

How much alcohol is consumed outside of the lifetime risk guidelines in Australia?

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Abstract

Introduction and Aims: This study aims to estimate the prevalence of long term risky drinking within the Australian population and the proportion of standard drinks that are consumed outside of the long term risk (LTR) guidelines of two Australian Standard Drinks (ASD) per day.

Design and Methods: Recruited by phone, 2020 Australian adults with an oversampling of risky drinkers were asked detailed questions about how much alcohol they consumed at a range of locations in 2013. Descriptive statistical analyses of data weighted to be representative of the Australian adult population were undertaken, with a focus on the ASD consumed above the LTR guidelines.

Results: Although 28% of respondents drink at levels above the LTR drinking guidelines, 56% of all ASD consumed are above the two per day recommended to reduce LTR. Three quarters of cask wine and liqueurs were consumed outside of the LTR guidelines, as were 58% of all ASD consumed in the home, similar to the proportion of ASD consumed above the guidelines in pubs (55%).

Discussion and Conclusions: While the minority of Australians drink to LTR levels, the majority of alcohol is consumed by long-term risky drinkers. More research and policy focus on the patterns of alcohol consumption that lead to long term risk, particularly outside of licensed premises, is required.

In Australia the National Health and Medical Research Council (NHMRC) guidelines state that *“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”* (1). The alcohol related diseases referred to in the guidelines liver disease (2), a range of cancers (3), hypertension and heart disease (4) and many other diseases (5). Once an individual consumes more than 14 Australian Standard Drinks (ASD; 10gm of ethanol) a week, they are drinking outside of the LTR guideline and all drinks are thought to contribute to that risk, even on an occasion when less than two ASD are consumed.

When examining risky consumption, the focus is usually on the proportion of people who consume at risky levels, rather than the proportion of ASD consumed (6-8). One exception is an analysis of the 1998 National Drug Strategy Household Survey (NDSHS), which found that two thirds of all alcohol consumed was consumed above either short- or long-term risk guidelines, with 39% of alcohol consumed by those who drank to long term risk (9). In particular, 90% of alcohol consumed by 18-24 year olds in that survey was consumed by those who drank to long term risk or in sessions that were over the short term risk limit. This was despite the low coverage of the amount of alcohol sold in Australia, with less than 50% of sales accounted for by survey responses. It is worth noting that some of the under-reporting in the NDSHS surveys is from infrequent drinkers who seem to under-estimate their consumption proportionally more than frequent drinkers (10). It is worth noting that this study was conducted before the 2009 version of the NHRMC guidelines; at that time both the short- and long-term guidelines for males used in analysis were higher than the current guidelines.

With its beverage-specific location-based loops used in the consumption questions, the International Alcohol Control (IAC) study (11) survey can account for 86%% of sales (10), compared to the 40-60% in most surveys, thus providing more accurate estimates of the prevalence of risky drinking. Another reason for this increase in reported consumption is thought to be that respondents can describe their drinks in the containers they would use to drink them, there is evidence to suggest that this alone can account for much of the gap between sales and reported consumption in most surveys (12). Previous research using these data found that most consumption occurs in the home and that those who drink to LTR drink more at home and less at pubs than those who do not drink to LTR (13). There has not however been any work done on the units consumed outside of the LTR guidelines with information on beverage types or locations.

In this study we use data from the IAC to estimate the proportion of alcohol consumed in Australia above the level of the Australian guidelines to avoid long term risk. Although the first two drinks are only thought to be low risk if that limit is not crossed (1) the focus in the current paper will be on what proportion of ASD are consumed above and beyond that amount. We also investigate whether a given age, sex, location or drink type accounts for a disproportionately high amount of consumption above long term risk levels. We also report the proportion of consumption above a higher threshold -- more than four drinks per day (High Long Term Risk; HLTR).

