

National survey data can be used to measure trends in population alcohol consumption in Australia

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Debate about Australian alcohol consumption trends has highlighted the limitations of data sources that traditionally underestimate more objective measures of consumption derived from data on alcohol sales.^{1,2} Estimated per capita consumption data produced by the Australian Bureau of Statistics (ABS) provide reliable measures of over-arching trends,³ especially since they were corrected for the changing alcohol content of wine.⁴ Nevertheless, survey data are needed to understand the drivers of overall trends, across sub-populations based on demography or drinking patterns. It is important to ascertain whether the survey under-estimation of per capita consumption is consistent to validate the use of surveys for assessing trends in the population.

In general, there is mixed evidence as to the validity of surveys to accurately capture shifts in per capita alcohol consumption. For example, recent analyses of the National Alcohol Survey in the US found a 25% increase in alcohol consumption between 2000 and 2010, which contrasts with stable estimates from more objective measures.⁵ A long-term analysis of Finnish survey data between 1968 and 2008 found that survey estimates broadly captured per capita trends, but that there was substantial variation in coverage rates (38%–56%).⁶ Similarly, a comparison of UK and Scottish surveys with estimated sales data suggested only moderate concordance between survey trends and sales trends.⁷

In this paper, we examine how appropriate key Australian survey data are for measuring trends over time in alcohol consumption by comparing trends derived from five waves of

Abstract

Objectives: To assess the accuracy of the National Drug Strategy Household Survey (NDSHS) at capturing trends in alcohol consumption at the population level, using apparent per capita alcohol consumption as a benchmark.

Methods: Data was from five waves of the NDSHS (2001–2013), with estimates of per capita alcohol consumption derived from the detailed graduated frequency alcohol questions. Trends are compared with per capita measures, and trends in both series compared. Further analyses explore whether recent trends in consumption are consistent across age groups.

Results: The NDSHS survey estimates still track apparent consumption well, which increases between 2001 and 2007 and then declines to 2013. Since 2007, survey estimates show a 10.5% decline in per capita alcohol consumption, compared with 8.9% in ABS data. Two-thirds of the decline came from reductions in drinking among respondents under 30.

Conclusions: NDSHS data provide reasonably accurate estimates of trends in Australian population alcohol consumption. Survey data are critical to understanding the composition of overarching trends, with these analyses demonstrating substantial variation by age.

Implications: Survey data are a crucial tool in monitoring Australian alcohol consumption, despite their inherent limitations.

Key words: alcohol, trends, surveys

the National Drug Strategy Household Survey (spanning 13 years) against trends from the ABS data on per capita consumption of pure alcohol. We demonstrate the need for survey data when considering population trends in behaviour, by demonstrating markedly different trends across different age groups.

Methods

The benchmark data on alcohol consumption come from the Australian Bureau of Statistics 'Apparent Consumption of Alcohol' series.³ These data are derived from import clearances, excise collection and wine production, plus survey-based estimates of cider consumption and home production

of beer and wine, and represent the most reliable measure of alcohol consumption in Australia. Estimates are provided as litres of pure alcohol per person aged 15 or over. The ABS data are estimated based on financial years; an average was taken to provide calendar year estimates to match the survey data (e.g. data for 2001 was taken as the average of 2000/01 and 2001/02).

Survey data were taken from five waves (2001 through 2013) of the National Drug Strategy Household Survey (NDSHS), a tri-annual survey managed by the Australian Institute for Health and Welfare (AIHW). Full details of the survey methods are available in the relevant reports.^{8–12} Importantly, survey response rates have been relatively stable over the study period at around 50% (low

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of 46% in 2004, high of 51% in 2010). All survey data are weighted to adjust for the probability of selection and for differences in demographics between the survey sample and the Australian population.

Data on alcohol consumption came from a series of questions aimed at measuring the frequency of alcohol consumption by respondents at different levels (the graduated-frequency approach).¹³

Respondents were asked how often they drank 20 or more standard drinks in a session, and then how often they drank between 11 and 19 drinks, and so on down to how often they drank 1–2 drinks.

An estimate of total annual consumption volume for each respondent was derived by multiplying the mid-point of each volume category (e.g. for the 11–19 drinks category, a volume of 15 is used) by the mid-point of each frequency category (e.g. for 5–6 days per week, a frequency of $5.5 \times 52 = 286$ is used). Where respondents provided more than 365 drinking occasions, their heaviest 365 were used. The top volume category (20 or more drinks) was coded as 21 drinks. See Greenfield¹³ for a more detailed explanation of this approach. The volume measure was converted from standard drinks (10 g of alcohol) to litres of pure alcohol using the standard conversion.¹⁴

Analyses are largely descriptive, with estimates of average consumption of alcohol per capita derived by year and compared with benchmark ABS data. More detailed analyses examine the trends in consumption by age group and estimate the relative contribution of different age groups to recent changes in overall consumption. Trends in coverage were tested using simple linear regression between year and coverage rate, while a comparison of the ABS and AIHW estimates of per capita consumption was conducted by assessing the correlation of the proportional changes in each series over time. Analyses used Stata 13, using the 'SVY' suite of commands to adjust for the complex survey design.¹⁵

Table 1: Per-capita alcohol consumption, Australia, NDSHS and ABS estimates, 2001–2013.

