DRUG INFO clearinghouse

www.druginfo.adf.org.au

Prevention of alcohol-related harms

Prevention research evaluation report

Prevention research summaries

Reading and resource list

ADF Australian Drug Foundation
• preventing drug problems •

State Government Victoria
Premier's Drug Prevention Council

The Prevention Research Evaluation Report, Prevention Research Summaries and Reading and Resource List are part of the DrugInfo Clearinghouse's quarterly publications on drug prevention. Other publications and resources include the newsletter ***DrugInfo*** and a range of Fact Sheets tailored for specific audiences, such as professionals and others working in the drug prevention sector, teachers, students, parents and others with an interest in drug prevention. The quarterly publications usually provide a range of perspectives on current research and best practice around a central theme in drug prevention. All of these publications may be downloaded from our website.

The DrugInfo Clearinghouse provides a first port of call for workers, professionals and others seeking information on drugs and drug prevention.

You can sign up for membership online at our website, or by visiting, telephoning or writing to:

DrugInfo Clearinghouse
Australian Drug Foundation
409 King Street, West Melbourne, Victoria 3003 Australia
Tel. 1300 85 85 84 (Victoria only)
Email: **druginfo@adf.org.au**
Web: **www.druginfo.adf.org.au**

Any enquiries or comments on this publication should be directed to the Publishing Manager, DrugInfo Clearinghouse, at the above address.

The research presented in this publication represents work done on behalf of the DrugInfo Clearinghouse by the two collaborative teams of the Centre for Youth Drug Studies at the Australian Drug Foundation and the Centre for Adolescent Health at The University of Melbourne.

DrugInfo Clearinghouse is an initiative of the Australian Drug Foundation and the Victorian Premier's Drug Prevention Council.

Could an alcohol-abstinence focus through childhood and adolescence reduce alcohol-related harm?

Associate Professor John W Toumbourou[1], Mr Bosco Rowland[2] and Ms Aimee Jeffreys[2]

Alcohol-related harm is the major contributor to preventable health and social costs experienced by young people. Alcohol harm-minimisation strategies such as random breath testing have contributed to improvements on key indicators of alcohol-related harm such as reductions in death and injury, and these strategies have clearly benefited young people. Although many indicators of acute alcohol-related harm have shown reductions among young people over the past two decades, this has not occurred due to young people drinking alcohol at moderate levels. Children and adolescents have tended to drink alcohol at younger ages and at higher levels over the past decade. The extent of youth alcohol use raises concern as to whether there may be categories of alcohol-related harm that have been overlooked and that may be adversely impacting the healthy development of children and young people in Australia.

This 13th Prevention Research Evaluation Report for the DrugInfo Clearinghouse examines the scientific evidence for the impacts of alcohol use on children and adolescents. The specific question explored in this report is whether there may be benefits if current harm-minimisation policies were supplemented through a greater emphasis on alcohol abstinence for children and adolescents. The effectiveness of prevention strategies that have been based on an abstinence focus for children and early adolescents is examined and their compatibility with current policy approaches is discussed.

Inclusion criteria and literature appraisal method

The current report revisits a range of literature that has been previously reviewed in the DrugInfo Clearinghouse Prevention Research Evaluation Reports. The starting point for the present review was the electronic search strategies and evaluation of previous reviews detailed in Loxley, Toumbourou, Stockwell, Haines *et al.* (2004). This literature was supplemented by an electronic search to locate more recent studies relevant to the harms associated with alcohol use in childhood and adolescence.

In line with the previous reports in this series, the perspective from the published literature was juxtaposed against the views of stakeholders. The potential to supplement current policy approaches by enhancing an abstinence focus for children and adolescents was explored from the perspectives of ten people with work and other experience relevant to the issue of alcohol and young people.

1 Centre for Adolescent Health, Murdoch Childrens Research Institute and Department of Paediatrics, University of Melbourne
2 Centre for Youth Drug Studies, Australian Drug Foundation

Trends in the alcohol use of young people

Australian adolescents are showing increasing rates of alcohol use, while rates of use for adolescents in the United States are declining.

Both alcohol production data and survey research have shown steady population declines in per-capita alcohol consumption in the broader Australian population since the mid-1980s (AIHW 2003). However, the available evidence suggests that these declines have not been matched within Australia's population of young people, whose rates of use have increased and age of initiation lowered. For example, in a recent report (Chikritzhs, Pascal & Jones 2004) 23 per cent of Australian adolescents aged 14–17 years were observed as drinking alcohol at levels that the National Health and Medical Research Council has deemed to pose risks for acute harm. The same report documented increases in high-risk drinking among teenage girls from 1998 to 2001.

In studying behavioural trends in younger populations, the best available source is survey data collected from school students. The Australian School Survey of Alcohol and Drugs (ASSAD) is the only source of trend data for monitoring behaviour to the beginning of high school. Trends in this study have shown rising patterns of alcohol use over time through the 1990s among early high school students. Student reports of current alcohol consumption in the 12–15 years age group were significantly higher in the recent ASSAD surveys in 2002 and 1999, relative to the 1996 and 1993 surveys. For the 16–17 years age group, the proportion of students reporting that they are current drinkers has remained stable at high levels since the early 1990s (White & Hayman 2004).

In contrast, over the past two decades successive reductions in youth alcohol use have been noted in the United States through the high school years. The main source of data regarding student alcohol use in the United States is the Monitoring the Future (MTF) school survey. In the 1983 MTF survey, 69 per cent of United States secondary school students in their final year reported drinking alcohol in the previous month. Twenty years later, in 2003, this figure had decreased to 47 per cent (Johnston O'Malley & Bachman 2001). The MTF survey techniques were extended to countries in Europe in 1995 and 1999. These studies have revealed that rates of youth alcohol use are higher in Europe relative to the United States (Hibel, Aderson, Ahlstrom, Balakireva *et al.* 2000).

Contrasting behavioural estimates between countries can be complicated due to different methodologies, survey techniques and reporting methods. The International Youth Development Study (IYDS) currently being conducted at the Centre for

Table 1: Prevalence estimates of lifetime alcohol use and binge drinking in the past two weeks for students in different school grades in Victoria, Australia and Washington State in the United States

	Washington State, USA		Victoria, Australia	
	Boys	**Girls**	**Boys**	**Girls**
Grade 5				
Alcohol use	25.3%	16.3%	60.4%	41.2%
School Year 7				
Alcohol use	37.1%	38.9%	64.2%	55.2%
Binge Drinking	4.4%	5.0%	11.6%	8.8%
School Year 9				
Alcohol use	56.2%	58.2%	79.9%	84.5%
Binge drinking	9.1%	11.7%	30.1%	31.2%

Notes
1. Shaded percentages reflect significantly higher differences (p <.05) between same sex, state estimates.
2. Alcohol use—students had more than just a sip or two of an alcoholic drink (like beer, wine or spirits) at some point in their life.
3. Binge drinking—drank more than five drinks in a session at least once over the previous two weeks.
4. The grade cohorts in each country comprised just under 1000 students.

Adolescent Health in Melbourne is a collaboration with researchers from the Social Development Research Group at the University of Washington. The IYDS aims to compare patterns of substance use for student populations in Victoria, Australia and Washington state in the United States. The findings from the IYDS presented in Table 1 show the substantially higher rates of alcohol use in Victoria relative to Washington state students.

