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Measuring alcohol risk in the 2010 National Drug Strategy Household Survey

Implementation of the 2009 Alcohol Guidelines

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**Please note that there is the potential for minor revisions of data in this report.
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Contents

Acknowledgments

Abbreviations

AIHW	Australian Institute of Health and Welfare
AUDIT	Alcohol Use Disorders Identification Test
GQF	graduated quantity-frequency
NCETA	National Centre for Education and Training on Addiction
NDSHS	National Drug Strategy Household Survey
NHMRC	National Health and Medical Research Council
QF	quantity-frequency
SPSS	Statistical Package for the Social Sciences
WHO	World Health Organization

Summary

In 2001, the National Health and Medical Research Council (NHMRC) released *Australian Alcohol Guidelines: health risks and benefits* (the 2001 Guidelines) (NHMRC 2001). In March 2009, the NHMRC released new guidelines, *Australian Guidelines to Reduce Health Risk from Drinking Alcohol* (the 2009 Guidelines) (NHMRC 2009). The amended guidelines had implications for the analysis of alcohol data in the National Drug Strategy Household Survey (NDSHS), as previous information released by the AIHW was based on the 2001 Guidelines. The 2010 NDSHS report contains estimates of single occasion and lifetime risk from alcohol consumption, consistent with the 2009 Guidelines. This report outlines the steps that were involved in developing a consistent measure for analysing alcohol data and determining a common approach for reporting in relation to the 2009 Guidelines.

Methods and models

There is an extensive array of models and methods available for collecting, analysing and reporting on alcohol-related data. The first step of this project involved reviewing the literature to identify common themes. This assisted in determining best practice for analysing and reporting alcohol data collected in the NDSHS. A number of methods and models were identified, and stakeholders with expertise in the alcohol sector were consulted.

Stakeholders advised that alcohol consumption data collected from the public should be considered in light of current public health policy and recommendations. Therefore, the 2009 Guidelines should be used as the model for reporting alcohol data in the 2010 NDSHS report. Stakeholders also recommended that the graduated quantity-frequency (GQF) and quantity-frequency (QF) methods should continue to be used to support this model. These methods are widely recognised and recommended, both nationally and internationally.

Results

A combination of the GQF and QF methods were used to calculate single occasion risk and lifetime risk. Single occasion risk involves determining if a person has consumed more than 4 standard drinks on a single drinking occasion in the last 12 months and, if so, determining how often this occurs—once a year, at least once a month, at least once a week or at least 5 days per week. Low risk drinkers are defined as those who had not had more than 4 standard drinks on any occasion in the last 12 months. Those with an average of more than 2 drinks per day are considered to be at risk of alcohol-related harm over their lifetime.

The change in the guidelines impacts the interpretation of the proportion of the population drinking at risky levels. For single occasion risk (at least once a month), the proportion of risky drinkers changes from 20.3% (at risk of harm in the short-term) using the 2001 Guidelines, to 28.4% (at risk of harm from a single drinking occasion) using the 2009 Guidelines. For lifetime risk, the proportion changes from 10.0% (at risk of harm in the long-term) to 20.1% (at risk of lifetime harm) using the 2009 Guidelines.

Future work

Future research should consider reporting alcohol consumption independently of the NHMRC alcohol guidelines. Continued research is needed into understanding and comparing the accuracy of methods used for capturing alcohol data.

Introduction

Purpose

The purpose of this report is to document the methods used by the AIHW to report on alcohol consumption in the 2010 National Drug Strategy Household Survey (NDSHS) report, particularly at levels that put people's health at risk, and to outline the consultation process undertaken.

The report details:

- the various methods that were considered for analysing the 2010 NDSHS alcohol data
- how and why the final analysis method was selected
- how the 2001 and 2009 Alcohol Guidelines differ and what impact this has on assessment of risk
- the survey questions used in the creation of the single occasion risk and lifetime risk codes.

Background

In March 2009, the NHMRC released new guidelines on alcohol consumption and health risk, *Australian Guidelines to Reduce Health Risk from Drinking Alcohol*. These guidelines moved away from previous threshold-based definitions of 'risky' or 'high-risk' drinking in recognition of the fact that the lifetime risk of harm from consuming alcohol increases progressively with the amount consumed (NHMRC 2009). Until now, the information released by the AIHW about alcohol risk and harm was based on the 2001 Guidelines. The amended NHMRC guidelines provided the opportunity to review and reassess the way alcohol consumption data in the NDSHS is collected and reported, and to ensure that outputs from the survey are in line with current policy and remain as relevant and useful as possible.

Major changes to the guidelines

Major changes to the Alcohol Guidelines included the following:

- The text was simplified and the number of guidelines was reduced.
- Only two universal guidelines for healthy adults, one guideline for children and young people and one guideline for pregnant or breastfeeding women were included.
- The concept of progressively increasing risk of harm with the amount of alcohol consumed was introduced, rather than specifying 'risky' and 'high risk' levels of drinking above guideline levels.
- Guidelines for children and young people, males and pregnant and/or breastfeeding women are more conservative than the comparable 2001 Guidelines (NHMRC 2009).

Table 1: Summary of the 2001 and 2009 Alcohol Guidelines

	2001 Guidelines			2009 Guidelines		
	Low risk	**Risky**	**High risk**		**Low risk**	**Risky**
Short-term, males	≤ 6 standard drinks	7–10 standard drinks	≥ 11 standard drinks	**Single occasion risk**	≤ 4 standard drinks	≥ 5 standard drinks
Short-term, females	≤ 4 standard drinks	5–6 standard drinks	≥ 7 standard drinks			
Long-term, males	≤ 4 standard drinks	5–6 standard drinks	≥ 7 standard drinks	**Lifetime risk**	≤ 2 standard drinks	≥ 3 standard drinks
Long-term, females	≤ 2 standard drinks	3–4 standard drinks	≥ 5 standard drinks			

Source: Roche 2009.

Consultation

A number of stakeholders were consulted in developing the method used for reporting alcohol risk in the 2010 NDSHS. The 2010 NDSHS Technical Advisory Group was consulted regarding the best approach to calculate alcohol risk. In addition, a range of views from other alcohol experts were considered in developing an approach for analysing alcohol data. This ensured that all estimates published in the 2010 NDSHS report were based on best-practice methodology. A complete list of stakeholders consulted can be found in Appendix 1.

