Australia, the healthiest nation: death, hospital and cost savings of the Preventative Health Taskforce target reductions for alcohol, 2007 to 2020

Tanya Chikritzhs[1], Steve Whetton[2], Mike Daube[3], Richard Pascal[1], Michaela Evans[1]

1. National Drug Research Institute, Curtin University

2. South Australian Centre for Economic Studies, University of Adelaide and Flinders University of South Australia

3. Public Health Advocacy Institute of Western Australia, Curtin University

BRIEF REPORT

Corresponding Author:
Associate Professor Tanya Chikritzhs
National Drug Research Institute
Curtin University
GPO Box U1987
PERTH WA 6845
T.N.Chikritzhs@curtin.edu.au
http://ndri.curtin.edu.au

Abstract

Background
The National Preventative Health Taskforce has set a 30% target reduction in the proportion of risky and high-risk drinkers by 2020. This study estimated the potential saving in deaths, hospitalisations and associated economic cost savings to premature mortality and health of achieving the target.

Method
Past national estimates of alcohol-attributable hospitalisations and deaths were used to forecast trends from 2007 to 2020. Estimated potential savings in deaths and hospitalisations were based on incremental decline in the prevalence of risky/high-risk drinking reaching a total of 30% by 2020 (about 2.3% per year). Associated economic costs of premature death were estimated using the Value of Statistical Life method (willingness to pay). Hospital costs were estimated from known trends in annual national costs for recent past years and taking inflation into account.

Results
A 30% reduction in risky/high-risk drinkers would avoid an estimated 7,200 deaths and some 94,000 person-years-of-life lost due to premature death by 2020. The estimated benefit to the health sector would include 330,000 fewer hospitalisations and 1.5 million associated bed days. The net present value of these benefits is AUD 22.7 billion from deaths avoided and AUD 1.7 billion from fewer hospital separations totalling AUD 24.4 billion.

Conclusion
The potential savings in premature deaths, health and associated financial costs of a 30% reduction in risky and high-risk drinking by 2020 across the Australian population are considerable.

Key Words
Alcohol consumption; Morbidity; Mortality; Costs and cost analysis; Prevention

Background

The National Preventative Health Taskforce (Taskforce) report, released in September 2009, sets out a National Preventative Health Strategy aimed at ensuring that Australia is "the healthiest nation" by 2020. A starting point for the Strategy was to establish ambitious but achievable targets that respond to the need for "urgent, comprehensive and sustained action" (p. viii) in the three priority areas of obesity, tobacco and alcohol [1].

We estimate the potential impact of the Taskforce's 30% target reduction in risky/high-risk drinkers (hereafter referred to as 'Target') on alcohol-

attributable mortality (deaths, person-years-of-life lost) and morbidity (hospital separations, bed days). To achieve the 2020 Target, current prevalence (i.e. 2007) of risky/high-risk drinkers [2] would need to decline from 20.4% to 14.3% for short-term harm and from 10.3% to 7.2% for long-term harm.

Method

Data sources

Population drinking prevalence estimates from the 2007 National Drug Strategy Household Survey (NDSHS) served as the reference point for current alcohol consumption within Australia [3]. National estimates of alcohol-attributable mortality and morbidity were sourced from recent National Alcohol Indicators Project estimates [4].

Population alcohol aetiologic fractions

Estimates of alcohol-attributable mortality and morbidity were made by applying the population aetiologic fraction (PAF) method to unit records of deaths and hospitalisations. This method will be briefly summarised here as it has been described elsewhere in detail [5].

