



GUIDANCE ON THE CONSUMPTION OF ALCOHOL BY CHILDREN AND YOUNG PEOPLE

From Sir Liam Donaldson
Chief Medical Officer for England

December 2009

DH INFORMATION READER BOX

Policy HR/Workforce Management Planning/Performance Clinical	Estates Commissioning IM & T Finance Social Care/Partnership Working
Document purpose	For information
Gateway reference	13224
Title	Guidance on the Consumption of Alcohol by Children and Young People
Author	Sir Liam Donaldson, Chief Medical Officer
Publication date	17 Dec 2009
Target audience	Health and social care professionals and providers of alcohol support services.
Circulation list	
Description	Guidance for health and social care professionals on the consumption of alcohol by children and young people.
Cross reference	
Superseded documents	
Action required	N/A
Timing	N/A
Contact details	Robert Duff Chief Medical Officer Department of Health www.dh.gov.uk/cmo
For recipient's use	

Contents

Abbreviations	iv
Foreword	v
Executive summary	vii
1 Introduction	1
1.1 Why this document has been produced	1
1.2 How to use this document	2
2 Nature and extent of the problem	4
2.1 Headline figures	4
2.2 When children start to drink	4
2.3 How often children and young people drink	5
2.4 How many children get drunk or have been drunk	5
2.5 How much children drink	6
2.6 How often children end up in hospital as a result of drinking	7
2.7 Consequences of drinking alcohol	7
2.8 Attitudes towards drinking alcohol	10
2.9 How young people access alcohol	11
3 Guidance on the consumption of alcohol by children and young people	13
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.	14
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.	17
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.	19
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.	22
5 Support services must be available for children and young people who have alcohol-related problems and their parents.	25

4	Review of current policy, guidance and practice	29
4.1	Alcohol strategy	29
4.2	Policies targeting children and young people	30
4.3	Support for parents and carers	31
4.4	School-based approaches	32
4.5	Information and advice for young people and parents	34
4.6	Encouraging young people to participate in leisure, education, training and employment	36
4.7	Treatment for young people	36
4.8	The international picture	37
5	Epidemiological review of harms to children	40
5.1	Introduction	40
5.2	Methods	41
5.3	Effects on development	41
5.4	Risk and protective factors	44
5.5	Age of drinking onset	52
5.6	Adolescent drinking and acute outcomes	60
5.7	Adolescent drinking and long-term consequences	70
6	References	76

List of figures

Figure 1	Mean alcohol consumption (units) in England in the last week, by sex (age 11–15), 1990–2008	6
Figure 2	Proportion of 15–16-year-old drinkers who have been involved in a fight or had regretted sex after drinking, by frequency of binge drinking	9

List of tables

Table 1	Alcohol-specific hospital admission rates in 2007/08. Persons admitted per 100,000 population by age	7
Table 2	A summary of findings on alcohol's physiological effects in adolescents	43
Table 3	Risk and protective factors for childhood and adolescent alcohol consumption	49
Table 4	Odds ratios and 95% confidence intervals for negative experiences by alcohol consumption (Lavikainen et al, 2008)	62
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 who drink alcohol (Swahn et al, 2004)	66
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)	67
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)	69
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)	69
Table 9	Odds ratios (95% CI) for binge drinking at different ages in adulthood according to drinking levels in adolescence (Jefferis et al, 2005)	71
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)	72

Abbreviations

BAC	Blood alcohol concentration
CAF	Common Assessment Framework
CBT	Cognitive behavioural therapy
CI	Confidence interval
DAAT	Drug and Alcohol Action Team
DCSF	Department for Children, Schools and Families
DSM-IV	<i>Diagnostic and Statistical Manual of Mental Disorders</i> (fourth edition)
ESPAD	European School Survey 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 Youth
NTA	National Treatment Agency for Substance Misuse
OCJS	Offending, Crime and Justice Survey
OR	Odds ratio
PSHE	Personal, social and health education
RR	Relative risk
SHEU	School Health Education Unit

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.

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 among children and young people and its consequences on health, crime, violence and antisocial behaviour.

Some key statistics highlight the problem:

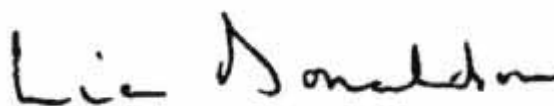
- 20 million units of alcohol are consumed in a week by 11 to 17 year olds.
- By 15 years, most children have drunk alcohol.
- Children in England are more likely to drink alcohol than children in many other countries.
- 500,000 young people aged 11 to 15 years were drunk in the previous four weeks.
- The majority of 15 and 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.

This guidance was published initially in draft form as part of a consultation on advice and information for children, young people and alcohol, being facilitated in England by the Department for Children, Schools and Families. The findings from this consultation have been collated and utilised in the development of this final version of the Chief Medical Officer's guidance. I am grateful to all the individuals and organisations who took the time to share their views on the draft guidance and their expertise on alcohol use in young people.

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 England, half a million children between the ages of 11 and 15 will have been drunk in the past four weeks, and young people under 18 will have consumed the equivalent of 2 million bottles of wine in the past week alone. The majority of young people under the age of 15 do not drink, and many young people aged 16 to 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 risk 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 that 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 antisocial 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.



EXECUTIVE SUMMARY

The Chief Medical Officer's guidance on the consumption of alcohol by children and young people takes the form of five evidence-based statements. Each statement is supported by a short rationale and a summary of the best evidence currently available.

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 harmful effect on a child's development. Alcohol use during the teenage years is related to a wide range of health and social problems, and young people who begin drinking before the age of 15 are more likely to experience problems related to their alcohol use.

Evidence summary

Age of drinking onset

Children who start drinking alcohol at an early age are more likely to develop alcohol problems in adolescence and adulthood. Family standards and rules, parental monitoring, and close family relationships are important in delaying alcohol initiation in early adolescence.

Alcohol misuse

Children who begin drinking at a young age drink more frequently and in greater quantities than those who delay drinking, and are more likely to drink and to get drunk. Vulnerability to alcohol misuse in later adolescence appears to be greatest among those who begin drinking before age 13.

Risky behaviour

Beginning to drink before age 14 is associated with increased health risks, including alcohol-related injuries, involvement in violence, and suicidal thoughts and attempts. Drinking at an early age is also associated with having more sexual partners, pregnancy, using drugs, employment problems, and risky driving behaviours.

Development

Significant changes in brain structure accompanying heavy drinking in young people with alcohol use disorders can affect brain functions related to motivation, reasoning and other processes. Heavy drinking during adolescence may also affect normal brain functioning during adulthood. Young people who drink heavily may experience adverse effects on liver, bone, growth and endocrine development.

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, in England by the age of 15 many children have already consumed alcohol and some drink on a weekly basis. How much alcohol young people drink is related to their ability to access alcohol, and the location in which they drink.

Evidence summary

Parenting approaches

Young people who are poorly monitored by their parents and carers begin drinking alcohol at an earlier age, tend to drink more, and are more likely to develop problematic patterns of drinking. Parental monitoring,¹ family standards and rules and close family relationships are important in delaying alcohol initiation in early adolescence.

Harsh parenting, family conflict and a permissive approach to alcohol by parents are associated with risky drinking in adolescence.

Spending money

Alcohol consumption by young people, including heavy and regular drinking, increases as the amount of spending money young people have available to them increases.

Supervised drinking

Young people may suffer high levels of harm if they begin drinking in parks, streets and other unsupervised settings. In the home and other supervised settings, parents and carers can monitor the amounts of alcohol consumed.

¹ 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).

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. Individuals vary in the way that they react to alcohol, and young people may have a greater vulnerability to certain harmful effects of alcohol than adults.

Evidence summary

Immediate risks

Binge drinking and heavy alcohol use in young people is associated with health risk behaviours including injury, sexual activity, fighting and drug use.

Adolescents who use alcohol are more likely to have had sexual intercourse and multiple numbers of sexual partners. Young women who binge drink are more likely to have experienced regretted sex as well as forced, or attempted forced, sex. Alcohol use before sexual activity can result in condoms being used incorrectly or not used at all.

Drinking is associated with violent behaviour in young people. Those who drink frequently or binge drink are more likely to be involved in fights, to be injured fighting, to commit violent offences and to carry weapons.

Young people are more likely than adults to have road traffic crashes at any blood alcohol level – even at levels below the legal limit.

Longer-term consequences

Young people who binge drink in adolescence are more likely to be binge drinkers as adults and have an increased risk of developing alcohol dependence in young adulthood.

Young people who binge drink at an early age are more likely to experience drug use and dependence, be involved in crime, and achieve lower educational attainment as adults.

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. Parents can positively influence their children's alcohol use by maintaining a close relationship with their children, establishing rules concerning alcohol and supervising their children's drinking.

Evidence summary

Parental drinking behaviour

Parental use of alcohol increases the likelihood that children will also consume alcohol. In addition, a family history of alcoholism is associated with an increased risk of alcoholism in children.

Relationship quality

Warm and supportive parent–adolescent relationships are associated with lower levels of adolescent alcohol use, as well as lower rates of problematic alcohol use and misuse.

Parental behaviour management

The use of incentives, setting limits and consequences for behaviour, and negotiating boundaries and rules for appropriate behaviour are associated with less alcohol use in early adolescence, and lower rates of problematic drinking in early adulthood.

Higher rates of child alcohol use are linked to overly strict discipline and higher levels of family conflict. When parents are openly permissive towards adolescent alcohol use, young people tend to drink more. In general, when parents show disapproval, children are less likely to drink.

Peer factors

Peers play an important role in the onset of drinking behaviours. The effect of peers has been shown to be particularly powerful when parent–adolescent relationships are poorer in quality.

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

5

Rationale

Policy makers and professionals need to ensure that all services are meeting the needs of young people and their parents that relate to alcohol.

Evidence summary

Identification and referral

Professionals from health, education, social care and criminal justice agencies need to be able to identify, assess and, where necessary, appropriately refer young people experiencing alcohol-related problems.

Brief advice

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, how to reduce the risks and how to find sources of support is an effective approach for tackling harmful drinking among children and young people.

CBT interventions and motivational-type approaches

NICE has recommended cognitive behavioural therapy (CBT) as an effective intervention for treating young people's substance misuse.² NICE also recommends that motivational-type brief interventions can be used as one-off interventions, or to facilitate engagement with more structured substance misuse treatment.

Treatment

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.

² Substance misuse means alcohol and drugs.

Implications

There are a number of policy and practice implications of the Chief Medical Officer's guidance on the consumption of alcohol by children and young people. These are summarised below.

What parents and carers can do

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.

- Parents and carers should ensure that their children maintain an alcohol-free childhood for as long as possible and at the very least up to and including the age of 14 years.
- Parents and carers who choose to allow their children to consume alcohol at age 15 or older should promote lower-risk drinking in accordance with this guidance. Young people should never exceed recommended adult daily limits and should not drink on more than one day a week. Drunkenness should never be a condition experienced in childhood.
- Parents and carers can prepare young people for an adult environment dominated by alcohol by discussing the dangers associated with drinking and by setting boundaries for drinking.
- Parents and carers have a critical role to play in showing children and young people how to drink responsibly. Parents and carers should avoid drunkenness and binge drinking behaviour, especially in front of children. Parents are advised to consider how their drinking behaviour affects their children.

- Parents and carers should talk to other parents about the rules regarding alcohol they have established for their own children.
- Parents and carers should make reasonable efforts to ensure that 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. Parents should also be aware of whether alcohol is being taken without their permission from the home.

Informing young people

The *Safe. Sensible. Social. Alcohol strategy local implementation toolkit* recommends that all young people should receive information and education about the effects of alcohol on young people through schools.

- Educational curricula should be revised in accordance with this guidance to ensure that the advantages of an alcohol-free childhood are emphasised.
- Educational curricula should also be revised so that young people who choose to drink are advised not to do so until at least age 15 and are encouraged to make such decisions through discussion and agreement with their parents or carers. Young people should also be advised that they should never exceed recommended adult daily limits and should not drink on 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.

Supporting parents and carers

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

- Parents and carers should be provided with advice and support on how to ensure that their children 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.
- Advice should be made available to parents and carers on young people's alcohol use as well as guidance that enables them to promote lower-risk drinking (in those who wish their children to consume alcohol). Advice should also be available to parents and carers on how to ensure young people do not exceed recommended adult daily limits and do not drink on more than one day a week, and on how to help children who are known to be exceeding such limits.
- Social marketing approaches should be used to ensure that information, advice and signposting to other services are available to all parents and carers and young people in an accessible and credible manner.
- Guidance should provide parents and carers with practical advice about talking to children about alcohol and the consequences of alcohol misuse, and the importance of setting realistic boundaries and incentives. The guidance should recognise faith and cultural differences and how they relate to alcohol consumption among children and adults.

- More targeted support should be extended to meet the needs of families and communities facing additional difficulties.