Methodological challenges in measuring alcohol consumption

Various methodological issues influence the measurement of alcohol consumption in surveys. Research suggests that alcohol consumption is underestimated in population health surveys by as much as 40–60%, when compared with alcohol sales data (Stockwell 2001). The main issues affecting the accurate reporting of alcohol consumption based on survey data are listed in the table below.

Table 2: Summary of challenges in measuring alcohol consumption

Item	Challenges
Respondent recall	There is the potential for measurement error due to respondent recall, particularly in surveys that are highly dependent on memory. The timeframe in relation to which a respondent is required to report may affect responses, and forgetting also increases with increasing consumption.
Reference period	The choice of reference period directly affects the way in which consumption can be assessed. With short reference periods (i.e. 1 week or less) researchers can ask respondents to describe the exact number, size and type of drinks they consumed on each day. But methods asking respondents to record their precise consumption within a short reference period are associated with limitations such as not accurately representing the respondent's typical consumption throughout the year, particularly where drinking volumes or patterns vary according to season or are influenced by various holidays. The exact recall approach is not well suited to populations where many drinkers consume alcohol on an infrequent or irregular basis. A longer reference period (i.e. 1 year) is recommended for assessing both drinking behavior and problems where many people are light, irregular drinkers.
Under-reporting	When people are asked to estimate their average intake over a past period, they tend to report median, not mean, quantities because they exclude from consideration occasional high-intake episodes. This results in an underestimate of quantity-frequency measurements.
Desirability to give socially acceptable answers	Individuals tend to supply answers to questionnaires that place the interviewee in a favourable light. This tendency is called socially desirable responding.
Context	The placement of alcohol questions in surveys and questionnaire construction may affect responses.
Standard drink concepts	It can be difficult to translate standard drinks into real-life situations; there are no common glass sizes used across all public drinking environments or in private homes.
	Most glasses hold more than one standard drink. The problem is compounded when large containers (jugs, casks) are shared, when glasses are topped up by another person, when the composition of mixed drinks is not known (e.g. cocktails or punch at a party) and when pre-mixed spirit drinks contain variable amounts of alcohol per bottle or can.

Source: Sobell & Sobell 1995; Dawson 2003; Muggli et al. 2010; Computer Assisted Telephone Interview Technical Reference Group 2003.

Despite these limitations and some reservations about the accuracy of self-report data, surveys are the major means of estimating the prevalence of risky drinking among different socio-demographic groups (WHO 2000).

Methods and models considered for reporting alcohol data

In determining the best approach for reporting the 2010 NDSHS alcohol data, a number of methods and models were considered. Brief descriptions of the methods used to capture these data are outlined below:

- Simple yesterday—asks how many standard drinks were had yesterday and captures which day of the week it was.
- Detailed yesterday—asks how many cans, bottles, nips or glasses of various types of alcohol were consumed the day before the survey.
- Last 7 days—counts the number of drinks consumed on each of the seven days before the survey, beginning with the most recent day.
- Quantity-frequency (QF)—measures alcohol consumption with two simple questions: usual number of drinks consumed per occasion and overall frequency of alcohol consumption within a defined timeframe.
- Graduated quantity-frequency (GQF)—asks how often people drink specified amounts of alcohol at various frequencies, usually starting with large amounts and graduating down to smaller quantities (WHO 2000).

The methods used for measuring alcohol consumption (as described above) may also be applied to a number of models, which allow results to be reported according to alcohol-related outcomes (such as the proportion of the population with alcohol-related problems or the proportion of individuals consuming alcohol at levels that places them at risk of harm).

The following alcohol-related models were considered for reporting the 2010 NDSHS alcohol data:

- Alcohol Use Disorders Identification Test (AUDIT)—a screening tool that measures alcohol consumption, dependence and alcohol-related problems; contains 10 items.
- *Australian Alcohol Guidelines: health risks and benefits* (the 2001 Guidelines)—levels of consumption were defined as low risk, risky or high risk and were expressed in terms of short- and long-term harm.
- *Australian Guidelines to Reduce Health Risks from Drinking Alcohol* (the 2009 Guidelines)—advice about how to reduce lifetime and single occasion drinking risks.

The strengths and limitations of each of these methods and models are provided in Appendix 2.

Previous reporting of NDSHS alcohol data used the 2001 Guidelines as a model. The analysis was based mainly on the QF and GQF methods. If the AUDIT was used as a model, the analysis would also consist of a combination of the GQF and QF methods, as well as questions regarding alcohol dependence. Advice was sought from members of the NDSHS Technical Advisory Group on whether one of the models should be used for reporting alcohol data or whether data should be reported independently of the guidelines, merely covering the frequency and quantities consumed (using one of the methods mentioned above).

Summary of advice

The majority of stakeholders recommended that the 2010 NDSHS report should present data according to both the 2009 Guidelines and the old 2001 Guidelines. Experts advised that any alcohol consumption data that are collected from the public should be considered in light of current public health policy recommendations related to consumption. Therefore, the report should contain estimates of single occasion and lifetime risk from alcohol that are consistent with the 2009 Guidelines. The 2001 Guidelines had been used as a framework for reporting cross sectional and time series information in previous NDSHS reports. It was therefore important that the NDSHS reports continue reporting against the 2001 Guidelines, as well as the new ones, to allow the continuation of time series data until more survey cycles have been completed.

There was some discussion as to whether the proportion of the population drinking at upper prevalence levels—that is, those consuming more than 7 or 11 standard drinks—should also be presented. While knowing upper prevalence levels (or high risk drinkers) is useful for describing the distribution of drinking, it was important that a clear and consistent message was provided to the public. Reporting on very high levels of risky drinking patterns, as well as the 2009 Guidelines, may be confusing to the reader. It was agreed to only report what the 2009 Guidelines recommend rather than to complicate the message by including additional higher levels of consumption.

Use of the AUDIT as a model for reporting alcohol consumption was not recommended as it is a clinical tool and therefore not appropriate for reporting consumption or for applying to a large general population. The AUDIT is a measure of (potential) problem drinking rather than a measure of consumption patterns.

