

Alcohol industry and governmental revenue from young Australians

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Abstract

Objective. The aim of the present study was to estimate the revenues collected by government and industry from alcohol consumption by young Australians in 2010.

Methods. Statistical analyses were performed on data from the Australian National Drug Strategy Household Survey 2010 and alcohol data collected from an online retailer to calculate the proportion, frequency, quantity and revenues from alcohol consumption by young Australians.

Results. One-third of adolescents (12–17 years old) and 85% of young adults (18–25 years old) consume alcohol. More than half the adolescents' alcohol consumption is from ready-to-drink spirits. Revenue generated from alcohol consumption by 12–25 year olds is estimated at \$4.8 billion in 2010 (2014 Australian dollars): \$2.8 billion to industry (sales) and \$2.0 billion to government (taxes).

Conclusions. Alcohol consumption by young Australians is prevalent, and young Australian drinkers consume alcohol in substantial amounts. The industry and taxation revenue from young drinkers is also considerable. It would be in the public interest to divert some of this revenue towards health initiatives to reduce drinking by young people, especially given the high societal costs of alcohol consumption.

What is known about the topic? Australian adolescents aged 12–17 years consume substantial amounts of alcohol, and substantial amounts of revenue are generated from alcohol sales to them.

What does this paper add? This paper provides recent estimates of alcohol consumption and revenue generated by Australian adolescents, and extends estimates to young adults aged 18–25 years.

What are the implications for practitioners? A substantial proportion of Australian young people consume alcohol. The sales and taxation revenue generated from young people's drinking is substantial at A\$4.8 billion in 2010 and is higher in real terms than estimates from previous studies. Some of the alcohol taxation revenue could be diverted to health promotion and education for young people, because the costs of alcohol consumption in terms of health outcomes and productivity losses for these age groups are expected to be especially high.

Additional keywords: adolescents, alcohol consumption, policy, taxation, young people.

Received 7 August 2015, accepted 31 October 2015, published online 18 December 2015

Introduction

The consumption of alcohol is commonplace across various countries, cultures and settings.¹ Because of its pervasive reach, a significant amount of research has investigated the consequences of alcohol consumption. There is a substantial literature examining the social and health costs of alcohol. Alcohol is responsible for a large amount of hospitalisations and deaths in Australia: 3.2% of Australia's burden of disease and 4.6% of the global burden of disease.^{2–4}

Alcohol use by young people continues to be an area of particular research interest for several reasons. Alcohol consumption, particularly heavy alcohol consumption, adversely affects brain development in young people.^{5,6} Hence, alcohol consumption may have adverse effects while the brain is

developing into the early to mid-20s.⁶ Large proportions of young people consume alcohol in ways that place themselves and others around them at risk of acute harm because of falls, assaults, road crashes and other injuries.⁷ Therefore, research into the patterns of alcohol consumption, as well as revenue generated, is of interest given the substantial health and social impacts associated with alcohol use by young people.

Substantial proportions of young people consume alcohol.⁸ This extends even to young people who are below the legal alcohol purchase age (18 years) in Australia. For example, Doran *et al.* estimated that approximately 30% of Australian adolescents aged 12–17 years have consumed alcohol.⁹ In addition, substantial revenue is generated from alcohol consumption by young people in Australia in two forms: industry revenue and

taxation. Further, studies by Doran *et al.* suggest that revenue generated by the consumption of alcohol by Australian adolescents increased over the period 2002–05.^{9,10}

The purpose of the present study was to update and extend estimates of alcohol consumption by young people in Australia, as well as the alcohol industry and taxation revenue generated. For the remainder of this paper, the following terms are used to refer to Australians in the various age groups examined: (1) those aged 12–17 years old are termed ‘adolescents’; (2) those aged 18–25 years are termed ‘young adults’; and (3) when referring to the entire sample age groups (12–25 years), the term ‘young people’ is used.