Support for young people with alcohol-related problems

Depending on a young person's needs, they will be offered services at a universal, targeted or specialist level.

- Policy makers, commissioners and professionals should be familiar with National Treatment Agency for Substance Misuse (NTA) guidance, which provides a framework to conceptualise the service components of an integrated and comprehensive child-based service for young people with substance use problems (NTA, 2008).
- Professionals working in universal and targeted services for young people and their families need to be able to identify children and young people with alcohol-related problems; to make appropriate referrals to support services; and to provide necessary support in conjunction with treatment provision.
- Specialist substance misuse treatment for young people includes both social care and health interventions that aim to facilitate changes in substance misuse behaviour. Health and social care interventions support and enhance each other and are provided as part of a single specialist substance misuse treatment care plan, which in turn is part of a young people's broader care plan.
- Professionals from 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 resources such as screening tools and intervention toolkits.

- Targeted interventions need to continue to be directed at vulnerable groups, including young people who began drinking regularly below the age of 15; 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.
- Professionals should be familiar with NICE guidance on psychosocial interventions. For example, CBT focuses on understanding behaviour so that coping mechanisms can be increased and problem behaviours reduced.

Alternatives to underage drinking

- Alternatives to underage drinking must be available, accessible and affordable in all localities. Involvement in supervised social activities such as being a member of a youth club, group or team can be protective against frequent and problem alcohol use.

Drinking and driving

- Young people aged 17 to 20 should be encouraged never to drink and drive instead of staying 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.

- 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.

Legislation

- The Government may wish to examine current drinking legislation to allow moderate drinking with meals by those aged 15 and older in licensed premises when accompanied by a parent or carer. This would enable parents and carers who have chosen to allow their children to consume alcohol 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 an adult accompanies them.
- Government may wish to examine the benefits of establishing a minimum price per unit of alcohol on alcohol consumption by children and young people.

Moving forward

The guidance is intended to empower and thus help parents and carers to supervise their children's alcohol consumption – ensuring that it does not result in any avoidable harm. However, whilst 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. Consequently, this guidance should be seen as a tool to help inform a wide range of stakeholders in their efforts to reduce the harms that alcohol causes young people, their families and the communities in which they live.



1. INTRODUCTION

1 Introduction



In England, children aged 11 to 17 years drink around 20 million units of alcohol every week. That is the equivalent of 9 million pints of beer or 2 million bottles of wine.

1.1 Why this document has been produced

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 to 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 Officer for England 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.

Whilst the guidance has not been developed to be used directly by children and their parents and carers, it will inform future campaigns and materials developed by the Department of Health and the Department for Children, Schools and Families (DCSF). The guidance and related materials are 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. Parents and carers have a significant influence on how their children approach alcohol; however, other factors such as peer influences, cultural norms and the law also have a role to play. Whilst 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 that 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 Report* document.



2. NATURE AND EXTENT OF THE PROBLEM

2 Nature and extent of the problem



This section examines how much and how often alcohol is consumed by adolescents and children, 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 England, there are an estimated:³

- 2.85 million children aged 11–17 who have ever consumed alcohol (1.58 million aged 11–15 and 1.27 million aged 16–17)
- over 1 million children aged 11–17 who drink alcohol weekly (391,000 aged 11–15 and 623,000 aged 16–17)
- 486,000 children aged 11–17 who drink more than once a week (177,000 aged 11–15 and 309,000 aged 16–17)
- 500,000 children aged 11–15 who have been drunk in the last four weeks
- 20 million units (equivalent to around 9 million pints of beer or 2 million bottles of wine) consumed in the last week by 11–17 year olds
- over 7,600 children aged 11–17 each year who are admitted to hospital as a result of a condition specifically due to their alcohol consumption.

2.2 When children start to drink

Data from national surveys of drinking behaviour in young people indicate that, by age 15, the vast majority of young people have had their first alcoholic drink. In 2008, 19% of boys and 13% of girls aged 11 in England reported that they had ever had an alcoholic drink (Fuller, 2009). The proportion that had ever drunk alcohol increased with age, to 52% and 81% of 13 and 15 year olds respectively.

There has been a decrease in recent years in reported experience of alcohol consumption. In 2008, 52% of pupils aged 11 to 15 reported that they had ever had an alcoholic drink, compared with 61% of those surveyed between 2001 and 2003 (Fuller, 2009).

³ Alcohol consumption figures for 11–15 year olds are taken from Fuller (2009). For 16 and 17 year olds they are taken from the General Household Survey (GHS) 2007. Sample sizes for 16 and 17 year olds in the GHS are small, but results are consistent with larger, local datasets examined. Proportions were applied to age-specific population figures for England. Number of children drinking more than once a week used usual frequency of drinking in 11–15 year olds, but as this was not available for 16–17 year olds, the proportion drinking on two or more days in the previous week was used. Calculations of units consumed in the last week use the proportion in each age year who drank in the last week multiplied by: for 11–15 year olds, the average number of units consumed in the last week; and for 16–17 year olds, average weekly units consumed. Conversion to pints of beer is calculated at 2.3 units per pint; conversion to bottles of wine is calculated at 10 units per bottle.

2.3 How often children and young people drink

Compared with 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 in England are over three times those reported in some Scandinavian countries (e.g. Finland and Norway; see Currie et al, 2008).

2.3.1 Frequency of weekly alcohol consumption

Over 1 million children aged 11–17 in England are estimated to drink alcohol weekly (391,000 aged 11–15 and 623,000 aged 16–17).

An estimated 486,000 children aged 11–17 in England drink more than once a week (177,000 aged 11–15 and 309,000 aged 16–17).

At age 11, only 3% of boys and 1% of girls in England report drinking alcohol at least once a week. By age 13 this has increased to 8% of boys and 9% of girls, and by age 15 a third of boys (31%) and a quarter of girls (27%) are drinking alcohol at least once a week (Fuller, 2009).

Overall in 2008, 6% of pupils aged 11 to 15 years old reported that they drank alcohol twice or more a week (Fuller, 2009). This increased with age, from 2% of 11-year-old boys and 0% of 11-year-old girls to 15% of 15-year-old boys and 11% of 15-year-old girls.

2.4 How many children get drunk or have been drunk

An estimated 500,000 children aged 11–15 in England have been drunk in the last four weeks.

In 2008, 2% of 11 to 12 year olds reported having been drunk in the last four weeks. This increased with age to 38% of 15 year olds. From age 13, drunkenness was more commonly reported by girls than boys. For example, 42% of 15-year-old girls reported having been drunk in the last four weeks compared with 36% of 15-year-old boys (Fuller, 2009).

Looking only at children who had drunk alcohol in the last four weeks, over a quarter (28%) of 11 to 12-year-old drinkers reported having been drunk in the last four weeks, increasing with age to two-thirds (63%) of 15 year olds. Around one in eight (12%) 11 to 12-year-old drinkers had deliberately tried to get drunk in the last four weeks. Again, the proportion of drinkers specifically seeking drunkenness increased with age, to 42% of 15 year olds.

The Health Behaviour in School-aged Children (HBSC) survey found that over a fifth (24% of girls and 23% of boys) of 15 year olds said they first got drunk at age 13 or younger (Currie et al, 2008).

2.4.1 Frequency of drunkenness

In 2008, <1% of 11 to 12 year olds reported having been drunk three or more times in the last four weeks. This increased with age to 14% of 15 year olds (Fuller, 2009). The 2007 School Health Education Unit (SHEU) survey found that 2% of males and 1% of females aged 14 to 15 years reported that they had been drunk on three or more days in the past week, compared with 0% of males and females aged 12 to 13 years (SHEU, 2007).

Based on UK data from the 2007 European School Survey Project on Alcohol and Other Drugs (ESPAD) survey (Hibell et al, 2009), 6% of 15 to 16 year olds reported having been drunk at least 40 times in their lifetime, and 13% reported having been drunk at least 10 times in the last 12 months.

In the last 30 days, 11% and 10% of 15 to 16-year-old boys and girls respectively reported that they had been drunk at least three times.

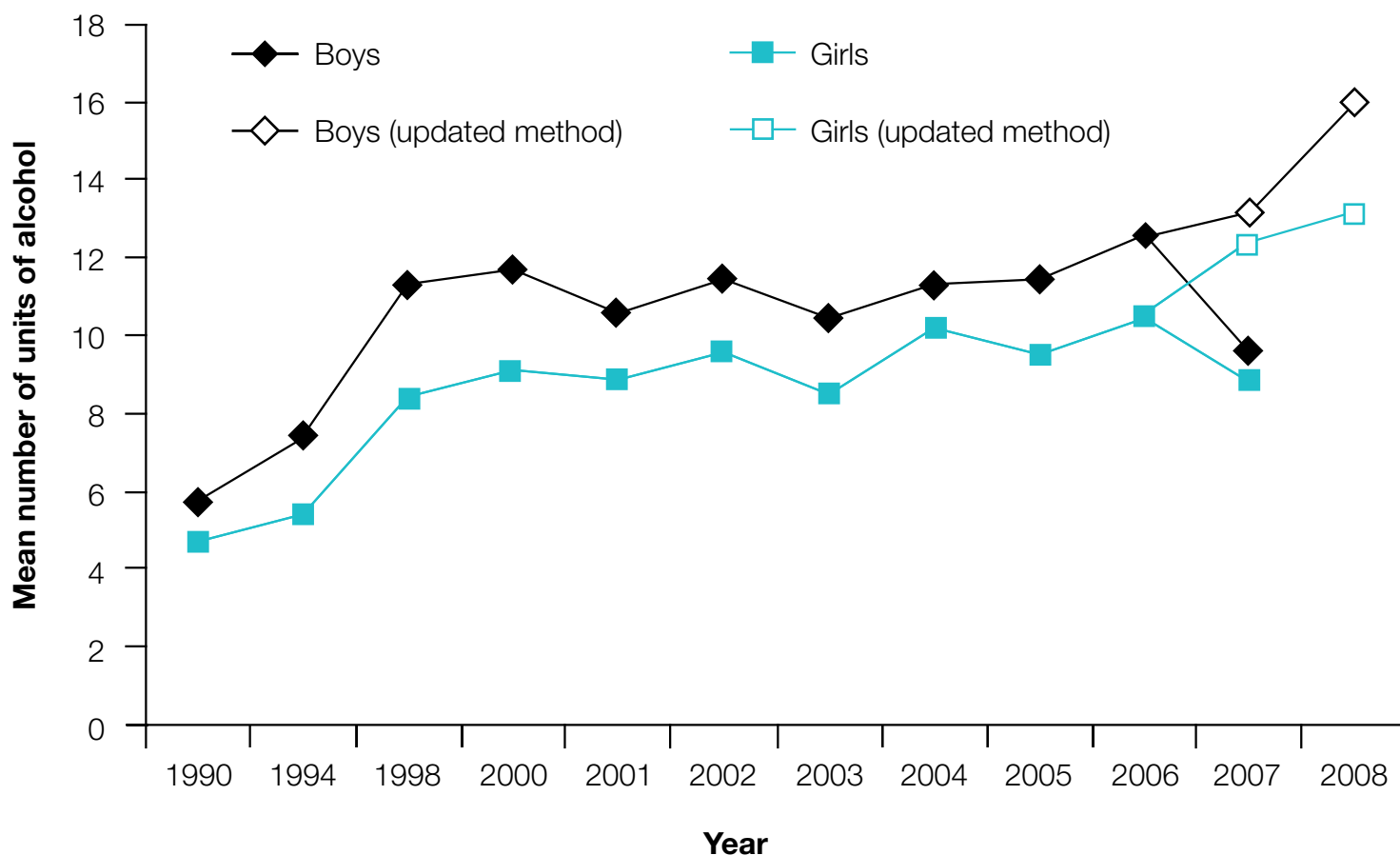
2.5 How much children drink

An estimated 20 million units (equivalent to around 9 million pints of beer or 2 million bottles of wine) were consumed in the last week by 11–17 year olds.

In England, mean weekly alcohol consumption by children who drink has increased substantially since 1990, for both boys and girls. In 11 to 15-

year-old drinkers, mean weekly units increased from 5.7 in 1990 to 16.0 in 2008 for boys and from 4.7 in 1990 to 13.1 in 2008 for girls (Fuller, 2009; Figure 1). In 2008, the mean number of units consumed by boys who drank in the last week increased with age, from 10.9 units per week for 11 to 13 year olds to 17.4 units per week in those aged 15 years. For girls, however, the mean number of units consumed per week was relatively similar across age groups: 13.4 units in 11 to 13 year olds, 12.3 units in 14 year olds and 13.5 units in 15 year olds.

Figure 1: Mean alcohol consumption (units) in England in the last week, by sex (age 11–15), 1990–2008



Source: Fuller, 2009. Data for 2007 are shown using the original and revised (updated) methods of calculating units of alcohol from drinks consumed.

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

Over 7,600 children aged 11–17 are admitted to hospital each year as a result of a condition specifically due to their alcohol consumption.

