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Foreword | *It is well documented that alcohol-related problems compromise individual and social health, and wellbeing. The individual harms are numerous, including premature death, loss of enjoyment and loss of social utility through fear of crime and victimisation. The misuse of alcohol, particularly among those most at risk in our community, presents a major challenge for all levels of government. In this paper, a study is presented that provides a better national-level estimate of the costs of alcohol-related problems in Australia. Despite taking a conservative estimate, the aggregate of a range of societal costs substantially outweighs the tax revenue for the Commonwealth generated from the sale of alcohol. Results of this study provide evidence to policymakers regarding costs to the criminal justice system, costs to the health system, costs resulting from lost productivity and costs related to alcohol-related road accidents. Such evidence will provide an understanding of the economic tradeoffs that are present when making decisions that affect all Australians. Proposals are provided in the conclusion for a greater investment in prevention, based on the sound evaluation of prevention and diversion strategies by comparison with treatment options, in order to ensure better investments for the nation.*

Adam Tomison
Director

The societal costs of alcohol misuse in Australia

Matthew Manning, Christine Smith and Paul Mazerolle

It is well documented that alcohol-related problems compromise individual and social health, and wellbeing (Homel, McIlwain & Carvolth 2004). However, much of the burden of such problems is initially born by first response and public emergency services including police, ambulance and hospital emergency departments (Collins & Lapsley 2002). The individual harms are numerous, including premature death, loss of enjoyment and loss of social utility through fear of crime and victimisation (ADCA 2000). Further, alcohol misuse is a problem for business that suffers due to lost worker productivity and absenteeism (Collins & Lapsley 2002). The misuse of alcohol, particularly among those most at risk in our community, presents a major challenge for all levels of government. How to effectively and efficiently moderate the high costs associated with risky drinking behaviour (eg binge drinking or drinking in high-risk areas such as entertainment districts) by young people has been a recent focus of policymakers. Not all alcohol use represents misuse; rather, misuse comprises use that is above the recommended limits in particular contexts (such as driving or use of equipment), use at levels that leads to health-related problems and use that has reached the level where dependency exists (NHS UK 2013).

Results from a national-level study on the societal costs of alcohol-related problems in Australia are presented. These costs are based on 2010 data supplied from various agencies (eg Australian policing services, Australian Bureau of Statistics) and empirical evidence from peer-reviewed published papers. Incident data, together with estimates of rate of occurrence (eg percentage of all incidents attended by police that were found to be alcohol related) from empirical studies and cost estimates from past literature are used to generate a total cost estimate. All costs are adjusted where necessary to reflect present value in 2010 Australian dollars. The results include costs to the criminal justice system, costs to the health system, costs resulting from lost productivity and costs related to alcohol-related road accidents. They do not include self-reported assessments of costs (cf Laslett et al. 2010) but rather verifiable costs from objective sources. As such, the costs reported here can be regarded as conservative.

Introduction

Alcohol is a psychoactive substance that when consumed in moderation has many benefits; for example, providing the user with feelings of euphoria and relaxation. Alcohol can also act as a social conduit, creating a warm and friendly atmosphere among responsible adult users. However, misuse of alcohol (eg binge drinking; see Courtney & Polich 2009) leads to a range of problems including individual health issues, lower life expectancy, reduced productivity in the workforce and absenteeism, accidents, violence and other alcohol-related offences (eg public nuisance offences), as well as drink driving (Collins & Lapsley 2008).

Assessing the harms associated with alcohol misuse is critical to developing good policy. The social costs of alcohol abuse in Australia (2004–05) were estimated to be in excess of \$15b (Collins & Lapsley 2008), with \$10.8b attributed to tangible costs (eg labour and health costs) and \$4.5b to intangible costs such as loss of life through violence (Collins & Lapsley 2008).