Method

Sample and Survey

Computer assisted telephone interviews were conducted with adults chosen by probabilistic sampling of a dual-frame (60% landline, 40% mobile phone) sample using random digit dialling. Drinkers who consumed ≥ 5 ASD on an occasion at least once a month were oversampled; two thirds of those who did not meet this criterion were screened out. The oversampling increased the power for respondents who are of particular interest in this study while still allowing representative statistics to be estimated with appropriate weighting. That is, the proportion of respondents who meet the risky drinking criterion in the weighted sample is the same as it would have been if we had not oversampled risky drinkers. A total of 2020 people aged sixteen and over from across Australia participated in the study (57.3% male, mean age = 44.6, SD=17.5), with the oversampling of risky drinkers and subsequent weighting altering the demographics (51.1% female, mean age = 45.1). A response rate of 37.2% by the standards of the American Association for Public Opinion Research (Response Rate 3; RR3) (14). RR3 was used as it accounted for the unknown eligibility of those who refused to participate in the study before eligibility was ascertained (for example: those who would not have been interviewed because of the heavy drinker oversample). This eligibility was calculated using the AAPOR's method of using the responses of those eligible to participate in the survey. As the majority of analyses in the current study are on units of alcohol consumed, rather than the respondents, the data are mostly taken from the 1789 respondents who consumed alcohol in the past year. In analyses where respondents are split into demographic groups, 1773 respondents are used as 16 people (<1%) declined to give their age. The sample is described in more detail in the study's Technical Report (15).

Respondents were asked how often they drank at a number of geographically exclusive locations -- on-premise locations (pubs, nightclubs, bars, clubs, restaurants and special events), where the alcohol they consumed was bought there, or off-premise locations (own home, someone else's home, workplace or a public space), where the alcohol was purchased elsewhere. For each drinking location they were then asked their consumption on a *usual* occasion at that location, in terms of what drink types, and how many consumed of each of these. Respondents could answer in the units that they would drink it in; for instance, they could say they drank six "stubbies" of regular strength beer, rather than being expected to know that this is approximately 8.4 standard drinks. The reference period for all consumption items was the six months prior to the survey. Summing across all locations, LTR drinkers were operationalised as those who drank an average of two or more ASD per day and HLTR drinkers as those who drank an average of four or more ASD per day.

Data Analysis

Analyses were conducted using Stata Version 13 (16). Results are pre-weighted to adjust for the number of in-scope members of a household and the chance of being surveyed twice due to mobile and landline sampling, and post-weighted to adjust for the likelihood of being surveyed based on age, sex, location and the oversampling of risky drinkers.

With the exception of the proportion of the sample drinking outside of the guidelines, the unit of interest in this paper is ASD, not people. When looking at the proportion of ASD consumed, either per location, or per drink type, the proportion of total ASD consumed outside of the guidelines was applied to the relevant drink types consumed over the reference period. For instance, if a respondent stated that they consumed 730 drinks over the past six months, half of these were outside the LTR guidelines (as two per day, or 365 in the past six months, is the long-term low-risk guideline). If 500 of these ASD were regular strength beer and 230 were bottled wine, then 250 beers and 115 wines were considered consumed outside of the LTR guidelines.

Results

The percentage of people who drank more than the LTR guidelines recommend, the percentage of all ASD consumed outside of these guidelines and the percentage of alcohol consumed by those who drink outside of the guidelines within each of the demographic groups are shown in Table 1. The weighted percentage of respondents who drank more than

the LTR guidelines recommend is 28% -- 35% of males and 20% of females. The relationship with LTR and age was murky, the proportion of drinkers drinking outside the guidelines decreased with age but the proportion of units consumed outside of the guidelines peaked in 25-34 year olds for males and in 35-54 year olds in females. Of all drinks consumed by the respondents, 56% were consumed outside of the LTR guidelines. The proportion varied between demographic groups: 35% of all drinks consumed by females aged 55 and over were drunk to outside of the LTR guidelines, compared to 67% of drinks consumed by males aged 25 to 34.

