Marian Shanahan, Chris Doran, Amy Gibson, Jennifer Stafford, & Richard P Mattick

Interventions for Excessive Alcohol Use: Costs and Outcomes of Pharmacotherapies and Other Treatments

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INTERVENTIONS FOR EXCESSIVE ALCOHOL USE: COSTS AND OUTCOMES OF PHARMACOTHERAPIES AND OTHER TREATMENTS

Marian Shanahan, Chris Doran, Amy Gibson, Jenny Stafford and Richard Mattick

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For further information about this publication please contact:

Marian Shanahan
National Drug and Alcohol Research Centre
University of New South Wales
Sydney, NSW 2052

Telephone: +61 (0)2 9385 0333
Facsimile: +61 (0)2 9382 0222
Email: m.shanahan@unsw.edu.au

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ABBREVIATIONS

AA	Alcoholics Anonymous
AGDHA	Australian Government Department of Health and Ageing
AIHW	Australian Institute of Health and Welfare
AU	Original prescription
AUDIT	Alcohol use disorders identification test
AR	Repeat prescription
BEACH	Bettering the Evaluation and Care of Health
BMT	Behavioural marital therapy
CAGE	Cut-down, Annoyed, Guilty, Eye-opener
CBT	Cognitive-behavioural therapy
CIDI	Composite International Diagnostic Interview
DGP	Department of General Practice
DSM-IV	Diagnostic and Statistical Manual of Mental Disorders, Fourth edition.
ECG	Electrocardiogram
GP	General Practitioner
HIC	Health Insurance Commission
LSD	Lysergic acid diethylamide
MAST	Michigan alcoholism screening test
Project MATCH	Matching alcoholism treatments to client heterogeneity project
MBS	Medicare Benefits Schedule
MET	Motivational enhancement therapy
NDARC	National Drug and Alcohol Research Centre
NDSHS	National Drug Strategy Household Survey
NHMRC	National Health and Medical Research Council
NMDS	National Minimum Data Set
NSMHWB	National Survey of Mental Health and Well-Being
NTX	Naltrexone
PBS	Pharmaceutical Benefits Scheme
RCT	Randomised controlled trial
RR	Relative risk
RRMA	Rural and remote metropolitan area
SECCAT	Socioeconomic Costs and Consequences of Alcoholism Treatment
SES	Socioeconomic status
WMD	Weighted mean difference

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EXECUTIVE SUMMARY

Tobacco smoking and alcohol consumption are the two main causes of premature and preventable death and disease in Australia. It has been estimated that in 1998, 185,557 hospital separations were attributable to tobacco and alcohol related illness; 21,084 Australians died as a consequence of tobacco and alcohol related causes; and a total of 205,726 years of life were lost as a result of this premature mortality (Ridolfo and Stevenson 2001). Recent cost estimates suggest that the total costs to society of tobacco and alcohol use are approximately $28,623 million of which around 47% are potentially avoidable (Collins and Lapsley 2002). The Australian Government supports the use of pharmacotherapies to alleviate the burden of harm associated with tobacco smoking and alcohol misuse.

This report documents work conducted over the past two and half years examining the uptake of the pharmacotherapies acamprosate and naltrexone among alcohol dependent population, and the perceptions of the effectiveness and prescribing patterns of these medications by practitioners. While the work examining the uptake and prescribing patterns of the pharmacotherapies was underway, it was realised that the public health impact on excessive use of alcohol was minimal given the low uptake of the pharmacotherapies and the small group for whom these pharmacotherapies were appropriate. Therefore it was decided to broaden the report to include 1) a background on consumption and harms of alcohol in Australia, 2) a general chapter on the economic literature on interventions to decrease the burdens, and 3) an examination of the costs and outcomes of specific treatment for excessive use of alcohol in Australia. This report was prepared alongside a report on smoking cessation.

Each chapter of the report deals with a separate topic, and as such there are key findings for the various chapters. The final chapter of the report brings together the various findings and discusses them in a policy context. Below are the key findings and recommendations from each of the chapters.

Key findings and recommendations

Chapter 2: Economic evidence on interventions to lessen the burden related to excessive alcohol use

Key findings from literature review

- Fiscal policies - an increase in taxes leading to increased prices, may lead to a decrease in alcohol consumption among adolescents and young adults. This may be a very important finding of this research, if the further contention that alcohol abuse in adolescence is a predictor of alcohol abuse in later life (Chaloupka, Grossman et al. 2002) holds true.
- Price changes have a minimal effect on beer consumption.
- Interventions such as drink driving legislation and raising the legal drinking age have been demonstrated to be effective in decreasing harmful behaviours related to excessive consumption of alcohol, but it would appear that there have not been any economic evaluations conducted on these interventions. It is often argued that the cost of many of these strategies is cheap relative to the costs of health consequences. However, these interventions are only effective if they are enforced and enforcement comes at some cost.
- Inpatient detoxification is more expensive than outpatient detoxification but inpatient detoxification appears more cost effective for those with co-morbid conditions, particularly mental health or social problems.

Chapter 3: Use of Acamprosate and Naltrexone among the dependent alcohol using population

Key findings

- Prevalence of acamprosate and naltrexone use was estimated at 3% among all dependent drinkers over 12 months.
- Uptake rate among 18 to 29 age group was 5.7 per 1000 dependent drinkers which is the age where the rate alcohol dependence is the highest; uptake rate for those aged 50-59 was 102 per 1000 dependent drinkers, and those in the 60+ and 40-49 age categories had similar uptake rates of 59.3 and 54.6 per 1000 dependent
- The uptake of repeat prescriptions (second month) was found to be 38% for naltrexone and 34% for acamprosate which means that no more that 35% of the persons who start a pharmacotherapy obtain a repeat script for the second month. This suggests that no more than 5,800 people are using these medications in a manner consistent with recommendations.

Recommendation/ questions:

- Determine the appropriate use of acamprosate and naltrexone; who would benefit most; should they be used in younger populations? If these pharmacotherapies are to be used more broadly, more information on their effective use and cost effectiveness should be ascertained.

Chapter 4

Key findings

- 96% of psychiatrists and 97% of gastroenterologists, but only 63% of the responding general practitioners self report that they consistently sought information regarding patients' drinking behaviour.
- 20% general practitioners report using a screening instrument in assessing drinking status; 32% report having had training in providing advice to those with alcohol dependence.
- 75% of the overall sample rated counselling by a GP as their preferred treatment strategy for alcohol dependence.
- Multi-variate analysis of practitioners' survey data indicated that female doctors and older doctors stated they were less likely to prescribe pharmacotherapies while those with mental health training were more likely.
- Multi-variate analysis indicated that those who stated they had received training in the provision of advice to patients with alcohol dependence were 1.5 times more likely to prescribe pharmacotherapies.

Recommendations / Questions

- Clarify the definition of a comprehensive treatment program, verify its uptake and impact on treatment outcomes.
- Expand training opportunities for GPs in the provision of advice to patients with drug and alcohol dependence.

Chapter 5

- When only direct costs of payment to general practitioners were considered, it was estimated that it costs an average of $231 to achieve modification of one patient's drinking behaviour (accounting for all those screened but not given an intervention, and when the intervention was unsuccessful).
- Using an incremental cost effectiveness ratio to explore the marginal effect it was estimated at that if intervention rates were increased by 5% it would cost an additional $49 per additional person to successfully modify drinking behaviour.

Chapter 6

- Lack of consistent outcome measures across studies made full cost effectiveness analysis impossible.
- Costs were estimated based on treatment guidelines, supplemented by data from literature.
- Brief advice, either in single or multiple sessions, resulted in a 21 to 38% decrease in alcohol consumption from baseline for drinkers classified as risky. For those classified as dependent, or sought treatment for excessive alcohol use, self directed interventions decreased alcohol consumption by 44% (range 23-59%), CBT by

49% (45-57%), CBT with cue exposure 62% (range 48-88%); and Naltrexone 3-6 month outcomes 90% (range 83-97%).

- Using the outcome measure 'percentage days abstinent', motivational enhancement treatment achieved 78% (74 to 82%) days abstinent; CBT 75% (33 to 84%) CBT with cue exposure 48% (32 to 78%), naltrexone 3 to 6 months 90% (79 to 98%) and acamprosate for 3 to 6 months 41% (24 to 49%).
- Costs per intervention provided ranged from $24 for single brief intervention, $47 for multiple brief interventions, $25 for self guided, $171 for motivational enhancement intervention, $428 for CBT, $343 for CBT with cue exposure, six months of naltrexone was $1,294 and six months of acamprosate $1,327.
- The cost per 1% change in mean alcohol consumption for this group of risky drinkers is estimated at $1.14 and $1.24 for single and multi brief interventions respectively.
- In the interventions with abstinence outcomes, the costs per 1% gain in abstinent days are the lowest in the psychosocial interventions, particularly MET ($2.19/1% change in abstinent days). CBT ($5.71/1% change in abstinent days) appears to achieve a given outcome for less expenditure than CBT with cue exposure interventions ($7.15/1% change in abstinent days), and the pharmacotherapies cost more per 1% change than the psychotherapies.
- When the outcome "change in alcohol consumption" is used, CBT with cue exposure ($5.53/1% change in alcohol consumption) appears to be more cost effective than CBT alone ($8.73/1% change in alcohol consumption). This is most likely related to the fact that the results for CBT alone have been influenced by the good outcomes of Project MATCH. Naltrexone pharmacotherapy appears to be the least cost effective ($14.38/1% change in alcohol consumption) and self guided interventions are the most cost effective ($0.57/1% change in alcohol consumption) for this outcome measure.

Recommendations / Questions

- Explore internet provision of self directed interventions
- Cost effectiveness study of acamprosate and naltrexone
- Consider a payment schedule for trained drug and alcohol counsellors
- Individual assessments of drinking status required but:
    - Promote self directed interventions as a first line approach followed by psychotherapies
    - Relapse prevention – psychotherapies and then pharmacotherapies
    - Ongoing uptake of pharmacotherapies need to be encouraged
    - Ongoing assessment as to who would benefit from inpatient or day hospital detoxification

CHAPTER 1: INTRODUCTION

Shanahan, M.

1.1 The aims and structure of this report

Tobacco smoking and alcohol consumption are the two main causes of premature and preventable death and disease in Australia. It has been estimated that in 1998, 185,557 hospital separations were attributable to tobacco and alcohol related illness; 21,084 Australians died as a consequence of tobacco and alcohol related causes; and a total of 205,726 years of life were lost as a result of this premature mortality (Ridolfo and Stevenson 2001). Recent cost estimates suggest that the total social costs of tobacco and alcohol use are approximately $28,623 million of which around 47% are potentially avoidable (Collins and Lapsley 2002). The Australian Government supports the use of pharmacotherapies to alleviate the burden of harm associated with tobacco smoking and alcohol misuse.

This document is in part, a report on the work conducted over the past two and half years examining the uptake of the pharmacotherapies acamprosate and naltrexone among the alcohol dependent population, and the perceptions of the effectiveness and prescribing patterns of these medications by practitioners. While the work examining the uptake and prescribing patterns of the pharmacotherapies was underway, it was realised that the public health impact on excessive use of alcohol was minimal given the low uptake of the pharmacotherapies and the small group for whom these pharmacotherapies were appropriate. Therefore it was decided to broaden the report to include a background on consumption and harms of alcohol in Australia, a general chapter on the economic literature on interventions to decrease the burdens, and an examination of the costs and outcomes of specific treatment for excessive use of alcohol in Australia. This report was prepared alongside a report on smoking cessation.

Chapter 1 provides the background on the consumption patterns of alcohol in Australia describing differences by age and gender, and presents data on the mortality and morbidity caused by alcohol as well as other burdens attributed to the excessive use of alcohol. The chapter concludes with some data on the utilisation of treatment for excessive use of

alcohol. Chapter 2 discusses a range of other interventions that are commonly used to decrease alcohol consumption, and presents the available economic evidence on the efficiency of these interventions which include disparate activities such as changing prices of alcohol, school based prevention programs and increasing the age of legal consumption of alcohol.

Chapter 3 explores the uptake of pharmacotherapies (acamprosate and naltrexone) using data from the Health Insurance Commission. The addition of data from the 1997 National Survey of Mental Health and Well- Being (NSMHWB) allows the estimation of the prevalence of use among dependent drinkers.

The National Drug and Alcohol Research Centre (NDARC) in partnership with the Department of General Practice (DGP) at the University of Adelaide surveyed general practitioners, psychiatrists and gastroenterologists to assess their management of patients with alcohol dependence. In particular, NDARC was interested in the use of pharmacotherapies such as naltrexone (Revia ®) and acamprosate (Campral ®) to manage patients. As the Australian Pharmaceutical Benefits Schedule (PBS) guidelines require a comprehensive treatment program to accompany these pharmacotherapies, information on additional treatments provided was also obtained. These results are presented in Chapter 4.

The potential costs and outcome of introducing strategies to increase detection of and intervention with alcohol misuse by general practitioners (GPs) are presented in Chapter 5, using a scenario analysis to explore a range of options.

The effectiveness of treatment and costs of various treatment options are presented in Chapter 6. Chapter 7 is a summary of the findings, including policy recommendations.

1.2 Background

1.2.1 Alcohol consumption

Although a great deal of work has been conducted in relation to the classification of drug and alcohol problems, there is no single set of accepted definitions that are sufficiently descriptive of the range of problems that exist and the level of dependence present (Mattick and Jarvis 1993). One set of definitions by the National Health and Medical Research Council include low risk, risky and high risk drinking in the short and long term (National Health and Medical Research Council 2001). Alcohol abuse and dependence are defined below, and refer to a pattern of substance use that causes clinically significant distress or impairment (Degenhardt, Hall et al. 2000). Levels of drinking are defined as follows:

Table 1.1: Alcohol consumption for risk of harm in the short term

Gender	Low risk (standard drinks)	Risky (standard drinks)	High risk (standard drinks)
Males	Up to 6 on any one day, no more than 3 days per week	7 to 10 on any one day	11 or more on any one day
Females	Up to 4 on any one day, no more than 3 days a week	5 to 6 on any one day	7 or more on any one day

Source: 2001 NHMRC guidelines (National Health and Medical Research Council 2001)

Table 1.2: Alcohol consumption for risk of harm in the long term

Gender	Low risk (standard drinks)	Risky (standard drinks)	High risk (standard drinks)
Males	Up to 4 per day Up to 28 per week	5 to 6 per day 29 to 42 per week	7 or more per day 43 or more per week
Females	Up to 2 per day Up to 14 per week	3 to 4 per day 15 to 28 per week	5 or more per day 29 or more per week

Source: 2001 NHMRC guidelines (National Health and Medical Research Council 2001)

The criteria for alcohol abuse and dependence are set out in the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association 1994). DSM-IV criteria

require a pattern of substance use that is causing clinically significant distress or impairment. This distress or impairment may involve a failure to fulfil role obligations, use in hazardous situations, or legal, social or interpersonal problems (American Psychiatric Association 1994). DSM-IV dependence criteria require a cluster of three or more indicators that a person continues to use the substance despite significant substance related problems (American Psychiatric Association 1994). These include: tolerance to the effects of alcohol or other drugs; a withdrawal syndrome on ceasing or reducing use; substance used in larger amounts or for a longer period than intended; a persistent desire or unsuccessful efforts to reduce or cease use; a disproportionate amount of time spent obtaining the substance, using it and recovering from use; social recreational or occupational activities reduced or given up due to substance use; and use continues despite knowledge of physical or psychological problems induced by substance use.

1.2.2 Patterns of consumption

In the National Drug Strategy Household Survey (NDSHS), 72.7% of all persons aged 14 years and over consumed alcohol in quantities that were considered to be low risk to health in the long term by the NHMRC (Australian Institute of Health & Welfare 2002). It was estimated that 7% of the population consumed alcohol in a manner considered risky and a further 2.9% consumed alcohol in a manner considered to be high risk to health in the long term. Overall, 34.4% of persons aged 14 years and over put themselves at risk of alcohol-related harm in the short term on at least one drinking occasion over a 12 month period. Seven percent of all persons place themselves at risk for health problems (risky and high risk) in the short term at least weekly (Australian Institute of Health & Welfare 2002).

With respect to alcohol use disorders, the 1997 National Survey of Mental Health and Well-Being (NSMHWB) was the first national survey conducted in Australia, which examined the prevalence of alcohol use disorders in the population. The prevalence of DSM-IV alcohol dependence was estimated to be 4.1% and the prevalence of alcohol abuse was estimated to be 1.9% in persons over 18 years of age (Degenhardt, Hall et al. 2000). Rates of alcohol use disorders in the Australian population are similar to rates in the United States (Grant 1997; Kessler, Crum et al. 1997).

Intermittent episodes of at risk consumption are a feature of Australian drinking patterns. With regard to frequency of consumption, 8.3% of 2001 NDSHS respondents drank daily. The figure in 1998 was 8.5%, and in 1995, 11%. For people of all ages, a greater proportion of the population drink at levels considered risky or high risk in the short term compared to the long term.

1.2.2.1 Gender

Clear gender differences in patterns of alcohol consumption exist. Men usually begin drinking at a younger age than women (16 years compared to 18 years)(National Expert Advisory Committee on Alcohol 2001) and widespread problems in the areas of alcohol misuse and violence have been identified as major health policy issues for men (Connell, Schofield et al. 1998). However, female teenagers (14.6%) are more likely than male teenagers (8.8%) to consume alcohol at high risk levels for long term harm (Australian Institute of Health & Welfare 2002). Females are also more vulnerable to both the acute and chronic effects of alcohol misuse than males (National Expert Advisory Committee on Alcohol 2001).

With regard to quantity consumed per drinking occasion, 28% of males and 33% of females drank at hazardous or harmful levels in 1995 (Commonwealth Department of Health and Family Services 1996), defined by the Australian NHMRC as more than four and more than two standard drinks per day respectively, where one standard drink is the equivalent of 10 grams of pure ethanol (National Health and Medical Research Council 1992).

Data from the 2001 NDSHS about proportions of the population classified as abstinent and drinking at levels considered to be low risk, risky and high risk for harm in the long term, by gender, are shown in Table 1.3 (Australian Institute of Health & Welfare 2002). These data indicate that females are more likely than males to be non-drinkers (20.8% compared to 14.1%). Approximately 3.5% males and 2.2% of females were at high risk of harm (Table 1.3). The proportion of the population who place themselves at risk of harm in the short term is displayed in Table 1.4. Figures suggest that overall males are more likely than females to put themselves at risk of harm in the short term.

Table 1.3: Proportion of the population aged 14 years and over at risk of harm in the long term by gender[a]

Gender	Abstinent (%)	Low risk (%)	Risky (%)	High risk (%)
Males	14.1	75.6	6.7	3.5
Females	20.8	69.8	7.2	2.2

a According to 2001 NHMRC guidelines (National Health and Medical Research Council 2001)

Table 1.4: Proportion of the population aged 14 years and over at risk of harm in the short term by gender[a]

Gender	Risky and high risk (%)		
	At least yearly (%)	At least monthly (%)	At least weekly (%)
Males	15.5	15.3	8.5
Females	12.7	11.6	5.3

a According to 2001 NHMRC guidelines (National Health and Medical Research Council 2001)

1.2.2.2 Age

There are differences in levels of alcohol consumption by age. Results from the 2001 NDSHS (presented in Tables 1.5 and 1.6) indicate that the 20 to 29 years age group is the most likely to consume alcohol at levels that place them at risk of harm in both the short and long term (Australian Institute of Health & Welfare 2002). Patterns for risk of harm in the short term are also similar, with the 20 to 29 years age group having the highest proportion of risky level drinkers, with proportions decreasing with increasing age.

Table 1.5: Proportion of the population aged 14 years and over at risk of harm in the long term by age[a]

Age	Abstinent (%)	Low risk (%)	Risky (%)	High risk (%)
14-19	26.2	62.1	8.0	3.7
20-29	9.9	75.4	10.2	4.5
30-39	13.0	78.3	6.3	2.5
40-49	13.9	76.5	7.1	2.6
59-59	17.1	73.3	6.6	2.9
60+	27.1	66.8	4.4	1.6

a According to 2001 NHMRC guidelines (National Health and Medical Research Council 2001)

Table 1.6: Proportion of the population aged 14 years and over at risk of harm in the short term by age[a]

Age	Risky and high risk (%)		
	At least yearly (%)	At least monthly (%)	At least weekly (%)
14-19	13.4	20.5	10.7
20-29	21.1	27.3	12.0
30-39	20.5	16.5	6.3
40-49	16.0	11.1	6.2
59-59	10.2	6.4	5.8
60+	3.7	2.4	2.6

a According to 2001 NHMRC guidelines (National Health and Medical Research Council 2001)

In relation to diagnoses of alcohol abuse and dependence, data from the NSMHWB reveal that there was an age-related pattern of involvement with alcohol. The youngest age group (18 to 24 years) were most likely to meet criteria for alcohol abuse (5.2%) and dependence (9.3%) with prevalence decreasing among older groups.

1.2.3 Burden of harm associated with alcohol use

Skinner (1990) argued that only a small minority of the population who drink alcohol experience severe problems as a result of their alcohol consumption, while the majority experience no problems and the remainder experience, or are at increased risk of experiencing, alcohol-related harm (Skinner 1990). The relationship between consumption and harm varies substantially among age and gender cohorts, since alcohol-related risk status is not necessarily stable over a person's lifetime (eg. young people and males are at greater risk of harm) and would also vary between different defined sub-populations (eg. indigenous groups, those operating machinery, and pregnant women are at greater risk of harm) and between different drinking situations (eg. greater mortality and morbidity associated with drink driving in rural areas). However, the general pattern of the relationship between drinking and alcohol-related harm is likely to be relatively robust.

The evidence suggests that in general, higher levels of alcohol consumption in a population are associated with higher levels of alcohol-related problems. Overall population levels of alcohol consumption have been related to total mortality and to specific causes of death and disease including liver cirrhosis, traffic accidents, suicide and criminal violence.

Between 1992 and 2001, there were 31,333 deaths in Australia attributable to alcohol (Chikritzhs, Catalano et al. 2001). Of these, 53% were classified as from acute causes such as road crashes, other injuries and suicides, with 46% classified as from chronic causes such as alcoholic liver cirrhosis and cancer (Chikritzhs, Catalano et al. 2001). Of the deaths due to acute causes, 75% occur among males with 25% deaths occurring in the age group of 15-29. The net burden of deaths due to chronic causes again is highest among males at 81% with 63% of deaths due to chronic illness, split evenly between the age groups 45 -59 and 60-74 (Chikritzhs, Catalano et al. 2001).

A similar pattern exists among the 391,283 hospitalisations which occurred related to risky and acute drinking over the eight year period of 1993/4 to 2001/01 (Chikritzhs, Catalano et al. 2001). Australian estimates of morbidity are reflected internationally. For example, in the United Kingdom, 20% of male hospital admissions are alcohol-related, while in the United States, an estimated 25% of general hospital admissions are related to alcohol (Makkai 1994; Godfrey 1997).

While drinking associated with high dependence is known to cause harm, there is also evidence that considerable alcohol-related harm emanates from low dependent drinkers. This is referred to as the preventive paradox and is due to the relatively larger numbers of low dependent drinkers compared to highly dependent drinkers (Kreitman 1986; Ryder, Lenton et al. 1988). Reducing harm associated with low-dependent drinking patterns, such as episodes of intoxication, is likely to be at least as important as reducing harm associated with average consumption level (Kreitman 1986; Ryder, Lenton et al. 1988; National Health and Medical Research Council 2001).

Alcohol abuse also has substantial negative consequences for the general community. For example, alcohol abuse has been implicated in a high proportion of violent crime and is also related to child and spouse abuse, homicide, domestic violence, fires, suicide, financial problems and poverty, as well as motor vehicle and industrial accidents, both in Australia and internationally (Makkai 1994; Young 1994; English, Holman et al. 1995; World Health Organisation 1995; Godfrey 1997; Tai, Saunders et al. 1998). Although social morbidity is not well documented and is difficult to estimate reliably (National Health and Medical

Research Council 1992), the seriousness of alcohol-related problems as a public health issue in Australia has been long recognised (Kreitman 1986).

Regular alcohol users, males and younger persons are all more likely to have perpetrated an incident of alcohol-related crime. Eighteen percent of all regular drinkers report drink driving at least once in the previous 12 months, compared to 5% of less frequent drinkers; 14% of males report drink driving, compared to 6% of females; and 17% of 20 to 34 year olds report drink driving, compared to 11% of 35 to 54 year olds and 2% of those aged at least 55 (Commonwealth Department of Health and Family Services 1996). Data from the United States reports an estimated 30% of all arrests are for public drunkenness and approximately 55% of all arrests are alcohol-related (Makkai 1994), while alcohol was implicated in 44% of all traffic fatalities in 1993.

The relationship between alcohol consumption and harms is complex, as unlike other risk factors moderate alcohol consumption is recognised as having some health benefits for some sub-groups. Thus, rather than a linear relationship between consumption and harm, the relationship is referred to as a J–curve, where overall, moderate drinkers have better health outcomes than either non-drinkers or heavy drinkers from about middle-age onwards (Chikritzhs, Catalano et al. 2001; Babor, Ceateoan et al. 2003).

Although the burden of harm is borne heavily by the individual drinker, there are also personal, economic and social costs accruing to others (e.g. family members, employers, and wider society). Most economic research in the area of measuring harms related to alcohol has often focused on those areas where costs and benefits have been easier to quantify, such as on costs and outcomes to the individual (in terms of health consequences), and costs to the wider society in terms of health care costs and crime (Godfrey 1994; Collins and Lapsley 2002). Estimating costs related to the burden of alcohol use is both complex and controversial. For example, the possibility of a beneficial or protective effect from low-risk alcohol consumption implies that there are both benefits and costs associated with this level of drinking (Holman, English et al. 1996). Additional complexities are added by the variety of costs which can be loosely grouped as either tangible or intangible costs. Tangible costs are those that can be valued in the market, such as hospital costs and productivity losses. Intangible costs, such as pain and suffering or

loss of quality of life, are not often quantified or the intangible costs presented are for those related to road accidents only (Collins and Lapsley 2002).

The substantial mortality, morbidity and social consequences related to alcohol abuse are reflected in their resultant economic costs, both in Australia and elsewhere. The cost of alcohol abuse in Australia, England, Wales and the United States is approximately 2 to 5% of each country's Gross National Product in any one year (Godfrey 1997). Collins and Lapsley's (2002) tangible and intangible costs of alcohol abuse in Australia for 1998/99 are shown in Table 1.7.

Table 1.7: Tangible and intangible economic costs of alcohol abuse in Australia 1998-1999

Costs		**1998-99 ($ Million)**
TANGIBLE		
	Labour in the workforce costs	1949.9
	Labour in the household costs	402.6
	Less consumption benefits	(579.3)
	Total health care costs	225.0
	Total road accident costs	1274.4
	Crime costs	1104.6
	Addictive consumption resources	1164.2
	Total tangible costs	5541.3
INTANGIBLE		
	Loss of life	1800.5
	Pain and suffering	218.5
	Total intangible costs	2019.0
TOTAL COSTS		7560.4

Adapted from (Collins and Lapsley 2002)

1.2.4 Treatment for excessive alcohol use in Australia

Individuals receive treatment for excessive alcohol use from a number of providers (doctors, counsellors, specialised drug and alcohol clinics, and acute care hospitals). A single source of data on treatment provision is not available. However, the Australian National Minimum Data Set (NMDS) 2001/02 provides some information as does the National Hospital Cost Data Collection. The NMDS reports 41,866 individuals as having 'closed episodes' of treatment in 2001/02 where alcohol was the principal drug of concern

(Australian Institute of Health & Welfare 2003). A closed episode of treatment is defined as a treatment episode that has a date of commencement and cessation, where there has been no change in the principal drug of concern, treatment setting and main treatment type. If a client receives treatment in multiple settings, separate episodes are recorded. Treatments included are a single brief intervention, a series of counselling sessions, a course of pharmacotherapy, a detoxification episode or a stay in rehabilitation.

Table 1.8: Treatment episodes where alcohol is the principal drug of concern

Age	Males (%)	Females (%)	All (%)
10-19	5.6	5.7	5.6
20-29	21.7	18.1	20.6
30-39	30.1	32.7	30.8
40-49	24.8	27.9	25.7
50-59	12.3	10.6	11.8
60+	4.7	3.5	4.4
Not stated	.09	1.5	1.1
Total episodes	**29,428**	**12,398**	**41,886**

Source: Table 5.1 (Australian Institute of Health & Welfare 2003)

Thirty-one percent of episodes were for individuals aged 30 to 39; 26% aged 40 to 49; and 20% aged 20 to 29 (Table 1.8); but only 5.6% of treatment episodes were received by individuals aged 10 to 19 despite having the second highest risk profile (Tables 1.5 and 1.6).

Data collected for the NMDS where alcohol is the principal drug of concern show that 40% of individuals received counselling, and 25% had some form of withdrawal management (see Table 1.9) (Australian Institute of Health & Welfare 2003). The NMDS includes all publicly funded agencies that provide more specialist alcohol and other drug treatment and may include specialist drug and alcohol units in hospitals if they chose to provide information.

Table 1.9: Treatment episodes where alcohol is the drug of concern by type of treatment

Treatment	Proportion
Withdrawal management	25%
Counselling	40%
Rehabilitation	6%
Pharmacotherapy	1%
Support and case management only	4%
Information and education only	7%
Assessment only	15%
Other	4%
Total	**100%**
Number	**39,077***

Source: Table A3:15 (Australian Institute of Health & Welfare 2003)

* Individuals may be in this data set more than once if they had multiple episodes of treatment in a year.

It is not clear as to the extent to which units in hospitals have been included, leaving some uncertainty around the figures, particularly the proportion of individuals who may have received withdrawal management. Individuals who obtain treatment for excessive use of alcohol from their GPs would also not be included in the NMDS. While outpatient services that are provided in acute care hospitals are included in the NMDS, inpatient services from acute care services are not meant to be included (although there is the possibility that some inpatient services may also be included). Information from the National Hospital Cost Data Collection provides information on inpatient services in three separate Diagnostic Related Groups (Commonwealth Department of Health and Aging 2004). The 2001/02 Data collection includes 13,650 alcohol related inpatient admissions to public hospitals, of which 70% are reported to be for detoxification (note: a few of these cases may be in the NMDS). Additionally, not reported here are admissions to private hospitals, and psychiatric hospitals.

In summary, there is considerable information available about use and misuse of alcohol and the burden of alcohol use in Australia but there remain considerable gaps in the knowledge about how much treatment is being provided. In addition, information on who is provided with what treatment, the quantity each individual receives, the outcomes achieved, and the overall costs of this treatment are largely unknown. The next chapter of

this report provides an overview of various interventions to decrease the burden of harm related to excessive alcohol use.

CHAPTER 2: ECONOMIC EVIDENCE ON INTERVENTIONS TO LESSEN THE BURDEN RELATED TO EXCESSIVE ALCOHOL USE

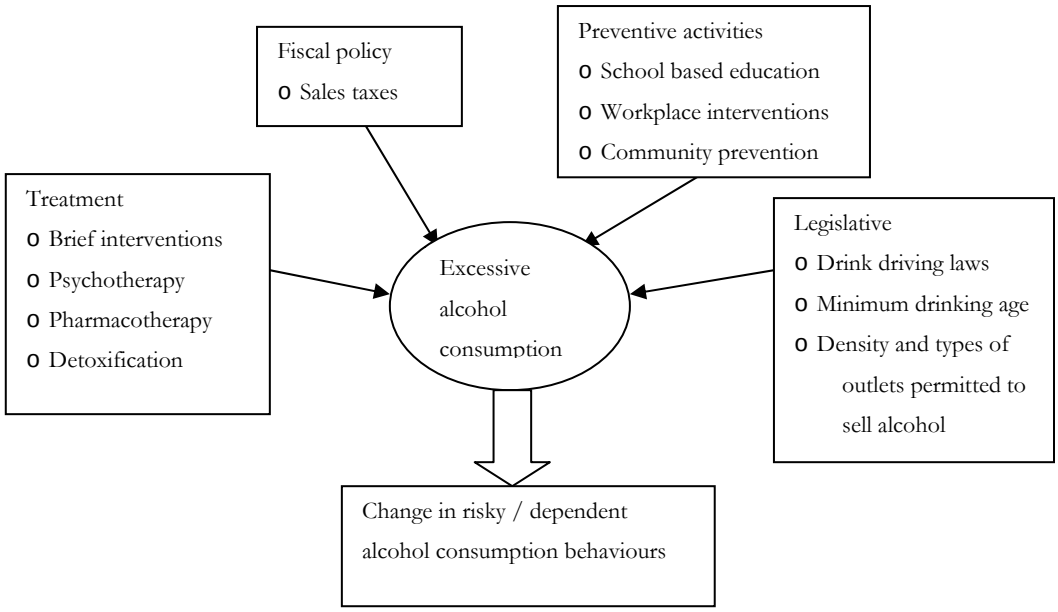
Shanahan, M.

2.1 Introduction

While the primary focus of this report pertains to the use of treatments (including pharmacotherapies, brief interventions and psychotherapies) to modify drinking behaviours in an attempt to minimise the harms of alcohol consumption, it is useful to place treatment in the broader context of other interventions to lessen the harmful impact of alcohol. As this broader context is not the focus of this report, this chapter will rely primarily on reviews of the literature and will concentrate on the economic literature. As the economic literature is very scarce for most types of interventions (as will be discussed below), this chapter has not attempted to include the literature on special interest groups such as Indigenous , non-English speaking, or pregnant women. However, it is recognised that the burden of harm and efficiency gains from treatment for these populations may be significant. For the purpose of this discussion, strategies to minimise societal harms related to alcohol have been loosely categorised as fiscal, preventative, legislative, and treatment. Treatment is further discussed in Chapter 6.