This study updates the Collins and Lapsley estimates to 2010, but also further expands their estimates. In particular, it examines the societal costs of alcohol misuse by disaggregating these into costs to the criminal justice system (eg police, courts and prisons), the health system (eg hospitals and emergency services), worker productivity (eg reduced workforce participation, absenteeism) and other alcohol-related problems (eg alcohol-related road accidents). This disaggregation is useful for guiding discussions on how best to allocate resources to reduce the harms associated with alcohol misuse.

Recent data identifies non-GST Commonwealth revenue from alcohol taxation in 2010 (DSICA 2009) as \$1.473b (customs duty), \$3.298b (excise duty) and \$703m (wine equalisation tax (WET)). A total of \$5.475b was collected. Beer consumption-related tax comprised \$46m (customs) and \$2.043b (excise); consumption of spirits and ready-to-drink alcohol products (RTDs) generated \$1.427b

(customs) and \$1.255b (excise) in tax revenue; while wine and cider consumption brought in \$703m in taxes (WET). An additional \$1.601b was collected from these consumption types in GST revenue from states and territories. This equates to \$7.075b in total tax revenue received by the Commonwealth in 2010. Given the magnitude of this revenue, and available evidence on mitigation expenditure by government, an increased proportion of this revenue could arguably be used to implement strategies aimed at further reducing the social costs associated with alcohol misuse.

Method

A mixed-methods approach (Moolenaar 2009) was used to calculate the total number of incidents and the costs per incident, and hence to derive the total costs to Australian society in 2010 dollars.

In some cases, the only financial information available is total budget or total expenditure. The process began by filtering out expenditure on non crime-related activities. This was done by examining explanatory notes to the budget, reviewing personnel data when available and reviewing international literature on similar organisations. The formula used to calculate the total expenditure for crime-related activities (TC^c) is:

$$TC^c = S^c \times TC$$

where S^c is the share of crime-related activities in the total expenditure. For example, if TC equals \$6m and the estimated spend associated with police time related to the activity was 30 percent, then $TC^c = \$1,800,000.00$.

In some cases (eg courts), it was found that the severity of crime may serve as a weight when identifying costs. For example, cases that are adjudicated in the Magistrates' court (90%) are more expensive than non-adjudicated cases (7%; Hayes & Makkai 2011). As a result, a weighting system for court-related activity by crime was applied using the method developed by Groot et al. (2007). In particular, the cost share (CS_i) for court-related costs is:

$$CS_i = \frac{\sum_j W_{ij} \times V_{ij}}{\sum_i \sum_j W_{ij} \times V_{ij}}$$

Where CS_i is the cost percentage for crime type i , W_{ij} is the weight for crime type i and activity j and V_{ij} is the crime volume of activity j with respect to crime type i . Total cost by TC_i^c crime type for all crime-related activities is then:

$$TC_i^c = CS_i \times TC^c$$

Sensitivity analyses are conducted testing the robustness of these estimates.

Groot et al. (2007) apply the following weights—settlements and dismissals $W_{i,1}=1$, court case single judge involvement $W_{i,2}=2$ and court case multiple judges $W_{i,3}=16.5$. Applying Australian data (ABS 2011a) on the average time difference between a plea of guilt versus going to trial for alcohol-related offences in the High Court, Magistrates' Court and the Children's Court, resulted in the application of a ratio of 1:2.66. That is, on average, going to trial consumes 2.66 times more court resources than a guilty plea.

To illustrate, the ABS (2011a) highlight that of the 603,604 cases that went before the Magistrates' court, 90 percent ($n=545,658$) were adjudicated and seven percent ($n=44,796$) were non-adjudicated. Assuming that 21 percent of those cases were alcohol related, then the weighted total number of alcohol-related offences in the Magistrates' court (applying hypothetical weights) is $545,658 \times 21\% \times 2 + 44,796 \times 21\% \times 1 = 238,583$. The weighted total number of all cases that went through the Magistrates' court is $545,658 \times 2 + 44,796 \times 1 = 1,136,112$. Therefore, the total cost share of alcohol-related offences is $238,583/1,136,112 = 21\%$ (derived from Makkai & Payne 2003). Multiplying 21 percent with total prosecution costs (TC^c) results in an estimate of TC_i^c to be \$378,000.

