

**Draft Guidance on the
Consumption of Alcohol by
Children and Young People
from the Chief Medical
Officers of England, Wales
and Northern Ireland**

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Abbreviations

BAC	Blood alcohol concentration
CAF	Common Assessment Framework
CI	Confidence Interval
DAAT	Drug and Alcohol Action Team
DCSF	Department for Children, Schools and Families
ECM	Every Child Matters
ESPAD	European School Project on Alcohol and Other Drugs
FSES	Full Service Extended Schools
HBSC	Health Behaviour in School-Aged Children
NESARC	National Epidemiologic Survey on Alcohol and Related Conditions
NICE	National Institute for Health and Clinical Excellence
NLAES	National Longitudinal Alcohol Epidemiologic Survey
NLSY	National Longitudinal Survey of Labor Market Experience
NTA	National Treatment Agency for Substance Misuse
OJSC	Offending, Crime and Justice Survey
OR	Odds Ratio
PCT	Primary Care Trust
PSHE	Personal, Social and Health Education
RR	Relative Risk
SHEU	School Health Education Unit
YPBAS	Young Person's Behaviour & Attitudes Survey

Foreword



In April 2008 I was asked by the Secretaries of State for Health and for Children, Schools and Families to prepare guidance on the consumption of alcohol by children and young people. I was asked to work with the Chief Medical Officers of the other three United Kingdom countries so that the guidance represented our joint views.

Over the last decade, public concern about the impact of alcohol on health and society has steadily mounted.

Particular concern has centred on the level and pattern of drinking amongst children and young people and its consequences on health, crime, violence and anti-social behaviour.

Some key statistics highlight the problem:

- 17 million units of alcohol are consumed in a week by 11-17 year olds
- By 16 years most children have drunk alcohol
- Children in the United Kingdom are more likely to drink alcohol than many other countries
- 360,000 young people aged 11-15 years were drunk in the previous week
- The majority of 15-16 year olds (71%) associate alcohol consumption with positive consequences and having fun
- Early age of starting drinking is associated with higher trends of alcohol dependence in adulthood and a wider range of other adverse consequences

The key role of the Chief Medical Officer is to provide, for the Government and the public, advice without fear or favour. I sought out the best scientific evidence and use this as the basis, not just for presenting the facts but also for making well-founded policy recommendations.

The work to support us in producing this report has been carried out by Professor Mark Bellis and his team at the Centre for Public Health, Liverpool John Moores University. I am deeply grateful to them for their excellent contribution.

The content of this document is based on a scientific review of the evidence and the work was undertaken with the cooperation and support of the four Chief Medical Officers of the United Kingdom who see this as a common problem.

This draft guidance document represents the views of myself and the Chief Medical Officers for Wales and Northern Ireland. The Chief Medical Officer for Scotland wishes to synchronise his own advice with policy documents on alcohol that are being prepared by the Scottish Government for publication in due course.

This guidance is part of a consultation on advice and information for children, young people and alcohol, being facilitated in England by the Department of Children, Schools and Families.

Procedures for consultations on such matters differ in each of the other United Kingdom countries.

The findings from consultation will be collated and considered for inclusion into a final version of this Chief Medical Officer guidance later this year.

We very much hope that this guidance will help parents, families and most of all, children and young people themselves to change the way they view and use alcohol. In this way, we would hope to enter a time when citizens control alcohol, rather than as is too often the case, alcohol controls them and their lives.



Sir Liam Donaldson
Chief Medical Officer for England and the United Kingdom's Chief Medical Adviser.

Why do we need Guidance?

Across the UK, over a third of a million children between the ages of 11 and 15 will have been drunk in the past week. Young people under 18 will have consumed the equivalent of 1.7 million bottles of wine over the same time. The majority of young people under the age of 15 do not drink and many young people aged 16 – 17 do not drink on a regular basis. However, since 1990 the amount of alcohol consumed by 11 to 15 year olds who drink has doubled and we have seen increases in the numbers of children admitted to hospital as a direct result of their alcohol consumption. Such admissions represent just the tip of the iceberg of harms caused by alcohol to children. The drinking behaviours of our children are some of the worst in Europe, the health consequences are alarming and this is a situation that must change.

Parents or carers have a responsibility for whether their children drink at all and if they do, how much and how frequently they drink. However, for parents to feel confident when talking to their children about alcohol and to empower them to set appropriate boundaries they need guidance. Young people also need guidance about the specific harms linked to drinking at a young age. They need to understand how risks change with both age of drinking and the frequency and quantity of alcohol they consume.

Our guidance makes it clear that an alcohol-free childhood is the healthiest option. Children who drink increase their risks of involvement in a wide range of health and social problems. Drinking can interfere with young people's physical and educational development. However, some parents may decide that consuming some alcohol is occasionally an appropriate behaviour for their children. In these circumstances it is vital that parents and young people understand that risks are reduced by delaying the age at which young people begin to drink and when they drink, understand how risks change with the frequency and quantity of alcohol they consume. Therefore, our guidance identifies that parents should try to ensure their children do not drink at least up to the age of 15 years. Where children of 15 and over consume alcohol, we have also outlined maximum levels of consumption in order to reduce the greater harms from alcohol associated with higher levels of consumption.

An alcohol free childhood is the healthiest option and if children and young people do consume alcohol it should be in moderation and always under parental guidance or supervision. If parents and young people follow this guidance their problems, and the wider societal problems linked with underage drinking, will be considerably reduced. This not only means improvements in the health of young people, but also better health prospects for them as adults. We should experience lower levels of the anti-social behaviour that communities suffer as a result of excessive alcohol consumption by some young people. We should see fewer young people emerging into adulthood who consider drunkenness as the goal of drinking.

Introduction

1.1 Why this document has been produced



In the UK, children aged 11-17 years drink around 17.2 million units of alcohol every week. That is the equivalent of 6.9 million pints of beer or 1.7 million bottles of wine.



The Youth Alcohol Action Plan published in June 2008 sets out what the Government will do to address the problems with young people's alcohol consumption by stopping young people drinking in public; working in partnership with industry; and providing clear information to parents and carers, and children and young people about the risks of early drinking. The Government wants to give parents and young people the information they need to make informed choices.

The Government has asked the Chief Medical Officers to develop new guidance for parents and young people on the consumption of alcohol by young people under the age of 18. The guidance will specifically address the age at which children and young people can start to drink alcohol; how much is sensible for young people to drink; and how far parents or carers should supervise young people's drinking.

The guidance is intended to empower and thus help parents and carers to supervise and guide their children's alcohol consumption and ensure that any harms related to alcohol consumption are minimised. While parents and carers have a significant influence on how their children approach alcohol, other factors such as peer influences, cultural norms and the law also have a role to play. While this general guidance is based on the scientific and medical evidence available at this time, it is also important to recognise that individual children will vary in the speed at which they develop and the ways in which they react to the consumption of alcohol. Consequently, this guidance recognises that changing alcohol consumption among young people will require some flexibility in the way parents supervise children as well as a multi-faceted approach which ensures public services help parents and children to make sensible choices about alcohol.

1.2 How to use this document

This document is organised into the following sections:

Section 2 *Nature and extent of the problem* provides an overview of drinking patterns and some of their consequences in young people in the UK.

Section 3 *Guidance for the consumption of alcohol by children and young people* presents each guideline followed by the rationale, the underpinning scientific evidence and implications. Links are made from the evidence to section 4 and section 5.

Section 4 *Review of current policy, guidance and practice* contains a summary of relevant information, which relates to the guidance.

Section 5 *A review of the epidemiological literature on the effects of alcohol consumption on children and young people* provides a comprehensive review of the scientific evidence.

Additional information about the evidence underpinning the guidelines is provided in the Supplementary Information document.

2 Nature and extent of the problem

This section examines how much and how often alcohol is consumed by adolescents and children and how such consumption varies with age and sex, and some of the consequences of alcohol consumption by children and young people.

2.1 Headline figures

In the UK there are an estimated¹:

- 3.5 million children aged 11-17 who have ever consumed alcohol (2 million aged 11-15 and 1.5 million aged 16-17)
- 1.5 million children aged 11-17 who drink alcohol weekly (704,000 aged 11-15 and 752,000 aged 16-17)
- 630,000 children aged 11-17 who drink more than once a week (240,000 aged 11-15 and 390,000 aged 16-17)
- 360,000 children aged 11-15 drunk in the last week
- 17 million units (equivalent to 6.9 million pints of beer or 1.7 million bottles of wine) consumed in the last week by 11-17 year olds (estimate for a 'typical' week in 2007)
- 10,000 children aged 11-17 who are admitted to hospital each year as a result of their alcohol consumption (6,000 aged 11-15 and 4,000 aged 16-17)

2.2 When children start to drink

Data from national surveys of drinking behaviour in young people indicate that by age 16, the vast majority of young people have had their first alcoholic drink. In 2007, 20% of boys and girls aged 11 in England reported that they had ever had an alcoholic drink (Fuller, 2008²). The proportion that had ever drunk alcohol increased with age, to 54% and 81% of 13 and 15 year olds respectively. Surveys conducted in Scotland (BMRB Social Research 2007³) and Northern Ireland (Northern Ireland Statistics and Research Agency 2008⁴) show almost identical experiences of ever having drunk alcohol among young people⁵. Across all ages, boys and girls are equally likely to have drunk alcohol. In all four constituencies, of those young people who had reported having taken an alcoholic drink, most reported having their first drink at the age of 13.

There has been a slight decrease in recent years in reported experiences of alcohol consumption. In England in 2007, for example, 54% of pupils aged 11 to 15 reported that

1 The measures are derived from the detailed tables of information provided in Appendix 1 (see separate document). Where age specific measures (whether prevalence, rate or mean units) were known for some administrations, these were used to fill in the gaps across administrations where the data were lacking. These measures were then applied to the age-specific populations for each administration to estimate the number of individuals affected for each age and these were summed for the UK for 11-15 and 16-17 year olds, respectively.

2 Drug use, smoking and drinking among young people in England

3 Scottish Schools Adolescent Lifestyle and Substance Use Survey (SALSUS)

4 Young Persons' Behaviour & Attitudes Survey (YPBAS)

5 Equivalent data are not available for individual aged children living in Wales.

they have ever had an alcoholic drink, compared with 61% of those surveyed between 2001 and 2003 (Fuller, 2008); and in Scotland in 2006, 84% of 15-year-olds reported ever having had an alcoholic drink compared with 88% in 2004 (BMRB Social Research 2007).

2.3 How often children and young people drink

Compared to other countries, young people in the UK are more likely to report that they drink alcohol at least weekly. For example, levels of weekly drinking in 15-year-old boys and girls are around three to four times those reported in many Scandinavian countries (Currie et al 2008⁶).

2.3.1 Frequency of weekly alcohol consumption

By combining measures of the prevalence of drinking at least weekly in children across all the administrations, there are an estimated 1.5 million children aged 11-17 in the UK who drank alcohol in the last week (704,000 aged 11-15 and 752,000 aged 16-17).

In England (2005-06), even at age 11, 12% of boys reported that they drank at least weekly. In Scotland and Wales, equivalent figures were 8% and 7%, respectively. A smaller proportion of 11-year-old girls reported drinking alcohol at least weekly; 4% of 11-year-old girls in England and Wales and 3% in Scotland. By age 13, the proportion of boys and girls drinking alcohol at least weekly has almost doubled, with little difference between boys and girls. In 2005-2006, around one in five 13-year-old boys and girls in the UK reported drinking at least weekly (Boys, 23% in Wales, 20% in England, 18% in Scotland; Girls, 20% in Wales, 17% in England and 16% in Scotland). By age 15, this proportion is around double that in 13-year-olds. In Wales, 42% of 15-year-old boys reported drinking at least weekly, with 41% in England and 39% in Scotland. The proportions of 15-year-old girls drinking alcohol at least weekly were similar (38% of girls in England and Wales and 36% in Scotland) (Currie et al, 2008).

2.3.2 Consumption of alcohol twice or more a week

By combining measures of the prevalence of drinking twice a week or more in children across all administrations, there are an estimated 630,000 children aged 11-17 in the UK who drink more than once a week (240,000 aged 11-15 and 390,000 aged 16-17).

Overall in 2007, 7% of pupils in England aged 11 to 15 years old reported that they drank alcohol twice or more a week (Fuller, 2008). This increased with age, from 1% of 11-year-old boys and girls to 16% of 15-year-old boys (and 19% in Scotland) and 13% of 15-year-old girls in England (and 17% in Scotland). Boys and girls in Scotland were more likely to drink alcohol twice or more a week than boys and girls in England of the same age (BMRB Social Research, 2007; Fuller, 2008). There was little difference between genders in the likelihood of drinking twice or more a week.

6 Health Behaviour in School-Aged Children (HBSC) survey.

2.4 How many children get drunk or have been drunk

By combining measures of the prevalence of being drunk at least once in the last week in children across all administrations, there are an estimated 360,000 children aged 11-15 who were drunk last week (data not available for children aged 16-17).

In Scotland, of the 57% of 13-year-olds who reported ever having had an alcoholic drink in 2006, 52% of boys and 53% of girls had been drunk at least once. Among 15-year-olds, 71% of boys and 75% of girls who reported ever having had an alcoholic drink had been drunk at least once (BMRB Social Research, 2007). In Northern Ireland, of the 11-16 year olds who reported having taken an alcoholic drink, over half (55%) stated that they had been drunk on at least one occasion (Northern Ireland Statistics and Research Agency 2008). There is no published data for this measure in England. However, surveys of 15-year-olds in England, Scotland and Wales show that around 21-25%⁷ of both sexes say they first got drunk at age 13 or younger (Currie et al, 2008).

By the age of 13, just over 20% of pupils (in Scotland, over 25%) reported that they had been drunk at least twice, increasing to approaching half of all 15-year-olds. At age 15, more girls than boys reported having been drunk at least twice (Currie et al, 2008).

2.4.1 Frequency of drunkenness

Based on data from the 2003 ESPAD survey⁸ (Hibbell et al 2004), 14% of 15 to 16 year old boys and girls reported getting drunk at least 20 times in the previous year (at least once every two to three weeks). During the last 30 days, 11% and 12% of 15 to 16 year old boys and girls, respectively, reported that they had been drunk at least six times (i.e. more than once a week). More boys than girls had been drunk on 'no occasions' in the last 12 months (34% compared to 30%) and in the last 30 days (56% compared to 51%).

The 2007 SHEU survey⁹ of 12-13 and 14-15 year olds found that 2% of males and 1% of females aged 14-15 years reported that they had been drunk on three or more days in the past week, compared to 0% of males and females aged 12-13 years (SHEU, 2007)

2.5 How much children drink

By combining measures of the mean units of alcohol consumed by children who drink across all administrations, an estimated 17 million units (equivalent to 6.9 million pints of beer or 1.7 million bottles of wine) were consumed in the last week (estimate for a 'typical' week in 2007).

In England, mean weekly alcohol consumption by children who drink has increased substantially since 1990, for both boys and girls. In 11-15 year old drinkers, mean weekly units increased from 5.7 in 1990 to 13.1 in 2007 for boys and from 4.7 in 1990 to 12.4 in 2007 for girls (Fuller, 2008). The mean number of units consumed by children who

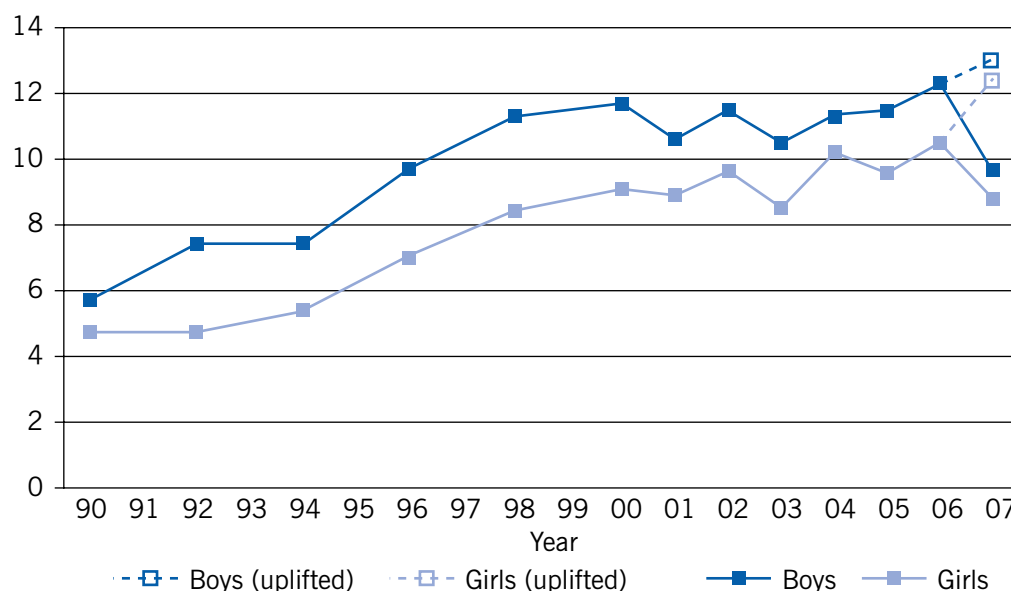
7 In England, 23% of 15-year-old boys and 24% of girls reported first getting drunk at 13 years of age or younger. In Scotland, 21% of boys of this age and 23% of girls had been drunk by the age of 13. In Wales, it was 25% of boys and 21% of girls.

8 European School Project on Alcohol and Drugs (ESPAD) survey

9 School Health Education Unit (SHEU) survey

drank in the last week increases with age, from around 8 units per week for 11 to 13 year olds in 2007 to 15 units per week in those aged 15 years.

Figure 1 Mean alcohol consumption (units) in England in the last week, by sex (Age 11-15): 1990-2007



Source: Fuller 2008; Fuller 2007. Data for 2007 are shown using the original and revised (uplifted) methods of calculating units of alcohol from drinks consumed

2.6 How often children end up in hospital as a result of drinking

By combining measures of the rate of admission to hospital for alcohol specific conditions across all administrations, nearly 10,000 children aged 11-17 are admitted to hospital each year in the UK as a result of their alcohol consumption (6,000 aged 11-15 and 4,000 aged 16-17).

Data from the ESPAD 2003 survey identified that in the UK, 2% of boys and 3% of girls aged 15-16 years had been hospitalised or attended an Accident and Emergency (A&E) unit due to their alcohol use (Hibell, et al 2004). The reasons were not recorded but relate to a wide variety of alcohol related problems, including injury and assault. In Scotland in 2006 (BMRB Social Research 2007), admission to hospital as a result of drinking was reported by 2% of 13 and 15 year olds; 2% and 4% of 13 and 15 year olds, respectively, had visited A&E.

2.6.1 England

In England in 2006/07 almost 8,000 children (3,617 boys, 4,266 girls) aged under 18 were admitted to hospital for conditions directly related to alcohol (see Table 1). Almost all of these children were admitted for conditions relating to alcohol poisoning and/or acute intoxication. Admissions increase sharply between ages 11 to 16, with females being more likely to be admitted than males. Admission rates in 17-year-olds drop slightly relative to

16-year-olds¹⁰, but then increase again with age. From 16 years onwards, male admissions exceed those for females.

Between 2002/03 and 2006/07 admissions rates among children in England aged under 14 years have remained relatively stable, whereas in the 15 to 19 year age group rates have increased by around 68%.

Table 1 Alcohol-specific hospital admission rates in 2006/07. Persons admitted per 100,000 population of that age.

	Persons age in years ...									
	10	11	12	13	14	15	16	17	18	19
England	4	12	41	126	246	292	233	229	297	314

Source: NWPHO from Hospital Episode Statistics for England

2.6.2 Scotland

Admission rates for children in Scotland in 2006/07 were considerably higher than those in England: around 56% higher in children aged under 15, and 84% higher in children aged 15 to 19 years. Data by individual year were not available but in Scotland admission rates were 50 per 100,000 among children under 15 years of age, and 501 per 100,000 among children aged 15 to 19 years. Differences in the definitions employed in the two countries are not likely to account for much of the observed difference. As in England, rates in the 15-19 year age group are almost 10 times those seen in under 15 year olds.

2.6.3 Wales

In 2006/07 114 children aged under 14 years, and 257 children aged 14-15 years, were admitted to hospital with “admission codes related to alcohol”¹¹. This corresponds to estimated admission rates of 24 per 100,000 among children aged 0-13 years, and 320 per 100,000 for children aged 14-15 years.

2.6.4 Northern Ireland

In 2006/07 58 children aged under 14 years, and 334 children aged 15-19 years, were admitted to hospital with “admission codes related to alcohol”. This corresponds to admission rates of 16 per 100,000 among children aged 0-14 years, and 334 per 100,000 for children aged 15-19 years.