Each of these types of interventions has been used to decrease excessive alcohol consumption, with the intent of decreasing the risky or dependent behaviours caused by the excessive use of alcohol (Figure 2.1). The effectiveness of these interventions is discussed in a number of reviews (Raistrick, Hodgson et al. 1999; Ludbrook, Godfrey et al. 2002; Babor, Ceateoan et al. 2003). While the effectiveness literature is widely reviewed, the economic evidence on many of these interventions appears to be scarce. This chapter reports on economic evidence as it exists and will include evidence on the impact of price changes and the cost effectiveness or cost benefit of a particular intervention.

Figure 2.1: Interventions to reduce on excessive alcohol consumption



Although each of these strategies may reduce harms related to excessive use of alcohol, the efficiency of achieving these reductions is difficult to compare as the research on the effectiveness of the various strategies typically use different outcome measures. Ludbrook et al. (2002) highlight these differences in their Table 2.1 (Ludbrook, Godfrey et al. 2002). Given the differences in outcome measures used, it is not possible to compare the effectiveness and net benefit of the various strategies, but nonetheless it is useful to explore the evidence.

Table 2.1: Overview of measures of effectiveness

Type of intervention	Measure of effectiveness
Policy and legislation	Population based measures of alcohol consumption Proportion of population exceeding recommended limits. Numbers of alcohol related motor accidents.
Enforcement	Reduction in offences such as drink driving and under-age sales of alcohol or their consequences
Prevention	Population or individual measured depending on intervention. Changes in knowledge attitudes and behaviour
Screening and detection	Validity and reliability of screening instrument. Detection rates for different screening strategies
Brief interventions	Individual based measures of level of change in alcohol consumption, proportion of patients reducing alcohol consumption and abstinence rates
Detoxification	Abstinence rates or problem free drinking rates
Relapse prevention	Increase in length of abstinence or reduction in alcohol consumed

Page 12 (Ludbrook, Godfrey et al. 2002)

2.2 Fiscal policy

Fiscal policies, specifically sales and excise taxes, can affect the price of alcohol products. While sales taxes (based on the price of the good purchased) and excise taxes (based on the quantity of alcohol purchased) are revenue generating instruments they have also been used to impact behaviours with the assumption that any increase in the tax would be passed on to the consumer. The assumption is that an increase in taxes leads to an increase in prices, which then reduces the consumption of alcohol.

2.2.1 Price elasticity

The impact of a change in price on demand for a good is measured by its price elasticity. Price elasticity is defined as the percentage change in demand for a good related to a 1% change in its price.

- If the price elasticity is equal to -1 then it is referred to as price elastic which implies that a 1% change in price will produce a 1% reduction in demand (consumption). If the price elasticity is between 0 and -1, the demand for the good is referred to as inelastic where the change in demand is less than the proportional change in price. For example if the price increases by 10%, and the price elasticity is -0.4, the change in demand will be about 4%.
- If the price elasticity is close to 0, then an increase in price will lead to increased revenue – either for the seller (if they raised the price) or to government (a tax increase) with little or no improvement in health or social outcomes.
- Alternatively, if the price elasticity is near or below -1, an increase in price may lower consumption but have a significant impact on sellers'/ producers' incomes.

Leung and Phillips (1993) in Raistrick et al. (1999) conducted an extensive review of the economic literature and concluded that the price elasticity for beer was -0.3, for wine -1 and spirits was -1.5, suggesting that increasing beer prices would have little impact on consumption compared to increasing the prices of wine or spirits (Raistrick, Hodgson et al. 1999). In a subsequent review, Raistrick et al. (1999) found a wide range of elasticities for beer, wine and spirits and although there are a number of methodological explanations for the differences it is still useful to summarise these findings (Raistrick, Hodgson et al. 1999).

In Table 2.2, it is clear that beer consumption is less likely to be impacted by price changes than either wine or spirits (i.e. more studies found beer to have a price elasticity between 0 and -0.5 compared to spirits and wine).

Table 2.2: Summary of data on price elasticity by type of alcohol

Number of results in range of:	Beer	Wine	Spirits
0.00 to -0.25 (little impact on consumption)	8	2	1
-0.26 to 0.50 (moderate impact on consumption)	6	4	4
-0.51 to -0.70 (little impact on consumption)	3	2	7
-0.76 to -1.00 (larger impact on consumption)	2	9	5
< - 1.00 (larger impact on consumption)	1	4	5

Source adapted from (Raistrick, Hodgson et al. 1999)

Many studies do not address whether a change in taxes actually leads to a change in price, or if a price change occurs whether there is a change in consumption among dependent drinkers, or adolescent and young adult drinkers, or whether an increase in price simply leads to those who already drink responsively decreasing their alcohol consumption. Also, some of the analyses are time series which do not adjust for the fact that the population is aging, and is generally more health conscious (US Department of Health and Human Services 2000). It is unclear as to how alcohol consumption in Australia might be affected by price changes given the variation in consumption across different types of alcohol. Data in Table 2.3 illustrates that both the UK, the US and Germany have a higher proportion of alcohol consumption that is beer compared to Australia; whereas Australia has a higher proportion of wine consumption than in all the countries listed, other than France.

Table 2.3: Alcohol consumption in selected countries

Year of Data	Country	Total Litres Per Capita a	Beer	Wine	Spirits
1999	Australia	10.29	50%	33%	17%
1999	Canada	7.58	50%	20%	29%
2000	France	13.31	16%	62%	22%
1999	Germany	12.45	55%	26%	19%
1999	UK	9.73	56%	24%	19%
2000	US	9.08	56%	18%	25%

Source : (World Health Organisation 2004)

Chaloupka et al. (2002) conducted a review of the literature on elasticities. They contend that it is crucial to focus on how price changes impact upon youth and young adults as the incidence of problem drinking and risky behaviour such as drinking and driving is high in this group, and because alcohol abuse in adolescence is a predictor of alcohol abuse in later life (Chaloupka, Grossman et al. 2002). However, studies which concentrate on specific groups often have mixed findings. Raistrick et al. (1999) suggests that early studies indicate that the consumption of beer by youth and young adults is inversely related to price increases. These findings are reinforced by Grossman et al. (1998) in Babor, Ceateoan et al. (2003). A contrary finding suggests that an increase in taxes on beer has an insignificant impact on teen drinking (Dee 1999). Chaloupka and Wechsler (1996) also found that changes in beer prices were not a major determinant of drinking behaviour among male college students and had little impact on female students (Chaloupka and Wechsler 1996).

Ruhm (1996) found that higher beer taxes and older minimum legal drinking age, reinforced by strong enforcement of laws, are associated with lower rates of traffic fatalities (Rhum 1996). Sloan et al. (1995) reports that a 10% price increase would decrease the number of binge drinking episodes by 8%, and other factors such as liability and insurance rules were more effective in decreasing binge drinking than were criminal sanctions (Sloan, Reily et al. 1995). Young and Likens (2000) found in an analysis of data from 48 American States, over nine years, that beer taxes did not have a significant impact on demand (Young and Likens 2000). Young and Likens, while suggesting the difference in results between their work and that of others (Rhum 1996; Chaloupka, Grossman et al. 2002) may be methodological, also think that much could also be done to verify the other links on whether taxes do affect prices, whether prices affect consumption among alcohol abusers, and how alcohol consumption is related to drink-driving behaviour (Young and Likens 2000).

2.2.2 Income elasticity

Another important consideration when examining the impact of price changes on the consumption of alcohol is the *income* elasticity of demand for alcohol products (that is the percentage change in consumption resulting from a 1% change in income). The summary data from Raistrick et al. (1999), presented in Table 2.4, illustrates beer consumption is less likely to vary with changes in income than wine and sprits (Raistrick, Hodgson et al. 1999).

Overall, wine consumption has more often been found to be susceptible to changes in income. This is particularly pertinent given the evidence that the price of alcohol in real terms has declined in the US since the 1950s (Babor, Ceateoan et al. 2003), and declined relative to real income in the UK (Raistrick, Hodgson et al. 1999).

Table 2.4: Summary of income elasticity of alcohol data

Number of results in range of:	Beer	Wine	Spirits
0.00 to 0.50	4	0	1
0.51 to 0.10	9	0	2
1.00 to 1.50	2	6	5
1.51 to 2.00	0	6	5
> 2.00	0	5	4

Source: Raistrick, Hodgson et al. (1999)

In summary, Babor et al. (2003) and Chaloupka et al. (2002) contend that although some studies provide a counter argument, the balance of evidence is that price has an important role in curbing total alcohol consumption, and more importantly, price has an impact on alcohol related problems. This leads them to the conclusion that the evidence is sufficiently strong to suggest that taxation can be used as a method to decrease harmful alcohol consumption (Chaloupka, Grossman et al. 2002; Babor, Ceateoan et al. 2003). A caveat on this conclusion is that the majority of this research is done in the US, and as such may not represent drinking or pricing patterns in Australia. Another important factor, often not considered in this literature, is there has been little work on the informal market (home production, illegal imports and marketing) with respect to alcohol.

2.3 Legislation

In general there are few formal economic evaluations of alcohol policies (Babor, Ceateoan et al. 2003). In a review of the literature, Ludbrook et al. (2002) found no economic evaluations on: the impact of changes in legislation pertaining to drink-driving controls; licensing provisions; or policies on alcohol advertising (Ludbrook, Godfrey et al. 2002). Babor argues that the cost of many of these strategies are cheap relative to the costs of health consequences, suggesting the most obvious case for raising the minimum drinking age for alcohol.

2.3.1 Blood Alcohol Levels for Driving

In the US, the lowering of blood alcohol levels to 0.08 from 0.10 percent reduced alcohol-related fatal crashes, and legislation permitting the automatic licence suspension was associated with reduced crashes and fatalities (Raistrick, Hodgson et al. 1999; Ludbrook, Godfrey et al. 2002). In the Australian context, the introduction of random breath testing in NSW coincided with a 22% reduction in total fatal accidents and a 36% reduction in alcohol related fatalities when compared to the average of the previous six years. This impact has been sustained into the 1990s (Homel 1993).

2.3.2 Minimum Legal Age for Purchasing Alcohol

Another legislative approach is to change the minimum alcohol purchasing age laws. As reported in Babor et al. (2003), raising the minimum age has been shown to lower the number of traffic crashes (O'Malley and Wagenaar, 1991), decrease single vehicle night time crashes involving young drivers by 11% to 16% (Wagenaar, 1981; and other studies) and cause a net decrease of 19% in fatal crashes among young drivers (Voas and Tippetts, 1991; Babor, Ceateoan et al. 2003). Wagenaar and Toomey (2000) in Babor et al. (2003) concluded after an extensive review of the literature that compared to other programs and efforts to reduce drinking among high school and college students, increasing the legal age to 21 was the most effective strategy (Babor, Ceateoan et al. 2003). Changing the minimum drinking age has been shown to have an effect on youth drinking which lasted even past the age of legal consent, which fits the theory that past consumption explains current consumption of alcohol, suggesting that long-run demand for addictive goods is

more responsive to price than is short run demand (US Department of Health and Human Services 2000).

However, when policies such as lowering legal blood alcohol levels and increasing minimum age of purchase are met with resistance, there is an increased burden on enforcement and policy administration. Given the effectiveness of drink driving legislation is dependent on its enforcement (Raistrick, Hodgson et al. 1999; Ludbrook, Godfrey et al. 2002), the economic costs of implementation should be included in comparisons of efficiency of programs.

2.3.3 Outlet density

Babor and colleagues (2003) makes the case that "as availability of a given good declines, its ease of purchase decreases, therefore consumers demand drops" to suggest that where off-premise monopoly systems exist they can limit alcohol consumption. Government monopolies in wholesale and retail off-premise outlets exist in several US states, much of Canada, Nordic countries, Eastern Europe and other parts of the world with "strong evidence that off-premise monopoly systems limit alcohol consumption and alcohol related problems, and that elimination of government off-premise monopolies can increase total alcohol consumption" (Babor, Ceateoan et al. 2003).

Economic theory would suggest that both the supply and demand for alcohol affect consumption and that if supply is restricted, prices should increase and consumption decrease. In a review of the literature Raistrick (1999) reports there is some evidence of a link between number of outlets and alcohol consumption, but that it must be interpreted carefully as some findings suggest that it is the demand for alcohol which affects consumption. Therefore, the number of outlets could itself be viewed as a long-run indicator of demand. Another argument is that the increased density of outlets leads to price competition, causing prices to be lowered, which then leads to increased consumption of alcohol. What is clear, is that the impact of increasing density of outlets is not well researched (Stockwell 1997; Raistrick, Hodgson et al. 1999).

Stockwell (1997) makes the case that scientific research into outlet density and harms related to alcohol consumption is perplexing (Stockwell 1997). Results from research often find that different measures of harm have opposite outcomes (with some improving and others getting worse) when densities of outlets change. However, there are a number of studies which find a positive relationship between increase in outlet density, and increase in road accidents and violent assault (Raistrick, Hodgson et al. 1999). Babor (2003) suggests that while there is some evidence that bunching of outlets may concentrate harms, there is to date no evidence that changes in densities over time affect rates of problem outcomes (Babor, Ceateoan et al. 2003). Most studies on densities of outlets were conducted in Nordic countries, with evidence that a dramatic change in outlets will impact on sales but the marginal changes are less clear if there are already a substantial number of outlets.

2.3.4 Licensing hours

Evidence related to the effect of licensing hours on alcohol consumption and alcohol related problems is also ambiguous, with some evidence that an increase in hours of sales leads to increases in drink driving episodes in Western Australia (Chikritzhs and Stockwell 2002). However other studies in the US, Sweden and the UK found opposite results when hours were shortened (Babor, Ceateoan et al. 2003).

There are limited studies, with mixed results, and little confirmation that the presupposed economic links exist. Babor et al. (2003) argue that while the evidence of the impact of changes in hours of sale is not entirely consistent it does appear that restrictions on hours of alcohol sales and service may have the potential to reduce drinking and alcohol-related problems. There does not appear to be any economic evaluation which documents the implementation costs and cost savings of such programs.

Young and Likens (2000) found that while the price of beer did not have a significant impact; the legal drinking age, seat belt and liquor store liability laws did have a significant impact on decreasing traffic facilities (Young and Likens 2000). Two other US studies explored the economic benefits of a server intervention program and sobriety checkpoint program. While both programs were specific to their location and thus may not be widely

generalisable they were both found to be cost beneficial from a societal perspective (Levy and Miller 1995; Miller, Galbraith et al. 1998).

2.4 Prevention programs

In a review of the literature Ludbrook el al. (2002) report not finding any economic evaluations of school-based programs or community prevention programs (Ludbrook, Godfrey et al. 2002) and no economic evaluations are reported in the Babor et al. (2003) chapter on education and persuasion strategies (Babor, Ceateoan et al. 2003). Ludbrook et al. (2002) do report on two economic evaluations of prevention activities. One is an economic evaluation of standard general practice, which involves assessing only those who are perceived as having high alcohol consumption versus screening all adolescents, and counselling those who classified as high risk. It is reported that the program would prevent one death from an alcohol related incident, and as such is judged to be not cost effective. However, the caveat of this study is that the results of this study are limited as both risky behaviours and motor vehicle statistics were different from other areas (Ludbrook, Godfrey et al. 2002). Another cost effectiveness analysis was an Australian study on the cost effectiveness of thiamine supplementation to prevent alcoholic Wernicke encephalopathy. In this study, the cost of thiamine supplements to either normal strength beer; beer and flask or flagon wines; or all bread were estimated, as were the number of cases of Wernicke encephalopathy averted. The addition of thiamine to beer was in all cases the most cost effective method, with the addition to wine and beer was ranked second, and the addition of thiamine to bread unambiguously the least cost-effective method (at least 28 times more costly than beer) of averting cases of Wernicke's encephalopathy (Connelly and Price 1996). These findings, the authors argue, do not provide any economic justification for the decision to add thiamine to bread as per the Australians Food Standards Code (1990).

School based programs and mass media campaigns have been shown to be effective in increasing knowledge but rather less effective in changing drinking behaviours. Botvin and Griffith (2003) report that early studies did not evaluate the impact on alcohol use (Botvin and Griffin 2003) A meta-analysis reported that information based programs had an impact on drug knowledge but no effect on other outcome measures (Tobler 1986). More recent work showed that using resistance skills training could change smoking, alcohol and marijuana behaviour; a review of studies published from 1980 to 1991 reported a positive effect on drug use behaviour in 63% of studies, a neutral effect in 26% and a negative

impact on behaviour in 11% (Botvin and Griffin 2003). Midford et al. (2002), in their review of school based alcohol education came to a similar conclusion; earlier work was not effective but more recent programs containing specific program elements were more effective in changing alcohol behaviours (Midford, Stockwell et al. 2002).

Mass media campaigns conducted through television and newspapers are most often associated with attempts to increase alcohol-related knowledge so that this may impact on individual decisions pertaining to alcohol consumption. While specific mass media campaigns targeting teenagers or pregnant mothers and dramatic negative-advertising have occasionally had a positive short term impact on alcohol consumption among pregnant women and teenagers (Babor, Ceateoan et al. 2003), for the most part these campaigns are seen to be less effective than the continuous promotion of alcohol seen in the media, as they are not as sophisticated and comprise only a small fraction of advertisements for alcohol. It has been suggested that counter-advertising may be a more realistic political option than seeking a ban on alcohol advertising (Saffer 2002).

Although there is a wide body of evidence around workplace interventions, there is mixed evidence that workplace alcohol prevention strategies deliver benefits in terms of reduced alcohol consumption or lower levels of alcohol-related harm. Allsop et al. (1996) reviewed 190 Australian papers on workplace interventions with the majority (90) being employee assistance programs (Allsop and Phillips 1996). Allsop et al. (1996) concluded that there was no clear evidence to suggest that any of the reviewed interventions minimised or reduced the harms or costs associated with alcohol use in the Australian workplace. The evidence on workplace interventions for alcohol use remains unknown in terms of costs and outcomes in the Australian context (Midford, Stockwell et al. 2002).

2.5 Treatment

Having considered fiscal, prevention and regulatory interventions for decreasing harms related to excessive alcohol use in the previous chapter, we now turn to treatment. In this report, treatment is being defined in a broad sense and includes any interventions provided by health care professionals including doctors, psychologists or nurses. Interventions include screening and brief interventions through to medical detoxification and pharmacotherapies. In their reviews of economic literature, French (2000) and Godfrey (1994) consider the issues and methods employed in assessing the efficiency of various treatments (Godfrey 1994; French 2000). Other reviewers have documented the burden of illness related to excessive alcohol use and provide an indication of that burden's cost to society (Chikritzhs, Catalano et al. 2001; Collins and Lapsley 2002; Babor, Ceateoan et al. 2003). Still others (Shand, Gates et al. 2003) have continued the discussion of the economics of treatment for excessive alcohol use. However, there remain a number of questions which economic analysis can address. In a review of the economic literature on treatment, Godfrey (1994) posed a number of questions which are useful for assessing the evidence in the existing economic literature and they are restated here: Are the economic benefits greater than the economic costs of providing a given treatment? Are treatment costs offset by savings to the health care system? Does the setting of treatment provision matter in terms of costs and effects? Does the treatment type matter in terms of costs and effects (Godfrey 1994)? The existing literature is reviewed in an attempt to answer these questions before a more detailed examination of the costs and outcomes occurs (Chapter 6). Each of these questions is restated below and attempts are made to answer them using existing literature.

2.5.1 Are the economic benefits greater than the economic costs of providing a given treatment?

Godfrey (1994) reports that Cicchinelli et al. (1978) determined that treatment for excessive alcohol use was cost beneficial when productivity gains were included (Godfrey 1994). Rundell et al. (1981) found a benefit-cost ratio of 4.4:1 from the perspective of the US economy when including productivity gains, reductions in car accidents, arrests and criminal justice costs (Godfrey 1994). This means that for every $1.00 spent on treatment

there was a $4.40 return in benefits to society. In a less rigorous study, Lessard et al. (1985) found that 49% of treatment costs were paid back within 6 months when changes in welfare payments, health care costs and criminal activities were considered (Godfrey 1994). Kristenson (1983) found in the Malmo study of treated and untreated heavy drinkers that minimal interventions resulted in an 80% reduction in sick absenteeism from work in the four years following the intervention; 60% reduction in hospital days over 5 years and 50% reduction in all cause mortality over six years (Kristenson, Ohlin et al. 1983).

Summary: Cost benefit studies which include a measure of societal benefits (eg. reduction in crime, court costs, and productivity) have consistently determined that the cost of treatment is worthwhile from a societal perspective in the reduction of the harmful burden of alcohol misuse (Godfrey 1994; Raistrick, Hodgson et al. 1999; Harwood, Malhotra et al. 2002).

2.5.2 Are treatment costs offset by savings to the health care system?

The evidence on whether treatment costs for excessive and dependent alcohol use are offset by savings to the health care system is somewhat mixed. In one review of 12 studies, Jones & Vishci (1979) reported that all studies showed a reduction in health care utilisation. There was a median 40% reduction in use of health services in those who were treated (Jones and Vischi 1979). However, Saxe et al. (1983) very cautiously concluded that there was evidence that the benefits of some forms of treatment exceeded the costs of providing them (Saxe, Dougherty et al. 1983). Holder (1987), after reviewing four newer, more methodologically sound studies, found that there was reasonable evidence for the treatment of excessive alcohol use to potentially offset health services use (Holder 1987).

Holder and Blose (1992), using administrative data, tracked 3,729 individuals who were identified as having chronic drinking problems for fourteen years. Of this group, 82% had received treatment for their alcohol problem and 18% had not. Analysis of costs through this period showed that the health care costs were 24% lower post-treatment than for those who were untreated (Holder and Blose 1992). However, Booth et al. (1997) in a longitudinal study of 85,000 Veterans Affairs patients, whose health services were provided free of charge based on need, had opposite findings. They found that both inpatient and

outpatient visits increased significantly post-treatment and that one of the major cost increases was related to ongoing treatment for substance abuse (Booth, Blow et al. 1997). However, the authors point out the follow-up period of three years is still short term and that much is yet to be learned about long term health services use among this group.

In a study looking at the benefits of brief interventions with general practitioners in the US, Fleming et al. (2002) used a benefit-cost analysis to show that two physician visits, plus two nurse follow-up telephone calls produced a US$43,000 reduction in future health care costs for every $10,000 invested in early intervention (Fleming, Mundt et al. 2002). This finding supported a previous study which found that brief interventions can generate a net benefit for patients, the health care system and society (Fleming, Mundt et al. 2000).

The majority of this research has occurred in the United States where much of the treatment occurs in the inpatient setting, not the usual mode of treatment in Australia. Ludbrook et al. (2002) report that the results for cost-offset studies are influenced by the size of the savings in treatment costs, and so will tend to be much higher in the US than in the UK, as both the volume of service use and the cost per item of service are higher in the US (Ludbrook, Godfrey et al. 2002). This is also likely to be true for Australia.

Much of the US research is also among higher socio-economic groups and the cost-offsets that occur in this group may not occur among lower SES populations with more complex health problems. In the UK, the SECCAT (Socio-economic Costs and Consequences of Alcoholism Treatment) survey was a cross-sectional study examining health services resource use among clients in a clinic (McKenna, Chick et al. 1996). The survey reported poor quality of life amongst the clients, and while treatment may not impact health services use in the short term, there was scope for considerable improvement in the long term that might be seen if the study had a longer follow-up. Firm conclusions on cost-offsets in health services use were not possible since this study was based on retrospective interviews and record review (Raistrick, Hodgson et al. 1999). The study demonstrated the complexities in the patient group and that resource use is related to diagnostic and clinical outcomes (Ludbrook, Godfrey et al. 2002).

Summary: Alcohol treatment appears to produce a cost-offset for the health care system at least in the US where much of this research has been undertaken. Studies suggest that savings can cover the cost of the treatment and generate wider economic benefits for society. However, the impact on long term health care utilisation and differential impacts on lower SES groups remains unknown. Whether these cost savings occur in Australia where less of the expensive inpatient treatment occurs is unclear, however as was discussed in the section above, the benefits relating to decrease in crime and improved productivity are clear.

2.5.3 Does the setting of treatment provision matter in terms of costs and effects?

2.5.3.1 Detoxification – does intensity of service matter?

When considering detoxification, treatment in an inpatient setting is estimated at four to ten times more expensive than treatment in an outpatient setting (Longabaugh, McCrady et al. 1983; Bartu 1989; Hayashida, Alterman et al. 1989; Goodman, Holder et al. 1992; Klijnsma, Cameron et al. 1995; Long, Williams et al. 1998; Pettinati, Meyers et al. 1999). This is also the conclusion reached by French (2000) in his review of the literature (French 2000). Not surprisingly, the longer the stay in an inpatient facility, the more expensive the treatment (Nalpas, Combescure et al. 2003), and treatment received in a day hospital is more expensive than outpatient care (Weisner, Mertens et al. 2000). The findings, that care for dependent drinkers is more expensive when provided in a more intensive setting, hold true even when subsequent care and health service utilization for up to a year are included (McCrady, Longabaugh et al. 1986; Nalpas, Combescure et al. 2003).

While there does not appear to be any debate over the relative costs of inpatient versus outpatient detoxification, the issue as to whether or not there is a difference in outcomes between the more or less resource intensive treatment is still under debate. Earlier studies found that the inpatient care was no more effective than outpatient care (Longabaugh, McCrady et al. 1983, Hayashida, 1989).

A French prospective non-randomised evaluation which compared outcomes and costs for patients receiving care in one of four inpatient detoxification units found that the centre with the highest total cost achieved outcomes 1.56 times better than the center with the

lowest cost (Nalpas, Combescure et al. 2003). Two studies which found no differences in outcomes between outpatient care and day hospital treatment, found when they included a separate study arm which included those clients who self-referred to treatment but refused to participate in the randomised controlled study (RCT), the day hospital group showed better outcomes than the outpatient group (Weisner, Mertens et al. 2000; Hilton, Maisto et al. 2001).

Contrary to earlier findings, some recent studies have demonstrated that at least some clients do better with more intensive inpatient treatment. A US randomised study of 1,073 new entrants to an Health Maintenance Organisation's chemical dependency program found no differences in outcomes between outpatient treatment and day hospital programs (Weisner, Mertens et al. 2000). However, when outcomes were examined by co-morbid psychiatric severity, the mid-level psychiatric level group achieved better alcohol abstinence in the day hospital setting compared to the outpatient setting. The day hospital group also tended to be younger, have more drug problems, and have higher levels of unemployment and family/social severity scores (Weisner, Mertens et al. 2000). A number of studies have concluded that for some populations (those with additional co-morbidities, higher levels of social problems), the additional costs of day hospital may be warranted (Pettinati, Meyers et al. 1999). Goodman et al. (1992), using regression analysis, analysed eight years of US insurance claims for a large manufacturing company and found that once influences such as co-morbidities and severity of alcohol problem were considered, the impact of the costs of the location of care (inpatient or outpatient) was insignificant in the model, reinforcing the more recent study results (Goodman, Holder et al. 1992; Weisner, Mertens et al. 2000; Hilton, Maisto et al. 2001).

Summary: Although inpatient care was more expensive than the outpatient care in all studies reviewed, it appears that for some subgroups of dependent drinkers inpatient care may be the most cost effective option. More work is necessary in selecting the treatment and the group that will most likely benefit from this form of care.

2.5.4 Does treatment type matter in terms of costs and effects?

2.5.4.1 Brief intervention

Brief interventions are thought to be relatively cost-effective, due to fairly high levels of effectiveness and low costs (Ludbrook, Godfrey et al. 2002). Wutzke et al. (2001) compare the impact of introducing screening and brief intervention for excessive alcohol use in the primary care setting to treatment as usual. The marginal costs per additional life saved with brief intervention was found to be AUS $1,873, and the costs associated with screening and providing a brief intervention where appropriate were found to be $19.14 to $21.50 per person screened (Wutzke, Shiell et al. 2001).

Project MATCH, which compared 12-step facilitation, cognitive-behavioural therapy (CBT) and motivational interventions with individuals with varying level of dependence, found that the three approaches did not have significant differences in treatment effectiveness even when the level of dependence was considered. Cisler et al. (1998) report that CBT, which was based on twelve sessions compared to four sessions for motivational enhancement therapy, was more costly (Cisler, Holder et al. 1998), although costs per patient contact hour were more expensive with motivational enhancement therapy. While post-treatment medical care costs are shown to decline more with motivational enhancement therapy, individuals with poor prognostic characteristics have better cost-saving potential with CBT and/or 12-step facilitation (Holder, Cisler et al. 2000).

Humphreys and Moos (1996) compared the treatment costs between dependent drinkers who selected Alcoholics Anonymous (AA) and those who selected professional treatment provided in the outpatient setting. Treatment costs were lower for the AA group with similar outcomes between groups (Humphreys and Moos 1996), although since the subjects selected their own treatment group, some bias may have occurred (US Department of Health and Human Services 2000).

O'Farrell et al. (1996) randomly assigned 36 males recently abstinent from alcohol to either a control group where they received individual counselling; or 10 weekly sessions of behavioural marital therapy (BMT) plus individual counselling; or an interactional couples therapy group plus counselling (O'Farrell, Choquette et al. 1996). While the authors

indicate that the cost benefit of BMT plus counselling was positive as demonstrated by decreases in health care costs and legal costs compared to before treatment (O'Farrell, Choquette et al. 1996), it is pointed out by French (2000) that the incremental differences in outcomes between counselling only and BMT plus counselling are small and that with the additional cost of the latter may not be economically justified (French 2000).

To date, a number of economic evaluations of acamprosate have been conducted. Three which use economic modelling (Schadlich and Brecht 1998; Annemans, Vanoverbeke et al. 2000; Palmer, Neeser et al. 2000) have found adjuvant acamprosate to be cost effective in a real world setting (Schadlich and Brecht 1998); cost effective in the long term when compared to standard counselling post detoxification (Palmer, Neeser et al. 2000); and cost effective when compared to a placebo (Annemans, Vanoverbeke et al. 2000). A cohort study, comparing acamprosate with psychotherapy to psychotherapy only, concluded that when one year of treatment and other health care costs were included the acamprosate group resulted in less expenditure and achieved a better rate of abstinence (Rychlick, Siedentop et al. 2003). In a review article, Foster and McClellan (1999) conclude that the evidence in these papers plus an additional Spanish article, suggest that adjuvant acamprosate has been shown to reduce hospitalisation and rehabilitation costs, and the Spanish study demonstrates there was a wide societal benefit (Foster and McClellan 1999).

Summary: The studies discussed above suggest that the provision of brief interventions by general practitioners appears to be cost effective when compared to usual treatment; CBT appears to be more cost-effective than motivational therapy at least in the short term; behavioural marital therapy over and above CBT is sometimes cost beneficial and acamprosate appears to be cost effective when compared to placebo and to counselling. There appear to be no economic evaluations of naltrexone treatment.

While individually these studies are important, they really do not help the policy maker when it comes to determining which is the most cost effective (or cost beneficial) method for operating a program to deal with excessive alcohol use. Which treatments for excessive alcohol use (be it risky or dependent drinking) are the most cost effective or provide the most benefit for the least cost is a question which Holder et al. (1991) made a first attempt to answer. They reviewed the literature on 33 different treatment modalities for excessive

alcohol use, then combined the data assessing whether there was a positive or negative effect of the treatment. Treatments with only one study were determined to have insufficient evidence. Costs were estimated for various treatments, and then classified as minimal, low, medium-low, and medium high, and high. The authors then categorised each study by its level of effect and cost category (Holder, Longabaugh et al. 1991). Finney et al. (1996) reviewed the work by Holder et al. (1991) and undertook what they refer to as the 2nd approximation of the cost effectiveness of treatment for alcoholism (Finney and Monahan 1996). Finney et al. (1996) did not show a significant relationship between effectiveness and cost (Finney and Monahan 1996).

Both authors acknowledge the need for some summary indication of level of efficiency of treatment modalities while recognising that their studies had many limitations. These studies included treatments which are not likely to be used in Australia currently, or in the future, such as disulfiram, shock therapy and LSD. Other treatments, such as hypnosis, educational films, have been shown by these authors (Holder, Longabaugh et al. 1991; Finney and Monahan 1996) and others not to be effective. Both Finney et al. (1996) and Holder et al. (1991) came to the conclusion that some treatment modalities were effective, including social skills training, community reinforcement approach, behavioural marital therapy and stress management training. Modalities such as residential milieu treatment and general counselling were not shown to be effective. Finney et al. (1996) rated several interventions, including brief motivational interventions, self control training and oral disulfiram as less effective than Holder et al. (1991) (US Department of Health and Human Services 2000).

Ludbrook et al. (2002) in a review of the literature found that in practice there are very few good quality economic evaluations, as many studies have omitted major costs or consequences. The lessons drawn from the data illustrate some of the issues impacting on cost-effectiveness rather than producing any ranking between the different interventions. Nevertheless, this review found evidence to support the cost effectiveness of: brief interventions; home and outpatient detoxification; outpatient treatment for relapse prevention; and the use of acamprosate as an adjunct treatment in relapse prevention (Ludbrook, Godfrey et al. 2002). There is also evidence that treatment is cost beneficial

from a societal perspective, and is also likely to off-set treatment costs at least in the short term.

2.6 Conclusion

When considering the wide range of interventions, the economic literature on prevention programs and the use of regulations to decrease the harms of excessive alcohol consumption appears to be rather absent for the most part. The use of fiscal policy does appear to have some impact on modifying alcohol consumption. However whether it impacts those who most need to reduce consumption is not clear.