A bottom-up approach (ie using information on costs per activity per crime type) was also applied to estimate TC_i^c . For example, the number of cases attended by police that were alcohol related was multiplied by the price or marginal cost of the activity and presented as the total cost of that activity. This was then summed across activity types for each crime type

$$TC_i^c = \sum_j P_{ij} \times V_{ij}$$

where P_{ij} is the price or marginal cost of activity j for crime type i . Summing TC_i^c provides an estimate of TC^c .

$$TC_i^c = \sum_i TC_i^c$$

That is, if hypothetically three activities (activity 1, 2 and 3) were associated with crime type i , then price or marginal cost estimates, for example, $P_{i,1}$, $P_{i,2}$ and $P_{i,3}$ are needed for each crime category i . Multiplying the price by the corresponding number of cases in each category produces the total cost by offence TC_i^c . Summing TC_i^c across all activities i produces the total cost for each crime type TC^c .

Please note that although hypothetical weights have been used to illustrate the method used in this section, real weights derived from published data were used when generating the reported results.

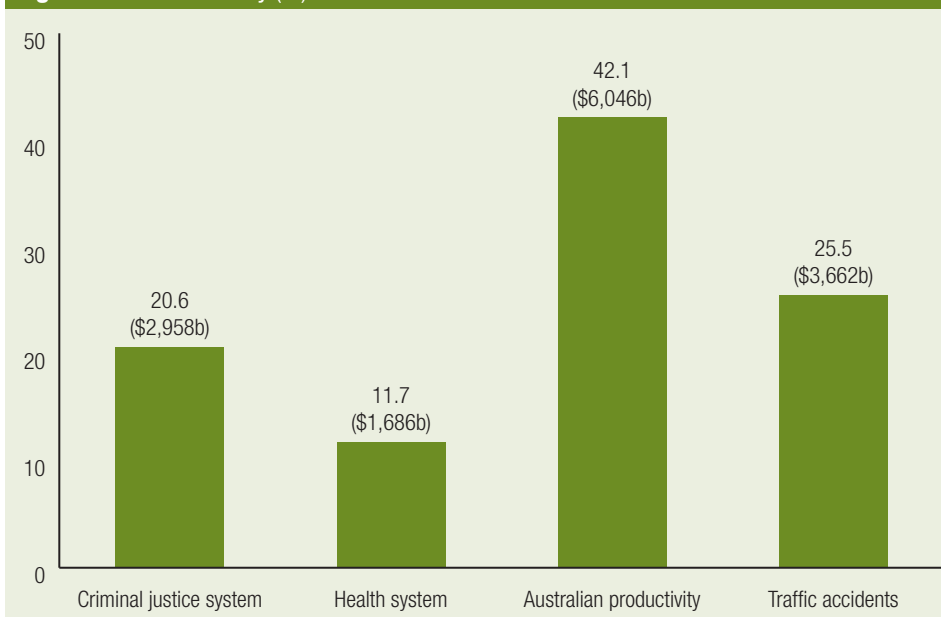
For a number of categories of costs, a price index was used to convert costs available in one year to costs expressed in another year's dollars. Where this was necessary, the relevant GDP price deflator was used, as this is more appropriate in the case of government services (such as police, prisons and hospitals) than for example a consumer price index, which is constructed to highlight how the average household expenditure bundle including food, clothing, rent, petrol etc has changed over time.

Further details on the methodology used in this study can be obtained from the authors upon request.

