# Drinking Contexts and Alcohol Consumption: How Much Alcohol Is Consumed in

## **Different Australian Locations?**

SARAH CALLINAN, PH.D.,<sup>*a*,\*</sup> MICHAEL LIVINGSTON, PH.D.,<sup>*a*,*b*</sup> ROBIN ROOM,

PH.D.,<sup>*a,c,d*</sup> & PAUL DIETZE, PH.D.<sup>*e,f*</sup>

<sup>a</sup>Centre for Alcohol Policy Research, School of Psychology and Public Health, La Trobe University, Melbourne, Victoria, Australia <sup>b</sup>Drug Policy Modelling Program, National Drug and Alcohol Research Centre, University of New South Wales, Sydney, Australia

<sup>c</sup>Melbourne School of Population and Global Health, University of Melbourne, Melbourne, Victoria, Australia

<sup>d</sup>Centre for Social Research on Alcohol and Drugs, Stockholm University, Stockholm, Sweden <sup>e</sup>MacFarlane Burnet Institute for Medical and Public Health Research, Melbourne, Victoria, Australia

<sup>f</sup>School of Public Health and Preventive Medicine, Monash University, Melbourne, Victoria, Australia

This article has been accepted for publication and undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process which may lead to differences between this version and the Version of Record. Please cite this article as doi: 10.15288/jsad.2016.77.612 The funding source for the data set used in this article is the Australian National Preventive Health Agency (ANPHA; grant ref 157ROO2011). The contents of this article are solely the responsibility of the authors and do not reflect the views of ANPHA. Sarah Callinan's time on this study was funded by the Foundation for Alcohol Research and Education, an independent, charitable organization working to prevent the harmful use of alcohol in Australia (www.fare.org.au). Paul Dietze is the recipient of a National Health and Medical Research Council (NHMRC) Senior Research Fellowship (1004140), and Michael Livingston is the recipient of an NHMRC Early Career Fellowship (APP1053029).

\*Correspondence may be sent to Sarah Callinan, Research Fellow, Centre for Alcohol Policy Research, La Trobe University, 215 Franklin Street, Melbourne, VIC, 3000, Australia, or via email at: s.callinan@latrobe.edu.au.

ABSTRACT. Objective: The aim of this study was to examine where Australians in different demographic groups and drinker categories consume their alcohol. Method: Results were taken from the Australian arm of the International Alcohol Control study, a telephone survey of 2,020 Australian adults with an oversample of risky drinkers. The 1,789 respondents who reported consuming alcohol in the past 6 months were asked detailed questions about the location of their alcohol consumption and how much alcohol they consumed at each place. Results: Sixty-three percent of all alcohol consumption reported by respondents was consumed in the drinker's own home, with much less consumed at pubs, bars, and nightclubs (12%). This is driven primarily by the number of people who drink in the home and the frequency of these events, with the amount consumed per occasion at home no more than in other people's homes or pubs, and significantly less than at special events. The average consumption on a usual occasion at each of these locations was more than five Australian standard drinks (above the Australian low-risk guideline for episodic drinking). Short-term risky drinkers had the highest proportion of consumption in pubs (19%), but they still consumed 41% of their units in their own home. Conclusions: The majority of alcohol consumed in Australia is consumed in the drinker's own home. Efforts to reduce long-term harms from drinking need to address off-premise drinking and, in particular, drinking in the home. (J. Stud. Alcohol Drugs, 77, 000-000, 2016)

THE GLOBAL BURDEN OF DISEASE attributable to alcohol consumption is both high and increasing (Lim et al., 2012), and higher levels of consumption are linked to higher levels of mortality (Di Castelnuovo et al., 2006). Rates of hospitalization attributable to alcohol have increased in Victoria (Jayasekara et al., 2013; Livingston et al., 2010) and in Australia more generally (Pascal et al., 2009). Although much of the focus of public debate and policy related to alcohol is on episodic heavy drinking in licensed premises (Mower, 2013; Pearlman, 2014), the impacts of long-term consumption are considerable, with evidence that alcohol consumption is a causal factor for a range of cancers (Baan et al., 2007), hypertension and heart disease (Rehm et al., 2010), liver disease, and many other conditions (Lim et al., 2012; Rehm et al., 2013).

A recent Australian burden-of-disease study found that much of the harm experienced from alcohol is linked to long-term consumption, with 54% and 76% of alcohol-related deaths from cancers, cardiovascular disease, or digestive diseases in males and females, respectively (Gao et al., 2014). In Australia, the National Health and Medical Research Council (NHMRC) guidelines state that neither males nor females should consume more than two Australian Standard Drinks (ASDs; 10 g of alcohol) per day to reduce long-term risks from their consumption and should avoid five or more standard drinks in 1 day to reduce short-term risk (NHMRC, 2009).

Research on the locations where alcohol is consumed tends to focus on where young people drink outside of the short-term risk guidelines. Recent Australian research suggests that heavy drinking occasions in both general adult and young adult populations occur away from licensed premises more often than would be expected given the recent focus on drinking in public space in the Australian media (Callinan et al., 2014; Dietze et al., 2014). However, the chances of experiencing short-term harms such as violence or drink driving are higher when drinking in licensed premises (Stockwell et al., 1993) and are also higher for young males (Livingston & Room, 2009). It may be the case that long-term risky drinking occurs in different settings and among different people than short-term risky drinking.