Overall, the proportion of respondents who drink at HLTR levels was roughly half that of LTR respondents; this decrease appeared more marked for females. More than a third (37%) of all ASD consumed by respondents was consumed above 4 ASD per day, while nearly two thirds (64%) of all alcohol was consumed by those who drink to HLTR.

The percentage and number of all ASD consumed to LTR by beverage type is shown in Figure 1. Beer was the drink type with the highest number of ASD consumed to LTR, a reflection of the popularity of beer, particularly among males, in Australia. The highest proportion of alcohol consumed above the LTR guidelines was for cask (boxed) wine and liqueurs. However, less absolute ASD of these drink types were drunk outside of the LTR guidelines than more popular drinks like bottled wine. Differentiation within broad drink types is important – the proportion of ASD consumed outside the LTR guidelines is higher for regular strength beer than for mid-strength and light beer, and cask wine had the highest proportion drunk outside of the guidelines, while bottled wine had the lowest.

The percentage and number of all ASD consumed to LTR by location of consumption is shown in Figure 2. The majority of ASD consumed overall were consumed in the drinker's own home (63%), and the percentage of ASD consumed at home which were outside of the LTR guidelines (58%) is relatively high. However, the proportion of ASD consumed outside of the LTR guidelines was higher for drinks consumed in public spaces (67%) and in the workplace (60%), although the total number of drinks consumed at these two places was quite low. The proportion of consumption outside of the LTR guidelines is notably low in restaurants (38%) compared to other locations.

Discussion

The proportion of both males and females who drank to long term risk was higher in this study than previously reported from research with consumption measured by graduated frequency measures: 35% and 20% of males and females respectively in this study, compared to 29% and 12% in the 2010 NDSHS (17). This difference reflects the finding that the IAC's beverage-specific location-based loops method elicits higher overall rates of consumption (11).

While 28% of respondents drank to LTR, they accounted for 84% of the total consumption, and their drinking beyond the guidelines constituted over half (56%) of the total consumption. While we commonly hear that the majority of Australians do drink in a responsible manner, and indeed our analysis does nothing to suggest that this is not the case, it might be worth also looking at the proportion of alcohol consumed in an unhealthy manner when discussing alcohol policy and health promotion in Australia.

While most of the ASD consumed to LTR are regular strength beer, bottled wine and spirits, this reflects the beverage types' general popularity; the proportion consumed to LTR was as low as 44% for bottled wine, and was 61% for spirits and 62% for regular strength beer. In contrast, over three quarters of liqueurs and cask wine ASD were consumed outside of the LTR guidelines. The discrepancy between cask wine and bottled wine provides another indication that the current taxation system for wine, based on price rather than alcohol content, operates against the interests of public health (18). Cask wine is considerably cheaper than bottled wine in Australia (19) and is more like to be consumed outside of the LTR guidelines than bottled wine. A volumetric tax applied on the basis of alcohol content to wine may rectify this.

The findings from this study are an important complement to research on short term risky drinking. There is an abundance of both research and media coverage related to short term risky drinking, particularly young people drinking in licensed premises (20-22). While the harms from short-term risky drinking are indeed considerable, the long-term harms from excessive alcohol consumption are also substantial (2-5) and our research indicates that long-term risky drinking is not limited to younger drinkers or licensed premises. Instead, most of the alcohol consumed outside of the LTR guidelines is consumed outside of licensed premises, and the proportion of all alcohol being consumed in a high risk fashion is highest in drinkers aged 35-54. With consumption in younger drinkers decreasing, more research on unhealthy off-premise consumption, particularly in those aged over 35 is required.

