

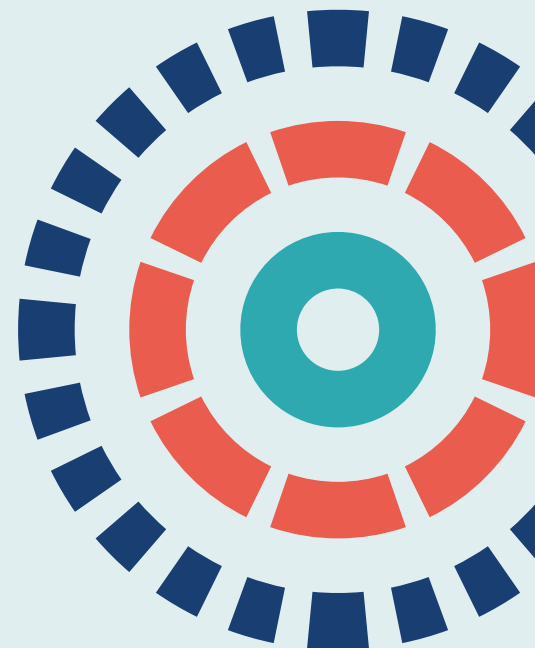
## Programme Grants for Applied Research

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# Screening and brief interventions for adolescent alcohol use disorders presenting through emergency departments: a research programme including two RCTs

*Paolo Deluca, Simon Coulton, Mohammed Fasihul Alam, Sadie Boniface, Kim Donoghue, Eilish Gilvarry, Eileen Kaner, Ellen Lynch, Ian Maconochie, Paul McArdle, Ruth McGovern, Dorothy Newbury-Birch, Robert Patton, Tracy Pellatt-Higgins, Ceri Phillips, Thomas Phillips, Rhys Pockett, Ian T Russell, John Strang and Colin Drummond*





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# Abstract

## Screening and brief interventions for adolescent alcohol use disorders presenting through emergency departments: a research programme including two RCTs

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**Background:** Alcohol consumption and related harm increase steeply from the ages of 12–20 years. Adolescents in the UK are among the heaviest drinkers in Europe. Excessive drinking in adolescents is associated with increased risk of accidents, injuries, self-harm, unprotected or regretted sex, violence and disorder, poisoning and accidental death. However, there is lack of clear evidence for the most clinically effective and cost-effective screening and brief interventions for reducing or preventing alcohol consumption in adolescents attending emergency departments (EDs).

**Objectives:** To estimate the distribution of alcohol consumption, alcohol-related problems and alcohol use disorders in adolescents attending EDs; to develop age-appropriate alcohol screening and brief intervention tools; and to evaluate the clinical effectiveness and cost-effectiveness of these interventions.

**Design:** The research has been conducted in three linked stages: (1) a prevalence study, (2) intervention development and (3) two linked randomised controlled trials (RCTs).

**Setting:** Twelve EDs in England (London, North East, and Yorkshire and The Humber).

**Participants:** A total of 5376 participants in the prevalence study [mean age 13.0 years, standard deviation (SD) 2.0 years; 46.2% female] and 1640 participants in the two linked RCTs (mean age 15.6 years, SD 1.0 years; 50.7% female).

**Interventions:** Personalised feedback and brief advice (PFBA) and personalised feedback plus electronic brief intervention (eBI), compared with alcohol screening alone. These age-appropriate alcohol interventions were developed in collaboration with the target audience through a series of focus groups and evaluations during stage 2 of the research programme and following two literature reviews.

**Main outcome measures:** Total alcohol consumed in standard UK units (1 unit = 8 g of ethanol) over the previous 3 months at 12-month follow-up, assessed using the Alcohol Use Disorders Identification Test, Consumption (3 items) (AUDIT-C).

**Results:** In the prevalence study, 2112 participants (39.5%) reported having had a drink of alcohol that was more than a sip in their lifetime, with prevalence increasing steadily with age and reaching 89.5% at the age of 17 years. The prevalence of at-risk alcohol consumption was 15% [95% confidence interval (CI) 14% to 16%] and the optimum cut-off point of the AUDIT-C in identifying at-risk drinking was  $\geq 3$ . Associations of alcohol consumption and early onset of drinking with poorer health and social functioning were also found. In the RCT, the analysis of the primary outcome (average weekly alcohol consumption at month 12) identified no significant differences in effect between the three groups in both trials. In the high-risk drinking trial, the mean difference compared with control was 0.57 (95% CI -0.36 to 1.70) for PFBA and 0.19 (95% CI -0.71 to 1.30) for eBI. In the low-risk drinking trial, the mean difference compared with control was 0.03 (95% CI -0.07 to 0.13) for PFBA and 0.01 (95% CI -0.10 to 0.11) for eBI. The health economic analysis showed that eBI and PFBA were not more cost-effective than screening alone.