2.7 Consequences of drinking alcohol

The range of adverse outcomes which children and young people risk when drinking alcohol is substantial. Section 5 provides a detailed review of the international literature. This review is complemented by a recent review of reviews (Newbury-Birch et al. 2008;

¹⁰ This may be an effect of differences in age-related admission policies as children reach 17.

¹¹ These figures were based on admission diagnoses including “toxic effect of alcohol, alcohol use, accidental alcohol poisoning and mental and behavioural disorders due to use of alcohol”. As such they are likely to be broadly comparable with the figures from England and Scotland. However, full details of how these figures were calculated were not available.

for DCSF, see Box 1, page 12). Together they highlight not only risks from disease, but also injury, poisoning, violence, depression and damage to the developmental process; especially in those that drink heavily. The following section provides a short overview of the epidemiology of negative consequences from alcohol consumption by children and adolescents.

2.7.1 General consequences

Data from the 2003 ESPAD survey of young people aged 15 and 16 years old (Hibell et al 2004), indicated that following alcohol consumption, 9% of boys and 12% of girls old had engaged in unprotected sex, 9% of boys and 11% of girls had been in trouble with the police, 12% of boys and 11% of girls had been in a scuffle or fight, and 3% of boys and 4% of girls had performed poorly at school. However, the most commonly reported consequence of alcohol use was damage to clothing (21% of boys and 28% of girls).

In Scotland in 2006, the most commonly reported consequence of alcohol consumption was vomiting, followed by having an argument (BMRB Social Research, 2007). In total, 40% of 13 year olds and 58% of 15 year olds reported that they had experienced at least one of the consequences listed¹² and 24% of 13 year olds and 39% of 15 year olds reported experiencing more than one in the past year. Girls were more likely than boys to report one of the behaviours (41% of 13 year old girls compared to 37% of boys; 62% of 15 year old girls compared to 54% of boys).

Based on data collected in 2006, in England young people who had drunk alcohol within the past four weeks were most likely to have felt ill or sick (23% of boys and 33% of girls) or to have had an argument (15% of boys and 22% of girls), after drinking (Fuller 2007). In Northern Ireland, of young people aged 11 to 16 who responded to the YPBAS survey, 2% had been in trouble at school because of drinking alcohol, 11% had been in trouble with the police, and 32% had been in trouble with their parents (Northern Ireland Statistics and Research Agency, 2008).

Box 1. Adverse consequences of drinking alcohol for children and young people

(based on Newbury-Birch et al. 2008)

The potentially adverse consequences for children and young people who misuse alcohol include:

- adolescents who misuse alcohol are more likely to suffer from side effects including appetite changes, weight loss, eczema, headaches and sleep disturbance
- the most common impacts of alcohol intoxication are vomiting and coma

¹² Had an argument; had a fight; visited an A&E department; been admitted to hospital overnight; had an injury that needed to be seen by a Doctor; been taken home by the police; stayed off school; been sick (vomited); tried any drugs; or been in trouble with the police.

- young people are not immune to the chronic diseases and conditions associated with excess alcohol consumption in adults, and deaths from liver disease are now occurring at younger ages
- adolescents and young people who drink and drive, or allow themselves to be carried by a drink driver, are more likely to be involved in a car accident
- adolescents and young people who drink alcohol are more likely to sustain an injury, often as a result of an assault
- alcohol abuse in adolescence, during a developmentally sensitive period, poses a particular danger to the emerging brain faculties of executive functioning and long term memory
- adolescents are likely to be more vulnerable than adults to both subtle brain damage and long lasting cognitive deficits following alcohol exposure
- alcohol may increase feelings of depression
- stress/anxiety based drinking is associated with long-term and more severe negative outcomes
- there is a relationship between adolescent alcohol use and mental health problems
- alcohol consumption during an evening may affect a child's performance at school on the following day, since it takes time to metabolise alcohol and this process varies depending on the dose of alcohol that was consumed and differing metabolic capacity
- there are associations between alcohol consumption and subsequent behaviour with peers and friends. Excessive alcohol use can be detrimental to a young person being able to maintain friendships, particularly if the consumption levels are higher than among the peer group generally.
- alcohol consumption can have a detrimental effect on young people's short term educational performance
- alcohol consumption by young people, particularly students, is more likely to make them vulnerable to being the victims of crime
- alcohol may make some young people more likely to display aggressive behaviour, although it is likely that other factors such as their personality and family life will play a role
- alcohol consumption is associated with: not using a condom during a young person's first sexual encounter; an increased likelihood of having sex and at a younger age; unprotected sex; teenage pregnancy and the likelihood of contracting sexually transmitted diseases.

2.7.2 Crime

The 2004 Offending, Crime and Justice survey (Matthews et al, 2006) found that among 10- to 17-year-olds who drank at least once a week, in the past 12 months, 39% had committed a violent offence, 10% had committed drug-related offences, 17% had committed criminal damage and 34% had committed theft. Boys who drank at least once a week reported committing significantly more offences than girls, with the exception of drug offences. Respondents who drank alcohol at least once a month were also asked about criminal and disorderly behaviour during or after drinking; 28% reported that they had got into an argument in the past 12 months and 12% reported getting into a fight. More boys reported fighting (14%) or stealing (3%) than girls (9% and 1% respectively).

2.7.3 Drinking and driving

Blood alcohol concentration levels (BACs) for road users who die within 12 hours of being injured in a road accident are published annually. In 2005, 260 road users aged 16 to 19 years died within 12 hours of being injured in a road accident. Of these, 30% had a BAC over the legal limit (80 mg/100ml). For drivers the highest percentage over the legal limit occurred in those aged 25 to 29 years (38%), but for motorcycle riders it was among those aged 16 to 19 (26%) (TRL Limited, 2007).

Based on data collected in the 1990s it was established that drink driving among younger drivers was greater among drivers in their early to mid twenties than among those in their late teens. For example, a roadside survey conducted in 1990 found that 0.3% of 16 to 19 year olds were over the legal limit compared to 0.8% of 20 to 24 year olds (Everest et al 1990). However, taking into account the relative mileage driven by different age groups, drivers in the 17-19 age group were found to have a higher rate of involvement in accidents. Approximately 24 drink-drive injury accidents per 100 million miles driven occurred among 17-19 year olds compared to 14 per 100 million miles for 20-24 year olds (Department for Transport, 2008).

2.8 Attitudes towards drinking alcohol

The 2003 ESPAD survey asked 15 and 16 year olds about the different positive and negative consequences that they thought might happen to them if they drank alcohol. The majority of respondents associated alcohol consumption with positive consequences (71% overall), for example, 78% of boys and 84% of girls reported that they associated alcohol consumption with having fun, and 74% and 82% of boys and girls, respectively, associated alcohol consumption with feeling happy. Overall, only 28% reported that they expected negative consequences from alcohol consumption; respondents were most likely to report that drinking alcohol would lead to them doing something that they regretted (39% of boys and 41% of girls).

The 2004 OCJS also examined young people's attitudes to alcohol consumption. Those aged 10-17 who drank at least once a month were most likely to agree that drinking alcohol made them feel more friendly and outgoing (78%) and relaxed (76%). Overall, 34% reported that they drank alcohol with the purpose of getting drunk.

In the 2003 YPBAS in Northern Ireland, the two most common reasons young people reported for drinking alcohol were “liked the taste” (86%) and “to celebrate” (84%). Overall 50% said they drink to “get drunk”.

2.9 How young people access alcohol

The 2004 OCJS identified that among 10-17 years olds, 48% obtained alcohol from their parents, 29% from friends, and 22% from pubs and bars. Those who had drunk alcohol at least once a month in the past year and who reported feeling very drunk at least once a month, tended to obtain alcohol from either friends (50%), pubs/nightclubs (47%) and shops (40%). Only 23% of this group reported that they obtained it from their parents.

In Scotland (BMRB Social Research 2007), among young people who drank alcohol, 61% of 13 year olds and 39% of 15 year olds reported that they had never bought alcohol. Of those that had purchased alcohol, friends/relatives (22% of 13 year olds; 29% of 15 year olds), shops (11% of 13 year olds; 23% of 15 year olds) and off licenses (7% of 13 year olds; 19% of 15 year olds) were the three most commonly reported sources. In addition, a small minority (<10%) had bought alcohol from a supermarket, pub, or club/disco. Almost half of 13 year olds who had ever had an alcoholic drink reported that they usually drank alcohol at home (47%), 32% reported that they drank alcohol outdoors, 29% at someone else’s home, and 22% at a party. At age 15, young people were less likely to report drinking at home (38%), and 45% reported drinking outdoors, 45% at someone else’s home and 42% at a party. Drinking location was associated with the quantity of alcohol drunk. Young people who had been drunk at least once were more likely to report that they drank outdoors (47% of 13 year olds and 56% of 15 year olds).

The YPBAS 2007 survey in Northern Ireland found that over a quarter (27%) of young people who had drunk alcohol had bought it themselves at some time in their life, with almost a fifth (19%) having bought it from a pub, 14% from an off-licence, and 5% from a shop/supermarket. The survey also reported that on the last occasion that young people drank alcohol, 39% were with a group of friends, 17% with a friend, 15% with parents, 14% with relatives, 5% with their boyfriend/girlfriend, 4% with sibling(s), and 4% drank on their own. One fifth (20%) of young people drank at home, 19% drank somewhere outside (e.g. park, street, in an entry, under a bridge etc) and 16% in someone else’s house.

3 Guidance on the consumption of alcohol by children and young people

In this section five evidence-based statements form the basis of guidance on the consumption of alcohol by children and young people. Each summary statement is supported by a short rationale, a summary of the evidence, and an outline of the policy implications of the statement. Each statement is based on the best evidence currently available.

Major themes in the evidence base are outlined below each statement with an extensive review of the evidence being provided in Section 5. There is sufficient evidence of strong and consistent relationships between patterns of alcohol consumption and harms to children and young people, which informs the guidance. For example, the long term benefits of delaying drinking among young people can be demonstrated. Evidence also shows how parents can influence young people's alcohol use, by having strict rules on young people's drinking; through supervision and management; and through the closeness of their relationships with their children. However the evidence base for the consequences of drinking in childhood and adolescence is continually evolving and, in particular, a better understanding of relationships between cause (e.g. alcohol consumption) and effect (e.g. unprotected sex) is still required.

The guidance is intended to empower and thus help parents and carers to supervise their children's alcohol consumption and ensure that it does not result in any avoidable harm. However, while parents and carers have a substantial influence on how their children approach alcohol, other factors such as peer influences, cultural norms and the law also have a role to play and therefore, the guidance should be seen as just one tool to help reduce the harms that alcohol consumption can cause to young people, their families and the communities in which they live.

1 Children and their parents and carers are advised that an alcohol-free childhood is the healthiest and best option. However, if children drink alcohol, it should not be until at least the age of 15 years.

Rationale

Alcohol consumption during any stage of childhood can have a detrimental effect on development and, in particular, during teenage years is related to a wide range of health and social problems. Vulnerability to alcohol related problems is greatest amongst young people who begin drinking before the age of 15. The safest option for children and young teenagers up to and including the age of 14 years is not to drink at all.

Evidence summary

Age of drinking onset

Early age of drinking onset is associated with an increased likelihood of developing alcohol abuse or dependence in adolescence and adulthood, and also dependence at a younger age. Vulnerability to alcohol abuse and dependence is greatest amongst young people who begin drinking before the age of 15. See Section 5.5.1, page 52

Studies have shown that family standards and rules, parental monitoring, and adolescent family attachment are important in delaying alcohol initiation in early adolescence. See Section 5.4.2, page 46

Alcohol misuse

Children who begin drinking at a young age (typically below the age of 13) drink more frequently and in greater quantities than those who delay drinking, and are more likely to drink to intoxication. As with alcohol dependence and abuse, vulnerability to alcohol misuse in later adolescence appears to be greatest among those who begin drinking prior to age 13. See Section 5.5.2, page 54

Risky behaviour

Initiation of drinking prior to age 14 has been shown to be associated with a number of risk factors including having experienced alcohol-related injuries, involvement in violent behaviours and suicide ideation and attempts. Early onset of drinking is also associated with having more sexual partners and pregnancy, other substance abuse, employment problems and risky driving behaviours. See Section 5.5.3, page 57

Development

Adolescence represents an important period of brain development. Young people with alcohol use disorders may display structural and functional deficits in brain development compared with their non-alcohol using peers. Studies of these young people have shown that significant changes in brain structure accompany heavy drinking that can affect motivation, reasoning, interpersonal interactions and other brain functions. In addition, heavy drinking during adolescence may affect normal brain functioning during adulthood. Young people who drink heavily may also experience adverse effects on the liver, bone, growth and endocrine development. See Section 5.3, page 42

Implications

The *Safe, Sensible, Social: Alcohol strategy local implementation toolkit*¹³ recommends that all young people – and their parents and carers – should receive information and education about the effects of alcohol on young people through schools (See Section 4.4, page 32). Educational curricula should be adapted to ensure children are advised to avoid alcohol until at least the age of 15 years. This message needs to be reinforced in the community by all appropriate agencies.

The advantages of abstinence or delaying the onset of drinking need to be publicised. Current sources of information including teaching resources, leaflets, booklets and FRANK focus on the acute risks and long-term problems of alcohol if people continue to drink into adulthood (See Section 4.5, page 35). Information targeted at children, parents and carers should be adapted to explain that alcohol consumption is not just a passing phenomenon for children and young teenagers. The impacts on the developing adolescent brain and health and wellbeing can potentially be tracked into adulthood.

Parents and carers should be provided with advice and support on how to maintain an alcohol-free childhood at least up to and including the age of 14 years. Children and young people who wish, or whose parents and carers wish them to continue to grow up without consuming alcohol, should be encouraged to do so and appropriate support for those wishing to abstain should be developed. Special support should be developed for those whose faith might require abstinence.

Alternatives to underage drinking must be available, accessible and affordable in all localities. Involvement in social activities such as being a member of a youth club, group or team is protective against frequent and problem alcohol use (see Section 5.4.4, page 49). Therefore, parents have an important role to play in encouraging their children to actively engage in sports and hobbies.

Full Service Extended Schools provide a broad range of services for children, families and communities on a single school site, including study support, community activities, adult learning, health services and childcare (See Section 4.2, page 30). Based on US experiences, the UK FSES programme was launched in 2003 as part of a government programme for all schools to offer extended activities by 2010. The FSES initiative could make an important contribution to protecting communities and individuals from alcohol related problems. Evidence in the UK suggests that the benefits may be particularly important for deprived and vulnerable people.

¹³ Home Office, Department of Health, Department for Children, Schools and Families (2008) *Safe, Sensible, Social: Alcohol strategy local implementation toolkit*

2 If young people aged 15 to 17 years consume alcohol, it should always be with the guidance of a parent or carer or in a supervised environment.

Rationale

Whilst no alcohol consumption is the healthiest option for young people, the reality is that by the age of 15 many children have already consumed alcohol and substantial numbers are drinking weekly (see Section 2.3.1, page 8). Young people's levels of alcohol use are related to their ability to access alcohol, and drinking patterns also depend on the location in which alcohol is consumed. In a home or other supervised environment, parents can monitor the amounts of alcohol consumed, discuss the dangers associated with drinking and set boundaries for consumption. Drinking in parks, streets and other unsupervised settings is related to greater alcohol-related harms.

Evidence summary

Parental monitoring of behaviour has been identified as an important factor in young people's alcohol use. Young people who are poorly monitored begin alcohol consumption at an earlier age, tend to drink more, are more likely to develop problematic drinking patterns, and are more likely to associate with 'deviant peers'. Studies have shown that family standards and rules, parental monitoring, and adolescent family attachment are important in delaying alcohol initiation in early adolescence. Harsh parenting, conflict, and a permissive approach to use of alcohol by parents have been associated with risky drinking in adolescence. See Section 5.4.2, page 46

Alcohol consumption, including heavy and regular drinking, is positively associated with the amount of spending money young people have available to them. See Section 5.4.4, page 49

There is evidence to suggest that individuals may benefit from being prepared for an adult environment dominated by alcohol, and additional evidence to suggest that naive drinkers may suffer high levels of harm when they begin drinking in unsupervised settings. See Section 5, Table 3, page 49

Implications

Advice should be available to parents and carers on the supervision of drinking in the home. This advice could include avoiding strong alcohol such as spirits and serving alcohol to children in appropriate amounts. Providing food with alcohol could also be encouraged as this delays the absorption of alcohol into the blood stream and slows the rate of intoxication.

Parents and carers should consider discussing with other parents and adults the rules and regulations regarding alcohol they have established for their own children. When acting in loco parentis, adults should respect the rules parents have established.

It is advisable that alcohol provision by parents and carers be accompanied by parent-child discussion about what constitutes moderate consumption; the types and strengths of different alcohol products; and the dangers associated with misuse.

Parental influence on children's alcohol use is most effective when there is a good parent-child relationship and consistent and appropriate monitoring and behaviour management. Evidence shows that clear rules and guidance from parents can reduce the likelihood of alcohol related problems in young people. Safe and sensible levels of drinking by the parents also exert a positive effect on young people's drinking behaviour. Please see guideline 4 for further information.

Drunkenness should never be a condition experienced in childhood. Whilst each case should be looked at on its individual merits, parents and carers who wilfully and routinely allow children to get drunk may be contributing to severe damage to their children's health and such behaviour could be considered neglectful. Repeated drunkenness in children should trigger the existing procedures in place to safeguard and promote the development of children. Where possible this should be done in partnership with parents and carers.

Social marketing and other health communication tools should be used to ensure all parents are familiar with the concept of low risk drinking and the relationship between increasing alcohol consumption and increasing health risks, and how they should educate and engage with their children about these issues. However, alcohol can be seen by children as one of the cheapest ways of passing evening and holiday times, and sports seen as an expensive or inaccessible option. Alcohol is available in some off license outlets for as little as 11p a unit (Bellis et al, in prep). Local authorities should ensure that free or low cost alternatives to drinking are easily available for young people from all communities to engage in, and Government should examine how establishing a minimum price per unit of alcohol would affect child consumption.

3 Parents and young people should be aware that drinking, even at age 15 or older, can be hazardous to health and that not drinking is the healthiest option for young people. If 15 to 17 year olds do consume alcohol they should do so infrequently and certainly on no more than one day a week.

Young people aged 15 to 17 years should never exceed recommended adult daily limits and on days when they drink, consumption should usually be below such levels.

Rationale

Children and young people who drink frequently and binge drink are more likely to suffer alcohol related consequences (see Section 5.6, page 67). While individuals vary in the way that they react to the consumption of alcohol, young people may have a greater vulnerability to certain harmful effects of alcohol use than adults (see Section 5.3.1, page 48). Young people also lack drinking experience and decision-making skills about amount, strength and speed of drinking. Brain development continues throughout adolescence and into young adulthood, and drunkenness, binge drinking or exceeding recommended maximum alcohol limits for adults should always be avoided.

Evidence summary

Acute risks

Studies have shown that binge drinking and heavy alcohol use in young people, including those over the age of 14, is associated with a range of health risk behaviours including injury, sexual activity, fighting, and other substance use. See Section 5.6.1, page 60

Binge drinking and heavy alcohol use in young people over the age of 14 is associated with adolescent sexual activity. Adolescents who use alcohol are more likely to have had sexual intercourse and multiple numbers of sexual partners. Young women who report binge drinking are more likely to have experienced attempted or forced sex. Alcohol use before sexual activity can adversely affect the use of condoms. See Section 5.6.2, page 63

Drinking frequency and volume are associated with violent behaviour in young people aged 14 and older. Young people who drink frequently or binge drink are more likely to be involved in fights, to sustain injuries from fighting, to commit violent offences and carry weapons. Drinking in public places is associated with a higher risk of being involved in fighting. See Section 5.6.3, page 65; & Section 5.6.4, page 68

Drinking frequency and volume may be associated with drinking and driving involvement in adolescents older than 14 years. See Section 5.6.5, page 68

Young people are more likely than adults to have a road traffic crash at any blood alcohol level. In addition, even at blood alcohol levels below the legal limit, young people are at an increased risk of being involved in a fatal crash.

Longer-term consequences

Young people who binge drink in adolescence (age 15 upwards) are more likely to be binge drinkers as adults. Frequent drinking and binge drinking have also been shown to increase the risk of developing alcohol dependence in young adulthood (around age 21). See Section 5.7.1, page 70

Young people who binge drink in adolescence (15-16 years) are more likely to experience negative outcomes in the transition to adulthood. In particular, binge drinking at this age has been linked to a higher likelihood of involvement in other substance use, crime, lower educational attainment and drug dependence. See Section 5.7.2, page 73

Implications

Educational curricula should be reviewed to ensure that young people are advised that they should never exceed the adult daily maximums already associated with lower risk alcohol consumption. For men this is 3-4 units a day and for women 2-3 units. Such levels should be regarded as maximums for young people and their consumption should typically be below such levels. If children aged 15 to 17 consume alcohol they should do so infrequently and certainly on no more than one day a week.