Methods

Some underlying assumptions regarding the alcohol purchasing habits of young people were made because of limitations in the data available for the present study. First, all alcohol was assumed to be accessed from ‘off-trade’ outlets (e.g. bottle shops), which are generally lower priced than ‘on-trade’ premises (e.g. bars and restaurants).¹¹ Sharma *et al.* distinguished between alcohol purchased from ‘off-trade’ and ‘on-trade’ sites;¹² however, this was not possible in the present study because of data limitations. Second, it was assumed that young people purchased in bulk to minimise the cost per unit. This may not hold for all young people who have limited disposable income because bulk purchases, despite having the cheapest unit price, generally cost more in absolute terms. However, to make a meaningful generalisation it was assumed that all young people were able to buy at the cheapest unit price. Third, it was assumed young people do not prefer to purchase premium alcohol products that are more expensive. Evidence for this has been found in the UK.^{13–15} These assumptions are consistent with providing conservative estimates of revenue generated from alcohol consumption. All price and revenue estimates in this paper were adjusted for inflation and are expressed in 2014 Australian dollars.

Number of drinkers

The study sample consisted of 22 814 Australians (including 3601 young people) from the 2010 National Drug Strategy Household Survey (NDSHS). That survey collected information on the attitudes and behaviours towards alcohol consumption of individuals aged 12 years and above, across 26 648 households in Australia.¹⁶ Drinkers in the present study were defined as individuals who stated that: (1) they had consumed alcohol within the 12 months before the survey; and (2) continued to consume alcohol. The prevalence of alcohol consumption by age and gender was then estimated. Two-tailed Chi-squared tests were used to test for significant differences in drinker status across demographic groups, with $P < 0.05$ considered significant.

Quantity consumed and main alcoholic drink

Annual consumption was determined using the graduated frequency (GF) method, based on the reported consumption of various quantities of alcohol in a day, for the past 12 months.¹⁷ Alternative consumption measures include the simpler ‘quantity frequency’ and the ‘yesterday’ methods. The former often fails to capture periods of heavy drinking outside of ‘usual’ routine, whereas the latter is prone to missing infrequent drinkers.^{17,18}

In the GF method, quantity responses were given in decreasing ranges down the page (20+ standard drinks, 11–19 drinks etc.), with frequency responses across the page starting with the most frequent (everyday, 5–6 days a week etc.). The midpoints of ranges were taken, except for the top quantity ‘20+’ where a value of 24.81 standard drinks was assigned based on the equally weighted day-of-the-week mean of ‘yesterday’ responses that were 20 drinks or more ($n = 64$). This allows for an empirically based estimate to what otherwise would be an arbitrary value for the top unbounded category. Midpoints for lower ranges have been shown to have little bias.¹⁹ A recurring issue of the GF method is respondents reporting more than 365 drinking days in a year, which we observed in 30% of our sample. This was adjusted by downward capping; that is, only the first 365 days starting from the highest consumption level were counted.¹⁹ Multiplying these quantity and frequency responses gave the annual standard drink consumption by gender and age, which were then extrapolated to the respective Australian population statistics in 2010.²⁰ The significance of differences in the quantity of drinks consumed by age and gender was tested using two-tailed *t*-tests, with $P < 0.05$ considered significant.

Respondents were asked to identify their main drink from 13 categories. This allows the consumption share of the various beverages by age and gender to be derived.

Price of alcohol in Australia

Price and product data, including alcohol content and container volume, were sourced from the Dan Murphy’s online alcohol retail store (August 2014; <http://danmurphys.com.au/>, accessed 6 August 2014), which provides more comprehensive data across a greater number of products than other online liquor retailers. After removing identical products with different packaging and bundled packs with non-alcoholic items, the initial extracted sample of 8143 products was reduced to 5234 unique alcoholic beverages.

The standard drink

Standard drinks were calculated according to guidelines from the Australian Tax Office.²¹ In Australia, one standard drink is equivalent to 10 g alcohol. This can be calculated using the beverage container volume and alcohol content data from the Dan Murphy’s website (<http://danmurphys.com.au/>, accessed 6 August 2014).

Tax on alcohol in Australia

The Australian Government imposes a two-step tax on alcohol beverages in Australia. First is an alcohol tax, followed by a 10% Goods and Services Tax. Alcohol tax in Australia falls into two broad categories: (1) a volumetric ‘excise duty’ that is based on the volume of alcohol in the beverage; and (2) the value-based *ad valorem* Wine Equalisation Tax. The tax rate that applies depends on the type of alcoholic beverage. Because prices in the present study were taken from June 2014, tax rates as of June 2014 from the Australian Taxation Office were used.²¹ Import duties and excises were not considered in the present study.