Treatment appears to have more to offer, at least by way of economic evidence. Cost benefit studies which include a measure of societal benefits (eg. reductions in crime, court costs, and increased productivity) have consistently determined that the cost of some treatments is worthwhile from a societal perspective in the reduction of the harmful burden of alcohol misuse (Godfrey 1994; Raistrick, Hodgson et al. 1999; Harwood, Malhotra et al. 2002). Alcohol treatment often appears to produce a cost-offset for the health care system, producing savings that cover the cost of the treatment and wider economic benefits for society. However, the impact on long term health care utilisation and differential impacts on lower SES groups remains unknown. An indication of this lack of knowledge is highlighted in a review of evaluations of treatment programs for alcohol misuse among Australian Aboriginals. The authors located only three evaluations of a total of 18 treatment programs, and the findings were inconclusive or suggested only modest gains (Gray D. 2000).

When examining specific types of treatment, inpatient detoxification has been found to be more expensive than outpatient detoxification but it is apparent that at least for some subgroups of dependent drinkers, inpatient care may be the most cost effective option. Other studies suggest that the provision of brief interventions by general practitioners appears to be cost effective when compared to usual treatment; CBT appears to be more cost-effective than motivational therapy at least in the short run; behavioural marital therapy over and above CBT may or may not be cost beneficial and acamprosate appears to be cost effective when compared to placebo and to counselling. Reviews of costs and outcome literature often have differing conclusions. While both Holder et al. (1991) and

Finney et al. (1996) concluded that social skills training, community reinforcement approach, behavioural marital therapy and stress management were effective there was no significant relationship between treatment type and cost effectiveness (Finney and Monahan 1996).

The status of the knowledge appears to be rather inconclusive as to which interventions are most efficient at decreasing the burden related to excessive alcohol use; although as will be discussed in Chapter 6, treatment does work, at least for some.

CHAPTER 3: USE OF ACAMPROSATE AND NALTREXONE AMONG THE DEPENDENT ALCOHOL USING POPULATION

Having examined the burden of excessive use of alcohol we now examine some specific treatment interventions. This chapter on the uptake and costs of two pharmacotherapies (acamprosate and naltrexone) is in two parts. The first is a previously published letter to the Medical Journal of Australia on the costs and uptake of these pharmacotherapies. The second is a further examination of the uptake and prevalence of the pharmacotherapies.

3.1 New pharmacotherapies for alcohol dependence: are they being used and what do they cost?

Doran, C.M., Fawcett, J.E., Shakeshaft, A.P., Shanahan, M. and Mattick, R.P.

An estimated 512,935 Australian adults, or 3.5% of the population aged 18 years and over, satisfy the criteria for alcohol dependence (Hall, Teesson et al. 1999). Pharmacotherapy is comprised of benzodiazepine (e.g., diazepam) for withdrawal and previously disulfiram for relapse prevention (Mattick and Jarvis 1993). Acamprosate and naltrexone have recently become available in Australia for the treatment of alcohol dependence, but little is known about the uptake or costs of these pharmacotherapies.

One indicator of uptake is the proportion of alcohol dependent individuals who fill a script. In 2001, 27,613 scripts for acamprosate and 13,349 for naltrexone were filled in Australia (Commonwealth Department of Human Services and Health 2002). Given a script for either medication lasts one month (Commonwealth Department of Health and Aged Care 2001) and assuming 50% compliance with recommended treatment periods (12 months for acamprosate and 3 months for naltrexone) (Medi Media Australia Pty Ltd 2002), an estimated 4,602 individuals (27,613 scripts filled / 12 scripts per year / 0.5 compliance) used acamprosate and 8,899 individuals (13,349 / 3 / 0.5) used naltrexone. This is equivalent to approximately 3% of alcohol dependent individuals filling a script for either acamprosate or naltrexone in 2001 (13,501 individuals using either / 512,935 dependent individuals).

Assuming the majority of scripts were written by general practitioners (GPs), treatment costs can be calculated based on the 2001 Medicare rate for a brief GP consultation of $33.05. Treatment for acamprosate comprised 13,807 GP visits (4,602 individuals x 3 visits [12 scripts with 1 repeat = 6 visits x 0.5 compliance]), totalling $456,321. Naltrexone comprised 8,899 GP visits (8,899 individuals x 1 visit [3 scripts with 1 repeat = 2 visits x 0.5 compliance]), totalling $294,112.

The cost of these pharmacotherapies to the Australian government in 2001 was $4,442,204 for acamprosate and $2,115,315 for naltrexone (Commonwealth Department of Health and Aged Care 2001; Commonwealth Department of Human Services and Health 2002). Out-of-pocket medication costs vary by patient Medicare classification (general, concessional or safety net) and were not constant across 2001 (Commonwealth Department of Health and Aged Care 2001; Commonwealth Department of Human Services and Health 2002). Taking these variations into account, individual costs were estimated as $252,407 for acamprosate and $118,892 for naltrexone. Therefore, total treatment and medication cost for acamprosate and naltrexone in 2001 was $7,679,251.

Further analyses based on varying assumptions regarding age (18 years or older), compliance rates (50%), source of scripts (GPs) and GP fees ($33.05) suggest acamprosate and naltrexone are unlikely to have been used by more than 5% of alcohol dependent individuals in Australia. Although their use is not necessarily appropriate for all dependent individuals, the low uptake of these medications raises serious concerns about the lack of Australian evidence for their field effectiveness and the nebulous nature of the recommended comprehensive treatment programs (Commonwealth Department of Health and Aged Care 2001).

3.2 Use of Acamprosate and Naltrexone among the dependent alcohol using population

Shanahan, M., Stafford, J., Doran, C., Gilmour,S., Proudfoot, H., Mattick, R.P.

A number of issues were identified in the previous letter to the Medical Journal of Australia and the following attempts to address two of those issues: to more closely examine who is taking the pharmacotherapies acamprosate and naltrexone; and to estimate the prevalence of the use of these pharmacotherapies across the alcohol dependent population. As has already been demonstrated in Chapter 1, many Australians consume alcohol in a low risk manner but 3.5% of the population have had an alcohol dependence disorder in a 12 month period (Teesson, Hall et al. 2000). However, despite the availability of treatments for alcohol disorders, research has found that few of these people seek help (Proudfoot and Teeson 2001). For those that do seek help in the form of post withdrawal relapse prevention, there are a number of options including pharmacotherapy. Other forms of treatment are discussed in Chapter 6.

Acamprosate and naltrexone are two pharmacotherapies which are currently available in Australia under the Pharmaceutical Benefits Schedule (PBS) for the use in the relapse prevention treatment of alcohol dependence. The evidence of effectiveness of these pharmacotherapies continues to be assessed. There is literature which suggests that acamprosate is safe for use and moderately effective over the long term when used in conjunction with psychosocial therapy (Shand, Gates et al. 2003). Naltrexone has also been found to lower relapse rates but the short term side effects are often a limiting factor in compliance with therapy. Ongoing psychosocial therapy providing coping skills therapy has been shown to improve outcomes of pharmacotherapy (Shand, Gates et al. 2003).

It has been estimated that approximately 3% of alcohol dependent people in Australia use acamprosate or naltrexone (Doran, Shakeshaft et al. 2002). Given that alcohol dependence is highest among males (6.1%) and more specifically in males aged 18 to 24 (9.3%) (Degenhardt, Hall et al. 2000), it is useful to understand the relationship between these demographics and the uptake of pharmacotherapies to assist with relapse prevention. This chapter aims to:

- Explore the uptake of pharmacotherapies across age and gender categories in Australia;
- Assess whether there are differences in who is being prescribed naltrexone and acamprosate; and
- Estimate the rate of prescription of naltrexone and acamprosate to dependent drinkers.

3.3 Method

3.3.1 Medications

Under the PBS, the doctor prescribing naltrexone or acamprosate must obtain an authority approval from the PBS. The original prescription (AU) is for 30 days, with one repeat prescription (AR) provided. A subsequent prescription for either acamprosate or naltrexone requires a visit to the doctor for an additional AU and AR. The recommended period of treatment for most patients is one year for acamprosate, and twelve weeks for naltrexone (MIMS 2004). Both pharmacotherapies are intended to be used as part of a comprehensive treatment program for alcohol dependence with the goal of maintaining abstinence (Australian Government Department of Health and Ageing 2004).

3.3.2 Data on scripts

Data on the total number of scripts for acamprosate and naltrexone claimed by pharmacies from the PBS was obtained from the Health Insurance Commission (HIC) for each month from January 2001 to December 2002 inclusive. Variables in the HIC data included month of the claim, age group and gender of recipient, and whether or not the script was an initial or a repeat. In the earlier months of the data a high number of records had unknown age and gender recorded, and some claims from the later part of 2002 may not have been submitted by the time the data was extracted (early 2003). For this reason only 12 consecutive months in the middle of the data (October 2001 to September 2002) were used for this analysis. Where one month of data only was used, the month of July 2002 was selected as the numbers for this month approximated the mean for the 12 month period.

3.3.3 Data from the National Survey of Mental Health and Wellbeing

Data from the 1997 National Survey of Mental Health and Wellbeing (NSMHWB) were used to estimate the number of dependent drinkers in Australia for two time periods - one month and one year. The NSMHWB was based on a stratified, multi-stage probability sample of persons aged 18 years and older in the Australian population (Teesson, Hall et al. 2000). The survey was conducted in all states and territories in 1997 with an overall response rate of 78% and 10,641 participants. Alcohol disorders were assessed by a

modified version of the Composite International Diagnostic Interview (CIDI) (Anonymous 1997). Alcohol use disorders were assessed in only those individuals who had consumed more than 12 standard drinks in a single drinking session (approximately 10 gm of alcohol) in the last 12 months (Proudfoot and Teeson 2001). In order to account for the complex survey design, weights were applied using the Jack-knife method with balanced repeated replications using SAS-callable SUDAAN software (Shah, Barnwell et al. 1997). This ensured that the survey estimates conform to independent estimation of the Australian population by state, age and gender (Burns, Teesson et al. 2001).

According to DSM-IV, individuals are alcohol dependent if they meet **any three** of the following criteria in the same twelve month period:

(1) Tolerance - the need for larger amounts of the drug in order to achieve the same effect.
(2) Withdrawal - characteristic syndrome present upon cessation of the drug or the drug is taken to relieve withdrawal symptoms.
(3) The substance is taken over a longer period of time than initially intended.
(4) A persistent desire to decrease use, however attempts may be unsuccessful.
(5) Social and personal interests are given up or decreased due to the substance use.
(6) Considerable time spent acquiring the substance/using or recovering from use.
(7) Continuation of substance use despite awareness of recurrent problems associated with use.

3.3.4 Estimating prevalence of use of pharmacotherapies amongst those with alcohol dependence

The prevalence of use of pharmacotherapies amongst dependent drinkers in Australia was ascertained from the number of dependent drinkers measured in the NSMHWB and the estimated number of HIC script recipients over the relevant period. HIC data, however, was script-based and gave no information on the number of prescriptions provided to individuals.

Since scripts for naltrexone and acamprosate are for a period of 30 days, the number of scripts dispensed in a single calendar month is likely to be an accurate representation of the

number of individuals who received a prescription in that month. This data can be used with the one-month dependence data to estimate prevalence. However, as the sample sizes for one month's dependence in NSMHWB were small in some age/gender categories, prevalence was also estimated by a second method using one year of data. This necessitated an estimation of the number of people receiving scripts in any one year. Data on the number of original scripts and repeats were used to estimate the number of individuals who may have received these medications. Three estimates, a high, mid and low were calculated for both men and women for both medications (Table 3.1). The assumption that every AU recipient was a unique individual provided the high estimate. The mid estimate assumed that 50% of the AR recipients received an additional AU script and the remainder received only the original AR. The low estimate assumed that 30% received 8 months of medication and the remainder received only one AU. These rather broad assumptions result in a range from 13,369 to 22,374 individuals receiving one of the pharmacotherapies at least once. This implies that 2.4% to 4% of all dependent drinkers received a script. For the remainder of the analysis in this report when 12 months of data is used the mid-level estimates are employed.

Table 3.1: Range of estimates for the number of individuals who received at least one script per year of acamprosate or naltrexone

Range of estimates	**Acamprosate****		**Naltrexone****		**Acamprosate & naltrexone combined**	**% dependent drinkers**
	Female	Male	Female	Male		
Low	3284	5911	1608	2566	13,369	2.4%
Mid	3929	7131	2044	3269	16,373	2.9%
High	5217	9569	2914	4674	22,374	4.0%

** includes only those 18+

3.3.5 Analysis

Data from the NSMHWB on the number of dependent drinkers by age and gender was combined with the HIC data to estimate the proportion of individuals dependent on alcohol who may have received at least one prescription for either naltrexone or acamprosate in this twelve month period. Log-linear multiple regression models were used to analyse the difference in rates between age and gender groups. Proportions were

presented in contingency tables, with Pearson chi-squared statistics for tests of association and Cochran-Mantel-Haenszel statistics for homogeneity of odds ratios across strata.

A series of tables are presented in section 3.3 which illustrate the total scripts by AR, AU, month, and age and gender of the recipient.

3.4 Results

3.4.1 Exclusions

Some data were excluded due to coding concerns: 3.86% of scripts were excluded as the age category and/or gender were unknown; less than 1% were excluded as the type of script was incorrect (i.e. some were classified as dental prescriptions); and less than 1% were excluded because the age group was 0 to 13 years (presumed to be a coding error). This resulted in a total of 4.2% scripts excluded (Table 3.2).

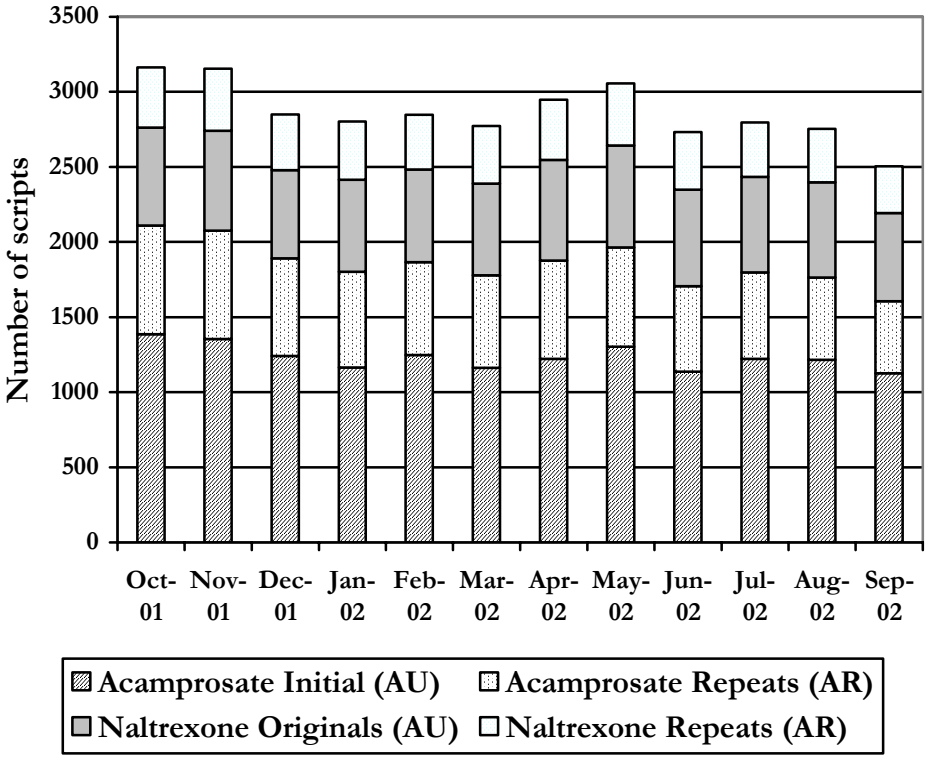
Table 3.2: Total scripts and exclusions for months of October 2001 to September 2002

	Acamprosate scripts		Naltrexone scripts		Overall Scripts	
Variable	**N**	**%**	**N**	**%**	**N**	**%**
Age 0 to13	69	0.3%	41	0.3%	110	0.31%
Category of script	9	0.04%	3	0.02%	12	0.03%
Unknown age/gender	893	3.9%	494	3.9%	1387	3.87%
Total excluded	971	4.2%	538	4.2%	1509	4.21%
Total scripts included (AU&AR)	22,184	95.8%	12,140	95.8%	34,322	95.79%
Total scripts (AU&AR)	23,156	100%	12,678	100%	35,831	100%

3.4.2 Scripts

Figure 3.1 presents the total prescriptions dispensed monthly. Acamprosate accounts for the largest proportion each month (approximately 65%), with AU scripts making up the largest proportion. The number of scripts per month is relatively steady, ranging from 2,500 to 3,150 scripts per month, similarly the distribution between acamprosate and naltrexone remains constant.

Figure 3.1: Acamprosate and Naltrexone – original and repeat scripts per month



Figures 3.2 and 3.3 present the number of acamprosate and naltrexone scripts by age and gender category. Naltrexone was prescribed less frequently than acamprosate, and males received more scripts than females in all age categories for both pharmacotherapies. When the data on the acamprosate and naltrexone are combined, there is evidence of a statistically significant trend to higher rates of prescribing of acamprosate in older individuals (χ^2=15.02, p<0.0001). Compared to naltrexone, acamprosate was prescribed for 50% of scripts in those aged 14-19 years, but for 73% of scripts among those aged over 70. Naltrexone is currently only listed on the PBS for use in alcohol dependence (Australian Government Department of Health and Ageing 2004), however it is possible the higher use of naltrexone in younger populations may be due to naltrexone being used for heroin dependence treatment in that group.

There is also a significant difference in age groups between males and females, with males over-represented among young and old age groups compared to middle age groups (χ^2=255.10, p<0.0001). It is inappropriate to test for a trend in this data due to the non-linear relationship.

Figure 3.2: Acamprosate scripts for males and females by age category

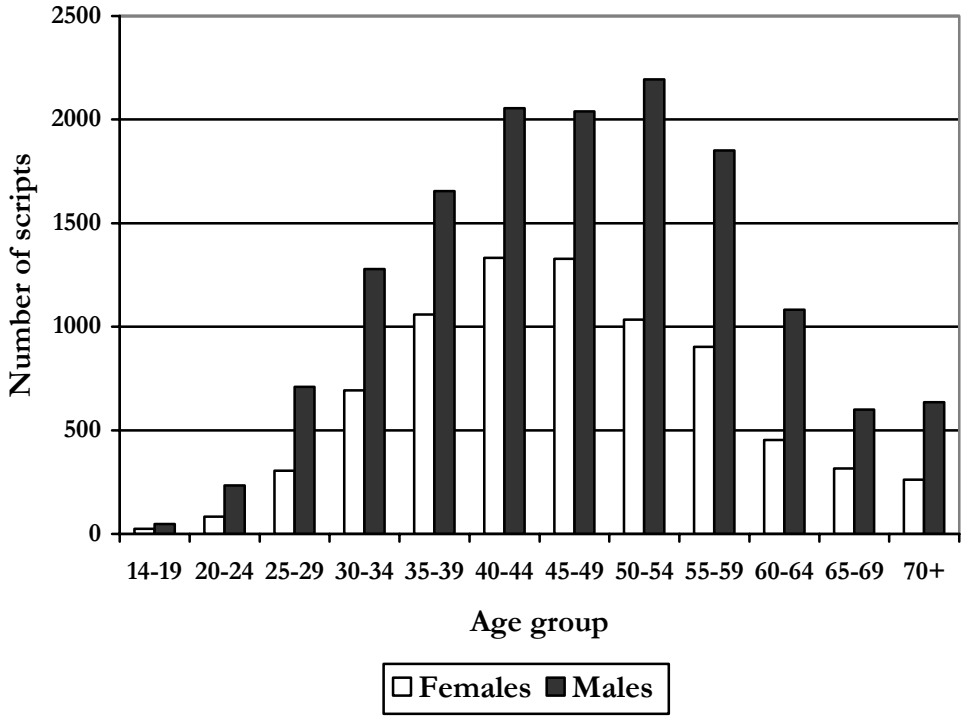
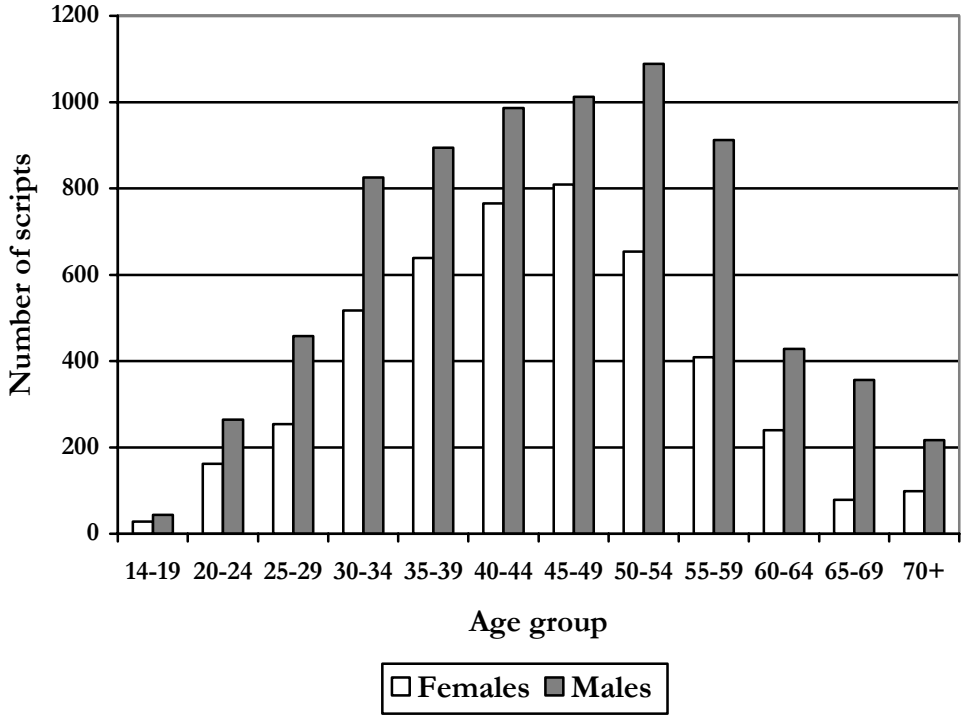


Figure 3.3: Naltrexone scripts for males and females by age category



3.4.3 Repeat Scripts

The variables, which indicated whether the script was an AU or AR script, were used to explore the uptake of repeat scripts. Although a third, fifth or seventh script would also be classified as an original by the PBS, and a fourth, sixth script a repeat, these data do provide some insight into the uptake of repeat scripts (Table 3.3). There was a small but significant difference (χ^2=51.58, p<0.0001) in rates of uptake of repeat scripts between the two drugs, with naltrexone having a higher rate of uptake (38% compared to 34%) despite there being more acamprosate scripts overall.

Table 3.3: Proportions of repeat scripts by drug used

	Initial (%)	Repeat (%)
Naltrexone	7,588 (62%)	4,552 (38%)
Acamprosate	14,734 (66%)	7,438 (34%)

When the proportion of repeats was examined by age, the linear trend for acamprosate is much stronger than for naltrexone. Age was more strongly associated with uptake of repeat scripts amongst acamprosate users than naltrexone users (χ^2 for trend =14.45 for acamprosate, χ^2 for trend=6.71 for naltrexone) with the older age categories more likely to go back for repeats (Table 3.4). Rates of uptake of repeat scripts by gender were similar for both drugs. When the data were pooled by drug type, there were also some differences in uptake of repeat scripts by age but again not by gender with higher proportions of repeat scripts being dispensed in older age groups (χ^2 for trend =14.88, p<0.0001). Forty-two percent of scripts to 70+ year olds were repeat scripts compared to 32% of those to 14 to 19 year olds, and 27% to 25 to 29 year olds.

Table 3.4: Proportion of scripts that are repeats by age and drug

Age	Naltrexone	Acamprosate
14-19	35%	30%
20-24	36%	23%
25-29	31%	24%
30-34	34%	26%
35-39	34%	30%
40-44	36%	32%
45-49	39%	34%
5054	39%	36%
55-59	42%	38%
60-64	40%	40%
65-69	43%	40%
70+	45%	41%

3.4.4 Dependent drinkers

The data from the NSMHWB was used to estimate the number of dependent drinkers for both one month and one year time periods. The total number of individuals classified in Australia in 1997 as dependent drinkers in one month was 234,453 and 558,858 for one year. In both time periods, the largest proportion of both male and female dependent drinkers is in the 18 to 29 age category. Males account for 70% of the dependent drinkers in the one month data and 72% in the one year data.

Table 3.5: Numbers of dependent drinkers in Australia by age and sex

	One month			One year		
Age	Females (% of total)	Males (% of total)	Total	Females (% of total)	Males (% of total)	Total
18-29	30,791 (13)	66,342 (28)	97,133	67,531 (12)	187,968 (34)	255,499
30-39	12,698 (5)	42,723 (18)	55,421	40,663 (7)	102,045 (18)	142,708
40-49	20,440 (9)	33,289 (14)	53,729	32,072 (6)	59,056 (11)	91,128
50-59	4,198 (2)	16,720 (7)	20,918	9,839 (2)	28,230 (5)	38,069
60+	1,328 (1)	5,924 (3)	7,252	5,176 (1)	26,278 (5)	31,454
Total	**69,454 (30)**	**164,999 (70)**	**234,453**	**155,280 (28)**	**403,577 (72)**	**558,858**

3.4.5 Prevalence of use

In order to estimate a rate of the use of these pharmacotherapies among the population it was necessary to estimate the number of individuals from the scripts. As discussed above,

two sets of data were used: the number of individuals receiving a script in one month and the number receiving a prescription in one year. The latter uses the mid-range estimates from Table 3.1 to estimate the numbers for each age and gender category.

Figure 3.4 presents the rates of use for one month and for one year by age category. Not surprisingly, the rates of use are higher for one year, with the peak rates at one year being in the 50 to 59 year category, and in the 60+age category for the one-month data.

Figure 3.4: One month and one year rates of dependent drinkers who received at least one prescription of naltrexone or acamprosate

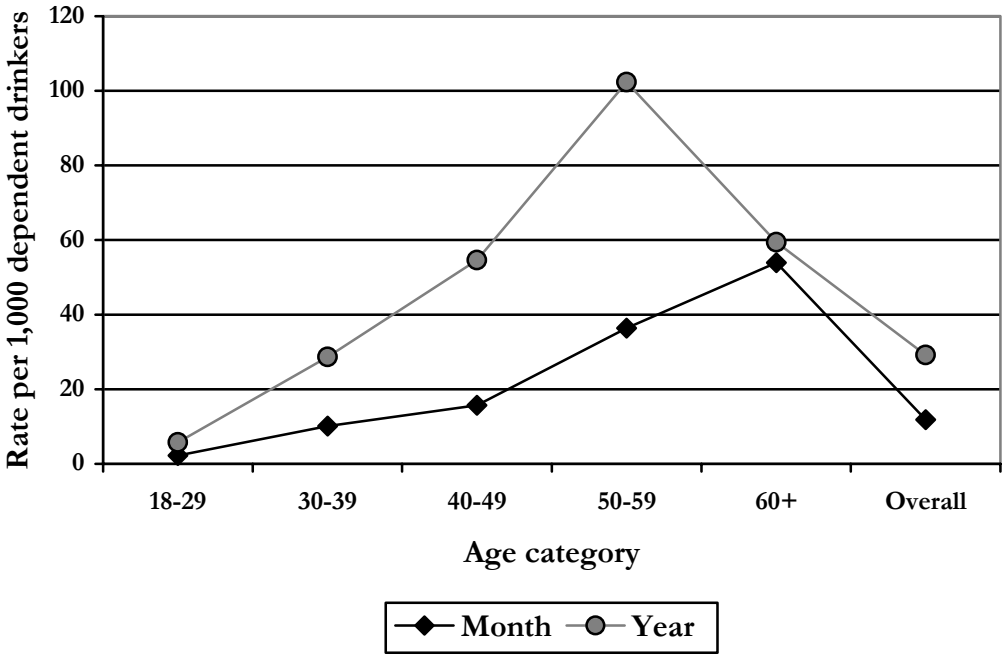


Table 3.6: Rates of use of acamprosate and naltrexone (combined) in one month

Population	Number individuals receiving scripts	Number of dependent drinkers	Rate per 1000 dependent drinkers -
AGE			
18-29	218	97,133	2.2
30-39	562	55,421	10.1
40-49	843	53,729	15.7
50-59	762	20,918	36.4
60+	391	7,252	53.9
GENDER			
Male	1,801	164,999	10.9
Female	975	69,454	14.0

The rate of individuals receiving a script in one month per 1000 dependent drinkers (Table 3.6) shows that the rate among age category 18 to 29 years is much lower than for older age categories despite the fact that 41% of the dependent drinkers are aged 18 to 29. A log-linear multiple regression model of the number of scripts dispensed was fitted, with age and gender as predictors and including an interaction term (Table 3.7).

Table 3.7: Multiple regression model of drug uptake in one month

	Relative risk	Chi-squared statistic (χ^2)	P value
AGE			
18-29	Reference group		
30-39	3.90	880.12	<0.0001
40-49	7.20	778.12	<0.0001
50-59	14.00	434.77	<0.0001
60+	21.30	193.93	<0.0001
GENDER			
Male	Reference group		
Female	1.13	0.74	0.4
INTERACTION			
Female, 18-29	Reference group		
Female, 30-39	1.60	8.27	0.004
Female, 40-49	0.91	0.29	0.6
Female, 50-59	1.80	12.76	0.0004
Female, 60+	1.70	8.79	0.003

Older dependent drinkers took up these two treatments at much greater rates than younger drinkers, and older women at even greater rates than younger men; female dependent

drinkers aged over 60 take up drug treatment at 36 times (21.3 x 1.7) the rate of women aged 18 to 29 years.

Table 3.8: Rates of use of acamprosate and naltrexone (combined) in one year

Population	Number individuals receiving scripts	Number of dependent drinkers	Rate per 1000 dependent drinkers
AGE			
18-29	1,468	255,499	5.7
30-39	4,089	142,708	28.6
40-49	4,974	91,128	54.6
50-59	3,893	38,069	102.3
60+	1,867	31,454	59.3
GENDER			
Male	10,336	403,577	25.6
Female	5,954	155,281	38.3

Table 3.8 presents the rates per 1000 dependent drinkers in one year. Results of a multiple regression analysis on these prescription rates are shown in Table 3.9. Here, older age is again strongly associated with increased rates of use of the treatments, with men aged 50 to 59 years 18 times as likely to use the drug as men aged 18 to 29. Women over 60 are 14 times or (9.6 x 1.5) as likely to use the drug as women aged 18 to 29. The interaction effect is highly significant (χ^2= 109.39, p<0.0001).

Table 3.9: Multiple regression model of drug uptake in one year

	Relative risk	Chi-squared statistic (χ^2)	P value
AGE			
18-29	Reference group		
30-39	4.80	1698.15	<0.0001
40-49	9.80	3780.87	<0.0001
50-59	18.20	5919.71	<0.0001
60+	9.60	2824.56	<0.0001
GENDER			
Male	Reference group		
Female	1.50	47.94	<0.0001
INTERACTION			
Female, 18-29	Reference group		
Female, 30-39	1.09	2.04	0.2
Female, 40-49	0.86	6.25	0.01
Female, 50-59	0.95	0.67	0.4
Female, 60+	1.50	33.81	<0.0001

3.5 Discussion

This analysis uses pharmacy claims for payment data from the Health Insurance Commission database and dependent drinking prevalence data from the NSMHWB to explore the uptake of prescriptions for acamprosate and naltrexone. This analysis, using different data and assumptions, supports the Doran et al. (2002) estimate that only 3% of dependent drinkers (range 2.4% to 4% depending on assumptions) obtain prescriptions for acamprosate or naltrexone in a 12 month period (Doran, Shakeshaft et al. 2002). The analysis presented here goes further in estimating the prevalence of the use of acamprosate and naltrexone across various age and gender categories for one month and one year periods.

These data show that older drinkers receive prescriptions for naltrexone/acamprosate at much greater rates than do younger drinkers, and the effect of age on prescription rates is even greater in women. Older people are also more likely to obtain repeat scripts of either drug, with the relationship between age and repeat prescriptions similar in both genders. Rates of repeat prescribing were similar between the two types of drug, but the trend in increased repeat prescribing over increasing age was more pronounced in acamprosate than naltrexone prescriptions.

In younger populations, where alcohol dependence is more prevalent (34% for males and 12% for females in the 18 to 29 age category) the rate of use of pharmacotherapies among dependent drinkers is lowest, at 5.7 per 1000 dependent drinkers being prescribed either pharmacotherapy (compared to rates of 10 to 20 times higher in the 40+ age groups).

There are several possible explanations for the different relationships between age and uptake of pharmacotherapies. Data on use of Medicare services shows that younger populations (particularly younger men) access services at lower rates than older aged groups, with approximately 78% of all males 20 to 29 accessing at least one Medicare service in a given year compared to approximately 85% of males 50 to 59, with the older population about 1.5 times more likely to access services 5 or more times per year (Australian Institute of Health & Welfare 2002). The higher rates of prescribing may be related to increased visits to a doctor. Alternatively, alcohol related disorders such as poor

liver function, cirrhosis; hypertension, diabetes or interactions of alcohol with other medications may result in patients seeking to decrease or discontinue alcohol consumption and may lead to an increased rate of prescription in the older age groups. Finally, it may be that alcohol dependence is not being identified in younger populations by GPs or these medications may not be seen as the most suitable method to treat dependence in the younger populations.

A limitation of this study is that these HIC data are only related to the prescribing of the pharmacotherapies, with no information on appropriateness of use, whether the scripts are actually used or the outcomes obtained from their use. While the rate of use of acamprosate and naltrexone by dependent drinkers appears low, this may be for a number of reasons. Firstly, pharmacotherapies may not be the first line treatment offered, as they are not without side effects. Secondly, there may be a lack of awareness of these medications by the public or their GPs. Finally, questions of who benefits most from the use of these medications in relapse prevention are yet to be answered. Perhaps these are important questions to address, especially given that these treatments are not without cost, as will be considered in Chapter 6. In addition, as individual linked data on scripts were not available, a number of assumptions required to estimate the number of recipients of the pharmacotherapies, however the results appear relatively robust.