The reasons for this advice and the advantages of adopting it need to be communicated to young people in a credible and effective way both at school and in the community via social marketing interventions. Current sources of information and advice including teaching resources, leaflets, booklets and FRANK should be amended to include this advice.

Advice should be available to parents and carers on how to ensure young people do not exceed recommended maximum units and weekly drinking frequencies, and on how to help children who are known to be exceeding such limits.

Parents should make reasonable efforts to ensure access to alcohol by their children only takes place with their knowledge and under their supervision. Parents should be aware of how much money children have at their disposal and engage in dialogue about what they are spending it on. Advice should be available to parents on children's income and how to minimise and monitor expenditure on alcohol.

Parents should be aware of how much alcohol they have in the home environment and whether any alcohol is being taken without their permission.

Young people aged 17 to 20 should be encouraged never to drink and drive even where they stay within the legal blood alcohol limit. Young people should also be encouraged not to ride in a car when the driver has been drinking even within the legal limit. Parents should encourage those aged 17 to 20 from any drinking and driving even where they stay within the legal blood alcohol limit. Social marketing and other health communication tools should be used to ensure all young people and parents know about the risks that drinking even within the legal limit poses to young, inexperienced drivers.

The Government may consider making a zero blood alcohol concentration limit a legal requirement across the UK for those aged 17 to 20 years of age. Such graduated measures have been introduced in many other countries (e.g. the United States) and have been effective at saving lives (Voas et al 2003).

4 The importance of parental influences on children's alcohol use should be communicated to parents, carers and professionals. Parents and carers require advice on how to respond to alcohol use and misuse by children.

Rationale

Parents' and carers' own drinking behaviours can influence their children's alcohol use. This includes all parents, from those with an alcohol problem to those who just drink in front of children from time-to time. Parents can also influence their children's alcohol use through having strict rules on young people's drinking; supervision and management; and the closeness of their relationships with their children. However, some parents and carers may feel ill equipped to respond to their children's alcohol use and related concerns. Parents may be concerned about what the right age is to permit drinking and what level of alcohol use is normal during adolescence. It is important for parents and carers to talk to a young person about alcohol consumption and set realistic guidelines and rules for them, so they can protect them from alcohol related harms.

Evidence summary

Parental drinking behaviour

Parental use of alcohol increases the likelihood that children will also consume alcohol. When parents get drunk, children are more likely to engage in alcohol related risk behaviours and are more likely to suffer harms as a result of parental alcohol consumption.

See Section 5.4.2, page 46

In addition, a family history of alcoholism is associated with an increased risk of alcoholism in children.

Relationship quality

Parent–child relationship quality underpins all aspects of parenting. Evidence shows that warm and supportive parent–adolescent relationships are associated with lower levels of adolescent alcohol use, as well as lower rates of problematic use and misuse. Young people from families with good relationship quality have been found to engage in heavy alcohol use less often. Other research has shown that young people from sole parent families or living with a stepparent are, on average, more often involved in heavy drinking.

See Section 5.4.2, page 46

Parental monitoring

Parental monitoring¹⁴ of behaviour including alcohol consumption has been identified as an important factor in young people’s alcohol use. Young people who are poorly supervised begin alcohol consumption at an earlier age, tend to drink more, are more likely to develop problematic drinking patterns, and are more likely to associate with ‘deviant peers’. Studies have shown that family standards and rules, parental monitoring, and adolescent family attachment are important in delaying alcohol initiation in early adolescence. Harsh parenting, conflict, and a permissive approach to use of alcohol by parents have been associated with heavy and binge drinking in adolescence.

See Section 5.4.2, page 46

Parental behaviour management

Parental behaviour management, encompassing positive practices such as: the use of incentives; setting limits and consequences for behaviour; and negotiating boundaries and rules for appropriate behaviour; is associated with lower initiation of alcohol use in early adolescence, and lower rates of alcohol abuse and dependence in early adulthood. Higher rates of child alcohol use are linked to overly strict discipline and higher levels of family conflict. Equally, when parents are openly permissive toward adolescent alcohol use, young people tend to drink more. Research shows that parental norms, attitudes, and beliefs with regard to adolescent alcohol use have an important influence on adolescent alcohol consumption. In general, when parents show disapproval, children are less likely to drink, and conversely, when parents are tolerant, children are likely to drink more.

See Section 5.4.2, page 46

¹⁴ Parental monitoring has been defined as parental awareness of the child’s activities, and communication to the child that the parent is concerned about, and aware of the child’s activities (Dishion and McMahon 1998)

Peer factors

Peers play an important role in the onset of drinking behaviours and studies conducted with young people aged 15-16 years have shown that alcohol use may be predicted by exposure to cannabis and alcohol use by peers and being offered alcohol by others. The effect of peers has been shown to become particularly powerful when parent-adolescent relationships are of poorer quality.

See Section
5.4.3, page 48

Implications

The Every Child Matters: Change for Children programme recognises that parents, carers and families are the most important influence on outcomes for children and young people.

Parents and carers have a critical role to play in showing children and young people how to drink responsibly, and should avoid drunkenness and binge drinking behaviour especially in front of children. Parents are advised to consider how their drinking behaviour affects their children.

A variety of techniques can be employed to increase the positive influences that parents and carers can have on their children's drinking. Advice should be made available to parents and carers on young people's alcohol use as well as guidance that enable them to promote low risk drinking (in those that wish their children to consume alcohol). The guidance should provide practical advice about talking to children about alcohol and the consequences of alcohol misuse, and the importance of setting realistic boundaries and incentives. Guidance for parents should recognise faith and cultural differences and how they relate to alcohol consumption among children and adults in the UK.

More targeted support should be extended at the local level to meet the needs of families and communities facing additional difficulties. For example, types of support offered could include structured parenting training groups. Social marketing approaches should be used to ensure that information, advice and signposting to other services, are available to all parents in an accessible and credible manner.

The Government may wish to examine current drinking legislation to allow moderate drinking with meals by those aged 15 and older in on-licensed premises when accompanied by a parent or carer. This would enable a parent or carer to promote moderate drinking behaviours. At present young people aged 16 and 17 may consume beer, cider and wine with a meal in an eating area on licensed premises providing they are accompanied by an adult.

5 Support services must be available for children and young people who have alcohol related problems and their parents.

Rationale

Young people with substance related needs are supported by interventions and services within a four-tiered model of drug and alcohol interventions outlined in the *Substance of young needs* (HAS, 1996 and 2001)¹⁵. Policy makers and professionals need to ensure that all services are meeting the needs of young people and their parents in response to alcohol.

Evidence summary

The National Treatment Agency (NTA) has recently published the consultation document entitled *Young people's specialist substance misuse treatment: exploring the evidence*. The document explains that young people's substance misuse is a relatively new area of academic study. Research on effective treatment interventions is patchy but is growing both in quantity and quality.

See Section 4.7,
page 37

Specialist substance misuse treatment interventions have been shown to be effective in reducing substance misuse among young people. Specialist treatment techniques that are evidence based appear to reduce drop out rates from treatment and bring benefits to areas of a young person's life beyond their substance misuse.¹⁷

See Section 4.7,
page 37

The National Institute for Health and Clinical Excellence (NICE) has recommended that offering brief, one-to-one advice on the harmful effects of alcohol use, and how to reduce the risks and find sources of support, is an effective approach for tackling harmful drinking among children and young people (NICE 2007a).¹⁷

See Section 4.7,
page 37

15 Health Advisory Service (1996) *Children and Young People: The Substance of Young Needs*. London, Home Office.
Health Advisory Service (2001) *The Substance of Young Needs: Review 2001*. London, Home Office

16 Substance use means alcohol and drugs

17 National Institute for Health and Clinical Excellence (2007a) *Interventions in schools to prevent and reduce alcohol use among children and young people*

NICE has recommended cognitive behavioural therapy (CBT) as an effective intervention for treating young people's substance misuse. Providing CBT in a group setting may help young people to role-play and practice coping with high-risk experiences. The group setting allows young people to share similar problems, develop social skills, model, rehearse and gain peer feedback. NICE also recommends that brief interventions using motivational interview techniques can be used as one-off interventions, or to facilitate engagement with more structured specialist substance misuse treatment. (NICE 2007b¹⁸, 2007c¹⁹).

See Section 4.7,
page 37

Implementation

Policy makers, commissioners and professionals should be familiar with the four tiers of treatment, which are intended to provide a framework to conceptualise the service components of an integrated and comprehensive child-based service (NTA, 2005).

Professionals working in generic tier 1 services need to be able to identify children and young people with alcohol related problems and make appropriate referrals to support services. (An explanation of the tiered treatment system is provided in Section 4.7, page 43)

Professionals from all tiers and all health, social care and criminal justice agencies need to be competent and confident in responding to alcohol related concerns in children and young people, and parents and carers. Professionals need to be supported by information, training and skill development and resources such as screening tools and intervention toolkits. The Common Assessment Framework (CAF) and other assessment resources need to be quality assured to ensure that they are able to identify young people at risk of alcohol related harm.

Targeted interventions need to continue to be directed at vulnerable groups including young people who began drinking regularly below the age of 14; the children of dependent drinkers; truants and school excludees; looked after children; and those involved in offending behaviour.

Involving a young person's family in their substance misuse treatment has been shown to be beneficial in providing support to the young person, and has been shown to improve the effectiveness of substance misuse treatment. Providing support and parenting skills can improve parents' ability to cope with their children's problems and reduce alcohol misuse among both parents and their children.

Professionals should be familiar with NICE (2007a, 2007b; 2007c) guidance on psychosocial interventions. For example Cognitive Behavioural Therapy (CBT) focuses on increasing the understanding of the problem or behaviour so that coping mechanisms can be increased and problem behaviours modified and reduced.

18 National Institute for Health and Clinical Excellence (NICE) (2007b) Community based interventions to reduce substance misuse among vulnerable and disadvantaged children and young people.

19 National Institute for Health and Clinical Excellence (NICE) (2007c) *Drug Misuse: Psychosocial Interventions*. London, UK: NICE

4 Review of current policy, guidance and practice

This section is a summary of some of the key policy, guidance and practice, which relate to how the CMOs' guidance in Section 3 can be implemented.

4.1 Alcohol strategy

The Alcohol Harm Reduction Strategy (2004) and *Safe. Sensible. Social.* The next steps in the National Alcohol Strategy (2007) outline the Government's goals and activities to reduce alcohol related harm in England, a number of which relate to children and parents. In addition, each of the devolved administrations has its own strategy, tailored to its individual circumstances.

4.1.1 England

In March 2004 the Government unveiled plans to address the range of problems caused by alcohol in England in its *Alcohol Harm Reduction Strategy*. The strategy identifies alcohol as a contributor to a range of health harms; crime and anti-social behaviour harms; loss of productivity and profitability; and harms to family and society.

During 2007 the Government published *Safe. Sensible. Social. The next steps in the National Alcohol Strategy*. Providing advice for parents and young people; penalising people who cause drink-related violence; and helping those most at risk from their drinking behaviour to change are highlighted as important steps.

The Government has worked closely with key partners including parents and children to send a clear message to young people who drink in public places that it is unacceptable to get drunk and behave in ways that make other people feel unsafe or put themselves at risk. The Government has stated that they want to create a culture where it is socially acceptable for young people to choose not to drink and, if they do start drinking, that they do so later and more safely.

4.1.2 Scotland

In June 2008 proposals for tackling alcohol misuse in Scotland were launched by the Scottish Government. *Changing Scotland's Relationship with Alcohol*²⁰ proposes a framework for action based on:

- reduced consumption
- supporting families and communities

²⁰ Changing Scotland's relationship with alcohol: a discussion paper on our strategic approach. Available from: www.scotland.gov.uk/Publications/2008/06/16084348/0

- positive attitudes, positive choices
- improved support and treatment

4.1.3 Wales

On 1 October 2008, the Welsh Assembly Government launched its new 10 year plan to reduce the harm caused by drugs and alcohol. Entitled *Working Together to Reduce Harm*²¹, the document has four key aims:

- Reducing the harm to individuals (particularly children and young people), their families and wider communities from the misuse of drugs and alcohol, whilst not stigmatising substance misuse.
- Improving the availability and quality of education, prevention and treatment services and related support, with a greater priority given than under the previous strategy to those related to alcohol.
- Making better use of resources – supporting evidenced based decision making, improving treatment outcomes, developing the skills base of partners and service providers by giving a greater focus to workforce development and joining up agencies and services more effectively in line with the *Making the Connections* policy for public service reform.
- Embedding the core Welsh Assembly Government values of sustainability, equality and diversity, support for the Welsh language and developing user focused services and a rights basis for children and young people in both the development and delivery of the strategy.

4.1.4 Northern Ireland

In October 2006, the Northern Ireland Executive launched the *New Strategic Direction for Alcohol and Drugs*²². The document builds on the objectives of previous strategies with the overall aim of reducing the level of alcohol and drug related harm in Northern Ireland. To support this, the strategy identifies six long term aims:

- To provide accessible and effective treatment and support for people who are consuming alcohol and/or using drugs in a hazardous, harmful or dependent way.
- To reduce level, breadth and depth of alcohol and drug-related harm to users, their families and/or their carers and the wider community.
- To increase awareness on all aspects of alcohol and drug-related harm in all settings and for all age groups.
- To integrate those policies which contribute to the reduction of alcohol and drug-related harm into all Government Department strategies.

21 Welsh Assembly Government. Working together to reduce harm: the substance misuse strategy for Wales 2008-2018. Available from: wales.gov.uk/about/strategy/publications/substancemisuse

22 Northern Ireland Executive, Department of Health, Social Services and Public Safety. New strategic direction for alcohol and drugs (2006-2011). Available from: [www.dhsspsni.gov.uk/new_strategic_direction_for_alcohol_and_drugs_\(2006-2011\).pdf](http://www.dhsspsni.gov.uk/new_strategic_direction_for_alcohol_and_drugs_(2006-2011).pdf)

- To develop a competent skilled workforce across all sectors that can respond to the complexities of alcohol and drug use and misuse.
- To promote opportunities for those under the age of 18 years to develop appropriate skills, attitudes and behaviours to enable them to resist societal pressures to drink alcohol and/or use illicit drugs.
- To reduce the availability of illicit drugs in Northern Ireland.

4.2 Policies targeting children and young people

In England, *Every Child Matters: Change for Children* details an approach to the well-being of children and young people from birth to 19. The Government's aim is for every child to have the support they need to be healthy; stay safe; enjoy and achieve; make a positive contribution and achieve economic well-being.

4.2.1 Every Child Matters

Key policy documents recognise the need for a holistic response to the prevention of substance use and the provision of integrated treatment. In particular, this is fundamental to the *Every Child Matters* reform of young people's services.

A central focus of the *Every Child Matters* programme is the focus on integrated commissioning and multi-agency working at a local level, which links well with the young persons' substance misuse tiers. The four-tier model aims to facilitate multi-agency working through improving agencies' understanding of their own role and responsibilities and that of other agencies, which may facilitate greater collaboration and avoid duplication.

Every Child Matters introduces the Common Assessment Framework (CAF), designed to standardise the way that young people's needs are assessed across agencies to aid multi-agency working in ensuring that all the needs are met. This should support the pathway that young people take through services.

The *Every Child Matters: Change for Children Young People and Drugs*²³ guidance recommends that services should be built around the needs of children and young people, particularly those who are most vulnerable to drug misuse. The *Every Child Matters* outcome 'Be healthy' uses the term 'drugs' which refers to controlled drugs within the meaning of the Misuse of Drugs Act 1971. The *Every Child Matters* guidance recognises that reducing the use of these drugs by children and young people will often involve broader education, assessment and intervention covering a wider range of substances, including alcohol. *Every Child Matters* describes the services that should meet the diverse needs of children and young people including those from the most vulnerable groups. The services are described below.

Services for children and young people

Drugs education. There is government guidance, which sets out how drug education, including alcohol, should be delivered in schools. See section 4.4, page 32.

23 Department For Education And Skills (2005) *Every Child Matters: Change For Children Young People And Drugs*

Advice and information on drugs including alcohol and services for young people and their families should be easily accessible. Many areas have built successful approaches based around the national FRANK helpline and website.

Prevention through access to core services to ensure all young people have direct access to core health, education, housing and family support services and that there is prompt access to specialist young peoples services when required.

Social inclusion programmes offer a range of sports and other activities aimed at ensuring that children and young people stay engaged or re-engage with their families, education and the community. Programmes, such as *Positive Futures*, can also act as a bridge between universal services and targeted services for vulnerable young people.

Targeted programmes including those aimed at truants and school excludees; looked after children; young people involved in the criminal justice system; and children of problem drug users. Consideration needs to be given to the recognition of the potential needs of children of problem drinkers.

Full Service Extended Schools (FSES)

Schools located at the heart of the community are well placed to take up the challenge of making *Every Child Matters* a reality for children, young people and communities.

Based on US experiences, the UK FSES programme was launched in 2003 as part of a government programme for all schools to offer extended activities by 2010. The FSES initiative aims to provide a broad range of services for children, families and communities on a single school site, including: study support, community activities, adult learning, health services and child care. Evaluation²⁴ of the three years of the programme suffered through a lack of baseline data, yet reported positive impacts on education attainment (particularly for pupils facing learning difficulties), along with improved life opportunities. Qualitative analysis suggested school-based support had reduced factors including conduct problems, aggression and anxiety among individual at-risk pupils. While the costs of implementing the programme are high, the costs saved also appear high. The benefits were largely accrued by deprived and vulnerable individuals.

Evaluation of a widespread implementation of Extended School Services in the US involving baseline and follow up studies (13 months after implementation) found positive impacts on academic measures, pro-social behaviours and alcohol use²⁵.

4.2.2 Other strategies

Each of the devolved administrations also has policies that target the health and wellbeing of children and young people. In Scotland, these documents are *Getting it Right for Every Child* and *Delivering a Healthy Future: An Action Framework for Children and Young People's Health in Scotland*; in Wales, *Children and Young People: Rights to Action (2004)*; and in Northern Ireland, *Our Children and Young People – Our Pledge: A 10 year strategy for children and young people in Northern Ireland, 2006-2010*.

²⁴ Please see Cummings C, Dyson A, Muijs D, et al (2007) Evaluation of the Full Service Extended Schools initiative: final report. London: Department for Education and Skills

²⁵ Please see Grossman J, Price M, Fellerath V, et al (2002) Multiple choices after school: findings from the Extended-Service Schools initiative. Philadelphia: Public/Private Enterprises

4.3 Support for parents and carers

In England, the *Every Child Matters: Change for Children* programme aims to ensure that support for parents becomes routine, particularly at key points in a child or young person's life. The 'Parent Know How' programme and Parentline are examples of help for parents.

Every Child Matters recognises that parents, carers and families have a key role in preventing problematic substance use among young people. Young people are more likely to delay or avoid substance use when they talk openly with their parents. Research also shows that where young people develop serious problems with substances, the involvement and support of parents and families can contribute greatly to improved outcomes.

Parent Know How is a programme designed to deliver better outcomes for children and parents by driving greater efficiency, innovation and reach in the parenting information and support services funded by the Department for Children, Schools and Families. The programme is designed to improve provision to all parents, with a particular focus on meeting the needs of parents who are not as well served by current sources of help as they could be; including parents of disabled children, fathers from all backgrounds and parents of teenage children.

Parentline (www.parentlineplus.org.uk) provides telephone and online confidential help and advice to parents and carers including specific services for parents of teenagers.

4.4 Guidance for schools

4.4.1 England

The *Drugs: Guidance for Schools* document (2004) provides guidance on all matters relating to drug education, the management of drugs within the school community, supporting the needs of pupils with regard to drugs and drug policy development. The guidance is based on the principles that underpin good practice in drugs education and managing drugs incidents. 'Drugs' in this context refers to all drugs including medicines, volatile substances, tobacco, illegal drugs and alcohol. The guidance is intended to help schools formulate a planned, coordinated and considered response to all substances.

The Government expects that, given the current negative impacts of alcohol misuse, educating pupils about the effects of alcohol and how to reduce alcohol related harm should be an important priority for all schools.