Data from the ESPAD 2007 survey identified that in the UK, 4% of boys and 2% of girls aged 15 to 16 years had been hospitalised or attended an Accident and Emergency (A&E) unit due to their alcohol use (Hibell et al, 2009). The reasons for hospital attendance were not recorded but can relate to a wide variety of alcohol-related problems, including alcohol poisoning, acute intoxication, injury and assault.

In England, in 2007/08 over 7,600 children (3,326 boys, 4,363 girls) aged under 18 were admitted to hospital for conditions directly related to alcohol (see Table 1 for the number of persons admitted per 100,000 population by age). Almost all of these children were admitted for conditions relating to alcohol poisoning and/or acute intoxication. Admissions increase sharply between ages 11 and 16, with females being more likely to be admitted than males. Admission rates in 17 year olds are similar to those in 16 year olds,⁴ but then increase again with age. From 16 years onwards, male admissions exceed those for females.

Between 2002/03 and 2007/08, 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 75%.

2.7 Consequences of drinking alcohol

The range of adverse outcomes that children and young people risk when drinking alcohol is substantial. Section 5 provides a detailed review of the international literature. This is complemented by a recent review of reviews (Newbury-Birch et al, 2008 for DCSF, see Box 1, page 8). Together they highlight not only risks from disease, but also injury, poisoning, violence, depression and damage to the developmental process, especially in those who 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

In 2008, over a quarter (29%) of 11 to 15 year olds who had consumed alcohol in the past four weeks reported having felt ill or sick. Other consequences of alcohol consumption included having an argument (16%), vomiting (13%), having clothing damaged (13%), having lost money (12%), and being taken to hospital (1%) (Fuller, 2009). A higher proportion of girls reported having felt ill or sick (37% compared with 22% of boys), and having an argument, vomiting, having clothing damaged or losing money.

Table 1: Alcohol-specific hospital admission rates in 2007/08

Persons admitted per 100,000 population by age										
	10	11	12	13	14	15	16	17	18	19
England	4	8	46	117	226	280	241	241	330	328

Source: NWPHO from Hospital Episode Statistics for England.

⁴ This may be an effect of differences in age-related admission policies as children reach 17.

Data from the 2007 ESPAD survey of young people aged 15 and 16 years old (Hibell et al, 2009) indicated that the most commonly reported consequence of alcohol use in the last 12 months

was an accident or injury (25% of boys and 26% of girls). Over one in ten boys (11%) and girls (13%) had performed poorly at school as a consequence of their alcohol use.

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 the following:

- 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.
- 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 Regretted and unprotected sex

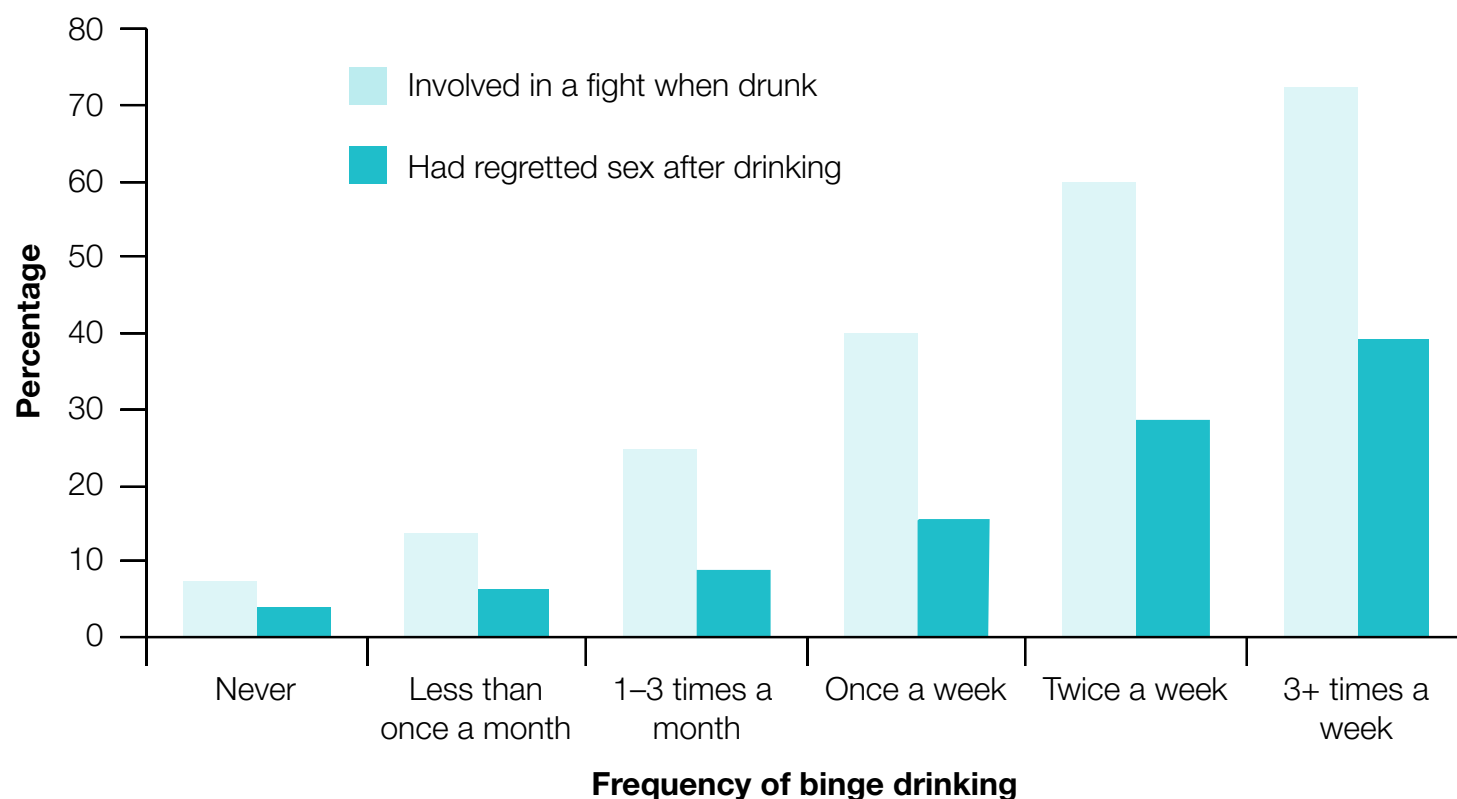
The 2007 ESPAD survey of 15 and 16 year olds (Hibell et al, 2009) highlighted that, following alcohol consumption, 11% of boys and 12% of girls in the UK had engaged in unprotected sex.

A study of 9,833 15 and 16-year-old schoolchildren in the North West of England found strong links between levels of alcohol consumption and consequences including regretted sex (Bellis et al, 2009b). Of drinkers, 4% of those who never binge drink reported regretted sex after drinking. This rose to 15% among those binge drinking once a week and 39% among those binge drinking three or more times a week (see Figure 2). Alcohol-related regretted sex was more common in females.

2.7.3 Crime

In 2008, 7% of 11 to 15 year olds who had consumed alcohol in the past four weeks reported having been in a fight and 6% reported having been in trouble with the police. A higher proportion of boys (9%) reported having been in a fight than girls (5%). This can be compared with the 2007 ESPAD survey of 15 and 16 year olds in the UK, which indicated that following alcohol consumption, 18% of boys and 13% of girls had been in trouble with the police in the last 12 months and 22% of boys and 14% of girls had been in a fight.

Figure 2: Proportion of 15–16-year-old drinkers who have been involved in a fight or had regretted sex after drinking, by frequency of binge drinking



Source: Bellis et al, 2009b.

The 2004 Offending, Crime and Justice Survey (OCJS) (Matthews et al, 2006) found that, among 10 to 17 year olds who drank at least once a week, 39% had committed a violent offence in the past 12 months, 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 been in 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).

The study of 15 and 16-year-old schoolchildren in the North West of England (Bellis et al, 2009b) also investigated associations between alcohol use and violence. Here, among drinkers, 7% of those who never binge drink reported having been involved in violence when drunk. This rose to 40% among those who reported binge drinking once a week and 72% among those reporting binge drinking three or more times a week (see Figure 2). Alcohol-related violence was more common in males.

2.7.4 Drinking and driving

Blood alcohol concentration (BAC) levels for road users who die within 12 hours of being injured in a road accident are published annually. In 2006, 251 road users aged 16 to 19 years died within 12 hours of being injured in a road accident. Of these, 25% 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 (36%), but for motorcycle riders it was among those aged 20 to 24 (22%) (TRL Limited, 2008). Accounting for the relative mileage driven by different age groups,

drivers in the 17 to 19 age group were found to have a higher rate of involvement in accidents (Department for Transport, 2008). Approximately 24 drink-drive injury accidents per 100 million miles driven occurred among 17 to 19 year olds compared with 14 per 100 million miles for 20 to 24 year olds (Department for Transport, 2008).

2.8 Attitudes towards drinking alcohol

The 2007 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 (Hibell et al, 2009). The majority of respondents associated alcohol consumption with positive consequences, with an average 71% endorsement across a range of positive outcomes. These included having a lot of fun (80%), feeling happy (77%), feeling more friendly and outgoing (76%), feeling relaxed (66%) and forgetting problems (54%). The average endorsement across the range of negative consequences presented was only 28%. These included doing something that was later regretted (38%), getting a hangover (35%), feeling sick (31%), harming health (28%), not being able to stop drinking (20%) and getting into trouble with the police (18%).

The 2004 OCJS also examined young people's attitudes to alcohol consumption. Those aged 10 to 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.

2.9 How young people access alcohol

Among 11 to 15-year-old schoolchildren in 2008 (Fuller, 2009), the most common method of accessing alcohol in the last four weeks was via friends and parents. Of all children, 24% reported having been given alcohol by friends (increasing from 3% of 11 year olds to 50% of 15 year olds) and 22% by parents (8% of 11 year olds, 36% of 15 year olds). A fifth (18%) had asked someone else to buy alcohol for them (1% of 11 year olds, 41% of 15 year olds), whilst 6% had tried to buy alcohol themselves from a shop (1% of 11 year olds, 15% of 15 year olds) and 4% from a pub (1% of 11 year olds, 9% of 15 year olds). Over one in ten had taken alcohol from home with permission (14%) and 6% had stolen alcohol from home.

The proportion of children using most access methods increased with the number of units of alcohol they had consumed in the last week. For example, among those who had consumed between one and four units in the last week, 53% had been given alcohol by friends, 37% had asked someone else to buy alcohol for them, 8% had tried to buy alcohol from a shop and 16% had stolen alcohol from home. Among those who had consumed 15 or more units in the last week, these proportions increased to 93% accessing alcohol through friends, 88% asking someone else to buy alcohol for them, 40% taking alcohol from home and 33% stealing alcohol from home. However, the proportion of children who were given alcohol by parents was highest among those who consumed between one and four units (62%) and then decreased with increasing alcohol use, to 46% of those drinking 15 or more units.



3. GUIDANCE ON THE CONSUMPTION OF ALCOHOL BY CHILDREN AND YOUNG PEOPLE

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, whilst 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.

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, alcohol use during teenage years is related to a wide range of health and social problems. Vulnerability to alcohol-related problems is greatest among 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 among young people who begin drinking before the age of 15.	See Section 5.5.1
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
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

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
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 liver, bone, growth and endocrine development.	See Section 5.3

Implications

The *Safe. Sensible. Social. Alcohol strategy local implementation toolkit*⁵ 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). Educational curricula should be revised in accordance with this guidance to ensure that: (1) the advantages of an alcohol-free childhood are emphasised; and (2) young people who choose to drink are advised not to do so until at least age 15 and are encouraged to make such decisions through discussion and agreement with their parents or carers. These messages need 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). 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 well-being can potentially be tracked into adulthood.

⁵ Home Office, Department of Health, Department for Children, Schools and Families (2008) *Safe. Sensible. Social. Alcohol strategy local implementation toolkit*. London: HM Government.

Parents and carers should be provided with advice and support on how to ensure that their children 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 supervised social activities such as being a member of a youth club, group or team can be protective against frequent and problem alcohol use (see Section 5.4.4). Therefore, parents have an important role to play in encouraging their children to actively engage in sports and hobbies.

Full Service Extended Schools (FSES) 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). 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.

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). 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

Parenting approaches	
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 the use of alcohol by parents have been associated with risky drinking in adolescence.	See Section 5.4.2
Spending money	
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
Supervised drinking	
There is evidence to suggest that naïve drinkers may suffer high levels of harm when they begin drinking in unsupervised settings. Drinking in family contexts is protective against underage drinking and problem drinking in later life.	See Section 5

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 bloodstream 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 guidance statement 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 that 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-licence outlets for as little as 11p a unit (Bellis et al, 2009b). 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.