CHAPTER 4: THE USE OF PHARMACOTHERAPIES FOR THE MANAGEMENT OF ALCOHOL DEPENDENCE IN CLINICAL PRACTICE

Doran, C.M., Duszynski, K., Beilby, J. and Mattick, R.P. (submitted to Addiction)

4.1 Introduction

As the key providers of primary medical care in Australia, general practitioners (GP) are in a strong position to offer advice and management options for addictive behaviours such as alcohol dependence. Consulting a GP is the second most common health-related action after medication use, with 86% of the Australian population consulting a GP in any one year (Australian Institute of Health and Welfare 2002). Recently developed guidelines for preventive activities in Australian clinical practice suggest practitioners assess alcohol intake for every patient over the age of 14 years (National Preventive and Community Medicine Committee of The Royal Australian College of General Practitioners 2002). Patients with potentially hazardous levels of drinking, should be offered at a minimum, a brief intervention to highlight the dangers of excessive drinking and advice to reduce alcohol consumption (National Preventive and Community Medicine Committee of The Royal Australian College of General Practitioners 2002).

An estimated 513,000 Australian adults, 3.5% of the population aged 18 years and over, satisfy criteria for alcohol dependence (Hall, Teesson et al. 1999). Pharmacotherapy for this condition typically comprises a benzodiazepine, such as diazepam, for withdrawal and disulfiram for relapse prevention. Acamprosate and naltrexone have also recently become available for treating alcohol dependence in Australia. Doran et al (2003) estimated that about 3% of alcohol-dependent individuals are taking either drug, at a total cost (treatment and medication) of $7.4m in 2001 (Doran, Fawcett et al. 2003).

Acamprosate and naltrexone have been approved under the Pharmaceutical Benefits Scheme (PBS) for use in treating alcohol dependence, provided that the patient is in a comprehensive treatment program for alcohol dependence with the goal of maintaining abstinence. Each authority prescription lasts for two months. There is no stated limit to the

duration of treatment, but further extension of PBS authority requires an additional application. The PBS subsidy reduces the price (30 days supply) from $176.30 (acamprosate) or $167.36 (naltrexone) to $23.70 (both drugs) (Australian Government Department of Health and Ageing 2004). Product information for naltrexone states that treatment duration is up to 12 weeks. However, the length of treatment is at the discretion of the prescriber (MIMS Australia 2003).

As elicited by Graham et al (2002), defining clear guidelines for use of the two main pharmacotherapies (acamprosate and naltrexone) is difficult in the present state of knowledge (Graham, Wodak et al. 2002). This difficulty stems from the fact that the various studies have examined the use of these drugs over varying groups of outcome measures and study durations. Acamprosate appears to have a prolonged action for up to a year after therapy has ceased, but compliance with a medication requiring thrice-daily administration is often difficult. On the other hand, naltrexone has well documented efficacy, at least in the initial three months of treatment, and is easier to take on a once-daily basis. Consideration of the outcomes desired by the patient, compliance history, other drug therapy and medical conditions might all influence the choice made by the prescriber.

Despite evidence on clinical efficacy of strategies available to assist practitioners manage alcohol problems and guidelines that encourage practitioners to detect and manage such problems, little is known about practitioner use of pharmacotherapies for the management of addictive behaviours in Australia. The purpose of this research is to collect data on the behaviours associated with the prescription of pharmacotherapies for alcohol dependence in Australian clinical practice.

4.2 Method

4.2.1 Design and participants

Data were derived from a 10-page, 46-item self-administered questionnaire sent to 2,680 Australian doctors (see Appendix 1). The survey examined characteristics of doctors and their therapeutic preferences in managing patients with either nicotine or alcohol dependence, particularly with respect to the use of pharmacotherapies in these conditions. Data collected from the survey participants comprised demographic and professional information including age and gender, completion of professional training programs and further qualifications, years worked in clinical practice and type of practice. Questions examining management of patients with nicotine or alcohol dependence related to training in providing an intervention, preferred treatment strategies, prescription of pharmacotherapies, relative effectiveness of pharmacotherapies and advocating adjuncts with prescription of pharmacotherapies.

Doctors comprised three specific doctor specialities including general practitioners (GPs), psychiatrists and gastroenterologists. These three groups of doctors were identified as being consistent with the opportunity to routinely manage large numbers of patients with nicotine or alcohol dependence. The three specialties were defined by the Health Insurance Commission's (HIC) Derived Major Specialty classification codes and formed a national sample, stratified by state (and territory) as well as Rural and Remote Metropolitan Area classification (HIC designation of rurality). The seven RRMA groupings were aggregated into the three categories: capital city (RRMA 1), other metropolitan centre (RRMA2) and non-metropolitan (RRMA 3-7).

4.2.2 Selection

In all, there were 16,798 general practitioners, 670 psychiatrists and 82 gastroenterologists regarded as eligible according to the criteria described. Of these, all psychiatrists and gastroenterologists were surveyed, while only a 10% random sample of general practitioners was surveyed. In this latter group, a minimum of 50 doctors in each state and RRMA were surveyed. In total, 2,680 surveys were sent to 670 psychiatrists, 82 gastroenterologists and 1,928 general practitioners.

4.2.3 Survey mail out

The survey was developed by the National Drug and Alcohol Research Centre (NDARC), University of New South Wales, and piloted with staff associated with both NDARC and the Department of General Practice at the University of Adelaide (see Appendix 1). All survey documentation was distributed by the HIC using their stationary and contained a cover letter from the HIC clarifying the process of selection. The project team were provided with de-identified data only. The initial survey was first distributed in March 2003 and sent a subsequent two times to non-responding doctors.

4.2.4 Statistical analysis

The data were initially analysed with the statistical software, Stata (SAS Proprietary Software 2001). Descriptive and summary statistics, where appropriate, were generated for all questions, by the three specialties. Logistic regression was then undertaken to examine associations (odds ratio) between the two categories of pharmacotherapy (bupropion for nicotine dependence and pharmacotherapies used in the treatment of alcohol dependence), and other variables. Where the overall p-value for univariate models was <0.2 these variables were included in the multivariate model.

4.3 Results

4.3.1 Sample

In all, 2,680 surveys were distributed, of which 1,291 surveys were returned and considered valid for inclusion in the analysis. A further 113 surveys were excluded where doctors were on leave, had retired from clinical practice or were unable to be contacted. Taking into consideration those 1,257 surveys for which no response was received and the 19 doctors declining to participate, the response rate was 48.9% (1310/2680). The specialty-specific response rates were 48%, 49% and 44% for GPs, psychiatrists and gastroenterologists, respectively.

4.3.2 Comparison between responders and non-responders

A comparison between responding and non-responding doctors using demographic, state and RRMA data provided by the HIC, revealed no differences apart from gender between the two groups. Significantly more female doctors returned a survey when compared with males ($p<0.0001$).

4.3.3 Characteristics of sample

Details of the characteristics of the three categories of respondents are provided in Table 4.1. The sample, comprising 72% GPs, 25% psychiatrists and 3% gastroenterologists, was predominately male (68%). Gastroenterologists had the largest proportion of males (100%) compared with 79% of psychiatrists and 63% of responding general practitioners. Mean age of the overall sample was 49 years (±SD 10.7), being similar across the three specialties. Almost 60% of respondents had been born in Australia with GPs having the fewest Australian born respondents (57%), compared with 70% of gastroenterologists and 61% of psychiatrists. Three-quarters of the sample indicated that they had completed their undergraduate medical training in Australia and this proportion was similar across all specialties except gastroenterology, where the proportion was higher (84%). A higher proportion of gastroenterologists (68%) reported that they were less than 25 years of age upon completion of their undergraduate degree compared with 58% of GPs and 55% of psychiatrists. Two-thirds of GPs practised in a capital city geographic location compared

with 83% of psychiatrists and 70% of gastroenterologists. More than 53% of the sample indicated that they had been in clinical practice for more than 20 years, although for the psychiatric specialty this proportion increased to 64%. A third of the sample indicated that their primary practice included between 3 and 5 doctors, while 20% of doctors recorded that their practice was solo in nature. The mean number of clinical sessions practised per week was 8 (SD± 3) sessions, comparable across the three specialties.

Table 4.1: General characteristics of survey respondents

Characteristic	GP	Psychiatrist	Gastroenterologist	Total
N (%)	925 (71.7)	329 (25.5)	37 (2.9)	1291 (100)
Male (%)	583 (63)	261 (79.3)	37 (100)	881 (68.2)
Mean age (SD)	48.21 (10.8)	50.78 (10.3)	50.03 (9.4)	48.92 (10.7)
Country of birth (%)				
Australia	527 (57.0)	201 (61.1)	26 (70.3)	754 (58.4)
Other	389 (42.1)	127 (38.6)	10 (27.0)	526 (40.7)
Country where undergraduate medical training completed (%)				
Australia	680 (73.5)	252 (76.6)	31 (83.8)	963 (74.5)
Other	237 (25.6)	77 (23.4)	5 (13.5)	319 (24.7)
Age at (undergraduate) graduation (%)				
≤ 24 years	532 (57.5)	180 (54.7)	25 (67.6)	737 (57.1)
25-34 years	343 (38.1)	140 (42.6)	10 (27.0)	493 (38.2)
≥ 35 years	19 (2.1)	3 (0.9)	0 (0.0)	22 (1.7)
Doctors working in capital city (%)	611 (66.1)	272 (82.7)	26 (70.3)	909 (70.4)
Years in clinical practice (%)				
< 1 year	1 (0.1)	0 (0)	0 (0)	1 (0.1)
1-2 years	2 (0.2)	0 (0)	0 (0)	2 (0.2)
3-5 years	20 (2.2)	9 (2.7)	1 (2.7)	30 (2.3)
6-10 years	102 (11.0)	22 (6.7)	1 (2.7)	125 (9.7)
11-20 years	288 (31.1)	88 (26.7)	15 (40.5)	391 (30.3)
>20 years	499 (53.9)	209 (63.5)	20 (54.1)	728 (56.4)
Mean clinical sessions per week (SD)	8.29 (± 2.71)	8.91 (± 2.44)	8.84 (± 2.43)	8.47(± 2.65)
Average practice size (%)				
Solo	142 (15.4)	108 (32.8)	14 (37.8)	264 (20.4)
2 doctors	159 (17.2)	48 (14.6)	8 (21.6)	215 (16.6)
3-5 doctors	362 (39.1)	73 (22.2)	5 (13.5)	440 (34.1)
6-8 doctors	162 (17.5)	46 (14.0)	1 (2.7)	209 (16.2)
> 8 doctors	88 (9.5)	48 (14.6)	8 (21.6)	144 (11.2)

4.3.4 Prescription of pharmacotherapies for alcohol dependence

Table 4.2 explores the prescription of pharmacotherapies in the management of patients with alcohol dependence. Less than 72% of the overall sample indicated that they consistently sought information regarding patients' drinking behaviour. More than 95% of both psychiatrists and gastroenterologists obtained this information compared with 63% of

GPs. Less than 14% of the overall sample applied a formal screening instrument in identifying use of alcohol. While almost 98% of the overall sample and a similar proportion across the three specialties, offered advice on the health risks of alcohol dependence, 31% had undertaken training in applying strategies to patients with an alcohol dependence problem.

Counselling either by a GP (75%) or by another appropriate health professional (71%) was the preferred strategy for management of patients with alcohol dependence with GPs having a strong preference for GP counselling. Pharmacotherapy was advocated by 40% of practitioners, being favoured most strongly by psychiatrists (65%) and gastroenterologists (43%) but by fewer GPs (30%). Three-quarters of the sample had prescribed one or more pharmacotherapies recommended for management of alcohol dependence, of whom 3.6% perceived pharmacotherapies to be ineffective.

Psychiatrists represented the highest proportion of actual prescribers (94%) compared with gastroenterologists (76%) and GPs (68%). Patient request was the most frequent reason cited by two-thirds of doctors for prescribing pharmacotherapy. The most frequent adjuncts used by those practitioners prescribing pharmacotherapies were counselling by a health professional (83%), followed by GP counselling (63%). At least 92% of each specialty stated that these adjuncts improved the likelihood that an individual would reduce their drinking.

Table 4.2: Prescription of pharmacotherapies for alcohol dependence

Characteristic N (%)	GP	Psychiatrist	Gastroenterologist	Total
Practitioner	925 (71.7)	329 (25.5)	37 (2.9)	1291 (100)
Doctors identifying patients drinking habits	579 (62.6)	317 (96.3)	36 (97.3)	932 (72.2)
Doctors use of a screening instrument in identifying drinking status	102 (11.3)	69 (21)	7 (18.9)	178 (13.8)
Doctors providing advice on the health risks of alcohol dependence	902 (97.5)	321 (97.6)	37 (100)	1260 (97.6)
Doctors undertaken training in providing advice about alcohol dependence	206 (22.3)	179 (54.4)	17 (46)	402 (31.1)
Doctors preferred treatment for management of patients with alcohol dependence*				
Counselling by GP	812 (87.8)	131 (39.8)	24 (64.9)	967 (74.9)
Counselling by other health professional	597 (64.5)	288 (87.5)	34 (91.9)	919 (71.2)
Pharmacotherapy	274 (29.6)	213 (64.7)	16 (43.2)	503 (40)
Literature	268 (29)	98 (29.8)	13 (35.1)	379 (29.4)
Other	79 (8.5)	97 (29.5)	3 (8.1)	179 (13.9)
Doctors prescribing pharmacotherapy	632 (68.3)	308 (93.6)	28 (75.7)	968 (75)
Doctors perceiving pharmacotherapy as ineffective	32 (5.1)	2 (0.1)	1 (3.6)	35 (3.6)
Doctors citing patient request as predominant reason for prescribing pharmacotherapy	441 (69.8)	194 (64)	14 (50)	649 (67.1)
Main adjuncts advised by doctors with pharmacotherapy*				
Counselling by other health professional	505 (79.9)	276 (89.6)	25 (89.3)	806 (83.3)
Counselling by GP	484 (76.6)	114 (37)	15 (53.6)	613 (63.3)
Other	121 (19.1)	156 (50.7)	6 (21.4)	283 (29.2)
Literature	180 (28.5)	104 (33.8)	8 (28.6)	292 (30.2)
Doctors perceiving adjuncts improve likelihood of quitting	575 (91)	293 (95.1)	25 (89.3)	893 (92.3)

*Note that some respondents may have responded to multiple response categories.

4.3.4.1 Multivariate analysis

Multivariate analysis was used to examine characteristics of the practitioners on their prescribing patterns for pharmacotherapies for alcohol dependent patients (see Table 4.3). Holding other variables constant, female doctors were significantly less likely to prescribe these pharmacotherapies when compared with males (adjusted OR, 0.55; 95% CI 0.39 to 0.77; p=0.001). Older doctors were also less likely to prescribe these pharmacotherapies (adjusted OR, 0.98; 95% CI 0.97 to 0.998; p=0.026), while doctors with an additional mental health qualification, were also significantly less likely to prescribe pharmacotherapies when treating patients with alcohol dependence (adjusted OR, 0.47;

95% CI 0.23 to 0.99; p=0.046). Doctors associated with a practice comprising between three and five doctors, were 1.5 times more likely to prescribe these pharmacotherapies (adjusted OR, 1.53; 95% CI 0.95 to 2.48; p=0.084) when compared with solo practitioners, but no other practice sizes were significantly different from solo practice.

Establishing patient drinking habits, use of screening instrument to detect drinking habits, provision of advice on health risks associated with alcohol dependence, and perception that alcohol dependence is a preventive priority were factors not significantly associated with prescribing these pharmacotherapies. However, doctors with training in provision of advice to patients with alcohol dependence were 1.5 times more likely to prescribe these pharmacotherapies (adjusted OR, 1.53; 95% CI 1.036 to 2.27; p=0.084).

Table 4.3: Multivariate associations between pharmacotherapy prescription for alcohol dependence and selected variables

Variable		Odds ratio (95% CI)	SE	P-value
Gender	Male	1.00		
	Female	0.55 (0.39 to 0.77)	0.10	0.001
Age		0.98 (0.97 to 0.998)	0.01	0.03
Additional mental health qualification	No	1.00		
	Yes	0.47 (0.23 to 0.99)	0.18	0.05
Practice size (doctors)	Solo	1.00		
	2 doctors	1.27 (0.74 to 2.19)	0.35	0.39
	3-5 doctors	1.53 (0.95 to 2.48)	0.38	0.08
	6-8 doctors	1.36 (0.77 to 2.39)	0.39	0.29
	> 8 doctors	0.64 (0.35 to 1.17)	0.20	0.14
Provision of advice on health risks of alcohol dependence	No	1.00		
	Yes	1.92 (0.74 to 4.99)	0.94	0.18
Training in advice provision to alcohol dependent patients	No	1.00		
	Yes	1.53 (1.03 to 2.27)	0.31	0.04
Doctor state origin	NSW	1.00		
	NT	0.39 (0.23 to 0.66)	0.10	<0.001
	VIC	1.08 (0.70 to 1.65)	0.23	0.74
	QLD	1.16 (0.73 to 1.83)	0.27	0.53
	SA	0.68 (0.40 to 1.16)	0.18	0.15
	WA	1.28 (0.73 to 2.26)	0.37	0.39
	TAS	1.88 (0.89 to 3.97)	0.72	0.10
	ACT	0.82 (0.32 to 2.10)	0.39	0.67

4.4 Discussion

This is one of the first studies in Australia to investigate practitioners' behaviours associated with the use of pharmacotherapies for alcohol dependence. With assistance from the HIC, a total of 1,291 prescribers completed the survey representing an overall response rate of just fewer than 50%. Before the main findings of this study are discussed, however, it is important to note several limitations of the study. First, results were procured from a self-administered questionnaire distributed by the HIC. Self-administered surveys are prone to poor completion rates and biases in reporting of activities. Although this survey obtained a response rate of just under 50%, the influence that running the survey through the HIC had on reporting behaviour is difficult to judge. As the HIC reimburses prescribers of pharmacotherapies it is feasible to speculate that the behaviours of prescribing may have been portrayed in a favourable light. Second, as only a 10% random sample of doctors categorised as GPs were surveyed the results may not reflect overall prescribing behaviour in the population of GPs. Third, as this is a survey of practitioners the characteristics of their patients are unknown. Some practitioners, for example, may have had a larger number of their clients who are dependent on nicotine or alcohol and this may affect their prescribing behaviours. In addition, practitioners who have an interest in the area of alcohol treatment may have chosen to respond.

Guidelines have recently been introduced in Australian clinical practice for preventive activities (National Preventive and Community Medicine Committee of The Royal Australian College of General Practitioners 2002). In terms of alcohol prevention, practitioners are encouraged to assess alcohol intake for every patient over the age of 14 years. The finding from our research suggests that practitioners are generally heeding this suggestion with up to 72% of practitioners identifying a patient's drinking status. Once identified the practitioner should then offer, at a minimum, brief advice to curb hazardous levels of drinking. Again, results from this study suggest that practitioners are receptive to these guidelines with 98% of practitioners providing advice on health risks of risky alcohol consumption.

Although practitioners report high rates of detection and intervention, the results of this research suggest that practitioners may not have adequate training to provide the necessary and relevant advice. Thirty-one percent of the sample indicated that they had undertaken formal training in providing brief advice for alcohol dependence. This finding is perhaps a cause for concern given that 75% of the overall sample rated counselling by a GP as their preferred treatment strategy for alcohol dependence.

The PBS requirements for practitioner prescription of acamprosate and naltrexone necessitate that the patient be enrolled in a comprehensive support and counselling program (Australian Government Department of Health and Ageing 2004). Although no clear parameters of a formal support program exist for any of these medicines, it is generally thought to consist primarily of support from the prescriber in terms of follow-up visits. Results from this study suggest that for acamprosate and naltrexone, the main adjuncts practitioners used were counselling by other health professionals (83%), counselling by GP (65%) and literature (31%). The vast majority of practitioners supporting the use of adjuncts with these medicines indicated that adjuncts increased the probability of a patient modifying behaviour, with counselling perceived to be the most effective adjunct available.

The results of the multivariate analysis provide some interesting findings pertaining to the relationship between practitioner characteristics and prescribing behaviour. For example, those practitioners who had undergone additional training in the provision of a brief advice for alcohol dependence were 1.5 times more likely to prescribe either acamprosate or naltrexone.

This research provides information on prescribing of pharmacotherapies for alcohol dependence in Australian clinical practice. Given that practitioners are in a strong position to offer treatment advice for alcohol dependence, a position that is supported by guidelines for preventive activities in general practice, the prescribing practices and underlying behaviours are important.

Chapter 5: GPs role in preventive medicine: scenario analysis using alcohol as a case study

Doran, C.M., Shakeshaft, A.P. and Fawcett, J.E.

A revised version of this chapter has been accepted for publication in Drug and Alcohol Review. To avoid repetition with background data provided in earlier chapters, the introduction to the chapter has been modified accordingly.

5.1 Introduction

While the previous chapter examined different types of practitioners' preferences for managing patients with alcohol dependence, this chapter examines the cost and average cost-effectiveness of improving the rates of general practitioners (GP) interventions, specifically the rates of detection and intervention with those consuming alcohol at risky levels.

When considering preventative strategies in the GP setting optimal results critically depend on several steps. These are: the detection of a patient's at risk alcohol status; intervening with these at risk patients and the effectiveness of these interventions. Although a number of studies have established types of preventive activities available to the GP, there currently exists no comprehensive study which evaluates prevention strategies when used in isolation or combination.

5.2 Method

The methods involve several steps. Firstly, to extract from the literature current levels of GP detection of at risk drinking behaviour by their patients, the rates at which GPs then provide an intervention and the effectiveness of these interventions; secondly, to develop a model based on these rates of detection, intervention and effectiveness and then develop a number of alternate scenarios; and thirdly, to use the model to consider the cost implications of current practice and the different scenarios.

5.2.1 Scenario analysis

Scenario analysis provides a convenient means to simulate the effects of implementing a range of interventions, either in isolation from, or in combination with, each other. By defining a scenario as a process in which a number of variables may be simultaneously altered, the methodology allows the exploration of complex processes, based on various assumptions. The method used in this study is a four step scenario analysis (see below). These steps provide the framework within which different scenarios will be modelled.

The first step involved identifying a decision process that describes a progression of events. These events nodes are as follows: first, the at risk drinker must visit a GP; second, the GP establishes the patient as being at risk; third, the GP must intervene with detected at risk drinkers; fourth, the at- risk drinker changes behaviour to reduce risk level (see Figure 5.1). The second step reviewed relevant published literature for data on the probabilities at each node on the decision process.

5.2.1.1 Estimated number of at risk drinkers visiting a GP

In the absence of evidence to suggest that drinkers do or do not consult their GP more often than the average, data on the proportion of the whole population (by age-gender) visiting a GP in a 12 month period (Australian Institute of Health and Welfare 2002) are combined with population estimates for the year 2000 (Australian Bureau of Statistics 2002) and age-gender specific rates for at risk alcohol use among a GP visiting population (Britt, Miller et al. 2001), to provide an estimate of the number of at risk drinkers, by age-gender, who visit their GP over a 12 month period. In line with existing Australian GP data (Britt, Miller et al. 2001), at risk alcohol consumption is defined as a score of 5 or more (males) and 4 or more (females) to the first three items of the Alcohol Use Disorders Identification Test (AUDIT) (Saunders, Aasland et al. 1993).

5.2.1.2 Rates of detection

Although a number of screening instruments have been developed to assist GPs in identifying at risk drinkers, including the Michigan alcoholism screening test (MAST) (Selzer 1971), the CAGE (Ewing 1984) and the AUDIT (Saunders, Aasland et al. 1993), evidence on the actual rates of GP detection appears scarce. In a study examining rates of screening and risk-reduction counselling behaviours of GPs, Heywood et al. (1994) reported that Australian GPs identified 43% of males and 29% of females as having high levels of alcohol consumption, defined as more than six (males) or four (females) standard drinks per day. These rates are used as base case estimates of detection in the current analysis. The authors do not report age specific rates of detection, so gender estimates are applied across all age groups to estimate the number of individuals at risk (Heywood, Ring et al. 1994).

5.2.1.3 Rates of intervening

There is little empirical evidence on the proportion of at risk drinkers who are offered an intervention by a GP. This is surprising considering GP delivered brief interventions have been shown to be cost-effective (Wutzke, Shiell et al. 2001). In the Heywood et al. (1994) study, 21% of males and 11% of females detected as being heavy drinkers were offered some kind of intervention, ranging from advice to cut down, advice to cut down plus a brochure or referral to a specialist program (Heywood, Ring et al. 1994). These rates are used as base case estimates of intervention in the current analysis. As with detection estimates, gender specific rates of intervention are applied across all age cohorts, to provide an estimate of the number offered an intervention.

5.2.1.4 Effectiveness of interventions

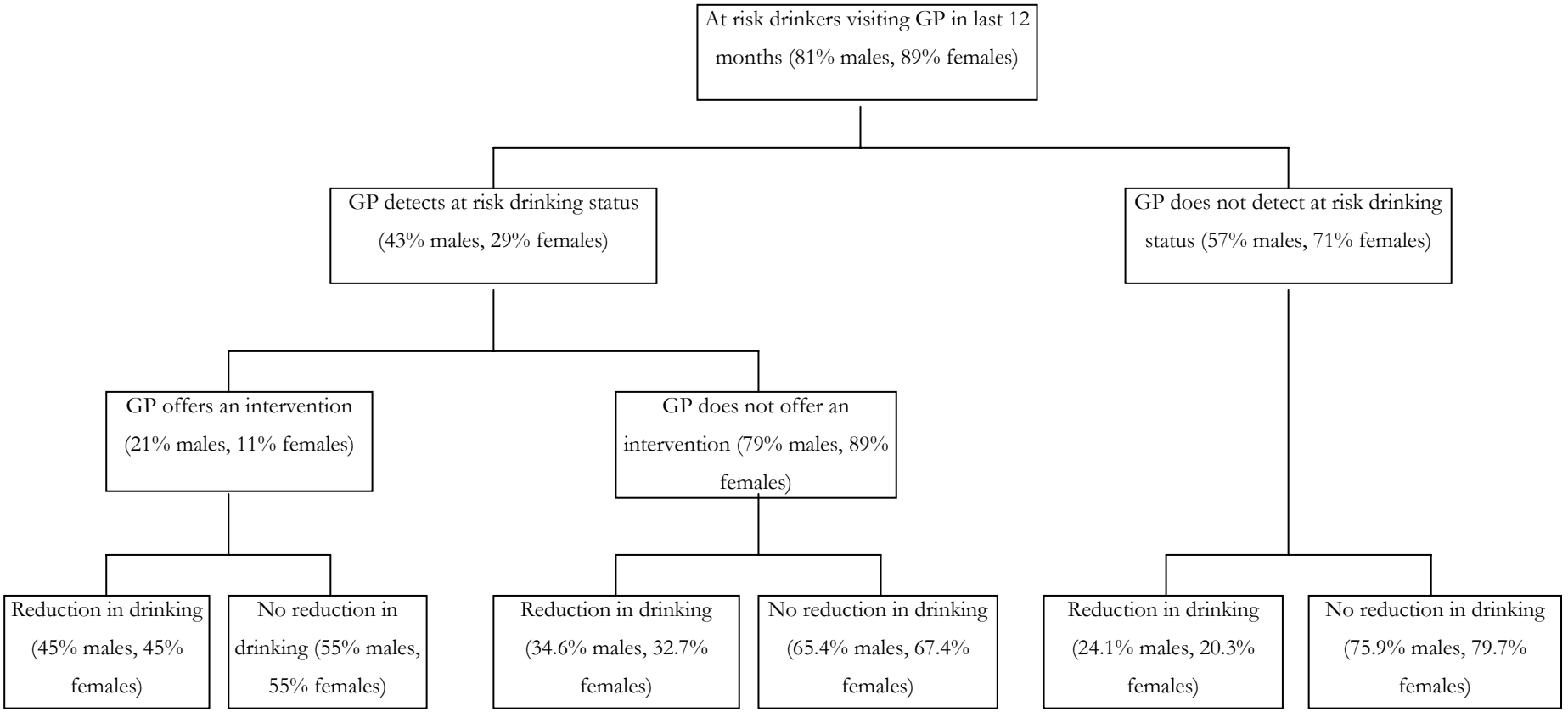
A wealth of research exists on the effectiveness of brief interventions in reducing alcohol consumption in at risk drinkers (Anderson 1987; US Preventive Services Task Force 1989; Bien, Miller et al. 1993; Brown, Evans et al. 1997; Fuller and Hiller-Sturmhoefel 1999; Walitzer and Connors 1999; Volpicelli 2001). Research summarised in recent guidelines for preventive activities in general practice shows that brief advice provided by GPs has resulted in a 25 to 30% reduction in alcohol consumption and a 45% reduction in the

number of excessive drinkers (National Preventive and Community Medicine Committee of The Royal Australian College of General Practitioners 2002). The latter rate is used in the current analysis to provide an estimate of the benefit of GP intervention.

A certain proportion of at risk drinkers not detected by a GP will modify drinking in the absence of any intervention. Rates of 24.1% for males and 20.3% for females are used in the current analysis to reflect the proportion of at risk drinkers that modify their behaviour unaided. These estimates reflect the change in the prevalence of at risk drinking in the youngest and oldest age cohorts from estimates of at risk drinking within the Australian population (Britt, Miller et al. 2001). In addition, if a patient is detected as being at risk and not offered an intervention, detection could in itself, be regarded as a quasi-intervention. To account for this, an assumption is made that at risk drinkers who are detected, but not offered an intervention, are likely to reduce their drinking status at 34.6% for males and 32.7% for females which reflect the midpoint of those drinkers offered an intervention (45% males and 45% females) and those that modify drinking status unaided (24.1% males and 20.3% females).

The probabilities of the base case are expressed in Figure 5.1 and relate to at risk drinkers attending a GP in the previous 12 months. As indicated in the figure, the branches of each node are mutually exclusive. For example, if 43% of males are detected by a GP as being at risk, 57% are not detected.

Figure 5.1: Decision tree: current levels of detection, intervention and effectiveness



The third step involves using the information provided from the literature to calculate outcomes for base case (current) levels of detection, intervention and effectiveness, and to model a number of scenarios in which these levels are increased. The scenarios are outlined in Table 5.1 and simulate the effect of increased rates of detection, intervention and effectiveness from base case estimates. For example; scenario 1.1 simulates the effect of an increase in detection of at risk drinkers by 5% points, from the current levels of 43% in males and 29% in females; scenario 2.2 simulates the effect of an increase in interventions of at risk drinkers by 10% points, from the current levels of 21% in males and 11% in females.

The fourth step in the scenario analysis is a consideration of scenarios when used in various combinations. For example, what is the impact of increasing both detection and intervention by 5 percentage points?

Table 5.1: Scenario analysis alternatives

Scenario	Detection Rate		Rate of Intervention		Effectiveness of intervention
	Male	Female	Male	Female	Male and Female
Base Case (current levels)	43%	29%	21%	11%	45%
Scenario 1: Increased rate of detection					
1.1	48%	34%	21%	11%	45%
1.2	53%	39%	21%	11%	45%
1.3	100%	100%	21%	11%	45%
Scenario 2: Increased rate of intervention					
2.1	43%	29%	26%	16%	45%
2.2	43%	29%	31%	21%	45%
2.3	43%	29%	100%	100%	45%
Scenario 3: Increased effectiveness of intervention					
3.1	43%	29%	21%	11%	50%
3.2	43%	29%	21%	11%	55%
3.3	43%	29%	21%	11%	100%
Scenario 4: Combinations					
4.1 Increased detection & intervention	48%	34%	26%	16%	45%
4.2 Increased intervention & effectiveness	43%	29%	26%	16%	50%
4.3 Increased detection & effectiveness	48%	34%	21%	11%	50%

5.2.2 Cost of strategies

In 2000, the fee for consulting a GP for a straightforward consultation (Type A) was $13.10 (Commonwealth Department of Health and Aged Care 2001). An assumption is made that all at risk drinkers who visit a GP will incur this base cost. However, if the GP undertakes a particular strategy or intervention to detect a patient's at risk drinking status additional GP time will be required. Item 23 of the Medical Benefits Schedule (MBS) incurs a fee of $27.55 for a GP consultation of less than 20 minutes. Item 36 incurs a fee of $49.80 for a GP consultation lasting at least 20 minutes but less than 40 minutes (Commonwealth Department of Health and Aged Care 2001). In estimating the total cost, item 23 is used as a proxy for estimating detection costs and item 36 for estimating intervention cost. Using these fees, the additional cost to detect a patient's drinking status is estimated as $14.45 ($27.55 - $13.10), and $22.45 ($49.80 - $27.55) to provide an intervention.

5.2.3 Cost-effectiveness ratio

An average cost-effectiveness ratio was calculated for each scenario by comparing the total cost associated with each scenario with the total benefit gained, which is measured as the number of at risk drinkers modifying drinking behaviour as a consequence of being detected and offered an intervention. It is important to note that only Medicare costs are considered and as such the resulting ratios provide a limited assessment of potential costs per unit of gain.

5.3 Results

The results of the scenario analysis are presented in Table 5.2. The focus of the analysis will be the additional at risk drinkers that modify their drinking behaviour as a consequence of changing rates of detection, intervention or effectiveness. The outcome measures of the scenarios include: an estimate of the number of at risk drinkers who are detected and offered an intervention; the number of at risk drinkers who are detected, offered an intervention and who modify their at risk drinking behaviour; the total cost of each scenario and the average cost per patient modifying drinking behaviour.

Base case (current) estimates suggest that in the year 2000 approximately 3,213,435 at risk drinkers visited a GP. The cost of initial GP consultations is estimated to be around $42.1 million. Of these at risk drinkers visiting a GP, approximately 1,189,050 were detected as being at risk by a GP. Approximately 209,778 detected drinkers were then offered an intervention with 94,400 of these drinkers modifying their at risk drinking behaviour. The total cost of this strategy (i.e., detection and intervention) is estimated to be $21.85 million, which equates to a cost-effectiveness ratio of $231.45 ($21.85 m / 94,000) per patient modifying drinking behaviour.