Results and discussion

The total costs to society of alcohol-related problems in 2010 was estimated to be \$14,352b. Of this, \$2,958b (or 20.6%) represents costs to the criminal justice system, \$1,686b (or 11.7%) comprises costs to the health system, \$6,046b (or 42.1%) involve costs to Australian productivity and \$3,662b (or 25.5%) are costs associated with traffic accidents. This estimate of total costs, however, does not incorporate the negative impacts on others (\$6,807b estimated by Laslett et al. 2010) associated with someone else's drinking. These impacts comprised only

Figure 1 Costs to society (%)



perceived costs and could arguably have included other categories of costs referred to above. Their inclusion would have involved some unknown amount of double counting.

Clearly, productivity losses accounted for the largest proportion of the total cost estimate—with these losses calculated as the sum of reduced workforce and household labour due to premature mortality, reduced household labour due to sickness and reduced workforce participation due to absenteeism (ABS 2010c, 2008, 2001; ACT Health 2010; AIHW 2011, 2010; CER 2010; Collins & Lapsley 2008; Longo & Cooke 2011; Matthews, Barrett & Lloyd 2011; Pidd et al. 2006; Qld Health 2010; Skov et al. 2010; Xiao et al. 2008). Premature mortality-related losses accounted for the majority of these losses (at 90%). The total cost of presenteeism (ie the extent to which poor health reduces a worker's capacity to perform) is estimated to be four times that of absenteeism (AIHW 2011). However, it has not been possible to identify sources from which a reliable estimate of alcohol-attributable presenteeism could be produced and so the total productivity loss estimate is arguably an underestimate.

Traffic accidents involving alcohol incur significant costs, which include human costs (from fatalities as well as serious injuries), vehicle and other property damage-related

costs, as well as other general costs. The estimates of traffic accident-related costs referred to above are primarily derived from updating the Bureau of Infrastructure, Transport and Regional Economics' (2009) data on alcohol-related incidents to 2010 using parameters derived from state-specific reports (Qld TMR 2011; WA RSC 2011; SA RCIU 2011; NT RST 2006; NSW CRS 2010; Vic TAC 2010) and combining this with cost-per-incident data derived from Collins and Lapsley (2008), indexed to 2010 dollars. Human costs (at 57.7%) accounted for the majority of the traffic accident costs associated with alcohol misuse.

Costs to the criminal justice system were incurred by police (38% of total), child protection and support services (8% of total) and prisons (21%), as well as to insurance administration (1%), to courts (3%) and other organisations associated with addressing violence (29% of total).

Costs to police are restricted in this study to the costs of police attending and investigating alcohol-related incidents. Data related to total police incidents per state were identified from various reports (BOCSAR 2010; Victoria Police 2010; QPS 2010; SA Police 2010; Western Australia Police 2010; NT PFES 2010; ACT Policing 2010). Palk, Davey and Freeman (2007) found that alcohol-related incidents comprise 23 percent of all police incidents. This percentage has been applied to the total

number of incidents for 2010 to generate an estimate of total number of alcohol-related police incidents in this time period. The per incident cost estimates included in Collins and Lapsley (2008) were updated to 2010 dollars. These costs represent the largest component of criminal system costs.

Alternative methodologies were considered for estimating per incident costs, including utilising data obtained from the Productivity Commission Annual Report on Government Services. Unfortunately, the data in this report were not disaggregated by type of incident and inconsistencies in the type of aggregate data quoted in these reports over time generated insurmountable difficulties. In addition, when the use of this aggregate data was simulated (rather than the methodology finally selected), it was clear that the estimated costs were lower. Much alcohol-related crime, such as being drunk and disorderly, sees offenders caught in the act rather than as a result of a costly police investigation—such investigation is normally reserved for more serious forms of violent crime.