**Conclusions:** The ED can offer an opportunity for the identification of at-risk alcohol use in adolescents. A simple, short, self-completed screening instrument, the AUDIT-C, is an effective tool for identifying adolescents who are at risk of alcohol-related problems. Associations of alcohol consumption and earlier onset of drinking with poorer health and social functioning were observed in the prevalence study. The trials were feasible to implement and exceeded the recruitment target and minimum follow-up rates. However, PFBA and eBI were not found to be more effective than screening alone in reducing or preventing alcohol consumption in 14- to 17-year-olds attending EDs.

**Limitations and future work:** Only one-third of participants engaged with the application program; this is likely to have limited the effect of the intervention. We recommend that future research should focus on methods to maximise engagement with digital interventions and evaluate the effect of such engagement on clinical outcomes.

**Trial registration:** Current Controlled Trials ISRCTN45300218.

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## List of abbreviations

A&E	accident and emergency	MI	motivational interviewing
app	application program	MINI-KID	Mini International Neuropsychiatric Interview for Children and Adolescents
AUD	alcohol use disorder		
AUDIT	Alcohol Use Disorders Identification Test	NICE	National Institute for Health and Care Excellence
AUDIT-C	Alcohol Use Disorders Identification Test, Consumption (3 items)	OR	odds ratio
CI	confidence interval	PFBA	personalised feedback and brief advice
CRAFFT	Car, Relax, Alone, Forget, Friends, Trouble	PMG	Programme Management Group
CSRI	Client Service Receipt Inventory	PSA	probabilistic sensitivity analysis
eBI	electronic brief intervention	PSS	Personal and Social Services
ED	emergency department	QALY	quality-adjusted life-year
EQ-5D-5L	EuroQol-5 Dimensions, five-level version	RCT	randomised controlled trial
eSBI	electronic screening and brief intervention	SBI	screening and brief intervention
ESPAD	European School Survey Project on Alcohol and Other Drugs	SD	standard deviation
GP	general practitioner	SE	standard error
ICD-10	<i>International Classification of Diseases</i> , Tenth Edition	SIPS	Screening and Intervention to Promote Sensible drinking
ICER	incremental cost-effectiveness ratio	SMS	short message service
		WTP	willingness to pay



## Plain English summary

Adolescents in the UK are among the heaviest-drinking adolescents in Europe. Drinking in adolescence is associated with alcohol-related harms, and early drinking is linked to intellectual impairment and more serious alcohol problems later on in life.

This research was conducted in three stages and targeted adolescents presenting to emergency departments to identify the size of the problem and develop and evaluate age-appropriate interventions.

First, we surveyed 5000 adolescents attending emergency departments, 40% of whom had drunk more than a sip of alcohol in their lifetime. Drinking earlier was linked to poorer health, and to alcohol and social problems. We found that a short questionnaire can identify adolescents who are drinking at risky levels.

Second, we reviewed published research and developed interventions. We met adolescents and parents to design the third stage of our research.

We then did two studies: (1) a study among adolescents drinking little who were aiming to delay starting drinking and (2) a study among adolescents drinking more who were aiming to reduce their consumption. Participants were allocated to one of three groups by chance: (1) screening only and care as usual, (2) feedback and brief alcohol advice, and (3) feedback and an application program with alcohol advice.

We successfully ran both studies and exceeded targets for recruitment and follow-up. However, we found that neither of our interventions was effective in reducing alcohol consumption in adolescents drinking high quantities of alcohol, or in delaying drinking in those drinking less or not drinking, compared with screening alone. Moreover, these interventions did not represent value for money compared with screening alone.

We later interviewed adolescents in the studies to explore their understanding and experience of taking part. Adolescents felt that they should know more about the risks of alcohol, that the advice was helpful and that emergency departments were a useful setting.



# Scientific summary

## Background

Alcohol consumption is a major public health concern. Although the main burden of chronic alcohol-related disease is in adults, its foundations often lie in adolescence. Alcohol consumption and related harm increase steeply from the age of 12 years, and although the proportion of young people in England aged between 11 and 15 years who reported that they had drunk alcohol had decreased in the last 30 years, the mean amount consumed by those who drank doubled. About 10% of 11- to 15-year-olds and 33% of 15- to 16-year-olds in England had reported alcohol intoxication in the past month.

Alcohol use and alcohol use disorders (AUDs) are relatively uncommon in early adolescence. Nevertheless, alcohol has a disproportionate effect on younger adolescents, for example by predisposing them to alcohol dependence in later life and damage to the developing brain. In middle adolescence (ages 15–17 years), binge drinking emerges. Although binge drinking does not necessarily meet the criteria for an AUD, it is associated with an increased risk of unprotected or regretted sexual activity, criminal and disorderly behaviour, suicidality and self-harm, injury, drink driving, alcohol poisoning and accidental death.