Scenario 1 considers an increase in GP detection rates of at risk drinkers. Table 5.2 shows that an additional 5% of at risk drinkers detected, equates to an extra 160,671 at risk drinking patients, an additional 26,858 at risk drinkers offered an intervention from which an additional 12,086 at risk drinkers modify their drinking behaviour. The total cost associated with scenario 1.1 is estimated to be $24.77 million, or $232.60 per patient modifying drinking behaviour.

Scenario 2 considers an increase in the intervention offered by the GP patients detected at being at risk. The results suggest that for every additional 5% of detected at risk drinkers who are offered an intervention, assuming there is no change in the number of at risk drinkers detected, an additional 59,453 at risk drinking patients are offered an intervention from which an additional 26,754 at risk drinkers modify their drinking behaviour. Unlike Scenario 1, increasing rates of intervention improves the average cost-effectiveness from $191.26 for Scenario 2.1 to $81.56 for Scenario 2.3.

Scenario 3 considers an increase in the effectiveness of GP interventions. The results suggest that for an increase of 5% points in the effectiveness of interventions, although there are no additional at risk patients detected or interventions made, an additional 10,489 at risk drinkers modify their drinking behaviour**.** The average cost-effectiveness associated with 5% increase in rates of effectiveness is $208.31 per patient modifying their drinking behaviour.

Scenario 4 considers an increase in a combination of strategies. In scenario 4.1, increasing both detection and intervention rates by 5% points result in an additional 42,455 at risk drinkers modifying their drinking behaviour with a cost-effectiveness of $191.96 per patient modifying their behaviour**.** Increasing rates of both intervention and effectiveness results in the lowest average cost-effective ratio of $172.14.

Table 5.2: Scenario analysis results

Scenario	Number of at risk drinkers detected DD	Number of at risk drinkers offered an intervention OI	Number of at risk drinkers detected, offered an intervention and modify drinking MD	Total cost associated with strategy TC	Cost of strategy per patient modifying drinking behaviour TC/MD
Base case	1,189,050	209,778	94,400	$21,849,339	$231.45
Scenario 1					
1.1: 5% change D	1,349,722	236,636	106,486	$24,768,635	$232.60
1.2: 10% change D	1,510,393	263,494	118,572	$27,687,931	$233.51
1.3: D=100%	3,213,435	537,159	241,722	$58,385,924	$241.54
Scenario 2					
2.1: 5% change I	1,189,050	269,231	121,154	$23,172,157	$191.26
2.2: 10% change I	1,189,050	328,683	147,908	$24,494,975	$165.61
2.3: I=100%	1,189,050	1,189,050	535,072	$43,638,128	$81.56
Scenario 3					
3.1: 5% change E	1,189,050	209,778	104,889	$21,849,339	$208.31
3.2: 10% change E	1,189,050	209,778	115,378	$21,849,339	$189.37
3.3: E = 100%	1,189,050	209,778	209,778	$21,849,339	$104.15
Scenario 4					
4.1: 5% change D+I	1,349,722	304,122	136,855	$26,270,200	$191.96
4.2: 5% change I+E	1,189,050	269,231	134,615	$23,172,157	$172.14
4.3: 5% change D+E	1,349,722	236,636	118,318	$24,768,635	$209.34

Notes: Change is always positive; D = detection; I = intervention, E = effectiveness

5.4 Discussion

5.4.1 Limitations

This analysis has attempted to model the average cost-effectiveness of several broad strategies available to the health sector with the purpose of reducing at risk drinking behaviour within the general population. To develop this model a number of assumptions regarding base case probabilities have been necessary. Estimates of at risk drinkers visiting a GP are derived from the combination of population estimates, general population rates of GP consultations and age-gender specific rates for at risk alcohol use. In the absence of contrary evidence, the rates at which at risk drinkers consult a GP have been assumed to be similar to rates at which the general population consult a GP. Further, the rates of at risk drinking behaviour used are from the BEACH analysis which define at risk drinking differently from the NHMRC (National Health and Medical Research Council 2001). Detection and intervention rates are derived from a research study (Heywood, Ring et al. 1994). However, in a study situation of that type, where GPs could check records or ask patients about the risk factors under study, one might expect that this rate of detection is an overestimate of detection rates in non-study situations. Also, these rates may not accurately reflect improvements in current detection or intervention rates. Another limitation of this study is that the costs of implementing these interventions are not included, and this would be an important consideration if the costs were different across strategies.

5.4.2 Advantages

The methodology employed in this paper provides an innovative and important angle from which to view prevention opportunities available to the GP. Although the base case estimates may be subject to contention, the scenario analysis enables these rates to be varied in both isolation and in combination to gauge the relative effect of different scenarios. Hence, the model is able to provide a gauge of the most cost-effective scenario in terms of a number of different outcome measures and subsequent cost implications. It is important to note that the modelling framework adopted should also be regarded as a first approximation. The complexity of the model may be enhanced through a consideration of the types, and subsequent effectiveness, of various

interventions and by the inclusion of additional costs that may be encountered (not only by Medicare) through the implementation of various scenarios.

5.4.3 Assessment

The potential of preventive medicine lies in identifying groups within the community who have particular behavioural risk factors and effectively modifying those behaviours (Sanson-Fisher, Webb et al. 1986). In this paper we have presented an analysis of at risk drinking as a behavioural risk factor that can be modified by GPs. The results of the scenario analysis suggest that the lowest average cost effectiveness is obtained by increasing the rates at which GPs provide intervention. Based on current rates of detection and intervention, the results suggest that the (Medicare) cost of modifying drinking behaviour of one patient is $231.45. Increasing intervention by 10% points, the cost of modifying drinking behaviour is reduced to $165.61.

5.4.3 Summary

The result of this analysis provides a first approximation of costs and potential reductions in drinking status in the general practitioner environment. The lack of available data on base case estimates, and assumptions required to estimate the number of at risk drinkers in the first instance, clouds the validity of results. Although scenario analysis is used to model variations from base case rates, the incremental change in costs and outcomes are dependent on baseline detection and intervention rates and cost estimates used. It is recommended that before these results are used in a policy context, a more sophisticated model be developed with closer scrutiny to base case estimates.

CHAPTER 6: CONSIDERING THE COSTS AND OUTCOMES OF TREATMENT INTERVENTIONS FOR EXCESSIVE ALCOHOL USE

Gibson, A. and Shanahan, M.

6.1 Introduction

6.1.1 Aims and structure of the chapter

Economics is the study of how choices are made to distribute scarce resources in order to meet unlimited wants. This oft used sentence can be applied to the study of the individual, through to the study of society, but here we will use the concept in an attempt to shed some light on the efficient use of resources in the area of 'treatment' for excessive alcohol use in Australia. Chapter 1 provided an overview of the use of alcohol in Australia and the associated burden of harm related to excessive alcohol use; Chapter 2 provided an overview of economic literature as it pertains to the wider field of interventions for the prevention of harms relating to excessive use of alcohol. There the discussion was on fiscal policies, prevention programs, and specific legislation pertaining to minimum drinking age, blood alcohol levels, outlet density or outlet hours as well as a review of the economic literature on treatment. This chapter, using a more rigorous approach, attempts to use the best information available on treatment interventions to explore the treatment costs and outcomes in the Australian context. Here, the term treatment includes those interventions that are provided by health care professionals such as brief interventions by general practitioners (GPs), psychological interventions and relapse prevention programs.

Economic analysis is often used to explore whether it is cost effective/ cost beneficial to undertake a given treatment from societies' perspective. Given there exists considerable evidence that treating excessive alcohol use is cost beneficial to society (Kristenson, Ohlin et al. 1983; Godfrey 1994), the next step is to assess which treatments are the most cost effective. Clinical studies examine whether or not something works whereas economics explores the relative outcomes and costs of providing treatment. This is because economists are interested in the opportunity cost of a given treatment – that is, considering the 'best' way to use limited resources because by funding one treatment, we must also forego funding other treatments. Considerations are two-fold – which

treatment provides the best outcome for the least expenditure but also what is the total impact of a given expenditure. For example, a given treatment may be very effective but be so expensive that only very few may be able to be treated, whereas another treatment may be less effective but also less expensive and permit a large number of individuals to be treated.

Considerable research has been conducted into understanding whether various interventions work. While this is important, this information does not necessarily provide adequate information to assist with making choices on the efficient allocation of resources within alcohol treatment nor even provide information to assess whether additional resources should be allocated to alcohol treatment.

The aim of this chapter is to:

- Review the effectiveness literature on treatments for excessive alcohol use in Australia on said treatments;
- Assess resource use of those treatments;
- Discuss the limitations of applying these data in the Australian context; and
- Estimate the cost of providing this treatment in Australian dollars.

6.2 Methods

6.2.1 Modelling

As was established in Chapter 2, the information currently available comparing the costs and cost effectiveness of various interventions for risky or dependent drinking are minimal and to our knowledge there is little data available in the Australian context. Therefore, one way forward is to use a modelling exercise to pool together what is known (from the Australian and the international literature) in terms of effectiveness of interventions with Australian costs of those interventions. Prior to discussing the data used in the modelling it is worth understanding the methods and benefits of using this method of economic analysis.

6.2.1.1 What is decision-modelling and why use it?

Modelling is often used in economic evaluations when valid and reliable empirical data (e.g. from randomised controlled trials, or RCTs) on costs, the epidemiology of disease, or screening/treatment effectiveness are not available for each alternative intervention, or when the relationship between costs and effects needs to be estimated under different assumptions (O'Malley, Jaffe et al. 1992; Claxton, Sculpher et al. 2002). Moreover, even where good quality trial data exist, modelling is usually required to extrapolate the empirically demonstrated short term effects, to predict any longer-term outcomes of interest such as reductions in morbidity or mortality.

Modelling, whether descriptive or predictive in aim, essentially provides a method for integrating information about the policy or clinical choices to be made, known or estimated epidemiological data about disease processes, and the costs and effectiveness of alternative interventions or other events.

6.2.2 Outcomes

This chapter was not intended to be an exhaustive review of alcohol treatments and their outcomes, but instead aimed to examine the outcomes of the most influential meta-analyses and studies of alcohol treatment. The primary sources for studies for this

exercise were the National Alcohol Strategy document on the treatment of alcohol problems (Shand, Gates et al. 2003), Cochrane Systematic Reviews, and meta-analyses and recent review articles discovered through Medline, Cinahl, Embase and PsychInfo searches.

In many cases, meta-analyses of the effectiveness of different types of alcohol treatment report their results in statistical "effect sizes". This approach expresses the effect of treatment in standard deviation units and is an approach that often combines the results from studies with a wide range of outcome measures. However, for the purpose of the proposed analyses in this report, a single "natural" outcome measure was required. "Natural" measures of outcomes are, by way of example: alive or dead; ill or well; or in this case, drinking or not drinking outcomes including number of drinks consumed.

Studies of alcohol treatment report a large range of different outcome measures, making it difficult to directly compare outcome from studies. This is not a new finding; it has been recommended that future studies use common outcome criteria so that meta-analysis is better able to be performed (Agosti 1995). In recent years, there is still a lack of generally accepted outcome measures in alcohol dependence treatment research (Overman, Teter et al. 2003).

As a single outcome measure is not consistently reported across the different types of alcohol treatment, the decision was made to use two outcome measures, grams of alcohol consumed per week and percentage of days abstinent.

- Alcohol consumption per unit time translatable into grams of pure ethanol per week is commonly reported in brief intervention studies, psychotherapy studies including self guided interventions, and a few relapse prevention studies using naltrexone.
- Abstinence outcomes (percentage days abstinent, or the number of days in a study where the patient did not have an alcoholic drink as a percentage of the total number of days in the study) was the common outcome for relapse prevention studies using acamprosate, naltrexone and few psychotherapy studies.

For those types of studies where both outcomes were reported, both are presented here. The lack of a single outcome measure for all treatment types means that direct comparison of effects between some treatment types is not possible.

6.2.2.1 Risky and dependent drinkers

People who might benefit from interventions to reduce or cease alcohol consumption are not a homogeneous group and have different levels of alcohol consumption. In this evaluation we consider two groups: risky drinkers and dependent drinkers. "Risky drinkers", for the purpose of this economic analysis, are people whose drinking level puts them at high risk of alcohol-related harms but do not fit a definition of dependent drinking. In addition, these people have not yet identified themselves as having a problem with alcohol consumption.

The actual drinking level required to meet the classification of risky drinkers varied according to each study's national drinking guidelines. The Australian definition of people at high risk of chronic alcohol-related harm, for instance, includes men drinking more than 29 to 42 drinks per week and women drinking more than 15 to 28 drinks per week, where one "drink" contains 10 grams ethanol (Shand, Gates et al. 2003).

"Dependent drinkers" are classified by each of the studies in the analysis as fitting some commonly recognised diagnostic criteria for alcohol dependence, such as those in the DSM-IV. On average, these individuals drink at higher levels than risky drinkers, and they would usually (although not always) consider themselves as having a problem with alcohol consumption. Of course, in reality, the distinction between a risky and a dependent drinker is not as clear cut as stated here.

Different forms of treatment are more appropriate to individuals with different levels of alcohol consumption, and the goal of treatment might vary from reducing alcohol consumption ("moderated drinking") to abstaining from alcohol consumption depending on the client's goals, level of dependence, physical health and relapse history (National Health & Medical Research Council 2001). There is strong evidence to recommend that the intensity of treatment interventions should vary, with individuals with more severe alcohol-related problems receiving more intensive treatment (Shand, Gates et al. 2003). Treatments such as brief interventions are more likely to be acceptable to individuals with less severe drinking problems (Moyer, Finney et al. 2002), whereas pharmacotherapies such as acamprosate and naltrexone for relapse prevention are only recommended for moderate to severely alcohol dependent clients (Shand, Gates et al. 2003).

6.2.2.2 Selecting studies

Types of alcohol treatments considered for this analysis were broadly those considered in Australian Guidelines as having good levels of evidence and supported as treatment options in Australia (Shand, Gates et al. 2003). Treatments included are brief interventions, psychosocial interventions (motivational approaches, cognitive-behavioural approaches and self guided materials), and pharmacotherapies (including acamprosate and naltrexone). Treatments to manage alcohol withdrawal (also known as "detoxification" treatments) are not included in this analysis, but are discussed in Chapter 2.

Brief intervention studies

> Definition of "brief intervention studies": These opportunistic interventions are often offered to patients in primary health care settings who have not sought treatment for alcohol problems. The aim is to inform patients that they are drinking at levels that could lead to health problems, and encourage them to decrease consumption so as to reduce the risk of future health problems (National Drug and Alcohol Research Centre 2003). The intervention generally involves screening for level of alcohol consumption, then one brief intervention with a GP of between 5 and 30 minutes. Generally some take-away information is provided in combination with the GP consultation; including pamphlets, booklet or self-help manual. Interventions that involve between two and five brief interactions with a general practitioner are classified in this analysis as "Multi-session Brief intervention studies".

Brief intervention treatment studies were selected from two meta-analysis reviews (Bien, Miller et al. 1993; Moyer, Finney et al. 2002) if they met certain inclusion criteria, listed below. Individual site reports for a multinational study (WHO Brief Intervention Study Group 1996), reported separately in the later meta-analyses were considered as a single study in this work.

Studies were assessed according to the following inclusion criteria: compared brief intervention versus control conditions (screening for study eligibility); reported a measure of alcohol consumption in units per time period or percentage abstinent days; had a randomised controlled design; were published in 1985 or later; had numbers of participants greater than 500; recruited subjects from the general population (eg: subjects attending general practice settings or workplace settings); and presented baseline and follow-up data. The inclusion criterion of having male and female outcomes reported separately was initially included as evidence suggests that brief interventions have different outcomes for males and females (WHO Brief Intervention Study Group 1996). However, separate results for males and females were not able to be included in this analysis as many studies of other forms of treatment, such as psychosocial and pharmacological interventions, do not report outcomes separately by gender.

Psychosocial intervention studies

Definition of "self guided interventions": Although self guided materials can form part of other types of interventions (such as brief interventions), this analysis focuses on the self guided material as the primary intervention. The only contact with a medical professional is to briefly assess the client and determine whether the intervention is appropriate. Self guided materials are provided to the client in either booklet or electronic (computer-based) format.

Definition of "motivational interventions": Client-centred, non-confrontational style of counselling, often used as the counselling style in brief interventions with risky drinkers. The goal of motivational interviewing is to steer the client toward motivation for change by drawing out reasons for change from the client (National Drug and Alcohol Research Centre 2003). Motivational enhancement therapy is a style of motivational intervention initially developed for Project MATCH, where it was used with dependent drinkers (Project MATCH Research Group 1997).

Definition of "cognitive-behavioural interventions" (CBT): Cognitive-behavioural interventions refers to an approach covering a range of strategies

> and techniques derived from learning principles, based on the observation that modifying and re-learning behaviour is influenced by how people view themselves and others (National Drug and Alcohol Research Centre 2003). Approaches include cue exposure therapy, behavioural self control training, skills training and cognitive restructuring.

The most recent Cochrane Collaboration systematic review (Huibers, Beurskens et al. 2003) only included two studies that reported the effectiveness of psychosocial interventions by general practitioners for excessive alcohol consumption. Since the interventions and outcome measures were partially incomparable for the two studies, meta-analysis was not performed and evidence was seen as limited or conflicting for the effectiveness of psychosocial interventions by general practitioners (Huibers, Beurskens et al. 2003). Neither of these studies expressed their results in appropriate outcome measures for our analysis.

Agosti (1995) could not adequately assess psychosocial interventions for alcohol treatment in a meta-analysis due to there being a large range of non-comparable outcome measures in the literature. The author suggests that outcome differences could be due to differences between therapists rather than between psychotherapies, and made the recommendations that outcome measures be standardised (Agosti 1995). However, in a review of literature, this does not appear to have occurred in recent years. Psychosocial studies were found to have broad ranging outcome measures and types of interventions, making the task of finding a set of representative comparison studies more difficult compared to brief interventions. Additionally, some psychosocial studies were of lower methodological quality and smaller sample size than the brief intervention studies.

Inclusion criteria for psychosocial intervention studies were studies which compared a motivational, CBT or self guided intervention with either screening or one of the previously mentioned interventions; published in 1985 or later. Studies also needed to report a measure of alcohol consumption in units per time period or in percentage abstinent days. Combinations of psychosocial interventions were permitted, for instance, self guided CBT interventions. The criteria did not exclude non-randomised studies although higher quality studies were selected where ever possible.

Studies identified in the National Alcohol Strategy document (Shand, Gates et al. 2003) were included if they had appropriate outcome units. Project MATCH outcomes (Project MATCH Research Group 1997) were obtained by gaining access to the public data set for the project.

A brief review of Medline (search terms: alcohol, psychosocial/ cognitive-behavioural/ motivational/ self guided/ bibliotherapy, treatment, review articles) revealed other related review articles. Articles from reviews by Morgenstern and Longabaugh (2000) and Carroll (1996) with appropriate outcome units were considered for cognitive-behavioural interventions (Carroll 1996; Morgenstern and Longabaugh 2000). Articles from DiClemente et al. (1999) with appropriate outcome units were considered for motivational interventions (DiClemente, Bellino et al. 1999). Articles from Apodaca and Miller (2003) were also considered for self guided interventions provided they presented suitable outcome measures (Apodaca and Miller 2003).

Meta-analyses often classified some of the same studies differently. For instance, in one meta-analysis a study might be classified as a brief intervention, and in another as a self guided intervention or a motivational intervention. All studies were re-classified using our definitions of the different types of interventions. The results are grouped by intervention and comparison group and presented in Table 6.1.

Relapse prevention pharmacotherapies: naltrexone and acamprosate

The recent Cochrane review of opioid antagonists for alcohol dependence (Srisurapanont and Jarusuraisin 2003) discusses the efficacy of naltrexone in comparison with placebo, acamprosate, disulfiram, nefazodone and other relapse prevention pharmacotherapies. Primary outcome measures include: number of patients who return to drinking, percentage or number of drinking days, number of standard drinks of alcohol, and amount of alcohol consumed.

For us to get a more comparable selection of studies, only those studies that included subjects who had already withdrawn from alcohol at the time of enrolment were used in this analysis. Since this was not a criterion of the Cochrane review (Srisurapanont and

Jarusuraisin 2003), a further review of the studies comparing naltrexone and placebo treatment was undertaken.

For acamprosate treatment, studies were selected from three reviews (Mason and Ownby 2000; Kranzler and van Kirk 2001; Overman, Teter et al. 2003). In their meta-analysis of acamprosate in the treatment of alcohol dependence, Overman et al. (2003) states that there is a lack of generally accepted outcome measures, and outcome data for trials evaluating naltrexone are different from those in the acamprosate trials (Overman, Teter et al. 2003).

6.2.2.3 Outcomes calculations

For each study where the outcome data were in various units of alcohol consumption per unit time, outcomes were converted to units of grams of ethanol consumed per week. In many studies, the unit "standard drinks" was used. Since "standard drinks" varies in alcohol content between countries (Miller, Heather et al. 1991), the definition of standard drinks/ units was obtained from the same study paper. Where a study paper did not define the alcohol content of their unit of standard drinks, a secondary paper of the same study or the published measurement instrument used in the study was consulted, for example the Project MATCH definition of "drinks" was obtained from one of the later study papers (Holder, Cisler et al. 2000). If this was unsuccessful, a country-specific definition of "standard drinks" was used (Miller, Heather et al. 1991).

Mean alcohol consumption at baseline and follow-up for intervention and control groups were collected, in addition to the sample size of each study. Mean change in alcohol consumption, then the weighted percentage change in alcohol consumption was calculated for each comparison group. Standard deviations, standard error or variance were sought for each study in order to calculate a 95% confidence interval for the weighted percentage change in alcohol consumption of each comparison group. Since not all studies published standard deviations, standard errors or variances, 95% confidence intervals could not be calculated for the full sample of studies and ranges have been given instead.

For studies where the outcome data were in units of abstinence, outcomes were transformed into percentage of total days abstinent (days in the study where the

participants had no alcohol consumption). This transformation was necessary as follow-up periods varied in length from three to 19 months. For the same reasons as stated above, 95% confidence intervals were not able to be calculated, and ranges have been given.

6.2.3 Costs

The next step was to estimate the costs for each intervention; however when using the literature to estimate the costs it was necessary to make several decisions. A first step was to understand the resource implications of various treatments by documenting estimates of the resources involved for each intervention for each study included in this analysis. Next, we reviewed the Australian treatment context and guidelines (National Drug and Alcohol Research Centre 2003), and estimated the resource use necessary to provide each intervention as per those guidelines. If a substantial difference existed between the type and quantity of resources used in the various studies and the Australian guidelines a decision needed to be made on which to use. If the literature were used, the cost may not reflect the Australian context; if the Australian guidelines was used the outcomes generated in the literature may not occur. In this study, a decision was made to cost Australian guidelines where available and to use sensitivity analysis to explore the potential impact of this decision. Once the resource use has been described, an appropriate price in Australian dollars was determined and a final cost of treatment was arrived at. Costs for resources only used for the purpose of research were excluded.

Costs of research treatments differ from the costs of non-research treatments in a number of ways. For example in the Project MATCH study, clinicians received training, supervision and monitoring at levels well above those seen in routine clinical practice (Cisler, Holder et al. 1998). For this reason we were interested in the cost of a treatment in the manner it would be implemented in clinical practice.

Estimating the resources used for each of the studies as they would occur in the routine treatment context requires some general assumptions to be made. For example: pathology tests that appeared to be used for the primary purpose of assessing the level of alcohol use (urine ethanol content) or dependence (liver enzyme levels), were considered to be research-only tests. Pathology tests taken at the baseline medical that served to assess the health of a subject's liver or kidneys were considered to be clinical tests. For

the pharmacotherapy studies, medical consultations were judged to occur only at the frequency needed for the writing of new prescriptions. In our decisions about the research or clinical nature of resource use we were guided by any available clinical guidelines (National Drug and Alcohol Research Centre 2003) and expert clinical opinion. Assumptions made have been documented in the costing results section.

6.2.4 Analysis/ Cost effectiveness analysis

The intent of this chapter is to estimate the costs and outcomes for each intervention with the intent to examine the cost effectiveness of the various treatments. Given the uncertainties (outlined below) in conducting this analysis it was decided that a formal cost-effectiveness analysis was not warranted. The key areas of concern are: firstly, the uncertainty around the relationship between resources used in the recommended treatment in Australia and outcomes achieved in the literature with highly resourced RCTs; secondly, the lack of knowledge on uptake or completion rates of therapy; and thirdly, the lack of a consistent outcome measures across all treatment types.

In addition, to be able to draw valid comparisons between the outcomes of different interventions, studies needed to be as homogeneous as possible in terms of methodology, outcome measures, study population, quality of evidence and sampling method. In the review of the effectiveness literature, we attempted to achieve homogeneity and for the most part this was achieved at least within a type of treatment. It would be ideal if all treatments could be compared to a common condition or treatment, such as a "screening only" condition but in actuality this was not the case.

Given all these limitations of the data, we limited analysis to estimating the average cost of the intervention and the average cost of achieving a 1% improvement in abstinence days or the average cost of achieving a 1% decrease in alcohol consumption over a given time period. These estimates unfortunately do not provide the marginal costs and benefits of one type of treatment over the other.

Sensitivity analysis was performed to allow for uncertainty in our assumptions concerning the costs and outcomes in this analysis. Firstly we have constructed a scenario for the treatment and costs as they would be most likely to occur in the clinical setting. We then continued with one way sensitivity analyses, varying only one cost or

outcome variable at a time, such as doubling the amount of counselling appointments or halving the retention in treatment, to investigate the results of these actions.

6.3 Results

6.3.1 Outcomes

Studies included for each intervention are presented, as are outcomes. A summary of all results is presented in Table 6.16 at the end of this section.

6.3.1.1 Brief intervention studies

In this analysis, brief intervention studies examined the "risky drinkers" population, who were generally people who had not previously identified that they might have a risky or dependent level of drinking requiring intervention. These subjects were only identified as "at risk" through a screening process in a primary care or workplace setting. For the purposes of this analysis, the subjects in the brief intervention studies have been assessed as coming from a similar population. All selected studies also have a follow-up interval that is as close as possible to six months (range: six to nineteen months; mean of nine months, see Table 6.1).

Brief interventions meeting our selection criteria are included in the analysis as either brief intervention studies or multi-session brief intervention studies (Table 6.1). Reclassified studies that did not meet the brief intervention study selection criteria were excluded (see Appendix 2). One multi-session brief intervention study (Heather, Campion et al. 1987) which did not meet the brief intervention study selection criteria due to lack of sample size, was retained in the analysis to increase the number of studies.

Table 6.1: Selected brief intervention studies[a]

Study	No. of subjects (females)	Length of follow-up	Comparison groups	Recruitment source	Country
Fleming, Barry et al. (1997)	774 (292)	6 months	Multi-session brief intervention, screening only	Primary care	US
Heather, Campion et al. (1987)	104 (26[b])	6 months	Multi-session brief intervention, screening only	Primary care	UK
Ockene, Adams et al. (1999)	530 (187)	6 months	Brief intervention, screening only	Primary care	US
Richmond, Kehoe et al. (1999)	954 (203)	8 months	Brief intervention, screening only	Police employees	Australia
Wallace, Cutler et al. (1988)	909 (268)	6 months	Brief intervention, screening only	Primary care	UK
WHO Brief Intervention Study Group (1996)	1559 (299)	6-19 months[c]	Brief intervention, screening only	Primary care	Multi-national[d]

[a] No subjects in the studies were 'withdrawn' from alcohol before brief intervention
[b] Outcomes not separately available for males and females
[c] Each study site had a different follow-up interval. Mean length of follow-up was 9.3 months.
[d] Study sites were in Australia, Bulgaria, Costa Rica, Kenya, Mexico, Norway, Russia, Wales, USA and Zimbabwe

Table 6.2: Brief intervention study outcomes

Study	N (group used for analysis)	Group	Mean reduction (g/week ethanol) from baseline	Mean reduction (%) from baseline
Ockene, Adams et al.(1999)	274	Brief intervention & screening	78.1	33%
Richmond, Kehoe et al. (1999)[c]	494	Brief intervention & screening	4.0	3%
Wallace, Cutler et al. 1988)[b]	448	Brief intervention & screening	125.9	26%
WHO Brief Intervention Study Group (1996)[a,d]	503	Brief intervention & screening	119.9	28%
Weighted mean[e]				**21%**
Ockene, Adams et al. (1999)	256	Screening only	39.7	19%
Richmond, Kehoe et al. (1999)[c]	460	Screening only	-25.0	-15%
Wallace, Cutler et al. (1988)[b]	459	Screening only	73.3	15%
WHO Brief Intervention Study Group (1996)[a,d]	488	Screening only	49.6	11%
Weighted mean[e]				**6%**

[a] No published standard deviation
[b] ITT analysis excluded 2 subjects who died during the study
[c] Only a 30% overlap between those subjects completing the baseline and follow-up interviews: data considered to be independent samples.
[d] Only two thirds of the groups in this study used for analysis
[e] Means have been weighted by the group sample size.

Table 6.3: Multi-session brief intervention study outcomes

Study	N (group used for analysis)	Group	Mean change (g/week ethanol) from baseline	Mean change (%) from baseline
Fleming, Barry et al. (1997)	392	Multi-session brief intervention	90.8	40%
Heather, Campion et al. (1987)[a]	34	Multi-session brief intervention	67.0	20%
Weighted mean[b]				**38%**
Fleming, Barry et al. (1997)	382	Screening	47.5	21%
Heather, Campion et al. (1987)[a]	38	Screening	73.0	16%
Weighted mean[b]				**20%**

[a] Only two thirds of the groups in this study used for analysis
[b] Means have been weighted by the group sample size.

The outcomes for both the brief intervention groups and the multi-session brief intervention groups for these studies result in a greater reduction in alcohol consumption than outcomes obtained by screening alone. We cannot test the significance of this difference because not all studies have published the standard deviation, standard error or variance associated with the change in alcohol consumption. It is of note that in the only workplace-based study (using police employees), the alcohol consumption of the screening group worsened, while the brief intervention group remained relatively unchanged (Richmond, Kehoe et al. 1999).

When the mean percentage change in alcohol consumption was weighted for the number of subjects in each study, the brief intervention treatment groups had a mean change of 21% (range: 3 to 33%, see table 6.2); while the multi-session brief intervention treatment groups had a mean change of 38% (range: 20 to 40%, see table 6.3). The screening group for the multi-session brief intervention studies also had a greater mean change, 20% (range 16 to 21%), compared to the brief intervention screening groups, 6% (-15 to 19%, see Table 6.2). The results of the police employees study (Richmond, Kehoe et al. 1999) has lowered the mean change of the brief intervention group for both treatment and screening groups. The impact of including this study is explored in the sensitivity analysis.

6.3.1.2 Psychosocial intervention studies

Articles from recent reviews (Carroll 1996; DiClemente, Bellino et al. 1999; Morgenstern and Longabaugh 2000; Apodaca and Miller 2003; Shand, Gates et al. 2003) that were excluded from the analysis are listed with their reasons for exclusion in Appendix 2. Included studies appear in Tables 6.4 (motivational interventions), 6.5 (cognitive-behavioural interventions) and 6.6 (self guided interventions).

Subjects for the psychosocial interventions appear to come from a similar population. All subjects had demonstrated that they judged themselves to have risky or dependent levels of alcohol consumption, whether in responding to a media advertisement in the style of "Do you have a risky level of alcohol consumption?", or already being in treatment for alcohol dependence. Subjects categorised themselves as requiring an intervention for risky or dependent alcohol consumption, and were not identified through routine screening programs in primary care or the workplace. Studies have been selected with follow-up intervals as similar to each other as possible to make the outcomes comparable. Follow-up intervals for the studies range from three to six months (see Tables 6.4, 6.5 and 6.6).

The population receiving psychosocial interventions were different from the population receiving pharmacotherapy interventions; in that not all subjects had a required period of withdrawal from alcohol consumption before entering the study. It has been reported that the major problem with the evidence on psychosocial interventions is the lack of standardisation in the interventions (Ludbrook, Godfrey et al. 2002), making comparisons between interventions difficult.

Many studies classified as psychosocial interventions were excluded (see Appendix 2). The most common reason for this was the study being "considered a brief intervention study". This occurred when a study intervention met our definition of a brief intervention study (the primary intervention was a brief consultation with a medical professional about their drinking) instead of our definition of a self guided study (where the primary intervention was the reading materials handed out at a medical interview or other encounter). This exclusion reason was particularly common (but not exclusively so) for studies identified from the meta-analysis of self guided interventions (Apodaca and Miller 2003). Another example was a study from the meta-analysis of motivational

interventions (DiClemente, Bellino et al. 1999), which was considered a brief intervention study because the only contact with a clinical staff member was a single 30 minute consultation with a GP discussing their levels of alcohol consumption (Heather, Rollnick et al. 1993).

Studies listed as having "no alcohol consumption or abstinence outcomes" used outcome measures that were not appropriate for this analysis because they were not common across other treatment interventions. Examples of these outcomes included: change on an alcohol dependency scale; alcohol avoidance skill; categorical outcomes of "problem drinker" and "drinking above recommended guidelines"; drink driving behaviour; percentage "heavy" drinking days; and the incidence of alcohol-related problems.