Limitations. Although the methods used in the IAC account for a higher proportion of overall consumption than the methods used in the NDSHS, some drinking outside of the LTR guidelines may not be identified by the “usually” questions in the IAC. The timing of the data collection, from April to June, may have impacted on results given the six month reference period, with any effect likely to result in underestimates of risky drinking. The response rate for the survey used in this study was low, albeit in line with many Australian surveys (23); this may also result in some mis-estimation of consumption (24). A common concern surrounding low response rates in alcohol research is that particularly risky drinkers are thought to be harder to recruit (25), however the high concurrence of the IAC with sales estimates (10) suggests that this was not a major problem in the current survey.

Conclusion

The findings from this study are an important complement to research on short term risky drinking, short term harms from consumption such as violence, and the kind of high risk drinking that occurs on licensed premises. While the majority of Australians drink within the LTR guidelines, the majority of ASD are consumed outside of them. There is a higher proportion of ASD consumed outside of the LTR guidelines off-premise than on. More work on the impact and prevalence of alcohol consumption in the home in older adults is required.

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References

- AAPOR. (2008). Standard Definitions: Final dispositions of cases, codes and outcome rates for surveys. Lenexa, Kansas: American Association for Public Opinion Research.
- Australian Institute of Health and Welfare. (2011). 2010 National drug strategy household survey *Drug Statistic Series*. Canberra: AIHW
- Baan, R., Straif, K., Grosse, Y., Secretan, B., El Ghissassi, F., Bouvard, V., . . . Cogliano, V. (2007). Carcinogenicity of alcoholic beverages. *The Lancet Oncology*, 8(4), 292-293.
- Breen, C., Shakeshaft, A., Sanson-Fisher, R., D'Este, C., Mattick, R. P., & Gilmour, S. (2014). Identifying individual- and population-level characteristics that influence rates of risky alcohol consumption in regional communities. *Australian and New Zealand Journal of Public Health*, 38(1), 60-65.
- Callinan, S., Livingston, M., Dietze, P., & Room, R. (2014). Heavy drinking occasions in Australia: Do context and beverage choice differ from low-risk drinking occasions? *Drug and Alcohol Review*, Early View.
- Callinan, S., Livingston, M., Room, R., & Dietze, P. (accepted for publication). Drinking contexts and alcohol consumption: How much alcohol is consumed in different Australian locations? *Journal of Studies on Alcohol and Drugs*.
- Casswell, S., Meier, P., MacKintosh, A., Brown, A., Hastings, G., Thamarangsi, T., . . . R., Y. (2012). The International Alcohol Control (IAC) Study - Evaluating the Impact of Alcohol Policies. *Alcoholism: Clinical and Experimental Research*, 36(8), 1462-1467.