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). Whilst 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). 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

Immediate 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 misuse.	See Section 5.6.1
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 forced, or attempted forced, sex. Alcohol use before sexual activity can adversely affect the use of condoms.	See Section 5.6.2

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 to carry weapons. Drinking in public places is associated with a higher risk of being involved in fighting.	See Section 5.6.3 and Section 5.6.4
Drinking frequency and volume may be associated with drinking and driving involvement in adolescents older than 14 years.	See Section 5.6.5
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.	See Section 5.6.5
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
Young people who binge drink in adolescence (15 to 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 misuse, crime, lower educational attainment and drug dependence.	See Section 5.7.2

Implications

Educational curricula should be reviewed to ensure that young people are advised that they should never exceed recommended adult daily limits 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 that young people do not exceed recommended adult daily limits and do not drink on more than one day a week, and on how to help children who are known to be exceeding such limits.

Parents should make reasonable efforts to ensure that 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 when 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 and carers should discourage those aged 17 to 20 from any drinking and driving, even when they stay within the legal blood alcohol limit. Social marketing and other health communication tools should be used to ensure that all young people and parents know about the risks that drinking, even within the legal limit, pose 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).

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

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

Relationship quality	
<p>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 step-parent are, on average, more often involved in heavy drinking.</p>	<p>See Section 5.4.2</p>
Parental behaviour management	
<p>Parental monitoring⁶ 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 the use of alcohol by parents have been associated with heavy and binge drinking in adolescence.</p>	<p>See Section 5.4.2</p>
<p>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 towards 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.</p>	<p>See Section 5.4.2</p>

⁶ 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	
<p>Peers play an important role in the onset of drinking behaviours and studies conducted with young people aged 15 to 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.</p>	<p>See Section 5.4.3</p>

Implications

The *Every Child Matters: Change for Children* programme recognises that parents, carers and families are the most important influences 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 enables them to promote low-risk drinking (for those who 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 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.

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 universal, targeted and specialist services as outlined in *Guidance on commissioning young people's specialist substance misuse treatment services* (NTA, 2008).⁷ 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

Identification and referral	
Professionals from health, education, social care and criminal justice agencies need to be able to identify, assess and, where necessary, appropriately refer young people experiencing alcohol-related problems.	See Section 4.7
Brief advice	
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 on how to reduce the risks and find sources of support, is an effective approach for tackling harmful drinking among children and young people. ⁸	See Section 4.7

⁷ National Treatment Agency for Substance Misuse (2008) *Guidance on commissioning young people's specialist substance misuse treatment services*. London: National Treatment Agency for Substance Misuse.

⁸ National Institute for Health and Clinical Excellence (2007a) *Interventions in schools to prevent and reduce alcohol use among children and young people*. London: National Institute for Health and Clinical Excellence.

CBT interventions and motivational-type approaches	
<p>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 practise 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.^{9, 10}</p>	<p>See Section 4.7</p>
Treatment	
<p>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.¹¹</p>	<p>See Section 4.7</p>

Implications

Policy makers, commissioners and professionals should be familiar with NTA guidance, which provides a framework to conceptualise the service components of an integrated and comprehensive child-based service for young people with substance use problems (NTA, 2008).

Professionals working in universal services need to be able to identify children and young people with alcohol-related problems and make appropriate referrals to targeted or specialist services (see Section 4.7).

Professionals from all tiers and all health, social care and criminal justice agencies need to be

competent and confident in responding to children and young people’s alcohol-related concerns, 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.

⁹ National Institute for Health and Clinical Excellence (2007b) *Community-based interventions to reduce substance misuse among vulnerable and disadvantaged children and young people*. London: National Institute for Health and Clinical Excellence.

¹⁰ National Institute for Health and Clinical Excellence (2007c) *Drug misuse: Psychosocial interventions*. London: National Institute for Health and Clinical Excellence.

¹¹ Substance misuse means alcohol and drugs.

Targeted interventions need to continue to be directed at vulnerable groups, including: young people who begin 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 guidance on psychosocial interventions (see footnotes 8–10 on pages 25–26). For example, CBT focuses on increasing the understanding of the problem, or behaviour, so that coping mechanisms can be increased and problem behaviours modified and reduced.



4. REVIEW OF CURRENT POLICY, GUIDANCE AND PRACTICE

4 Review of current policy, guidance and practice



This section is a summary of key policy, guidance and practice issues that relate to how the Chief Medical Officer's 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. The *Youth Alcohol Action Plan* (DCSF, 2008) sets out what the Government will do to address drinking by young people. The *Signs for improvement: commissioning interventions to reduce alcohol-related harm* (2009) document reiterates the importance of partnership approaches and clarifies who is responsible for addressing needs at a local level.

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.

4.1.1 National Alcohol Strategy

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.

4.1.2 Youth Alcohol Action Plan

The *Youth Alcohol Action Plan* sets out what the Government will do to address drinking by young people in three main ways:

- Working with police and the courts to stop underage drinking, by making it clear that unsupervised drinking by young people under the age of 18 in public places is unacceptable.

- Recognising that drinking by young people in the home is the responsibility of parents and families, but providing clearer health information for parents and young people about how consumption of alcohol can affect children and young people.
- Working with the alcohol industry to continue the good progress made to reduce the sale of alcohol to under-18s but also in marketing and promoting alcohol in a more responsible way.

4.1.3 Delivery through partnership

Children's Trusts and local Children and Young People's Strategic Partnerships, in association with Drug and Alcohol Action Teams (DAATs), are responsible for addressing the needs of young people and their families where alcohol is a consideration. They may, for example, tackle issues such as the prevalence and impact of underage drinking, and take action to tackle alcohol problems that contribute to poor educational attendance and attainment or teenage pregnancies.

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 age 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

misuse 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 NTA model for young people's substance misuse treatment. The 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 CAF, designed to standardise the way that young people's needs are assessed across agencies to aid multi-agency working in ensuring that all needs are met. This should support the pathway that young people take through services for substance misuse prevention and treatment.

The *Every Child Matters: Change for Children Young People and Drugs*¹² 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.

¹² Department for Education and Skills (2005) *Every Child Matters: Change for Children: Young People and Drugs*. London: Department for Education and Skills.

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.

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

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

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 childcare. Although the evaluation¹³ of the three-year programme suffered through a lack of baseline data, positive impacts on education attainment (particularly for pupils facing learning difficulties) and improved life opportunities were reported. Qualitative analysis suggested that school-based support had reduced factors including conduct problems, aggression and anxiety among individual at-risk pupils. Whilst the costs of implementing the programme are high, the cost savings 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, prosocial behaviours and alcohol use.¹⁴

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's 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 to play in preventing problematic substance use among young people. Young people are more likely to delay or avoid substance misuse when they talk openly with their

¹³ 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.

¹⁴ Grossman J, Price M, Fellerath V, et al (2002) *Multiple Choices After School: findings from the Extended-Service Schools initiative*. Philadelphia: Public/Private Ventures.

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 (DCSF). 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 School-based approaches

Guidance is provided to schools about drug and alcohol-related matters by the Government. A review by the Advisory Group on Drug and Alcohol Education (2008) has recommended that parents' and carers' knowledge and skills about drug and alcohol education should be enhanced to enable them to better inform and protect their children. Guidance from NICE (2007) on alcohol interventions in schools also provides clear priorities concerning alcohol and young people under the age of 18.

4.4.1 Guidance for schools

*Drugs: Guidance for schools*¹⁵ 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.

The Advisory Group on Drug and Alcohol Education (2008) conducted an independent review of the effectiveness of drug and alcohol education on behalf of the Government. The key recommendations are listed below:

- Increase parents' and carers' knowledge and skills about drug and alcohol education and prevention, enabling them to better inform and protect their children.
- Improve the quality of drug and alcohol education by making personal, social and health education (PSHE) a statutory subject – to enable schools and colleges to promote well-being effectively, and to improve the quality of training for PSHE teachers.
- Improve identification and support in schools for young people vulnerable to drug misuse.

¹⁵ Department for Education and Skills (2004) *Drugs: Guidance for schools*. London: Department for Education and Skills.

The Government (DCSF, 2008) has welcomed the recommendations in the Advisory Group's report and has set out key actions that government will take to improve drug and alcohol education. A relevant recommendation is that government should increase parents' and carers' knowledge and skills about drug and alcohol education, to enable them to better inform and protect their children, through improved parenting support and a widespread communications campaign.

The Government has stated that revised guidance to schools and further education colleges will set out a clear expectation that parents are informed about the timing and content of drug and alcohol education. This will focus on what is expected to be covered and when, and will give parents clear information about how they can best support messages about drugs and alcohol.

Box 2: Interventions in schools to prevent and reduce alcohol use among children and young people (NICE, 2007)

Recommendation 1

- Ensure alcohol education is an integral part of the national science, PSHE and PSHE education curricula, in line with 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 alcohol 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 Public health guidance on alcohol interventions in schools

Recent public health guidance from NICE on alcohol interventions in schools¹⁶ provides 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 increased awareness of safe and sensible alcohol consumption among all young people and their parents and 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 guidance on alcohol interventions in schools also provides clear priorities concerning alcohol and young people under the age of 18 (see Box 2).

NICE public health guidance on school, college and community-based PSHE focusing on sex and relationships and alcohol education¹⁷ is currently in development and due to be published in January 2011.

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 risks 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's alcohol and drug awareness service, which includes telephone, online and printed media help for parents and young people. Furthermore, the Directgov website¹⁸ provides advice on a wide range of topics, including alcohol. Local NHS services (formerly Primary Care Trusts), 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 website¹⁹ also has an area (D-world) designed for young people and their families, which focuses on understanding the

¹⁶ National Institute for Health and Clinical Excellence (2007) *Interventions in schools to prevent and reduce alcohol use among children and young people*. London: National Institute for Health and Clinical Excellence.

¹⁷ <http://guidance.nice.org.uk/PHG/Wave12/77>

¹⁸ www.direct.gov.uk/en/Parents/Yourchildshealthandsafety/WorriedAbout/DG_10026211

¹⁹ www.drugscope.org.uk

impact of drugs, alcohol and tobacco. The excerpt from the FRANK website (see Box 3 below) is typical of the information provided about alcohol but provides no reference to the intended target audience. There is also no specific information for those under 18 on the FRANK website. However,

since the consultation in England on advice and information for children, young people and alcohol, websites by independent groups (such as Drinkaware²⁰) have incorporated guidelines on drinking for young people under 18 into their advice.

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 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.

www.talktofrank.com/drugs.aspx?id=166

²⁰ www.drinkaware.co.uk/facts/children,-young-people-and-alcohol

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

NTA guidance requires 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 (2008)²¹ has produced guidance aimed at commissioners responsible for the planning and delivery of young people's specialist substance misuse treatment. The guidance sets out a new definition of young people's specialist substance misuse treatment to be applied across all local areas, including descriptions of specialist interventions. It explains how specialist substance misuse treatment interventions can be commissioned as part of an integrated commissioning process within Children's Trusts to encourage an integrated approach across universal, targeted and specialist provision.

In order to achieve a more consistent approach to treatment provision across the country, the following definition has been developed:

"Young people's specialist substance misuse treatment is a care planned medical, psychosocial or specialist harm reduction intervention aimed at alleviating current harm caused by a young person's substance misuse."

Young people's specialist substance misuse treatment services have two distinct roles (see Box 4).

Box 4: Dual role of young people's specialist substance misuse treatment

Supporting and enabling universal and targeted services: to identify the substance misuse-related needs of children and young people, to refer appropriately and effectively to specialist substance misuse treatment and to provide necessary support in conjunction with treatment provision.

Specialist substance misuse treatment for young people: includes both social care and health interventions that aim to facilitate changes in substance misuse behaviour. Health and social care interventions support and enhance each other and are provided as part of a single specialist substance misuse treatment care plan, which in turn is part of a young person's broader care plan.

The guidance requires staff to collaborate with others and make 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 identify, assess and respond to substance

²¹ National Treatment Agency for Substance Misuse (2008) *Guidance on commissioning young people's specialist substance misuse treatment services*. London: National Treatment Agency.

misuse problems among young people. Staff working with young people should be trained to identify alcohol problems, through either the CAF or an alcohol assessment tool.

The NTA has recently published the document entitled *Young people's specialist substance misuse treatment: Exploring the evidence*.²² The document explains that research on effective treatment interventions is still scarce but is growing both in quantity and quality.

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).²³ NICE also recommends that best practice on child protection, consent and confidentiality should be followed and, where appropriate, parents or carers should be involved in the treatment process.

NICE is currently developing guidance relating to alcohol use disorders in adults and young people. Each piece of guidance will focus on a different element of the care pathway, from the prevention and early identification of alcohol use disorders through to the clinical management of acute alcohol withdrawal and alcohol-related diseases. It is expected that the guidance will be issued in spring 2010.²⁴

4.8 The international picture

Although most countries have national alcohol policies, a review of international guidelines shows that very few countries have developed guidelines or guidance on the consumption of alcohol by children and adolescents. Exceptions to this are described below.