Long-term risky drinking is costly to society and, as it is based on average consumption, the location of consumption carrying long-term risk will be closely linked to location of overall consumption. Since World War II, the proportion of alcohol consumed somewhere other than where it was purchased (hereafter referred to as "off-premise consumption") has increased in a number of countries (Mäkelä et al., 1981); likewise, in Australia drinking has moved from the urban pub to the suburban home (Room, 2010). The percentage of alcohol consumed outside of licensed premises is roughly 77% (Euromonitor International, 2012); however, little beyond this is known on the specifics of where alcohol is consumed in Australia.

In this study we took advantage of the data collected in the International Alcohol Control (IAC) study (Casswell et al., 2012) to identify where alcohol in Australia is consumed. Furthermore, once we had established the proportion of alcohol consumed in each location, we examined the three factors contributing to this: the percentage of respondents who consumed alcohol in each place, how often these people did this, and how much they drank when they did. We also checked for demographic differences. This article addresses the following three research questions: (a) What proportion of all ASDs consumed by age and sex groups are drunk at each location? (b) Are the differences in total consumption per location driven by the number of people drinking at each location, more occasions at that location, or the number of ASDs consumed per occasion at each location? (c) Where do risky drinkers drink their alcohol?

### Method

Sample and survey

Ethical clearance to conduct this study was given by the Eastern Health Human Research Ethics Committee. Data were obtained from respondents to the Australian arm of the IAC study. The questionnaire was adapted from the New Zealand IAC survey (Casswell et al., 2002). Computer-assisted telephone interviews were conducted with a sample collected using probabilistic sampling methods in conjunction with random-digit dialing in a dual frame sample, with 60% of the sample recruited via landline and 40% via mobile phone.

Risky drinkers (who consumed  $\geq$ 5 ASDs per occasion at least once a month) were oversampled; only one third of those who did not meet this criterion (i.e., who were abstainers or lower-level drinkers) were asked to complete the survey. This resulted in a higher number of respondents of particular interest in the current study while still allowing representative statistics to be developed; these were generated by weighting low-risk drinkers and abstainers so that they were represented as they would have been if the oversampling had not occurred. A total of 2,020 people age 16 years and older from across Australia agreed to participate in the study, with a response rate by the standards of the American Association for Public Opinion Research (2008) Response Rate 3 (used to account for the eligibility of nonrespondents; further details can be found in the American Association for Public Opinion Research manual) of 37.2% (40.4% for the landline sample, 31.4% for mobiles).

This relatively low response rate, conservatively estimated, is in accord with other current Australian survey experience, but the resulting sample appears quite representative. As the majority of analyses in the current study are on units of alcohol consumed, rather than the respondents, the data are taken from the 1,789 respondents who reported consuming alcohol in the past 6 months (current drinkers), 59.6% male, with a mean age of 43.7 years (SD = 17.0). Please note that 16 respondents (<1%) did not give their age, so analyses with age splits consist of 1,773 respondents. The reference period for all of the consumption questions was 6 months (Jiang et al., 2014).

Current drinkers were asked a series of survey items within beverage-specific location-based loops to measure their alcohol consumption. That is, respondents were asked how often they drank at a number of distinct types of location, be they on-premise locations (pubs, clubs, restaurants, and special events) or off-premise locations (own home, someone else's home, workplace, or a public space). The category of pubs also included taverns, nightclubs, and hotels,<sup>1</sup> whereas the category of clubs included sporting clubs and social clubs such as the Returned and Services League of Australia. Special events included but were not limited to events focused on sport and music. All of these distinctions were made clear to respondents.

For each drinking location, respondents were asked, concerning a usual occasion at that location, what drink types and how many of each of these drink types they consumed. Respondents could give these usual consumption levels 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 ASDs (Casswell et al., 2002). This method results in higher reported consumption (more than 90% of sales accounted for) than more commonly used methods such as graduated frequency (40%–60%) (Livingston & Callinan, 2015). For the purposes of the current study, all respondents were split by gender and into four age groups (age 16–24, 25–34, 35–54,  $\geq$ 55 years). For a more detailed description of the survey methods, please see the technical report (Jiang et al., 2014).

Long-term risky drinking was operationalized in accordance with the NHMRC Guidelines (NHMRC, 2009) as consumption of an average of more than two ASDs per day (NHMRC, 2009), based on the total volume calculated from adding across the loops outlined above. Because respondents were asked questions about drinking occasions per location, not drinking days, it was difficult to identify short-term risky drinking using these data, as it may

<sup>&</sup>lt;sup>1</sup>An Australian hotel may or may not have rooms for travelers, since *hotel* was the traditional term for a pub.

have occurred over two or more locations. Therefore, the filter question asked at the beginning of the survey about the number of occasions at which five or more ASDs were consumed was used to identify short-term risky drinking, again as per the NHMRC guidelines (NHMRC, 2009). Those who stated that they did this once or more were designated short-term risky drinkers. Finally, those who did not participate in either type of risky drinking and those who participated in both were also identified.

### Data analyses

All data analyses were conducted using Stata Version 14 (StataCorp LP, College Station, TX). All results were pre-weighted to adjust for the number of in-scope members of a household and the chance of being surveyed twice because of mobile phone 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.

## Results

The overall distribution of alcohol consumption by location, age, and sex is presented in Table 1. Almost two thirds of reported alcohol consumption for respondents occurred in the home. Thirteen percent and 12% was consumed in other people's homes and pubs, respectively, with less than 4% of alcohol consumed at each of the other locations. There appears to be a positive relationship between the percentage of consumption in the home and age, with those age 16–24 years drinking less than 40%, and those age 55 and older drinking significantly more of their alcohol in their own home (77% for males and females). Conversely, the relationship between age and the proportion of consumption in other homes, in pubs, and at special events appears to be negative. Younger respondents (particularly women age 16–24) do a greater proportion of their drinking in pubs—significantly more than those age 35 or older. Those younger than age 25 also drank more than a fifth of their alcohol in other people's homes. Age plays a role in the proportion of alcohol consumption at special events as well, with those younger than age 25 drinking a significantly higher proportion of their alcohol at these events than those age 35 and older.