Recent NICE guidelines on alcohol interventions in schools²⁶ provide clear priorities concerning alcohol and young people under the age of 18. The NICE guidance explains that the aim of alcohol education should be to reduce the risks associated with pupils' own and others' drinking by taking a harm-reduction approach. This accepts that many, although not all, young people drink, and seeks to enhance pupils' abilities to identify and manage risks and make responsible and healthy decisions. The guidance requires

²⁶ National Institute for Health and Clinical Excellence (2007) Interventions in schools to prevent and reduce alcohol use among children and young people

increased awareness of safe and sensible alcohol consumption among all young people and their parents or carers, with both receiving information and education about the effects of alcohol on young people. The NICE guidance envisages that the education and information can be delivered through schools, but also through the wider community.

NICE guidelines on alcohol interventions in schools also provide clear priorities concerning alcohol and young people under the age of 18. Please see Box 2.

Box 2. Interventions in schools to prevent and reduce alcohol use among children and young people (National Institute for Health and Clinical Excellence 2007)

Recommendations

Recommendation 1

Ensure alcohol education is an integral part of the national science, PSHE and PSHE education curricula, in line with Department for Children, Schools and Families (DCSF) guidance.

Ensure alcohol education is tailored for different age groups and takes different learning needs into account (based, for example, on individual, social and environmental factors). It should aim to encourage children not to drink, delay the age at which young people start drinking and reduce the harm it can cause among those who do drink.

Introduce a 'whole school' approach to alcohol, in line with DCSF guidance. It should involve staff, parents and pupils and cover everything from policy development and the school environment to the professional development of (and support for) staff.

Where appropriate, offer parents or carers information about where they can get help to develop their parenting skills. This includes problem-solving and communication skills, and advice on setting boundaries for their children and teaching them how to resist peer pressure.

Recommendation 2

Where appropriate, offer brief, one-to-one advice on the harmful effects of alcohol use, how to reduce the risks and where to find sources of support. Offer a follow-up consultation or make a referral to external services, where necessary.

Where appropriate, make a direct referral to external services (without providing one-to-one advice).

Follow best practice on child protection, consent and confidentiality. Where appropriate, involve parents or carers in the consultation and any referral to external services.

Recommendation 3

Maintain and develop partnerships to support alcohol education in schools as part of the national science, PSHE and PSHE education curricula; ensure school interventions on alcohol use are integrated with community activities introduced as part of the 'Children and young people's plan'; find ways to consult with families (parents or carers, children and young people) about initiatives to reduce alcohol use and to involve them in those initiatives; and monitor and evaluate partnership working and incorporate good practice into planning.

4.4.2 Scotland

Although there is no specific guidance document related to alcohol and drug education in Scotland, the Scottish Government has established an expert steering group on substance misuse education in schools. The purpose of this group is to provide advice, guidance and proposals aimed at helping schools and authorities to achieve improvements, in the context of the *Curriculum for Excellence*.

4.4.3 Wales

In Wales, good practice in substance misuse education is outlined in *Substance Misuse: Children and Young People. Circular No 17/02*²⁷. The document highlights how effective substance misuse education should enable children and young people to make responsible well-informed choices about their lives. The Welsh Assembly Government has also directly funded the establishment of the *All Wales Schools Programme*, which aims to provide a core programme of accurate, consistent and credible information about substance misuse and other community safety information around which additional and locally determined prevention initiatives can be built.

4.4.4 Northern Ireland

Guidance to primary and post-primary schools in Northern Ireland is provided by "Drugs: Guidance for Schools" published by the Council for the Curriculum, Examinations and Assessment (CCEA) on behalf of the Department of Education. In addition, the latest alcohol and drug strategy, *New Strategic Direction for Alcohol and Drugs*, identifies the promotion of good practice in respect of alcohol and drug related education and prevention as a key priority of the strategy.

27 National Assembly for Wales Circular No 17/02. Substance misuse: children and young people

4.5 Information and advice for young people and parents

Safe. Sensible. Social. The next steps in the National Alcohol Strategy recommends that specific messages about what is sensible, the risks of other substance misuse and the increased risk of perpetrating and being a victim of crime that come with alcohol misuse should be communicated to young people

Safe. Sensible. Social. The next steps in the National Alcohol Strategy states that social marketing campaigns will help parents educate their children and set boundaries, and enable young people to make sensible drinking decisions. There are already a wide variety of sources of information aimed at young people and parents and carers including teaching resources, leaflets, booklets and online resources. In England, FRANK is the Government alcohol and drug awareness service, which includes telephone, online and printed media help for parents and young people. Know the Score in Scotland and Dan 24/7 in Wales, provide similar information and advice to young people and in Northern Ireland, the Health Promotion Agency develops public health information campaigns for various target groups and settings. Furthermore, the Directgov²⁸ website provides advice on a wide range of topics including alcohol and drugs and local primary care trusts (PCTs), Drug and Alcohol Action Teams (DAATs) and other organisations also provide advice to young people about alcohol.

In July 2006, FRANK launched leaflets for parents and young people – ‘*Does your child know more than you?*’ and ‘*Know the score*’ – to educate them on the risks associated with alcohol and drug use. The DrugScope website also has an area – D-word designed for young people and families, which focuses on understanding the impact of drugs, alcohol and tobacco. The excerpt from the FRANK website (See Box 3 below) is typical of the information provided about alcohol. There is no reference to the intended target audience for the information on the FRANK website. There is also no specific information for those under 18 on the FRANK website.

²⁸ www.direct.gov.uk/en/parents/yourchildshealthandsafety/index.htm

Box 3. FRANK alcohol information

The effects

- Alcohol will often exaggerate whatever mood you're in when you start drinking.
- Alcohol is a relaxant so, in moderation, it can reduce feelings of anxiety and inhibitions, making you feel more sociable.
- It takes your body an hour to process one unit of alcohol.

Chances of getting hooked

For most people, if you drink within the sensible limits for regular drinking, that's OK. But for some people drinking gradually gets out of control and results either in regular binge-drinking, heavy harmful drinking or alcoholism (alcohol dependence).

The risks

- One drink too many can leave you feeling out of control – like slurring your words, losing your balance and vomiting.
- Official guidelines recommend that men shouldn't regularly drink more than 3-4 units a day and women shouldn't regularly drink more than 2-3 units a day because of the harm this may cause. The guidelines also recommend that after an episode of heavy drinking, it's advisable to refrain from drinking for 48 hours to allow the tissues to recover.
- Psychological and physical dependence on alcohol can creep up on you. Tolerance gradually increases the more you drink excessively on a regular basis, so you may find you'll need more alcohol to reach the same state. In other words, you may seem to be getting better at holding your drink when that's really a sign of a developing problem.
- Alcohol can make you mouthy, argumentative and aggressive. There's no way of knowing beforehand if you're going to turn into a nasty drunk.
- Serious overindulgence can lead to alcohol poisoning which could put you in a coma or even kill you.
- Alcohol is blamed for contributing to all kinds of problems in Britain, from violent crime to domestic violence and to car-related deaths.
- Long-term excessive use of alcohol causes illnesses such as liver damage, stomach cancer and heart disease.

<http://www.talktofrank.com/drugs.aspx?id=166>

4.6 Encouraging young people to participate in leisure, education, training and employment

The Government, through its Positive Futures programme, is involved in a wide range of initiatives concerned with providing accessible alternatives to alcohol consumption.

The Positive Futures programme aims to have a positive influence on young people's lives by widening horizons and providing access to new opportunities within a culturally familiar environment. Sport and leisure activities are seen as a catalyst to encourage community participation and inclusion and steer young people towards education, training and employment.

4.7 Treatment for young people

The Every Child Matters and NTA guidance require the collaboration of a range of agencies to deliver an integrated approach. They aim to facilitate multi-agency working, greater collaboration and avoidance of duplication.

The NTA has recently published the consultation document entitled *Young people's specialist substance misuse treatment: exploring the evidence*²⁹. The document explains that young people's substance misuse is a relatively new area of academic study. Research on effective treatment interventions is still scarce but is growing both in quantity and quality.

The DCSF and the NTA developed a Memorandum of Understanding in May 2007 to set out their commitment to work in partnership to achieve the common goal of ensuring that every young person has access to high quality specialist substance misuse treatment provision when they need it³⁰.

Young people with drug related needs are supported by interventions and services within a four-tiered model of drug and alcohol interventions outlined in the *Substance of young needs* (HAS, 1996 and 2001). The four tiers are intended to provide a framework to conceptualise the service components of an integrated and comprehensive child-based service, see Box 4.

Box 4. The four-tiered model of drug and alcohol interventions

Tier 1 – Frontline of service delivery for young people and their families

The purpose of services within this structure is to ensure universal access and continuity of care to all young people. They aim to identify and screen those with vulnerability to substance misuse. They are concerned with education improvement, maintenance of health, and identification of risks or child protection issues. They also engage in providing advice and information concerning substances.

29 National Treatment Agency for Substance Misuse (2008) *Young people's specialist misuse treatment. Expecting positive effects from consumption of alcohol*

30 http://www.nta.nhs.uk/areas/young_people/Docs/DCFS_NTA_memorandum_of_understanding_final.pdf

Tier 2: Frontline of specialist services, youth services – practitioners with some knowledge of drugs and alcohol

Youth orientated services, offered by practitioners with some drug and alcohol experience and youth specialist knowledge. The aim and purpose of this tier is to be concerned with reduction of risks and vulnerabilities, reintegration and maintenance of young people in mainstream services.

Tier 3 – Services provided by specialist teams

Young people's specialist drug services and other specialised services, which work with complex cases requiring multidisciplinary team-based work, should be working at this level. The aim of tier 3 services is to deal with complex and often multiple needs of the child or young person and not just with the particular substance problems. Tier 3 services also work towards reintegrating and including the child in their family, school or work.

Tier 4 – Very specialist services

Tier 4 services provide very specialist forms of intervention for young drug misusers with complex care needs. It is recognised that, for a very small number of people, there is a need for intensive interventions, which could include short-term substitute prescribing, detoxification and places away from home. Such respite care away from home might be offered in a number of different ways, such as residential units, enhanced fostering, and supported hostels.

Adapted from Health Advisory Service 2001, and the NTA 2005

The tiered model requires skilled staff who are able to work across all tiers, collaborating with others and making appropriate referrals. Development of the workforce is a key element of Every Child Matters, in particular, the need for a common core of skills, knowledge and experience among people working with children, including the ability to be able to identify, assess and respond to substance misuse problems among young people. Staff working with young people should be trained to identify alcohol problems, either through the CAF or an alcohol assessment tool.

The NTA has produced guidance aimed at professionals working with young people under 18 years old who provide specialist substance misuse treatment services (NTA, 2008). The NTA defines young people's treatment as, "... care planned medical, psychosocial or specialist harm reduction interventions aimed at alleviating current harm caused by a young person's substance misuse." The draft report brings together evidence for effective treatment of substance misuse among young people aged 18 and under.

The National Institute for Health and Clinical Excellence (NICE) has recommended that offering brief, one-to-one advice on the harmful effects of alcohol use, and how to reduce the risks and find sources of support, is an effective approach for tackling harmful drinking among children and young people (NICE 2007a)³¹. NICE also recommends that best

³¹ National Institute for Health and Clinical Excellence (2007a) Interventions in schools to prevent and reduce alcohol use among children and young people

practice on child protection, consent and confidentiality should be followed and where appropriate, parents or carers should be involved in the treatment process.

4.8 The international picture

Although most countries have national alcohol policies, based on a review of international guidelines it is apparent that very few countries have developed guidelines or guidance on the consumption of alcohol by children and adolescents. The two exceptions to this are Australia and New Zealand.

Current Australian alcohol guidelines³² published in October 2001 included a guideline specifically targeting young people up to 18 years. The guidelines state that young people up to 18 years:

- Should follow the recommendations for young adults
- If they choose not to drink, should be supported in this decision
- In settings where alcohol is available to them, should be supervised by adults at all times
- Should keep any drinking to a minimum
- Most importantly, should not drink to become intoxicated
- To become responsible adult drinkers, a gradual, supervised introduction to alcohol is recommended.

In October 2007, new draft guidelines were launched for public consultation³³. The guidelines for children and young people under 18 years of age have been modified and updated and now state that:

- Parents and carers are advised that not drinking is the safest option for children and adolescents under 15 years of age
- Not drinking is the safest option for adolescents aged 15-17 years. If drinking does occur, it should be under parental supervision and within adult guideline for low-risk drinking (two standard drinks or less in any one day)

New Zealand has produced guidelines for adolescents on food and nutrition³⁴ and these include recommendations on alcohol consumption. The guidelines state that “while alcohol intake is not recommended for adolescents, alcohol consumption cannot be completely avoided”. They include the following advice for adolescents in relation to alcohol consumption:

- Limit intake of alcohol
- Discourage binge drinking
- Eat some food when you drink
- Dilute alcoholic beverages and keep count of the number of drinks consumed

32 Australian alcohol guidelines: health risks and benefits. Available from www.nhmrc.gov.au/publications/synopses/ds9syn.htm

33 www.nhmrc.gov.au/guidelines/consult/alcohol_guidelines.htm

34 New Zealand Ministry of Health. Food and nutrition guidelines for healthy adolescents. A background paper. Available from: www.nzgg.org.nz/guidelines/dsp_guideline_popup.cfm?guidelineCatID=24&guidelineID=66

- Do not drink alcoholic beverages if you intend to drive a car or operate machinery or undertake difficult tasks.

In 2007, the US Surgeon General launched a call to action to prevent and reduce underage drinking. The purpose of the call to action was to focus national attention on underage drinking and to emphasise that underage alcohol use is not inevitable. Based on this the Surgeon General proposed six goals:

- Goal 1. Foster changes in American society that facilitate healthy adolescent development and that help prevent and reduce underage drinking.
- Goal 2. Engage parents and other caregivers, schools, communities, all levels of government, all social systems that interface with youth, and youth themselves in a coordinated national effort to prevent and reduce underage drinking and its consequences.
- Goal 3. Promote an understanding of underage alcohol consumption in the context of human development and maturation that takes into account individual adolescent characteristics as well as environmental, ethnic, cultural, and gender differences.
- Goal 4. Conduct additional research on adolescent alcohol use and its relationship to development.
- Goal 5. Work to improve public health surveillance on underage drinking and on population based risk factors for this behaviour.
- Goal 6. Work to ensure that policies at all levels are consistent with the national goal of preventing and reducing underage alcohol consumption.

5 Epidemiological review of harms to children

5.1 Introduction

The consumption of alcohol has both health and social consequences. In adults, in addition to the range of negative health outcomes associated with chronic alcohol use, alcohol contributes to traumatic outcomes through violence and injury. There is increasing evidence that in addition to the volume of alcohol consumed, patterns of drinking may be relevant for the negative health outcomes (WHO Global Status Report on Alcohol 2004). An association between alcohol consumption and many types of disease and injury has been established primarily in adults (Single et al., 2001; see Box 5).

Box 5. Examples of disease and injury associated with alcohol consumption

Alcoholic psychosis	Colon cancer	Gastro-eosophangeal haemorrhage
Alcohol dependence	Rectal cancer	Cholelithiasis
Alcohol abuse	Hepatic cancer	Acute pancreatitis
Alcoholic polyneuropathy	Pancreatic cancer	Low birthweight
Alcoholic cardiomyopathy	Laryngeal cancer	Road injuries
Alcoholic gastritis	Breast cancer	Fall injuries
Alcoholic liver cirrhosis	Pellagra	Fire injuries
Ethanol toxicity	Hypertension	Drowning
Other alcoholic poisonings	Ischaemic heart disease	Aspiration
Lip cancer	Cardiac dysrhythmias	Machine injuries
Oral cancer	Heart failure	Suicide
Pharyngeal cancer	Stroke	Assault
Oesophageal cancer	Oesophageal varices	Child abuse

Adapted from Single et al. 2001

The following section describes key studies from an epidemiological review of the harms associated with adolescent alcohol consumption. In particular it explores the effects of age of drinking onset and the acute and longer term consequences of alcohol consumption under the age of 18 years. Results from this review form the evidence base upon which

the guidance for alcohol consumption by children is based (see Section 3). Each area of evidence reviewed begins with a summary statement and continues with details of the studies on which this is derived. More details of the studies included and other studies relating to child drinking are given in the Supplementary Information Document.

5.2 Methods

5.2.1 Search strategy

English language studies published since 1994 were identified by searching major medical databases; principally MEDLINE and CINAHL. In addition, reference lists of retrieved studies, key documents (e.g. documents related to the Alcohol Harm Reduction Strategy for England, ACMD Pathways to Problems; draft Australian alcohol guidelines for low risk drinking) and relevant websites (e.g. Department of Health) were searched.

5.2.2 Inclusion criteria

Studies that examined the impact of alcohol consumption in childhood and adolescence adulthood, or the association between alcohol consumption and the risk of acute and chronic outcomes were included if they met the following criteria:

- English language
- Populations of children, young people aged 18 years or younger
- Published from 1994 onwards

Initially, study inclusion was considered according to the hierarchy of evidence. We prioritised the inclusion of systematic reviews and/or meta-analyses, but if these types of studies were unavailable or did not report sufficient data, then the inclusion of case-control or cohort studies was considered against the inclusion criteria described above. When evidence was still unavailable then the inclusion of cross-sectional surveys, case series/reports and expert opinion was considered. For the section on the effects of alcohol consumption on development, findings were extracted from key review articles that have summarised current research findings.

5.2.3 Methods of analysis

All included studies were extracted following the tabular description contained in the Cochrane Review Manager software (Version 4.2 for Windows), under the following headings: methods, participants, results and notes. The results of studies are presented in a narrative overview.

5.3 Effects on development

There is a large volume of literature that has examined the effects of adolescent alcohol consumption on development. A key area of research is the effects of alcohol consumption, and in particular heavy consumption, on the developing brain.

5.3.1 Alcohol and the developing brain

Adolescence represents an important period of brain development. Young people with alcohol use disorders may display structural and functional deficits in brain development compared with their non-alcohol using peers. In addition, heavy drinking during adolescence may affect normal brain functioning during adulthood.

It is now well established that the development of the brain continues throughout adolescence and into young adulthood (Brown et al 2007). Brain development during childhood and adolescence is characterised by both progressive myelination of brain tissue and regressive ‘pruning’ processes (De Bellis et al 2001). White matter is composed of myelinated axons and during adolescence white matter volume appears to increase, particularly in the prefrontal area of the brain (Clark et al 2008; Lenroot and Giedd 2006). In contrast, volumes of grey matter appear to decrease during adolescence and it has been hypothesised that this process might reflect synaptic reorganisation (Moss 2008). Specific areas of the brain that undergo active development during childhood and adolescence include the prefrontal cortex, limbic brain regions, white matter and reward circuits. These structures relate to behavioural, emotional, and cognitive regulation and may be particularly vulnerable to the adverse effects of alcohol exposure during adolescence (Clark et al 2008).

Based on neuroimaging studies, compared with controls, adolescents with alcohol use disorders have been found to have smaller prefrontal white matter volumes (DeBellis et al 2005). Developments in imaging techniques have advanced understanding of white matter development, and findings from studies in alcohol-dependent adults suggest that decreases in white matter density loss are associated with alcohol dependence (Moss 2008). However, these findings were not replicated in a recent study of alcohol-dependent adolescents published by De Bellis et al (2008). The limbic brain regions include the hippocampus and amygdala, regions which are central to the processing of emotions and the formation of new memories. There is evidence that hippocampal volumes are smaller in adolescents and young adults with alcohol dependence compared to non-dependent controls, which suggests that the hippocampus may be particularly susceptible to the adverse effects of alcohol (Clark et al 2008). However, Clark et al (2008) caution that “research on the effects of alcohol on the developing adolescent brain has not, as of yet, produced definitive results”.

Studies that have longitudinally examined young people with and without alcohol abuse have indicated that heavy alcohol involvement during adolescence is associated with cognitive deficits that worsen as drinking continues into late adolescence and young adulthood (Brown and Tapert 2004; Brown et al 2007). For example, Brown et al (2000) found that alcohol-dependent adolescents demonstrated deficits in retrieval of verbal and nonverbal information and in visuospatial functioning compared to adolescents with no history of alcohol dependence.

Animal studies have demonstrated that adolescent rats appear to be more sensitive than adult rats to the learning and memory impairments produced by alcohol exposure (Brown and Tapert 2004). In addition, vulnerability to these effects may be exacerbated by particular patterns of adolescent drinking, such as periodic binge drinking (Crews et al

2000). Research using animal models has also shown that adolescents are considerably less sensitive than adults to most of the consequences of alcohol consumption (Windle et al 2008); including motor impairment, dysphoria, social impairment and sedation as well as certain post-intoxication “hangover” effects (Spear and Varlinskaya 2005). Conversely, adolescents are more sensitive than adults to a few effects of alcohol exposure, including ethanol-induced social facilitation and impairments in hippocampal long-term-potential (Spear and Varlinskaya 2005). These effects may be particularly pronounced during early adolescence.