The Australian Government has produced guidelines that communicate to the public evidence concerning the health risks that arise from drinking alcohol in Australia (National Health and Medical Research Council, 2009²⁵).

Guidance is provided to children and young people up to 18 years of age and for parents and carers about the safest options to prevent alcohol-related harm during these years.

- Parents and carers should be advised that children under 15 years of age are at the greatest risk of harm from drinking and that, for this age group, not drinking alcohol is especially important.
- For young people aged 15 to 17 years, the safest option is to delay the initiation of drinking for as long as possible.

New Zealand²⁶ has produced guidelines for adolescents on food and nutrition 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”.

²² National Treatment Agency for Substance Misuse (2009) *Young people's specialist substance misuse treatment: Exploring the evidence*. London: National Treatment Agency.

²³ National Institute for Health and Clinical Excellence (2007a) *Interventions in schools to prevent and reduce alcohol use among children and young people*. London: National Institute for Health and Clinical Excellence.

²⁴ www.nice.org.uk/guidance/index.jsp?action=byID&o=11875

²⁵ National Health and Medical Research Council (2009) *Australian Guidelines to Reduce Health Risks from Drinking Alcohol*. Canberra: National Health and Medical Research Council.

²⁶ New Zealand Ministry of Health (1998) *Food and Nutrition Guidelines for Healthy Adolescents: A Background Paper*. Wellington: Ministry of Health. Available from: www.nzgg.org.nz/guidelines/dsp_guideline_popup.cfm?guidelineCatID=24&guidelineID=66

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.
- 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 Epidemiological review of harms to children



This section provides a comprehensive review of the scientific evidence on the links between alcohol-related harm and children and young people.

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 (see Box 5).

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

(adapted from Single et al, 2001²⁷)

Alcoholic psychosis	Colon cancer	Gastro-oesophageal 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

²⁷ Single E, Collins D, Easton B, et al (2001) *International guidelines for estimating the costs of substance abuse*. Ottawa: Canadian Centre on Substance Abuse.

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). Findings from an extended review of the associations between alcohol use and teenage pregnancy have also been drawn on (Bellis et al, 2009a). Each area of evidence reviewed begins with a summary statement and continues with details of the studies from which this is derived. More details of the studies included and other studies relating to child drinking are given in the *Supplementary Report* 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*, the Advisory Council on the Misuse of Drugs' *Pathways to Problems* and 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 in 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 and 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, 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, 2008). 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 (De Bellis et al, 2005). Developments in imaging techniques have advanced understanding of white matter development, and findings from studies in alcohol-dependent adults suggest that white matter

density loss is associated with alcohol dependence (Moss, 2008). However, these findings were not replicated in a recent study of alcohol-dependent adolescents published by De Bellis and colleagues (2008). The limbic brain regions include the hippocampus and amygdala, regions that 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 with non-dependent controls, which suggests that the hippocampus may be particularly susceptible to the adverse effects of alcohol (Clark et al, 2008). However, Clark and colleagues (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, 2008). For example, Brown and colleagues (2000) found that alcohol-dependent adolescents demonstrated deficits in their retrieval of verbal and non-verbal information and in visuospatial functioning compared with 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 potentiation (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 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 of 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
Levels are also higher 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; Elgán et al, 2002; Fujita et al, 1999

Adapted from Faden and 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 of alcohol use, and also the factors that are protective against the early initiation of alcohol use and against problematic alcohol use later in adolescence. Table 3 on pages 49–51 summarises 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 and colleagues (1999) identified that, among adolescents who are not problem drinkers, higher risk and lower protection accelerated the likelihood of them becoming problem drinkers 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 has 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 adolescents who are undergoing treatment for alcohol use disorders (Gabel et al, 1999). In addition, Soloff and colleagues (2000) found that, compared with age-matched controls, adolescents with alcohol use disorders scored significantly higher on all measures of impulsivity and aggressivity compared

with healthy controls. Caspi and colleagues (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 characterised by low scores on measures of constraint (Traditionalism, Harm Avoidance and 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 any externalising disorder at 11 years of age have 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 and colleagues (1998) found that, among young people aged 11 and 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, 2004; Costa et al, 1999; Ellickson et al, 2001).

Early onset of puberty has been shown to be a risk factor for early initiation of alcohol use among females. Lanza and Collins (2002) found that females who had reached puberty at age 12 to 13 years were significantly more likely to initiate substance use between the ages of 12 and 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 misuse (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 the 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 step-parent, 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 and colleagues (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 an 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 and colleagues (2001) found that young people who reported that their parents drank daily had an increased risk of alcohol-related sexual risk taking.

A positive family history of alcoholism has been associated with a four- to ninefold increased risk of alcoholism for male offspring and a 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 and colleagues (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 and colleagues (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 and colleagues (2004) reported that there is a paucity of literature examining the relationship between parents' positive behaviour management practices and adolescent alcohol use; however, they identified a range of positive parental practices based on the programme 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 to 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 (Hayes et al, 2004).

Parental supply of alcohol to young people who have already begun drinking has been linked to subsequent levels of consumption. Hayes and colleagues (2004) presented the findings of Australian research that demonstrated that, on occasions when parents are 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 and 16 years, Bellis and colleagues (2007) found that being bought alcohol by parents was associated with lower levels of both binge drinking and drinking in public places among children who 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 step-parent, 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 with 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 and colleagues (2004) examined adults' approval of adolescents' alcohol use, finding that providing alcohol for consumption at parties was associated with a two-fold increase in the use of alcohol and binge drinking in the past 30 days.

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 to 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 and colleagues (1994) surveyed 11 to 15 year olds in 12 European countries and found that pocket money was positively associated with weekly drinking. Darling and colleagues (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 and colleagues (2007) also found that, in older adolescents (15 to 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 and colleagues (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 and 16 years.

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

Risk/protective factor	Findings		Study
Personality and behavioural factors			
i	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
i	Psychiatric diagnoses of conduct disorder	Psychiatric diagnoses of conduct disorder, oppositional defiant disorder or any externalising disorder at 11 years of age significantly increase the likelihood of starting to drink by age 14 years	McGue et al, 2001a
i	Depression and anxiety	Negative affectivity has also been shown to predict alcohol problems in adolescents	Colder and Chassin, 1997
i	Delinquent behaviour	One of the most consistent behavioural risk factors for starting to drink in adolescence is prior involvement in delinquent behaviour	Donovan, 2004
i	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, 2004; Costa et al, 1999; Ellickson et al, 2001
i	Positive alcohol expectancies ²⁸	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
i	Early onset puberty	Early onset puberty in females is associated with early onset drinking	Lanza and Collins, 2002

i Risk factor; h Protective factor; n Risk or protective factor depending on context

²⁸ Expecting positive effects from the consumption of alcohol.

Table 3: Risk and protective factors for childhood and adolescent alcohol consumption (continued)

Risk/protective factor	Findings		Study
Family factors			
i	Parental alcohol abuse	A positive family history of alcoholism has been associated with a four- to ninefold increased risk of alcoholism for male offspring and a two- to threefold increased risk for female offspring	Windle et al, 2008
		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
i	Family breakdown	There is a greater risk of alcohol use initiation for adolescents living with a step-parent, or with a sole parent, than for those living in intact families	Flewelling et al, 1990; Ellickson et al, 2001; Hayes et al, 2004
n	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
n	Parental supply of alcohol	Exposure to alcohol use by an important adult at grade 7 is associated with a greater likelihood of any problem-related drinking at grade 12	Ellickson et al, 2001
		Young drinkers who are supplied alcohol by their parents are likely to drink less than those who obtain it from friends or older siblings	Hayes et al, 2004; Bellis et al, 2007
h	Drinking context	Drinking in family contexts is protective against underage drinking and problem drinking in later life	Warner and White, 2003; Foley et al, 2004
i	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

i Risk factor; h Protective factor; n Risk or protective factor depending on context

Table 3: Risk and protective factors for childhood and adolescent alcohol consumption (continued)

Risk/protective factor	Findings		Study
Family factors (continued)			
i	Poor parental supervision and discipline	Poor parental monitoring has been correlated with externalising problem behaviours in adolescents, including antisocial behaviour, deviant peer associations, substance misuse and sexual risk taking	Hayes et al, 2004
Peer factors			
i	Peer alcohol and other substance misuse	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; peer effects become particularly powerful when parent–adolescent relationships are of poorer quality	Hayes et al, 2004
h	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			
i	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
h	Involvement in prosocial activities	Involvement in prosocial activities such as being a member of a youth club, group or team can be protective against frequent and problem alcohol use	Costa et al, 1999; Bellis et al, 2007

i Risk factor; h Protective factor; n 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 with dependence at a younger age. Vulnerability to alcohol abuse and dependence is greatest among adolescents who begin drinking before the age of 15.

Longitudinal studies

The aim of the study by Grant and colleagues (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* (fourth 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 Youth (NLSY), which began in 1979 (n=12,686 participants aged 14 to 21 years in 1979). Based on data collection seven 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 decreased by 9% with each increasing year of age at drinking onset, and the odds of abuse decreased by 7%.

McGue and colleagues (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=1,309 fathers and n=1,361 mothers). Their findings replicated those of other cross-sectional studies (e.g. Grant and 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 with 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 and colleagues (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 numbers 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 and colleagues (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 with 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 to 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 and colleagues (2008) examined associations between age at first drink and first incidence of DSM-IV alcohol dependence, abuse and specific alcohol use disorder criteria over three years. After controlling for all significant risk factors, respondents who started drinking at ages younger than 15 were at increased risk 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 causal 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 1990/91 Ontario Health Survey Mental Health Supplement, DeWit and colleagues (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 ages of 11 and 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 to 18 was not significant (relative to the reference group).

York and colleagues (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. 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 and colleagues (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 with 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 one year (OR 2.62; 95% CI: 1.79, 3.84) and of experiencing six to seven vs. three to five 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 the family, the mean age of onset was 14.2 years, with 18% reporting onset of drinking under the age of 11. Compared with 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 (less

than five 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 and colleagues (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 per cent had begun drinking at age 10 to 11 years. Participants who began drinking before or 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 over) and 16 to 17 year olds, with the exception of women's binge drinking.

Fergusson and colleagues (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, and 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 the 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 and colleagues (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 Twin Family Study. The sample was restricted to white 12th grade students (aged 17 to 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 age 10 to 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 and colleagues (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 and 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 to 18, and that students who began drinking prior to age 17 to 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 and colleagues (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 with non-drinkers, students who had started drinking during the previous year were more likely to be older, have a lifetime history of tobacco and cannabis use, go out at night, display delinquent behaviour, be a truant, have peers who drink and smoke, have parents who approve of drinking, and have parents who use alcohol.

Takakura and Wake (2003) examined the relationship between age of onset for smoking and subsequent patterns of smoking and drinking among students in grades 10 through to 12 in Japan (aged 15 to 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 and colleagues (2003) explored whether college students who were first intoxicated by alcohol before 19 years of age were more likely to meet criteria for alcohol dependence and be frequent heavy drinkers. After controlling for personal and demographic characteristics, the odds of meeting alcohol dependence criteria were

significantly greater for those who were first drunk at or before 12 years compared with drinkers who were first drunk at age 19 or older (OR 3.1; 95% CI not reported). In addition, respondents who were first drunk at or before 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 and colleagues (2003) grouped participants into three groups based on their drinking status in grade 7 (age 12 to 13 years): non-drinkers (never had a drink, not even a few sips); experimenters (drank fewer than three times in the past year and not in the past month); and drinkers (drank three or more times in the past year or in the past month). The authors examined the prevalence of problem behaviours at grades 7 (12 to 13 years) and 12 (17 to 18 years) and at age 23 among these groups. At age 12 to 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 to 18 years, students who began drinking

at age 12 to 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 an offence (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 to 13 years were more likely to: be weekly cannabis 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%); 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%); 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%); steal (13.8% vs. 7.7%); commit an offence (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 to 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 to 13 years, compared with 63% at age 15 to 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 three months.

Thomas and colleagues (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 and colleagues (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 five 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 and colleagues (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 to 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 three times as likely to report being in a fight in the past year whilst or right after drinking (95% CI not reported).

Swahn and colleagues (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 to 18 years). After controlling for demographic and other factors, compared with 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 and colleagues (2008) also examined the associations between early alcohol initiation and suicidal ideation, suicide attempts, and peer and dating violence victimisation 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 and colleagues (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 with 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 and colleagues (2003) also explored whether college students who were first intoxicated by alcohol at ages below 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 Study. Compared with students who were first drunk at age 19 or older, those who began drinking to intoxication in each age group below age 19 were significantly more likely to be seriously injured within six 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 to 15 were more likely to be seriously injured after drinking (OR 2.5; 95% CI: 1.2, 5.3), compared with 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 to 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 or 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 females), Agrawal and colleagues (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 use of multiple substances resulted in a sharp incline in the probability of experimentation with subsequent drug classes.