- Dietze, P., Livingston, M., Callinan, S., & Room, R. (2014). The big night out: what happens on the most recent heavy drinking occasion amongst young Victorian risky drinkers? *Drug and Alcohol Review*, 33(4), 346-353.
- Doran, C., Byrnes, J., Cobiac, L., Vandenberg, B., & Vos, T. (2013). Estimated impacts of alternative Australian alcohol taxation structures on consumption, public health and government revenues. *Medical Journal of Australia*, 199(9), 619-622.
- Gmel, G., & Rehm, J. (2004). Measuring alcohol consumption. *Contemporary Drug Problems*, 31, 467-540.
- Jiang, H., Callinan, S., Livingston, M., & Room, R. (Accepted). Off-premise alcohol purchasing in Australia: Variations by age group, income level and annual amount purchased. *Drug and Alcohol Review*.
- Jiang, H., Callinan, S., & Room, R. (2014). Alcohol Consumption and Purchasing (ACAP) Study: Survey approach, data collection procedures and measurement of the first wave of the Australian arm of the International Alcohol Control Study. Melbourne: Centre for Alcohol Policy Research
- Livingston, M., & Callinan, S. (2015). Under-reporting in alcohol surveys: whose drinking is under-estimated? *Journal of Studies on Alcohol and Drugs*, 76, 158-164.
- National Health and Medical Research Council. (2009). Australian Guidelines to Reduce Health Risk from Drinking Alcohol.
- O'Toole, J., Sinclair, M., & Leder, K. (2008). Maximising response rates in household telephone surveys. *BMC Medical Research Methodology*, 8(71).
- Rehm, J., Baliunas, D., Borges, G. L. G., Graham, K., Irving, H., Kehoe, T., . . . Taylor, B. (2010). The relation between different dimensions of alcohol consumption and burden of disease: an overview. *Addiction*, 105(5), 817-843.
- Rehm, J., Mathers, C., Popova, S., Thavorncharoensap, M., Teerawattananon, Y., & Patra, J. (2009). Global burden of disease and injury and economic cost attributable to alcohol use and alcohol-use disorders. *The Lancet*, 373(9682), 2223-2233. doi: 10.1016/s0140-6736(09)60746-7
- Seth, D., Haber, P., Syn, W.-K., Diehl, A., & Day, C. (2011). Pathogenesis of alcohol-induced liver disease: Classical concepts and recent advances. *Journal of Gastroenterology and Hepatology*, 26, 1089-1105.
- StataCorp. (2013). Stata/MP 13.1 for Windows. College Station TX 77845: StataCorp LP.
- Stockwell, T., Neale, P., Chikritzhs, T., Dietze, P., & Catalano, P. (2002). How much alcohol is drunk in Australia in excess of the new Australian alcohol guidelines? *Medical Journal of Australia*, 176(2), 91-82.

Table 1

Percentage of respondents drinking to long term risk and percentage of all drinks consumed that are consumed to long term risk in 2013.

| | Age | N | Long Term Risk | | | High Long Term Risk | | |
|---------|-------|-----|---|--|--------------------------------|---|---|---------------------------------|
| | | | % people drinking outside of LTR guidelines | % ASD consumed outside of LTR guidelines | % ASD consumed by LTR drinkers | % people drinking outside HLTR guidelines | % ASD consumed outside of HLTR guidelines | % ASD consumed by HLTR drinkers |
| Males | 16-24 | 198 | 39.7 (30.9, 49.2) | 61.0 (56.3, 65.7) | 86.5 (82.3, 90.7) | 22.8 (17.9-28.6) | 41.0 (37.5, 44.5) | 71.9 (68.7, 75.1) |
| | 25-34 | 184 | 35.0 (26.8, 44.1) | 66.7 (62.9, 70.5) | 89.7 (86.4, 93) | 19.7 (14.4-26.3) | 50.4 (47.3, 53.5) | 74.7 (72, 77.4) |
| | 35-54 | 389 | 34.3 (28.2, 41.0) | 62.7 (59, 66.4) | 88.7 (85.7, 91.7) | 19.6 (15.2-25.0) | 42.7 (39.9, 45.5) | 75.0 (72.5, 77.5) |
| | 55+ | 380 | 34.3 (28.3, 40.8) | 55.5 (52.1, 58.9) | 85.5 (82.6, 88.4) | 18.1 (14.0-23.2) | 33.4 (31, 35.8) | 66.8 (64.4, 69.2) |
| | Total | | 27.6 (25.2-30.1) | 56.2 (54.6, 57.8) | 84.1 (82.5, 85.7) | 13.7 (12.2-15.4) | 36.5 (35.4, 37.6) | 64.2 (63.1, 65.3) |
| Females | 16-24 | 143 | 15.1 (9.2, 23.7) | 39.5 (31.6, 47.4) | 69.9 (57.2, 82.6) | 7.5 (4.8-11.4) | 20.2 (16.8, 23.6) | 42.0 (37.9, 46.1) |
| | 25-34 | 137 | 24.4 (16.7, 34.1) | 48.1 (42.8, 53.4) | 81.0 (75, 87) | 10.6 (6.8-16.2) | 26.4 (23.4, 29.4) | 53.4 (50, 56.8) |
| | 35-54 | 331 | 23.8 (18.2, 30.5) | 50.6 (45.6, 55.6) | 79.2 (73.5, 84.9) | 8.9 (5.2-15.1) | 30.6 (27.7, 33.5) | 57.4 (54.3, 60.5) |
| | 55+ | 242 | 16.2 (11.6, 22.2) | 35.4 (29.6, 41.2) | 70.0 (62.1, 77.9) | 2.5 (1.5-4.0) | 15.6 (13.3, 17.9) | 30.8 (27.8, 33.8) |
| | Total | | 27.6 (25.2-30.1) | 56.2 (54.6, 57.8) | 84.1 (82.5, 85.7) | 13.7 (12.2-15.4) | 36.5 (35.4, 37.6) | 64.2 (63.1, 65.3) |