The Department of Health and Ageing (DoHA) advised that, from a policy perspective, it was not necessary to attempt any reconciliation of the 2001 and 2009 guidelines. Change in the guidelines represents an interesting point in the alcohol policy timeline and should be reflected in reporting. After further discussion with DoHA, it was agreed that the NDSHS report would primarily focus on the 2009 Guidelines but should also include analysis of the 2001 Guidelines (in an appendix) and supplementary tables to allow continuation of time series data.

No new methods were suggested, with stakeholders recommending using the GQF and QF methods for measuring alcohol consumption. The current NDSHS questionnaire uses the GQF and QF methods to capture alcohol data. Retaining the GQF and QF measures allows comparison with future and past data collections. Based on this advice it was agreed to:

- use the 2009 Guidelines as a model for reporting alcohol data
- continue using the GQF and QF methods to support this model.

The GQF and QF methods are widely recognised and recommended, both nationally and internationally.

Questions used to assess alcohol consumption

Due to the importance of survey data for estimating relationships between drinking and alcohol-related outcomes—and thus for the formulation of low-risk drinking guidelines—the general approaches and specific questions used to assess alcohol consumption have received much attention (Dawson 2003). Despite diverse national traditions regarding the measurement of alcohol consumption, researchers have made progress toward achieving consensus on key considerations that should guide the selection of an optimal approach (Dawson & Room R 2000), at least for Western, developed societies.

The World Health Organization (WHO) recommends that general patterns of drinking be measured over the previous 12-month period using the GQF method. GQF is preferred over QF as it overcomes omission of heavy drinking episodes and under-reporting of alcohol consumption (Sobell & Sobell 1995).

In 2001, after reviewing various international sources and the work of Australia's drug research bodies, the alcohol section in the NDSHS questionnaire was restructured. Based on the available literature and advice from the 2001 NDSHS Technical Advisory Committee, the alcohol section was expanded to include a full GQF matrix in addition to questions relating to the QF method. The new alcohol consumption questions in the 2001 survey enabled estimations of the population at risk of harm in the long- and short-term using the 2001 Guidelines. Both genders answered the same questions and reported in detail on the previous day's alcohol consumption.

Since the redesign of the alcohol section in 2001, the NDSHS questionnaire has used the GQF and QF measures to capture alcohol data. These questions have remained relatively unchanged to allow for time series comparisons. The GQF and QF measures are guideline and policy neutral, and are therefore reasonably versatile. They are also the most commonly used and recommended measures for estimating alcohol consumption.

Analysis of the 2009 Guidelines

As discussed above, it was agreed that NDSHS alcohol data would be primarily reported according to the 2009 Guidelines. The preferred and agreed upon methods for reporting single occasion risk and lifetime risk in line with the 2009 Guidelines are discussed below.

Preferred method for reporting single occasion risk and lifetime risk

A combination of both the GQF (question E17) and QF methods (questions E7 and E15) were used to calculate lifetime and single occasion risk. As results from previous studies have shown a tendency for respondents to under-report alcohol consumption levels, it was decided to use the method (either GQF or QF) that reported the highest level of consumption in the final analysis. This approach is different to the method used in the creation of the short- and long-term risk codes (2001 Guidelines) in previous NDSHS reports.

Reducing the risk of injury on a single occasion of drinking

Single occasion risk is based on those who had more than 4 standard drinks at various frequencies (yearly, monthly, weekly and most days/everyday). It simply involves determining if a person has consumed more than 4 standard drinks in the last 12 months and, if so, determining how often this occurs: once a year, at least once a month, at least once a week or at least 5 days per week. Low-risk drinkers were defined as those who had never had more than 4 standard drinks in the last 12 months on any drinking occasion. See Box 1 for a brief description of the code and the questions required for reporting data according to *Guideline 2: reducing the risk of injury on a single occasion of drinking*.

Box 1: Guideline 2 code description

Guideline 2:   **Reducing the risk of injury on a single occasion of drinking**

Questions used: E1, E2, E5, E7, E15, E17, E28

Code description: Respondents who reported drinking 5 or more standard drinks on an occasion are classified into groups based on the frequency of this behaviour. This code uses a combination of the QF and GQF methods. Respondents' behaviour is considered 'low risk' if they report drinking 4 standard drinks or fewer on a single occasion on *both* the QF and GQF questions. Risky drinking is defined as the proportion of respondents who consumed 5 or more standard drinks with some specified frequency (e.g. in the past year, at least once a month or at least once a week). If a respondent reports 5 or more standard drinks (e.g. all those drinking 5–6, 7–10, 11–19, 20+ drinks) using either the QF or GQF method, then their consumption is considered 'risky'. If the respondent is a risky drinker, it is then determined how often this occurs and frequency is allocated (yearly, monthly, weekly, and/or most days/everyday).

Reducing the risk of alcohol-related harm over a lifetime

Assessing lifetime risk was less straightforward than single occasion risk. There were numerous discussions with experts regarding which group of people should be counted as lifetime 'risky' drinkers. Two different approaches were considered for calculating the number of risky drinkers. The first approach was to count those people who, on average, had more than two standard drinks per day. The second approach was to count those people whose drinking patterns placed their relative risk (of alcohol-related death) at greater than 1 in 100, as the 2009 Guidelines use the level of one death for every 100 people as a guide to acceptable risk.

Advice received regarding these two different approaches was that the analysis should remain faithful to what the guideline recommends, which is no more than two drinks per day (on average), and not confuse the reader by involving the modelling used to determine guideline threshold (1 in 100). Guideline 1 is based on calculating the cumulative lifetime risk associated with multiple drinking occasions (NHMRC 2009).

Based on this advice, the number of standard drinks had by a person over the last 12 months was calculated and divided by 365. Those people whose average was greater than 2 drinks were considered to be lifetime 'risky' drinkers. See Box 2 for a brief description of the lifetime risk code and the questions required for analysis.

Box 2: Guideline 1 code description

Guideline 1:	**Reducing the risk of alcohol-related harm over a lifetime**
Questions used:	E1, E2, E5, E7, E15, E17, E28
Code description:	The lifetime risk code primarily uses QF and GQF methods to calculate a respondent's consumption over a year. Firstly, contribution to annual consumption is calculated by converting frequencies and quantities to averages for both the GQF and QF questions. The number of standard drinks is multiplied at each frequency. If the quantities include a range of drinks, the midpoint of these values is used (e.g. 5–6 drinks is converted to 5.5 drinks). The average is calculated by dividing the total number of drinks by 365 days. If the average is less than 2 standard drinks for *both* the QF and GQF methods, then the respondent's consumption is considered low risk. If the average is more than 2 standard drinks using either the QF or GQF method, the respondent's consumption is considered 'risky'.