### [COMP: Table 1 about here]

The total volume consumed in each place is the product of the number of people who drink at that location, the number of occasions at that location, and the mean number of ASDs consumed per occasion at that location. To see what drives the figures in Table 1, these three factors are shown for each type of location in Table 2. The mean number of ASDs consumed at special events was significantly higher than those at all other locations, followed by occasions at other homes, pubs, own home, and in public, with between 5.3 and 5.8 ASDs per occasion. Finally, the mean number of ASDs per occasion at clubs, restaurants, and work was lower again—between 2.9 and 3.7.

### [COMP: Table 2 about here]

The primary reason for the high level of consumption in the home is the high number of respondents who drink in the home and the high number of occasions that each person who drinks at home had there in the past 6 months. Although few people drink at work, those who do have a relatively high number of drinking occasions there compared with more popular locations like other homes, restaurants, and pubs. Conversely, although events had a high mean number of ASDs consumed, these occasions were quite rare, with an average of less than once a month among those who drank at special events at all.

The percentage of all alcohol consumed in each location by groups defined by their risky drinking status (not risky, long-term risky drinking only, short-term risky drinking only, short- and long-term risky drinking) also is shown in Table 2. For three of the four groups, the majority of all units were still consumed in the home. For short-term risky drinkers, 41% was consumed in the home, still the place with the highest percentage of consumption within this group. Consumption in pubs and other people's homes was lower for long-term risky

drinkers and higher for short-term risky drinkers. Overall, short-term risky drinking seems to result in less drinking in your own home and more in pubs and other homes, whereas longterm risky drinking is associated with drinking more in the home than it is in the other three risk-based groups.

To examine drinking patterns in more detail, the first three columns of Table 2 are expanded by age and sex group in Tables 3–5. Note that 16 respondents who did not give their age are excluded from these analyses, so there may be small differences in the totals shown in Tables 3–5 from those shown in Table 2. In Table 3 the percentage of all drinkers in each group drinking at each location is shown. The vast majority of drinkers reported drinking in their own home and in someone else's home at least once in the past 6 months. Likewise, more than half of drinkers in each group reported drinking at pubs and restaurants in the past 6 months, with the exception of males and females age 55 and older for pubs and females age 16–24 for restaurants. Drinking and at special events was more common in younger than in older age groups.

### [COMP: Tables 3-5 about here]

The mean number of monthly occasions at each location among those who reported any consumption at that location is shown in Table 4. The most striking finding was the relatively high number of drinking occasions in the home among those age 55 years and older who reported drinking at home. Both men and women reported more occasions per month on average than their counterparts younger than age 35. Significant gender differences in the number of occasions in pubs are only evident in drinkers age 55 and older, whereas the number of drinking occasions in restaurants did not differ greatly by demographic group.

The mean number of ASDs per occasion by demographic group is shown in Table 5. The highest mean number of ASDs per usual occasion was seen in males age 16–24 years at other people's homes, at special events, and in pubs, with 10, 9, and 9 ASDs, respectively, and in males age 25–34 at special events, with 9. Among women, the mean number of drinks at pubs and special events was 8 ASD for those age 16–24. The usual occasion for males age 16–24 at all places except restaurants and workplaces involved drinking at levels above the short-term risky drinking guidelines. Overall, the mean number of drinks per usual occasion at all locations except for clubs, restaurants, and workplaces was above the NHMRC guidelines to avoid short-term risk.

#### Discussion

The primary aim of the current study was to provide estimates of how much alcohol is consumed in each drinking location in Australia. The majority of alcohol was consumed in the drinker's own home, with other people's homes and pubs, bars, and nightclubs the other major locations of consumption. The mean number of ASDs consumed on a usual occasion at the drinker's own home; other people's homes; pubs, bars, and nightclubs; and at special events was more than five ASDs. Results in this study match up well to those based on sales, with just less than 80% of alcohol reported in this study consumed off premise, as compared with 77% in the data reported by Euromonitor (2012).

The majority of alcohol consumed by respondents, nearly two thirds, is consumed at home (with a further 13% consumed in others' homes), indicating that much of Australia's alcohol consumption is indeed occurring in private residences (Room, 2010). Given the high proportion of Australian alcohol-related deaths that result from long-term harm from consumption (Gao et al., 2014), the location where any level of alcohol is consumed in Australia is an important consideration, as is where alcohol is being consumed in a risky fashion.

We found differences in the location of consumption by age and sex. Not all groups consumed the majority of alcohol in their own home—those younger than age 25 years consumed less than 40% of their alcohol in the home, more than 20% of their alcohol in other

people's homes and pubs (a higher figure than for other age groups), and 5%–6% of their alcohol at special events. This figure for events is primarily driven by an average usual occasion of 9 and 8 ASDs, respectively; these high figures are consistent with an increase in alcohol-related harms surrounding special sporting events and public holidays (Lloyd et al., 2013), although some of the special events referred to, particularly more regular sporting events, would not have been assessed in this study.

We found a high level of consumption in the home that was not just a product of how often these occasions occur but also of how much was consumed on each occasion; the average usual drinking occasion in the home was above short-term risky levels at slightly more than five ASDs per occasion. However, this was also true of occasions in other people's homes and in pubs and nightclubs, in public spaces, and in particular at special events, where an average of nearly seven ASDs per usual occasion was consumed. Interestingly, drinking occasions in other people's homes tended to be similar to occasions in pubs, both in terms of the total volume consumed and of the consumption patterns within different demographic groups; the only significant difference between consumption in pubs and in other people's homes was for women older than age 55 years, who drank more in other people's homes than they did in pubs.