For most chronic diseases, the PAF method combines knowledge of the strength of the causal association between alcohol and disease (i.e. relative risk [RR]), with estimates of drinking prevalence within the population. For injuries, RRs are less widely available and the PAF method typically relies on proportions of alcohol-affected cases estimated from case-series studies. Alcohol-related conditions included the 41 conditions listed in Chikritzhs *et al.* [6] with the addition of type II diabetes, colorectal cancer and foetal alcohol syndrome with RRs sourced from the WHO [7] and Corrao *et al.* [8]. In keeping with current consensus [9] abstainers (self-reported as having never consumed a full serve of alcohol) were used as the reference group. The formula applied to derive alcohol aetiologic fractions was as follows:

$$AAF_i = \frac{p_i (RR_i - 1)}{\sum\limits_{i=0}^{k} p_i (RR_i - 1) + 1}$$

where,

i = the exposure category (e.g. low risk, risky/high-risk); *0* is the baseline category (non-exposed);

AAF$_i$ = population alcohol aetiologic fraction for a particular category of exposure *i*;

P$_i$ = the estimated prevalence of the *i*[th] category of exposure in the total population drawn from the 2007 NDSHS;

RR$_i$ = the Relative Risk, for the *i*[th] category of exposure relative to the reference category.

Valuing alcohol-attributable mortality reductions

Economic costs of premature death were estimated using the Value of a Statistical Life (VSL) method (willingness to pay). The VSL in Australia is estimated to be between 3 and 4 million AUD [10]. To estimate the dollar value accrued to avoided deaths, the mid-point of this range was used (AUD 3.5 million), increasing annually in line with real per capita GDP (2% per annum calculated 'peak-to-peak' over the most recent economic cycle [11]).

Benefits from averted mortality and morbidity were converted to present value terms using a real annual discount rate of 3% [12]. This is because the financial benefit is more valuable if realised today than in the future. The present value of benefits was also calculated using a 7% discount rate (the standard rate used in regulatory impact assessments [13]), to gauge sensitivity of the results.

Estimating the effect of decreased risky/high-risk drinkers

To estimate the impact of the Target, it was necessary to forecast annual alcohol-attributable mortality/morbidity from 2007 to 2020 using known mortality (1996-2006) and morbidity (1993/94-2004/05) trends [4]. Allowing for population growth and changes in age distribution, the average annual change was 1.1% for deaths, 4.1% for hospitalisations and 2.8% for bed days. Linear forecasts to 2020 were based on the assumption that future mortality and morbidity trends would continue current trends.

Estimates of person-years-of-life (PYL) were derived from 2006 mortality data using methods described in Ridolfo and Stevenson [14]. Forecasts to 2020 were based on the assumption that PYL saved (e.g. from apparent cardio-protective effects of moderate drinking) and lost (e.g. injuries, cancers) would remain stable at about 6.6 and 15 respectively. It was conservatively assumed that no increase in life expectancy would occur during the forecast period.

Forecast estimates of alcohol-related morbidity and mortality were subjected to two different drinking prevalence scenarios. Scenario (a) assumed that the prevalence of risky/high-risk drinkers remained constant at 2007 levels from 2007-2020. Scenario (b)

assumed that overall prevalence of risky/high-risk drinkers would decline incrementally by 2.3% per year, reaching 30% in 2020. The potential impact of the Target was measured as the difference between forecast estimates from scenarios (a) and (b).

For scenario (b), it was also assumed that declines in risky/high-risk drinkers would: i) be equally distributed by age and sex; and ii) result from consumption reductions rather than total drinking cessation, moving risky/high-risk drinkers into the low-risk drinking group. That is, as the proportion of risky/high-risk drinkers declines, the proportion of low-risk drinkers increases at an equivalent magnitude, while the proportion of non-drinkers remains unchanged.

The potential impact of the 30% reduction in risky/high-risk drinkers was measured as the difference between the morbidity and mortality estimates generated by scenarios a) and b).