For a step-by-step description of the codes please refer to Appendix 3. The SPSS syntax used to create the lifetime risk and single occasion risk codes are contained in the 2010 NDSHS codebook, available on the Australian Data Archive website at <http://www.ada.edu.au/social-science/ndshs>.

Children, young people and pregnant or breastfeeding women

For the purposes of the NDSHS report, young people (12–17 years) and pregnant and/or breastfeeding women were included in the analysis of guidelines 1 and 2, and it was recommended that these two groups not be excluded from the analysis. The guidelines for these populations recommend that not drinking is the safest option (NHMRC 2009). The proportion of individuals within these groups breaching these guidelines may be obtained by adding the proportion of low risk and risky drinkers, while abstainers represent the proportion not consuming alcohol in the last 12 months.

How does this affect reporting?

How does the change in the guidelines impact the NDSHS reports?

Results reported in the 2010 NDSHS were primarily analysed using the 2009 Guidelines, as these were current during the collection period. However, results in previous NDSHS reports were analysed using the guidelines released in 2001.

It was important that the alcohol section of the 2010 NDSHS report present the proportion of the population currently drinking at risky levels (according to public health policy and recommendations current at the time of data collection) and whether this had this changed over time. Therefore, both sets of guidelines (2001 and 2009) were applied. Until more time series data become available, it is important that consideration continue to be given to which guidelines are appropriate to apply to trend data.

To aid comparability with previous reports, the 2001 Guidelines have also been applied to the 2010 NDSHS data and the 2009 Guidelines have been applied to the 2007 NDSHS data. These additional analyses are available as supplementary tables to the report on the AIHW website, <www.aihw.gov.au>.

Long-term risk vs lifetime risk

The 2009 Guidelines are substantially different from those that preceded them in several important respects. The main differences are outlined below.

Risk—Guideline 1 of the 2009 Guidelines is predicated on calculations of cumulative risk of alcohol-related disease or injury over the lifetime. The three categories of risk (low-risk, risky and high-risk) from the 2001 Guidelines are no longer used.

The concept of risk applied in the 2009 Guidelines is one that is linear and continuous, in contrast to the categorical use of the terms 'risky' and 'high risk' applied in the previous guidelines (Roche 2009).

Gender—At 2 or fewer standard drinks per day, no distinction is drawn between men and women. At higher levels of drinking, the lifetime risk of **alcohol-related disease** increases more quickly for women and the lifetime risk of **alcohol-related injury** increases more quickly for men (NHMRC 2009).

Difference in results—The proportion of the population who are classified as 'risky drinkers' doubles when the 2009 Guidelines are used, from 10.0% (at risk of harm in the long term—2001 Guidelines) to 20.1% (at risk of lifetime harm—2009 Guidelines) (Figure 1).

Long-term risk vs Lifetime risk

Per cent

	Abstanier	Low risk ≤ 2 drinks (low risk)	Risky/high risk ≥ 3 drinks (risky)
2001 Guidelines	19.5	70.5	10.0
2009 Guidelines	19.5	60.4	20.1

■ 2001 Guidelines ■ 2009 Guidelines

Figure 1: People aged 14 years or older at risk of long-term harm (2001 Guidelines) compared with those at risk of harm over a lifetime (2009 Guidelines), 2010 (per cent)
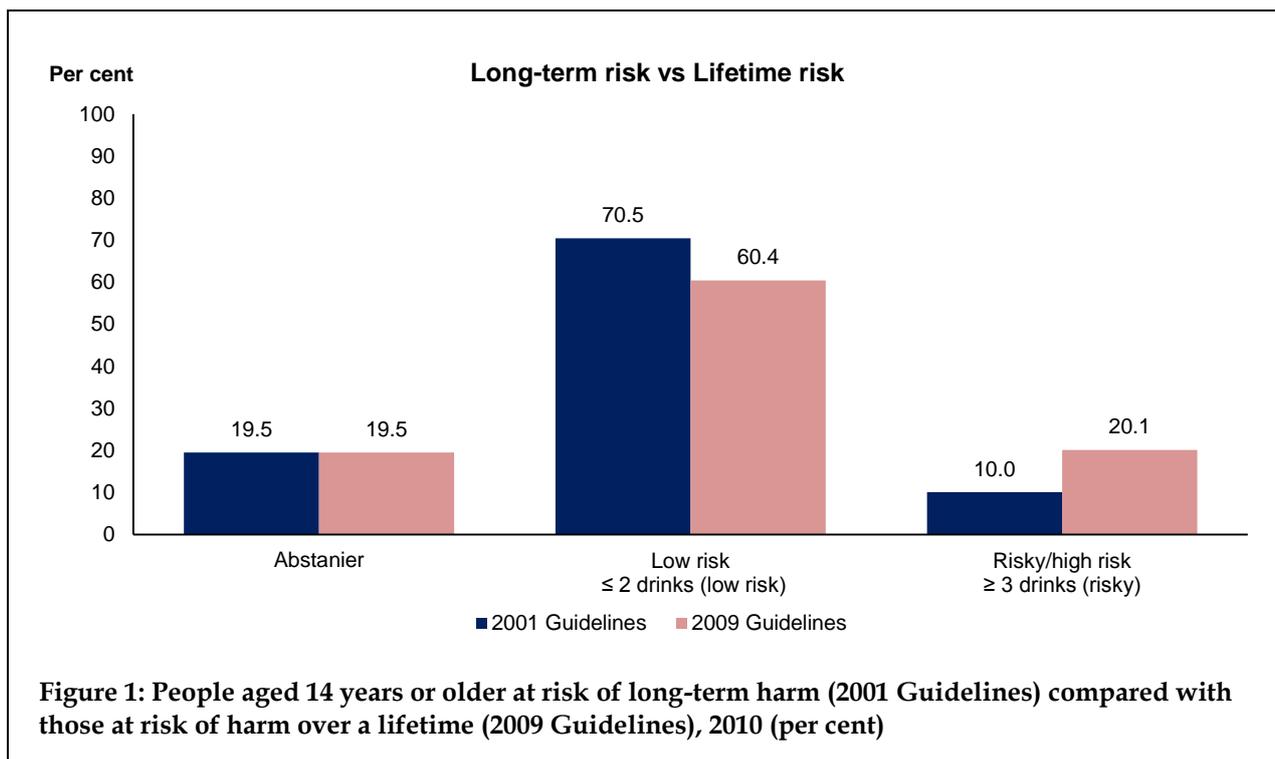
Short-term risk vs single occasion risk