We found that those respondents who drink to different types of risk still consume much of their alcohol in their own home. The majority of alcohol for three of the four drinker groups examined was consumed in the home, and for those who drank at short-term risky levels but not long-term risk, more than 40% was consumed in the home, still the place where the highest percentage of alcohol was consumed. Furthermore, the short-term risky group drank nearly a quarter of their alcohol at other people's homes. This finding is consistent with recent research on the high prevalence of alcohol consumption on heavy drinking occasions that occurs outside of licensed premises (Dietze et al., 2014; McClatchley et al., 2014). The central role of drinking in private locations (in terms of both the number of people and the number of drinks) we found highlights the need to focus on off-premise alcohol sales in relation to both long- and short-term risky drinking.

We found that short-term risky drinkers drank more in pubs and other people's homes, and long-term risky drinkers drank more at home and less in pubs. However, these deviations from the drinking locations of nonrisky drinkers appear to cancel each other out for those who participate in both types of risky drinking. The finding that short-term risky drinkers consume more alcohol in pubs than other types of drinkers is consistent with findings on short-term risky drinking and licensed premises (Stockwell et al., 1993). Given the high average number of drinking occasions in the home and in other people's homes, policies that affect off-premise alcohol are likely to reduce not only just the long-term health impacts of alcohol consumption but also the short-term harms.

## Limitations

Although the beverage-specific location-based loops used in the current study to measure amount and pattern of drinking account for a higher proportion of overall consumption than other methods such as those used in the National Drug Strategy Household Survey (Livingston & Callinan, 2015), some drinking occasions will not be well assessed by the "usually" questions in the IAC study. A person who drinks only at home, one drink every weeknight and 10 drinks on Friday and Saturday, will not be identified as high risk if they summarize their "usual" amount accurately. That said, the high number of drinks reported as being consumed on usual occasions in the home suggests that some respondents may interpret "usual" differently.

Finally, as is common in computer-assisted telephone interviewing studies in Australia (O'Toole et al., 2008), the response rate in this project was low. Study findings have been mixed on the impact of decreasing response rates on estimating the prevalence of risky behaviors, with some indicating that it results in underestimates of alcohol consumption (Kypri et al., 2011; MacLennan et al., 2012; Wild et al., 2001) and others not showing any difference or showing that the differences can be accounted for by controlling for demographic variables (Keeter et al., 2006; Van Loon et al., 2003). Apologies, fixed below] The IAC study had particularly good coverage of alcohol sales in Australia (Livingston & Callinan, 2015), higher than that of studies with a higher response rate, so we do not believe that this low response rate has resulted in an underestimate of risky behaviors in this study. Although the impact of our response rate on the interaction between variables such as location and consumption cannot be known, the good coverage of both off- and on-premise sales (Livingston & Callinan, 2015) gives us cause for cautious optimism that the low response rate did not have a sizable impact on our results.

## Conclusions

The recent prominence of news stories in Australia surrounding short-term risky drinking, young people, and violence in public spaces and licensed premises (Quilter, 2014) has resulted in a focus on short-term risky drinking in public spaces for health promotion efforts. But the majority of alcohol consumed in Australia is drunk in the home, with many drinking beyond the short-term risky guidelines during these occasions. Further, there are sizable human and financial costs stemming from long-term consequences of alcohol consumption, and much of this damage is being done in the home. With the majority of alcohol consumed away from licensed premises, particularly in the drinker's own home, efforts to reduce harms from alcohol would be well served focusing on broader measures targeting alcohol purchased from off-licensed premises (Livingston, 2013).

### Acknowledgments

The data used in this article are from the Australian arm of the IAC study, led by Professor Sally Casswell. The IAC core survey questionnaire was largely developed by researchers at the Social and Health Outcomes Research and Evaluation (SHORE) and <u>Te</u> <u>Ropū Whāriki</u> (Whāriki) Research Centre, College of Health, Massey University, New Zealand, with funding from the Health Promotion Agency, New Zealand. Further development involved collaboration among United Kingdom, Thai, Korean, and New Zealand researchers. The authors thank Petra Meier for her comments on an earlier version of this article, which greatly improved the work.

#### References

American Association for Public Opinion Research. (2008). *Standard definitions: Final dispositions of cases, codes and outcome rates for surveys.* Lenexa, KS: Author.

Baan, R., Straif, K., Grosse, Y., Secretan, B., El Ghissassi, F., Bouvard, V., . . . Cogliano, V.,
& the WHO International Agency for Research on Cancer Monograph Working Group.
(2007). Carcinogenicity of alcoholic beverages. *The Lancet Oncology*, *8*, 292–293.
doi:10.1016/S1470-2045(07)70099-2

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*, *33*, 354–357. doi:10.1111/dar.12135

Casswell, S., Huckle, T., & Pledger, M. (2002). Survey data need not underestimate alcohol consumption. *Alcoholism: Clinical and Experimental Research, 26*, 1561–1567. doi:10.1111/j.1530-0277.2002.tb02456.x

Casswell, S., Meier, P., MacKintosh, A. M., Brown, A., Hastings, G., Thamarangsi, T., . . . You, R. Q. (2012). The International Alcohol Control (IAC) study—Evaluating the impact of alcohol policies. *Alcoholism: Clinical and Experimental Research, 36*, 1462–1467. doi:10.1111/j.1530-0277.2012.01738.x

Di Castelnuovo, A., Costanzo, S., Bagnardi, V., Donati, M. B., Iacoviello, L., & de Gaetano, G. (2006). Alcohol dosing and total mortality in men and women: An updated meta-analysis of 34 prospective studies. *Archives of Internal Medicine, 166,* 2437–2445. doi:10.1001/archinte.166.22.2437

Dietze, P. M., Livingston, M., Callinan, S., & Room, R. (2014). The big night out: What happens on the most recent heavy drinking occasion among young Victorian risky drinkers? *Drug and Alcohol Review, 33*, 346–353. doi:10.1111/dar.12117

Euromonitor International. (2012). *Passport: Alcoholic drinks in Australia*. London, England: Author.