N = 2020. LTR Long Term Risk; HLTR High Long Term Risk; ASD Australian Standard Drinks.

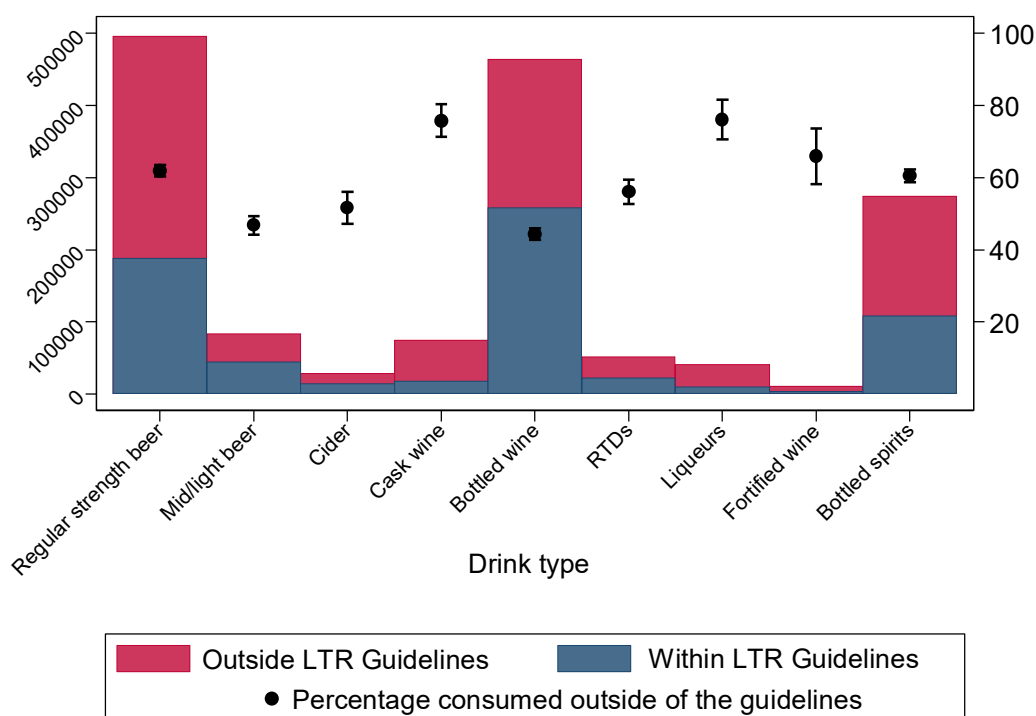


Figure 1. Number of ASD consumed within and outside of the long term risk guidelines with percentage of the ASD consumed consumed outside of the guidelines per drink type in 2013. N=1773