Price and tax per standard drink

Because alcoholic beverages are often sold in non-standardised containers (e.g. 750 mL wine bottles, 500 or 375 mL beer cans

etc.), the price and tax of each product were divided by the number of standard drinks the beverage contains to obtain a price and tax per standard drink. This allows for standard units that can be compared across beverages.

Industry and government tax revenue

The price per standard drink is equivalent to the unit total revenue generated, which was distributed to two main parties: (1) government via taxation; and (2) the alcohol industry. Total revenue for each beverage was calculated by multiplying the total number of standard drinks consumed annually (Table 1) with the price per standard drink for each beverage and its share of total consumption for each gender (Table 2). Aggregating these across sex and age groups yields total revenue from alcohol consumption (Table 3). Repeating the calculations with the tax per standard drinks yielded government tax revenue from alcohol consumption by young people (Table 3). The difference between total revenue and government tax revenue was industry revenue (Table 3).

Results

Patterns of alcohol consumption

In 2010, there were approximately 2.7 million young drinkers (aged 12–25 years), of whom approximately 518 000 were adolescent drinkers (Table 1). The prevalence of alcohol consumption increased with age, with much larger proportions (>50%) of those aged 16 and 17 year being drinkers than adolescents aged 12–15 years ($P < 0.01$). Among young adults aged 18–25 years, the prevalence rate was higher again compared

with younger age groups, at approximately 85% ($P < 0.01$). Sixty-three per cent of young people were drinkers compared with 78% across the population ($P < 0.01$). Prevalence rates were similar between males and females ($P = 0.086$).

Table 1 also presents standard drink consumption by age and sex. Young adults consumed more alcohol at around 17 standard drinks per week per drinker compared with 8 standard drinks per week for adolescents ($P < 0.01$). The weekly consumption by young people of 16 drinks was also higher than the 15 standard drinks by the general population ($P < 0.01$). Male young adults consumed more standard drinks per week per drinker than female young adults ($P < 0.01$).

Ready-to-drink (RTD) beverages were the preferred main drink for male (41%) and female (65%) adolescent drinkers (Table 2). Other alcoholic drinks that were mainly consumed were spirits and beer. For young adults, there was a difference in alcoholic beverage preferences. First, although a substantial proportion of young adults indicated RTD beverages were their main drink (17% of male and 31% of female young adults), this was much lower than for their adolescent counterparts. Second, the preference towards beer almost doubled to 44% for young adult males, whereas for young adult females bottled wines more than tripled to 26%. Spirits consumption remained high and consistent at approximately 20%, regardless of age group and sex.

Revenue from alcohol consumption

Price and tax per standard drink are presented in Table 2. Bottled wines, ciders, RTD beverages and spirits were the most expensive per standard drink. However, the taxes per standard drink collected were disproportionate to their prices, a result of the

Table 1. Drinkers and standard drinks, Australia 2010

Note, because the data for those aged 12–15 years are sparse, they have been aggregated into one group. Percentage figures refer to the prevalence rate of alcohol for each age group, and gender