Gao, C., Ogeil, R., & Lloyd, B. (2014). *Alcohol's burden of disease in Australia*. Canberra, Australia: FARE and VicHealth in collaboration with Turning Point.

Jayasekara, H., Ferris, J., Matthews, S., Livingston, M., & Lloyd, B. (2013). Trends in alcohol-attributable morbidity and mortality for Victoria, Australia from 2000/01 to 2009/10. *Journal of Public Health, 36*, 399–407. doi:10.1093/pubmed/fdt063

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, Australia: Centre for Alcohol Policy Research.

Keeter, S., Kennedy, C., Dimock, M., Best, J., & Craighill, P. (2006). Gauging the impact of growing nonresponse on estimates from a national RDD telephone survey. *Public Opinion Quarterly*, *70*, 759–779. doi:10.1093/poq/nfl035

Kypri, K., Samararnayaka, A., Connor, J., Langley, J., & Maclennan, B. (2011). Nonresponse bias in a web-based health behaviour survey of New Zealand tertiary students. *Preventive Medicine*, *53*(4-5), 274-277. doi:10.1016/j.ypmed.2011.07.018

Lim, S. S., Vos, T., Flaxman, A. D., Danaei, G., Shibuya, K., Adair-Rohani, H., . . . Ezzati, M. (2012). A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990-2010: A systematic analysis for the Global Burden of Disease Study 2010. *The Lancet, 380,* 2224–2260. doi:10.1016/S0140-6736(12)61766-8. Erratum in *The Lancet, 381,* 628 and *The Lancet, 381,* 1276.

Livingston, M. (2013). To reduce alcohol-related harm we need to look beyond pubs and nightclubs. *Drug and Alcohol Review, 32,* 113–114. doi:10.1111/dar.12026

Livingston, M., & Callinan, S. (2015). Underreporting in alcohol surveys: Whose drinking is underestimated? *Journal of Studies on Alcohol and Drugs*, *76*, 158–164. doi:10.15288/jsad.2015.76.158

Livingston, M., Matthews, S., Barratt, M. J., Lloyd, B., & Room, R. (2010). Diverging trends in alcohol consumption and alcohol-related harm in Victoria. *Australian and New Zealand Journal of Public Health, 34*, 368–373. doi:10.1111/j.1753-6405.2010.00568.x

Livingston, M., & Room, R. (2009). Variations by age and sex in alcohol-related problematic behaviour per drinking volume and heavier drinking occasion. *Drug and Alcohol Dependence*, *101*, 169–175. doi:10.1016/j.drugalcdep.2008.12.014

Lloyd, B., Matthews, S., Livingston, M., Jayasekara, H., & Smith, K. (2013). Alcohol intoxication in the context of major public holidays, sporting and social events: A time-series analysis in Melbourne, Australia, 2000-2009. *Addiction, 108,* 701–709. doi:10.1111/add.12041

Maclennan, B., Kypri, K., Langley, J., & Room, R. (2012). Non-response bias in a community survey of drinking, alcohol-related experiences and public opinion on alcohol policy. *Drug and Alcohol Dependence, 126*(1-2), 189-194. doi: 10.1016/j.drugaldep.2012.05.014

Mäkelä, K., Room, R., Single, E., Sulkunen, P., & Walsh, B. (1981). Alcohol, society and the

*state – 1: A comparative study of alcohol control.* Toronto, Ontario: Addiction Research Foundation.

McClatchley, K., Shorter, G. W., & Chalmers, J. (2014). Deconstructing alcohol use on a night out in England: Promotions, preloading and consumption. Drug and Alcohol Review, 33, 367–375. doi:10.1111/dar.12150

Mower, J. (2013, November 19). One in eight deaths of young Australians attributable to alcohol: National Council on Drugs report. Retrieved from http://www.abc.net.au/news/2013-11-20/alcohol-to-blame-for-one-in-eight-deaths--report/5102594

National Health and Medical Research Council (NHMRC). (2009). Australian Guidelines to Reduce Health Risk from Drinking Alcohol. Retrieved from https://www.nhmrc.gov.au/guidelines-publications/ds10

O'Toole, J., Sinclair, M., & Leder, K. (2008). Maximising response rates in household telephone surveys. *BMC Medical Research Methodology*, *8*, 71. doi:10.1186/1471-2288-8-71

Pascal, R., Chikritzhs, T., & Jones, P. (2009). Trends in estimated alcohol attributable deaths and hospitalisations in Australia 1996-2005. *National Alcohol Indicators, Bulletin no. 12*.
Perth, Australia: National Drug Research Institute, Curtin University of Technology.