Costs of child protection and support services comprise the next most significant set of costs to the criminal justice system. Of these, the largest percentage (namely 83.9%) goes to the costs of providing child protection services and out-of-home care services to family members affected by alcohol-related incidents. Child protection

refers to the functions of government that receive and assess allegations of child abuse and neglect, and/or harm to children and young people, provide and refer clients to family support and other relevant services, and intervene to protect children (AIHW 2010). Out of home care services refers to services delivered to children and young people aged 0–17 years who are placed away from their parents or family home for reasons of safety or family crisis (eg abuse, neglect, inability of parent to provide adequate care) (SRGSP 2011: Sections 15.2 and 15.4).

The estimate of the total number of children under both child protection notifications and involved in out of home placements in 2010 were identified from SRGSP (2011) data, while the proportion of these notifications and associated placements that were alcohol related and the cost per notification data are derived from Laslett et al. (2010).

Costs to prisons (a significant component of criminal system costs) are estimated by the addition of three components. The first component relates to the direct cost of incarceration of alcohol-affected offenders in prisons. Total incarcerations by sex of offender were derived from ABS (2010c) data and the proportion of these offenders who were intoxicated at the time of their most serious offence was derived from Makkai and Payne (2003), and Johnson (2004). The average cost per incarceration was

derived from Collins and Lapsley (2008) and updated to 2010 using a relevant Reserve Bank of Australia price index. Once again, alternative methodologies were considered but as stated above, there are problems associated with using sources such as the annual Productivity Commission reports that only provide aggregate cost data rather than the finer grained incarceration data used in this study.

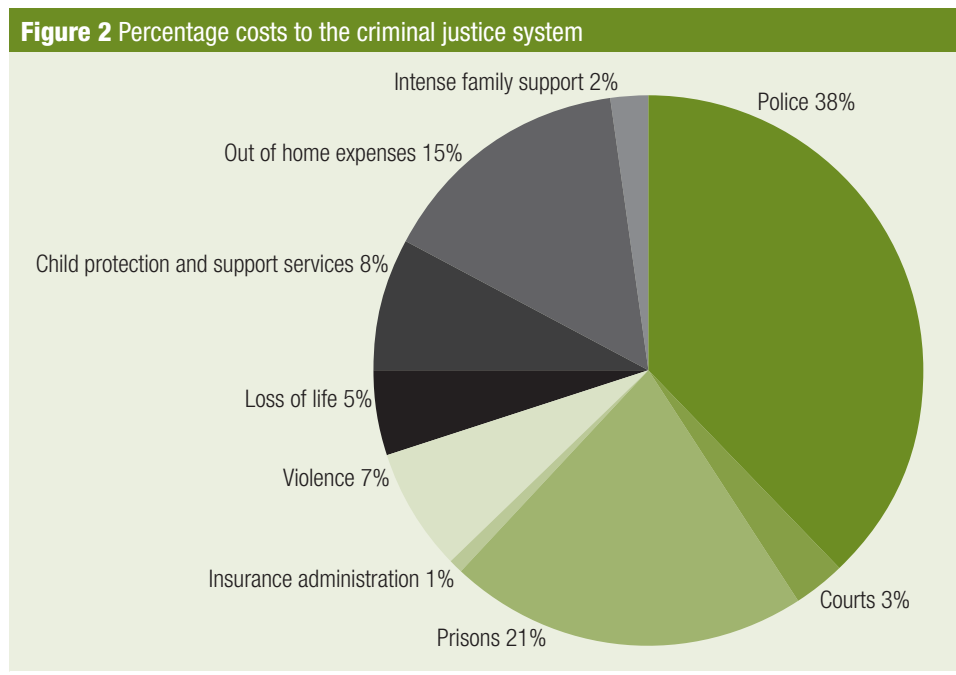
The second component relates to the indirect cost of loss of productivity to society from the incarcerated individual no longer being part of the workforce while in prison. These costs are estimated based on the average productivity loss per incarcerated individual contained in Collins and Lapsley (2008) and updated to 2010 in the same manner as described above.