The IYDS findings presented in Table 1 suggest that rates of youth alcohol use in Victoria are like the patterns in southern Europe in that they are markedly higher relative to young people in the United States. The reduction in rates of youth alcohol use achieved in the United States over the past two decades are likely to be due to many causes. Among these are policy changes that have included successful attempts to increase the legal drinking age across the United States, beginning in the 1980s. The evidence from temporal trend studies (summarised below) has consistently associated these changes with both reductions in early age alcohol use and reductions in alcohol-related harm in the young adult population.

Harms associated with alcohol use for children and young people

The evidence presented above suggests that current Australian harm-minimisation policies have not been as successful as those in the United States in reducing rates of youth alcohol use. However, this may not in itself be cause for concern, as Australia's harm-minimisation policies have aimed less at reducing use and more at reducing harms. In the sections that follow, we summarise information from a range of sources relevant to the harms experienced by children and young people due to alcohol use in Australia.

On balance, the evidence summarised below suggests that current harm-minimisation approaches have a record of success in containing many of the potential acute harms that young people could otherwise experience given their high rates of alcohol consumption. With respect to overall youth mortality, accident and injuries, and for some sexually transmissible infections (HIV/AIDS), the trends for young adults compare favourably against other nations.

Mortality

Current trends

In the late 1990s, the Australian Institute of Health and Welfare (AIHW) completed its first report examining the health of young Australians aged 12–24 years (Moon, Meyer & Grau 1999). Among a number of positive trends was a decline in youth death rates from 85 per 100 000 in 1979 down to 60 per 100 000 in 1997. The decline in vehicle accident deaths associated with alcohol use had been partly responsible for these trends. In their report providing the most specific data available to date, Chikritzhs, Pascal & Jones (2004) reveal that from 1990 to 2002 the deaths attributable to alcohol in the age group 14–17 years showed a marked reduction, despite increasing rates of alcohol consumption.

Future projections

Public-health policies are actively addressing these issues and hence mortality rates for young people should continue to decline.

Injuries

Current trends

Among young Australians aged 12–24 years, rates of injury continued to decline through the 1990s (Moon, Meyer & Grau 1999). This has been largely attributed to the success of harm-minimisation strategies that have reduced vehicle accidents associated with alcohol use. In their report, Chikritzhs, Pascal & Jones (2004) reveal variation across states in alcohol-attributable hospitalisation trends from 1993 to 2000 within the 14–17 years age group. In general, trends appear to show stability; however, in some states such as New South Wales increases may be evident for males.

Future projections

The overall trend for decreasing youth injuries should continue. However, the more specific data on alcohol-related hospitalisations has only recently emerged and should be carefully monitored.

Crime and violence

Current trends

Existing statistics are inadequate. However, on the basis of available evidence it does not appear that the increased rates of youth alcohol use in Australia have been accompanied by escalating crime and violence. An analysis of trends from the National Drug Strategy Household Survey did not show any increase among rural youth in alcohol-related crime and violence through the 1990s, despite rising rates of alcohol use by young people (Williams 1999). A comparison of trends in self-reported crime comparing state representative surveys of Victorian students in 1992 and 1999 showed relatively stable trends (Toumbourou 2000).

Future projections

Our best guess is that overall rates of youth alcohol-related crime and violence will remain stable, although there is likely to be a larger cohort of female offenders. Factors that drive youth involvement in alcohol-related crime and violence include underlying rates of childhood behaviour problems, the organisation of drinking venues and the cumulative level of social developmental risk and protective factors (Loxley *et al.* 2004). Although there are policies addressing each of these areas, their overall effectiveness is unclear and hence we have not predicted any overall improvements in this area.

Sexually transmissible infections

Current trends

With respect to sexually transmissible infections, there have been many successes, but also some areas of concern. Rates of new HIV and syphillis infections were shown to have declined through the 1990s. Teenage fertility declined from 55 births per 1000 women in 1971 to 20 in 1988, and had been stable over the remaining decade. However, rates of Chlamydia infections had more than doubled in prevalence over the 1990s, from 71 to 196 per 100 000 notifications (Moon, Meyer & Grau 1999). Although trend statistics are not published, recent media reports have uncovered very high rates of pregnancy terminations among young women.

Future projections

On current trends, some categories of sexually transmissible infection will increase. Previous policy successes in these areas suggest that it may be possible to reduce some aspects of these problems without introducing a policy emphasis of abstinence for children and adolescents.

Conclusions—existing indicators of alcohol-related harm

On the basis of the indicators summarised above, it would appear that, despite high rates of youth alcohol use, current harm-minimisation policies are demonstrating many successes, and indicators are showing many reductions in alcohol-related harm for young people. However, the evidence presented below suggests that there may be categories of alcohol-related harm that have escaped policy attention.

Have existing policies failed to take account of developmental harms?

A category of harms that has not received very much attention in Australia to date relates to developmental harms. For example, this category of alcohol-related harm was notably absent in a recent discussion paper investigating harmful alcohol consumption released by the Victorian Parliament (Drugs and Crime Prevention Committee 2004). Developmental harm refers to the special categories of harm that may be experienced by children and adolescents whose brains, bodies and behaviours are still developing (Loxley *et al.* 2004). The evidence summarised below examines different areas in which alcohol use may have particular developmental impacts for children and adolescents.

Impact of alcohol use by children and young people on maternal alcohol use and foetal exposure to alcohol

Drinking patterns in adolescence have been shown to either remain stable or to increase into young adulthood (Toumbourou, Williams, Snow & White 2003). High rates of alcohol use among children and adolescents and increasing rates among young

women raise the prospect of higher levels of alcohol use among young women as they enter child-bearing age.

Adverse effects on the unborn child of maternal alcohol and other drug use have been documented. These effects are on the physical and psychological development, in both the short and longer terms. This potential for long-term harm means that an important issue for prevention policy surrounds the use of alcohol and other drugs by pregnant women and also women who are planning to become pregnant. Specific effects have been documented in relation to the use of both tobacco and alcohol (Loxley *et al.* 2004). Even in the absence of Foetal Alcohol Syndrome, infants born to alcohol-dependent mothers show an increased incidence of intellectual impairment, congenital anomalies and decreased birth weight (Aronson, Kyllerman, Sabel, Sandin *et al.* 1985).

There is currently little monitoring of alcohol use among women who are pregnant or breastfeeding in Australia. The 2001 National Drug Strategy Household Survey (AIHW 2002) revealed that 41.5 per cent of pregnant women and 45.8 per cent of breastfeeding women had drunk alcohol. Only a small minority, however, stated that they had not either reduced their drinking or completely abstained while pregnant (4.4 per cent) or breastfeeding (5.8 per cent).

Future projections

The current drinking trends of young people in Australia pose the possibility of foetal alcohol-related harm increasing for future generations in Australia. There are no systems in place to monitor this possibility. With the increasing rates of alcohol use there are now more young women drinking excessive amounts of alcohol around the high-risk time of conception.