Pearlman, J. (2014, March 1). Australia leading the way in crackdown on one-punch killers. *The Telegraph*. Retrieved from

http://www.telegraph.co.uk/news/worldnews/australiaandthepacific/australia/10670485/Australia-leading-the-way-in-crackdown-on-one-punch-killers.html

Quilter, J. A. (2014). One-punch laws, mandatory minimums and 'alcohol-fuelled' as an aggravating factor: Implications for NSW criminal law. *International Journal for Crime, Justice and Social Democracy, 3*, 81–106. doi:10.5204/ijcjsd.v3i1.145

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,* 817–843. doi:10.1111/j.1360-0443.2010.02899.x

Rehm, J., Samokhvalov, A. V., & Shield, K. D. (2013). Global burden of alcoholic liver diseases. *Journal of Hepatology*, *59*, 160–168. doi:10.1016/j.jhep.2013.03.007

Room, R. (2010). The long reaction against the wowser: The prehistory of alcohol deregulation in Australia. *Health Sociology Review*, *19*, 151–163. doi:10.5172/hesr.2010.19.2.151

Stockwell, T., Lang, E., & Rydon, P. (1993). High risk drinking settings: The association of serving and promotional practices with harmful drinking. *Addiction*, *88*, 1519–1526. doi:10.1111/j.1360-0443.1993.tb03137.x

Van Loon, A., Tijhuis, M., Picavet, H., Surtees, P., & Ormel, J. (2003). Survey Non-response in the Netherlands: Effects on Prevalence Estimates and Associations. *Annals of Epidemiology, 13*(2), 105-110. doi: 10.1016/S1047-2797(02)00257-0

Wild, T., Cunningham, J., & Adlaf, E. (2001). Nonresponse in a follow-up to a representative telephone survey of adult drinkers. *Journal of Studies on Alcohol and Drugs*, 62(2). doi: 10.15288/jsa.2001.62.527

Age, in years	Own home	Other home	Pubs	Clubs	Restaurant	Work	Public	Events
16–24								
Male	34.9	25.6	23.0	3.4	2.8	1.4	3.2	5.6
	[31.2, 38.7]	[22.4, 28.9]	[19.7, 26.2]	[1.1, 5.6]	[1.1, 4.4]	[-0.9, 3.7]	[1.1, 5.3]	[3.6, 7.7]
Female	38.9	21.3	27.0	1.5	3.6	0.3	2.4	5.0
	[33.9, 43.9]	[17.4, 25.3]	[22.5, 31.5]	[-0.8, 3.8]	[1.3, 6.0]	[-2.0, 2.6]	[-0.3, 5.1]	[2.6, 7.5]
25–34								
Male	50.3	15.6	18.1	2.5	3.5	2.9	4.1	3.0
	[46.2, 54.3]	[12.5, 18.6]	[14.8, 21.4]	[0.4, 4.7]	[1.7, 5.2]	[0.5, 5.4]	[1.3, 6.9]	[1.3, 4.7]
Female	45.5	18.5	19.9	1.4	7.6	1.1	2.3	3.8
	[40.7, 50.3]	[14.7, 22.2]	[16.0, 23.9]	[-0.8, 3.5]	[4.7, 10.4]	[-0.9, 3.1]	[-0.1, 4.6]	[1.4, 6.2]
35–54								
Male	72.4	8.9	9.6	2.1	2.9	2.1	1.0	1.0
	[70, 74.8]	[7.2, 10.6]	[7.7, 11.4]	[0.7, 3.4]	[1.8, 4.0]	[0.5, 3.8]	[0.0, 2.0]	[0.2, 1.9]
Female	70.5	12.3	9.0	1.6	4.4	0.2	1.0	0.9
	[67.8, 73.2]	[10.2, 14.5]	[6.9, 11.0]	[0.2, 3.1]	[3, 5.8]	[-0.6, 1.1]	[-0.3, 2.3]	[0, 1.8]
≥55								
Male	76.7	8.2	6.2	3.5	3.0	1.4	0.3	0.7
	[74.4, 79]	[6.4, 9.9]	[4.4, 8.1]	[1.9, 5.2]	[1.8, 4.2]	[-0.9, 3.6]	[-0.5, 1.2]	[-0.1, 1.6]
Female	77.3	8.6	3.8	1.7	8.0	0.0	0.2	0.4
	[74, 80.6]	[6.1, 11.1]	[1.5, 6.0]	[-0.3, 3.7]	[5.5, 10.6]	[-0.4, 0.4]	[-0.8, 1.2]	[-0.7, 1.5]
Total	63.1	13.2	12.4	2.4	3.9	1.4	1.6	2.0
	[61.9, 64.2]	[12.3, 14.1]	[11.5, 13.4]	[1.7, 3.0]	[3.3, 4.5]	[0.7, 2.2]	[1.0, 2.3]	[1.5, 2.5]

TABLE 1. Percentage of all units consumed at each location by each demographic group (n = 1,773)

*Note:* Data are % [95% confidence interval].