	No. ($\times 10^4$) drinkers			No. standard drinks					
	Male	Female	Total	Male		Female		Total	
				Weekly per drinker	Total annual ($\times 10^6$)	Weekly per drinker	Total annual ($\times 10^6$)	Weekly per drinker	Total annual ($\times 10^6$)
Adolescents (12–17 years)									
12–15	72.5 (12.6%)	95.6 (17.5%)	168.1 (15.0%)	3.1	11.8	5.5	27.5	4.5	39.3
16	79.8 (54.3%)	72.7 (52.3%)	152.5 (53.2%)	12.1	50.0	10.7	40.6	11.4	90.6
17	101.7 (68.8%)	96.1 (68.5%)	197.8 (68.6%)	11.1	58.5	7.9	39.3	9.5	97.8
Total	254.0 (29.2%)	264.4 (32.1%)	518.4 (30.6%)	9.1	120.3	7.8	107.3	8.4	227.6
Young adults (18–25 years)									
18	128.0 (85.0%)	116.4 (81.4%)	244.4 (83.1%)	22.8	151.5	13.5	81.7	18.4	233.2
19	130.2 (83.2%)	125.2 (83.8%)	255.3 (83.5%)	28.6	193.3	9.5	61.9	19.2	255.2
20	144.3 (88.4%)	133.0 (86.1%)	277.3 (87.1%)	16.7	125.5	13.7	94.9	15.3	220.4
21	135.7 (83.2%)	133.1 (86.0%)	268.8 (84.7%)	25.3	178.7	11.0	75.8	18.2	254.6
22	142.8 (87.5%)	132.6 (85.6%)	275.4 (86.5%)	23.4	173.7	11.9	81.8	17.8	255.6
23	138.6 (83.6%)	142.1 (90.4%)	280.7 (87.2%)	24.5	176.4	13.1	96.6	18.7	273.0
24	127.5 (75.6%)	139.0 (87.0%)	266.6 (82.1%)	17.3	115.0	13.6	98.3	15.4	213.3
25	149.8 (88.6%)	126.1 (77.8%)	275.9 (82.2%)	16.4	128.0	12.7	83.2	14.7	211.2
Total	1096.9 (84.4%)	1047.5 (84.8%)	2,144.4 (84.6%)	21.8	1242.2	12.4	674.3	17.2	1916.5
Aggregates									
Young people ^A	1350.9 (62.2%)	1311.9 (63.7%)	2,662.8 (62.9%)	19.4	1362.5	11.5	781.6	15.5	2144.1
Population ^B	7002.6 (80.2%)	6546.9 (75.4%)	13,549.5 (77.8%)	19.1	6953.0	10.3	3521.4	14.9	10 474.4

^A‘Young people’ refers to all those aged 12–25 years.

^B‘Population’ refers to all people aged 12–75 years.

Table 2. Price and tax per standard drink, Australia 2010

RTD, ready-to-drink

Beverage	Price per standard drink (\$A)	Tax per standard drink (\$A)	Main drink (%)	
			Male	Female
Adolescents (12–17 years)				
Low-strength beer	1.83	0.44	4.0	0.4
Mid-strength beer	1.86	0.56	7.5	0.4
Full-strength beer	2.11	0.64	23.1	2.0
Bottled wine ^A	2.39	0.71	2.5	7.1
Cask wine	0.42	0.12	1.0	3.1
Fortified wine	1.81	0.53	0.0	0.0
Cider	2.47	0.92	0.5	0.8
RTD beverages	2.39	1.21	40.7	64.7
Spirits	2.29	1.19	19.6	18.4
Other	2.81	0.95	1.0	3.1
Total			100	100
Young adults (18–25 years)				
Low-strength beer	1.83	0.44	1.1	0.3
Mid-strength beer	1.86	0.56	7.4	1.9
Full-strength beer	2.11	0.64	44.3	8.3
Bottled wine ^A	2.39	0.71	6.4	26.0
Cask wine	0.42	0.12	0.4	1.3
Fortified wine	1.81	0.53	0.2	0.6
Cider	2.47	0.92	1.4	2.1
RTD beverages	2.39	1.21	17.2	30.7
Spirits	2.29	1.19	20.8	26.7
Other	2.81	0.95	0.9	2.1
Total			100	100

^ABottled wine consists of red wine, white wine, champagne and sparkling wine.

different tax rates applicable. RTD beverages were the most expensive and taxed the highest rate on a per standard drink basis.

Table 3 presents disaggregated revenue estimates from alcohol consumption in Australia. Young people generated \$4.8 billion in total revenue in 2010 (note, results are presented in 2014 Australian dollars throughout), comprised of \$2.8 billion (59%) in industry revenue and \$2.0 billion (41%) in government tax revenue. Beers provided the most industry revenue (39% of total industry revenue) whereas RTD beverages generated the most tax revenue (33% of total tax revenue), followed closely by spirits (29% of total tax revenue).