Impact of alcohol use by children and young people on future rates of child abuse and neglect

As patterns of alcohol use in adolescence tend to remain stable or increase into young adulthood, high rates of alcohol use among children and young people can translate in future years to higher levels of alcohol use as young people become parents. This, in turn, may project to increasing levels of child abuse and neglect.

Current indicators in Australia are showing substantial increases in levels of child abuse and neglect. For example, in 1999–2000 there were 107 134 child protection notifications (relevant to child abuse and neglect) received by state authorities across Australia. This had nearly doubled to 198 355 in the four years to 2002–03 (AIHW 2004). These increases were not explained by better surveillance or population increases.

Over the past decade Victoria has experienced a considerable escalation in demand for child protection and placement services, and these problems can be related to high rates of alcohol and drug use in the young adult population. The increase in notifications of suspected child abuse is substantial and not explained simply due to the introduction of mandatory reporting. Although the introduction of mandatory reporting in 1993 was associated with a large increase, there was a more recent 20 per cent increase in notifications from 1996–97 to 2001–02 (from 31 707 to 37 967). Since 1996–97, the number of substantiated cases has increased and there is now a greater likelihood that substantiated cases will be subject to re-notification. Department of Human Services tracking of "concerning characteristics" of parents involved in child protection matters reveals that alcohol and other drug abuse is increasingly observed. In 1996–97, substance abuse was a concern in 12.5 per cent of first notifications and by 2001–02 this had doubled to 25.2 per cent of cases (Allen Consulting Group 2003).

Future projections

Notifications and substantiated cases of child abuse and neglect are projected to continue to rise (Allen Consulting Group 2003). The extent to which these trends can be related to high rates of youth alcohol use remains unclear.

Impact of alcohol use by children and young people on future rates of young adult alcohol-related disorders and mental health problems

Australia's increasing rates of early age alcohol use could result in a higher number of young Australians

experiencing alcohol-related disorders (alcohol abuse and dependence) and experiencing adverse mental health in future years. Although there has been little research in Australia, there is an international trend for increasing rates of alcohol dependence problems to be identified among more recent cohorts of young women (Holdcroft & Iacono 2002).

A range of longitudinal behavioural research demonstrates that the initiation of alcohol use at an early age increases the likelihood of escalating to higher frequencies and amounts of alcohol use in adolescence (for example, Fergusson, Horwood & Lynskey 1995). Higher frequencies and amounts of alcohol use in adolescence have in turn been shown to lead to higher levels of alcohol-related disorders (for example, Guo, Hawkins, Hill & Abbott 2001) and alcohol-related harms (Toumbourou, Williams *et al.* 2003). These effects continue to apply after controlling for other developmental risk factors. Early involvement in alcohol use can also have a range of other developmental effects in shaping recreational interests, coping strategies, social relationships and attitudes to other forms of substance use (Loxley *et al.* 2004).

In the late 1990s, problems associated with mental illness represented the major burden of disease for young people and were noted to be higher than for any other age group. Depression contributed substantially to this burden. Youth suicide and self-harm had each steadily increased during the 1990s (Moon, Meyer & Grau 1999), but appear to have stabilised or reduced since that time.

It is unclear to what extent the high rates of alcohol use evident for young people in Australia can be related to the high rates of mental health problems. Preliminary analyses of the IYDS study show slightly elevated rates of depressive symptoms for young people in Victoria, Australia relative to their counterparts in Washington state, United States. Rates of self-harming behaviour appear more clearly elevated in Victoria relative to Washington state.

Recent evidence supports the possibility that the higher rates of self-harm for young people in Victoria may be partly attributable to their higher rates of alcohol use. In a recent paper by Windle (2004), a conceptual model was developed and then tested relevant to the processes linking adolescent alcohol use with suicidal behaviour. A sample of 1200 United States high-school students were interviewed and then followed over two years. Analysis revealed that binge drinking predicted suicide attempts, after controlling for other influences. In a study by Light, Grube, Madden & Gover (2003), a survey was completed by 600 United States students (aged 12 and older) and then repeated two-years later. At both study waves the experience of common alcohol-related problems (for example, feeling sick, hangovers, school problems) were associated with suicidal thoughts and behaviours. The study investigated the direction of the relationship between suicidal thoughts and behaviours and alcohol-related problems, and found different models applied for males versus females. Alcohol-related problems predicted suicidal thoughts and behaviours for males. However, for females suicidal thoughts and behaviours led to an increase in alcohol-related problems.

Future projections

The current tendency for earlier-age alcohol use and higher levels of use in adolescence could result in an increased demand for services to treat alcohol-related disorders in the future. As statistics in this area are poorly organised, there is currently no way of monitoring this projection. Further research will be required to enable an estimate of the impact of youth alcohol use on mental health problems.

Adolescent brain impact of current patterns of alcohol use

It is possible that an earlier age of alcohol use and more regular use during adolescence could result in damage to brain development. Considerable progress has been made in recent years in identifying the effects of alcohol use on the adolescent brain. The maturation during adolescence of the brain's reward pathways for alcohol provides one plausible explanation for the attraction of substance use through this phase and the potential for specific vulnerability due to alcohol misuse.

Recent literature reviews published in the United States present evidence that the brain development that continues through adolescence can be placed

at risk due to alcohol use (Brown & Tapert 2004; Chambers, Taylor & Potenza 2003; White & Swartzwelder 2004). In their review, Chambers *et al.* (2003) observed that during adolescence brain development occurs in areas such as the frontal cortex and within specific midbrain regions that clinical research has associated with motivation, impulse control and addiction. These developmental changes to the adolescent brain are interpreted to explain a lowering of impulse control and heightened adventurousness through this period, operating to confer an increased interest in substance use.

The effects of the episodic, binge drinking patterns that are common in Australian adolescents have been investigated using experimental studies with rats. These studies clearly demonstrate that exposure to these binge-drinking patterns result in more brain damage and cognitive functional impairment when the drinking occurs in adolescence rather than in adulthood (Brown & Tapert 2004; White & Swartzwelder 2004). It is unclear whether these findings generalise to humans.

Using magnetic resonance brain imaging technologies and cognitive testing, it is now possible to study the functioning of the human adolescent brain over time. Studies using these technologies have documented clear changes in the adolescent brain associated with alcohol abuse. These studies suggest that alcohol withdrawal experiences (associated with episodic binge drinking) may be particularly damaging (Brown & Tapert 2004; White & Swartzwelder 2004).

One immediate implication that flows from the data reported in the above studies is the possibility that Australian young people may have observable levels of alcohol-induced brain damage. The review by Brown and Tapert (2004) presents a disturbing finding in this regard. They observe that at lower levels of alcohol-related brain damage there tends to be no functional evidence of this damage. This is because the adolescent brain tends to be very good at compensating by using alternative areas of the brain to retain the function lost in areas that have been damaged due to alcohol use.

A considerable body of research has now been completed to uncover the specific processes that underlie the impact of alcohol on the brain. In their review, White & Swartzwelder (2004) present evidence that both functional memory and simulated hippocampal function are adversely impacted by alcohol use, with effects dose-related and measurable after only one or two alcoholic drinks. These specific spatial memory and functional simulation effects are more evident in the adolescent phase than in adulthood, with the youth vulnerability still evident into the early 20s. For example, spatial memory recall was more impaired under a small dose of alcohol when subjects were in their early 20s, compared to subjects in their late 20s.