Table 6.4: Selected motivational enhancement therapy (MET) intervention studies

Study	No of subjects (females)	Length of follow-up	Comparison groups	Recruitment	Country
Project MATCH Research Group (1997) Aftercare[a]	774 (155)	6 months	Motivation enhancement therapy, CBT	Inpatient alcohol treatment	US
Project MATCH Research Group (1997) Outpatient[b]	952 (264)	6 months	Motivation enhancement therapy, CBT	Outpatient alcohol treatment	US

[a] Subjects had been withdrawn from alcohol before receiving study treatment
[b] Subjects were withdrawn from alcohol prior to study treatment if medically indicated (unknown how many were withdrawn prior to treatment).

Table 6.5: Selected cognitive-behavioural intervention studies

Study	No of subjects (females)	Length of follow-up	Comparison groups	Recruitment	Country
Dawe, Rees et al. (2002)[d]	100 (39[a])	8 months	CBT, Cue exposure	Media	Australia
Project MATCH Research Group (1997) Aftercare[b]	774 (155)	6 months	Motivation Enhancement Therapy, CBT	Inpatient alcohol treatment	US
Project MATCH Research Group (1997) Outpatient[c]	952 (264)	6 months	Motivation Enhancement Therapy, CBT	Outpatient alcohol treatment	US
Sitharthan, Sitharthan et al. (1997)[d]	42 (9[a])	6 months	CBT, cue exposure	Media	Australia

[a] Outcomes not separately available for males and females
[b] Subjects had been withdrawn from alcohol before receiving study treatment
[c] Subjects were withdrawn from alcohol prior to study treatment if medically indicated (unknown how many were withdrawn prior to treatment).
[d] Subjects were not withdrawn from alcohol before receiving study treatment

Table 6.6: Selected self guided intervention studies[a]

Study	No of subjects (females)	Length of Follow-up	Comparison groups	Recruitment	Country
Heather, Whitton et al. (1986)[c]	132 (21[b])	6 months	Self guided CBT, self guided	Media	UK
Heather, Kissoon-Singh et al. (1990)[d]	107 (38[b])	6 months	Self guided CBT, self guided	Media	UK
Hester and Delaney (1997)	40 (16[b])	20 weeks	Self guided CBT, screening	Media & Primary care	US
Sanchez-Craig, Davila et al. (1996)	155 (56)	3 months	Self guided & assessment, self guided	Media	Canada
(Sitharthan, Kavanagh et al. (1996)	121 (51)	6 months	Self guided CBT, self guided	Media	Australia

[a] All subjects in the studies were not withdrawn from alcohol before study treatment
[b] Outcomes not separately available for males and females
[c] Non-randomised study
[d] Only half the groups in this study used for this analysis

Table 6.7: Motivational enhance therapy (MET) study outcomes

Study	N (group used for analysis)	Group	% Days abstinent (at follow-up)
Project MATCH Research Group (1997) Aftercare[a]	245	Motivation enhancement therapy	82%
Project MATCH Research Group (1997) Outpatient[a]	300	Motivation enhancement therapy	74%
Weighted mean[b]			**78%**

[a] Analysis done only on those subjects followed up
[b] Mean has been weighted for group sample size

All studies assessing a motivational intervention in this analysis are from the one study, Project MATCH. Despite being a very large study, it may not adequately represent the ranges of motivational interventions (and their outcomes) that exist. Many of the studies identified in the review of motivational interventions (DiClemente, Bellino et al. 1999) we subsequently excluded from the analysis of motivational interventions because they more closely met our criteria for a brief intervention study instead. The issue of the intervention outcomes coming only from Project MATCH will be explored in sensitivity analysis.

The results from the two groups within Project MATCH show a high percentage of abstinence from alcohol over the duration of the study (Table 6.7). In the aftercare

group, the abstinence was after an inpatient withdrawal from alcohol, but in the outpatient group only those subjects for whom it was clinically indicated were withdrawn from alcohol before study treatment.

Results for the change in alcohol consumption from baseline for Project MATCH do exist, but have not been included in this table. This is because the baseline measure of alcohol consumption was measured during the three months prior to inpatient or outpatient withdrawal treatment programs, not prior to study treatment. If this baseline measure were to be used, the mean change in alcohol consumption would represent the change attributed to the inpatient or outpatient withdrawal treatment plus the change attributed to the randomised study treatment.

Table 6.8: Cognitive-behavioural intervention studies outcomes

Study	N (group used for analysis)	Group	Mean change (g/week ethanol) from baseline	Mean change (%) from baseline	% Days abstinent (at follow-up)
Dawe, Rees et al.(2002)[a, b]	41	CBT	448.7	45%	33%
Dawe, Rees et al.(2002)[a, b]	39	Cue exposure	566.3	48%	32%
Project MATCH Research Group (1997) Aftercare[b]	251	CBT			84%
Project MATCH Research Group (1997) Outpatient[b]	290	CBT			74%
Sitharthan, Sitharthan et al. (1997)[a,b]	20	CBT	231.7	57%	57%
Sitharthan, Sitharthan et al. (1997)[a,b]	22	Cue exposure	417.7	88%	78%
Weighted mean (CBT)[c]				**49%**	**75%**
Weighted mean (CBT cue exposure)[c]				**62%**	**48%**

[a] No standard deviation published for one or both outcome measures
[b] Analysis done only on those subjects followed up
[c] Mean is weighted for group sample size

The results from Project MATCH using the outcome of percent days abstinent can be compared to other studies using cognitive-behavioural interventions (Table 6.8). In both of the other studies subjects were not withdrawn from alcohol before receiving the study treatments (Sitharthan, Sitharthan et al. 1997; Dawe, Rees et al. 2002), so they might be expected to have lower rates of abstinence. The Project MATCH aftercare group were all withdrawn from alcohol before study treatment, and they had the highest abstinence levels during the study. Only some (exact amount unknown) of the Project MATCH

outpatient group were withdrawn from alcohol prior to study treatment (Project MATCH Research Group 1997). The Sitharthan study cue exposure group has abstinence rates more comparable with Project MATCH (Sitharthan, Sitharthan et al. 1997).

Table 6.9: Self guided intervention studies outcomes

Study	N (group used for analysis)	Group	Mean change (g/week ethanol) from baseline	Mean change (%) from baseline	% Days abstinent (at follow-up)
Heather, Whitton et al. (1986)[a,b,c]	78	Self guided CBT manual	264.0	43%	
Heather, Whitton et al. (1986)[a,b,c]	54	Self guided booklet	170.0	26%	
Heather, Kissoon-Singh et al. (1990)[c]	23	Self guided CBT manual	212.0	37%	
Heather, Kissoon-Singh et al. (1990)[c]	27	Self guided booklet	152.0	23%	
Hester and Delaney (1997)[b,e]	20	Self guided CBT computer program	293.4	59%	49%
Sanchez-Craig, Davila et al. (1996)[c]	74	Self guided book & assessment	158.6	54%	
Sanchez-Craig, Davila et al. (1996)[c]	81	Self guided book	134.4	46%	
Sitharthan, Kavanagh et al. 1996)[c]	70	Self guided CBT letters	216.4	51%	
Sitharthan, Kavanagh et al. (1996)[c]	51	Self guided letters	217.8	46%	
Weighted mean[f]				**44%**	**49%**
Hester and Delaney (1997)[b,e]	20	Screening	303.4	51%	42%

[a] Non-randomised study
[b] No standard deviation published for one or both outcome measures
[c] Analysis done only on those subjects followed up
[d] Exact numbers in each experimental group not given, equal distribution assumed
[e] Analysis done on subjects receiving at least 3 treatment sessions
[f] Mean is weighted for group sample size

The mean percentage change in alcohol consumption for self guided interventions was 44%, with a range of 23 to 59% (Table 6.9). The only study with a screening only group had a mean percentage change in alcohol consumption of 51% for the screening group and 59% for the self guided intervention group.

6.3.1.3 Relapse prevention pharmacotherapies: naltrexone and acamprosate

Included studies comparing naltrexone and placebo treatment from the Cochrane review (Srisurapanont and Jarusuraisin 2003) are listed in Table 6.10. Included acamprosate treatment studies from various reviews (Mason and Ownby 2000; Kranzler and van Kirk 2001; Overman, Teter et al. 2003) are listed in Table 6.11. Excluded pharmacotherapy studies are listed in Appendix 2.

Like the subjects in the psychosocial treatment studies, all subjects in naltrexone or acamprosate treatment studies had demonstrated that they judged themselves to have problematic levels of alcohol consumption, by being in treatment for alcohol dependence. Subjects were not identified through routine screening programs in primary care or the workplace. All subjects in the selected acamprosate and naltrexone treatment studies had withdrawn from alcohol before being randomised to the study.
There was a considerable source of variability within and between the naltrexone and acamprosate groups in terms of length of follow-up period. In all but one study, this follow-up period was the same length as the treatment duration. For naltrexone studies, all but one study had a follow-up period of approximately three months, and the final study had a follow-up period of 12 months. In the acamprosate studies, six studies had a 12 month follow-up period, five studies had a six month follow-up period and the final study had a three month follow-up period. These differences in follow-up period will be dealt with by presenting the costs and outcomes for three to six month follow-up separately to costs and outcomes for 12 month follow-up.

Table 6.10: Selected naltrexone intervention studies[a]

Study	No of subjects (females)	Length of follow-up[e]	Comparison groups	Recruitment	Country
Anton, Moak et al.(1999)	131 (38[b])	3 months	Naltrexone, placebo	Outpatient alcohol treatment	US
Chick, Anton et al. (2000)	175 (44[b])	3 months	Naltrexone, placebo	Outpatient alcohol treatment	UK
Kranzler, Modesto-Lowe et al. (2000)	183 (41[b])	3 months	Naltrexone, placebo	Media and primary care	US
Krystal, Cramer et al.(2001)	627 (12[b])	3 months[d]	Naltrexone, placebo	Outpatient alcohol treatment	US
O'Malley, Jaffe et al. (1992)	97 (25[b])	3 months	Naltrexone, placebo	Outpatients and media	US
Rubio, Jimenez-Arriero et al. (2001)[c]	157 (0)	12 months	Naltrexone, acamprosate	Outpatient alcohol treatment	Spain
Volpicelli, Alterman et al. (1992)	70 (0)	3 months	Naltrexone, placebo	Outpatient alcohol treatment	US
Volpicelli, Rhines et al. (1997)	97 (22[b])	3 months	Naltrexone, placebo	Outpatient alcohol treatment	US

[a] All subjects in the studies had reportedly withdrawn from alcohol before study treatment
[b] Outcomes were not separately available for males and females
[c] Participants were required to have a member of their family accompany them to all study appointments
[d] Alcohol consumption outcomes also available at 12 month follow-up
[e] For all studies this was also the length of the maximum possible treatment period.

Both naltrexone and placebo groups in all of these studies received a substantial amount of psychotherapy in addition to pharmacological treatment. The use of psychotherapy in the studies ranged from "usual psychosocial treatment" (not further specified) to a very intensive program of eight hours individual and group psychosocial treatment and social support per day for the first four weeks, and then group therapy twice per week for the remainder of the program. The amount of psychotherapy provided will become more evident in the section on resource use.

Table 6.11: Selected acamprosate intervention studies[a]

Study	No of subjects (females)	Length of follow-up[f]	Comparison groups	Recruitment	Country
Barrias, Chabac et al. (1997)	302[e]	12 months	Acamprosate, placebo	Treatment centres	Portugal
Besson, Aeby et al. (1998)[d]	118 (22[b])	12 months	Acamprosate, placebo	Psychiatric clinics	Switzerland
Chick, Howlett et al. (2000)	581 (96[b])	6 months	Acamprosate, placebo	Psychiatric and general hospital clinics	UK
Geerlings, Ansoms et al. (1997)	262 (63[b])	6 months	Acamprosate, placebo	Treatment centres	Belgium, Netherlands, Luxembourg
Ladewig, Knecht et al. (1993)	61[e]	6 months	Acamprosate, placebo	Psychiatric hospitals	Switzerland
Paille, Guelfi et al. (1995)	538 (108[b])	12 months	Acamprosate (low and high dose), placebo	Specialist alcohol centres	France
Pelc, Verbanck et al. (1997)	188[e]	3 months	Acamprosate (low and high dose), placebo	Inpatient alcohol treatment	Belgium, France
Poldrugo (1997)	246 (67[b])	6 months	Acamprosate, placebo	Treatment centres	Italy
Rubio, Jimenez-Arriero et al. (2001)[c]	157 (0)	12 months	Naltrexone, acamprosate	Outpatient alcohol treatment	Spain
Sass, Soyka et al. (1996)	272 (61[b])	12 months	Acamprosate, placebo	Psychiatric outpatient clinics	Germany
Tempesta, Janiri et al. (2000)	330 (57[b])	6 months	Acamprosate, placebo	Outpatient alcohol treatment	Italy
Whitworth, Fisher et al. (1996)	448 (95[b])	12 months	Acamprosate, placebo	Hospitals	Austria

[a] All subjects in the studies were withdrawn from alcohol before study treatment
[b] Outcomes were not separately available for males and females
[c] Participants were required to have a member of their family accompany them to all study appointments
[d] Only results from subjects not concurrently taking disulfiram medication used
[e] Number of female subjects not stated
[f] For all studies this was also the length of the maximum possible treatment period.

Four acamprosate studies included a substantial amount of psychotherapy in addition to pharmacotherapy treatment (see Tables 6.14 and 6.15).

In a Cochrane review on naltrexone treatment (Srisurapanont and Jarusuraisin 2003) short term outcomes (up to three month outcomes) comparing naltrexone and placebo showed significant differences in favour of naltrexone in the number of patients that return to drinking (61% naltrexone, 69% placebo, Relative risk (RR)= 0.88 (0.80 to

0.98)); percentage or number of drinking days (Weighted mean difference (WMD)= -4.52 (-5.29 to -3.75); and number of patients who relapse to alcohol dependence (38% naltrexone, 60% placebo, RR= 0.63 (0.44 to 0.91)). There were no significant differences between naltrexone and placebo in treatment discontinuation rates; amount of alcohol consumed (WMD= 0.51 (-0.11 to 1.13)); and duration of adherence to treatment (WMD= 0.80 (-1.18 to 1.13)). The majority of the studies included in this review also included a substantial amount of psychotherapy in addition to pharmacotherapy in both naltrexone and placebo treatment groups (Srisurapanont and Jarusuraisin 2003).

Medium-term outcomes (between three and 12 month outcomes) revealed no significant differences in outcomes between naltrexone and placebo groups (Tables 6.12 and 6.13). The reviewers conclude that naltrexone is effective for alcohol dependence in short term treatment, and the evidence may be too weak to support the superiority of naltrexone to acamprosate. Naltrexone treatment is recommended to be given concurrently with a psychosocial intervention, as was the case for the majority of these studies. Further randomised, placebo-controlled trials of naltrexone treatment for alcohol dependence are still required to identify which treatments are most cost effective (Srisurapanont and Jarusuraisin 2003).

Table 6.12: Naltrexone intervention studies outcomes (three to six month outcomes)

Study	N (group used for analysis)	Mean change (g/week) from baseline	Mean change (%) from baseline	% Days abstinent (follow-up)
NALTREXONE PLUS COUNSELLING GROUPS				
Anton, Moak et al. (1999)[a]	68	770.1	97%	90%
Chick, Anton et al. (2000)[b]	90	759.9	83%	
Kranzler, Modesto-Lowe et al. (2000)[d,e]	61			79%
Krystal, Cramer et al. (2001)[a,c,d,e]	209	693.2	89%	89%
O'Malley, Jaffe et al. (1992)[b,d]	52	533.0	97%	96%
Volpicelli, Alterman et al. (1992)	35			98%
Volpicelli, Rhines et al. (1997)[d]	48			94%
Weighted mean[f]			**90%**	**90%**
PLACEBO PLUS COUNSELLING GROUPS				
Anton, Moak et al. (1999)[a]	63	735.4	92%	82%
Chick, Anton et al. (2000)[b]	85	657.8	70%	
(Kranzler, Modesto-Lowe et al. (2000)[d,e]	63			84%
Krystal, Cramer et al. (2001)[a,c,d,e]	209	586.1	85%	86%
O'Malley, Jaffe et al. (1992)[b,d]	52	504.7	92%	90%
Volpicelli, Alterman et al. (1992)	35			92%
Volpicelli, Rhines et al. (1997)[d]	49			89%
Weighted mean[f]			**84%**	**86%**

[a] "Standard drink" definition obtained from Miller, Heather et al. (1991)
[b] Intention to treat analysis only used clients who had received at least medication for one week
[c] Not analysed by intention to treat
[d] Standard deviations not available for one or both outcome measures
[e] Only two of three study groups used for this analysis
[f] Means weighted by group sample size

Table 6.13: Naltrexone intervention studies outcomes (12 month outcomes)

Study	N (group used for analysis)	Group	Mean change (g/week) from baseline	Mean change (%) from baseline	% Days abstinent (follow-up)
Rubio, Jimenez-Arriero et al. (2001)	77	Naltrexone & counselling			67%

The most important thing to note about the outcomes of the naltrexone intervention studies is that in the majority of cases, the results obtained for the naltrexone and counselling groups were very similar to those obtained by the placebo and counselling groups. In the weighted alcohol consumption three to six month outcomes the mean percentage change for the naltrexone groups was 90% (range: 83 to 97%), compared to 84% (range 70 to 92%) in the placebo groups. In weighted percent days abstinence three

to six month outcomes, naltrexone groups had 90% (range: 79 to 98%) study days abstinent and placebo groups had 86% (range: 82 to 92%) study days abstinent (see Table 6.16). The magnitude of the change for both outcome measures in the naltrexone and placebo groups is high and may reflect an effect of intense counselling and clinician contact, as well as a pharmacological effect.

Table 6.14: Acamprosate intervention studies outcomes (three to six month outcomes)

Study	N (group used for analysis)	Group	% Days abstinent (follow-up)
Chick, Howlett et al. (2000)[a,b]	289	Acamprosate	43%
Geerlings, Ansoms et al. (1997)[a]	128	Acamprosate	34%
Ladewig, Knecht et al. (1993)	29	Acamprosate	68%
Pelc, Verbanck et al. (1997)[a]	63	Acamprosate high dose	63%
Pelc, Verbanck et al. (1997)[a]	63	Acamprosate low dose	58%
Poldrugo 1997)[a]	122	Acamprosate & counselling	55%
Tempesta, Janiri et al. (2000)[a]	164	Acamprosate & counselling	61%
Weighted mean[c]			**58%**
Chick, Howlett et al. (2000)[a,b]	292	Placebo	45%
Geerlings, Ansoms et al. (1997)[a]	134	Placebo	24%
Ladewig, Knecht et al. (1993)	32	Placebo	43%
Pelc, Verbanck et al. (1997)[a]	62	Placebo	38%
Poldrugo (1997)[a]	124	Placebo & counselling	39%
Tempesta, Janiri et al. (2000)[a]	166	Placebo & counselling	49%
Weighted mean[c]			**41%**

[a] Intention to treat analysis only used clients who had received at least one medication dose
[b] Standard deviations not available for one or both outcome measures
[c] Means were weighted by study group size

Table 6.15: Acamprosate intervention studies outcomes (12 month outcomes)

Study	N (group used for analysis)	Group	% Days abstinent (follow-up)[b]
Barrias, Chabac et al. (1997)[a]	150	Acamprosate	48%
Besson, Aeby et al. (1998)[a,c]	55	Acamprosate	38%
Paille, Guelfi et al. (1995)[a]	173	Acamprosate high dose	54%
Paille, Guelfi et al. (1995)[a]	188	Acamprosate low dose	61%
Rubio, Jimenez-Arriero et al. (2001)	80	Acamprosate & counselling	49%
Sass, Soyka et al. (1996)[a]	136	Acamprosate & counselling	67%
Whitworth, Fisher et al. (1996)[a]	224	Acamprosate	39%
Weighted mean[d]			**52%**
Barrias, Chabac et al. (1997)[a]	152	Placebo	35%
Besson, Aeby et al. (1998)[a,c]	55	Placebo	20%
Paille, Guelfi et al. (1995)[a]	177	Placebo	47%
Sass, Soyka et al. (1996)[a]	136	Placebo & counselling	48%
Whitworth, Fisher et al. (1996)[a]	224	Placebo	29%
Weighted mean[d]			**37%**

[a] Intention to treat analysis only used clients who had received at least one medication dose
[b] Standard deviations not available for one or both outcome measures
[c] Only study groups not receiving disulfiram used for analysis
[d] Mean weighted by the group sample size

Even within the pharmacotherapy studies, not all had comparable outcome measures. No acamprosate intervention study reported alcohol consumption outcomes. Seven naltrexone interventions studies reported only abstinence outcomes, two reported only alcohol consumption outcomes and six studies reported both.

In the three to six month outcomes, the weighted mean percentage abstinent days for the acamprosate groups was 58% (range: 34 to 68%) and the mean for the placebo groups was 41% (range 24 to 49%, see Table 6.16). For twelve month outcomes, the weighted mean percentage abstinent days for acamprosate was 52% (range: 38 to 67%) and the mean for the placebo groups was 37% (range: 20 to 48%). The psychosocial interventions for acamprosate studies tended to be less intensive than those for the naltrexone studies.

6.3.1.4 Summary of outcomes

The following discussion refers to Table 6.16. In both brief interventions and multi-session brief interventions, treatment conditions appeared to produce greater mean change in alcohol consumption outcomes than control conditions (screening only).

Much larger changes in alcohol consumption were seen in the treatment groups of motivational enhancement therapy and CBT groups, although it should be noted that all or half of the respective outcomes for these interventions came from the one study, Project MATCH. Two cognitive-behavioural interventions using cue exposure treatment had lower changes in mean alcohol consumption than the main cognitive-behavioural intervention group. Motivational enhancement therapy, CBT and CBT with cue exposure treatment were not able to be compared to control conditions.

Nine self guided intervention groups produced a weighted mean change in alcohol consumption of 44% reduction from baseline consumption levels. There was only one control condition, and this had a greater reduction in alcohol consumption (51%) than the treatment groups.

Naltrexone three to six month outcomes in both treatment (naltrexone plus counselling) and control (placebo plus counselling) group, produced very similar results for both outcome measures, suggesting that the majority of the change in these groups might be driven by the counselling. There was only one naltrexone 12 month outcome study. Acamprosate three to six month outcomes for percentage days abstinent were less than the naltrexone interventions, but the results for treatment (acamprosate) and control (placebo) groups were quite similar. This observation also applied to the acamprosate 12 month outcomes. Unlike the naltrexone studies, counselling was not a part of all the acamprosate intervention studies.

Table 6.16: Summary of outcomes

Intervention	Group	Number of study groups	Weighted mean change from baseline (% alcohol consumption), range	Weighted mean (% days abstinent at follow-up), range
Brief intervention	Treatment	4	21% (3 to 33%)	
	Control[a]	4	6% (-15 to 19%)	
Multi-session brief intervention	Treatment	2	38% (20 to 40%)	
	Control[a]	2	20% (16 to 21%)	
Motivation enhancement therapy	Treatment	2		78% (74 to 82%)
Cognitive-behavioural interventions	Treatment	4	49% (45 to 57%)	75% (33 to 84%)
Cognitive-behavioural interventions with cue exposure	Treatment	2	62% (48 to 88%)	48% (32 to 78%)
Self guided interventions	Treatment	9	44% (23 to 59%)	49%
	Control[a]	1	51%	42%
Naltrexone interventions 3 to 6 mth outcomes	Treatment	7	90% (83 to 97%)	90% (79 to 98%)
	Control[b]	7	84% (70 to 92%)	86% (82 to 92%)
Naltrexone interventions 12 mth outcomes	Treatment	1		67%
Acamprosate interventions 3 to 6 mth outcomes	Treatment	7		58% (34 to 68%)
	Control[b]	6		41% (24 to 49%)
Acamprosate interventions 12 mth outcomes	Treatment	7		52% (38 to 67%)
	Control[b]	5		37% (20 to 48%)

NB: Unless otherwise stated, outcomes are at approximately 6 months (± approximately 3 months).
[a] Control condition was "screening only"
[b] Control condition included placebo treatment and varying degrees of psychosocial therapy

6.3.2 Costs

Particularly in the pharmacological intervention studies, separating out research costs and treatment costs was difficult. In many cases there was little detail about the nature of follow-up appointments; however every attempt was made to identify clinical resource use only.

Little was found about what actually occurs in clinical practice with regards to psychotherapy interventions (including motivational, cognitive-behavioural and self guided interventions) and clinical guidelines we sourced provided minimal information on the length of a course of treatment or the actual range of resources used (National Drug and Alcohol Research Centre 2003). Therapists and counsellors in clinical practice do not commonly remain with a particular program of interventions or a style of psychotherapy for any one client. In reality, clinicians tailor their interventions to the

client and will tend to use a range of psychotherapies, even in the one therapy session (F. Shand, personal communication).

There was a considerable amount of variability in the resources required for each of the research studies, and only a few of these resources are included in Australian treatment guidelines. For the resources to be costed in this analysis (Table 6.17), we have primarily used the Australian treatment guidelines (National Drug and Alcohol Research Centre 2003), meaning the more intensive resource use of some of the research studies has been ignored. Where these guidelines do not state the exact resources used, or are not clear, the information has been supplemented by information from the research studies. Tables listing the resources used in the research studies and in the treatment guidelines are provided in Appendix 3.

Table 6.17: Resources use to be costed

Intervention Type	Resource use	Mean Recommended use	Mean actual use (Range if applicable)
Brief intervention	Medical professional consultation	1	N/A
	Self help pamphlet	1	N/A
Multi session brief intervention	Medical professional consultation	2[a]	1.5 (1 to 2)
	Self help pamphlet	1	N/A
Motivational enhance therapy (MET)	Medical professional consultation[b]	1	N/A
	Blood test (liver functioning)	1	N/A
	Psychologist consultation	4	3[c]
Cognitive-behavioural intervention	Psychologist consultation	12[d]	6 (1 to 16)
Cognitive-behavioural intervention (cue exposure)	Psychologist consultation	9	6.75[e]
	Alcoholic standard drink	3 per visit[f]	3 (2 to 4) per visit[g]
Self guided interventions[r]	Self help booklet	1	Booklet to book
	Medical professional consultation	1	Psychologist to medical consultation
Naltrexone intervention (3 to 6 months outcomes, 6 months costed)	Medical professional consultation (initial)	1	N/A
	Medical professional consultation (subsequent)	2	1.13[m] (0 to 2)
	Blood test (liver functioning)	1	N/A
	Naltrexone scripts filled[h]	6	3.95[m] (1 to 6)
	Psychologist consultation	6[j]	3 (0 to 6)
Naltrexone intervention (12 months outcomes, 12 months costed)	Medical professional consultation (initial)	1	N/A
	Medical professional consultation (subsequent)	5	2.33[n] (0 to 5)
	Blood test (liver functioning)	1	N/A
	Naltrexone scripts filled[h]	12	6.3[n] (1 to 12)
	Psychologist consultation	12[j]	6[k] (0 to 12)
Acamprosate intervention (3 to 6 month outcomes, 6 months costed)	Medical professional consultation (initial)	1	N/A
	Medical professional consultation (subsequent)	2	1.64[o] (0 to 2)
	Blood test (liver functioning)	1	N/A
	Blood test (kidney function)	1	N/A
	Acamprosate script[h,i]	6	5.21[o] (1 to 6)
	Psychologist consultation	6[j]	3[l] (0 to 6)
Acamprosate intervention (12 month outcomes, 12 months costed)	Medical professional consultation (initial)	1	N/A
	Medical professional consultation (subsequent)	5	3.54[p] (0 to 5)
	Blood test (liver functioning)	1	N/A
	Blood test (kidney function)	1	N/A
	Acamprosate script[h,i]	12	8.77[p] (1 to 12)
	Psychologist consultation	12[j]	6[l] (0 to 12)

The footnotes to this table are listed in Appendix 4.

Brief intervention, multi session brief intervention and self guided intervention studies all use comparatively minor resources (primarily medical consultations and self help materials), and there was less discrepancy between the treatment guidelines (National

Drug and Alcohol Research Centre 2003) and the interventions appearing in the research studies. The resource use for motivational interventions comes only from the one study, Project MATCH.

The resource use of CBT interventions differs depending on whether the intervention uses cue exposure therapy (requiring alcoholic drinks), or not. There was great variability in the number of psychological consultations between research studies, and the treatment guidelines did not recommend a specific number of treatment sessions (National Drug and Alcohol Research Centre 2003), so the resources to be costed reflects the variability between research studies (Table 6.17). In the comparison of costs and outcomes, cue exposure and non-cue exposure CBT will be individually compared.

Naltrexone and acamprosate intervention resource use to be costed is similar to the Australian treatment guidelines (National Drug and Alcohol Research Centre 2003), so there is less variability in the resources to be costed. However, the number of psychologist consultations was not given in the treatment guidelines and so have been obtained from the research studies. The great majority of the naltrexone studies had weekly psychotherapy sessions, more than most psychosocial interventions including motivational and CBT programs. Despite the majority of acamprosate studies not including psychosocial interventions, the studies that require psychologist consultation have a greater variability than naltrexone studies in the amount of resources required. This variability is reflected by the range of psychologist consultations shown in Table 6.17.

Table 6.18: Price list for resources used

Item or Service	Cost per Unit (2003 Aus dollars)	Source
Level A Medical consultation (for blood test only)[a]	$11.45	MBS
Medical consultation (for brief intervention)[b]	$22.55	MBS
Level C Medical consultation (for pharmacotherapy studies)[c]	$47.60	MBS
Psychologist consultation[d]	$35.68	NSW Health
Standard drink[e]	$1.04	Coles online
Pathology (blood liver function tests)	$16.35	MBS
Pathology (blood kidney function tests)	$16.35	MBS
Printed material (pamphlet)[f]	$1.48	NDARC
Printed material (booklet)[g]	$2.50	"Drink less program", University of Sydney[h]
Prescription (naltrexone) and repeat	$165.49	PBS
Prescription (acamprosate) and repeat	$168.28	PBS

[a] Consultation for a straightforward task, obvious problems, simple medical history
[b] As a brief intervention is only a component of a medical consultation, but the counselling component would allow the GP to claim a level C consultation (lasting at least 20 minutes) rather than a level B consultation. Following the example of Wutzke, Shiell et al. (2001), the difference between a level C and level B consultation has been used.
[c] Consultation including taking a detailed history, examining multiple systems, and an attendance of at least 20 minutes.
[d] Costed for a psychologist in their 8th year of service.
[e] This is a cost of a standard drink of "VB" beer as listed on Coles online. Slightly more than half of all alcohol consumed in Australia is some form of beer (Chikritzhs, Catalano et al. 2003).
[f] A pocket size pamphlet of less than 5 pages
[g] A pocket size booklet of 40 pages
[h] Faculty of Medicine 2003

6.3.3 Analysis

6.3.3.1 Recommended treatment costs

The next step is to apply the costs from Table 6.18 to the recommended treatment as listed in Table 6.17. These costs assume that all patients attend for the full course of treatment, which can be up to 12 months in the case of naltrexone and acamprosate treatment. It is important to note that in the clinical context, this situation is not likely as only a minority of patients attend the full course of treatment. Recommendations were used to give an estimation of the upper limit of costs.

Several other assumptions have been made for this analysis. As the number of multi-session brief interventions was not specified in the guidelines, the number of brief intervention sessions from research studies was used. Similarly, the consumption of standard drinks during a typical session of CBT cue exposure therapy was also from research study data. The number of CBT psychologist consultations has been obtained through expert clinical advice (C. Sannibale, personal communication).

Pharmacotherapy treatment using naltrexone and acamprosate has been costed for both six and 12 month courses of treatment. Prescriptions are filled on a monthly basis, and a new prescription (requiring a brief medical consultation) is required every second month. The first medical consultation is a longer consultation and includes relevant pathology tests and the first prescription. Psychologist consultations are assumed to occur on a monthly basis for both naltrexone and acamprosate treatment. Full details of the nature of each of these assumptions can be found in the footnotes to Table 6.17 (Appendix 4).

In putting together costs and outcomes, we are faced with the difficulties that outcomes obtained from these studies selected for this analysis may or may not be achieved by following recommended practice in Australia and secondly, we have to make assumptions about the number of individuals who start and complete a given treatment. This is further compounded by lack of consistent outcomes measures across the interventions. There was also no common comparator; not all studies compared outcomes of treatment and screening only, and many treatments were not compared to each other.

Therefore we are unable to present a full cost effectiveness analysis with incremental costs and effectiveness but rather present the costs for treatment as recommended, with the outcomes from Table 6.16 (see Table 6.19). Some of the assumptions and uncertainty about numbers of individuals completing treatment are explored in sensitivity analysis.

Table 6.19: Estimated costs and outcomes for a patient completing a course of each intervention type

Intervention type	Costs per person for recommended treatment (2003 AUS dollars)	Weighted mean % change in alcohol consumption	Weighted mean % days abstinent
Brief intervention	$24	21%	
Multi session brief intervention	$47	38%	
Motivational enhance therapy (MET)	$171		78%
Cognitive-behavioural intervention	$428	49%	75%
Cognitive-behavioural intervention (with cue exposure therapy)	$343	62%	48%
Self guided intervention	$25	44%	49%
Naltrexone intervention (6 month treatment)	$1,294	90%	90%
Naltrexone intervention (12 month treatment)	$2,535		67%
Acamprosate intervention (6 month treatment)	$1,327		58%
Acamprosate intervention (12 month treatment)	$2,585		52%

Combining costs and outcomes: recommended treatment

As previously indicated, although considerable effort was made to achieve common outcomes and homogeneous study populations across the various outcomes, this was not possible. However, some comparisons are possible given certain caveats. The first set of comparisons is for those interventions which may be targeted at risky drinkers and the second is for dependent drinkers which are further broken down by the type of outcome measured.

The population in brief intervention studies (including brief intervention studies and multi session brief intervention studies) were from the "risky drinkers" population, who had had not yet identified themselves as having a drinking problem. They were sampled from generalised population screening through general practice or workplace settings. None of this population had undergone a withdrawal from alcohol prior to receiving the

intervention, and the measurement of outcomes was approximately six months after randomisation to the study.