Other risky behaviours

Dawson and colleagues (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 three 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 misuse.

Bonomo and colleagues (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 and 17 years who participated in the Adolescent Health Survey. There was an elevated risk of alcohol-related injuries in those who reported high-dose drinking²⁹ (OR 2.3; 95% CI: 1.3, 4.0) and those reporting antisocial behaviour (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 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 on more than two days per week and high-dose drinking).

Best and colleagues (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

²⁹ Five or more units of alcohol per drinking day.

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 that 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 educational aspirations.

Miller and colleagues (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 to 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 their last sexual intercourse (OR 2.3; 95% CI: 1.5, 3.4), have ever been or made 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: ride 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 their last sexual intercourse (OR 10.3; 95% CI: 7.1, 14.8); have ever been or made 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 and 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: 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 and colleagues (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 to 16 years) who participated in the ESPAD survey. 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 who reported being drunk or using alcohol on more than 20 occasions were 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 ratios 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	Trouble 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 Livingston and Room³⁰ examined how the relationship between a broad range of harms and alcohol consumption changes 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, and by the number of days per year on which five or more standard drinks were consumed. This was then presented as a ratio for each age group, compared with the index group, males aged 40–44 years (harm score set as 1.0). Analysis identified a strong increase in the harm index among 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 (under 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 and colleagues (1994) examined the links between drinking and a range of sexual risk behaviours on two specific occasions of

³⁰ Livingston M, Room R (in press) Variations by age and sex in alcohol-related problematic behaviour per drinking volume and heavier drinking occasion. *Drug and Alcohol Dependence*.

intercourse: (1) first intercourse ever; and (2) first intercourse with most recent partner. Analyses were based on 1,259 sexually experienced respondents aged 13 to 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 and colleagues (1994) examined whether the 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 to 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 misuse³¹ and measures of early onset sexual activity (sexual intercourse before age 16 years) and sexual risk-taking behaviours. Data from 953 children aged 15 to 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 and colleagues (2004) found that drinking at 16 was significantly related to the number of sexual partners at ages 16 to 21 years and 21 to 25 years. The number of sexual partners, sexually transmitted infection and pregnancy increased linearly with increasing consumption of alcohol at age 16.

Ramisetty-Mikler and colleagues (2004) examined whether drinking and drug use constituted risk factors for unsafe sexual practices using data from 2,657 students in grades 9 to 12 who participated in the Hawaii Youth Risk Behavior Surveillance. The authors found that, compared with abstainers, heavy episodic drinkers³² 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 three 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 to have had two or more partners in the past three months (OR 2.9; 95% CI: 1.1, 7.6). Use of alcohol or 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

³¹ Engaging in frequent, heavy or problem drinking.

³² Drank five or more drinks at any time within a two-hour period.

potential effects of unknown confounding factors. Based on data from the National Longitudinal Study of Adolescent Health ($n=16,677$ adolescents aged 11 to 21 years), Rees and colleagues (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 that 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 to the National Longitudinal Survey of Youth 1997. In contrast to Rees and colleagues (2001), Sen found that the results of the model indicated a strong association between alcohol use and sexual activity. For adolescent girls (boys in brackets), alcohol use was associated with a 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. The author found that heavy drinking (five or more drinks on one occasion) had weak effects on sexual intercourse, which, in her view, suggested that it may be relatively 'lighter' levels of alcohol consumption that increase the likelihood of sexual intercourse. Rashad and Kaestner (2004) have called into question the methods used by these authors. Based on a subsequent reanalysis of the data used by Rees and colleagues (2001) and Sen (2002), they concluded that the causal relationship between substance use and sexual behaviour remains unknown.

Kim-Godwin and colleagues (2007) assessed associations between sexual behaviours and alcohol based on data from the National Youth Risk

Behavior Survey. The sample for the study included 619 middle school students and 375 high school students. Drinking patterns were strongly associated with nine measures of sexual behaviour. There was no association between drinking patterns and whether students had been taught about AIDS or HIV. 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 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 to 12). Compared with girls who did not consume any alcohol, inebriated girls were significantly less 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 and colleagues (1997) studied 82 female clients aged 16 to 19 years recruited from an STD clinic and adolescent health clinics, and Morrison and colleagues (2003) included 112 sexually experienced adolescents aged 14 to 19 years. Neither study found a relationship between alcohol use prior to sexual activity and condom use.

Champion and colleagues (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 to 20 years), females who reported binge drinking were three 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 to commit violent offences. Drinking in public places is associated with a higher risk of being involved in fighting.

Fergusson and colleagues (1996) examined the associations between alcohol misuse³³ and juvenile offending at ages 15 and 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 and colleagues (2004) found that drinking behaviours at 16 were also significantly associated with the number of violent offences committed between ages 16 and 21 years (but not ages 21 and 25 years).

Dukarm and colleagues (1996) investigated the relationship between substance use and violent behaviour based on data from 12,272 respondents (aged 15 to 18 years) who participated in the 1991 National Youth Risk Behavior Survey. 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).

Swahn and colleagues (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 to 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 (on 9 to 30 days per month), binge drinking, problem drinking or peer drinking were more likely to be involved in all three violence and injury outcomes (fighting in the past 12 months, injured in a fight in the past 12 months, and injured others in the past 12 months) than drinkers who did not report these patterns, as shown in Table 5.

³³ Engaging in frequent, heavy or problem drinking.

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 who 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 and colleagues (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 on more than nine days per month (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 and colleagues (2006) was to determine whether there is a significant relationship between vulnerability to physical violence and alcohol consumption in young people aged 11 to 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
Drinking frequency		
Fighting	2.38	2.04, 2.76
Hitting others	6.89	5.00, 9.49
Being hit	2.94	2.19, 3.95
Drunkenness frequency		
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 adults from the National Longitudinal Survey of Youth (males and females aged 17 to 21 years), two studies by Wells and colleagues (2005; 2006) examined alcohol-related aggression. Wells and colleagues (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 and colleagues (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 and colleagues (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 of 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.

Mattila and colleagues (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 lifestyle choices. The sample included 8,135 Finnish adolescents aged 12 to 18 years. Among the sample, 27% of adolescents involved in alcohol-related violence reported an injury, whilst 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 on staying away from school or hobbies. Alcohol-related violence most often occurred in 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 and colleagues (2008) examined the association between alcohol and medically attended injuries by urban/rural geographic status. Data were obtained from the 2001/02 Health Behaviour in School-aged Children survey ($n=7,031$ participants aged 11 to 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 and colleagues (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 to 18 years, who participated in the National Youth Risk Behavior Survey. Both high-quantity drinking, defined as five or more drinks per occasion, and high-frequency drinking, defined as three or more 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 and colleagues (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 to 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 (see Table 8).

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)

	Crash type	BAC (mg/100ml)				
		0	10–19	20–49	50–79	80–99
Male	Single vehicle	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	Single vehicle	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)

5.6.6 Cannabis and other substance use

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

Guxens and colleagues (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 Project, Hill and colleagues (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-binge drinkers to be alcohol dependent at age 21. Participants whose binge drinking frequency increased between the ages 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 non-binge drinkers to be alcohol dependent at age 21. The study by Chassin and colleagues (2002) was based on data from 238 children of alcoholics and 208 controls. The authors created four groups depending on binge drinking trajectories: non-binge drinkers; 'early-heavy' (early onset of binge drinking at age 13 to 14 years and high level of binge drinking); 'late-moderate' (later onset of binge drinking and less than monthly binge drinking 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 to 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 a higher risk of a diagnosis of alcohol abuse or dependence than those who did not binge drink (all $p < 0.05$).

Jefferis and colleagues (2005) assessed continuities in binge drinking across adulthood and the association between adolescent drinking level and adult binge drinking (10 or more units per session for men and seven or more units per session for women). The results suggested that women who rarely or never drank at age 16 were less likely than light drinkers (zero to two units per week) to binge drink in adulthood. However, male light drinkers were no more likely than non-drinkers to binge drink as adults. Drinking three to six units in the past week at 16 years, compared with zero to two units, increased the odds of adult binge drinking at each adult age in men and at 33 and 42

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 (years)	Adolescent drinking ^a			
		Rarely/never drink	0–2 units	3–6 units	7 or more units
Men					
n=4,747	23	1.06 (0.89, 1.25)	1.00	1.38 (1.13, 1.70)	2.07 (1.71, 2.51)
n=4,212	33	0.86 (0.71, 1.03)	1.00	1.26 (1.00, 1.58)	1.65 (1.33, 2.04)
n=4,205	42	1.01 (0.85, 1.21)	1.00	1.27 (1.02, 1.59)	1.64 (1.33, 2.08)
Women					
n=4,780	23	0.65 (0.55, 0.77)	1.00	1.18 (0.93, 1.45)	1.43 (0.94, 2.12)
n=4,408	33	0.73 (0.60, 0.90)	1.00	1.33 (1.01, 1.74)	0.96 (0.55, 1.67)
n=4,395	42	1.01 (0.83, 1.21)	1.00	1.27 (1.02, 1.78)	2.88 (1.85, 4.48)

^a Units of alcohol consumed in previous week. ^b Ten or more units per session (men); seven or more units per session (women).

years in women. The heaviest drinkers at 16 years (seven or more units per 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.

McCarty and colleagues (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 and colleagues (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 three or more days in the previous week) and binge drinking (consuming five 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 and 18 had significantly increased odds for later dependence (OR 8.1; 95%

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 to 6	Category	Estimated frequency		Alcohol dependence at age 20 years	
		n	95% CI	OR	95% CI
Frequent drinking	None	1,344	1,313, 1,374	1.0	–
	One wave	169	142, 196	4.4	2.4, 8.4
	More than one wave	88	68, 108	8.1	4.2, 16.0
Binge drinking	None	900	858, 942	1.0	–
	One wave	298	263, 333	3.0	1.4, 6.7
	More than one wave	403	367, 439	6.7	3.6, 12.0

CI: 4.2, 16.0), as did those who reported recurrent binge drinking (OR 6.7; 95% CI: 3.6, 12.0). In addition, the likelihood of alcohol dependence increased with persistence of frequent drinking through adolescence (frequent drinking at one wave: OR 2.0; 95% CI: 1.0, 4.3; frequent drinking at multiple waves: OR 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.

Wells and colleagues (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 from 953 respondents to the Christchurch Health and Development Study, who were assessed up to 25 years of age. 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 three 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 to 21 years and 21 to 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 to 21 years and 21 to 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 drinking³⁴ 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.

5.7.2 Health risk behaviours

Young people who binge drink in adolescence (15 to 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 misuse, crime, lower educational attainment and drug dependence.

Range of behaviours

Hill and colleagues (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 adolescence (reported previously). After controlling for confounders, participants classified as 'early highs' were not more likely than non-binge drinkers to be depressed, involved in crime or drug dependent at age 21, but they 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 onsetters' were more likely than non-binge

drinkers to be drug dependent, and were less likely to complete high school.

Chassin and colleagues (2002) described binge drinking trajectories from adolescence to young adulthood among a sample of participants who were children of alcoholics. Participants who were in any of the binge drinking trajectory groups ('early-heavy', 'late-moderate' or 'infrequent') were more likely than non-binge drinkers to be diagnosed with drug abuse and dependence, with the 'early-heavy' group at greatest risk. There was no significant effect of binge drinking group on predicting depression diagnoses or anxiety disorders. Participants in the non-binge drinking 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 and colleagues (2007) used data from an eight-wave cohort of 1,943 adolescents followed from adolescence (aged 14 to 15 years) to young adulthood (aged 24 to 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 misuse in young adulthood?; and (3) To what extent does heavier adolescent use of

³⁴ Defined as two or more episodes of consuming four or more drinks in a row in the previous two weeks.

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 use³⁵ independently predicted a higher rate of later high-risk cannabis use (OR 2.6; 95% CI: 1.2, 5.7). High-risk alcohol users³⁶ 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 to 16 years) drinking and educational attainment around age 26. Among boys, any past month alcohol use was associated with a 2 percentage point reduction in the probability of graduating on schedule, a 7 percentage point reduction in the probability of entering college, and a 5 percentage point reduction in graduating from college. The

results were similar for binge drinking in boys aged 15 to 16 years. Girls who used alcohol between ages 15 and 16 years had a 4 percentage point reduction in entering college compared with girls who did not use alcohol in the 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 to 18 years) drinking and educational attainment were not statistically significant. However, among boys, any alcohol use between the ages of 17 and 18 was associated with a 7 percentage point reduction in college entrance, and binge drinking was associated with a 9 percentage 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 suggested 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 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 drink in high school face an earnings penalty of 1.5 to 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.

³⁵ Defined as exceeding 28 standard drinks for the previous week in males and 14 standard drinks in females.

³⁶ Defined as exceeding 43 standard drinks for the previous week in males and 28 standard drinks in females.