While the adolescent brain is more sensitive than the adult brain to hippocampal-related memory deficits following alcohol use, animal experiments demonstrate that adolescents are also less sensitive compared to adults to the sedative and motor-impairing effects of alcohol. Taken together the implication of these findings are that adolescents may be capable of drinking large amounts of alcohol while also being more sensitive to the dose-related hippocampal memory impairment associated with alcohol use. Alcohol use in adolescence also appears to change the brain so that it continues to be less sensitive to motor impairment following alcohol use, with this effect maintained into adulthood. Although there are functional changes, studies are yet to clarify whether adolescent binge drinking causes observable long-term brain damage (White & Swartzwelder 2004).

The above evidence is disconcerting in suggesting that alcohol use may have a greater functional and brain impact on adolescents relative to adults. Despite this vulnerability, adolescents appear to be very attracted to alcohol and recent evidence is beginning to uncover why this may be the case. Part of the appeal appears to be due to a general attraction to risk taking through this period. The Chambers, Taylor & Potenza (2003) review argued that brain changes in adolescence result in a greater attraction to novelty and risk and in this regard the brain changes through adolescence increase both attraction and vulnerability to substance use.

Another part of the attraction appears to operate through the puberty mediated drive for sex. Patton, McMorris, Toumbourou, Hemphill *et al.* (2004) recently demonstrated in an analysis of the IYDS study a strong cross-sectional relationship such that

stages of puberty were found to be a better predictor of levels of substance use (tobacco, alcohol or illicit drug use) than age or school-year level. Potential risk processes mediating the relationship between puberty and substance use were investigated. Findings supported the view that puberty acted to increase the risk of substance use due to its influence in increasing the tendency to peer affiliation. As the social context currently involves a high level of peer drug use, in late puberty more friends were reported to be substance users and this effect partly explained the effect of puberty on substance use. The implication of the study is to support the view that adolescence is a heightened period of vulnerability to peer risk factors for substance use. At the same time that adolescents are more attracted to peer affiliation, experimental studies with rat populations suggest they may also be more vulnerable than adults to an increased sense of social facilitation through use of alcohol (Varlinskaya & Spear 2004).

The evidence reviewed in this section suggests that adolescence is a period of heightened vulnerability to alcohol use. At this stage the evidence does not make clear whether Australian adolescents are experiencing any increases in observable functional deficits in areas such as cognition, memory or intellectual functioning as a consequence of their high levels of alcohol use.

Future projections

With an earlier age of alcohol use it is possible that subtle forms of alcohol-related brain damage may be increasing for young people in Australia. There are currently no monitoring systems in place that have the capacity to monitor this projection.

Conclusions—some developmental harms related to alcohol may be increasing

The above evidence is disconcerting in suggesting that there are a variety of developmental harms related to alcohol that are not currently being monitored in current policy considerations, and hence may be being overlooked. The projections presented above suggest that in many cases these developmental harms are likely to be increasingly prevalent in their adverse influence on children and young people in future years.

The data presented above is controversial to the extent that it represents information that has not been part of the formal policy agenda to date (for example, Drugs and Crime Prevention Committee 2004). Clearly, a period of time will be required for policy forums to debate the evidence presented above. The sections that follow have been written on the assumption that at least a partial case exists for encouraging an enhanced alcohol-abstinence focus for children and adolescents.

How could childhood alcohol abstinence be achieved in the Australian harm-minimisation policy context?

In a recent Commonwealth review relevant to the prevention of harmful drug use, the potential to integrate different prevention frameworks was considered (Loxley *et al.* 2004). This review argued that there were potentially strong compatibilities between harm minimisation and developmental prevention approaches. On one hand, harm-minimisation approaches that reduce levels of intoxication support developmental prevention objectives by improving conditions for healthy child development through reductions in areas such as domestic violence. On the other hand, developmental prevention programs such as those which work to reduce child behaviour problems can also contribute to harm-minimisation objectives by reducing the number of individuals at risk of alcohol abuse and violent behaviour.

In the sections that follow, strategies that could have the potential to reduce the number of children and early adolescents using alcohol are reviewed. A specific focus in this examination is the interrelationship between the practices of parents and the broader culture as represented by the legal and community contexts.

Parents

Although a range of factors influence alcohol use, parents appear to play a critical role in introducing their children to alcohol and also in discouraging early

or excessive use. In an analysis of the Christchurch, New Zealand cohort, parental approval of adolescent alcohol use at age 14 predicted a higher frequency of alcohol use at age 15 (Fergusson, Lynskey & Horwood 1994). Currently in Australia, children and early adolescents report their parents as their major source for obtaining alcohol (White 2001).

A number of recent literature reviews have summarised evidence for the influence of parents on the alcohol use of children and young people (Hayes, Smart, Toumbourou & Sanson 2004; Toumbourou, Rowland, Leigh & Hemphill 2003). In their review, Hayes *et al.* (2004) presented evidence suggesting that parental monitoring, parental rules for youth alcohol use and parental skills for managing child behaviour all had direct effects on the alcohol use of children and adolescents. Parent–adolescent relationship quality also appeared to have an overall effect on these parenting behaviours, as well as direct connections to alcohol use. Parental characteristics also had an indirect effect on alcohol use, by way of their influence on parenting behaviours (Hayes *et al.* 2004).

The available evidence suggests, therefore, that Australian parents have the capacity to establish family environments that would enable them to set effective rules and parenting practices that would delay the age at which their children would begin using alcohol. However, for a variety of reasons, it appears that many Australian parents do not emphasise abstinence from alcohol for children. Instead, they attempt to manage adolescent alcohol use through strategies such as monitoring alcohol availability. An insight into the extent of these practices is provided through the ASSAD survey. Among the students aged 12–15 years responding to the ASSAD survey, 42 per cent reported parents as the most common source for obtaining alcohol (White & Hayman 2004). Other surveys also concur in the observation that a considerable number of adolescents obtain alcohol through their parents. The 2003 Victorian Youth Alcohol and Drug Survey found that parents had purchased alcohol for half of the adolescents who had drunk alcohol and were under 18 years (51 per cent) (Premier's Drug Prevention Council 2003).

The review by Hayes *et al.* (2004) comprehensively examined this literature evaluating the potential effectiveness of parenting strategies in limiting youth alcohol use, while also noting limitations. The following provides a very selective account of pertinent findings. There has been little research into the effectiveness of Australian parents in managing adolescent alcohol use. In particular, there has been little research into effective strategies that parents might be able to use to encourage moderation in contexts in which children are using alcohol.

There is some cross-sectional evidence from the ASSAD study to suggest that young people may drink lower amounts of alcohol in contexts in which parents—rather than peers—have provided the alcohol (White & Hayman 2004). This evidence accords with the view that providing children and adolescents with alcohol may introduce a home environment conducive to open discussion in which high-risk practices might be anticipated and prevented. The main problem for parents is that introducing children to alcohol use at home has the potential for early use to become an entrenched pattern that escalates over time. For example, Grade 5 children who were permitted to drink alcohol at home were shown to have an increased likelihood of maintaining alcohol use two years later (Jackson, Henrikson & Dickinson 1999).

