 2001 NDSHS	Secondary analysis of 2001 NDSHS looking at prevalence and patterns of alcohol use in the Australian workforce	Some findings of note regarding agriculture and those employed in agriculture	Some
Zwerling et al	2001	USA	1583 participants in the Keokuk County Rural Health Study in Iowa	Compared prevalence of high risk behaviours for injury (including alcohol abuse and binge drinking) between farmer and non farm populations	Found percentage of male farmers <65 years who reported alcohol abuse was significantly lower than non farmers. No difference between the binge drinking behaviours of farmers and non farmers	Yes
Mariger et al	2009	USA	308 participants in Virginia Agricultural Health and Safety Survey	Examined common causes of agricultural injuries and their contributing factors	Found 62% of farmers consumed alcohol on a regular basis and on average consumed 5.4 drinks per week	Yes
Firth et al	2001	New Zealand	586 farmers in Southland NZ	Looked alcohol use amongst farmers using the Alcohol Use Disorders Identification Test (AUDIT)	Found a smaller percentage Southland farmers (14.4%)had a score indicating an alcohol use disorder than the national population (17.3%). However Southland farm workers had a higher percentage with a score of >8 indicating an alcohol use disorder	Yes
Alcohol consumption as a contributing factor to injury						
Franklin et al	2001	Australia	373 unintentional work related fatalities	Examined circumstances leading up to fatality to identify contributing factors	Found 6.7% of work related fatalities had a BAC > 0.05	Yes
Franklin et al	2001	Australia	214 unintentional non work related farm fatalities	Examined circumstances leading up to fatality to identify contributing factors	Found 32.5% of non work related fatalities had a BAC > 0.05. Concluded that in 15 incidents alcohol probably contributed to the fatality	Yes

Mitchell et al	2002	Australia	233 farm related fatalities of persons aged 15-24 years or older than 55 years from 1989-1992	Describe the type of injury and circumstances surrounding fatal farm related injuries for older and younger persons	Younger adults almost twice as likely to have a BAC > 0.05 than older adults. No comment on whether this contributed to fatality	Yes
Day et al	2009	Australia	248 injured and NOK of 4 fatally injured males aged 16 years or over working on farms in Victoria	Identify risk factors for serious injury for men whilst working on farms	Found little evidence that alcohol consumption was associated with an increased risk of injury	Yes
Mariger et al	2009	USA	308 participants in Virginia Agricultural Health and Safety Survey	Examined common causes of agricultural injuries and their contributing factors	Found no correlation between alcohol consumption and increased injury risk	Yes
Stallones & Xiang	2003	USA	872 individuals from 485 farms in Colorado	Examined the contribution of alcohol consumption to farm work related injuries	Alcohol consumption is associated with a higher injury rate and that the injury rate increased with the amount of alcohol consumed	Yes
Zhou & Roseman	1994	USA	718 Alabama farmers	Examined potential risk factors for agricultural injury	Found a positive relationship between alcohol consumption and injury	Yes
Lyman et al	1999	USA	1310 active male farmers in Alabama and Mississippi	Examined prevalence, characteristics and factors associated with history of prior injury	Found positive association between alcohol consumption and prior injury history amongst farm owner/operators (black and white) and black farm workers. Amount of alcohol did not provide a predictor of injury frequency.	Yes
Sprince et al	2002	USA	Questionnaire survey of 6,999 Iowa farmers	Assessed risk factors for machinery related injuries	Found association between problem drinking (as defined by a hgih CAGE score) and machinery related injury.	Yes
Hall et al	2009	USA	112 ATV fatalities between 2004 and 2006 in West Virginia	Examined circumstances, injuries and toxicology to identify contributing factors	Found alcohol to be a risk factor in all types of ATV accidents	Not specifically
Wang et al	2010	China	2050 farmers in a northeastern province in China	Examined alcohol consumption and agricultural work related injuries	Found the risk of injury increased with the amount of alcohol consumed per day, the frequency of consumption and length of time that alcohol has been consumed (in years).	Yes
Pickett et al	1996	Canada	1364 persons from Ontario farm operations	Examined exposure to medication for those persons reporting a farm injury	Found alcohol to be associated with lower risk for injury although not statistically significant and some study limitations may have contributed to result	Yes
Singh et al	2005	India	45 males and 7 females with wheat thresher injuries	Analysis of wheat thresher injuries and background and contributing factors	Found alcohol was being used to overcome fatigue and improve work performance	Yes
Gassend et al	2009	Croatia	47 fatal tractor accident victims between 2001-2005 in Zagreb County	Examined characteristics of fatal tractor accidents with a particular focus on alcohol use	Found 73% of fatalities had a positive alcohol reading, 82% of which had readings over 0.5mg/ml.	Yes

Attachment 2

Australia – definition of hazardous drinking

In Australia, guidelines are developed by the National Health and Medical Research Council (NHMRC) to give guidance on levels of alcohol consumption that increase the risk of health effects. Most recently these guidelines were revised in 2009, replacing the previous ones from 2001. The latest guidelines differ considerably from those prior. Whereas the old guidelines had detailed definitions of short term, long term, risky and high risk behaviour (see Table 1), the new guidelines have been simplified to four guidelines (see Table 2). Two of these relate to adult consumption, one to consumption of alcohol by young people and the remaining one to the consumption of alcohol by pregnant and breastfeeding women.

Table 1: NHMRC Australian Alcohol Guidelines 2001 from Berry et al [9]

	Low risk (standard drinks)*	*Risky (standard drinks*)*	*High risk (standard drinks*)*
Risk of short-term harm			
Males	Up to 6 (on any one day, no more than 3 days per week)	7–10 (on any one day)	11 or more (on any one day)
Females	Up to 4 (on any one day, no more than 3 days per week)	5–6 (on any one day)	7 or more (on any one day)
Risk of long-term harm			
Males	Up to 4 (on an average day)	5–6 (on an average day)	7 or more (on an average day)
	Up to 28 (overall weekly level)	29–42 (overall weekly level)	43 or more (overall weekly level)
Females	Up to 2 (on an average day)	3–4 (on an average day)	5 or more (on an average day)
	Up to 14 (overall weekly level)	15–28 (overall weekly level)	29 or more (overall weekly level)

*A standard drink equals 10 g (12.5 millilitres) of alcohol.

Table 2 NHMRC Australian guidelines to reduce health risks from drinking alcohol 2009 [43]

Guideline 1

Reducing the risk of alcohol-related harm over a lifetime

For healthy men and women, drinking no more than two standard drinks on any day reduces the lifetime risk of harm from alcohol-related disease or injury.

Guideline 2

Reducing the risk of injury on a single occasion of drinking

For healthy men and women, drinking no more than four standard drinks on a single occasion reduces the risk of alcohol-related injury arising from that occasion.

Guideline 3

Children and young people under 18 years of age

A. Parents and carers should be advised that children under 15 years of age are at the greatest risk of harm from drinking and that for this age group, not drinking alcohol is especially important.
B. For young people aged 15-17 years, the safest option is to delay the initiation of drinking for as long as possible.

Guideline 4

Pregnancy and breastfeeding

A. For women who are pregnant or planning a pregnancy, not drinking is the safest option.
B. For women who are breastfeeding, not drinking is the safest option.