6. REFERENCES

6 References

- Aas HN, Leigh BC, Anderssen N, Jakobsen R (1998) Two-year longitudinal study of alcohol expectancies and drinking among Norwegian adolescents. *Addiction* 93(3):373–84.
- Advisory Group on Drug and Alcohol Education (2008) *Drug Education: An Entitlement For All. A report to Government by the Advisory Group on Drug and Alcohol Education*. London: Department for Children, Schools and Families.
- Agrawal A, Grant JD, Waldron M, et al (2006) Risk for initiation of substance use as a function of age of onset of cigarette, alcohol and cannabis use: findings in a Midwestern female twin cohort. *Preventive Medicine* 43(2):125–8.
- Andrews JA, Hops H, Ary D, et al (1993) Parental influence on early adolescent substance use: specific and non-specific effects. *Journal of Early Adolescence* 13(3):285–310.
- Bellis MA, Hughes K, Morleo M, et al (2007) Predictors of risky alcohol consumption in schoolchildren and their implications for preventing alcohol-related harm. *Substance Abuse Treatment, Prevention, and Policy* 2:15.
- Bellis MA, Morleo M, Tocque K, et al (2009a) *Contributions of alcohol use to teenage pregnancy: An initial examination of geographical and evidence based associations*. Liverpool: North West Public Health Observatory/Centre for Public Health, Liverpool John Moores University.
- Bellis MA, Phillips-Howard PA, Hughes K, et al (2009b) Teenage drinking, alcohol availability and pricing: a cross-sectional study of risk and protective factors for alcohol-related harms in school children. *BMC Public Health* 9:380.
- Best D, Manning V, Gossop M, et al (2006) Excessive drinking and other problem behaviours among 14–16 year old schoolchildren. *Addictive Behaviors* 31(8):1424–35.
- Block GD, Yamamoto ME, Mallick A, Styche AJ (1993) Effects on pubertal hormones by ethanol abuse in adolescents. *Alcoholism: Clinical and Experimental Research* 17:505.
- Bonomo YA, Bowes G, Coffey C, et al (2004) Teenage drinking and the onset of alcohol dependence: a cohort study over seven years. *Addiction* 99(12):1520–8.
- Bonomo Y, Coffey C, Wolfe R, et al (2001) Adverse outcomes of alcohol use in adolescents. *Addiction* 96(10):1485–96.
- Brown SA, McGue M, Maggs J, et al (2008) A developmental perspective on alcohol and youths 16 to 20 years of age. *Pediatrics* 121 (Suppl 4):S290–310.
- Brown SA, Tapert SF (2004) Adolescence and the trajectory of alcohol use: basic to clinical studies. *Annals of the New York Academy of Science* 1021:234–44.
- Brown SA, Tapert SF, Granholm E, Delis DC (2000) Neurocognitive functioning of adolescents: effects of protracted alcohol use. *Alcoholism: Clinical and Experimental Research* 24(2):164–71.
- Caspi A, Begg D, Dickson N, et al (1997) Personality differences predict health-risk behaviors in young adulthood: evidence from a longitudinal study. *Journal of Personality and Social Psychology* 73(5):1052–63.

- Champion HL, Foley KL, DuRant RH, et al (2004) Adolescent sexual victimization, use of alcohol and other substances, and other health risk behaviors. *Journal of Adolescent Health* 35(4):321–8.
- Chassin L, Pitts SC, Prost J (2002) Binge drinking trajectories from adolescence to emerging adulthood in a high-risk sample: predictors and substance abuse outcomes. *Journal of Consulting and Clinical Psychology* 70(1):67–78.
- Chatterji P (2006) Does alcohol use during high school affect educational attainment?: Evidence from the National Education Longitudinal Study. *Economics of Education Review* 25(5):482–97.
- Clark DB, Lynch KG, Donovan JE, Block GD (2001) Health problems in adolescents with alcohol use disorders: self-report, liver injury, and physical examination findings and correlates. *Alcoholism: Clinical and Experimental Research* 25(9):1350–9.
- Clark DB, Thatcher DL, Tapert SF (2008) Alcohol, psychological dysregulation, and adolescent brain development. *Alcoholism: Clinical and Experimental Research* 32(3):375–85.
- Colder CR, Chassin L (1997) Affectivity and impulsivity: temperament risk for adolescent alcohol involvement. *Psychology of Addictive Behaviors* 11(2):83–97.
- Cooper ML, Peirce RS, Huselid RF (1994) Substance use and sexual risk taking among black adolescents and white adolescents. *Health Psychology* 13(3):251–62.
- Costa FM, Jessor R, Turbin MS (1999) Transition into adolescent problem drinking: the role of psychosocial risk and protective factors. *Journal of Studies on Alcohol* 60(4):480–90.
- Crews FT, Braun CJ, Hoplight B, et al (2000) Binge ethanol consumption causes differential brain damage in young adolescent rats compared with adult rats. *Alcoholism: Clinical and Experimental Research* 24(11):1712–23.
- Currie C, Gabhainn SN, Godeau E, et al (eds) (2008) *Inequalities in young people's health: Health Behaviour in School-aged Children. International report from the 2005/2006 survey*. WHO Policy Series: Health policy for children and adolescents, Issue 5. Copenhagen: WHO Regional Office for Europe.
- Darling H, Reeder AI, McGee R, Williams S (2006) Brief report: Disposable income, and spending on fast food, alcohol, cigarettes, and gambling by New Zealand secondary school students. *Journal of Adolescence* 29(5):837–43.
- Dawson DA, Goldstein RB, Chou SP, et al (2008) Age at first drink and the first incidence of adult-onset DSM-IV alcohol use disorders. *Alcoholism: Clinical and Experimental Research* 32(12):2149–60.
- Dawson DA, Grant BF, Li TK (2007) Impact of age at first drink on stress-reactive drinking. *Alcoholism: Clinical and Experimental Research* 31(1):69–77.
- De Bellis MD, Clark DB, Beers SR, et al (2000) Hippocampal volume in adolescent-onset alcohol use disorders. *American Journal of Psychiatry* 157:737–44.
- De Bellis MD, Keshavan MS, Beers SR, et al (2001) Sex differences in brain maturation during childhood and adolescence. *Cerebral Cortex* 11(6):552–7.

De Bellis MD, Narasimhan A, Thatcher DL, et al (2005) Prefrontal cortex, thalamus, and cerebellar volumes in adolescents and young adults with adolescent-onset alcohol use disorders and comorbid mental disorders. *Alcoholism: Clinical and Experimental Research* 29(9):1590–600.

De Bellis MD, Van Voorhees E, Hooper SR, et al (2008) Diffusion tensor measures of the corpus callosum in adolescents with adolescent onset alcohol use disorders. *Alcoholism: Clinical and Experimental Research* 32(3):395–404.

Department for Children, Schools and Families (2008) *Government Response to the report by the Advisory Group on Drug and Alcohol Education*. London: Department for Children, Schools and Families.

Department for Children, Schools and Families, Home Office, Department of Health (2008) *Youth Alcohol Action Plan*. London: Department for Children, Schools and Families.

Department for Transport (2008) *Road casualties Great Britain: 2007*. London: Department for Transport.

Department of Health (2009) *Signs for improvement: commissioning interventions to reduce alcohol-related harm*. London: Department of Health.

DeWit DJ, Adlaf EM, Offord DR, Ogborne AC (2000) Age at first alcohol use: a risk factor for the development of alcohol disorders. *American Journal of Psychiatry* 157(5):745–50.

Dishion TJ, McMahon RJ (1998) Parental monitoring and the prevention of child and adolescent problem behavior: a conceptual and empirical formulation. *Clinical Child and Family Psychology Review* 1(1):61–75.

Donovan JE (2004) Adolescent alcohol initiation: a review of psychosocial risk factors. *Journal of Adolescent Health* 35(6):529.e7–18.

Dooley D, Prause J, Ham-Rowbottom KA, Emptage N (2005) Age of alcohol drinking onset: precursors and the mediation of alcohol disorder. *Journal of Child and Adolescent Substance Abuse* 15(2):19–37.

Dukarm CP, Byrd RS, Auinger P, Weitzman M (1996) Illicit substance use, gender, and the risk of violent behavior among adolescents. *Archives of Pediatrics and Adolescent Medicine* 150(8):797–801.

Dye C, Upchurch DM (2006) Moderating effects of gender on alcohol use: implications for condom use at first intercourse. *Journal of School Health* 76(3):111–6.

Elgán C, Dykes AK, Samsioe G (2002) Bone mineral density and lifestyle among female students aged 16–24 years. *Gynecological Endocrinology* 16(2):91–98.

Ellickson PL, Tucker JS, Klein DJ (2003) Ten-year prospective study of public health problems associated with early drinking. *Pediatrics* 111:949–55.

Ellickson PL, Tucker JS, Klein DJ, McGuigan KA (2001) Prospective risk factors for alcohol misuse in late adolescence. *Journal of Studies on Alcohol* 62(6):773–82.

Faden VB, Goldman M (2005) The effects of alcohol on physiological processes and biological development. *Alcohol Research and Health* 28(3):125–31.

Fehily AM, Coles RJ, Evans WD, Elwood PC (1992) Factors affecting bone density in young adults. *American Journal of Clinical Nutrition* 56(3): 579–86.

- Fergusson DM, Horwood LJ (2000) Alcohol abuse and crime: a fixed-effects regression analysis. *Addiction* 95(10):1525–36.
- Fergusson DM, Lynskey MT (1996) Alcohol misuse and adolescent sexual behaviors and risk taking. *Pediatrics* 98(1):91–6.
- Fergusson DM, Lynskey MT, Horwood LJ (1994) Childhood exposure to alcohol and adolescent drinking patterns. *Addiction* 89(8):1007–16.
- Fergusson DM, Lynskey MT, Horwood LJ (1996) Alcohol misuse and juvenile offending in adolescence. *Addiction* 91(4):483–94.
- Flewelling RL, Bauman KE (1990) Family structure as a predictor of initial substance use and sexual intercourse in early adolescence. *Journal of Marriage and the Family* 52(1):171–81.
- Foley KL, Altman D, Durant RH, Wolfson M (2004) Adults' approval and adolescents' alcohol use. *Journal of Adolescent Health* 35(4):345.e17–26.
- Fortenberry JD, Orr DP, Katz BP, et al (1997) Sex under the influence. A diary self-report study of substance use and sexual behavior among adolescent women. *Sexually Transmitted Diseases* 24(6):313–9.
- Frias J, Rodriguez R, Torres JM, et al (2000a) Effects of acute alcohol intoxication on pituitary-gonadal axis hormones, pituitary-adrenal axis hormones, beta-endorphin and prolactin in human adolescents of both sexes. *Life Sciences* 67(9):1081–6.
- Frias J, Torres JM, Rodriguez R, et al (2000b) Effects of acute alcohol intoxication on growth axis in human adolescents of both sexes. *Life Sciences* 67(22):2691–7.
- Fujita Y, Katsumata K, Unno A, et al (1999) Factors affecting peak bone density in Japanese women. *Calcified Tissue International* 64(2):107–11.
- Fuller E (ed) (2009) *Smoking, drinking and drug use among young people in England in 2008*. London: NHS Information Centre for Health and Social Care.
- Gabel S, Stallings MC, Schmitz S, et al (1999) Personality dimensions and substance misuse: relationships in adolescents, mothers and fathers. *American Journal on Addictions* 8(2):101–13.
- Grant BF, Dawson DA (1997) Age at onset of alcohol use and its association with DSM-IV alcohol abuse and dependence: results from the National Longitudinal Alcohol Epidemiologic Survey. *Journal of Substance Abuse* 9:103–10.
- Grant BF, Stinson FS, Harford TC (2001) Age at onset of alcohol use and DSM-IV alcohol abuse and dependence: a 12-year follow-up. *Journal of Substance Abuse* 13(4):493–504.
- Gruber E, DiClemente RJ, Anderson MM, Lodico M (1996) Early drinking onset and its association with alcohol use and problem behavior in late adolescence. *Preventive Medicine* 25(3):293–300.
- Guxens M, Nebot M, Ariza C, Ochoa D (2007) Factors associated with the onset of cannabis use: a systematic review of cohort studies. *Gaceta Sanitaria* 21(3):252–60.
- Hawkins JD, Graham JW, Maguin E, et al (1997) Exploring the effects of age of alcohol use initiation and psychosocial risk factors on subsequent alcohol misuse. *Journal of Studies on Alcohol* 58(3):280–90.
- Hayes L, Smart D, Toumbourou JW, Sanson A (2004) *Parenting influences on adolescent alcohol use*. Melbourne: Australian Institute of Family Studies.

Hibell B, Guttormsson U, Ahlström S, et al (2009) *The 2007 ESPAD Report: Substance Use Among Students in 35 European Countries*. Stockholm: The Swedish Council for Information on Alcohol and Other Drugs.