Although Australian parents might see the merit of attempting to set family rules that forbid children using alcohol, they are often pessimistic that this will be feasible in an environmental context that does not support such a prohibition. Among the important information presented by Hayes *et al.* (2004) was an analysis of the parent and adolescent data available through the Australian Temperament Project, a longitudinal study of children that began in 1983 with a representative cohort of around 2500 Victorian infants. This analysis provided some support for the potential effectiveness in Victoria of parental prohibitions against child and adolescent alcohol use.

Parents were asked whether they allowed their adolescent to use alcohol within the home. Around the time the adolescents were aged 16 to 17 years, a large minority of the parents (44 per cent) reported that they had not permitted their adolescent to drink at home—not even a small amount at celebrations

prior to age 18. In other families, adolescents had been permitted to use alcohol at home, with the age at which this had been first allowed showing variation.

The parent reports of the age at which adolescents had been allowed to drink at home were compared against the adolescent reports of their alcohol use. The pattern of findings suggested that delaying the age at which adolescents were allowed to use alcohol at home tended to be associated with more abstinent and moderate patterns of adolescent alcohol use. These findings are important in suggesting that in Victoria's harm-minimisation context it may still be possible for parents to effectively set an abstinence prohibition against adolescent alcohol use without inciting inevitable, rebellious adolescent alcohol use.

Previous Prevention Research Evaluation Reports for the current series have reviewed the evidence for prevention approaches based on parent education (Toumbourou, Rowland *et al.* 2003) and family intervention (Toumbourou, Duff, Bamberg & Blyth 2003) strategies. The evidence demonstrates that these interventions have been effective in the United States' abstinence context in reducing the age of first alcohol use. Given the differences in the cultural conditions relevant to youth and alcohol use, efforts to trial programs emphasising childhood abstinence from alcohol use should be carefully evaluated for their effectiveness in the Australian context.

The present consideration of underage alcohol use needs to acknowledge the community context of this behaviour. Although parents have an important influence on their child's alcohol use, there are complex influences at work, including the practices of other parents, and school and community influences. A tolerant approach to youth alcohol use on the part of other sections of the community may provide a source of access to alcohol that contravenes the values and preferences within the child's family.

The law and its enforcement

Evidence that the law can be an important influence on the introduction of children to alcohol use and on the level of adolescent alcohol use has been reviewed in previous reports for the present series (Toumbourou, Godfrey, Rowland & Duff 2004). The following provides a brief summary.

Studies, primarily conducted in the United States and Canada, suggest that increasing the legal age for alcohol purchase and use from 18 to 21 years reduced youth alcohol use and alcohol-related harm (Douglass 1980; Whitehead & Wechsler 1980; Yu & Shacket 1998). A multi-site matching trial of the enforcement of minimum drinking age laws in the United States also demonstrated a significant reduction in youth access to alcohol (Grube 1997).

Some limited attempts have been made to examine the processes by which changes to the law influence youth alcohol use. One research program that is relevant in this regard was conducted in New York state, United States. The introduction of a law increasing the drinking age to 21 years was monitored through a series of state youth surveys. The introduction of the law was associated with self-reported declines in alcohol purchase, alcohol use, driving while under the influence of alcohol and being a passenger in a vehicle with an alcohol-impaired driver (Yu & Shacket 1998). Findings from this study suggested that parental supervision may have been an important factor in enforcing the drinking-age law and reducing youthful alcohol use. Yu (1998) monitored findings from the state youth surveys to examine changes in attitudes over the period through the 1980s when the state legal drinking age was modified from 19 to 21 years. The analysis associated the movement to older minimum drinking-age laws with less favourable parental attitudes to underage drinking.

The above findings suggest that increasing the legal age for alcohol purchase and use may be one method of reducing early age alcohol use and the alcohol-related harm experienced by young people. The available evidence suggests that changes to the law may be associated with changes toward less tolerant parent practices relevant to youth alcohol use.

What are the prospects for increasing legal drinking age laws in Australia? The National Drug Strategy Household Survey has monitored public attitudes for a number of years and generally finds that around 40 per cent of Australians would support raising the minimum age for alcohol purchase and use. Very few of the practitioners interviewed for the present report emphasised increasing the legal age for alcohol purchase and use as a policy strategy. As will be

presented below, these practitioners tended not to support the use of legal mechanisms in attempts to discourage underage alcohol use. The common view of those interviewed was that cultural change had to precede changes to the law.

Obviously, the law and its enforcement can also be powerful influences in shaping youth behaviour in ways that are more compatible with the harm-minimisation goals of moderate alcohol consumption. A previous report (Toumbourou, Godfrey *et al.* 2004) argued that the management of early experiences with intoxication may provide intervention opportunities for diverting young people away from harmful alcohol use. Enforcement of laws prohibiting public drunkenness provide one mechanism for police intervention with young people who are demonstrably alcohol impaired. Community protocols such as escorting young people home and advising parents of the young person's behaviour, and possible parental responses, could be simple mechanisms for encouraging parenting interventions. Although police are active in these areas, there is little evidence that programs have been formally documented or evaluated.

Community and cultural change

If it is accepted that changes to the culture must precede efforts to change the law, the question arises as to how community and cultural change might be encouraged in such a way that would reduce alcohol use among children and adolescents. Social marketing is one strategy that has been used in efforts to change community attitudes and behaviours. There have been a number of social marketing programs relevant to youth alcohol use in Australia, and the existing evaluations have suggested these programs may have had some impact, particularly related to attitudinal changes.

For example, the initial Australian "Drug Offensive Campaign Against Alcohol Abuse" was launched in 1988 and included five television commercials, reinforced with notices in magazines and on buses and trains. Key messages emphasised that alcohol use could harm the physical development of young people, that drunken behaviour could result in social embarrassment, that responsible alcohol consumption was important and that parental modelling of alcohol use influenced the behaviour of young people.

Evaluation included pre- and post-testing, conducted with 2400 young people aged 15–17 years and a smaller number of parents. The young people reported high awareness of the television commercials, but this awareness was weakly associated with actual or intended behavioural change. A small shift in parents' behavioural intentions was noted. As there has been little research to demonstrate that parents can influence young people who are using alcohol to drink moderately, it is unclear what effect the achievement of this campaign goal might have. The evaluation concluded that there had been some attitude change associated with the campaign (Department of Community Services and Health 1990).

The 2000 National Alcohol Campaign aimed to reduce alcohol-related harm among young Australians. The campaign targeted young people aged 15–17 years and parents with children aged 12–17 years. Messages were conveyed via a range of media including television, radio, cinemas, magazines, newspapers and a website. The campaign also included media components specific to people from Indigenous and non-English speaking backgrounds.

Key messages for young people emphasised "drinking choices", with "excessive drinking" portrayed as socially unacceptable and having the potential for regretted consequences. The decision to avoid excessive drinking was contrasted as having social and health benefits. Behaviours recommended for avoiding excessive alcohol use included eating before drinking, monitoring the amount and pace of drinking, and substituting alcohol with non-alcoholic beverages. Young people were encouraged to avoid social pressures to drink, but how to achieve this was not specified. The parents' role in educating young people about the possible consequences of excessive alcohol use and the need to set limits was emphasised by the campaign.