Risk—Guideline 2 of the 2009 Guidelines is predicated on evidence that suggests that as more alcohol is consumed, skills and inhibitions decrease while risky behaviour increases, leading to a greater risk of injury (NHMRC 2009). The three categories of risk (low-risk, risky and high-risk) from the 2001 Guidelines are no longer used.

Gender—At 4 or fewer standard drinks per drinking occasion, no distinction is drawn between men and women. While on average, women reach a given blood alcohol concentration with a lower amount of alcohol, men take more risks and experience more harmful effects.

Differences in results—The proportion of the population drinking at 'risky' levels at least once a month increases when the 2009 Guidelines are used, from 20.3% (at risk of harm in the short-term—2001 Guidelines) to 28.4% (at risk of harm from a single drinking occasion— 2009 Guidelines) (Figure 2).

For research conducted prior to 2010, the short-term risk code used GQF as the primary method of analysis and only the used the QF method if the questions relating to GQF were not answered. As mentioned in the section on the preferred method for reporting single occasion risk and lifetime risk, a different approach was used for calculating risk in 2010. The guideline for women (single occasion and short-term risk) remained constant between the two sets of guidelines, at no more than 4 standard drinks. When comparing the proportion of risky women drinkers (short-term risk compared with single occasion risk), the proportions are slightly different due to the change in approach.

Short-term risk vs Single occasion risk

Per cent

■ 2001 Guidelines　■ 2009 Guidelines

Yearly:
- Abstainers: 19.5 / 19.5
- Low risk: 47.7 / 40.7
- Risky/high risk ≥ 5 drinks (risky): 32.8 / 39.8

Monthly:
- Abstainers: 19.5 / 19.5
- Low risk: 60.2 / 52.1
- Risky/high risk ≥ 5 drinks (risky): 20.3 / 28.4

Weekly:
- Abstainers: 19.5 / 19.5
- Low risk: 73.0 / 64.6
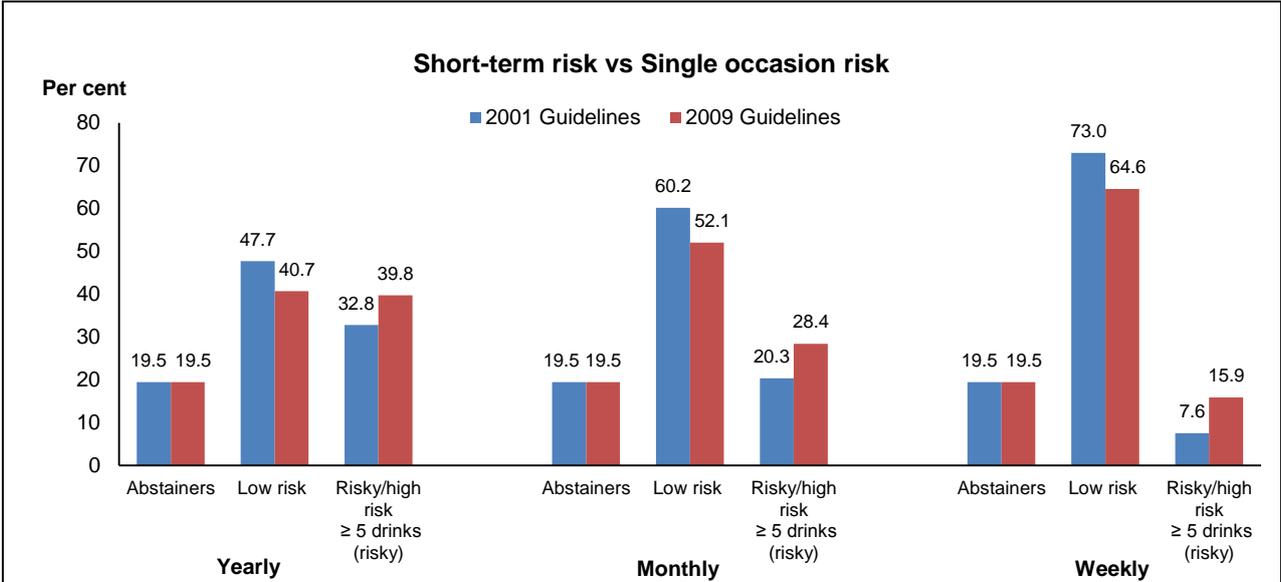- Risky/high risk ≥ 5 drinks (risky): 7.6 / 15.9

Figure 2: People aged 14 years or older at risk of short-term harm (2001 Guidelines) compared with those at risk of harm from a single occasion (2009 Guidelines), 2010 (per cent)

Options for the future

The reliance of NDSHS data on the *Australian Alcohol Guidelines* (2001 Guidelines) as a model for reporting alcohol consumption affects time series data and places restrictions on the format and wording of questions. Due to the need to update guidelines in accordance with the latest research, it is important to consider reporting alcohol consumption independently of these guidelines in the future.

Consultation with stakeholders revealed that using the AUDIT or other alcohol-related models for reporting alcohol data were not considered appropriate. So, rather than using methods such as GQF and QF and then applying them to a model, alcohol data could simply be reported based on these methods.

There are four different measures that the NDSHS could potentially report, based on the type of questions covered in the questionnaire: simple yesterday, detailed yesterday, QF and GQF. However, this list is not exhaustive and consideration needs to be given as to whether current measurement techniques are suitable and are capturing the required data.