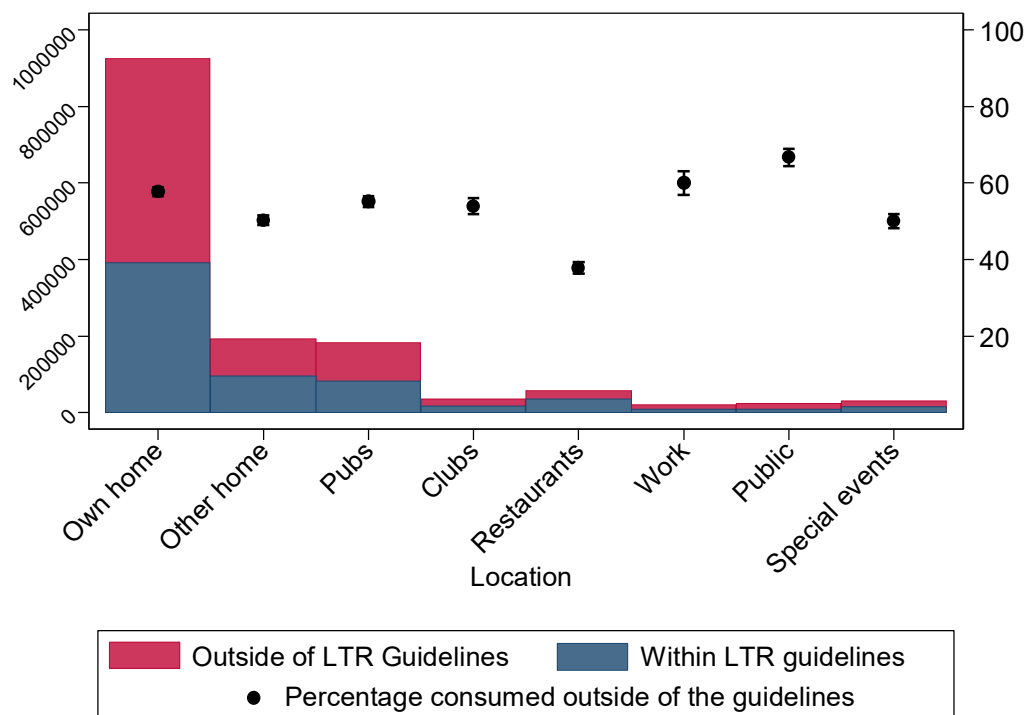


Figure 2. Number of ASD consumed within and outside of the long term risk guidelines with percentage of the ASD consumed consumed outside of the guidelines per location in 2013. N=1773