Household and phone surveys with samples of around 1000 parents and young people were conducted before and after the launch phase. Awareness of the campaign was high, with 88 per cent of young people

and 81 per cent of parents reporting awareness. Young people reported that the campaign had prompted them to think about the potential negative consequences of drinking (94 per cent) and 63 per cent reported discussing the messages with friends. Of parents, 51 per cent reported responding to the campaign by talking with children about excessive alcohol use and by "keeping an eye on them". Parents accepting that "teenagers learn to drink from the way their parents drink" increased from 64 per cent to 71 per cent over the course of the campaign. The evaluation noted some small reductions in alcohol use across the surveys, but was unable to associate these with the campaign. Levels of potentially harmful alcohol use remained high at the end of the campaign (Carroll, Lum & Taylor 2000).

The above evaluations suggest that it may be feasible to modify community attitudes through carefully planned social marketing campaigns. To date, Australian campaigns have not attempted to convey information relevant to developmental harms or to emphasise the advantages of delaying the age at which children and adolescents are introduced to alcohol. A logical starting point in efforts to encourage change in community attitudes could be educational campaigns which aim to increase awareness of the potential for developmental harms to be associated with childhood alcohol use.

In addition to social marketing campaigns, community and cultural practices relevant to alcohol use have also been successfully modified through community intervention programs. Community intervention efforts have been implemented and evaluated for their potential to contribute to reductions in alcohol-related harm. The effectiveness of community mobilisation programs has been evaluated previously in the present series (Toumbourou, Rowland, Williams & Hemphill 2002). These programs encompass a broad range of practices aimed at reducing local social–environmental influences that contribute to harmful substance use. Typically, activities aim to involve local people in the coordination and implementation of a range of complementary prevention strategies. At one level, programs have focused on encouraging local norms unfavourable to youth alcohol use (for example, Perry, Williams, Ueblen-Mortenson *et al.* 1996); in other cases the focus has been on the reduction of harms associated with drinking (Holder, Saltz, Gruber, Voas *et al.* 1997). Holder and colleagues (1997) demonstrated that reductions in alcohol-related harm were achievable through an integrated community action campaign that included enforcement of local laws.

More recent evidence supports the view that integrated community mobilisation programs can reduce alcohol-related violence. A program based on community mobilisation, training in responsible beverage service for servers and stricter enforcement of existing alcohol laws was initiated in Stockholm, Sweden in 1996. Over a 10-year period, violent crimes decreased significantly in the intervention community, relative to a control community (Wallin, Norstrom & Andreasson 2003).

There is evidence from the United States that community mobilisation approaches can be used to discourage childhood and adolescent alcohol use (Perry *et al.* 1996). Efforts to introduce programs of this nature in the Australian context would have to be carefully evaluated.

The stakeholder perspective

As has been the practice for previous reviews in this series, information from published sources was supplemented with a series of interviews with practitioners and stakeholders considered to have experience relevant to the prevention of harmful youth alcohol use. The ten people interviewed were working in health promotion (n=1), alcohol industry (1), local government (1), policing (1), schools (2), parent education (2) or were interviewed as parents (2). The following questions were asked during a phone interview of approximately half an hour:

- What are some of the harms associated with adolescent alcohol use?
- What are some of the issues associated with adolescent alcohol use?
- Some research suggests that individuals may be at greater risk of dependence in young adulthood if they take up alcohol during early adolescence. Do you think that is correct?

- What do you think are the major influences leading to adolescent alcohol use?
- What role do you think parents have in adolescents taking up alcohol before the age of 18?
- Within some circles it has been suggested that young people under 18 years should not be permitted to drink alcohol under any circumstances.
  What is your reaction to this proposal?
- Can you see any benefits with adopting this approach? Can you see any problems with adopting this approach?

Interviews were transcribed and then subjected to theme analysis.

Those interviewed tended to be highly conscious of the harms—both acute, short-term harms and developmental harms—associated with the use of alcohol by children and young people. Although more were aware of acute harms or mental health impacts, a minority expressed awareness of developmental harms. In these cases there was acknowledgment that children are "still developing, emotionally, physically and psychologically"... and that alcohol "can interfere with the maturation process". The potential for alcohol use to adversely impact the adolescent's developing brain was mentioned by a number of respondents.

The clear majority also agreed that alcohol use at an earlier age increased the risks of young people experiencing harm. In part, the increasing risk posed by earlier age of alcohol use was explained due to the resulting longer period of exposure to alcohol use. "Young people who drink earlier have longer drinking careers, by definition. [Hence,] more chance of experiencing harms or developing diseases, or to suffer organic damage". Although there may not be "any particular trauma or immediate harm there may be invisible harm. They may be suffering harm in the sense that they are learning that alcohol is an essential part of relaxation and entertainment".

In two cases respondents agreed that alcohol use at an earlier age increased the risks of young people experiencing harm, but they disagreed that this was the underlying cause. "I think it is correct. But it ignores the factors behind why young people take up alcohol at an early age." In one case there was disagreement based on personal experience. "For me, I come from a culture that allowed me to drink alcohol at the age of 12 [sip of wine]. So, no, I do not agree. If the young person is resilient, they would not have a low self-esteem."

Both in the unprompted question asking about "the major influences leading to adolescent alcohol use" and in the more specific questions asking about the role of parents there was a strong consensus that parents play an influential role. However, the complex web of causal contribution was also widely acknowledged. Parental influences were emphasised both in establishing broader guidelines for young people and in behaviour modelling, but also in specific practices such as hosting parties and providing alcohol. Additional advice and support to parents was a popular direction.

Although parents were regarded as important, those interviewed appeared to be aware of the complex range of influences underlying youth alcohol use. A number mentioned the force of peer groups and "prevailing cultural attitudes which suggests that it is not only acceptable, but that everyone does it and everyone should". There was a sense that although "different families have a different sense of what is appropriate" there is a "norm to drink during the teenage years". The prevailing culture was considered to place pressure on parents. "As a parent I think my teenager drinks far too much and so do his mates."

In some cases respondents were aware that the current context placed parents in a difficult situation with respect to their children's alcohol use. "I suspect that in the best possible world that they [parents] would prefer to have their children avoid alcohol as long as possible. Some give them [adolescents] alcohol to stave off the child going overboard." One parent stated "in retrospect I probably did the wrong thing… bought alcohol for them when they had a party. At least it is controlled and modelling moderate consumption. But they just went and got more".

Respondents generally argued that changing the law to discourage under-age alcohol use ahead of efforts to change the culture would not be workable. There was a clear view that investment to change

the culture was needed prior to changing the law. "However, it flies in the face of current social norms; where most think it is appropriate to drink at an early age." Changing the law was considered to be not politically feasible as it would "create an uproar and a lot of resistance, [and be] opposed by young people".

"There needs to be a broader educational approach before you go down that way."

"Need an education campaign on adolescent brain development."

One of the dangers expressed by a number of respondents was that if you "ban alcohol you could push them to indulge in other substances".