The final component relates to the cost of detoxification and counselling services accessed by alcohol incident-related offenders while incarcerated. These costs were estimated based on adjusting relevant state-specific data derived from Black, Dolan and Wodak (2004) and updating this on a per incident basis to 2010.

Costs of violence associated with alcohol-related incidents are derived by first estimating the number of surviving victims of such incidents using data from the Australian Institute of Health and Welfare (2011) and per incident costs obtained from Collins and Lapsley (2008)—updated to 2010. The costs of loss of life associated with this category is then added in—with the latter estimates derived from data extracted from Verueda and Payne (2010), ABS (2011c), and Collins and Lapsley (2008).

Other criminal justice system-related costs are comparatively small. For example, the cost to courts are estimated separately for incidents dealt with by children's courts, Magistrates courts and higher courts using data derived from ABS (2010c), Makkai and Payne (2003), Prichard and Payne (2005), Pezzullo et al. (2010), and Collins and Lapsley (2008).

Health system costs, while not as significant as criminal justice system-related costs, were nevertheless substantial. These costs involved hospital costs, nursing home costs,



Note: Percentages do not total 100 due to rounding

pharmaceutical expenses and ambulance costs. These costs are derived by updating estimates derived from Chikritzhs (2009), Collins and Lapsley (2008), Lloyd (2011) and various state government annual reports (NSW Ambulance Service 2010; Ambulance Victoria 2010; Qld DES 2010; Tas DHHS 2010; ACT DJCS 2010; St Johns Ambulance Service NT 2010; St Johns Ambulance Service WA 2010). Costs associated with hospitalisation (at 46.1%) accounted for the majority of the health system costs associated with alcohol misuse.

Further details on the results by crime and activity type can be obtained by the authors upon request.

Moving forward

The results reported above are conservative, as they do not include all of the indirect costs (or externalities) imposed on others by alcohol misuse. In order to include these additional costs, the methodology employed by Lasset et al. (2010) would need to be adapted in order to ensure double counting was minimised and that realistic bounds are placed on the subjective estimates of victims—for example, through the use of modern discrete choice techniques (see Train 2003).

Results from this study's cost model demonstrate that the societal costs of alcohol (eg in this case direct costs) outweigh the revenue generated from alcohol taxation by a ratio of 2:1. That is, the direct societal costs of alcohol, estimated to be approximately \$14,352b (2010 dollars), are more than double that received by the Commonwealth (\$7.075b) in total tax revenue in 2010. This estimate includes costs to the criminal justice system, costs to the health system, costs resulting from lost productivity and costs included with respect to alcohol-related road accidents. As stated above, this estimate does not include the indirect costs such as pain and suffering, which could conceivably more than double this estimate. It is recognised that not all of these costs can be mitigated by government policy. For example, productivity losses associated with premature death are a sizeable

component of the total cost estimates. While governments cannot resurrect those individuals experiencing a premature death as a result of alcohol misuse, they can take action to reduce such premature deaths from occurring in the future.

Rather than relying on charitable organisations (eg Salvation Army, Mission Australia, Lifeline) to deal with a significant proportion of the effects of alcohol misuse, it is proposed that a reasonable proportion of the government revenue generated from alcohol taxation be directed to diversion and prevention strategies. Such strategies might be implemented in partnership with the abovementioned organisations or with similar community groups in order to enhance their cost-effectiveness and uptake. Alternatively, such strategies might be implemented within existing public health agencies following a significant diversion to them of additional budget and resources from this alcohol-related tax revenue.

When patients (or offenders) present at hospitals (or courts) for alcohol-related treatments (or matters), they could be referred on to a government-funded or implemented prevention program as a highly recommended complement to their outpatient follow-up requirements (or release from custodial sentence). Such a policy shift, however, needs to be transparent with a long-term commitment from a government interested in pursuing sustainable change. Further, robust economic analyses focusing on the costs and benefits of prevention compared with diversion and/or treatment are required to demonstrate to policymakers the value of directing resources to early prevention.

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