	% of respondents who drink at	No. of occasions	No. of drinks per				
Variable	this location	per month <sup>a</sup>	occasion <sup>a</sup>	Not risky, %	LTR only, %	STR only, %	LTR & STR, %
Own home	90.1 [87.8, 92.0]	9.7 [9.1, 10.4]	5.3 [4.9, 5.7]	63.0 [60.6, 65.3]	76.2 [72.7, 79.8]	40.6 [37.7, 43.5]	63.5
Other home	77.3	2.1	5.8	13.4	10.1	23.4	[61.8, 65.2] 12.6
Pubs	[74.2, 80.2] 60.6	[1.9, 2.3] 2.3	[5.4, 6.1] 5.7	[11.6, 15.3] 8.3	[7.3, 13] 5.3	[20.9, 25.9] 19.2	[11.3, 13.9] 13.1
Clubs	[57.1, 63.9] 25.5	[2.0, 2.5] 1.7	[5.3, 6.1] 3.7	[6.6, 10.1] 2.9	[2.8, 7.8] 1.6	[16.7, 21.6] 2.3	[11.8, 14.5] 2.4
	[22.7, 28.5]	[1.5, 1.9]	[3.3, 4.1]	[1.3, 4.6]	[-0.1, 3.3]	[0.7, 3.9]	[1.5, 3.3]
Restaurant	61.4 [57.9, 64.7]	1.4 [1.3, 1.6]	3.0 [2.9, 3.2]	8.8 [7.1, 10.5]	4.6 [2.5, 6.6]	6.8 [5.0, 8.6]	3.0 [2.2, 3.7]
Work	11.7 [9.8, 14.1]	3.1 [2.3, 3.9]	2.9 [2.5, 3.3]	1.5 [-0.6, 3.7]	1.0 [-1.2, 3.1]	1.4 [-0.6, 3.4]	1.5 [0.5, 2.4]
Public	19.1	1.1	5.3	0.7	0.3	2.0	1.9
Events	[16.7, 21.8] 34.8 [31.7, 38.0]	[0.8, 1.3] 0.6 [0.5, 0.6]	[4.6, 5.9] 6.8 [6.2, 7.4]	[-0.4, 1.9] 1.3 [0.2, 2.3]	[-0.7, 1.3] 0.9 [-0.4, 2.2]	[0.4, 3.6] 4.4 [2.8, 6.0]	[1.0, 2.7] 2.0 [1.4, 2.7]

TABLE 2. Descriptive statistics for usual drinking occasion at each location for drinkers (N = 1,789)

*Notes:* Data in brackets are 95% confidence intervals. No. = number; LTR = long-term risk (average of two or more Australian standard drinks per day); STR = short-term risk (occasions where five or more drinks are consumed at least monthly). "Among those respondents who had at least one occasion at this location.

Age, in years	Own home	Other home	Pubs	Clubs	Restaurant	Work	Public	Events
16–24								
Male	83.0	94.6	87.2	34.7	52.0	12.9	32.0	63.3
	[73.4, 89.7]	[87.3, 97.8]	[76.9, 93.3]	[25.5, 45.1]	[41.6, 62.2]	[6.7, 23.2]	[23.5, 42]	[53.0, 72.5]
Female	70.7	82.6	62.1	17.8	42.1	2.6	24.3	48.8
	[57.2, 81.4]	[70, 90.6]	[47.8, 74.6]	[10.1, 29.4]	[30, 55.2]	[1.0, 7.0]	[14.7, 37.5]	[36, 61.8]
25–34								
Male	87.0	84.9	77.7	26.0	60.6	28.3	23.2	50.2
	[76.3, 93.3]	[75.7, 91.1]	[66.2, 86.2]	[18.0, 36.0]	[48.9, 71.2]	[19.3, 39.6]	[16.6, 31.4]	[39.3, 61.1]
Female	88.4	88.0	83.2	18.4	80.9	20.0	30.7	51.4
	[75.8, 94.9]	[76.3, 94.4]	[70.8, 91]	[11.7, 27.8]	[71.6, 87.8]	[12.0, 31.4]	[20.1, 43.9]	[38.2, 64.5]
35–54								
Male	94.4	74.7	68.4	25.1	63.0	19.4	25.3	29.6
	[89.6, 97.1]	[66.6, 81.4]	[60.8, 75.2]	[19.7, 31.4]	[55.3, 70.1]	[14.0, 26.3]	[18.9, 32.9]	[23.4, 36.6]
Female	93.9	76.5	57.9	21.9	63.5	8.3	15.2	27.2
	[88.4, 96.9]	[67.6, 83.5]	[48.7, 66.5]	[15.5, 30.0]	[54.3, 71.8]	[4.8, 14.2]	[10.1, 22.2]	[20.4, 35.2]
≥55								
Male	95.3	65.9	39.8	35.2	55.1	5.7	11.4	24.9
	[90.9, 97.6]	[57.7, 73.2]	[32.6, 47.5]	[28.1, 43.1]	[47.3, 62.7]	[3.4, 9.5]	[7.4, 17]	[19.3, 31.5]
Female	91.5	69.9	36.7	21.4	69.8	1.2	6.0	17.4
	[84.6, 95.5]	[60.8, 77.6]	[28.3, 46]	[15.0, 29.8]	[60.9, 77.4]	[0.3, 4.7]	[3.4, 10.4]	[11.7, 25.2]
Total	90.2	77.3	60.7	25.6	61.3	11.7	19.2	34.8
	[87.9, 92.1]	[74.1, 80.2]	[57.2, 64.1]	[22.8, 28.5]	[57.8, 64.7]	[9.7, 14]	[16.7, 21.9]	[31.6, 38]

TABLE 3. Percentage of respondents who reported any consumption in the past 6 months at each location, by demographic groups (n = 1,773)

Note: Data are % [95% confidence interval].