5.3.2 The effects of alcohol on other physiological processes

Adolescents who drink heavily may experience adverse effects on the liver, bone, growth and endocrine development.

Few studies have examined health problems associated with adolescent alcohol use, but the evidence indicates that adolescents who drink heavily experience adverse effects on the liver, bones, growth and endocrine development (Faden and Goldman 2005). Major findings in relation to alcohol’s physiological effects are shown in Table 2. Findings from animal studies have also contributed to the understanding of the effects on alcohol (see Faden and Goldman 2005).

Table 2 A summary of findings on alcohol’s physiological effects in adolescents

Findings	Study
Liver effects	
Levels of enzymes that are used as indicators of liver damage are higher in adolescents with alcohol use disorders	Clark et al 2001
And in obese adolescents who drink more moderate amounts	Strauss et al 2000
Endocrine and growth effects	
Drinking alcohol can lower oestrogen levels in adolescent girls	Block et al 1993
Drinking alcohol can lower luteinizing hormone and testosterone levels in adolescent boys	Frias et al 2000a
In both sexes, acute intoxication reduces levels of growth hormones	Frias et al 2000b
Bone density effects	
Increased alcohol consumption is associated with lowered bone mineral density in adolescent males but not females	Fehily et al 1992; Neville et al 2002; Elgan et al 2002; Fujita et al 1999

Adapted from Faden & Goldman, 2005

5.4 Risk and protective factors

Many factors play a part in the development of adolescent drinking. There is a large body of literature that has sought to establish the factors that put young people at risk for alcohol use, and also the factors that are protective against the early initiation of alcohol use and with problematic alcohol use later in adolescence. Table 3 summaries risk and protective factors identified from the literature across four domains. There is evidence to suggest that the higher the risk and the lower the protection, the greater the problem use of alcohol. Costa et al (1999) identified that among adolescents who are not problem drinkers, higher risk and lower protection accelerated the likelihood of becoming a problem drinker in subsequent years.

5.4.1 Personality and behavioural factors

Certain personality traits have been associated with adolescent drinking patterns. Children who express behavioural problems or who have a psychiatric diagnosis of conduct disorder may be more likely to use alcohol and other substances. Children and adolescents who are depressed or anxious may use alcohol as a coping strategy, and this has been shown to be associated with alcohol problems in later life.

Children's expectations about the effects of alcohol on drinkers generally become more positive as they become older and as they move into adolescence. Having positive expectations about the effects of alcohol consumption have been shown to predict onset of drinking in adolescence.

Prior involvement in delinquent behaviour is one of the most consistent behavioural risk factors for starting to drink in adolescence. In addition, early school-related problems may increase the likelihood that a child or adolescent will begin to drink. Early onset of puberty has also been shown to be a risk factor for early initiation of alcohol use among females.

Certain personality traits may be associated with adolescent drinking patterns. Traits related to disinhibition or poor regulation have been shown to predict both heavy alcohol use and alcohol use disorders in adolescents. For example, novelty seeking has been shown to be significantly correlated with substance misuse in adolescent who are undergoing treatment for alcohol use disorders (Gabel et al 1999). In addition, Soloff et al (2000) found that, compared to age-matched controls, adolescents with alcohol use disorders scored significantly higher on all measures of impulsivity and aggressivity compared to healthy controls. Caspi et al (1997) examined whether temperament at age 3 could predict health-risk behaviours at age 21, and whether age 18 personality mediated this association. Adolescents who at age 18 were characterized by low scores on measures of constraint (Traditionalism, Harm Avoidance, Control) and positive emotionality (Social Closeness), and by high scores on negative emotionality measures (Alienation and Aggression) were significantly more likely to be involved in health-risk behaviours at age 21 such as alcohol abuse. In addition, psychiatric diagnoses of conduct disorder, oppositional defiant disorder, or of any externalizing disorder at 11 years of age has been shown to significantly increase the likelihood of starting to drink by age 14 (McGue et al 2001a). Traits relating to negative affectivity have also been shown to predict alcohol

initiation and use. For example, Colder and Chassin (1997) found that negative affect predicted alcohol use and interacted with impulsivity to predict higher levels of alcohol use and alcohol-related impairment. There is also some evidence that drinking to cope with negative emotional states is particularly associated with alcohol problems (Kuntsche et al 2005).

Positive expectations about the effects of alcohol have been shown to predict onset of drinking in adolescence (Zucker et al 2008). Children's expectations about the effects of alcohol on drinkers generally become more positive as they become older and as they move into adolescence. For example, Aas et al (1998) found that among young people aged 11-12 years, expectations of the positive social effects of alcohol predicted drinking initiation, and that drinking also influenced subsequent expectancy in the early stages of drinking.

Donovan (2004) identified that prior involvement in delinquent behaviour is one of the most consistent behavioural risk factors for starting to drink in adolescence. In addition, early school-related problems such as poor grades, low expectations for success, and lower levels of bonding to school may increase the likelihood of starting to drink (e.g. Donovan et al 2004; Costa et al 1999; Ellickson et al 2001).

Early onset of puberty has been shown to be risk factor for early initiation of alcohol use among females. Lanza and Collins (2002) found that females who had reached puberty at age 12-13 years were significantly more likely to initiate substance use between the ages of 12-14 years. Possible explanations for this finding have been examined, including that the link may occur because of a mismatch of physiological and psychological maturity, or because early maturing girls tend to have older friends who may be involved in substance use (Lanza and Collins 2002).

5.4.2 Family factors

Parental use of alcohol increases the likelihood that children and adolescents will consume alcohol. When parents use alcohol frequently, their children have an increased likelihood of being exposed to alcohol-related risk behaviours. In addition, a family history of alcoholism is associated with an increased risk of alcoholism in male and female offspring.

Parental monitoring of behaviour has been identified as an important factor in young people's alcohol use. Young people who are poorly monitored begin alcohol consumption at an earlier age, tend to drink more, are more likely to develop problematic drinking patterns, and are more likely to associate with 'deviant peers'. Studies have shown that family standards and rules, parental monitoring, and adolescent family attachment are important in delaying alcohol initiation in early adolescence. Harsh parenting, conflict, and a permissive approach to use of alcohol by parents have been associated with heavy and binge drinking in adolescence.

Other factors that may influence alcohol use in children and adolescence relate to family structure. Research has shown that there is a greater risk of alcohol use initiation for adolescents living with a stepparent, or with a sole parent, than for those living in intact families.

Parental drinking behaviour

There is evidence that parents' own use of alcohol may increase the likelihood that young people will also consume alcohol (Hayes et al 2004). Hayes et al (2004) also identified research that suggests that parental alcohol use may impact indirectly, for example, by changing parental management skills. Older siblings have also been identified as role models, with association between older sibling and younger sibling alcohol use (Windle et al 2008). When parents use alcohol frequently, their children have an increased likelihood of being exposed to alcohol-related risk behaviours. For example, Bonomo et al (2001) found that young people who reported that their parents drank daily had an increased risk of any alcohol-related sexual risk taking.

A positive family history of alcoholism has been associated with a four- to nine-fold increased risk of alcoholism for male offspring and two- to threefold increased risk for female offspring (Windle et al 2008). In addition, parental alcohol dependence has indirect effects on adolescent alcohol use, through the changes it exerts on parenting behaviours and socialisation patterns (Hayes et al 2004).

Parenting influences

Parental monitoring has been defined as parental awareness of the child's activities, and communication to the child that the parent is concerned about, and aware of the child's activities (Dishion and McMahon 1998). Hayes et al (2004) identified that there is a considerable body of evidence that shows that young people who are poorly monitored begin alcohol consumption at an earlier age, tend to drink more, and are more likely to develop problematic drinking patterns. There is also evidence to show that poorly monitored teens are more likely to associate with 'deviant peers'. Hayes et al (2004) also identified that parental norms, attitudes, and beliefs with regard to adolescent alcohol use have an important influence on adolescent alcohol consumption. The research evidence suggests that in general, when parents show disapproval, children are less likely to drink, and conversely, when parents are tolerant, children are likely to drink more.

Hayes et al (2004) reported that there is a paucity of literature, which has examined the relationship between parents' positive behaviour management practices and adolescent alcohol use; however they identified a range of positive parental practices based on the program of research from the Seattle Social Development Project. These studies have shown that family standards and rules, parental monitoring, and adolescent family attachment are important in delaying alcohol initiation in early adolescence. In addition, parental rules, rewards for good behaviour, a strong values system, and well developed negotiation skills when adolescents were aged 10-16 years, predicted lower alcohol abuse and dependence at the age of 21 years. More recently, studies by Van Der Vorst and colleagues (2006; 2007) have examined associations between parenting influences and adolescent alcohol use. These studies have shown that having clear rules about alcohol consumption decreases the likelihood of drinking in adolescence, regardless of age. Less effective parental management approaches have also been identified (Hayes et al 2004). Harsh parenting and conflict have both been shown to be connected to adolescent alcohol use, but there is evidence that the links are indirect and the result of the impact on other parenting behaviours such as parental monitoring. Research has also shown that children and adolescents whose parents permit them to drink alcohol when they are under the legal

age may be more likely to engage in heavy or binge drinking, as are those who rebel against parental authority.

Parental supply of alcohol to young people who have already begun drinking has been linked to subsequent levels of consumption. Hayes et al (2004) presented the findings of Australian research that demonstrated that on occasions when parents were aware of their adolescents' alcohol use and when they actively engage with their adolescents in the purchase or provision of alcohol, then their adolescents consume less. Based on a cross-sectional survey of 10,271 schoolchildren aged 15-16 years, Bellis et al (2007) found that being bought alcohol by parents was associated with both lower bingeing and drinking in public places amongst children that consume alcohol.

Other family factors

Family structure has been shown to be associated with alcohol initiation. There is a greater risk of alcohol use initiation for adolescents living with a stepparent, or with a sole parent, than for those living in intact families (Flewelling et al 1990; Ellickson et al 2001; Hayes et al 2004)

Drinking in family contexts has been shown to be protective against underage drinking and problem drinking in later life. Warner and White (2003) found that compared to participants who initiated drinking at older ages at a family gathering, both early initiates who first drank at a family gathering and early initiates who first drank outside a family gathering had significantly higher odds of developing problems associated with alcohol use. Foley et al (2004) examined adults' approval of adolescents' alcohol use, finding that providing alcohol for consumption at parties was associated with a two-fold increase in past 30-day use and binge drinking.

5.4.3 Peer factors

Peers play an important role in the onset of drinking behaviours and studies conducted with older adolescents (15-16 years) have shown that alcohol use may be predicted by exposure to cannabis and alcohol use by peers and being offered alcohol by others. The effect of peers has been shown to become particularly powerful when parent-adolescent relationships are of poorer quality.

Studies conducted with older adolescents (15-16 years) have shown that alcohol use may be predicted by exposure to cannabis and alcohol use by peers and being offered alcohol by others (Donovan 2004; Ellickson et al 2001) In addition the effect of peers has been shown to mediate the influence of parenting factors on adolescents' alcohol use. That is, peer effects become particularly powerful when parent-adolescent relationships are of poorer quality (Hayes et al 2004). Donovan (2004) identified that social assertiveness in childhood (i.e. independence from peer influence) predicts delayed onset of alcohol use, at least up to the age of 14.

5.4.4 Other risk and protective factors

Alcohol consumption, including heavy and regular drinking is associated positively with spending money.

Involvement in prosocial activities such as being a member of a youth club, group or team is protective against frequent and problem alcohol use.

Van Reek et al (1994) surveyed 11-15 year olds in 12 European countries and found that pocket money was positively associated with weekly drinking. Darling et al (2006) examined self-reported sources of income and expenditure, and the association between part-time employment and spending on fast food, alcohol, cigarettes, and gambling among secondary school students in New Zealand (mean age 15 years). They found that part-time employment was associated with increased purchasing of alcohol. Bellis et al (2007) also found that in older adolescents (15-16 years), binge, frequent and public drinking were all strongly related to amounts of spending money youths had available.

Involvement in prosocial activities has been shown to be protective against frequent and problem alcohol use (Costa et al 1999). Bellis et al (2007) also found that being a member of a youth club, group or team was generally protective against binge drinking in a sample of alcohol consuming schoolchildren aged 15-16 years.

Table 3 Risk and protective factors for childhood and adolescent alcohol consumption

Risk/Protective factor	Findings	Study
Personality and behavioural factors		
↓ Impulsive and aggressive personality traits	Traits related to disinhibition or poor regulation have been shown to predict both heavy alcohol use and alcohol use disorders in adolescents, including impulsiveness, aggression, novelty-seeking and low harm avoidance	Soloff et al 2000; Gabel et al 1999; Caspi et al 1997
↓ Psychiatric diagnoses of conduct disorder	Psychiatric diagnoses of conduct disorder, oppositional defiant disorder, or of any externalizing disorder at 11 years of age significantly increase the likelihood of starting to drink by age 14 years	McGue et al 2001a
↓ Depression and anxiety	Negative affectivity has also been shown to predict alcohol problems in adolescents Drinking to cope with negative emotional states has been shown to be particularly associated with alcohol problems	Colder & Chassin 1997 Kuntsche et al 2005

Risk/Protective factor	Findings	Study
↓ Delinquent behaviour	One of the most consistent behavioural risk factors for starting to drink in adolescence is prior involvement in delinquent behaviour	Donovan 2004
↓ School-related problems	Early school-related problems such as poor grades, low expectations for success, and lower levels of bonding to school may increase the likelihood of starting to drink	Donovan et al 2004; Costa et al 1999; Ellickson et al 2001
↓ Positive alcohol expectancies ³⁵	An expectation of the positive social effects of alcohol among children aged 11-12 predicted the initiation of drinking a year later.	Aas et al 1998
↓ Early onset puberty	Early onset puberty in females is associated with early onset drinking	Lanza and Collins 2002
Family factors		
↓ Parental alcohol abuse	A positive family history of alcoholism has been associated with four- to ninefold increased risk of alcoholism for male offspring and two- to threefold increased risk for female offspring. Parental alcohol dependence has indirect effects on adolescent alcohol use, through the changes it exerts on parenting behaviours and socialisation patterns.	Windle et al 2008 Hayes et al 2004
↓ Family breakdown	Greater risk of alcohol use initiation for adolescents living with a stepparent, or with sole parent, than for those living in intact families	Flewelling et al 1990; Ellickson et al 2001; Hayes et al 2004
↔ Parental attitudes towards alcohol	Positive or permissive parental attitudes towards alcohol may predict alcohol initiation at a younger age	Andrews et al 1993; Fergusson et al 1994; Hayes et al 2004
↔ Parental supply of alcohol	Exposure to alcohol use by an important adult at Grade 7 was associated with a greater likelihood of any problem-related drinking at Grade 12 Young drinkers who are supplied alcohol by their parents are likely to drink less than those who obtain it from friends or older siblings	Ellickson et al 2001 Hayes et al 2004; Bellis et al 2007

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Risk/ Protective factor	Findings	Study
↑ Drinking context	Drinking in family contexts is protective against underage drinking and problem drinking in later life	Warner & White 2003; Foley et al 2004
↓ Parental drinking	Parental alcohol consumption increases the likelihood that adolescents will also consume alcohol and parental alcohol use is also associated with greater alcohol-related risk behaviours in adolescents.	Hayes et al 2004
↓ Poor parental supervision and discipline	Poor parental monitoring has been correlated with externalising problem behaviours in adolescents, including antisocial behaviour, deviant peer associations, substance use, and sexual risk-taking.	Hayes et al 2004
Peer factors		
↓ Peer alcohol and other substance use	In older adolescents (15-16 years), alcohol use is predicted by exposure to cannabis and alcohol use by peers and being offered alcohol by others	Ellickson et al 2001; Donovan 2004
	The effect of peers mediates the influence of parenting factors on adolescents' alcohol use and peer effects become particularly powerful when parent-adolescent relationships are of poorer quality.	Hayes et al 2004
↑ Social assertiveness	Social assertiveness in childhood (i.e. independence from peer influence) predicts delayed onset of alcohol use, at least up to the age of 14	Donovan 2004
Other factors		
↓ Spending money	Alcohol consumption, including heavy and regular drinking is associated positively with spending money	Van Reek et al 1994; Darling et al 2006; Bellis et al 2007
↑ Involvement in prosocial activities	Involvement in prosocial activities such as being a member of a youth club, group or team is protective against frequent and problem alcohol use.	Costa et al 1999; Bellis et al 2007
↓ Risk factors; ↑ Protective factor; ↔ Risk or protective factor depending on context		

5.5 Age of drinking onset

5.5.1 Alcohol abuse and dependence

Early age of drinking onset is associated with an increased likelihood of developing alcohol abuse or dependence in adolescence and adulthood, and also dependence at a younger age. Vulnerability to alcohol abuse and dependence is greatest amongst adolescents who begin drinking before the age of 15.

Longitudinal studies

The aim of the study by Grant et al (2001) was to examine the relationship between age at drinking onset and the development of alcohol abuse and dependence meeting the diagnostic criteria of the Diagnostic and Statistical Manual of Mental Disorders (4th Edition; DSM-IV), in a 12-year prospective study of youth in the USA. The study was based on data from the National Longitudinal Survey of Labor Market Experience in Youth (NLSY), which began in 1979 (n=12,686 participants aged 14 to 21 years in 1979). Based on data collection 7 years later (in 1989), the odds of alcohol dependence decreased by 5% with each increasing year of age at drinking onset. The odds of alcohol abuse were not significantly related to age of drinking onset at this data collection point. However, based on data collection 12 years later (in 1994), both alcohol abuse and dependence were related to age of drinking onset. The odds of alcohol dependence increased by 9% with each increasing year of age at drinking onset, and the odds of abuse decreased by 7%.

McGue et al (2001a) explored the mechanisms underlying the association of age at first drink and alcoholism drawing on data from the Minnesota Twin Family Study. The authors found an association between age at first drink and the rate of alcohol dependence in the sample of parents included in the study (n=1309 fathers and n=1361 mothers). Their findings replicated those of other cross-sectional studies (e.g. Grant & Dawson, 1997); for parents who reported their first drink before age 15, rates of alcohol dependence were greater than 45% in men and 20% in women, compared to 13% and 2% among men and women, respectively, who drank for the first time after the age of 19. However they also identified that age at first drink was not specifically associated with alcohol dependence, but with a range of substance abuse and dependence disorders including nicotine dependence, any drug diagnosis, conduct disorder, antisocial personality disorder and academic underachievement. The authors therefore suggested that an early age of first drink may also reflect a 'vulnerability to disinhibitory behaviour'. Further analyses undertaken by McGue et al (2001b) provide some support to this hypothesis. The authors demonstrated that parents who first drank before age 15 had sons, but not daughters, with significantly higher number of lifetime symptoms of externalising disorders such as conduct disorder. They also found that for boys, heritability of early alcohol use was moderate to strong.

Dooley et al (2005) explored early alcohol drinking onset and the mechanisms by which it leads to later alcohol disorder, also using data from the NLSY (see Grant et al 2001). The authors found that compared to those who first started drinking at 16 years or older, the odds of later alcohol abuse and dependence were higher for those who first began drinking

at 12 years or younger (odds ratio [OR] 1.71 and OR 1.66, respectively; both $p < 0.05$) and for those who began drinking at ages 13-15 years (OR 1.61 and OR 1.89, respectively; both $p < 0.01$). To explore the mechanisms by which age of drinking onset influenced later abuse or dependence the authors examined potential mediators that could account for the associations between age of drinking onset and alcohol disorder. However, despite these controls, early age of drinking onset remained significantly linked to later abuse and dependence.

Dawson et al (2008) examined associations between age at first drink and first incidence of DSM-IV alcohol dependence, abuse and specific alcohol use disorder criteria over 3 years. After controlling for all significant risk factors, respondents who started drinking at ages younger than 15 were at increased risk of the incidence of alcohol dependence (OR 1.38; 95% confidence interval [CI]: 1.00, 1.90) and alcohol abuse (OR 1.52; 95% CI: 1.05, 2.21). Among those who started drinking between the ages 15 to 17, there was an increased adult incidence of alcohol abuse for both men and women (OR 1.30; 95% CI: 1.07, 1.59), but an increased incidence of dependence was limited to women (OR 1.54; 95% CI: 1.12, 2.11 for women vs. OR 0.97; 95% CI: 0.75, 1.25 for men). Analysis of a subsample of low-risk drinkers, who did not report any family history of substance abuse or mental disorder and were negative for all personality disorders and childhood risk factors, revealed a strong association between age of first drink before the age of 18 and the incidence of alcohol dependence (OR 3.79; $p = 0.001$) but not abuse (OR 1.11; $p = 0.835$), relative to initiation of drinking at 18 years or older. The authors suggested that the increased risk of adult-onset alcohol use disorders among individuals with early age of first drink derives in large part from a greater likelihood of their engaging in heavy and/or hazardous patterns of drinking in adulthood.