References

1. National Health and Medical Research Council. Australian Guidelines to Reduce Health Risk from Drinking Alcohol. 2009.
2. Seth D, Haber P, Syn W-K, Diehl A, Day C. Pathogenesis of alcohol-induced liver disease: Classical concepts and recent advances. *Journal of Gastroenterology and Hepatology*. 2011;26:1089-105.
3. Baan R, Straif K, Grosse Y, Secretan B, El Ghissassi F, Bouvard V, et al. Carcinogenicity of alcoholic beverages. *The Lancet Oncology*. 2007;8(4):292-3.
4. Rehm J, Baliunas D, Borges GLG, Graham K, Irving H, Kehoe T, et al. The relation between different dimensions of alcohol consumption and burden of disease: an overview. *Addiction*. 2010;105(5):817-43.
5. Rehm J, Mathers C, Popova S, Thavorncharoensap M, Teerawattananon Y, Patra J. Global burden of disease and injury and economic cost attributable to alcohol use and alcohol-use disorders. *The Lancet*. 2009;373(9682):2223-33.
6. Breen C, Shakeshaft A, Sanson-Fisher R, D'Este C, Mattick RP, Gilmour S. Identifying individual- and population-level characteristics that influence rates of risky alcohol consumption in regional communities. *Australian and New Zealand Journal of Public Health*. 2014;38(1):60-5.
7. Callinan S, Livingston M, Dietze P, Room R. Heavy drinking occasions in Australia: Do context and beverage choice differ from low-risk drinking occasions? *Drug and Alcohol Review*. 2014;Early View.
8. Dietze P, Livingston M, Callinan S, Room R. The big night out: what happens on the most recent heavy drinking occasion amongst young Victorian risky drinkers? *Drug and Alcohol Review*. 2014;33(4):346-53.
9. Stockwell T, Neale P, Chikritzhs T, Dietze P, Catalano P. How much alcohol is drunk in Australia in excess of the new Australian alcohol guidelines? *Medical Journal of Australia*. 2002;176(2):91-82.
10. Livingston M, Callinan S. Under-reporting in alcohol surveys: whose drinking is under-estimated? *Journal of Studies on Alcohol and Drugs*. 2015;76:158-64.
11. Casswell S, Meier P, MacKintosh A, Brown A, Hastings G, Thamarangsi T, et al. The International Alcohol Control (IAC) Study - Evaluating the Impact of Alcohol Policies. *Alcoholism: Clinical and Experimental Research*. 2012;36(8):1462-7.
12. Stockwell T, Zhao J, Chikritzhs T, Greenfield TK. What did you drink yesterday? Public health relevance of a recent recall method used in the 2004 Australian National Drug Strategy Household Survey. *Addiction*. 2008;103(6):919.
13. Callinan S, Livingston M, Room R, Dietze P. Drinking contexts and alcohol consumption: How much alcohol is consumed in different Australian locations? *Journal of Studies on Alcohol and Drugs*. 2016;77(4):612-9.
14. AAPOR. Standard Definitions: Final dispositions of cases, codes and outcome rates for surveys. Lenexa, Kansas: American Association for Public Opinion Research, 2008.
15. Jiang H, Callinan S, Room R. Alcohol Consumption and Purchasing (ACAP) Study: Survey approach, data collection procedures and measurement of the first wave of the Australian arm of the International Alcohol Control Study. Melbourne: Centre for Alcohol Policy Research 2014.

16. StataCorp. Stata/MP 13.1 for Windows. College Station TX 77845: StataCorp LP; 2013.
17. Australian Institute of Health and Welfare. 2010 National drug strategy household survey. Canberra: AIHW 2011.
18. Doran C, Byrnes J, Cobiac L, Vandenberg B, Vos T. Estimated impacts of alternative Australian alcohol taxation structures on consumption, public health and government revenues. *Medical Journal of Australia*. 2013;199(9):619-22.
19. Jiang H, Callinan S, Livingston M, Room R. Off-premise alcohol purchasing in Australia: Variations by age group, income level and annual amount purchased. *Drug and Alcohol Review*. 2016.
20. Markham J, Young M. Promoting violence? Alcohol specials lead to increased aggression in bars: The Conversation; 2015 [updated 10/7/2015/27/10/2016]. Available from: <https://theconversation.com/promoting-violence-alcohol-specials-lead-to-increased-aggression-in-bars-43539>.
21. Miller P, Zinkeiwicz L, Hayley A, Sonderlund A, Litherland S, Medew-Ewen T, et al. Barroom Aggression Among Australian Men: Associations with heavy episodic drinking, conformity to masculine norms, and personal and perceived peer approval of barroom aggression. *Journal of Studies on Alcohol and Drugs*. 2016;77(3):421-30.
22. Coomber K, Pennay A, Droste N, Mayshak R, Martino F, Bowe J, et al. Observable characteristics associated with alcohol intoxication within licensed entertainment venues in Australia. *International Journal of Drug Policy*. 2016;36:8-14.
23. O'Toole J, Sinclair M, Leder K. Maximising response rates in household telephone surveys. *BMC Medical Research Methodology* 2008;8(71).
24. Gmel G, Rehm J. Measuring alcohol consumption. *Contemporary Drug Problems*. 2004;31:467-540.
25. Kypri K, Stephenson S, Langley J. Assessment of Nonresponse Bias in an Internet Survey of Alcohol Use. *Alcoholism Clinical and Experimental Research*. 2004;28:630-4.