Year	Survey estimate (95% CI)	ABS estimate	Coverage
2001	5.74 (5.60–5.89)	10.12	56.8%
2004	5.80 (5.67–5.94)	10.41	55.7%
2007	5.79 (5.62–5.96)	10.76	53.9%
2010	5.63 (5.48–5.77)	10.42	54.0%
2013	5.18 (5.04–5.33)	9.80	52.9%

Table 2: Proportional change in estimated per-capita alcohol consumption, National Drug Strategy Household Survey and Australian Bureau of Statistics (ABS) Apparent Consumption.

Period	% change in survey	% change in ABS
2001–2004	+1.05%	+2.87%
2004–2007	-0.17%	+3.36%
2007–2010	-2.76%	-3.16%
2010–2013	-8.00%	-5.95%

Results

Data on estimated per capita consumption from the NDSHS and the ABS Apparent Consumption data are presented in Table 1. A measure of survey coverage (the proportion of per capita consumption data covered by the survey estimates) is also provided.

Survey coverage has declined slightly over time (Coeff=-0.95, $p=0.01$ in a simple regression of coverage against year), suggesting that the NDSHS has become slightly worse at capturing population consumption over time. In spite of this, the actual variation in coverage rates is rather small and the survey trends mirror national estimates quite closely, with consumption increasing between 2001 and 2007 (although the survey is stable between 2004 and 2007) followed by a steady decline to 2013.

It is difficult to conduct statistical tests with just five data points. To assess how well the changes in the survey estimates of consumption tracked changes in the apparent per capita consumption produced

by the ABS, we compared the changes over time (in percentage terms) in each of the two series (Table 2). For example, the estimated volume of pure alcohol per capita from the NDSHS increased by 1.05% between 2001 and 2004, while the ABS apparent consumption estimates increased by 2.87%. The similarity of these changes over time were assessed via a simple Pearson Correlation test, which found that they were highly correlated (0.94, $p=0.06$), suggesting that the two sets of estimates had similar patterns over time.

Finally, Table 3 examines how different age groups have contributed to the trends in alcohol consumption, focusing on the increase between 2001 and 2007 and the decline between 2007 and 2013 separately. Between 2001 and 2007, a sharp decrease in underage drinking was offset by increases in drinking among middle-aged Australians (who drink more and also make up a much larger proportion of the population).

The period of declining consumption was driven predominantly by large declines in drinking by Australians aged under 30, with much more moderate shifts among older Australians. Based on the relative population sizes of the age groups in Table 3, more than two-thirds of the decline in total per capita alcohol consumption in Australia since 2007 has been driven by these declines in drinking by people aged under 30 (~27% of the population).

Discussion

The data presented here demonstrate a clear and declining trend in Australian alcohol consumption evident from 2007, which is consistent across the survey data and apparent consumption data. The survey trends are highly correlated with the more objective apparent consumption measures, with relatively stable levels of coverage. This provides important support to the ongoing use of the NDSHS as a tool to monitor drinking in the population. It is worth noting that, in spite of these trends, rates of alcohol-related harm remain high in Australia and some indicators continue to increase.¹⁶ When survey trends were examined by age, there was strong evidence that much of the recent decline in per capita consumption had been driven by declining drinking by teenagers and young adults. Indeed, the data suggest that teen drinking was declining

Table 3: Volume of alcohol consumed per person, 2007–2013, by age group, NDSHS estimates.

Age group	2001	2004	2007	2010	2013	Trend (01–07)	Trend (07–13)
14–17	3.62	2.81	2.73	1.98	1.50	-24.5%	-45.1%
20–24	8.53	8.72	8.41	7.79	6.19	-1.4%	-26.4%
25–29	6.87	6.81	7.22	6.38	5.78	5.1%	-20.0%
30–39	5.63	6.02	5.95	5.91	5.50	5.7%	-7.7%
40–49	5.67	5.87	6.02	5.91	5.99	6.1%	-0.4%
50–59	5.85	5.61	5.88	5.99	5.52	0.5%	-6.1%
60–69	4.62	5.04	4.76	5.10	5.03	2.9%	5.8%
70+	4.08	3.83	3.82	3.84	3.68	-6.1%	-3.8%

even during the period of increasing alcohol consumption between 2001 and 2007, but that this decline was offset by increasing drinking among older people. This supports a broader international literature that identifies declines in drinking by teenagers starting in the early 2000s,^{17,18} although there has been little previous evidence that this decline has continued into young adulthood.

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