Cross-sectional studies

Grant and Dawson (1997) examined the relationship between age of onset of alcohol use and the prevalence of alcohol abuse and dependence in late adolescence and adulthood. The study was based on data from the National Longitudinal Alcohol Epidemiologic Survey (NLAES). The prevalence of alcohol dependence was greater than 40% among participants who initiated alcohol use before the age of 15. Among those who started drinking at ages 15 and 16, the prevalence of alcohol dependence was 39% and 31%, respectively. The odds of lifetime alcohol dependence and abuse were reduced by 14% and 8%, respectively, with each increasing year of age at first use.

The purpose of the study by Prescott and Kendler (1999) was to evaluate casual and non-causal hypotheses for the association between early drinking and alcohol-related diagnoses using data from twin pairs ($n = 8,746$ participants). Based on individual-level analyses, the authors found an association between age of drinking onset and alcohol abuse and dependence in the sample. For each additional year before the initiation of drinking, the risk of developing alcohol dependence was shown to decrease by 21% (OR 1.21; 95% CI: 1.19, 1.24). Based on analysis of twin pairs, the authors found that unaffected co-twins of twins with alcohol dependence or alcohol abuse began drinking earlier than twins from pairs in which neither twin had a diagnosis. The authors suggest that these findings support a non-causal, familial-based vulnerability for early drinking onset, consistent with the “shared vulnerability” hypothesis.

Using data from the 1990–1991 Ontario Mental Health Supplement, DeWit et al (2000) investigated the influence of age at first use of alcohol on the risk of progressing to alcohol abuse and dependence. They found that participants who started to drink between the ages of 11 and 14 were at the greatest risk of developing alcohol abuse, whereas the highest risk profile for developing lifetime alcohol dependence occurred for participants who had their first drink at age 11 or 12. After adjusting for potential confounding factors, the authors found that vulnerability to the risk of abuse was highest for adolescents who started drinking between the age 11–14, followed by those who started drinking before the age of 11 and participants who had their first drink at age 15 or 16. Relative to those who started drinking after the age of 19, the risk of developing dependence for those who started to drink at ages 15–18 was not significant (relative to the reference group).

York et al (2004) aimed to determine the relationship of age at first drink to traditional drinking variables as well as novel current drinking variables in a national general population sample. Age of first drink was not significantly related to the probability of current alcohol abuse or dependence after adjusting for age and other confounders, but was significantly related to the probability of lifetime alcohol abuse or dependence. For an increase of 1 year in the age at first drink, the odds of lifetime abuse or dependence are reduced by 12% for each year of increase in the age at first drink (OR 0.88; $p < 0.001$).

Based on data from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), Hingson et al (2006) examined whether starting to drink at an early age was associated with developing alcohol dependence at a younger age and chronic relapsing dependence. Compared to those who began drinking at age 21 years or older, participants who started drinking before the age of 14 years had elevated hazards of developing lifetime dependence (adjusted hazard ratio 1.78; 95% CI: 1.51, 2.11), dependence within 10 years of drinking onset (adjusted hazard ratio 1.69; 95% CI: 1.38, 2.07), dependence before the age of 25 (adjusted hazard ratio 8.12; 95% CI: 6.33, 10.43) and past year dependence (hazard ratio 1.93; 95% CI: 1.40, 2.64). Among participants with alcohol dependence, relative to those who began drinking after the age of 21, those drinking before the age of 14 had greater odds of experiencing episodes of dependence exceeding 1 year (OR 2.62; 95% CI: 1.79, 3.84) and of experiencing 6 to 7 vs. 3 to 5 dependence symptoms (OR 2.89; 95% CI: 1.97, 4.23).

5.5.2 Alcohol misuse

Children and adolescents who begin drinking at a young age, typically below the age of 13, drink more frequently and in greater quantities than those who delay drinking, and are more likely to drink to intoxication. As with alcohol dependence and abuse, vulnerability to alcohol misuse in later adolescence appears to be greatest among those who begin drinking prior to age 13 years.

Longitudinal studies

Warner and White (2003) examined the relationship between age of first use, context of alcohol initiation and problem drinking. The mean age of drinking onset in the sample was 10.7 years. First drinking experience at a family gathering was reported by 73% of the sample (mean age of initiation 8.6 years; 81% reported drinking before age 11). For those

who initiated drinking outside of the family, the mean age of onset was 14.2 years, with 18% reporting onset of drinking under the age of 11. Compared to participants who initiated drinking at older ages and at a family gathering, both early initiates who first drank at a family gathering and early initiates who first drank outside a family gathering had significantly higher odds of developing problems associated with alcohol use (OR 2.86; 95% CI: 1.36, 6.00/ OR 8.32; 95% CI: 2.28, 30.41, respectively). When there was a relatively faster transition from first drinking in a family context to drinking outside (<5 years), the odds of problem drinking were significantly greater than when five or more years had elapsed (OR 2.54; 95% CI: 1.45, 4.42).

The aim of the study by Pitkänen et al (2005) was to investigate the relationship between age of onset of drinking and several indicators of alcohol use. The mean age of onset of drinking among participants in the study was 15.5 years (range 10-30 years, standard deviation [SD] = 2.4). Two percent had begun drinking at age 10-11 years. Participants who began drinking at ≤ 13 years scored significantly higher on all indicators of adult use of alcohol (frequency of drinking, binge drinking and alcoholism screening tests) than the oldest group (≥ 18 years), and 16-17 year olds with the exception of women's binge drinking.

Fergusson et al (1994) examined the relationship between age at first exposure to alcohol and four measures of drinking behaviour (frequency of drinking, typical and most amount consumed, alcohol-related problems) at age 15 years. The study was based on data from the Christchurch Health and Development Study. The authors found that at age 15, children who had been introduced to alcohol before the age of 6 years had the highest frequency of drinking, the highest mean consumption levels and the highest rate of reported problems. Children introduced to alcohol after age of 13 years had the lowest mean scores on all these measures. After adjusting for covariate factors, the results presented showed that young people who were exposed to alcohol before the age of 6 years had between 1.9 to 2.4 times the risk of frequent, heavy or problem drinking when compared with young people not introduced to alcohol by the age of 13 years. The authors noted that children who were introduced to alcohol at an early age had parents who tended to report more frequent drinking when the child was aged 11 years, parents who were less disapproving of alcohol consumption and parents who displayed favourable attitudes to alcohol.

Cross-sectional studies

The objective of the study by Gruber et al. (1996) was to examine the relationship between age of drinking onset and patterns of use, abuse of other substances and the prevalence of other alcohol related problems. The study was based on data from the Minnesota Study Survey. The sample was restricted to White 12th grade students (aged 17-18 years) and the mean age of drinking onset was 14.4 years. The average duration of use was 3.3 years (range 0-9 years) and 15% of the sample were classified as 'early initiators' as they reported drinking at or before the age of 12. Based on multivariate logistic regression analysis, students who initiated drinking from ages 10 through 12 were significantly more likely than later initiators (age 13 or older) to score in the upper tertile on an alcohol abuse scale when accounting for age and current gender (OR 2.7; 95% CI: 0.21, 3.4).

Hawkins et al (1997) examined whether the age of initiation of alcohol use mediated the effects of other variables that predict alcohol misuse among adolescents using data from 808 5th grade students (aged 10-11 years) who participated in the Seattle Social Development Project. The authors found that age of initiation was a strong predictor of alcohol misuse at ages 17-18, and that students who began drinking prior to age 17-18 years were more likely to misuse alcohol. The authors found that a range of factors including parents' drinking, proactive parenting, peer influences and perceptions of the harm of drinking affected the age of alcohol initiation, which in turn affected alcohol misuse in late adolescence.

The aim of the study by Monshouwer et al (2003) was to understand the onset of alcohol use and first intoxication as a function of age, sex and a set of risk factors. Data were derived from the Dutch National School Survey on Substance Abuse. In the sample of 7,094 students (mean age 14.3 years), 74% had drunk at least one glass of alcohol and 44% had been drunk. A significant relationship was found for both boys and girls between the age of first alcohol use and first intoxication, indicating that a later age of first alcohol use was associated with a lower probability of first intoxication (boys: adjusted OR 0.85; 95% CI: 0.73, 0.98/ girls: adjusted OR 0.79; 95% CI: 0.69, 0.90). The authors also reported that compared to non-drinkers, students who had started drinking during the previous year were more likely to be older, have a life-time history of tobacco and cannabis use, go out at night, display delinquent behaviour, be a truant; to have peers who drink and smoke, have parents who approve of drinking, and have parents who use alcohol.

Takura and Wake (2003) examined the relationship between age of onset for smoking and subsequent patterns of smoking and drinking among 10 through to 12 grade students in Japan (aged 15-18 years). They found that, after adjustment for confounding factors, compared with students who started drinking at 15 years or older, students who started drinking at 12 years or younger, or 13 or 14 years, were more likely to be current drinkers (≤ 12 years: OR 1.9; 95% CI: 1.4, 2.5/ 13 or 14 years: OR 1.6; 95% CI: 1.2, 2.2) and were more likely to report drinking heavily (≤ 12 years: OR 4.6; 95% CI: 1.7, 12.9/ 13 or 14 years: OR 4.5; 95% CI: 1.6, 13.2).

Hingson et al (2003) explored whether college students who were first intoxicated by alcohol at ages < 19 years were more likely to meet criteria for alcohol dependence and frequent heavy drinkers. After controlling for personal and demographic characteristics, the odds of meeting alcohol dependence criteria were significantly greater for those first drunk ≤ 12 years compared with drinkers who first drunk at age 19 or older (OR 3.1; 95% CI not reported). In addition, respondents who were first drunk ≤ 12 years had greater odds of reporting recent heavy episodic drinking than those who were first drunk after age 19 (OR 2.1; 95% CI not reported).

5.5.3 Other risky behaviours

Initiation of drinking prior to age 14 has been shown to be associated with a number of risk factors including having experienced alcohol-related injuries, involvement in violent behaviours and suicide ideation and attempts. Early onset of drinking is also associated with having more sexual partners and pregnancy, other substance abuse, employment problems and risky driving behaviours.

Multiple risk behaviours

Ellickson et al (2003) grouped participants into three groups based on their drinking status in grade 7 (age 12-13 years): non-drinkers (never had a drink, not even a few sips); experimenters (drank <3 times in the past year and not in the past month); and drinkers (drank 3 or more times in the past year or in the past month). The authors examined the prevalence of problem behaviours at grades 7 (12-13 years) and 12 (17-18 years), and at age 23 among these groups. At age 12-13 years, compared with non-drinkers, drinkers were more likely to engage in weekly smoking (11.2% vs. 0.6%), any hard drug use (13.1% vs. 0.7%), and weekly cannabis use (4.1% vs. 0.3%). They were also more likely to steal (18.0% vs. 4.0%), be sent out of or skip class (41.4% vs. 12.4%), be frequently absent from school (38.1% vs. 19.9%) and have poor grades (39.3% vs. 23.9%). At 17-18 years, students who began drinking at age 12-13 years were more likely than non-drinkers to be daily smokers (27.0% vs. 7.0%), 'hard' drug users (57.0% vs. 17.9%), have multiple alcohol problems (53.6% vs. 22.2%), have school problems (dropped out 26.7% vs. 14.3%), steal (36.3% vs. 19.3%), commit a felony (27.3% vs. 12.9%), sell drugs (14.8% vs. 4.4%), engage in violence (30.8% vs. 17.4%) and experience early parenthood (8.4% vs. 5.2%) and pregnancy (28.1% vs. 13.1%). As young adults, compared with non-drinkers, students who were classified as drinkers at age 12-13 years were more likely to: be weekly marijuana users (17.9% vs. 3.8%) and show signs of drug abuse (31.3% vs. 8.3%); engage in hard and polydrug use (68.5% vs. 26.4%), have multiple drug problems (9.3% vs. 2.8%), and have received any drug or alcohol treatment since age 18 (12.6% vs. 4.8%); be daily smokers (30.6% vs. 11.4%); be weekly or binge drinkers (54.2% vs. 31.8%), show signs of alcohol dependence (40.5% vs. 17.4%), and have multiple alcohol problems (32.2% vs. 13.9%); report missing work for no good reason (30.8% vs. 22.8%); sell drugs (12.3% vs. 2.7%); be arrested (32.5% vs. 16.3%); and steal (13.8% vs. 7.7%), commit a felony (12.6% vs. 5.9%), or engage in predatory violence (16.1% vs. 8.2%).

Sexual risk behaviours

Stueve and O'Donnell (2005) examined the relationship between early alcohol use (defined as initiation at 12-13 years) and subsequent alcohol and sexual risk behaviours in a sample of 1,034 Black and Hispanic adolescents. Around a quarter of the sample (26%) reported lifetime use of alcohol use at age 12-13 years compared to 63% at age 15-16 years. Early initiation of alcohol use was significantly associated with recent alcohol use (OR 2.40; 95% CI 1.75, 3.29), binge drinking in the past month (OR 1.87; 95% CI 1.25, 2.80), getting drunk or high in the past year (OR 2.01; 95% CI 1.23, 3.27), having more than two lifetime sexual partners (OR 1.54; 95% CI 1.10, 2.26) and lifetime pregnancy (OR 1.73; 95% CI 1.10, 2.70). However, there was no association between

early initiation of alcohol use and sexual initiation or having sexual intercourse within the past 3 months.

Thomas et al (2000) examined the relationships between adolescent alcohol misuse and sexual risk-taking behaviours. Based on a longitudinal model, the study showed that early onset of drunkenness increased the risk of both alcohol misuse and sexual risk taking, but that early onset of sexual behaviour did not predict later sexual behaviour or alcohol misuse. Adolescents who became drunk at an early age were at a higher risk of engaging in later sexual activities, including having multiple partners.

Injuries and violence

Hingson et al (2000) examined data from NLAES to explore whether early age of drinking onset was related to heavy drinking and unintentional injuries. They found that relative to those who began drinking at age 21 or older, participants who began drinking before the age of 14 were more likely to report consuming 5 or more drinks on a single occasion at least once per week in the past year (OR 1.44; 95% CI: 1.10, 1.88), and drinking enough to become intoxicated once a week (OR 2.79; 95% CI: 1.75, 4.45). They were also more likely to report drinking five or more drinks at least once a week during their heaviest period of drinking (OR 2.76; 95% CI: 2.13, 3.58). In terms of injury involvement, relative to those who began drinking at age 21 or older, participants who began drinking before age 14 were more likely to have ever been in a situation after drinking that increased their risk of injury (OR 3.04 95% CI: 2.47, 3.74) and more likely to have done so in the past year (OR 1.52 95% CI: 0.95, 2.43). In addition, participants who began drinking before the age of 18 were significantly more likely than those starting at age 21 or older to have placed themselves in situations after drinking in the past year that increased their risk of injury.

Hingson et al (2001) further analysed data from NLAES to explore whether people who start drinking at an early age are more likely to have been in physical fights after drinking. After controlling for ever being alcohol dependent, years of drinking alcohol, age, gender, race/ethnicity, current and previous illicit drug use and smoking, and family history of alcoholism, participants who began drinking before the age of 14 were more likely than those who began after age 21 to report ever being in a fight after drinking (OR 4.7; 95% CI: 3.6, 6.1). In each individual age group examined (14-20 years), participants who started drinking before the age of 21, were significantly more likely than those who started drinking at age 21 or older to have been in a physical fight after drinking. Participants who started drinking before the age of 16 were at least 3 times as likely to report being in a fight in the past year while or right after drinking (95% CI not reported).

Swahn et al. (2007) examined the associations between alcohol use initiation before the age of 13 and subsequent suicide ideation and attempts. The study was based on data collected for the Youth Risk Behavior Surveillance System in 2005 and included 13,917 students in grades 9 to 12 (age 14-18 years). After controlling for demographic and other factors, compared to not drinking, alcohol use initiated at any age was significantly associated with suicide ideation (<13 years vs. non-drinkers: OR 1.89; 95% CI: 1.46, 2.44) and suicide attempts relative to non-drinkers. (<13 years vs. non-drinkers: OR 2.71; 95% CI: 1.82, 4.02). Alcohol use initiation before age 13 was associated with an

increased likelihood of suicide ideation (OR 1.24; 95% CI: 1.03, 1.48) and attempts (OR 1.32; 95% CI: 1.04, 1.66) relative to alcohol use initiation after the age of 13.

Swahn et al (2008) also examined the associations between early alcohol initiation and suicidal ideation, suicide attempts, and peer and dating violence victimization and perpetration among high-risk adolescents. The study was based on data from the 2004 Youth Violence Survey of 4,131 students in grades 7, 9 and 11/12 in a school district in a high-risk community. Alcohol initiation before the age of 13 was significantly associated with dating violence victimisation, suicidal ideation and suicide attempts after controlling for a range of confounding variables. In addition, compared with non-drinkers, students who initiated alcohol use before age 13 reported greater involvement in violent behaviours.

Drinking and driving

Using data from NLAES, Hingson et al (2002) assessed whether people who began drinking at younger ages were more likely to report drunk driving or alcohol-related crash involvement over their life course. Compared to participants who began drinking after 21 years of age, participants who began drinking when they were age 14 were more likely to report ever driving after drinking too much (OR 2.8; 95% CI: 2.2, 3.6) and were more likely to have done so within the past year (OR 2.5; 95% CI: 1.7, 3.6). In addition, they were more likely to report having been in a motor-vehicle crash after drinking too much, ever (OR 3.5; 95% CI 2.4, 5.1) and in the past year (OR 5.1; 95% CI: 1.7, 15.6).

Hingson et al (2003) also explored whether college students who were first intoxicated by alcohol at ages <19 years were more likely to drive after drinking, ride with intoxicated drivers and be injured after drinking. The study was based on data from the 1999 Harvard College Alcohol Survey. Compared with students who were first drunk at age 19 or older, those who began drinking to intoxication in each age group less than 19 were significantly more likely to be seriously injured within 6 hours of drinking (≤ 12 years: OR 2.6; 95% CI: 1.0, 6.8), drive after drinking (≤ 12 years: OR 1.6; 95% CI: 1.2, 2.2), drive after five or more drinks (≤ 12 years: OR 2.0; 95% CI: 1.4, 3.1) and ride with a driver who was high or drunk (≤ 12 years: OR 1.8; 95% CI: 1.3, 2.5). However after controlling for whether respondents drove after five or more drinks, and whether they rode with a driver who was high or drunk, only those who were first intoxicated at ages 13-15 were more likely to be seriously injured after drinking (OR 2.5; 95% CI: 1.2, 5.3), compared to those first intoxicated at 19 years or older.

Zakrajsek and Shope (2006) examined age of drinking onset to determine whether those with earlier drinking initiation reported more risky drinking over time. Participants were 1,738 young adults, from the high school graduation classes of 1991 and 1992, who had participated in the longitudinal Alcohol Misuse Prevention Study. Students were classified as early onset drinkers if they reported drinking onset between 5th and 8th grade (age 10-14 years). Early onset drinkers were significantly more likely than non-drinkers and students who initiated drinking later to have committed a risky offence (e.g. speeding, careless driving) and to have committed an alcohol-related offence before the age of 21. However there was no difference in the likelihood of having had a crash (alcohol-related or not) by drinking onset.

Other substance abuse

Lo (2000) evaluated the relationship between onset of age of drinking and the use of drugs based on data collected over 21 years for the Monitoring the Future study. The impact of onset drinking age was important in predicting the frequency of lifetime alcohol use and frequency of annual alcohol use. Onset drinking age also significantly predicted cannabis and cocaine use. The author stated that the study demonstrated that onset drinking age is a consistent and stable factor affecting different kinds of drug use during an individual's late teen years.

Based on data from the Missouri Adolescent Female Twin Study (n=3,729 young adult female), Agrawal et al (2006) investigated whether use and early-onset use of cigarettes, alcohol and cannabis contributed to an increase in risk for initiation of subsequent psychoactive substances in women. The authors found that early cannabis and other drug use were associated with alcohol use prior to age 14 years. In addition, early onset of multiple substances resulted in a sharp incline in the probability of experimentation with subsequent drug classes.

Other risky behaviours

Dawson et al (2007) studied the impact of age at first drink on the association between stress and drinking. The study was based on a subsample of past year drinkers who had participated in NESARC (mean age 42.7 years). Compared with individuals who started drinking at age 18 or above, the authors found that participants who began drinking at age 14 or younger experienced significantly more stressors and drank more than 3 times as great a volume of alcohol. In addition, increasing stress levels were associated with a greater increase in consumption among individuals who started drinking at age 14 and younger than among those who started drinking at older ages; however, the association between stress and volume of consumption was significant only for early initiators (p=0.018).