It is important to determine how well existing measurement approaches capture atypical light drinking among subgroups whose predominant drinking pattern is one of infrequent heavy drinking. Other areas where research is needed include:

- a comprehensive comparison of data obtained using the QF and GQF approaches and the diary/daily recall approaches
- comparison of volume estimates and the accuracy of capturing overall drinking frequency and frequency of risky drinking
- whether the use of arithmetic midpoints for quantity and frequency ranges is supported by data on the underlying distribution of those variables (Dawson 2003).

These are some of the important issues that must be addressed to continue improving the measurement and reporting of alcohol consumption and risk.

Appendix 1: Stakeholders consulted

Table A1: Stakeholders consulted

Name	Organisation
Professor Steve Allsop	National Drug Research Institute
Associate Professor Tanya Chikritzhs	National Drug Research Institute
Mr Mark Cooper-Stanbury	Australian Institute of Health and Welfare
Professor Louisa Degenhardt	Burnet Institute
Mr Hitendra Gilhotra	Australian Government Department of Health and Ageing
Ms Jane-Ann Jones	Australian Government Department of Health and Ageing
Dr Toni Makkai	Australian National University
Ms Michelle Marquardt	Australian Bureau of Statistics
Mr Chris Milton	Australian Government Department of Health and Ageing
Mr Matthew Montgomery	Australian Bureau of Statistics
Mr Jason Payne	Australian Institute of Criminology
Mr George Phillips	Australian Government Department of Health and Ageing
Dr Ken Pidd	National Centre for Education and Training on Addiction
Ms Bree Rankin	Australian Government Department of Health and Ageing
Professor Jürgen Rehm	Canadian Centre for Addiction and Mental Health
Associate Professor Alison Ritter	National Drug and Alcohol Research Centre
Professor Ann Roche	National Centre for Education and Training on Addiction
Professor Robin Room	Turning Point Alcohol and Drug Centre
Mr Fearnley Szuster	Health Workforce Australia
Mr Corey Taylor	National Centre for Education and Training on Addiction
Ms Jenny Taylor	Australian Government Department of Health and Ageing

Appendix 2: Methods considered for measuring alcohol consumption

There are a variety of tools available for measuring alcohol consumption and detecting alcohol-related risk. A number of these tools are outlined below. Each model and method has been summarised together with key pros and cons in relation to their perceived usefulness for survey data analysis. This summary information is derived from a variety of sources including literature review, stakeholder advice and AIHW expertise.

Table 3: Advantages and disadvantages of the *Australian Alcohol Guidelines: health risks and benefits*

Model	Australian Alcohol Guidelines: health risks and benefits
Brief description	These guidelines were released by the National Health and Medical Research Council in 2001. They have since been superseded but have been used as the basis for analysis of NDSHS surveys since then. The guidelines defined levels of risk in the short and long term, differentiating between males and females. Levels of consumption were also defined as low risk, risky or high risk.
Advantages	- a useful basis for statistical analysis of survey data - allows for time series analysis - provided a consistent measure for analysing alcohol data - have been used as the consensus measure to indicate various levels of drinking, as they provided a consistent way in which most alcohol-related data can be analysed and reported - differentiate between lower levels of consumption and higher levels of consumption - enabled comparisons between different data sets
Disadvantages	These guidelines are now out of date and no longer reflect the weight of scientific evidence about alcohol-related risks.

Table 4: Advantages and disadvantages of the AUDIT

Model	Alcohol Use Disorders Identification Test (AUDIT)
Brief description	The AUDIT is a brief screening tool that measures alcohol consumption, particularly hazardous and harmful consumption, dependence and problems related to alcohol consumption. The AUDIT contains 10 items. The AUDIT was developed by the WHO as a simple method of screening for excessive drinking. It provides a framework for intervention to help risky drinkers reduce or cease alcohol consumption, thereby avoiding the harmful consequences of their drinking. The AUDIT also assists in identifying alcohol dependence.
Advantages	- is unique among alcohol-related screening instruments in that it is designed to measure a range of risk levels, from low-risk drinking to hazardous drinking, and alcohol use disorders. Includes questions on alcohol consumption, drinking behaviour and dependence, and on the consequences or problems related to drinking - performs well in detecting both people with formal alcohol disorders and those with hazardous alcohol intake - questions are easy to read and understand - WHO recommends using the AUDIT in questionnaires where space is limited - is the best instrument for identifying low-level hazardous drinking behaviour in adults and adolescents - has been validated in six countries - extensively used internationally
Disadvantages	- may not be as sensitive in older people - no definitive cut-off points - validating the use of various cut-off points for hazardous and harmful drinking is somewhat problematic, as operational definitions for these two concepts vary from study to study - cut-off scores may need to be modified depending on the characteristics of the client group; for instance, the cut-off points for potentially hazardous consumption in the AUDIT do not differentiate between males and females - some NDSHS questions are slightly different to the AUDIT questions

Table 5: Advantages and disadvantages of the *Australian Guidelines to Reduce Health Risks from Drinking Alcohol*

Model	Australian Guidelines to Reduce Health Risks from Drinking Alcohol
Brief description	These guidelines were released by the National Health and Medical Research Council in 2009. They contain advice about how to reduce lifetime and single occasion drinking risks, as well as advice for young people and pregnant women. The guidelines note that lifetime risk increases with the amount of alcohol consumed. Men and women are advised to drink no more than two standard drinks a day to reduce lifetime alcohol-related risks. To reduce the risk of alcohol related injury from a single occasion, men and women are advised to drink no more than four standard drinks in a day.
Advantages	- clear and simple - analysis of guidelines 3 and 4 (pregnant women and children) would be straightforward as the guidelines advise against any alcohol consumption - analysis of guidelines 1 and 2 (lifetime risk and single occasion risk) are more straightforward than the 2001 Guidelines, as the 2009 Guidelines do not differentiate between men and women and do not contain varying degrees of risk
Disadvantages	- lack of definitional cut-off points for low risk and riskier drinking - time series analysis (would present an entirely different picture of alcohol risk in the population compared with past analyses) - currently there is no agreed universal measure for reporting alcohol data that is in accordance with the 2009 Guidelines