An assertive approach to cultural change was also regarded as unnecessary as there were alternative strategies available. [There are few] "political risks if we take the smoking path", which in this context referred to the successful efforts to encourage a community norm that regards smoking unfavourably. Targeting children's alcohol use in the absence of efforts to address adult behaviour was also seen as potentially hypocritical. "We as adults drink excessively, and young people are imitating us. So if we just introduce young people's drinking [to the policy agenda], we are stigmatising young people for what we do." In two cases respondents argued that there may be room to adopt laws similar to those in New South Wales, where it is an offence to offer alcohol to another family's children.

Two respondents appeared to be attracted to moving toward the United States position of raising the drinking age. "Age 21 would change the industry." However, this was controversial in that others were strongly opposed to this direction. "The problem with a set-age is that there is no period of getting to know alcohol or drinking moderately."

Conclusions

The current review aimed to address the question as to whether there may be potential benefits achievable for reducing the alcohol-related harm experienced by young people through a strategy of enhancing the abstinence focus of alcohol policies for children and adolescents. Available evidence supports the view that benefits have been achieved through current harm-minimisation policy approaches and hence proposals for policy change must be approached cautiously to ensure existing benefits are retained and enhanced. While levels of alcohol use do appear to be higher for young people in Australia, it is not clear that rates of acute harms and behaviour problems related to alcohol use are rising. Policies to reduce alcohol-related harm have demonstrated a number of benefits for the young adult population in important areas including reduced mortality, injuries and containment of some sexually transmissible infections. Although existing data is not strong, it does not appear that the rising use of alcohol use by young people has been accompanied by overall increases in crime and violence.

This report has argued that there may be important categories of alcohol-related harm that have been largely ignored within current policy approaches. The argument developed in the present report is based on suggestive indicators, rather than solid evidence of alcohol-related harm. Although there is some evidence to suggest that the high rates of alcohol use in the young may be associated with some mental health problems such as suicidal behaviours, the available evidence is not strong. There is also some ground to believe that the high rates of alcohol use among young people in Australia may be associated with the rising levels of the sexually transmissible Chlamydia. However, again, the evidence base is poor.

It is also likely that early age and regular adolescent alcohol use will establish patterns of high-level alcohol use in young adulthood, elevating alcohol-related disorders. There are suspicions that the high levels of alcohol use in the young adult population may be contributing to the rise in child abuse and neglect currently being reported within Australian families. Again, the indicators in this area do not allow solid conclusions. There are theoretical grounds to expect that the current levels of alcohol use by children and young people may be elevating the prevalence of alcohol-related brain damage, but again there are no reliable statistics to confirm these trends.

The first step in investigating whether there is a case for delaying the age for the first use of alcohol

and reducing the level of use through adolescence will, therefore, be to improve the monitoring of potential sources of alcohol-related developmental harms. Particularly valuable in this regard would be longitudinal and other developmental research that can further explore and quantify the contribution of alcohol use by Australian children and young people to the pathways that lead to sexually transmissible infections, mental health problems, alcohol use disorders and child-rearing problems. Brain imaging and other studies that can further enlighten the possibility of alcohol-related brain damage in Australian children and young people would also be valuable.

Given that there is suggestive evidence of harms, the national imperative to protect the healthy development of children may suggest the need to adopt a cautious approach. From such an approach it may be safer to prevent children using alcohol until the evidence suggesting it is harmful can be disproved. In this report a number of strategies were reviewed that have evidence that they could assist the objectives of encouraging a delayed age for first alcohol use and lower rates of alcohol use through adolescence.

The evidence suggests that the attitudes and practices of parents will be critical drivers in efforts to achieve reductions in the use of alcohol through childhood and adolescence. With an appropriate social marketing investment in public education, it may be possible to raise community concern such that providing alcohol to children at an early age would be considered controversial. Evidence from the United States also suggests that changes to the law can be an important component in reducing youth alcohol use.

Those interviewed for the present report were of the strong opinion that efforts to encourage cultural change needed to precede any efforts to change the law. Those interviewed argued that the current Australian cultural context was unlikely to be amenable to an abstinence focus for children and would consider changes to the law in this direction as unacceptable. Therefore, one of the main conclusions flowing from the present report is that investment is warranted to better publicise existing information relevant to the potential for alcohol to lead to developmental harm and for research investment to better monitor the possibility of this type of alcohol-related harm.

References

Allen Consulting Group 2003 "Protecting children: The child protection outcomes project, final report for the Victorian Department of Human Services", Melbourne: The Allen Consulting Group Pty Ltd, Australia

Aronson M, Kyllerman M, Sabel KG, Sandin B & Olegard R 1985 "Children of alcoholic mothers: Developmental, perceptual, and behavioral characteristics as compared to matched controls", *Acta Paediatrica Scandinavica*, *74*:1, pp. 27–35

AIHW, Australian Institute of Health and Welfare 2004 *Child protection in Australia 2002–03*, AIHW Catalogue No. CWS 22, Canberra: AIHW

AIHW, Australian Institute of Health and Welfare 2003 *Statistics on drug use in Australia 2002*, AIHW Catalogue No. PHE-43, Canberra: AIHW

AIHW, Australian Institute of Health and Welfare 2002 *2001 National Drug Strategy Household Survey*, Canberra: AIHW

Brown SA & Tapert SF 2004 "Adolescence and the trajectory of alcohol use: Basic to clinical studies", *Annals of the New York Academy of Sciences*, *1021*, pp. 234–44

Carroll T, Lum M & Taylor J 2000 *Evaluation of the launch phase of the National Alcohol Campaign*, Sydney: Government Department of Health and Aged Care

Chambers RA, Taylor JR & Potenza MN 2003 "Developmental neurocircuitry of motivation in adolescence: A critical period of addiction vulnerability", *American Journal of Psychiatry*, *160*, pp. 1041–52

Chikritzhs T, Pascal R & Jones P 2004 *Under-aged drinking among 14–17 year olds and related harms in Australia*, National Alcohol Indicators, Bulletin No.7, Perth: National Drug Research Institute

Department of Community Services and Health 1990 "The first twelve months of the Drug Offensive Campaign Against Adolescent Alcohol Abuse",

Unpublished report. Canberra: Department of Community Services and Health

Douglass RL 1980 "The legal drinking age and traffic casualties: A special case of changing alcohol availability in a public health context", in H Wechsler (ed.) *Minimum drinking-age laws: An evaluation*, Washington DC: Lexington Books, Heath and Company, pp. 93–132

Drugs and Crime Prevention Committee 2004 *Inquiry into strategies to reduce harmful alcohol consumption*, Melbourne: Drugs and Crime Prevention Committee, Parliament of Victoria

Fergusson DM, Horwood LJ & Lynskey MT 1995 "The prevalence and risk factors associated with abusive or hazardous alcohol consumption in 16-year-olds", *Addiction*, *90*, pp. 935–46

Fergusson DM, Lynskey MT & Horwood LJ 1994 "Childhood exposure to alcohol and adolescent drinking patterns", *Addiction*, *89*, pp. 1007–16

Grube JW 1997 "Preventing sales of alcohol to minors: Results from a community trial", *Addiction*, *92*, Suppl. 2, pp. S251–60

Guo J, Hawkins JD, Hill KG & Abbott RD 2001 "Childhood and adolescent predictors of alcohol abuse and dependence in young adulthood", *Journal of Studies on Alcohol*, *62*, pp. 754–62