Psychosocial interventions (including motivational, cognitive-behavioural and self guided interventions), worked with the "dependent drinkers" population. This population was recruited from those either responding to a media advertisement calling for people "who drank too much", or those who had approached treatment services for assistance with their drinking. Some studies did not require a withdrawal from alcohol before treatment, demonstrating that not all subjects necessarily had a physical dependence to alcohol. The measurement of outcomes also occurred approximately six months after study randomisation.

Pharmacological intervention studies (naltrexone and acamprosate studies), worked with the "dependent drinkers" population, and all studies required a withdrawal from alcohol to be completed prior to study randomisation. However, the major discrepancy between studies occurred when the period of follow-up was compared. Naltrexone intervention studies primarily measured their outcomes three months after randomisation, whereas acamprosate studies measured outcomes either 12 or six months after randomisation. Since it would be inaccurate to say that outcomes at three months are in any way comparable to outcomes at 12 months, these interventions will have to be compared separately.

Risky drinkers

The two interventions used with drinkers who have been screened and assessed as risky drinkers but who have not yet identified themselves as having a problem with alcohol consumption are either a single or a multiple brief intervention. The cost per 1% change in mean alcohol consumption for this group of risky drinkers is estimated at $1.14 and $1.24 respectively.

Self guided interventions have also been included in this comparison, despite the subjects being a part of a different population by identifying themselves as having a problem with alcohol consumption. In terms of resource use, this intervention is very similar to a brief intervention (with a slightly more expensive booklet). The cost per 1% change in mean

alcohol consumption is estimated at $0.57. A summary of this information is accompanied by the results of the sensitivity analysis in Table 6.21.

Dependent drinkers

The treatments for those people who identified themselves as having a problem with alcohol consumption included self guided interventions, counselling and pharmacotherapies. Costs for one episode of treatment range from $25 for one self guided intervention, $171 for four sessions of motivational enhancement therapy (MET), $428 for 12 sessions of CBT, to $2,585 for six months of acamprosate pharmacotherapy and monthly psychologist consultations. As there are no common baseline comparators or consistent outcomes, only limited comparisons can be made.

In the interventions with abstinence outcomes, the costs per 1% gain in abstinent days are the lowest in the psychosocial interventions, particularly MET ($2.19/1% change in abstinent days). CBT ($5.71/1% change in abstinent days) appears to achieve a given outcome for less expenditure than CBT cue exposure interventions ($7.15/1% change in abstinent days), and the pharmacotherapies cost less per 1% change than the psychotherapies.

When the outcome "change in alcohol consumption" is used, CBT with cue exposure ($5.53/1% change in alcohol consumption) appears to be more cost effective than CBT alone ($8.73/1% change in alcohol consumption). This is most likely related to the fact that the results for CBT alone have been influenced by the good outcomes of Project MATCH. Naltrexone pharmacotherapy appears to be the least cost effective ($14.38/1% change in alcohol consumption) and self guided interventions are the most cost effective ($0.57/1% change in alcohol consumption) for this outcome measure.

The comparison between pharmacotherapies (naltrexone and acamprosate) and then between other interventions is also problematic as four out of seven of the naltrexone studies (three to six month outcomes) used "change in alcohol consumption", six studies reported used "percent days abstinent" and three studies use both outcome measures. The one 12 month outcome study of naltrexone used only "percent days abstinent" as did all acamprosate studies. No acamprosate study reported change in alcohol

consumption as an outcome measure. Please refer to Table 6.21 for a summary of this information accompanied by the results of the sensitivity analysis.

The cost and outcome of counselling only was an important consideration for the pharmacotherapy studies. Using the six- month data only, the counselling only groups of the naltrexone studies had an estimated cost of $2.49 per 1% change in days abstinent. In the counselling only groups of the acamprosate studies, the cost was $5.22 per 1% increase in days abstinent. Six months of naltrexone plus counselling is $1,294 per person which results in a cost of a 1% increase in days abstinent of $14.38 compared to six months of acamprosate plus counselling of $1,327 per person or $22.88 for a 1% increase in days abstinent, suggesting that the addition of the pharmacotherapy comes at some additional cost. Naltrexone appears to be more cost effective than acamprosate but without more randomised controlled trials directly comparing the efficacy of the two treatments we cannot be positive.

6.3.4 Sensitivity Analysis

6.3.4.1 "Actual" treatment costs

The costs for "recommended treatment" assume that every person who begins a program completes the treatment. This raises two further issues, that is whether the outcomes derived from the literature are achieved with the recommended practice in Australia and secondly, the uncertainty about the number of individuals completing a given program. In an attempt to understand the possible impact some further assumptions have been made. The first set of assumptions involves estimating costs when not all persons complete the intervention. Key assumptions include:

- Seventy-five percent attendance rate for the multi-session brief intervention medical appointments, the motivational intervention counselling sessions and the CBT cue exposure counselling sessions on the basis of limited research data.
- Fifty percent attendance for CBT counselling sessions and the counselling sessions accompanying pharmacotherapies has been assumed on the basis of clinical advice.

- Retention in acamprosate treatment was as reported by Barrias, Chabac et al. (1997) for 12 month outcomes and Tempesta, Janiri et al.(2000) for three to six month outcomes.
- For three to six month naltrexone outcomes, retention was recorded for the first three months in (Krystal, Cramer et al. 2001). The only 12 month naltrexone outcome study reported 90% retention in naltrexone treatment (Rubio, Jimenez-Arriero et al. 2001) however as this rate is improbable in routine clinical practice, the third month retention rate as in Krystal, Cramer et al. (2001) was used with a 12^{th} month retention of 30%.
- The sixth month retention for the naltrexone three to six month outcome studies was assumed to be the same as the newly calculated value for the 12 month outcome studies, with a steady drop-out rate assumed for all unknown values.

When these assumptions are made, the costs for many of the treatments are lower. Table 6.19 showed the estimated costs for a single patient receiving the recommended treatment. Table 6.20 shows our best estimates of costs for 100 persons beginning a given treatment in the clinical setting based on the assumptions listed above, the resources in Table 6.17 and the prices listed in Table 6.18. These estimated costs are compared to the costs of 100 persons receiving recommended treatment.

Table 6.20: Estimated costs for 100 patients in each intervention type as it might occur in clinical practice

Intervention type	Costs for "actual" treatment (2003 dollars)	Costs for recommended treatment	Percent difference
Brief intervention	$2,403	$2,403	No difference
Multi session brief intervention	$3,531	$4,658	76%
Motivational enhance therapy (MET)	$13,484	$17,052	79%
Cognitive-behavioural intervention	$21,408	$42,816	50%
Cognitive-behavioural intervention (with cue exposure therapy)	$26,190	$34,296	76%
Self guided intervention	$2,505	$2,505	No difference
Naltrexone intervention (6 month treatment)	$83,769	$129,387	65%
Naltrexone intervention (12 month treatment)	$134,754	$253,524	53%
Acamprosate intervention (6 month treatment)	$108,286	$132,696	82%
Acamprosate intervention (12 month treatment)	$181,073	$258,507	70%

There was no difference in the costs between recommended and "actual" treatment for both self guided interventions and a brief interventions, as the treatments were so minimal as to allow little variation in costs. For other interventions, the "actual" treatment costs varied between 50 and 82% of the costs for recommended treatment, depending on the assumptions surrounding what "actual" treatment involves.

6.3.4.2 One-way sensitivity analyses

The following table (Table 6.21) shows the cost per unit outcome measure as calculated from the costs for recommended treatment. Cost per outcome for one-way sensitivity analyses are also presented as a comparison.

Table 6.21: Cost per unit outcome measure for interventions compared to one-way sensitivity analysis results

Intervention Change for sensitivity analysis	$/1% change alcohol consumption	$/1% change abstinent days
Brief interventions	**$1.14**	
Exclude Richmond, Kehoe et al. (1999)	$0.86	
Multi-session brief interventions	**$1.24**	
Double the number of physician consultations	$2.42	
Motivational enhancement therapy		**$2.19**
Assume outcomes half as favourable		$4.38
Double the number of counselling sessions		$4.01
Cognitive-behavioural therapy (CBT)	**$8.73**	**$5.71**
Use only non-Project MATCH outcomes		$10.44
Double the number of counselling sessions	$17.47	$11.41
CBT cue exposure	**$5.53**	**$7.15**
Self guided interventions	**$0.57**	
Use manual instead of booklet	$0.77	
10 minute psychologist appointment instead of medical appointment	$0.20	
Naltrexone interventions 6 month treatment	**$14.38**	**$14.38**
Assume outcomes half as favourable	$28.76	$28.76
Doubling number of counselling sessions	$16.76	$16.76
Acamprosate interventions 6 month treatment		**$22.88**
Assume outcomes 50% more favourable		$15.25
Double number of counselling sessions		$26.57

Investigations for the one way sensitivity analysis for brief intervention studies involved excluding the outcomes of the study recruiting from the police workplace (Richmond, Kehoe et al. 1999), as it had very different outcomes to the other brief intervention studies. The effect of this was to slightly decrease the cost per one percent change in alcohol consumption. The cost per unit outcome for multi-session brief interventions was mostly driven by the number of physician consultations as doubling the number of consultations almost doubled the cost per percent change in alcohol consumption.

The good outcomes for motivational enhancement therapy interventions were only from the one study (Project MATCH). If we assumed the outcomes were half as favourable, the cost per percent change in abstinent days doubled. Doubling the number of counselling sessions had a similar result.

By removing the influence of project MATCH in the percentage change in abstinent days outcome to assess CBT only, CBT cue exposure became the more cost effective of the two interventions, similar to what was observed when comparing CBT and CBT cue exposure with the percent change in alcohol consumption outcome. Doubling the number of counselling sessions approximately doubled the cost per unit outcome measure.

If a self guided intervention distributed a manual instead of a booklet, the cost of achieving a 1% change in alcohol consumption only altered slightly. Alternatively, if the self guided intervention was distributed by a psychologist in a 10 minute consultation instead of a medical professional, the cost per percentage change in alcohol consumption was greatly reduced.

We have performed sensitivity analysis on only six months of treatment for both naltrexone and acamprosate, because there was only one study for naltrexone 12 month outcomes. Weighted mean percentage change alcohol consumption and percentage change in abstinent days for naltrexone interventions were both high at 90%. This can be compared to a lower mean reported abstinence outcome of 58% in the acamprosate studies. If we reduce the reported efficacy of the naltrexone interventions by half, the cost per percent abstinent days almost doubles; similarly assuming acamprosate outcomes are 50% higher substantially reduces the cost per percent abstinent days. Doubling the number of counselling sessions for both naltrexone and acamprosate treatment has a smaller effect, indicating the efficiency is primarily driven by the reported outcomes.

6.4 Discussion

Detoxification, while discussed elsewhere in the report, was excluded from this chapter as cost and outcome information on detoxification as it occurs in Australia was not readily available, and as such we were unable to relate the results of studies conducted overseas primarily in the US to the Australian context. Previous studies strongly recommend diazepam as the "gold-standard" and first-line treatment for treating alcohol withdrawal symptoms (Shand, Gates et al. 2003). It is recognised that some populations, such as those who are homeless, have additional mental health co-morbidities or who suffer from alcohol withdrawal complications require additional withdrawal management such as inpatient care (Shand, Gates et al. 2003) and this would have significant resource implications.

The analysis in this chapter attempts to compare forms of treatment suited to individuals with different levels of alcohol consumption, so it is not surprising that the goals of treatment as reported in the literature vary from reducing alcohol consumption to abstaining from alcohol altogether depending on the client's goals, level of dependence, physical health and relapse history (Shand, Gates et al. 2003). This variation in treatment goals and researcher objectives, have led to a wide variation in outcome measures being used in alcohol research. A single outcome measure to compare studies using brief, psychosocial and pharmacological interventions was not available as there were no reported common outcome measures for brief interventions, motivational enhancement therapy and acamprosate interventions. Therefore, two outcome measures were used in our analysis: percentage reduction in alcohol consumption from baseline, and percentage of days during study treatment where a subject was abstinent from alcohol.

The selection criterion of the studies was to attempt to ensure homogeneity according to methodology, study population, quality of evidence, sampling method, and follow-up period. In the psychosocial interventions, unlike the pharmacological interventions, not all subjects had a required period of withdrawal from alcohol consumption before entering the study. This lack of standardisation means comparisons between interventions is difficult (Ludbrook, Godfrey et al. 2002), and a large number of heterogeneous studies were excluded for various reasons. As the number of studies included decreased, so did the generalisability of this analysis. This analysis used two

outcome measures and four groups of interventions (brief interventions, psychosocial interventions, pharmacotherapy three to six month outcome and pharmacotherapy twelve month outcome studies) that differ in some important ways to each other.

Several studies had resource use that was considered excessive and were not considered for the collection of resource use for the costing exercise, as they are unlikely to be applied in Australia. Examples of this included two intensive outpatient treatment programs accompanying one acamprosate study and one naltrexone study. These treatment programs included activities such as individual counselling, group counselling, information sessions and social activities totalling 40 to 44 hours per week.

In quantifying the resources likely to be used in the Australian clinical context, we have made numerous assumptions. We were partially aided in this process by Australian treatment guidelines, although treatment guidelines for some interventions were not clear about the resources required. Where information was lacking, we substituted mean resource use from the research studies, possibly inflating the levels of resources required. Through sensitivity analysis we were able to explore the effect of modifying some of the assumptions.

Project MATCH, which was a large study, was used in this analysis for its outcomes for MET and CBT. The study reported very good outcomes, and in the case of MET, this was the only study for that type of treatment. However, percentage change in abstinent days was the only outcome measure suitable for use in this analysis. This had the effect of making CBT appear to be more cost effective than CBT cue exposure therapy for abstinence outcomes and not for change in alcohol consumption outcomes. By using only non-project MATCH outcomes in the sensitivity analysis this unusual result was removed and CBT cue exposure was found to be more cost effective than CBT for both outcome measures.

Sensitivity analysis also showed us how easily variations in major resource use such as the number of medical consultations or the retention in treatment can impact on the cost effectiveness of treatments. For this reason it is important to take into account the numerous assumptions made when considering the treatment cost effectiveness.

In the "actual" treatment model we made a number of assumptions to try and make the treatment as close as possible to what might occur in a clinical situation. For many treatments, costs of "actual" treatment were driven by just one factor: the attendance at counselling or medical appointment, for example: where 75% counselling or medical appointment attendance was assumed for multi-session brief interventions, motivational interventions and CBT cue exposure interventions, the "actual" treatment costs were close to 75% of the recommended costs. Where 50% counselling appointment attendance was assumed for CBT interventions, "actual" treatments were 50% of recommended costs. The situation for pharmacotherapies was not so simple, with costs being driven by both counselling attendance (50% assumed) and retention in treatment. Retention in treatment was obtained from a relevant study that reported this information. "Actual" treatment costs for the pharmacotherapies ranged from 53 to 82% of the recommended treatment costs.

Due to many difficulties including the lack of comparable outcomes, treatment heterogeneity and incomplete data on costs in the Australian treatment context, we did not complete a full cost effectiveness evaluation. Sensitivity analysis has demonstrated just how assumptions such as levels of treatment attendance and outcomes obtained have the ability to strongly influence results. The costs per change in unit outcome and the estimated costs of treatment obtained in this analysis should be considered cautiously in light of the number of assumptions that were required.

However, our analysis does show us that for risky drinkers, brief interventions and multi-session brief interventions are comparable in terms of cost ($1.14 and $1.24 per a one percentage change in alcohol consumption). It is recommended that screening and brief interventions where appropriate continue to be promoted as good preventative medicine among general practitioners.

When treatments for more dependent drinkers are considered, self guided interventions, cognitive-behavioural interventions, and cognitive-behavioural interventions with cue exposure therapy all have similar efficacies (weighted mean percentage change in alcohol consumption of 44%, 49% and 62% respectively). However, self guided interventions are much less expensive, costing only $0.57 per one percent change in alcohol consumption in comparison with $8.73 for cognitive-behavioural interventions and $5.53 for

cognitive-behavioural interventions with cue exposure therapy. Therefore, perhaps self guided interventions should be the first line of therapy.

It is tempting to convert these cost outcomes to cost per life year saved using some estimation of life years saved by the gain in days of abstinence or the decrease in alcohol consumption. However we would argue that given the lack of homogeneity in treatment groups and results that such a conversion would place more credence on the absolute results than we feel is valid.

As will be discussed further in the next chapter, the results do permit some recommendations to be made. Importantly, it should be recognised that treatment for excessive alcohol use is not a one-size fits all situation. For example, there are various levels of excessive use – from occasional binge drinking, through to severe dependency. In addition, not all treatments are available in all locales or usable by all persons. In the case of self guided interventions, not all people will have the required reading skills to benefit from the materials, and an unstructured intervention might be less useful for people living in temporary or unstable housing conditions. Providing a range of interventions, including naltrexone and acamprosate, for risky and dependent drinkers is important to treat people with different treatment needs.

CHAPTER 7: DISCUSSION AND POLICY RECOMMENDATIONS

Background

This report has examined the Australian uptake rates of two pharmacotherapies used in relapse prevention of alcohol; the perceptions of prescribers of their effectiveness and their prescribing patterns; the literature on the effectiveness of these pharmacotherapies, and other forms of treatment in the management of alcohol dependence. In addition, the economic implications of the use of these pharmacotherapies are explored. As a prelude to the chapters on treatment for excessive alcohol use, the introductory chapter provides background on the consumption patterns of alcohol in Australia by describing differences by age and gender; and also presents data on the mortality and morbidity caused by alcohol, as well as other burdens attributed to the excessive use of alcohol. To provide some further background, the literature was reviewed on a wider set of interventions that are used to affect behaviours in an attempt to minimise harms related to excessive alcohol use.

It is estimated that 86% of men and 79% of women in Australia consume some alcohol each year (National Health and Medical Research Council 2001), with 34.4% of the population aged 14 years and over placing themselves at risk of alcohol-related harm in the short term on at least one drinking occasion over a 12 month period. Furthermore, 7% of the population consumed alcohol in a manner considered risky, and an additional 2.9% consumed alcohol in a manner considered to be high risk to health in the long term.

As discussed in Chapter 1, the relationship between alcohol consumption and burden of harm is complex, as unlike other risk factors such as cigarette smoking, moderate alcohol consumption is recognised as having some health benefits. Thus, rather than a linear relationship between consumption and harm, the relationship is typically J-shaped, where overall, moderate drinkers have better health outcomes than either non-drinkers or heavy drinkers from about middle-age onwards (Chikritzhs, Catalano et al. 2001; Babor, Ceateoan et al. 2003). However, the excessive or risky consumption of alcohol results in considerable health related problems, in terms of morbidity, mortality, and other tangible and intangible costs. Collins and Lapsley estimated that the costs related to excessive

consumption of alcohol was $AUS $7,560.4 million in 1998/99 (Collins and Lapsley 2002) which was about 1% of GDP.

Chapter 2 considered the range of interventions available to modify drinking behaviour including fiscal policies, prevention programs, legislation, and treatment. Fiscal policies, prevention programs and legislation are easily recognised as having a public health potential, as they are by definition, programs which are designed to protect and promote health and to prevent illness in the wider population. Treatment on the other hand is often associated with only the individual receiving the treatment. However in this report, with the introduction of some of the relevant costs of providing various treatments, treatment is also considered in a population health context. The cost and outcome information are used to consider various methods of decreasing the harms related to excessive alcohol use from a population perspective.

Chapter 2 also explored the economic implications of these interventions. Interventions such as drink driving interventions and raising the legal drinking age have been demonstrated to be effective in decreasing harmful behaviours related to excessive consumption of alcohol. However, the economic evidence on these interventions is sparse. It is often argued that these strategies have low costs relative to the costs of health consequences from excessive alcohol consumption. Yet these interventions are only effective if they are enforced, and enforcement comes at some cost. Thus from an economic perspective, the evidence appears to be rather inconclusive as to which of these interventions are most efficient at decreasing the burden related to excessive alcohol use.

There is some literature on the impacts of fiscal policy, suggesting that increasing prices appears to have some impact on reducing overall levels of alcohol consumption. However, the magnitude and distribution between problem and non-problem drinkers of this impact is unclear. Empirical research has estimated a wide range of price elasticities for beer, wine and spirits, with the consumption of beer less likely to be impacted by price increases than either wine or spirits (Raistrick, Hodgson et al. 1999). There are a number of unresolved questions with respect to these price elasticity data. For example, many studies do not examine who is affected by the price rise, whether everyone changes their drinking behaviours or whether it is just those who drink excessively, or those who

do not. Some price elasticity research suggests that an increase in taxes leads to increased prices, which leads to a decrease in alcohol consumption among adolescents and young adults. This may be a very important finding of this research, especially if the further contention that alcohol abuse in adolescence is a predictor of alcohol abuse in later life (Chaloupka, Grossman et al. 2002) holds true. However, most of this research has been conducted in the UK and US, countries with very different patterns of alcohol consumption to Australia, and as such the transferability of these results is unclear.

Treatment research appears to have more to offer, at least by way of economic evidence. Studies which include a measure of societal benefits (eg. reduction in crime, court costs, and productivity) have consistently determined that the cost of treatment is worthwhile from a societal perspective in the reduction of the harmful burden of alcohol misuse (Godfrey 1994; Raistrick, Hodgson et al. 1999; Harwood, Malhotra et al. 2002). Alcohol treatment can produce a cost-offset for the health care system, producing savings that cover the cost of the treatment and result in wider economic benefits for society. However, the impact on long term health care utilisation and differential impacts on lower socio economic groups remains unknown, as does which type of treatment is the most cost effective.

Turning to specific types of treatment, the literature suggests that inpatient detoxification is more expensive than outpatient detoxification (Longabaugh, McCrady et al. 1983; Bartu 1989; Hayashida, Alterman et al. 1989; Goodman, Holder et al. 1992; Klijnsma, Cameron et al. 1995; Long, Williams et al. 1998; Pettinati, Meyers et al. 1999) but it has been concluded that at least for some subgroups of dependent drinkers, particularly those with co-morbid mental health illness or significant social problems, inpatient or at least day hospital care may be the most cost effective option (Pettinati, Meyers et al. 1999; Goodman, Holder et al. 1992; Weisner, Mertens et al. 2000; Hilton, Maisto et al. 2001). Treatment for co-morbidity, including stabilizing medications and specific psychotherapies, may improve the effectiveness of the alcohol treatment.

Other studies reveal that the provision of brief interventions by general practitioners is cost effective when compared to usual treatment for those who are not yet aware that they are consuming alcohol at a risky level; CBT appears to be more cost effective than motivational therapy at least in the short run; behavioural marital therapy may or may not

be cost effective over and above CBT, and acamprosate appears to be cost effective when compared to a combination of placebo and counselling. Reviews of the cost and outcome literature often have differing conclusions as to which type of treatment is more cost-effective. For example, while both Holder et al. (1991) and Finney et al. (1996) concluded that while social skills training, community reinforcement approach, behavioural marital therapy and stress management were effective, there was no significant relationship between effectiveness and cost across various studies (Holder, Longabaugh et al. 1991; Finney and Monahan 1996)

Pharmacotherapies

Chapter 3 specifically examined the use of pharmacotherapies for alcohol dependence. Pharmacotherapies such as naltrexone and acamprosate are appropriate for alcohol dependent drinkers and then only for those who are determined to be at moderate to high risk of relapse. Using data from the Health Insurance Commission and the National Survey of Mental Health and Wellbeing, the prevalence of the use of acamprosate and naltrexone by age and sex was estimated.

Prevalence was estimated at 3% among all dependent drinkers over 12 months. The rates were found to be the lowest among the 18 to 29 age group, at 5.7 per 1000 dependent drinkers, which is also the age where the rate of alcohol dependence is the highest. Those aged 50-59 had an uptake rate of 102 per 1000 dependent drinkers, and those in the 60+ and 40-49 age categories had similar uptake rates of 59.3 and 54.6 per 1000 dependent drinkers. There may be a number of reasons why these differences in the rate of use of pharmacotherapies may occur. Firstly it may be that younger populations are not screened for alcohol use, either because they present to GPs less frequently, or GPs fail to screen this population. Or it may be that the older age groups have co-morbid conditions such as diabetes, heart conditions or hypertension that are difficult to treat with an existing alcohol dependence and so this group seeks, or is offered treatment for alcohol dependence. This older group may also have previously been unsuccessful in decreasing their alcohol consumption using other methods.

While the data does not permit comment on the appropriateness of the prescribing rate of naltrexone and acamprosate among the dependent population it is possible to make comment on the uptake of repeat prescriptions. MIMS recommends that acamprosate

should be started as soon as possible after the withdrawal from alcohol and should be continued for a period of treatment of one year, even if the patient relapses. Naltrexone is recommended for at least twelve weeks and has been used for up to a year. However, using the HIC data, uptake of repeat prescriptions (second month) was found to be 38% for naltrexone and 34% for acamprosate which means that approximately 35% of the persons who start either acamprosate or naltrexone fill the prescription for the second month. This would suggest that of the 3% (16,780) of the estimated 558,858 dependent drinkers who took up a pharmacotherapy, only an estimated 5,870 obtained more than one month's prescription. With this uptake rate, it is highly unlikely that the outcomes achieved in Australia are similar to those in the studies reported in Chapter 6, where those randomised to naltrexone plus counselling were abstinent for 90% of the days at sixth months and those using acamprosate were abstinent 58% of the days. More importantly, while this may be an effective treatment for a small minority of dependent drinkers, in its current form it is not an effective population health approach to lowering the burden of harm related to alcohol. Examination of these data raised more questions than answers; such as what is the appropriate rate of use, who benefits from its use, is it more useful/acceptable for older populations, and how long are the pharmacotherapies actually being used? Some of these issues may be answered upon the completion of the RCT on the Role of Pharmacotherapy in Prevention of Relapse in Alcohol Dependence currently being conducted by Haber, Hall, Bell and Teesson at Royal Prince Alfred Hospital in Sydney.

Although little is currently known about who may benefit, when and for how long the pharmacotherapies should be used, consideration should be given to evidence that it may be the engaging in the process of treatment, and the regular visits with a clinician that may actually lead to an improvement in outcomes (i.e. not totally the result of the medication). A similar conclusion was reached by Hall and colleagues (2003) in the examination of the relationship between antidepressants and suicide (Hall, Mant et al. 2003).

Practitioners' prescribing patterns

Pharmacotherapies are recommended to be used within a comprehensive treatment program for alcohol dependence, with the goal of maintaining abstinence. However there is anecdotal evidence that patients may not be participating in comprehensive

treatment programs and as such may not stay in treatment for the recommended period. Chapter 4 reports on a survey sent to 2,680 practitioners (general practitioners [GP], psychiatrists and gastroenterologists) asking questions about their screening for alcohol behaviours, prescribing patterns of pharmacotherapies for excessive alcohol use, and any recommended adjuncts to treatment. Sixty eight percent of general practitioners, 94% of psychiatrists and 76% of gastroenterologists report prescribing a pharmacotherapy (acamprosate and/or naltrexone) for relapse prevention. Of those who have ordered a pharmacotherapy at least once, 80% of GPs, 90% of psychiatrists, and 89% of gastroenterologists stated they advised patients to obtain counselling from a health professional, which was often a GP. These data, while self reported and not verifiable, suggest that doctors are recommending some ongoing adjunct treatment with pharmacotherapies. However, this does not tell us what proportion of patients are actually taking up counselling as recommended, nor whether doctors repeat this recommendation each time the pharmacotherapy is prescribed.

This survey also found that 96% of psychiatrists and 97% of gastroenterologists, but only 63% of the general practitioners indicated that they consistently sought information regarding patients' drinking behaviour. This would suggest that while some general practitioners may prescribe pharmacotherapies (primarily to older populations as evidenced in Chapter 3), and recommend counselling in those who they recognise as having an alcohol dependency, they continue to overlook considerable opportunities to assess drinking status and provide appropriate treatment recommendations. Overall, only 20% of the sample report using a screening instrument in assessing drinking status, and 32% report having had training in providing advice to those with alcohol dependence.

It is interesting to contrast results from the practitioner survey with uptake according to the HIC (Chapter 2). It is reported in the practitioner survey that the vast majority of practitioners support the use of pharmacotherapies for alcohol dependence. Further, practitioners report that they commonly detect and then offer an intervention for alcohol dependence, of which pharmacotherapies are a preferred strategy. Chapter 2, however, suggests that the uptake of pharmacotherapies by alcohol dependence individuals could be as low as 3%. This apparently contradictory finding suggests that further research is required to assess who is prescribing pharmacotherapies and for which patients.

The recently developed guidelines for preventive activities in general practice provide evidence and recommendations on screening for excessive alcohol (National Preventive and Community Medicine Committee of The Royal Australian College of General Practitioners 2002). A key finding from this survey is that only 63% of GPs state that they seek information regarding patients' drinking behaviour. Such a finding indicates that there is still much work to be done to increase the rates of compliance with these guidelines.

One way of improving knowledge of and compliance with the guidelines may be through the ongoing implementation of the project for the Guidelines for the Treatment of Alcohol Problems (funded by the Australian Government Department of Health and Ageing). This project which has already conducted approximately 100 workshops across Australia, had primarily targeted alcohol and drug professionals, but others such as general practitioners, mental health workers, nurses and social workers were also invited to many of the workshops. The general workshops covered a wide range of drinking problems and interventions, whilst workshops targeted at GPs focussed more strongly on brief interventions, withdrawal management, and pharmacotherapies for relapse prevention. Notably, of the several workshops targeted specifically at general practitioners, attendance by GPs at the workshops was very low suggesting that this approach may not be a very effective method of changing general practitioners behaviours. It would arguably be an expensive exercise to provide training in drug and alcohol assessment and treatment, and such a program should it be implemented should have an evaluation phase to assess whether interactive workshops, academic detailing, or a reminder system would by the most efficient method of implementing such an education program.

In Chapter 5, using data from the literature, a model was used to assess the cost to government and expected number of at risk drinkers who modify their alcohol consumption when rates of detection, intervention, and effectiveness were assumed to vary. Data used in the initial model included the probability of visiting a general practitioner each year at 81% for males and 89% for women, the rate of detecting an at risk drinking status among those who visit a general practitioner of 43% males and 29% females; general practitioners offered an intervention to 21% males and 11% females

found to be drinking at a risky levels, and once the intervention was received, 45% decreased their alcohol consumption. The only costs included in the model were the direct costs of payment to general practitioners. Using this initial model it was estimated that currently it costs $231 to achieve modification of one patient's drinking behaviour (accounting for all those screened but not given an intervention, or when the intervention was unsuccessful). If rather than an average cost/effect ratio (as presented in Chapter 5), we performed an incremental cost effectiveness analysis (difference in costs divided by the difference in outcomes with the base case as the constant comparator) in order to explore the marginal effect the results were somewhat different. If the rate of detection was increased by 5% it would cost an additional $241 per additional person who successfully modified their drinking behaviour. It costs an additional $49 per person if the intervention rate for those identified as consuming excessive alcohol was increased by 5%. Combining the scenarios and improving the effectiveness of the intervention (which has no additional costs in this model) would lower the cost of an additional person lowering their drinking behaviours even further. In order for this illustrative model to be complete it would require additional cost information on the processes to achieving these improvements in outcomes. Nonetheless, the model provides some interesting information on the potential of modifying behaviours through general practitioners.

Treatment outcomes and resource use

The Australian Guidelines on Treatment of Alcohol Problems provide guidance on appropriate treatment based on level of alcohol consumption, co-existing health, social problems or cultural differences. The guidelines are fairly comprehensive, with the recommendation that each encounter starts with an assessment of drinking status, determination of whether alcohol consumption is occurring beyond recommended levels, and then whether there are signs of dependence. Then:

- If the person is assessed to be consuming alcohol beyond recommended limits but there is no indication of dependence, the suggested intervention is brief advice and follow-up.
- If the individual is assessed to have signs of dependence there needs to be a further assessment as to the necessity of a managed withdrawal, whether existing co-morbid mental health problems require additional treatment, and then finally an assessment of relapse risk.

- If the probability of relapse is moderate to high, consideration should be given to using pharmacotherapies such as acamprosate or naltrexone.

Treatment guidelines such as this, which are incremental in nature, depending upon the level of alcohol use, should in theory fit neatly into an economic evaluation comparing the resource use (costs) and outcomes as progress occurs through the various treatment options. The purpose of Chapter 6 was to review the literature on treatment for excessive alcohol consumption and extract information from the literature on effectiveness and resources used in the provision of treatment and to model the costs of providing this treatment in Australian dollars. However, as is discussed extensively in Chapter 6 there were a number of challenges in undertaking this work. Some of these challenges are the level of evidence, the lack of homogeneity across intervention groups, different methods of measuring outcomes across interventions, the discrepancies between how treatments are provided in RCTs and recommended treatment in Australia, and then the differences between recommended treatment and what is likely occurring in Australia, all make it challenging to assess the actual costs and the cost effectiveness of various interventions in the Australian context. Before discussing the findings and implications of the findings some of these issues are discussed further. The purpose of this discussion of challenges is not to discount the findings of individual studies comparing, say, CBT with self directed treatment or even to challenge reviews which suggest that one treatment is more effective than another. Its purpose is to highlight the challenges when attempting to undertake an economic evaluation which requires careful and systematic evaluation of not only outcomes but also of resource use and costs in order to make any meaningful recommendations.