Table 6: Advantages and disadvantages of the quantity-frequency method

Method	Quantity-frequency method (QF)
Brief description	This method measures average consumption and simply asks respondents how much alcohol they usually drink per occasion and how often they drink.
Advantages	• very brief and quick to administer • can cover a long reference period • provides a quick and easy rough estimate of the total amount consumed • sufficient if a genuine average across all drinking situations is the desired effect
Disadvantages	• does not capture information about heavy drinking occasions or light consumption days, because the emphasis is on 'usual' behaviour • no information about the type of beverage • the standard drink concept is required • requires inferences about the relationship between the usual quantity and usual frequency • sporadic heavier drinking days are not captured, therefore alcohol-related problems tend to go unreported in QF estimates (i.e. they are not part of the 'average' or 'typical' pattern) • tend to misclassify drinkers compared with other methods, as QF measures reflect less drinking

Table 7: Advantages and disadvantages of the graduated quantity-frequency method

Method	Graduated quantity-frequency method (GQF)
Brief description	This method enhances the quantity-frequency method by asking respondents how often they drink certain amounts of alcohol. It contains 8 items. The GF measure starts with a question about the highest number of drinks on any occasion during the past year. It then asks a series of questions about the number of occasions on which specific quantities were consumed.
Advantages	• most comprehensive method for assessing the pattern of drinking over time • encourages full reporting by asking first about how often people drink large quantities • generates higher estimates of the proportion of the population who regularly drink at risky levels • can cover a long reference period • studies have found that the GF measure has much higher sensitivity than the other measures (such as QF and last 7 days) for identifying potentially harmful levels of consumption • more effective in capturing episodes of very high consumption • studies contrasting QF, GQF and last 7 days methods found that there are marked differences between the results generated by each measure and the clear superiority of GQF for not underestimating high risk drinkers or overestimating abstainers • does not require as much averaging to be done by the respondent and captures more information on variability of alcohol intake, when compared with the QF measure
Cons	• no information about the type of beverage • the standard drink concept is required • analysis of risk is complex and, in practice, it generates results for some individual respondents with drinking days exceeding 365 in the past year • length of the reference period

Table 8: Advantages and disadvantages of the last 7 days method

Method	Last 7 days
Brief description	This method asks participants to complete a diary of their drinking each day over the past week. It usually asks for the number of drinks consumed on each of the 7 days before the survey, beginning with the most recent day.
Pros	• gathers more detailed information about consumption than the usual drinking methods allow • can also gather more detailed information about matters such as drinking setting (such as where alcohol is consumed and with whom) • can capture atypical periods (based on the concept that the last 7 days are a 'sample' of a longer period) • the standard drink concept is not necessary • short reference period (may yield more reliable reporting, resulting in higher consumption estimates than the alternative approach of summarising usual drinking patterns over a longer period) • capable of demonstrating variability between drinking occasions
Cons	• is time consuming • limited use for measuring drinking patterns • adjustments need to be made for holidays etc • it may be difficult for respondents to recall detail on precise quantity and type of beverage • very sensitive to the frequency and regularity of individuals' drinking patterns (consumption of infrequent drinkers may be missed) • not collected in the NDSHS

Table 9: Advantages and disadvantages of the simple and detailed yesterday method

Method	Simple yesterday
Brief description	This method simply asks respondents how many standard drinks they had yesterday (and records the day of the week) (AIHW 2004).
Advantages	• reduces potential memory issues • is quick to administer • can capture atypical periods (based on the notion that yesterday is a sample of a longer period)
Disadvantages	• does not capture information on drinking patterns • no information on the type of beverage • biases introduced by particular days of the week, holidays etc need to be addressed • relies on the standard drink concept • complex analysis required to adjust for day of week, holidays, festivities, etc, and to extrapolate to longer periods • consumption of infrequent drinkers may be missed
Method	**Detailed yesterday**
Brief description	Respondents are asked how many cans, bottles, nips or glasses they consumed of various alcohol types during the day before the survey.
Advantages	• captures detailed information on quantity and type of beverage, without the necessity of the standard drink concept. • covers close to 80% of known alcohol sales • reduces potential memory issues • is quick to administer • can capture atypical periods (based on the notion that yesterday is a sample of a longer period)
Disadvantages	• does not capture information on drinking patterns • biases introduced by particular days of the week, holidays etc need to be addressed • complex analysis required to adjust for day of week, holidays, festivities, etc, and to extrapolate to longer periods • consumption of infrequent drinkers may be missed

Appendix 3: Lifetime risk and single occasion risk calculation (detailed description)

Guideline 1: Reducing the risk of alcohol-related harm over a lifetime

Questions used: E1, E2, E5, E7, E15, E17, E28

Step 1:   **Convert the responses in the GQF matrix into quantities**

- Convert each standard drink range to an average (the mid-point)
  e.g. 11–19 standard drinks = 14.5

- Convert each of the frequencies into days per year
  e.g. 3–4 days a week = 82 days a year (midpoint of 156–208 days a year)

Step 2:   **Calculate annual alcohol consumption from GQF matrix**

- Multiply the number of standard drinks consumed at each frequency
  e.g. 11–19 standard drinks, 3–4 days a week = 14.5 × 182 = 2,639 standard drinks in a year

- Sum the entire GQF for each respondent to calculate total annual alcohol consumption

Step 3:   **Correct for over-reporting**

- After summing the GQF matrix, some respondents may have reported consuming alcohol more than 365 drinking days in a year; prorate back to 365 days

Step 4:   **Calculate the average number of drinks per day**

- Divide the total number of drinks from the matrix by 365 days
  e.g. 2,639 standard drinks in a year = 7.2 standard drinks per day on average

Step 5:   **Convert the responses in the QF questions into quantities**

- For the quantity frequency questions (E7 and E15), convert each of the frequencies into days per year and then convert each standard drink range to an average (the mid-point)

Step 6:   **Calculate the average consumption from GQF questions**

- Multiply the average quantity of drinks by the number of days per year and then divide by 365

Step 7: **Assign a risk level**

- If the QF (E7, E15) and GQF (E17) methods both compute the average number of drinks to be less than 2, Guideline 1 equals low risk
- If the QF method is less than 2 but the GQF method is missing, code Guideline 1 as low risk
- If the QF method is missing but the GQF method is less than 2, code Guideline 1 as low risk
- If either the QF or GQF method is greater than 2, code Guideline 1 as risky