5.6 Adolescent drinking and acute outcomes

5.6.1 Range of risk factors

Binge drinking and heavy alcohol use in young people older than 14 years is associated with a range of health risk behaviours including injury, sexual activity, fighting, and other substance use.

Bonomo et al (2001) examined behaviours occurring under the influence of alcohol and determined the associated risk factors for different behaviours. The study was based on data from 658 students aged 16-17 years who participated in the Adolescent Health Survey. There was an elevated risk of alcohol-related injuries in those who reported high dose drinking³⁶ (OR 2.3; 95% CI: 1.3, 4.0) and those reporting antisocial behaviours (OR 2.4; 95% CI: 1.4, 4.1). Respondents who reported that most of their peers were drinkers also had increased odds of alcohol-related injuries (OR 3.3; 95% CI: 1.4, 8.1). Drinking alcohol on more than two days a week was not independently associated with alcohol-related injury (OR 2.7; 95% CI: 0.94, 7.5). Both psychiatric morbidity and antisocial

³⁶ Five or more units of alcohol per drinking day

behaviour were associated with alcohol-related sexual risk taking. In addition, young people who reported that their parents drank daily had an increased risk of any alcohol-related sexual risk taking. There was no independent association with the measures of alcohol use (alcohol >2 days/week and high dose drinking).

Best et al (2006) investigated excessive drinking and associations with other problem behaviours in seven London secondary schools. Excessive drinking was defined as drinking at a level of consumption that could be expected to produce intoxication with significant impairment of thinking, judgement and behaviour. This was operationally defined as 'consumption of more than 10 standard units of alcohol on any drinking occasion'. The authors conducted a logistic regression analysis to investigate factors which were associated with excessive drinking. Use of cannabis (OR 2.99; 95% CI: 2.29, 3.90), more positive attitudes towards illicit drug use (OR 1.25; 95% CI: 1.16, 1.34), frequency of cigarette smoking (OR 1.04; 95% CI: 1.02, 1.05), lower anxiety scores (OR 0.94; 95% CI: 0.91, 0.98), higher depression scores (OR 1.05; 95% CI: 1.02, 1.08), and greater involvement in delinquent acts (OR 1.26; 95% CI: 1.17, 1.36) were all found to be significantly associated with excessive drinking. There was no association between excessive drinking and ecstasy and cocaine use, or education aspirations.

Miller et al (2007) evaluated the association between binge drinking and other health risk behaviours, such as drinking and driving, risky sexual behaviour, tobacco use, interpersonal violence, suicide, and other drug use. The study was based on data from 14,114 adolescents aged 14-18 years, who participated in the 2003 National Youth Risk Behavior Survey. Compared with non-drinkers, current drinkers who did not binge drink were more likely to ride with a driver who had been drinking (OR 3.5; 95% CI: 2.8, 4.2), be currently sexually active (OR 2.2; 95% CI: 1.9, 2.6), drink or use drugs before last sexual intercourse (OR 2.3; 95% CI: 1.5, 3.4), to have ever been or gotten someone pregnant (OR 1.7; 95% CI: 1.2, 2.4), smoke cigarettes or cigars (OR 4.2; 95% CI: 3.3, 5.3), use smokeless tobacco (OR 1.9; 95% CI: 1.2, 3.1), be involved in a physical fight (OR 2.3; 95% CI: 2.0, 2.6), experience dating violence (OR 1.9; 95% CI: 1.5, 2.3), have forced intercourse (OR 1.6; 95% CI: 1.2, 2.1), consider or attempt suicide (OR 1.9; 95% CI: 1.5, 2.2 and OR 2.0; 95% CI 1.6, 2.7), and use cannabis (OR 5.6; 95% CI: 4.8, 6.5), cocaine (OR 5.9; 95% CI: 2.8, 12.3), and inhalants (OR 3.2; 95% CI: 2.2, 4.6). Current drinkers who did binge drink were more likely to engage in the following health risk behaviours than non-drinkers: rode with a driver who had been drinking alcohol (OR 10.8; 95% CI: 9.0, 13.1); be currently sexually active (OR 5.5; 95% CI: 4.5, 6.5); have used alcohol or drugs before last sexual intercourse (OR 10.3; 95% CI: 7.1, 14.8); to have ever been or gotten someone pregnant (OR 4.7; 95% CI: 3.4, 6.5); smoke cigarettes or cigars (OR 18.9; 95% CI: 15.3, 23.4); use smokeless tobacco (OR 7.9; 95% CI: 5.2, 12.1); be involved in a physical fight (OR 4.4; 95% CI: 3.9, 5.1); experience dating violence (OR 3.7; 95% CI: 3.0, 4.5); have forced intercourse (OR 3.7; 95% CI: 2.8, 4.9); consider or attempt suicide (OR 2.5; 95% CI: 2.1, 3.1/ OR 4.3; 95% CI 3.5, 5.4); and use cannabis (OR 21.4; 95% CI: 17.0, 26.9), cocaine (OR 63.2; 95% CI: 30.6, 130.6), and inhalants (OR 12.3; 95% CI: 8.1, 18.7). Condom use during last sexual intercourse was not associated with drinking status. Binge drinkers were more likely to engage in health risk behaviours than current drinkers who did not binge such that the odds ratios for the binge drinkers was 1.3 to 10.7 times the odds ratios for the current drinkers who did not binge (data not reported). Logistic regression analysis revealed a strong and statistically

significant ($p < 0.05$) dose-response relationship between the frequency of binge-drinking days among current drinkers and the prevalence of the risk behaviours examined.

Lavikainen et al (2008) assessed the relationship between negative experiences and frequency of alcohol drinking and drunkenness based on Finnish data from 3,321 Finnish adolescents (aged 15-16 years) who participated in the European School Project on Alcohol and Other Drugs (ESPAD). Drunkenness, but not frequency of alcohol use, was significantly related to engaging in sexual intercourse regretted the next day ($p < 0.001$), and getting into trouble with the police ($p < 0.001$). Both alcohol use and drunkenness were significantly related to engaging in sexual intercourse without a condom, and getting into a scuffle or fight (all $p < 0.001$). Adolescents that reported being drunk or using alcohol on more than 20 occasions was significantly more likely than those who reported these behaviours on fewer occasions to report sexual intercourse without a condom (use of alcohol ≥ 20 occasions: OR 2.47 95% CI: 1.61, 3.78; drunkenness ≥ 20 occasions: OR 5.26 95% CI: 3.49, 7.92). Odds ratio and their corresponding 95% confidence intervals are shown, with the exception of sexual intercourse without a condom, in Table 4.

Table 4 Odds ratios and 95% confidence intervals for negative experiences by alcohol consumption (Lavikainen et al 2008)

Measure	OR (95% CI)		
	Regretted sexual intercourse	Troubles with the police	Scuffle or fight
Use of alcohol			
Never	1.00	1.00	1.00
1-5 occasions	0.96 (0.31, 2.99)	1.18 (0.61, 2.30)	1.22 (0.92, 1.62)
6-19 occasions	1.25 (0.40, 3.89)	1.27 (0.57, 2.84)	1.57 (1.11, 2.22)
≥ 20 occasions	1.75 (0.51, 6.00)	1.52 (0.68, 3.38)	2.35 (1.62, 3.40)
Drunkenness			
Never	1.00	1.00	1.00
1-5 occasions	2.44 (1.14, 5.25)	1.99 (1.20, 3.28)	1.17 (0.90, 1.53)
6-19 occasions	7.92 (3.51, 17.87)	3.60 (2.03, 6.37)	1.03 (0.78, 1.37)
≥ 20 occasions	20.53 (8.28, 50.92)	10.45 (5.68, 19.23)	2.17 (1.55, 3.05)

An Australian study by Room & Livingstone (National Health and Medical Research Council 2007) examined how the relationship between a broad range of harms and alcohol consumption change with age. For individuals, harm scores were derived from a series of questions on self-reported harms from drinking, with one point assigned for each positive response relating to the past 12 months. A harm index was calculated as the harm score divided by the volume of drinking. This was then presented as a ratio for each age group to the index – those aged 40–44 years. Analysis identified a strong increase in the harm index amongst those drinking under the age of 15 years which suggested that

young drinkers were much more likely than older drinkers to experience risky or antisocial behaviour connected with their drinking.

5.6.2 Sexual behaviour

Binge drinking and heavy alcohol use during adolescence (> 14 years) are associated with adolescent sexual activity. Adolescents who use alcohol are more likely to have had sexual intercourse and multiple numbers of sexual partners. Whether alcohol use before sexual activity affects the use of condoms is less clear.

Cooper et al (1994) examined the links between drinking and a range of sexual risk behaviours on two specific occasions of intercourse: (i) first intercourse ever; and (ii) first intercourse with most recent partner. Analyses were based on 1,259 sexually experienced respondents aged 13-19 years. Drinking proximal to intercourse was associated with significant increases in risky behaviours for both occasions of intercourse, with the exception of condom use at first intercourse with most recent partner.

Lowry et al (1994) examined whether use of alcohol and other substances was related to the likelihood of sexual behaviours that increase the risk of HIV. The study was based on data from 11,631 students aged 14-18 years who participated in the Youth Risk Behavior Surveillance System. Compared with students who reported no substance use, students who used only alcohol or cigarettes were significantly more likely to have ever had sexual intercourse (OR 4.0; 95% CI: 3.0, 5.4), and to have had four or more sexual partners (OR 2.7; 95% CI: 1.7, 4.2). However, there was no difference in condom use at last sexual intercourse (OR 1.2; 95% CI: 0.8, 1.8).

Fergusson and Lynskey (1996) examined the associations between alcohol misuse³⁷ and measures of early onset sexual activity (sexual intercourse before age 16 years) and sexual risk taking behaviours. Data from 953 children aged 15-16 years were collected as part of the Christchurch Health and Development Study, a 16-year longitudinal study of a birth cohort of children born during mid-1977. Both boys and girls who reported misusing alcohol (n=79) had higher rates of sexual intercourse, were more likely to report multiple (three or more) partners, and reported higher rates of unprotected intercourse than those who did not misuse alcohol. After adjustment for common and correlated risk factors there were small to moderate associations between alcohol misuse and early onset sexual activity (boys: OR 2.9; 95% CI 1.4, 6.0; girls: OR 6.2; 95% CI 1.6, 23.4), and alcohol misuse and unprotected intercourse (boys: OR 6.9; 95% CI 2.5, 18.9; girls: OR 4.5; 95% CI 1.7, 11.9). However, there was no significant relationship between alcohol misuse and multiple partnerships after adjustment (boys: OR 1.3; 95% CI 0.4, 4.1; girls: OR 1.9; 95% CI 0.7, 5.5). Further analyses of the same cohort by Wells et al. (2004) found that drinking at 16 was significantly related to the number of sexual partners at ages 16-21 years and 21-25 years. The number of sexual partners, sexually transmitted infection and pregnancy increased linearly with increasing consumption of alcohol at 16.

Ramisetty-Mikler et al (2004) examined whether drinking and drug use constituted risk factors for unsafe sexual practices using data from 2,657 students in grades 9-12 who participated in the Hawaii Youth Risk Behaviour Surveillance. The authors found that

³⁷ Engaging in frequent, heavy or problem drinking

compared to abstainers, heavy episodic drinkers³⁸ were significantly more likely to have engaged in sexual activity (OR 2.8; 95% CI: 2.0, 3.9), used alcohol or drugs before sex (OR 5.6; 95% CI: 3.2, 9.8); had multiple partners in their lifetime (OR 3.5; 95% CI: 2.3, 5.3), and had multiple partners in the last 3 months (OR 5.7; 95% CI: 2.6, 12.4). Non-episodic drinkers were also significantly more likely to have had multiple partners in their lifetime (OR 1.6; 95% CI: 1.1, 2.3), to have ever had intercourse (OR 1.4; 95% CI: 1.0, 3.8), and had two or partners in the past 3 months (2.9; 95% CI: 1.1, 7.6). Use of alcohol/drugs before sex was not associated with non-episodic drinking.

In order to establish whether the relationship between adolescent alcohol use and sexual activity is causal, two studies (Rees et al 2001; Sen 2002) used statistical models to control for the potential effects of unknown confounding factors. Based on data from the National Longitudinal Study of Adolescent Health (n=16,677 adolescents aged 11-21 years), Rees et al. (2001) estimated the effects of cannabis and alcohol on the probability of being sexually active, and the probability of having sex without contraception. The authors concluded that their results suggested the link between alcohol use and sexual behaviour may not reflect causation, although they found evidence to suggest that drinking until “very high” increased the probability that males had sex without using contraception. Sen (2002) investigated the association between alcohol use and adolescent sexual activity using data from 8,984 respondents of the National Longitudinal Study of Youth 1997. In contrast to Rees et al (2001), Sen found that the results of the model indicated a strong association between alcohol use and sexual activity. Alcohol use was associated with 20–27% (20–37%) increase in the probability of sexual intercourse and an 11–16% (10–17%) increase in the probability of intercourse without contraception for adolescent girls (boys in brackets). The author found that heavy drinking (five or more drinks on one occasion) had weak effects on sexual intercourse, which in their view, suggested that it may be relatively ‘lighter’ levels of alcohol consumption that increases the likelihood of sexual intercourse. Rashad and Kaestner (2004) have called into question the methods used by these authors. Based on a subsequent reanalyse of the data used by Rees et al. (2001) and Sen (2002) they concluded that the causal relationship between substance use and sexual behaviour remains unknown.

Kim-Godwin et al (2007) assessed associations between sexual behaviours and alcohol based on data from the Youth Risk Behaviour Study. The sample for the study included 619 middle school students and 375 high school students. Drinking patterns were strongly associated with the overall sexual behaviours, except for AIDS or HIV education. Among middle school students, alcohol experience and initiation of alcohol use were significantly associated with sexual experience, initiation of sex, number of partners, and condom use. Among the high school students, all four alcohol behaviours (alcohol experience; initiation of alcohol; current drinking; and binge drinking) were associated with sexual experience, initiation of sex, number of partners, currently sexually active, condom use, alcohol and drug use before sex, forced sex, and dating violence.

Dye and Upchurch (2006) examined whether the effects of level of alcohol consumption on condom use at first sex depended on gender. The study was based on data from wave 1 of the National Longitudinal Study of Adolescent Health (6,867 students in grades 7-12). Compared to girls who did not consume any alcohol, inebriated girls were significantly less

38 Drank five or more drinks any time within a two-hour period

likely to use a condom at first intercourse (OR 0.43; $p < 0.001$); there was no difference for girls with some alcohol use. Boys regardless of their level of alcohol use, were not significantly different from girls who did not use alcohol in the likelihood of condom use.

Two studies examined the relationship between alcohol use and condom use using sexual activity diaries. Fortenberry et al (1997) studied 82 female clients aged 16-19 years recruited from an STD clinic and adolescent health clinics and Morrison et al. (2003) included 112 sexually experienced adolescents aged 14-19 years. Neither study found a relationship between alcohol use prior to sexual activity and condom use.

Champion et al (2004) examined the relationship between substance use, other health risk behaviours and sexual victimisation among female adolescents. Based on data collected in 1999 ($n = 647$ females aged 16-20 years), females who reported binge drinking were 3 times more likely to have experienced attempted or actual forced sex (OR 3.0; 95% CI: 1.43, 6.28).

5.6.3 Violent behaviour and offending

Drinking frequency and volume are associated with violent behaviour in adolescents aged 14 and older. Young people who drink frequently or binge drink are more likely to be involved in fights, to sustain injuries from fighting, and commit violent offences. Drinking in public places is associated with a higher risk of being involved in fighting.

Fergusson et al (1996) examined the associations between alcohol misuse³⁹ and juvenile offending at ages 15-16 years in a cohort of 953 respondents from the Christchurch Health and Development Study. After adjusting for covariate factors, the authors found that there was a small but significant association between alcohol misuse and violent offending (OR 3.2; 95% CI 1.4, 7.6) but not property offences (OR 1.4; 95% CI 0.6, 3.3).

Fergusson and Horwood (2000) further analysed the effects of alcohol use on crime in this cohort using a fixed effects regression model. Analysis of the association between the symptoms of alcohol abuse and crime rates showed that in all cases there was evidence of statistically significant increases ($p < 0.01$) in rates of violent and property crimes with increases in symptoms of alcohol abuse. After controlling for confounding factors and observed time dynamics, there were still significant ($p < 0.001$) associations between alcohol abuse and crime. The incidence rate ratios showed that a one-symptom increase in the level of alcohol abuse was associated with a 1.15 times increase in the rate of violent crime and a 1.10 times increase in the rate of property offending. Further analyses of the same cohort by Wells et al (2004) found that drinking behaviours at 16 were also significantly associated with the number of violent offences committed between ages 16-21 years (but not ages 21-25 years).

Dukarm et al (1996) investigated the relationship between substance use and violent behaviour based on data from 12,272 respondents (aged 15-18 years) who participated in the 1991 National Youth Risk Behavior Study. The authors found that alcohol use in males and females was significantly associated with weapon carrying (males: OR 2.6; 95% CI: 2.1, 3.2; females: OR 2.8; 95% CI: 2.1, 3.7) and physical fighting (males: OR 2.2; 95% CI: 1.8, 2.6; females: OR 2.0; 95% CI: 1.7, 2.3).

³⁹ Engaging in frequent, heavy or problem drinking

Swahn et al. (2004) examined the associations between specific alcohol use measures and physical fighting, injuries received and injuries inflicted on others whilst fighting. Data were examined for 8,885 adolescents aged 12-21 years who responded to the National Longitudinal Study of Adolescent Health and who reported consuming at least one alcoholic drink in the past year. Fully adjusted multivariate logistic regression models with all alcohol variables included showed that adolescent drinkers who reported frequent drinking (9-30 days/month), binge drinking, problem drinking or peer drinking were more likely to be involved in all three violence and injury outcomes (fighting in past 12 months, injured in fight in past 12 months, injured others in past 12 months) than drinkers who did not report these patterns, as shown in Table 5.

Table 5 Adjusted odds ratios and 95% confidence intervals for involvement in physical fights, having been injured in physical fights and injuring others in physical fights by drinking characteristics among youth drink alcohol (Swahn et al 2004)

Measures	Fighting, past year	Injured in a fight, past year	Injured others, past year
Drinking frequency = 2-8 days/month	1.02 (0.84, 1.22)	0.87 (0.64, 1.18)	1.07 (0.89, 1.29)
Drinking frequency = 9-30 days/month	1.41 (1.05, 1.87)	1.96 (1.31, 2.95)	1.55 (1.17, 2.04)
Binge drinking frequency = 2-30 days/month	1.35 (1.12, 1.62)	1.85 (1.35, 2.54)	1.32 (1.06, 1.65)
Problem drinking	1.51 (1.26, 1.81)	1.44 (1.08, 1.92)	1.47 (1.19, 1.83)
1-3 peers drink	1.34 (1.12, 1.61)	1.60 (1.22, 2.10)	1.47 (1.18, 1.84)

Based on the same sample of adolescents as Swahn et al. (2004), Swahn and Donovan (2005) examined demographic and psychosocial factors to determine the predictors of fighting attributed to alcohol use among adolescent drinkers. The authors identified that the following variables were significant predictors of the initiation of fighting attributed to alcohol use: drinking more than 9 days/months (OR 2.22; 95% CI: 1.20, 4.10); any high volume drinking (five or more drinks on one occasion; OR 2.61; 95% CI: 1.72, 3.96); trouble in school (OR 1.69; 95% CI: 1.10, 2.58); low college expectations (OR 1.61; 95% CI: 1.05, 2.47); and involvement in weekly sports activities (OR 2.07; 95% CI: 1.33, 3.22). Subgroups of adolescents who reported trouble in school and who had low expectations of going to college were also more likely to report the onset of fighting attributed to alcohol use. Having trouble in school significantly increased the likelihood of initiating fighting attributed to alcohol use for adolescents age 15 to 16 years but not for younger or older adolescents. Low college expectations were a significant predictor of the initiation of fighting attributed to alcohol use for males but not for females.

The aim of the study by Shepherd et al. (2006) was to determine whether there is a significant relationship between vulnerability to physical violence and alcohol consumption in young people aged 11-16 years, independent of a relationship between alcohol

consumption and violent behaviour. The results of logistic regression analyses showed a direct relationship between alcohol consumption and drunkenness and vulnerability to being hit. Those who reported alcohol consumption or drunkenness were more likely to have been hit three or more times in the past year (alcohol: OR 2.25, 95% CI: 1.34, 3.77; drunkenness: OR 2.99; 95% CI: 1.92, 4.65). In addition, there was a statistically significant association between alcohol consumption and drunkenness, and fighting, hitting others and being hit as shown in Table 6.