Hospital separation costs

To estimate the potential economic impact of the Target on hospitalisations, separations avoided from 2007 to 2020 were multiplied by forecast estimates of the average national cost per separation. From 2002/03 to 2006/07 the average cost per separation nominally increased by 6% [15]. Conditions related to alcohol consumption have an average cost weight of 1.42, giving an average cost per alcohol-attributable separation of AUD 5,322. The average rate of inflation over this period was 3% [16], therefore, to forecast separation costs to 2020 it was assumed that the cost per separation would increase at a real rate of 3%.
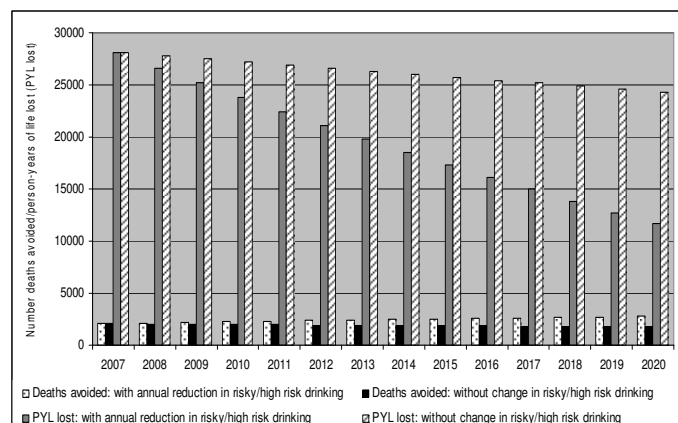
Results

Mortality

Achieving a 30% reduction in risky/high-risk drinkers by 2020 would increase the annual number of net lives saved from premature death attributable to alcohol (i.e. more deaths avoided), thereby accruing an additional 7,286 lives saved by 2020 (see Figure 1). The PYL saved due to avoided deaths would sum to 94,421. The present value of the additional net lives saved by 2020 would sum to AUD 22.69 billion (AUD 15.8 billion using a 7% discount rate).

Figure 1: Estimated annual net number[1] of deaths avoided and person-years of life lost attributable to

---

[1] Estimates include mortality due to all alcohol consumption, i.e. low and risky/high-risk.
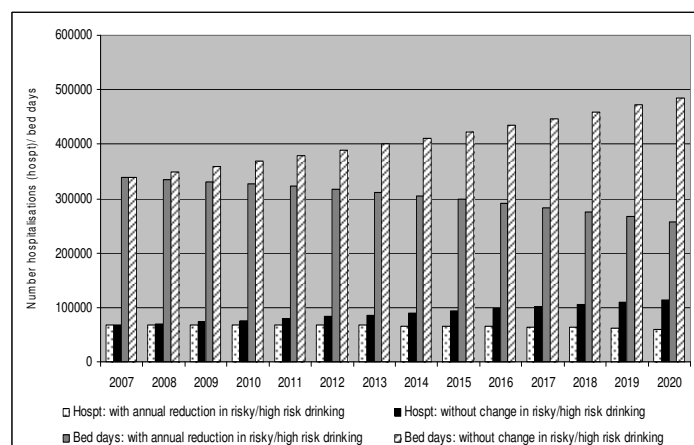
alcohol consumption with regard to annual reduction in risky/high-risk drinking versus no change.

Morbidity

Achieving the Target yields an estimated saving of 327,998 separations and 1,448,649 bed days (see Figure 2) by 2020 with an estimated cost saving of approximately AUD 1.7 billion (AUD 1.2 billion using a 7% discount rate).

Figure 2: Estimated annual net number[2] of hospitalisations and bed days attributable to alcohol consumption with regard to annual reduction in risky/high-risk drinking versus no change.

Discussion

Achieving a 30% reduction in risky/high-risk drinkers by 2020 would increase the proportion of low-risk drinkers. In Australia, the number of lives saved (mostly cardiovascular) from alcohol consumption typically exceeds lives lost, producing a net saving of lives. However, as the number of deaths due to heart disease has fallen, potential savings from

---

[2] Estimates include morbidity due to all alcohol consumption, i.e. low and risky/high-risk.

alcohol's putative cardio-protective effects have also declined leading to a steady decline in the net number of lives saved over time [6]. If, however, a 30% reduction in risky/high-risk drinkers were to be achieved by 2020, thereby increasing the proportion of low-risk drinkers, declining annual numbers of net lives saved would be reversed, producing an estimated 7,286 additional lives saved. Unlike deaths *per se*, Australian PYL lost has always exceeded PYL saved [6] – mostly because PYL lost due to alcohol is particularly influenced by youthful injury deaths (e.g. road crashes) whereas potential lives saved from chronic disease largely occur among older age groups. Nevertheless, over time, the reduction in premature loss of life is substantial, accruing to over AUD 23 billion saved by 2020.