Step 8: **Recover those who are recent and lifetime abstainers**

- If never tried alcohol (E1 = No) or has never consumed a full serve of alcohol (E2 = No), code as abstainer (lifetime abstainer)
- If respondent has not had an alcoholic drink in the last 12 months (E5 = No), code as abstainer (recent abstainer)
- Only use E28 if respondent has had a drink in the last 12 months (E5 = Yes) but has not answered E7, E15 or E17
- If respondent considers themselves at present time to be a non-drinker or an ex-drinker at E28, code as recent abstainer
- If missing on all relevant alcohol questions or answered yes at E2 but is missing at E5, code as missing
- If respondent answered yes to E5 but is missing on the QF and GQF questions, code as low risk

Step 9: **Deal with missing cases**

- If missing on all relevant alcohol questions or answered yes at E2 but is missing at E5, code as missing
- If respondent answered yes to E5 but is missing on the QF and GQF questions, code as low risk

Guideline 2: Reducing the risk of injury on a single occasion of drinking

Questions used: E1, E2, E5, E7, E15, E17, E28

Step 1:   **Create variables for Guideline 2 at various frequencies**
- Create the following variables: G2yearly, G2monthly, G2weekly and G2mostdays
- All variables are initially coded as low risk (note: abstainers get recovered out at the end)

Step 2:   **Calculate risk of harm from a single drinking occasion from GQF matrix**
- Using the GQF matrix, calculate the risk of harm from a single drinking occasion for each frequency by determining if the respondent has had more than 5 standard drinks at each frequency

Step 3:   **Calculate risk of harm from a single drinking occasion at least yearly**
- If respondent has answered either every day, 5-6 days a week, 3-4 days a week,
1-2 days a week, 2-3 days per month, 1 day a month OR less often for E17a, E17b, E17c or E17d (i.e. had 5 or more standard drinks at least once), then G2yearly is coded as risky
- If respondent has not ticked any frequency for E17a to E17d, code G2yearly, G2monthly, G2weekly, G2mostday as missing on relevant E17 questions

Step4:   **Calculate risk of harm from a single drinking occasion at least monthly**
- If respondent has answered either every day, 5-6 days a week, 3-4 days a week,
1-2 days a week, 2-3 days per month OR 1 day a month for E17a, E17b, E17c or E17d (i.e. had 5 or more standard drinks at least once a month), code G2monthly as risky

Step 5:   **Calculate risk of harm from a single drinking occasion at least weekly**
- If respondent has answered either every day, 5-6 days a week, 3-4 days a week OR 1-2 days a week for E17a, E17b, E17c or E17d (i.e. had 5 or more standard drinks at least once a week), code G2weekly as risky

Step 6:   **Calculate risk of harm from a single drinking occasion on most days**
- If respondent has answered either everyday OR 5-6 days a week for E17a, E17b, E17c or E17d (i.e. had 5 or more standard drinks at least 5-6 days per week), code G2mostday as risky

Step 7: **Deal with missing responses**

- If respondent has not answered any of the GQF questions (i.e. missing on all E17a to E17g), code G2yearly, G2monthly, G2weekly, G2mostday as missing on all E17 questions
- If respondent has answered never for all GQF questions, code as reported no consumption for E17

Step 8: **Recover lifetime and recent abstainers**

- If never tried alcohol (E1 = No) or has never consumed a full serve of alcohol (E2 = No), code as abstainer (lifetime abstainer)
- If respondent has not had an alcoholic drink in the last 12 months (E5 = No), code as abstainer (recent abstainer)
- Only use E28 if respondent has had a drink in the last 12 months (E5 = Yes) but has not answered E7, E15 or E17
- If respondent considers themselves at present time to be a non-drinker or an ex-drinker at E28, code as abstainer (recent)
- If respondent has answered E5 but not answered E7, E15 or E17 and is NOT a non-drinker or ex-drinker at E28, code as missing

Step 9: **Calculate consumption using the QF method (E7 and E15) and create backup values for breach of Guideline 2**

- To begin, code all backup values as missing
- If E7 equals every day or 5–6 days per week and E15 equals between 5–6 drinks and 20 or more drinks, code G2yearly_backup, G2monthly_backup, G2weekly_backup, G2mostday_backup as risky
- If e15 equals between half a drink and 3–4 drinks, code as low risk
- If E7 equals 3–4 days per week or 1–2 days per week and E15 equals between 5–6 drinks and 20 or more drinks, code G2yearly_backup, G2monthly_backup, G2weekly_backup as risky, and code G2ymostdays_backup as low risk
- If E15 equals between half a drink and 3–4 drinks, code as low risk
- If E7 equals 2–3 or 1 day a month and E15 equals between 5–6 drinks and 20 or more drinks, code G2yearly_backup, G2monthly_backup as risky, and code G2mostdays_backup and G2weekly_backup as low risk
- If E15 equals between half a drink and 3–4 drinks, code as low risk
- If E7 equals less often and E15 equals between 5-6 drinks and 20 or more drinks, code G2yearly_backup as risky, and code G2mostdays_backup, G2weekly_backup, G2monthly_backup as low risk
- If e15 equals between half a drink and 3-4 drinks then code as low risk

Step 10: **Assign back up values to abstainers**

- If abstainer (as per step 8), code all back-up values as abstainers

Step 11: **Assign risk level using back-up variables (where necessary)**

- If the QF (back-up variables) equals risky but the GQF equals low risk, code Guideline 2 as risky
- If the GQF equals risky but the QF equals low risk, code Guideline 2 as risky
- If the GQF and the QF equals low risk, code Guideline2 as low risk
- Repeat for each frequency
- If missing on the GQF questions or reported no consumption at E17, assign QF values (back-up variables)
- If missing on the QF then assign GQF values

Step 12: **Deal with missing responses**

- If missing on all relevant alcohol questions or answered yes at E2 but is missing at E5, code as missing
- If missing on QF and GQF questions but respondent has answered yes at E5 and is not a non-drinker or ex-drinker at E28, code as low risk

Related publications

This report is a technical supplement to the 2010 NDSHS report.

The NDSHS is part of a series that is conducted every three years. The AIHW has managed the last five surveys and earlier editions of these reports can be downloaded for free from the AIHW website at <www.aihw.gov.au/national-drugs-strategy-household-surveys>.

Supplementary tables relating to the 2010 NDSHS report were published separately online at <www.aihw.gov.au/national-drugs-strategy-household-surveys>.

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