Measuring outcomes – in any economic evaluation, the outcome measure needs to be identical for every intervention being compared. A wide range of outcome measures are used in studies that examine the effectiveness of treatments for excessive alcohol use. Most studies use several outcome measures within each study, but as is discussed in Chapter 6 there is not one consistent outcome measure used across all interventions. There may be justifiable reasons for this from the researchers' perspective. For example, studies examining the effectiveness of screening with brief interventions by GPs would probably not include abstinence as an outcome measure. Also some researchers' personal viewpoints may lead to selection of abstinence outcomes, while others who

favour harm reduction may not measure abstinence but only measure change in alcohol consumption. Even within these two types of outcomes measures there appears to be numerous methods used to quantify behaviour change. This lack of consistent outcome measures across and even within different types of alcohol treatment makes it difficult to directly compare results across studies, and this has been long recognised by others (Agosti 1995; Overman, Teter et al. 2003). For clinical researchers this may not pose a problem as others have found methods to combine this information, using meta-analyses to obtain effect sizes. However, these effects sizes were not amenable to use in an economic evaluation and are also difficult to interpret for policy purposes.

For the purpose of our analysis, the decision was made to use two natural outcome measures, grams of alcohol consumed per week and percentage of days abstinent. This decision meant that direct comparison of effects between some treatment types was not possible, thus neither was an economic evaluation. The alcohol consumption outcome was reported for brief intervention studies, psychotherapy studies including self guided interventions, and a few relapse prevention studies using naltrexone. Percentage of days abstinent was the common outcome reported for relapse prevention studies using acamprosate, naltrexone and few psychotherapy studies.

An additional dilemma was that it was necessary to infer that a decrease in use of alcohol, over various ranges, results in the same effect. For example, does a 25% decrease in alcohol consumption from a base of 300 grams of alcohol per week result in a similar impact as a 25% decrease in alcohol consumption from a base of 1000 grams per week? In order to compare across treatments this assumption was necessary.

In an attempt to establish some homogeneity of populations, studies were separated into two main groups; those studies on excessive drinkers were classified as risky (for whom brief advice is the most effective treatment), and those who were classified as dependent drinkers for whom there are a number of treatments (self guided interventions, CBT, motivational intervention, and pharmacotherapies as relapse prevention).

Pre-treatment detoxification - Further complicating the analysis was the issue of detoxification (the assessment of where, who should and did receive it). The estimation of costs of detoxification in Australia was beyond this project. After reviewing the

literature it was determined that some pharmacotherapy studies required detoxification while others did not, so for consistency, pharmacotherapy trials which did not stipulate that prior detoxification (either home, outpatient or inpatient was necessary) had occurred were excluded. For non-pharmacotherapy studies most did not require detoxification, but a few stated it was used if warranted, but did not indicate what proportion had detoxification prior to other treatment. This alone suggests that non-pharmacotherapy treatments are likely targeted at different places on the continuum of excessive drinking.

Determining resource use - One of the key objectives of the study was to model costs and outcomes in the Australian context. However, the data from the studies in the literature, primarily RCTs, had higher rates of compliance with treatment and greater intensity of resource use in treatment than what is recommended in Australia as well as much higher than likely occurs in practice. Therefore a decision was made to estimate costs based primarily on the alcohol treatment guidelines in Australia. Estimates of 'actual' costs, based on best estimates of uptake, are also presented in the sensitivity analysis.

Comparator – Some studies used as their comparator a placebo plus treatment, others used standard GP practice, and still others CBT. This lack of a standard comparator across all treatment modalities meant that for our purposes, the comparator was alcohol consumption at baseline. However, without careful examination of the results this may lead to an impression that only the intervention of interest achieved the total change in alcohol consumption – this is particularly true with the pharmacotherapies, where the intervention also included considerable counselling and the comparator was placebo plus counselling. Often in these studies the change in alcohol consumption (or days abstinent) was significantly different between the groups, yet the control intervention resulted in considerable change in alcohol consumption from baseline, indicating that the total change was not solely related to the pharmacotherapy.

Outcomes

Brief advice, either in single or multiple sessions, resulted in a 21% to 38% decrease in alcohol consumption from baseline for drinkers classified as risky. For those classified as dependent, or who sought treatment for excessive alcohol use, self directed interventions decreased alcohol consumption by 44% (range 23-59%), CBT by 49% (range 45%-57%),

CBT with cue exposure by 62% (range 48%-88%); and naltrexone 3-6 month outcomes by 90% (range 83-97) from baseline consumption. As there were no consistent 'change in alcohol consumption' measures for motivational enhancement and acamprosate, percentage days abstinent are also reported at 78% (range 74 to 82%) for motivational enhancement treatment; CBT 75% (range 33 to 84%); CBT with cue exposure 48% (range 32 to 78%), naltrexone 3 to 6 months 90% (range 79 to 98%) and acamprosate for 3 to 6 months 41% (range 24 to 49%).

Average costs per intervention in 2003 $AUS, based on treatment as recommended in Australia, ranged from $24 for a single brief intervention, $47 for multiple brief interventions, $25 for self guided, $171 for motivational enhancement intervention, $428 for CBT, $343 for CBT with cue exposure, six months of naltrexone was $1,294 and six months of acamprosate $1,327.

There are clear differences in costs across the interventions for those who were recognised as dependent or at least sought treatment, with the self guided treatments being the least expensive. The pharmacotherapies with counselling are clearly the most expensive option, with CBT and motivational enhancement in the middle. The temptation is to combine the costs and outcomes and recommend what appears to be the most cost effective option and overlook the others. However, given the review limitations outlined above and the recognition that both alcohol misuse and treatment take place on a continuum, a decision was made not to do this.

For the group of drinkers who were either defined as dependent drinkers or had identified themselves as having a problem with alcohol, self guided interventions appear to be the least costly, and similar in outcome to the psychotherapy options, for decreasing excessive alcohol consumption. Self guided intervention in this study involved only printed materials. Another method of providing such interventions is via the Internet. A review of Internet based interventions for substance abuse (Martin and Copeland 2003) determined that the literature on the use of these interventions is sparse. However, potential impact of an effective intervention is significant. There is considerable scope for a web based self assessment of drinking status, and with an on-line interactive self directed intervention similar to those being developed for smoking cessation programs such as the TheQuitCoach.org.au, a web site developed by VicHealth

Centre for Tobacco Control (Ron Borland and James Balmford). Such a self directed program, whether it is telephone, paper or internet based (or a combination of all three) accompanied by a public advertisement campaign could be the first step to both educate the public, to help individuals assess whether they are currently consuming alcohol in a risky or excessive fashion and then provide advice. An interactive web site could be used to provide feedback or structured advice based on individual responses to questions regarding frequency and amount of alcohol consumption. Given the perceived stigma attached to reporting excessive alcohol consumption, lack of resources to deal with these problems particularly in rural and remote areas, and that information provided could be pertinent to the specific individual, be provided anonymously and be continuously available via a website, this is a potential first line public health approach to deal with excessive use of alcohol.

In a review of web based substance use interventions by Martin and Copeland (2003), there were no economic evaluations identified, and none have been located subsequently. Those who have developed internet based interventions have suggested costs are relatively "cheap" or "favourable". The initial development and implementation costs of such an intervention might be substantial but would provide continuous access, individualised responses to screening outcomes, links to existing treatment, and permit the targeting of a significant portion of the population.

There would be additional costs to the establishment of such a program However, given the relative difference in cost estimates of $25 for self directed versus $428 for a course of CBT, with similar outcomes in term of altering alcohol consumption, there is considerable scope for up front costs to establish the program before it became as expensive as CBT in terms of a population approach.

Andrews (1984) argued in a letter to the British Medical Journal that the use of non-propriety drugs and non-drug techniques were not widely promoted for a range of conditions despite clinical studies demonstrating their effectiveness. It would appear that little has been achieved in the 20 years since (Andrews 1984). Given the apparent findings from this study, that self guided treatment and psychotherapies have a role in treatment for dependent alcohol consumption, combined with the apparent lack of training and often lack of willingness among GPs to provide drug and alcohol

counselling, it may be an opportune time to evaluate and consider a Medical Benefits Scheme (MBS) fee for the provision of counselling by trained counsellors for relapse prevention. While the costs of pharmacotherapies included in this study are primarily covered by the PBS (except for $23.80 fee per script paid by individuals), medical costs are covered part by the MBS, and counselling may be provided within a specialist clinic, hospital outpatient or community setting. Counselling obtained outside of these settings by trained counsellors will primarily be the financial responsibility of the individual and likely be at a higher charge that the costs used in this study. From 1 July 2004, people with chronic conditions and complex care needs who are being managed through an Enhanced Primary Care multidisciplinary care plan may be eligible for up to five allied health services per year on referral from their GP (http://www.health.gov.au/medicare/health_pro/gp/pdf/allied.pdf). These MBS items, while providing some financial assistance and leading to additional counseling services, may not resolve the costs pertaining to those with alcohol dependency if they do not visit a general practitioner, are not classified as having a chronic condition or need more than five counseling sessions.

However, before such a move takes place, a commitment by trained counsellors to the provision of this treatment, as well as standards and training programs need to be developed to ensure that adequate standards are maintained and that counselling sessions contain the necessary ingredients to bring about change.

This is not to say that the use of pharmacotherapies should not be used for relapse prevention when warranted, however the current uptake and compliance with ongoing treatment in Australia appears to be very low, so this is currently not addressing the estimated 560,000 dependent drinkers in Australia or the other 7.9% of the population who are drinking at risky levels.

Key recommendations

- Determine the appropriate use of acamprosate and naltrexone; who would benefit most; should they be used in younger populations? If these pharmacotherapies are to be used more broadly, more information on their effective use and cost effectiveness should be ascertained.

- Clarify the definition of a comprehensive treatment program to be provided with pharmacotherapies, and assess the uptake and impact of comprehensive treatment on outcomes.
- Provide training opportunities for GPs in the provision of counselling for patients to address drug and alcohol problems.
- Ongoing promotion of NHMRC guidelines on screening for excessive alcohol use by GPs.
- Assessment of the provision of Internet based self- directed interventions, needs to include telephone access for illiterate people, and printed materials for those who do not have access to the Internet.
- A well conducted cost effectiveness analysis of acamprosate and naltrexone pharmacotherapies.
- Individual assessment of individuals drinking status is necessary but establishing a clear continuum of treatment is also necessary. Therefore:
    - promote self directed interventions as a first line approach, then psychotherapies and
    - for relapse prevention – psychotherapies and then pharmacotherapies
- Further research is required as to who would benefit from inpatient or day hospital detoxification in terms of costs and outcomes.

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Appendix 1- Practitioner survey

NICOTINE & ALCOHOL CESSATION THERAPIES

Medical Practitioner Survey

National Drug and Alcohol Research Centre
The University of New South Wales
with
The Department of General Practice
The University of Adelaide

Part A: Demographic and Background Details

Firstly, we would like to obtain some general information about yourself:

1. What is the year of your birth?	19 _ _
2. In which country were you born?	Australia New Zealand United Kingdom Other (please specify) .....
3. What is your gender?	Male Female
4. In what year did you graduate from medical school?	19 _ _
5. Where was your undergraduate medical training completed?	Australia New Zealand United Kingdom Other (please specify) .....
6. Have you completed FMP/RACGP (or overseas equivalent) training?	Yes No Current training
7. Are you vocationally registered as a GP?	Yes No
8. Do you have a specialist qualification either as a psychiatrist or gastroenterologist?	Yes No
8a. Please specify qualification:	
9. Do you have a postgraduate medical qualification?	Yes No **SKIP to Q11**

10. Is your postgraduate qualification in mental health?

Yes
No

10a. Please specify the postgraduate qualification:

.....
.....

11. How many years have you worked in general/specialist practice?

< 1 year
1 - 2 years
3 - 5 years
6 -10 years
11 - 20 years
> 20 years

12. How many sessions would you normally work per week? *(A session equals 3.5 hours or half day).*

…….……..

13. What is the postcode of your major practice address? _ _ _ _

14. How many doctors (FTE) work at the practice where you do most of your consulting?

Solo
2 doctors
3-5 doctors
6-8 doctors
More than 8 doctors

15. Please indicate the extent to which computers are used at the practice where you do most of your consulting. *(Please tick all boxes which apply).*

Not at all
Billing/accounting
Administration
Prescribing
Medical records
Pathology/report downloads
Other *(please specify)*
.....

Part B: Nicotine Cessation Therapies

We would like to obtain some information about management of patients with nicotine dependence:

(**Note**: buproprion hydrochloride=**Zyban** & nicotine replacement therapy =**NRT**)

16. Do you establish the smoking status of all of your patients?

Yes
No

17. Do you provide advice on the benefits of smoking cessation to all patients who smoke?

Yes
No

18. Have you undertaken training in providing a brief smoking intervention eg. smokescreen?

Yes
No

19. Do you regard smoking cessation as a preventative priority?

Yes
No

20. Are you familiar with the five As of smoking intervention?

Yes
No

What aspects of care do the five A's cover?

.....
.....
.....
.....
.....

21. What is your preferred treatment strategy(ies) for nicotine dependence? *(Please tick as many boxes which apply).*

NRT
Zyban
Counselling by GP
Counselling by other health professional
Quitline
Pamphlets
Herbal product
Hypnosis
Acupuncture
Other *(please specify)*
.....

22. Have you ever recommended NRT for nicotine dependence?

Yes
No

Please state your reason(s) for NOT prescribing NRT: *(Please tick all boxes which apply).*

22a. Treatment not effective
22b. Cost
22c. Patient not motivated
22d. Possible adverse effects of medication
22e. Other *(please specify)*
.....
.....
.....

23. How effective do you think Zyban is in helping patients to achieve long-term abstinence?

Not effective
Slightly effective
Effective
Very effective
Don't know

24. Have you ever prescribed Zyban for nicotine dependence?

Yes **SKIP to Q25**
No

Please state your reason(s) for NOT prescribing Zyban. *(Please tick all boxes which apply).*

24a. Treatment not effective
24b. Cost
24c. Patient not motivated
24d. Possible adverse effects of medication
24e. Other *(please specify)*
.....
.....
.....

If answered NO to Q24, please SKIP to Q32 in Section C.

25. How many scripts of Zyban do you estimate you have prescribed?
……..……..

26. What factors trigger a decision to prescribe Zyban rather than another form of treatment? *(Please tick all boxes which apply).*

Patient request
Request by family member
Health status of patient
Other *(please specify)*
.....
.....
.....

27. In prescribing Zyban do you advise patients to pursue other programs or products to assist smoking cessation?

Always
Frequently
Rarely
Never **SKIP to Q29**

28. Please indicate the programs or products which were advised by you for use in conjunction with Zyban. *(Please tick all boxes which apply).*

Zyban Action Plan (ZAP)
NRT
Counselling by GP
Counselling by other health professional
Quitline
Pamphlets
Other *(please specify)*
.....

29. Do you think that programs or products in association with Zyban improve the likelihood of smoking cessation?

Yes
No **SKIP to Q32**

30. Which program or product do you think is the most effective when used in conjunction with Zyban? *(Please tick only one box).*

Zyban Action Plan (ZAP)
NRT
Counselling by GP
Counselling by other health professional
Quitline
Pamphlets
Other *(please specify*
.....

31. What proportion of your patients prescribed Zyban, do you estimate returned for a follow-up consultation related to smoking cessation?

……..……..

Part C: Alcohol Cessation Therapies

We would like to obtain some information about management of patients with alcohol dependence:

32. Do you establish the drinking status of all your patients?

Yes
No **SKIP to Q34**

33. In general, do you use a screening instrument to detect drinking status?

Yes
No

33a.
Which screening instrument(s) do you use? *(Please tick all responses which apply).*

AUDIT (Alcohol use disorders identification test)
Drinking diary
Other *(please specify)*.....

34. Do you provide advice on the health risks of excessive alcohol use?

Yes
No

35. Have you undertaken training in providing advice to patients about excessive alcohol use?

Yes
No

36. Do you regard advice for excessive alcohol use as a preventative priority?

Yes
No

37. What is your preferred treatment strategy(ies) for excessive alcohol use? *(Please tick as many boxes which apply).*

Pharmacotherapy
Counselling by GP
Counselling by other health professional
Pamphlets
Herbal product
Other *(please specify)*
.....

38. Have you ever prescribed a pharmacotherapy for excessive alcohol use?

Yes
No

Please state your reason(s) for NOT prescribing pharmacotherapies for alcohol dependence. *(Please tick all boxes which apply).*

38a. Treatment not effective
38b. Cost
38c. Patient not motivated
38d. Possible adverse effects of medication
38e. Other *(please specify)*
.....
.....
.....

SKIP to Q46 if answered NO to Q38.

39. What factors trigger a decision to prescribe a pharmacotherapy rather than another form of treatment? *(Please tick all boxes which apply)*

Patient request
Request by family member
Health status of patient
Other *(please specify)*
.....

40. Which pharmacotherapy(ies) have you prescribed? *(Please tick all boxes which apply).*

Naltrexone (Revia)
Acamprosate (Campral)
Disulfiram (Antabuse)
Other *(please specify)*
.....

41. Please indicate how effective you think pharmacotherapies are in helping patients to reduce excessive alcohol use *(Please tick one box only):*

Not effective
Effective
Very effective
Don't know
Slightly effective

42. Please indicate the effectiveness of pharmacotherapies in helping patients to reduce excessive alcohol use *(Please tick one box only for each medication):*

Naltrexone	**Acamprosate**	**Disulfiram**
Not effective	Not effective	Not effective
Effective	Effective	Effective
Very effective	Very effective	Very effective
Don't know	Don't know	Don't know
Slightly effective	Slightly effective	Slightly effective

43. In prescribing pharmacotherapies for excessive alcohol use, were patients advised to pursue other programs or products in conjunction with the pharmacotherapy?

Always
Frequently
Rarely
Never **SKIP to Q46**

44. Please indicate the programs or products which were advised for use in conjunction with pharmacotherapies for excessive alcohol use. *(Please tick all responses which apply).*

Counselling by GP
Counselling by other health professional
Pamphlets
Other (please specify)
.....

45. Do you think that these programs or products improve the likelihood of reducing alcohol consumption?

Yes
No

46. Do you have any further comments?

_____
_____

Thank you for completing this survey.

Please return the survey in the reply-paid envelope provided.
Alternatively, post to:
Nicotine & Alcohol Cessation Therapies
Department of General Practice
The University of Adelaide
Reply Paid 65650
UNIVERSITY OF ADELAIDE SA 5005
For any queries, please phone Katherine on (08) 8303 3467.

Appendix 2- Excluded studies

Table A2.A: Excluded brief intervention studies

Authors	Source	Reason for exclusion
(Anderson and Scott 1992)	Psychosocial intervention searches	Sample size
(Baer, Marlatt et al. 1992)	(Moyer, Finney et al. 2002)	No control intervention
(Borsari and Carey 2000)	Psychosocial intervention searches	Sample size
(Duckert, Amundsen et al. 1992)	(Moyer, Finney et al. 2002)	No control intervention
(Fleming, Manwell et al. 1999)	(Moyer, Finney et al. 2002)	Subjects restricted to people aged 65 years and older
(Gentilello, Rivara et al. 1999)	(Moyer, Finney et al. 2002)	Recruitment from trauma ward not general population
(Heather, Kissoon-Singh et al. 1990)	(Bien, Miller et al. 1993)	Considered a self guided study
(Miller, Benefield et al. 1993)	Psychosocial intervention searches	Sample size
(Richmond, Heather et al. 1995)	(Moyer, Finney et al. 2002)& Psychosocial intervention searches	Not randomised
(Scott and Anderson 1990)	Psychosocial intervention searches	Sample size
(Senft, Polen et al. 1997)	(Moyer, Finney et al. 2002)	No baseline data
(Sitharthan, Kavanagh et al. 1996)	(Moyer, Finney et al. 2002)	No control intervention

Table A2.B: Excluded psychosocial intervention studies

Authors	Source	Exclusion reason
(Abril 1994)	(Apodaca and Miller 2003)	Unpublished doctoral dissertation
(Anderson and Scott 1992)	(Apodaca and Miller 2003)	Considered a brief intervention study
(Annis, Davis et al. 1989)	(Carroll 1996)	Unpublished work
(Annis and Davis 1989)	(Carroll 1996)	Descriptive paper only
(Baer, Kivlahan et al. 2001)	(Shand, Gates et al. 2003)	No alcohol consumption or abstinence outcomes
(Bien, Miller et al. 1993)	(Shand, Gates et al. 2003)	Outcome calculation method not clearly defined
(Borsari and Carey 2000)	(Shand, Gates et al. 2003)	Binge drinking population only
(Brown and Miller 1993)	(Morgenstern and Longabaugh 2000)	Intervention included residential detoxification
(Chaney, O'Leary et al. 1978)	(Morgenstern and Longabaugh 2000)	Study treatment occurred while subjects were in an intensive in and outpatient program
(Chick, Lloyd et al. 1985)	(Apodaca and Miller 2003)	Considered a brief intervention study
(Cunningham, Sdao-Jarvie et al. 2001)	(Apodaca and Miller 2003)	Majority of sample also received an unspecified outpatient alcohol treatment
(Edwards, Orford et al. 1977)	(DiClemente, Bellino et al. 1999)	Sample limited to married men, reported composite outcome measures only
(Fleming, Barry et al. 1997)	(DiClemente, Bellino et al. 1999)	Considered a brief intervention study
(Gentilello, Rivara et al. 1999)	(Shand, Gates et al. 2003)	Limited to serious trauma patients
(Harris and Miller 1990)	(Apodaca and Miller 2003)	Data only presented graphically

(Hawkins, Catalano et al. 1986)	(Morgenstern and Longabaugh 2000)	No alcohol consumption or abstinence outcomes
(Hawkins, Catalano et al. 1989)	(Morgenstern and Longabaugh 2000)	No alcohol consumption or abstinence outcomes
(Heather, Campion et al. 1987)	(Apodaca and Miller 2003)	Considered a brief intervention study
(Heather, Kissoon-Singh et al. 1990)	(Apodaca and Miller 2003)	Considered a brief intervention study
(Heather, Rollnick et al. 1993)	(DiClemente, Bellino et al. 1999)	Considered a brief intervention study
(Heather, Rollnick et al. 1996)	(Apodaca and Miller 2003)	Considered a brief intervention study
(Heather, Brodie et al. 2000)	(Shand, Gates et al. 2003)	Included poly-drug users who also drank alcohol
(Ito, Donovan et al. 1988)	(Morgenstern and Longabaugh 2000)	No true baseline (data taken prior to hospitalisation which was prior to study)
(Jones, Kanfer et al. 1982)	(Morgenstern and Longabaugh 2000)	No baseline data presented
(Kadden, Cooney et al. 1989)	(Morgenstern and Longabaugh 2000)	No alcohol consumption or abstinence outcomes
(Marlatt, Baer et al. 1998)	(Shand, Gates et al. 2003)	Limited to subjects attending university, primarily binge drinking
(Miller and Taylor 1980)	(Apodaca and Miller 2003)	Data only presented graphically
(Miller, Gribskov et al. 1981)	(Apodaca and Miller 2003)	Data only presented graphically
(Miller, Benefield et al. 1993)	(Shand, Gates et al. 2003)	Considered a brief intervention study
(Monti, Abrams et al. 1990)	(Morgenstern and Longabaugh 2000)	Possible drinking days not defined
(Monti, Rohsenow et al. 1993)	(Morgenstern and Longabaugh 2000)	Date only presented graphically
(Monti, Colby et al. 1999)	(Shand, Gates et al. 2003)	No alcohol consumption or abstinence outcomes
(Oei and Jackson 1980)	(Morgenstern and Longabaugh 2000)	No alcohol consumption or abstinence outcomes
(Oei and Jackson 1982)	(Morgenstern and Longabaugh 2000)	Data only presented graphically
(O'Farrell, Choquette et al. 1993)	(Carroll 1996)	Intervention in combination with behavioural marital therapy
(Reynolds, Coombs et al. 1995)	(Apodaca and Miller 2003)	Study limited to pregnant women only
(Richmond, Heather et al. 1995)	(Apodaca and Miller 2003)	Considered a brief intervention study
(Rohsenow, Monti et al. 2001)	(Shand, Gates et al. 2003)	No alcohol consumption or abstinence outcomes
(Savage, Hollin et al. 1990)	(Apodaca and Miller 2003)	Follow-up interval too short compared to other selected studies (1 month)
(Scott and Anderson 1990)	(Apodaca and Miller 2003)	Considered a brief intervention study
(Sellman, Sullivan et al. 2001)	(Shand, Gates et al. 2003)	No alcohol consumption or abstinence outcomes
(Spivak, Sanchez-Craig et al. 1994)	(Shand, Gates et al. 2003)	No alcohol consumption or abstinence outcomes
(WHO Brief Intervention Study Group 1996)	(Apodaca and Miller 2003)	Considered a brief intervention study

Table A2.C: Excluded pharmacological intervention studies

Authors	Source	Exclusion reason
(Carroll, Ziedonis et al. 1993)	(Srisurapanont and Jarusuraisin 2003)	Subjects had cocaine and alcohol dependence
(Galarza, Ramirez et al. 1997)	(Srisurapanont and Jarusuraisin 2003)	Dose of NTX not specified, only psychosocial outcomes
(Heinala, Hannu et al. 2001)	(Srisurapanont and Jarusuraisin 2003)	No baseline data in appropriate outcome units
(Hersh, Van Kirk et al. 1998)	(Srisurapanont and Jarusuraisin 2003)	Dual cocaine and alcohol dependent subjects
(Johnson, Ait-Daoud et al. 2000)	(Srisurapanont and Jarusuraisin 2003)	Combination NTX and ondansetron treatment
(Knox and Donovan 1999)	(Srisurapanont and Jarusuraisin 2003)	Subjects not withdrawn before first naltrexone dose
(Landabaso, Iraurgi et al. 1999)	(Srisurapanont and Jarusuraisin 2003)	Combination NTX and aversion agent
(Lhuintre, Moore et al. 1985)	(Overman, Teter et al. 2003)	No alcohol consumption or abstinence outcomes
(Lhuintre, Moore et al. 1990)	(Overman, Teter et al. 2003)	No alcohol consumption or abstinence outcomes
(Morris, Hopwood et al. 2001)	Srisurapanont & Jarusuraisin (2003)	Appropriate outcomes not analysed by intention to treat
(Namkoong, Lee et al. 2003)	(Overman, Teter et al. 2003)	Follow-up period not comparable to other selected studies
(Oslin, Liberto et al. 1997)	Srisurapanont & Jarusuraisin (2003)	Only 50 to 70 year old subjects
(Pelc, Le Bon et al. 1992)	Overman et al. (2003)	Only graphical data presented
(Roussaux, Hers et al. 1996)	Overman et al. (2003)	No alcohol consumption or abstinence outcomes

Appendix 3- Resource use in research studies and treatment guidelines

Table A3.A: Typical resource use for the intervention types in selected studies

Intervention Type	Resource use
Brief intervention	All groups had 5 to 20 min medical professional consultation, self-help booklet provided (pamphlet to book plus audio cassette). 2/4 groups had self-completed screening survey (5 to 20 minutes) 1/4 groups had baseline blood test.
Multi session brief intervention	All groups had self completed screening survey, two general practitioner consultations (approx. 15 minutes), self help booklet (including drinking diary in 1/2 groups), 1/2 groups had baseline blood test,
Motivational intervention	All groups had medical assessment averaging 3 hours, 1 blood, 1 urine, 4 breathalyser tests 4 individual counselling sessions of approximately 60 mins,
Cognitive-behavioural intervention	4/6 groups had baseline medical assessment (estimated 30 minutes), breathalysed 6 to 12 times, individual therapy (8 to 12 sessions of 40 to 60 minutes), 2/6 groups had group therapy (6 sessions of 90 mins, 3 to 4 in group), 2 to 4 standard drinks of alcohol each, drinking diary.
Self guided interventions[a]	All group had media (newspaper) advertising 9/10 groups had written self help materials (booklet to 100 pg manual), 5/10 groups had baseline interview (approx 5 minutes).
Naltrexone intervention[b]	All groups had baseline medical assessment, 7/8 groups had baseline blood test, weekly individual counselling (12 to 16 sessions for 6 groups, 52 sessions for 1 group), naltrexone 50 mg/day for 12 weeks (6 groups) or 12 months (1 group), 3/8 groups had 1 to 4 additional medical assessments, 2/8 groups had baseline urine test.
Acamprosate intervention[c]	All groups had medical assessment, 13/14 groups had baseline blood tests, 8/14 groups had 3 to 11 additional medical assessments, 6 acamprosate tablets/day if >60kg, 4 Acamprosate tablets/day if <40kg for 2 to 12 months. 4/14 groups had 6 acamprosate tablets/day for 3 to 12 months, take home materials (drinking cards or calendar), 6 to 52 counselling sessions of 15 to 90 minutes, 3/14 groups had 3 additional blood tests, 2/14 groups had 4 acamprosate tablets/day for 3 to 12 months.

[a] Resources used only by one group include: staff supervision for computer use (15 to 45 minutes for 8 sessions); baseline blood test; 9 uses of breathalyser; 30 minute motivational assessment; self monitoring cards; and computer access and software.

[b] Resources used by one group include: urine pregnancy test for women; naltrexone 25 mg/day for the first 2 days and 50mg/day for 12 weeks; intensive (8 hour) therapy day program for 4 weeks, then group counselling twice per week for 8 weeks; drinking calendar.

[c] Resources used by only one group included: 2 ECG measurements; and intensive outpatient support of 44 hours/week for 4 weeks then weekly for 20 weeks.

Table A3.B: Typical resource use for intervention types in the Australian treatment context (National Drug and Alcohol Research Centre 2003)

Intervention Type	Resource use	Number	Time
Brief intervention	Medical professional consultation (including screening)	1	5 to 10 minutes
	Self help materials (eg: pamphlet)	1	
Multi session brief intervention	Medical professional consultations (including screening)	Several	5 to 10 minutes
	Self help materials (eg: pamphlet)	1	
Motivational intervention	Blood test (liver functioning),	1	
	Individual intervention	As required	As required
Cognitive-behavioural intervention	Skills training: either individual or group, practice sessions as group	As required	As required
	Cue exposure training	6 to 12	50 to 90 minutes
	Cue exposure alcoholic beverages	2 to 4 drinks	
Self guided interventions	Printed material (brief guidelines to larger books)	1	
Naltrexone intervention	Medical professional consultation	2	As required
	Blood test (liver functioning)	1	
	Naltrexone tablets	25 mg/day for the first 2 days, then 50 mg/day	3 months but 6 to 12 months may be necessary
	Regular monitoring of depression and psychosocial relapse prevention.	As required	As required
Acamprosate intervention	Medical professional consultation	2	As required
	Baseline blood (liver and kidney function)	1	
	Acamprosate tablets	6[a] tablets of 333mg daily in 3 doses with meals	3 to 6 months[b]
	Psychosocial techniques to deal with relapse.	As required	As required

[a] This dosage is assuming the patient weighs 60 kilograms or more. Patients weighing less than 60 kilograms have a dose of 4 tablets daily in 3 doses.
b Acamprosate is recommended as a 12 month treatment in MIMS online (MIMS 2004).

Appendix 4- Footnotes to Table 17

[a] As the number of medical consultations was not given in the guidelines, this is the recommended resource use of the research studies (Appendix 3). An attendance of 75% has been assumed for the actual attendance.
[b] This consultation is only for the purposes of taking a blood sample
[c] It has been assumed that 75% of the psychologist consultations were attended. The average number of counselling sessions attended by participants in the Project MATCH study was 3.19 (Cisler, Holder et al. 1998)
[d] This is the average number of counselling sessions offered at a clinical practice in Sydney for a 6 month period (C. Sannibale, personal communication). Actual no of sessions attended (50% attendance) and a range is also recorded.
[e] An attendance of 75% has been assumed. (Dawe, Rees et al. 2002) reported a mean attendance of 5.8 out of 7 counselling sessions. Average recommended no of counselling sessions is 9, from the Australian guidelines.
[f] The number and range have been calculated from 2 to 4 standard drinks per session as reported in the research studies (Appendix 3).
[g] This is the range for the recommended number of standard drinks, not the actual number of standard drinks
[h] A script being filled is assumed to occur every month. Two scripts can be filled per prescription written (and per medical professional visit).
[i] Dosage is 6 tablets of 333mg daily in 3 doses with meals, and is the dosage for people weighing 60 kilograms and over. Number of scripts is from the Australian treatment guidelines (3 to 6 month outcomes) or the MIMS online recommendations (12 month outcomes).
[j] Since the number of psychologist consultations was only specified in the treatment guidelines as as required , a monthly psychologist consultation has been assumed. Actual attendance is assumed to be 50% of this value.
[k] Counselling sessions attended from (Rubio, Jimenez-Arriero et al. 2001), reported an attendance rate of 43 of 48 possible sessions (90%), which has not been used in this case as it is likely not to occur in clinical practice.
[l] In the research studies, the majority of studies did not routinely attend counselling sessions, but use within a comprehensive treatment program is recommended in the PBS guidelines (Australian Government Department of Health and Ageing 2004), so 50% attendance of recommended counselling sessions has been assumed.
[m] Mean additional medical consultation attendance and prescription filling based on a cumulative retention in treatment as reported by (Kranzler, Modesto-Lowe et al. 2000). The drop in subject retention for months 3 to 6 of treatment is assumed to follow the same pattern as the 12 month outcomes.
[n] Mean additional medical consultation attendance and prescription filling based on a 3rd month retention rate of 60% by (Kranzler, Modesto-Lowe et al. 2000) and a 12th month retention of 30%, half the 3 month value. Drop in subject retention per month is assumed to occur at a consistent rate throughout the treatment.
[o] Mean additional medical consultation attendance and prescription filling based on (Tempesta, Janiri et al. 2000).
[p] Mean additional medical consultation attendance and prescription filling based on (Barrias, Chabac et al. 1997). Drop in retention rates only reported for odd months, so a consistent drop in subject retention for all months has been assumed.
[q] It has been assumed that a brief (10 minute) consultation with a psychologist will be required to determine treatment suitability and possibly a mailing address before the self guided materials are distributed.
[r] It was considered unlikely for general practitioners to fund newspaper advertising to recruit clients to this treatment, so self guided intervention will be costed in a similar way to brief interventions. Screening and recruitment to treatment would occur in the course of a medical consultation.