Annual numbers of alcohol-attributable hospitalisations have increased steadily for over a decade [4, 6]. If left unchecked, this annual growth is likely to continue, contributing substantially to the burden on the health care sector. However, alcohol-attributable hospitalisations are potentially avoidable and a 30% reduction in risky/high-risk drinkers would save over 330,000 hospitalisations and 1.5 million bed days by 2020, saving over AUD 1.2 billion.

Thus a total saving of some AUD 24.4 billion (AUD 17 billion at the 7% discount rate) is achievable. This is based on the assumption that life expectancy will remain stable over time. If average life expectancy was to increase however, then PYL saved and associated financial savings would also increase. Policies which achieved the Target (e.g. volumetric tax, reduced trading hours, outlet density, restrictions on alcohol advertising and promotion through sport, labelling) would have a positive benefit cost ratio providing their annual cost was no more than AUD 1.6 billion (the annualised value of the benefits).

These estimates include two major contributors to the economic burden of preventable alcohol-attributable disease and injury, but they do not provide a full account. An estimate of the total potential cost benefits would also require the inclusion of intangible costs of alcohol-attributable ill-health, and a range of other medical and non-medical costs (such as emergency department presentations, nursing homes, road traffic accidents, property damages, policing and courts). The types of costs included here, for instance, comprise only 31 percent of the total social costs of alcohol misuse estimated for 2004/05 [17]. Future estimates might also include cost components associated with harm to others such as victims of violence, child neglect and passengers in road crashes.

Conclusion

Based on current understandings of the relationship between alcohol consumption, injury, disease and death a 30% reduction in risky/high-risk drinkers by 2020 would potentially save Australia some AUD 24.4 billion (AUD 17 billion at the 7% discount rate) in premature loss of life and hospitalisations.

The Taskforce's Target reflected a view that there is "increased community and political concern about the harmful consumption of alcohol…" (p. 238) and an increasingly solid base of evidence upon which policy decisions can be made [1]. Achieving the Target will not be easy, but will bring about substantial health and economic benefits.

References

1. National Preventative Health Taskforce. *Australia: the healthiest country by 2020. A discussion paper*. Canberra: Commonwealth of Australia, 2008. Available at http://www.health.gov.au/internet/preventative health/publishing.nsf/Content/discussion-healthiest (accessed 18 May 2009).
2. National Health and Medical Research Council. *Australian alcohol guidelines: Health risks and benefits*. Canberra: National Health and Medical Research Council, 2001. Available at: http://www.nhmrc.gov.au/_files_nhmrc/file/publications/synopses/ds9.pdf (accessed 18 May 2009).
3. Australian Institute of Health and Welfare (AIHW). *2007 National Drug Strategy Household Survey: detailed findings*. Drug Statistics Series number 22. Cat. no. PHE 107. Canberra: AIHW, 2008. Available at: http://www.aihw.gov.au/publications/index.cfm/title/10674 (accessed 18 May 2009).
4. Pascal R, Chikritzhs T, Jones P. *Trends in estimated alcohol-attributable deaths and hospitalisations in Australia, 1996-2005*. National Alcohol Indicators, Bulletin No.12. Perth: National Drug Research Institute, Curtin University of Technology, 2009. Available at: http://ndri.curtin.edu.au/local/docs/pdf/naip/naip012.pdf (accessed 18 May 2009).
5. World Health Organization (WHO). *International guide for monitoring alcohol consumption and related harm*. WHO/MSD/MSB/00.4. Geneva: Department of Mental Health and Substance Dependence, Noncommunicable Diseases and Mental Health Cluster, World Health Organization, 2000. Available at: http://whqlibdoc.who.int/hq/2000/WHO_MSD_MSB_00.4.pdf (accessed 18 May 2009).