Total revenue from adolescent drinkers was estimated to be \$517 million, comprising \$281 million (55%) in industry revenue and \$235 million (45%) in government tax revenue. On a per drinker basis, each adolescent drinker generated a revenue of \$997 per annum, whereas drinking by young adults generated \$2000 per annum. RTD beverages were the main source of revenue to both industry and government from adolescent drinkers because of their higher tax rate and a strong consumption preference by this age group. For young adults, beer was the largest source of industry revenue (\$1.05 billion) given the large shift in preference towards beer.

Comparisons with the Australian population

Although the focus of the present study was on young people, estimates for the Australian population aged 12–75 years old are

included in Tables 1 and 3. Some useful observations are as follows: the 2.7 million young drinkers made up 20% of all drinkers in Australia and consumed 20% (2.1 billion) of total standard drinks. Tax revenue from young people accounted for 25% of population tax revenue and contributed to 21% of total revenue. Overall, young people generated \$1805 in revenue per drinker per annum compared with \$1663 for the general population.

Discussion

Substantial proportions of adolescents (approximately one-third) and young adults (~85%) are drinkers. The average consumption for young people was approximately 16 standard drinks per week, whereas the Australian National Health and Medical Research Council's recommendation is that young people below 18 years of age should not consume alcohol.²² Furthermore, substantial amounts of industry and governmental revenue were generated from alcohol sales to young people.

There are no reliable, publicly available estimates of government expenditure on measures to address harm from alcohol in Australia, including measures such as prevention strategies, education and treatment services. Expenditure on prevention of alcohol harm in particular is likely to be modest on the basis that it is estimated that only 1.5% of governmental health expenditure goes to public health.²³

Researchers and health groups have suggested that a proportion of alcohol taxation revenue could be hypothecated to prevent and reduce harm from alcohol.^{24,25} Given that surveys have identified high levels of community concern about alcohol use by young people and associated harms, a useful area of investigation may be the potential to hypothecate alcohol taxation revenue generated by young people for the purpose of addressing harm from alcohol among young people.²⁶ For example, a proportion of alcohol taxation revenue could be directed to funding components of a comprehensive strategy to reduce harm from alcohol.²⁷

The substantial industry revenue generated by young people's drinking raises questions about the appropriateness of the alcohol industry profiting from drinking by those under the legal alcohol purchase age. Although alcohol industry groups publicly state their commitment to reducing underage drinking,²⁸ researchers and health experts have expressed concern about the industry's apparent conflicts of interest and questioned the effectiveness of industry-led initiatives that purport to address harm associated with alcohol.²⁹ For example, a study by Pettigrew *et al.* identified that a youth-targeted 'responsible drinking' campaign developed by an alcohol industry social aspects/public relations organisation may be counterproductive.³⁰

Furthermore, previous studies have shown that alcohol consumption is associated with large economic costs. To provide some perspective on the costs of alcohol consumption, Collins and Lapsley estimated alcohol-related social costs in Australia to be in excess of A\$15 billion in 2004–05, with approximately two-thirds and one-third of these costs being attributed to tangible and intangible social costs, respectively.³¹ Manning *et al.* estimated direct costs of alcohol consumption to be approximately A\$14.4 billion in Australia in 2010.³² These costs are substantial. Furthermore, because one of the main drivers of alcohol costs is

Table 3. Industry and government tax revenue, Australia 2010

The 10 drink categories have been condensed to six broad groups. Low-, mid- and full-strength beers have been combined into 'Beers', whereas bottled, cask and fortified wines have been combined into 'Wines'. RTD, ready-to-drink