Hill KG, White HR, Chung IJ, et al (2000) Early adult outcomes of adolescent binge drinking: person- and variable-centered analyses of binge drinking trajectories. *Alcoholism: Clinical and Experimental Research* 24(6):892–901.

Hingson RW, Heeren T, Jamanka A, Howland J (2000) Age of drinking onset and unintentional injury involvement after drinking. *Journal of the American Medical Association* 284(12):1527–33.

Hingson R, Heeren T, Levenson S, et al (2002) Age of drinking onset, driving after drinking, and involvement in alcohol-related motor vehicle crashes. *Accident Analysis and Prevention* 34(1):85–92.

Hingson RW, Heeren T, Winter MR (2006) Age at drinking onset and alcohol dependence: age at onset, duration, and severity. *Archives of Pediatrics and Adolescent Medicine* 160(7):739–46.

Hingson R, Heeren T, Zakocs R (2001) Age of drinking onset and involvement in physical fights after drinking. *Pediatrics* 108(4):872–7.

Hingson R, Heeren T, Zakocs R, et al (2003) Age of first intoxication, heavy drinking, driving after drinking and risk of unintentional injury among U.S. college students. *Journal of Studies on Alcohol* 64(1):23–31.

Jefferis BJ, Power C, Manor O (2005) Adolescent drinking level and adult binge drinking in a national birth cohort. *Addiction* 100(4):543–9.

Jiang X, Li D, Boyce W, Pickett W (2008) Alcohol consumption and injury among Canadian adolescents: variations by urban-rural geographic status. *Journal of Rural Health* 24(2):143–7.

Kim-Godwin YS, Clements C, Bullers S, et al (2007) Sexual behaviors and drinking patterns among middle school and high school students in southeastern North Carolina. *Journal of School Nursing* 23(4):214–21.

Kuntsche E, Knibbe R, Gmel G, Engels R (2005) Why do young people drink? A review of drinking motives. *Clinical Psychology Review* 25(7):841–61.

Lanza ST, Collins LM (2002) Pubertal timing and the onset of substance use in females during early adolescence. *Prevention Science* 3(1):69–82.

Lavikainen H, Ahlström S, Metso L, et al (2008) Relationship between negative experiences and drinking experience among 15- to 16-year-old adolescents in Finland. *European Addiction Research* 14(3):169–78.

Lenroot RK, Giedd JN (2006) Brain development in children and adolescents: insights from anatomical magnetic resonance imaging. *Neuroscience and Biobehavioral Reviews* 30(6):718–29.

Lo CC (2000) Timing of drinking initiation: a trend study predicting drug use among high school seniors. *Journal of Drug Issues* 30(3):525–54.

Lowry R, Holtzman D, Truman BI, et al (1994) Substance use and HIV-related sexual behaviors among US high school students: are they related? *American Journal of Public Health* 84(7):1116–20.

Matthews S, Brasnett L, Smith J (2006) *Underage drinking: findings from the 2004 Offending, Crime and Justice Survey*. London: Home Office.

Mattila VM, Parkkari J, Lintonen T, et al (2005) Occurrence of violence and violence-related injuries among 12–18 year-old Finns. *Scandinavian Journal of Public Health* 33(4):307–13.

McCarty CA, Ebel BE, Garrison MM, et al (2004) Continuity of binge and harmful drinking from late adolescence to early adulthood. *Pediatrics* 114(3):714–9.

- McGue M, Iacono WG, Legrand LN, et al (2001a) Origins and consequences of age at first drink. I. Associations with substance-use disorders, disinhibitory behavior and psychopathology, and P3 amplitude. *Alcoholism: Clinical and Experimental Research* 25(8):1156–65.
- McGue M, Iacono WG, Legrand LN, Elkins I (2001b) Origins and consequences of age at first drink. II. Familial risk and heritability. *Alcoholism: Clinical and Experimental Research* 25(8):1166–73.
- Miller JW, Naimi TS, Brewer RD, Jones SE (2007) Binge drinking and associated health risk behaviors among high school students. *Pediatrics* 119(1):76–85.
- Monshouwer K, Smit F, de Swart WM, et al (2003) Progress from a first drink to first intoxication: age of onset, time-windows and risk factors in a Dutch national sample of secondary school students. *Journal of Substance Use* 8(3):155–63.
- Morrison DM, Gillmore MR, Hoppe MJ, et al (2003) Adolescent drinking and sex: findings from a daily diary study. *Perspectives on Sexual and Reproductive Health* 35(4):162–8.
- Moss HB (2008) Special section: alcohol and adolescent brain development. *Alcoholism: Clinical and Experimental Research* 32(3):427–9.
- National Health and Medical Research Council (2009) *Australian Guidelines to Reduce Health Risks from Drinking Alcohol*. Canberra: National Health and Medical Research Council.
- National Treatment Agency for Substance Misuse (2008) *Guidance on commissioning young people's specialist substance misuse treatment services*. London: National Treatment Agency.
- Neville CE, Murray LJ, Boreham CA, et al (2002) Relationship between physical activity and bone mineral status in young adults: the Northern Ireland Young Hearts Project. *Bone* 30(5):792–8.
- Newbury-Birch D, Gilvarry E, McArdle P, et al (2008) *Impact of Alcohol Consumption on Young People: A Review of Reviews*. Newcastle: Newcastle University for the Department for Children, Schools and Families.
- Patton GC, Coffey C, Lynskey MT, et al (2007) Trajectories of adolescent alcohol and cannabis use into young adulthood. *Addiction* 102(4):607–15.
- Pitkänen T, Lyyra AL, Pulkkinen L (2005) Age of onset of drinking and the use of alcohol in adulthood: a follow-up study from age 8–42 for females and males. *Addiction* 100(5):652–61.
- Prescott CA, Kendler KS (1999) Age at first drink and risk for alcoholism: a noncausal association. *Alcoholism: Clinical and Experimental Research* 23(1):101–7.
- Ramisetty-Mikler S, Caetano R, Goebert D, Nishimura S (2004) Ethnic variation in drinking, drug use, and sexual behavior among adolescents in Hawaii. *Journal of School Health* 74(1):16–22.
- Rashad I, Kaestner R (2004) Teenage sex, drugs and alcohol use: problems identifying the cause of risky behaviors. *Journal of Health Economics* 23(3):493–503.
- Rees DI, Argys LM, Averett SL (2001) New evidence on the relationship between substance use and adolescent sexual behavior. *Journal of Health Economics* 20(5):835–45.
- Renna F (2007) The economic cost of teen drinking: late graduation and lowered earnings. *Health Economics* 16:407–19.
- Sabel JC, Bensley LS, Van Eenwyk J (2004) Associations between adolescent drinking and driving involvement and self-reported risk and protective factors in students in public schools in Washington State. *Journal of Studies on Alcohol* 65(2):213–6.

School Health Education Unit (2007) *Young People into 2007*. Exeter: School Health Education Unit.

Sen B (2002) Does alcohol-use increase the risk of sexual intercourse among adolescents? Evidence from the NLSY97. *Journal of Health Economics* 21(6):1085–93.

Shepherd JP, Sutherland I, Newcombe RG (2006) Relations between alcohol, violence and victimization in adolescence. *Journal of Adolescence* 29(4):539–53.

Sindelar HA, Barnett NP, Spirito A (2004) Adolescent alcohol use and injury. A summary and critical review of the literature. *Minerva Pediatrica* 56(3):291–309.

Smith GT, Goldman MS (1994) Alcohol expectancy theory and the identification of high-risk adolescents. *Journal of Research on Adolescence* 4(2):229–48.

Soloff PH, Lynch KG, Moss HB (2000) Serotonin, impulsivity, and alcohol use disorders in the older adolescent: a psychobiological study. *Alcoholism: Clinical and Experimental Research* 24(11):1609–19.

Spear LP, Varlinskaya EI (2005) Adolescence. Alcohol sensitivity, tolerance, and intake. *Recent Developments in Alcoholism* 17:143–59.

Strauss RS, Barlow SE, Dietz WH (2000) Prevalence of abnormal serum aminotransferase values in overweight and obese adolescents. *Journal of Pediatrics* 136(6):727–33.

Stueve A, O'Donnell LN (2005) Early alcohol initiation and subsequent sexual and alcohol risk behaviors among urban youths. *American Journal of Public Health* 95(5):887–93.

Swahn MH, Bossarte RM (2007) Gender, early alcohol use, and suicide ideation and attempts: findings from the 2005 Youth Risk Behavior Survey. *Journal of Adolescent Health* 41(2):175–81.

Swahn MH, Bossarte RM, Sullivent EE (2008) Age of alcohol use initiation, suicidal behavior, and peer and dating violence victimization and perpetration among high-risk, seventh-grade adolescents. *Pediatrics* 121(2):297–305.

Swahn MH, Donovan JE (2005) Predictors of fighting attributed to alcohol use among adolescent drinkers. *Addictive Behaviors* 30(7):1317–34.

Swahn MH, Simon TR, Hammig BJ, Guerrero JL (2004) Alcohol-consumption behaviors and risk for physical fighting and injuries among adolescent drinkers. *Addictive Behaviors* 29(5):959–63.

Takakura M, Wake N (2003) Association of age at onset of cigarette and alcohol use with subsequent smoking and drinking patterns among Japanese high school students. *Journal of School Health* 73(6):226–31.

Thomas G, Reifman A, Barnes GM, Farrell MP (2000) Delayed onset of drunkenness as a protective factor for adolescent alcohol misuse and sexual risk taking: a longitudinal study. *Deviant Behavior* 21(2):181–209.

TRL Limited (2008) *Blood alcohol levels in road accident fatalities for 2006 in Great Britain*. Wokingham: TRL Limited.

Van Der Vorst H, Engels RC, Deković M, et al (2007) Alcohol-specific rules, personality and adolescents' alcohol use: a longitudinal person-environment study. *Addiction* 102(7):1064–75.

Van Der Vorst H, Engels RC, Meeus W, Deković M (2006) The impact of alcohol-specific rules, parental norms about early drinking and parental alcohol use on adolescents' drinking behavior. *Journal of Child Psychology and Psychiatry* 47(12):1299–306.

Van Reek J, Adriaanse H, Knibbe R (1994) Alcohol consumption and correlates among children in the European Community. *International Journal of the Addictions* 29(1):15–21.

Viner RM, Taylor B (2007) Adult outcomes of binge drinking in adolescence: findings from a UK national birth cohort. *Journal of Epidemiology and Community Health* 61(10):902–7.

Voas RB, Tippetts AS, Fell JC (2003) Assessing the effectiveness of minimum legal drinking age and zero tolerance laws in the United States. *Accident Analysis and Prevention* 35(4):579–87.

Warner LA, White HR (2003) Longitudinal effects of age at onset and first drinking situations on problem drinking. *Substance Use and Misuse* 38(14):1983–2016.

Wells JE, Horwood LJ, Fergusson DM (2004) Drinking patterns in mid-adolescence and psychosocial outcomes in late adolescence and early adulthood. *Addiction* 99(12):1529–41.

Wells S, Graham K, Speechley M, Koval JJ (2005) Drinking patterns, drinking contexts and alcohol-related aggression among late adolescent and young adult drinkers. *Addiction* 100(7):933–44.

Wells S, Graham K, Speechley M, Koval JJ (2006) Do predisposing and family background characteristics modify or confound the relationship between drinking frequency and alcohol-related aggression? A study of late adolescent and young adult drinkers. *Addictive Behaviors* 31(4):661–75.

Windle M, Spear LP, Fuligni AJ, et al (2008) Transitions into underage and problem drinking: developmental processes and mechanisms between 10 and 15 years of age. *Pediatrics* 121(Suppl 4):S273–89.

York JL, Welte J, Hirsch J, et al (2004) Association of age at first drink with current alcohol drinking variables in a national general population sample. *Alcoholism: Clinical and Experimental Research* 28(9):1379–87.

Zador PL, Krawchuk SA, Voas RB (2000) Alcohol-related relative risk of driver fatalities and driver involvement in fatal crashes in relation to driver age and gender: an update using 1996 data. *Journal of Studies on Alcohol* 61(3):387–95.

Zakrajsek JS, Shope JT (2006) Longitudinal examination of underage drinking and subsequent drinking and risky driving. *Journal of Safety Research* 37(5):443–51.

Zucker RA, Donovan JE, Masten AS, et al (2008) Early developmental processes and the continuity of risk for underage drinking and problem drinking. *Pediatrics* 121(Suppl 4):S252–72.



© Crown copyright 2009

299789 1p 500 Dec 09 (FMP)

Produced by COI for the Department of Health

If you require further copies of this title visit

www.orderline.dh.gov.uk and quote:

299789/Guidance on the consumption of alcohol by children and young people

Tel: 0300 123 1002

Minicom: 0300 123 1003

(8am to 6pm, Monday to Friday)

www.dh.gov.uk/publications



When you have finished
with this please recycle it

50% recycled

This is printed on
recycled paper