Table 6 Odds ratios and 95% confidence intervals for the association between alcohol consumption and drunkenness and fighting, hitting others and being hit (Shepherd et al 2006)

Measure	Odds ratio	95% CI
<i>Drinking frequency</i>		
Fighting	2.38	2.04, 2.76
Hitting others	6.89	5.00, 9.49
Being hit	2.94	2.19, 3.95
<i>Drunkenness frequency</i>		
Fighting	2.10	1.84, 2.41
Hitting others	6.62	5.35, 8.19
Being hit	4.01	3.17, 5.08

Based on young adult from the National Longitudinal Study of Youth (males and females aged 17-21 years), two studies by Wells et al. (2005; 2006) examined alcohol-related aggression. Wells et al. (2005) examined the roles of heavy drinking, drinking frequency and drinking volume in explaining alcohol-related aggression and whether drinking context modified these relationships or predicted alcohol-related aggression independently. In adjusted multiple logistic regression models, drinking frequency (males: OR 1.31; 95% CI: 1.07, 1.60; females: OR 1.34; 95% CI: 1.08, 1.65), but not heavy episodic drinking (males: OR 0.94; 95% CI: 0.44, 2.04; females: OR 1.89; 95% CI: 0.87, 4.13) or drinking volume (males: OR 1.00; 95% CI: 1.00, 1.01; females: OR 1.01; 95% CI: 1.00, 1.02), was significantly associated with fights after drinking. Drinking frequency and volume were found to confound the relationship between heavy episodic drinking and fights after drinking. In terms of drinking context, there was a strong positive association between drinking frequency and fights after drinking for those who reported drinking in public locations away from home ($p < 0.0001$) but a much weaker association was found between fights after drinking for those who reported drinking in private locations ($p = 0.0013$). Wells et al. (2006) examined whether predisposing and family background characteristics confounded or modified the association between drinking frequency and alcohol-related aggression. Drinking frequency was found to be a significant explanatory variable for fights after drinking after controlling for demographic, family background, and predisposing characteristics for both males and females (males: OR 1.30; 95% CI: 1.06, 1.60; females: OR 1.42; 95% CI: 1.15, 1.76). The authors did not find any evidence that

predisposing and family background characteristics confounded the relationship between drinking frequency and fights after drinking.

5.6.4 Injuries

Studies conducted in medical settings have shown an association between alcohol use in both childhood and adolescence, and the risk of injury. Research has also shown that adolescents may be more likely to sustain injuries from violence if they have consumed alcohol.

Sindelar et al. (2004) reviewed retrospective and prospective studies that have investigated the role of alcohol in adolescent hospital admissions. Across the studies included, adolescents who tested positive for alcohol were more likely to be injured than alcohol-negative adolescents, but there were typically no differences in the type and mechanism of injury sustained. Adolescents who used alcohol appeared to be at high risk for being involved in a motor vehicle crash, in the studies reviewed, 13-19% of adolescents in motor vehicle crashes tested positive for alcohol. The findings in relation to degree of injury severity and alcohol use were inconclusive.

Matilla et al. (2005) investigated the occurrence, nature, and severity of violence and violence-related injuries. The study was part of the Finnish Adolescent Health and Lifestyle Survey, a national monitoring system of adolescent health and health-related lifestyles. The sample included 8,135 Finnish adolescents aged 12-18 years. Among the sample, 27% of adolescents with alcohol-related violence reported an injury, while the corresponding figure in alcohol-free violent events was 17% ($p=0.006$). Boys reported alcohol-related injuries more frequently than girls (52% vs. 31%; $p=0.015$). Alcohol had no effect on the type or anatomical distribution of injury or staying away from school or hobbies. Alcohol-related violence most often occurred at leisure-time (86% in boys and 75% in girls) and the home (6% and 22%, respectively) and the other party was most often a stranger (55% in boys and 34% in girls).

Jiang et al. (2008) examined the association between alcohol and medically attended injuries by urban-rural geographic status. Data were obtained from the 2001-2002 Health Behavior in School-Aged Children survey ($n=7,031$ participants aged 11-15 years). After adjusting for age, sex, ethnicity and socioeconomic status, for all types of alcoholic drink, the relative risk of reporting a serious injury rose with increasing frequency of alcohol consumption.

5.6.5 Drinking and driving involvement

Drinking frequency and volume may be associated with drinking and driving involvement in adolescents older than 14 years.

Sabel et al (2004) examined the associations between self-reported drinking and driving or being a passenger of a drinking driver based on data from 2,955 students aged 14-18 years, who participated in the Youth Risk Behaviour Survey. Both high quantity drinking, defined as ≥ 5 drinks per occasion, and high frequency drinking, defined as ≥ 3 drinking

days per month, were significantly associated with driving after drinking and riding with a drinking driver as shown in Table 7.

Table 7 Adjusted odds ratios and 95% confidence intervals for the association between alcohol consumption and driving after drinking and riding with a drinking driver (Sabel et al 2004)

Measure	Adjusted OR (95% CI)	
	Passenger only	Drinking driver
High quantity drinking (≥ 5 drinks per occasion)	2.6 (1.9, 3.6)	6.6 (3.3, 13.2)
High frequency drinking (≥ 3 drinking days per month)	1.9 (1.4, 2.5)	5.1 (2.4, 10.7)

Zador et al (2000) examined alcohol-related relative risks for driver involvement in fatal crashes by age and gender as a function of blood alcohol concentration. The relative risk of a fatal injury in a single vehicle crash decreased with age, and at all blood alcohol levels, young people aged 16-20 years had a higher crash risk than those aged 21 and over. Even at a low positive BAC (10-19mg/100ml) the relative risk of a fatal injury from a single vehicle crash increased by 55% among males and 35% among females.

Table 8 Risk of driver fatalities in single vehicle and all fatal crashes as a function of driver BAC for males and females aged 16 to 20 years (Zador et al 2000)

		BAC (mg/100ml)				
Crash type		0	10-19	20-49	50-79	80-99
Male	SV	1.00	1.55 (1.36, 1.76)	4.64 (2.97, 7.26)	17.32 (7.56, 39.70)	51.87 (16.45, 163.57)
	All	1.00	1.42 (1.28, 1.58)	3.44 (2.37, 4.99)	9.94 (4.98, 19.82)	24.03 (9.23, 62.53)
Female	SV	1.00	1.35 (1.21, 1.50)	2.86 (1.96, 4.16)	7.04 (3.50, 14.14)	14.91 (5.68, 39.15)
	All	1.00	1.22 (1.10, 1.34)	1.98 (1.40, 2.80)	3.56 (1.88, 6.76)	5.80 (2.39, 14.10)

SV single vehicle crashes; All all fatal crashes

5.6.6 Cannabis and other substance use

Alcohol use in childhood and adolescence is associated with cannabis use.

Guxens et al. (2007) examined factors associated with the onset of cannabis use through a systematic review of cohort studies. Both alcohol and tobacco use were factors associated with cannabis use. In five cohort studies that examined the association between alcohol consumption and cannabis use, odds ratios for the association between alcohol consumption and cannabis use ranged from 1.3 to 2.6.

5.7 Adolescent drinking and long term consequences

5.7.1 Drinking patterns in adulthood

Young people who binge drink in adolescence (age 15 upwards) are more likely to be binge drinkers as adults. Frequent drinking and binge drinking have also been shown to increase the risk of developing alcohol dependence in young adulthood (around age 21 years).

Two studies (Hill et al 2000; Chassin et al 2002) examined binge drinking trajectories from adolescence to early adulthood. Using data on 808 children and their families from the Seattle Social Development Research Project, Hill et al (2000) grouped participants into four trajectory groups based on patterns of binge drinking in adolescents: non-bingers; early highs (early onset of binge drinking but limited to adolescence); increasers (increase in frequency of binge drinking from age 15); and late onsetters (increase in frequency of binge drinking at age 18). The authors found that participants who reported an early age of onset of binge drinking but who had matured out of binge drinking by late adolescence ('early highs') were no more likely than non-bingers to be alcohol-dependent at age 21. Participants whose binge drinking frequency increased between the age of 15 and 18 ('increasers') had the highest likelihood of alcohol abuse or dependence at age 21, but participants who reported a late onset of binge drinking ('late onsetters') were also more likely than nonbingers to be alcohol dependent at age 21. The study by Chassin et al (2002) was based on data from 238 children of alcoholics and 208 controls. The authors created four groups depending on binge drinking trajectories: nonbingers; 'early-heavy' (early onset of binge drinking at age 13-14 years and high level of binge drinking); 'late-moderate' (later onset of binge drinking and less than monthly binge frequency); and 'infrequent' (early age of onset but binge drinking did not escalate in frequency). Participants who reported an early onset of binge drinking (age 13-14 years) and a high level of binge drinking had the greatest risk of a diagnosis of alcohol abuse or dependence in early adulthood. However, participants who reported infrequent binge drinking or a later onset of binge drinking were also at higher risk of a diagnosis of alcohol abuse or dependence than those who did not binge drink (all $p < 0.05$).

Jefferis et al (2005) assessed continuities in binge drinking across adulthood and the association between adolescent drinking level and adult binge drinking (≥ 10 units/session for men and ≥ 7 units/session for women). The results suggested that women, who rarely or never drank at age 16, were less likely than light drinkers (0-2 units/week) to binge drink in adulthood. However, male light drinkers were no more likely than non-drinkers to binge drink as adults. Drinking 3 to 6 units in the past week at 16 years compared to 0 to

2 units increased the odds of adult binge drinking at each adult age in men and at 33 and 42 years in women. The heaviest drinkers at 16 years (≥ 7 units/week) were significantly more likely to binge drink at each age in adulthood for men and at 42 years for women. Further analysis showed that the effects of adolescent drinking on binge drinking were similar across ages 23, 33 and 42 for men, whereas for women there was a significant difference, there was a stronger effect of adolescent drinking on adult binge drinking at age 42 than at ages 23 or 33. odds ratios for drinking at different ages in adulthood according to drinking levels in adolescence are shown in Table 9.

Table 9 Odds ratios (95% CI) for binge drinking at different ages in adulthood according to drinking levels in adolescence (Jefferis et al 2005)

Adult binge drinking ^b	Age (yr)	Adolescent drinking ^a			
		Rarely/ never drink	0-2 units	3-6 units	≥ 7 units
Men					
n=4747	23	1.06 (0.89, 1.25)	1.00	1.38 (1.13, 1.70)	2.07 (1.71, 2.51)
n=4212	33	0.86 (0.71, 1.03)	1.00	1.26 (1.00, 1.58)	1.65 (1.33, 2.04)
n=4205	42	1.01 (0.85, 1.21)	1.00	1.27 (1.02, 1.59)	1.64 (1.33, 2.08)
Women					
n=4780	23	0.65 (0.55, 0.77)	1.00	1.18 (0.93, 1.45)	1.43 (0.94, 2.12)
n=4408	33	0.73 (0.60, 0.90)	1.00	1.33 (1.01, 1.74)	0.96 (0.55, 1.67)
n=4395	42	1.01 (0.83, 1.21)	1.00	1.27 (1.02, 1.78)	2.88 (1.85, 4.48)

^aunits of alcohol consumed in previous week; ^b ≥ 10 units/session (men) ≥ 7 units/session (women)

McCarty et al (2004) tested the hypothesis that late adolescent drinking behaviour was associated with harmful and binge drinking in adulthood. Harmful drinking at ages 17 to 20 was associated with an increased risk of harmful drinking at ages 30 to 31 for men (relative risk [RR] 2.71; 95% CI: 1.63, 4.48), but did not reach significance for women (RR 1.43; 95% CI: 0.83, 2.46). Binge drinking at ages 17 to 20 also increased the risk of binge drinking at ages 30 to 31 for both men (RR 2.34; 95% CI: 1.81, 3.04) and women (RR 3.38; 95% CI: 2.38, 4.78).

The aim of the study by Bonomo et al (2004) was to determine whether adolescent alcohol use predisposed participants to alcohol dependence in young adulthood. Based on data from a seven-wave cohort study (n=1,601 participants), the authors found that frequent drinking (drinking on 3 or more days in previous week) and binge drinking (consuming 5 or more standard drinks on one occasion) in adolescence both showed strong associations with alcohol dependence in young adulthood. Participants who reported recurrent frequent drinking between ages 14-18 had significantly increased odds for later dependence (OR 8.1; 95% CI: 4.2, 16), as did those who reported recurrent binge drinking (OR 6.7; 95% CI: 3.6, 12). In addition, the likelihood of alcohol dependence increased with persistence of frequent drinking through adolescence (OR for frequent drinking at one wave: 2.0; 95% CI: 1.0, 4.3; OR for frequent drinking at multiple

waves: 3.1; 95% CI: 1.2, 7.7). The estimated frequency of time varying adolescent measures and their association with alcohol dependence in frequent alcohol users at age 20 years are shown in Table 10.

Table 10 Estimated frequency of time varying adolescent measures and their association with alcohol dependence in frequent alcohol users at age 20 years (Bonomo et al 2004)

Adolescent measure: waves 1-6	Category	Estimated frequency		Alcohol dependence at age 20 years	
		n	95% CI	OR	95% CI
Frequent drinking	None	1344	1313, 1374	1	–
	One wave	169	142, 196	4.4	2.4, 8.4
	More than one wave	88	68, 108	8.1	4.2, 16
Binge drinking	None	900	858, 942	1	–
	One wave	298	263, 333	3.0	1.4, 6.7
	More than one wave	403	367, 439	6.7	3.6, 12

Wells et al (2004) investigated the pattern of drinking in mid-adolescence and subsequent outcomes across the major domains of life in late adolescence and early adulthood. Data were used for 953 respondents to the Christchurch Health and Development Study, assessed up to 25 years. The authors found that four latent classes were required to describe patterns of drinking at age 16. Examination of these patterns showed a progression across the four classes from those in class 1 who had not consumed any alcohol in the past 3 months (24% of the sample) through to alcohol abusers in latent class 4 who drank often, consumed large amounts and reported a number of alcohol-related problems (9% of the sample). Alcohol consumption and alcohol dependence in the periods 16-21 years and 21-25 years all showed a strong linear trend that increased with latent class ($p < 0.002$). That is, worse outcomes were more common for adolescents who drank more at age 16. After controlling for background and correlates, drinking behaviours consistently related to drinking at age 16 over both age periods (16-21 years and 21-25 years) were drinking at least weekly, amount per last occasion (past year), largest amount on a single occasion (past year), and alcohol dependence.

The aim of the study by Viner and Taylor (2007) was to determine outcomes in adulthood of binge drinking in adolescence based on data from the 1970 British Birth Cohort Study. The total sample analysed included 4,911 participants for whom data on alcohol consumption were available at age 16, and who were followed up at age 30. Frequent binge drinking⁴⁰ in adolescence predicted a higher risk of adult alcohol dependency (OR 1.4; 95% CI: 1.1, 1.9) and weekly alcohol consumption above recommended levels (OR 1.3; 95% CI: 1.1, 1.7), independently of adolescent habitual frequency of alcohol consumption.

40 Defined as two or more episodes of consuming four or more drinks in a row in the previous 2 weeks

5.7.2 Health risk behaviours

Young people who binge drink in adolescence (15-16 years) are more likely to experience negative outcomes in the transition to adulthood. In particular, binge drinking at this age has been linked to a higher likelihood of involvement in other substance use, crime, lower educational attainment and drug dependence.

Range of behaviours

Hill et al (2000) examined the consequences of binge drinking patterns in adolescence on social functioning, criminal behaviour, and mental health in the transition to adulthood. The authors found that binge drinking patterns in adolescence significantly predicted crime, drug abuse/dependence, high school completion, involvement in clubs/activities and parental bonding at age 21. Participants were grouped into four trajectory groups based on patterns of binge drinking in adolescent (reported previously). After controlling for confounders, participants classified as 'early highs' were not more likely than non-bingers to be depressed, involved in crime, or drug-dependent at age 21, but were less likely to complete high school, be involved in clubs and activities and be bonded to their parents at age 21. Adolescent drug abuse in the 'increasers' group predicted negative outcomes at age 21. 'Late onsets' were more likely than non-bingers to be drug dependent, and were less likely to complete high school.

Based on four groups of binge drinking trajectories, Chassin et al (2002) found that the effects of drinking trajectory group were larger for males than for females. Those who were in any of the binge-drinking trajectory groups were more likely than non-bingers to be diagnosed with drug abuse and dependence. There was no significant effect of drinking group on predicting depression diagnoses or anxiety disorders. Participants in the non-binger group were more likely to be in college full time than those in any of the other groups (all $p < 0.01$).

In their analysis of the 1970 British Birth Cohort Study, Viner and Taylor (2007) also identified that frequent binge drinking at age 16 predicted convictions (OR 1.6; 95% CI: 1.2, 2.3), a history of exclusion from school (OR 3.4; 95% CI: 1.4, 8.1) and leaving school without any qualifications (OR 1.3; 95% CI: 1.0, 1.6), as well as a history of significant accidents (OR 1.3; 95% CI: 1.1, 1.6), independently of adolescent habitual frequency of alcohol consumption.

Cannabis and other substance abuse

Patton et al (2007) used data from an eight-wave cohort of 1,943 adolescents followed from adolescence (aged 14-15 years) to young adulthood (aged 24-25 years) to examine the following questions: 1) To what extent do individuals report potentially harmful use of alcohol and/or cannabis during adolescence and young adulthood? 2) To what extent does heavier adolescent use of alcohol and/or cannabis predict substance use in young adulthood? 3) To what extent does heavier adolescent use of alcohol and/or cannabis predict different social circumstances in young adulthood? Cannabis and alcohol use were associated at all levels of risk, but the strength of association declined as the cohort aged and concurrent high-risk level alcohol and cannabis use was consistently low throughout

the study. Adolescent moderate-risk alcohol use⁴¹ independently predicted a higher rate of later high-risk cannabis use (OR 2.6; 95% CI: 1.2, 5.7). High-risk alcohol users⁴² were more likely to use other substances (amphetamines: OR 3.5; 95% CI: 2.2, 5.4; ecstasy: OR 2.9; 95% CI: 2.0, 4.2; cocaine: OR 2.9; 95% CI: 1.7, 5.0), but with the exception of relationship status (not in a relationship: OR 1.6; 95% CI: 1.2, 2.3), their social circumstances and help-seeking did not differ from those without a history of high-risk substance use. Adolescent moderate-risk alcohol users were also at elevated risk for later daily cigarette smoking (OR 2.0; 95% CI: 1.3, 3.1), ecstasy (OR 2.0; 95% CI: 1.1, 3.6) and cocaine use (OR 2.4; 95% CI: 1.2, 4.7), but with the exception of higher rates of parenthood in females (OR 2.5; 95% CI: 1.2, 5.2), this group appeared similar in their later social context to non-risk substance-using adolescents.

Educational attainment

Chatterji (2006) used data from the 2000 National Education Longitudinal Study to estimate the association between high school alcohol use and educational attainment measured around age 26. The models developed showed evidence of a robust, negative association between 10th grade (aged 15-16 years) drinking and educational attainment around age 26. Among boys, any past month alcohol use was associated with a 2% point reduction in the probability of graduating on schedule, a 7% point reduction in the probability of entering college, and a 5% point reduction in graduating from college. The results were similar for binge drinking in boys aged 15-16 years. Girls who used alcohol between ages 15-16 years had a 4% point reduction in entering college compared to girls who did not use alcohol in 10th grade. Binge drinking among girls detracts from college graduation, but there was no statistically significant association between any alcohol use in the past month and college graduation among girls. Among girls, most associations between 12th grade (aged 17-18 years) drinking and educational attainment were not statistically significant. However, among boys, any alcohol use between the ages of 17-18 was associated with a 7% point reduction in college entrance and binge drinking was associated with a 9% point reduction in college entrance. The authors conducted further analyses to account for unknown confounding within the analyses. Based on these findings the authors concluded that although the results suggest that alcohol use is associated with reductions in educational attainment, there was little evidence that this association represented a causal relationship.

Renna (2007) analysed the effect that binge drinking has on the probability of graduating on time from high school and on future earnings based on data from 12,686 participants between the ages of 14 and 21 years who participated in the 1979 National Longitudinal Survey of Youth. Heavy drinking decreased the probability of graduating on time. Binge drinking did not have a direct independent impact on adults' earnings, but graduating late resulted in lower income. The authors estimated that because of late graduation, young men who binge in high school face an earnings penalty of 1.5–1.84 percentage points. They also found that women faced a penalty, but that this seemed mostly due to the fact that women who graduate late work in industries and occupations that pay less

41 Defined as exceeding 28 standard drinks for the previous week in males and 14 standard drinks in females.

42 Defined as exceeding 43 standard drinks in males and 28 standard drinks in females.

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