Hayes L, Smart D, Toumbourou JW & Sanson A 2004 *Parenting influences on adolescent alcohol use*, report prepared by the Australian Institute of Family Studies (AIFS) for the Department of Health and Ageing, Melbourne: AIFS

Hibel B, Aderson B, Ahlstrom S, Balakireva O, Bjarnason T, Kokkevi A & Morgan M 2000 *The 1999 ESPAD report: Alcohol and other drug use among students in 30 European countries*, Canada: Pompidou Group

Holdcroft LC & Iacono WG 2002 "Cohort effects on gender differences in alcohol dependence", *Addiction*, *97*, pp. 1025–36

Holder HD, Saltz RF, Grube JW, Voas RB, Gruenewald PJ & Treno AJ 1997 "A community prevention trial to reduce alcohol-involved accidental injury and death: Overview", *Addiction*, *92*, Suppl. 2, pp. S155–71

Jackson C, Henriksen L & Dickinson D 1999 "Alcohol-specific socialization, parenting behaviors and alcohol use by children", *Journal of Studies on Alcohol*, *60*:3, pp. 362–67

Johnston LD, O'Malley PM & Bachman JG 2001 *The monitoring the future national survey results on adolescent drug use, 1975–2000*, Volume 1: Secondary school students, Rockville, MD: National Institute of Drug Abuse

Light JM, Grube JW, Madden PA & Gover J 2003 "Adolescent alcohol use and suicidal ideation: A nonrecursive model", *Addictive Behaviors*, *28*:4, pp. 705–24

Loxley W, Toumbourou JW, Stockwell T, Haines B, Scott K, Godfrey C, Waters E, Patton G, Fordham R, Gray D, Marshall J, Ryder D, Saggers S, Sanci L, & Williams J 2004 *The prevention of substance use, risk and harm in Australia: A review of the evidence*, report prepared by the National Drug Research Institute and the Centre for Adolescent Health, for the Commonwealth Department of Health and Ageing

Moon L, Meyer P & Grau J 1999 *Australia's young people: Their health and wellbeing*, Cat No. PHE 19, Canberra: AIHW

Patton GC, McMorris BJ, Toumbourou JW, Hemphill SA, Donath S & Catalano RF 2004 "Puberty and the onset of substance use and abuse", *Pediatrics*, *114*:3, pp. e300–306

Perry C, Williams CL, Veblen-Mortenson S, Toomey T, Komro K, Anstine P, McGovern P, Finnegan J, Forster J, Wagenaar A & Wolfson M 1996 "Project Northland: Outcomes of a community wide alcohol use prevention program during early adolescence", *American Journal of Public Health*, *86*, pp. 956–65

Premier's Drug Prevention Council. 2003 *Victorian Youth Alcohol and Drug Survey 2003*, Melbourne: Victorian Government Department of Human Services

Toumbourou JW, Godfrey C, Rowland B & Duff C. 2004 *Law, regulation, policing and enforcement in the prevention of alcohol-related harm*, DrugInfo Clearinghouse Prevention Research Evaluation Report No. 9, West Melbourne: Australian Drug Foundation, available at *www.druginfo.adf.org.au/article.asp?id=7172&ContainerID=466*

Toumbourou JW, Duff C, Bamberg J & Blyth A 2003 *Family intervention in the prevention of drug related harm*, DrugInfo Clearinghouse

Prevention Research Evaluation Report No. 7, West Melbourne: Australian Drug Foundation, available at *www.druginfo.adf.org.au/article.asp?id=6036&ContainerID=466*

Toumbourou JW, Rowland B, Leigh B, Hemphill S, Marshall J & Dimovski M 2003 *Parent education in the prevention of drug related harm*, DrugInfo Clearinghouse Prevention Research Evaluation Report No. 6, West Melbourne: Australian Drug Foundation, available at *www.druginfo.adf.org.au/article.asp?id=5549*

Toumbourou JW, Williams IR, Snow PC & White VM 2003 "Adolescent alcohol-use trajectories in the transition from high school", *Drug & Alcohol Review*, *22*, pp. 111–16

Toumbourou JW, Rowland B, Williams J, Hemphill S & Farrell C 2002 *Preventing drug related harm through community mobilisation*, DrugInfo Clearinghouse Prevention Research Evaluation Report No. 5, West Melbourne: Australian Drug Foundation, available at *www.druginfo.adf.org.au/article.asp?id=4306*

Toumbourou JW 2000 "Will crime prevention using the Communities That Care approach be relevant in Australia?", Keynote paper presented to the Australian Institute of Criminology Conference, Reducing Criminality: Partnership and Best Practice, Perth, available at *www.aic.org.au*

Varlinskaya EI & Spear LP 2004 "Changes in sensitivity to ethanol-induced social facilitation and social inhibition from early to late adolescence", *Annals of the New York Academy of Sciences*, *1021*, pp. 459–61

Wallin E, Norstrom T & Andreasson S 2003 "Alcohol prevention targeting licensed premises: A study of effects on violence", *Journal of Studies on Alcohol*, *64*:2, pp. 270–77

White V 2001 *Australian secondary students' use of alcohol in 1999*, National Drug Strategy Monograph no. 45, Canberra: Commonwealth of Australia

White V & Hayman J 2004 *Australian secondary studentss use of alcohol in 2002*, Melbourne: The Cancer Council Victoria

White AM & Swartzwelder HS 2004 "Hippocampal function during adolescence: A unique target of ethanol effects", *Annals of the New York Academy of Sciences*, *1021*, pp. 206–20

Whitehead PC & Wechsler H 1980 "Implications for future research and public policy", in H Wechsler (ed.) *Minimum-drinking-age laws: An evaluation*, Washington DC: Lexington Books, Heath and Company, pp. 177–84

Williams P 1999 "Alcohol-related social disorder and rural youth: part 1—Victims", *Trends & Issues in Crime and Criminal Justice*, *140*, Australian Institute of Criminology

Windle M 2004 "Suicidal behaviors and alcohol use among adolescents: A developmental psychopathology perspective", *Alcoholism, Clinical and Experimental Research*, *28*:5 Supplement, pp. 29S–37S

Yu J 1998 "Perceived parental/peer attitudes and alcohol-related behaviors: An analysis of the impact of the drinking age law", *Substance Use and Misuse*, *33*:14, pp. 2687–702

Yu J & Shacket RW 1998 "Long-term change in underage drinking and impaired driving after the establishment of drinking age laws in New York State", *Alcohol Clinical and Experimental Research*, *22*:7, pp. 1443–49

Need to find more information on our catalogue?

To search the Resource Centre library catalogue for more information on this subject, try using terms and phrases such as:

Alcohol & adolesc*
Harm minimisation & adolesc*
Drink* & adolesc*
Polic* & adolesc*
Teen* & alcohol
Underage
Young people & alcohol
Minors

Need help with your research?

Contact our friendly staff in the DrugInfo Clearinghouse Resource Centre and library:

Telephone
1300 85 85 84 (Monday to Friday, 9am to 5pm)

Fax
(03) 9328 3008

Email
druginfo@adf.org.au

Website
www.druginfo.adf.org.au

www.druginfo.adf.org.au

DrugInfo Clearinghouse
409 King Street West Melbourne
Victoria 3003
Email: druginfo@adf.org.au