Age, in years	Own home	Other home	Pubs	Clubs	Restaurant	Work	Public	Events
16–24							$\mathbf{O}$	
Male	6.2	2.6	2.9	1.6	1.3	3.8	1.3	0.8
	[4.7, 7.6]	[2.1, 3.0]	[2.4, 3.4]	[1.0, 2.2]	[1.0, 1.7]	[1.0, 6.6]	[0.6, 2.0]	[0.6, 1.1]
Female	4.2	1.5	2.1	0.7	1.2	2.1	0.6	0.5
	[2.6, 5.8]	[1.1, 2.0]	[1.4, 2.7]	[0.3, 1.2]	[0.8, 1.6]	[1.5, 2.8]	[0.3, 0.9]	[0.4, 0.6]
25–34								
Male	8.5	2.7	2.6	1.8	1.7	3.1	2.6	0.6
	[6.8, 10.2]	[1.8, 3.5]	[2.0, 3.3]	[1.1, 2.5]	[1.3, 2.1]	[2.1, 4.2]	[1.2, 3.9]	[0.4, 0.8]
Female	5.9	2.2	2.0	1.1	1.5	1.1	0.5	0.6
	[4.5, 7.3]	[1.2, 3.1]	[1.5, 2.5]	[0.5, 1.7]	[1.1, 2]	[0.6, 1.6]	[0.3, 0.8]	[0.4, 0.7]
35–54								
Male	10.7	1.6	2.2	1.6	1.2	5.2	1.0	0.5
	[9.2, 12.2]	[1.2, 2.0]	[1.6, 2.8]	[1.1, 2.0]	[1.0, 1.4]	[3.0, 7.4]	[0.5, 1.5]	[0.4, 0.7]
Female	8.7	1.9	1.6	1.2	1.4	0.8	0.7	0.5
	[7.0, 10.4]	[1.4, 2.3]	[0.8, 2.5]	[0.8, 1.6]	[1.1, 1.7]	[0.5, 1.0]	[0.4, 1.0]	[0.3, 0.6]
≥55								
Male	14.0	2.6	3.3	2.8	1.4	3.9	0.8	0.7
	[12.3, 5.7]	[1.9, 3.2]	[2.4, 4.3]	[2.2, 3.4]	[1.1, 1.7]	[0.7, 7.1]	[0.4, 1.2]	[0.4, 0.9]
Female	12.0	1.8	1.4	1.1	1.8		0.5	0.3
	[9.8, 14.1]	[1.3, 2.2]	[1.0, 1.8]	[0.6, 1.6]	[1.2, 2.4]	a	[0.3, 0.7]	[0.2, 0.4]
Total	9.7	2.1	2.3	1.7	1.4	3.1	1.1	0.6
	[9.1, 10.4]	[1.9, 2.3]	[2.0, 2.5]	[1.5, 1.9]	[1.3, 1.6]	[2.3, 3.9]	[0.8, 1.3]	[0.5, 0.6]

TABLE 4. Mean number of monthly occasions per location by demographic group (n = 1,773)

*Notes:* Each figure is the mean number of drinks consumed among those who reported any consumption in that location. Data in brackets are 95% confidence intervals.  $a_n < 5$ .

Age, in years	Own home	Other home	Pubs	Clubs	Restaurant	Work	Public	Events
16–24								
Male	6.7	9.9	8.5	7.0	3.7	2.7	8.0	8.9
	[5.5, 7.8]	[8.2, 11.5]	[7.2, 9.9]	[5.1, 8.8]	[3.0, 4.5]	[1.5, 4.0]	[5.9, 10.2]	[7.3, 10.4]
Female	6.7	6.6	8.4	2.6	2.3	2.3	5.6	7.7
	[3.9, 9.4]	[5.5, 7.8]	[4.9, 11.8]	[0.8, 4.3]	[1.8, 2.8]	[1.6, 3.0]	[2.8, 8.3]	[5.2, 10.1]
25–34								
Male	6.4	7.9	8.0	5.3	3.3	3.2	6.7	9.3
	[5.3, 7.4]	[6.8, 9.0]	[6.7, 9.3]	[3.8, 6.8]	[2.9, 3.7]	[2.3, 4.2]	[5.2, 8.1]	[7.4, 11.2]
Female	6.3	5.7	5.8	3.8	3.0	2.5	5.2	6.6
	[4.5, 8.1]	[4.4, 7.0]	[4.7, 6.8]	[2.5, 5.2]	[2.5, 3.5]	[1.6, 3.5]	[3.4, 7.1]	[4.8, 8.5]
35–54								
Male	6.2	5.7	5.6	4.1	3.4	2.8	4.3	7.4
	[5.1, 7.3]	[5.0, 6.5]	[4.8, 6.4]	[3.3, 5.0]	[2.9, 4.0]	[2.3, 3.4]	[3.4, 5.1]	[6.3, 8.5]
Female	4.4	4.4	3.9	2.9	2.8	2.8	5.0	5.3
	[3.8, 5.0]	[3.7, 5.1]	[3.3, 4.6]	[1.9, 3.8]	[2.5, 3.2]	[2.3, 3.4]	[2.5, 7.5]	[3.5, 7.1]
≥55								
Male	4.8	4.6	3.4	2.8	3.0	3.7	3.0	3.7
	[4.2, 5.3]	[4.0, 5.2]	[2.8, 4.1]	[2.4, 3.2]	[2.7, 3.3]	[1.8, 5.5]	[2.3, 3.7]	[2.9, 4.5]
Female	3.3	3.3	2.7	2.2	2.5	а	2.9	3.1
	[2.7, 3.9]	[2.9, 3.7]	[2.3, 3.2]	[1.8, 2.6]	[2.3, 2.8]		[2.2, 3.5]	[2.5, 3.7]
Total	5.3	5.8	5.7	3.7	3.0	2.9	5.3	6.8
	[4.9, 5.7]	[5.4, 6.1]	[5.3, 6.1]	[3.3, 4.1]	[2.9, 3.2]	[2.5, 3.3]	[4.6, 6.0]	[6.2, 7.4]

TABLE 5. Mean number of Australian Standard Drinks per occasion, per location by demographic groups (n = 1,773)

*Notes:* Each figure is the mean number of drinks consumed among those who reported any consumption in that location. Data in brackets are 95% confidence intervals.  ${}^{a}n < 5$ .

20