6. Chikritzhs T, Catalano P, Stockwell T, *et al. Australian alcohol indicators, 1990-2001: Patterns of alcohol use and related harms for Australian states and territories*. Perth: National Drug Research Institute, Curtin University of Technology, 2003. Available at: http://ndri.curtin.edu.au/local/docs/pdf/naip/naipaaifullreport.pdf (accessed 18 May 2009).

7. World Health Organization (WHO). *International guide for monitoring alcohol consumption and related harm*. Geneva: Department of Mental Health and Substance Dependence, Noncommunicable Diseases and Mental Health Cluster, World Health Organization, in press.

8. Corrao G, Bagnardi V, Zambon A, Arico S. Exploring the dose-response relationship between alcohol consumption and the risk of several alcohol-related conditions: a meta-analysis. *Addiction* 1999; 94(10):1551-73.

9. Chikritzhs T, Stockwell T, Jonas H, *et al.* Towards a standardised methodology for estimating alcohol-caused death, injury and illness in Australia. *Aust N Z J Public Health* 2002; 26(5):443-50.

10. Abelson P. *Establishing a monetary value for lives saved: Issues and controversies*. Office of Best Practice Regulation: Working papers in cost benefit analysis, WP 2008-02. Canberra: Commonwealth Department of Finance and Deregulation, 2008. Available at: http://www.finance.gov.au/obpr/docs/Working-paper-2-Peter-Abelson.pdf (accessed 18 May 2009).

11. Australian Bureau of Statistics (ABS). *Australian national accounts: National income, expenditure and product*. Catalogue Number 5206.0. Canberra: ABS, 2009.

12. World Health Organization. *Global burden of disease: 2004 update.* Geneva: World Bank, 2008. Available at: http://www.who.int/healthinfo/global_burden_disease/2004_report_update/en/index.html (accessed 18 May 2009).

13. Australian Government. *Best practice regulation handbook*, Canberra: Commonwealth Department of Finance and Deregulation, 2007. Available at: http://www.finance.gov.au/obpr/docs/handbook.pdf (accessed 18 May 2009).

14. Ridolfo B, Stevenson C. *The quantification of drug-caused mortality and morbidity in Australia, 1998*. Drug Statistics Series Number 7. AIHW cat. no. PHE 29. Canberra: Australian Institute of Health and Welfare, 2001. Available at: http://www.aihw.gov.au/publications/index.cfm/title/6461 (accessed 18 May 2009).

15. Commonwealth Department of Health and Ageing (CDHA). *National hospital cost data collection: Cost report round 11 (2006-2007)*. Canberra: CDHA, 2008. Available at: http://www.health.gov.au/internet/main/publishing.nsf/Content/5F8B6BE822DC75B3CA25748300164037/$File/R11CostReport_Final.pdf (accessed 18 May 2009).

16. Australian Bureau of Statistics (ABS). *Consumer price index, Australia*. Catalogue Number 6401.0. Canberra: ABS, 2009.

17. Collins D, Lapsley H. *The costs of tobacco, alcohol and illicit drug abuse to Australian society in 2004/05*. National Drug Strategy Monograph Series No. 64. Canberra: Department of Health and Ageing, Commonwealth of Australia, 2008. Available at: http://www.health.gov.au/internet/drugstrategy/publishing.nsf/Content/34F55AF632F67B70CA2573F60005D42B/$File/mono64.pdf (accessed 18 May 2009).

PEER REVIEW

Not commissioned. Externally peer reviewed.

CONFLICTS OF INTEREST

The authors declare that they have no competing interests.