	Main drink (%)	Revenue in 2010 (A\$ million)			Revenue per drinker in 2010 (A\$)		
		Industry	Tax	Total	Industry	Tax	Total
Adolescents (12–17 years)							
Beer	16.7	63.55	26.93	90.48	122.59	51.95	174.54
Wine	7.3	19.21	8.05	27.27	37.07	15.53	52.60
Cider	0.7	2.25	1.33	3.58	4.34	2.57	6.90
RTD beverages	54.2	140.08	143.23	283.32	270.23	276.31	546.53
Spirits	18.9	47.81	51.48	99.29	92.23	99.30	191.53
Other	2.2	8.48	4.37	12.85	16.37	8.42	24.79
Total	100	281.39	235.39	516.78	542.82	454.07	996.89
Young adults (18–25 years)							
Beer	29.4	1048.61	456.51	1505.12	489.01	212.89	701.89
Wine	18.6	442.82	185.54	628.36	206.50	86.53	293.03
Cider	1.8	47.90	28.34	76.24	22.34	13.21	35.55
RTD beverages	24.7	497.56	508.75	1006.31	232.03	237.25	469.28
Spirits	24.1	483.12	520.13	1003.25	225.30	242.56	467.85
Other	1.5	45.80	23.58	69.38	21.36	10.99	32.35
Total	100	2565.81	1722.85	4288.66	1196.53	803.43	1999.96
Young people (12–25 years)							
Beer	26.9	1112.16	483.43	1595.60	417.67	181.55	599.23
Wine	16.3	462.03	193.59	655.63	173.52	72.70	246.22
Cider	1.5	50.15	29.67	79.82	18.83	11.14	29.98
RTD beverages	30.6	637.64	651.99	1289.63	239.47	244.85	484.32
Spirits	23.0	530.93	571.61	1102.54	199.39	214.67	414.06
Other	1.7	54.29	27.94	82.23	20.39	10.49	30.88
Total	100	2847.20	1958.23	4805.44	1069.27	735.41	1804.68
Population (12–75 years)							
Beer	31.9	5969.54	2506.62	8476.16	440.57	185.00	625.57
Wine	42.5	5402.77	2263.76	7666.53	398.74	167.07	565.82
Cider	0.7	117.23	69.35	186.58	8.65	5.12	13.77
RTD beverages	9.9	1240.98	1268.89	2509.88	91.59	93.65	185.24
Spirits	13.8	1622.65	1746.98	3369.63	119.76	128.93	248.69
Other	1.3	214.48	110.40	324.88	15.83	8.15	23.98
Total	100	14 567.64	7966.00	22 533.65	1075.14	587.92	1663.06

loss of productivity, the adverse per capita lifetime cost of alcohol consumption for young people is expected to be even starker. It would be in the public interest to divert some revenue towards prevention policies in order to encourage less harmful levels of alcohol consumption.

The revenue and quantity estimates in the present study are larger than reported for 2005 by Doran *et al.* even after accounting for inflation.⁹ This is due, in part, to the use of the GF method, which has been shown in other studies to estimate larger quantities of alcohol compared with the weekly recall method used by Doran *et al.*⁹ The choice of the GF method was dictated by the data available from the NDSHS. Nevertheless, both methods have their respective merits.³³ Another potential reason for the higher estimates in the present study is that the sample also includes adolescents who do not attend school, and it is possible that their alcohol consumption may be higher. Larger revenues in the present study could also be the result of higher taxation and excise duties levied on alcohol products, as well as higher retail prices of alcohol beverages, since the study of Doran *et al.*⁹

The limitations of the study are largely associated with the assumptions outlined in the Methods section. First, it was

assumed that drinkers only consumed one type of alcoholic beverage, namely the one they specified as their main drink in the NDSHS. Secondary drink responses are not considered because it was not possible to objectively determine the proportions of the main and secondary drinks consumed on the basis of the available data. Second, the prices from Dan Murphy's are among the cheapest compared with other competitors.³⁴ Therefore, the revenue estimates reported herein are likely to be conservative.

Conclusion

The present study has provided updated estimates of drinking and its associated revenue for Australian adolescents, and extended the estimates to include young adults. The use of actual alcohol prices and product information from the unique dataset collected for the present study provides holistic and accurate price and standard drink estimates for the different alcoholic beverage categories.

A substantial number of young people were drinkers, and the average number of standard drinks consumed by young alcohol

drinkers was high. The revenue estimates from the present study show there is significant revenue from alcohol sales in Australia. Given the high costs of alcohol consumption and the substantial revenue generated from young people, some revenue should be diverted towards education and prevention policies.

Competing interests

The authors acknowledge funding for this research from the McCusker Centre for Action on Alcohol and Youth.

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