In 2009, the Chief Medical Officer for England provided recommendations on alcohol consumption in young people based on an evidence review (Donaldson L. *Guidance on the Consumption of Alcohol by Children and Young People*. London: Department of Health and Social Care; 2009). These recommendations stated that children should abstain from alcohol before the age of 15 years and that 15- to 17-year-olds should not drink, but, if they do drink, then they should consume no more than the recommended limits for adults (currently 14 units per week).

## Alcohol screening and brief interventions in health settings

Opportunistic alcohol screening and brief interventions (SBIs) in emergency departments (EDs) capitalise on the 'teachable moment' when a connection can be made between alcohol consumption and ED attendance. SBIs in EDs have shown efficacy in adults and adolescents, and evidence of cost-effectiveness in adults. However, although there has been an increase in SBIs for adults, adolescents remain a comparatively neglected group.

Several alcohol screening methods have been developed in the USA but not evaluated in the UK. Questionnaires were found to perform better than blood markers or breath alcohol concentration in all age groups. However, most of these had low sensitivity and specificity and are therefore suboptimal for effective screening.

The validity of alcohol screening methods in younger adolescents is also unclear. Existing approaches do not sufficiently take account of the age and developmental stage of adolescents.

Moreover, a systematic review of brief alcohol interventions in young people attending health settings identified nine randomised controlled trials (RCTs) between 1999 and 2008. Eight were based in the USA and one was based in Australia. Six trials tested brief interventions based on one or two sessions of motivational interviewing (MI) that lasted between 20 and 45 minutes. One trial tested a more intensive programme of four MI sessions over 1 month. Two studies used information technology to deliver brief interventions, one using an audio programme in primary care and the other using an interactive computer program in a minor injury unit.

Five trials reported significant positive effects of brief interventions on a range of alcohol consumption measures, whereas three trials reported null effects after brief interventions. One trial reported an increase in alcohol use and binge drinking among brief intervention subjects, which is a possible adverse effect.

Therefore, there is a need to develop more effective alcohol screening tools and interventions for adolescents in the ED that are age appropriate and cover a wider range of alcohol consumption and alcohol-related problems than do existing methods. Although evidence suggests that brief interventions may be beneficial for adolescents, particularly in EDs, there is a clear need for a UK trial to examine this further.

This research programme was designed to address these key gaps in the evidence base for the most clinically effective and cost-effective SBIs for at-risk adolescent heavy drinkers, and prevent alcohol uptake or increased alcohol consumption in low-risk adolescents attending EDs.

### **Work package 1: prevalence study of alcohol consumption and alcohol use disorders in adolescents aged 10–17 years attending emergency departments**

This work package investigated the prevalence of alcohol consumption in adolescents presenting to EDs and the association between that consumption, age at onset, and health and social behaviours. In addition, we assessed the diagnostic performance of brief screening tools.

#### **Methods**

We included 5376 consecutive attenders, aged 10–17 years, at 10 EDs. We collected information on alcohol use, alcohol-related health and social consequences, general health and social functioning, and quality of life.

#### **Results**

Nearly 40% of adolescents reported that their consumption of alcohol was more than a sip in their lifetime. First alcohol consumption before the age of 15 years was associated with tobacco use [odds ratio (OR) 2.8, 95% confidence interval (CI) 1.8 to 4.2;  $p < 0.001$ ], lower quality of life (OR 1.5, 95% CI 0.5 to 2.6;  $p = 0.003$ ) and diagnosis of AUD (OR 2.4, 95% CI 1.3 to 4.4;  $p = 0.002$ ). It was also associated with impaired general social functioning [presence of conduct disorder (OR 4.5, 95% CI 1.8 to 11.4;  $p < 0.001$ ) and hyperactivity (OR 2.6, 95% CI 1.4 to 4.8;  $p < 0.001$ )], alcohol-related health and social consequences [accidents (OR 1.8, 95% CI 1.0 to 3.2;  $p = 0.046$ ), and problems with parents (OR 4.4, 95% CI 1.3 to 15.4;  $p = 0.017$ ), school (OR 3.7, 95% CI 1.2 to 11.3;  $p = 0.0117$ ) or police (OR 13.5, 95% CI 1.7 to 102.4;  $p = 0.012$ )].

We tested the screening properties of the questionnaire against the standard (Timeline Followback) criteria for at-risk drinking, heavy episodic alcohol consumption and the *International Classification of Diseases*, Tenth Edition (ICD-10), for hazardous alcohol use and dependence. We identified appropriate cut-off points for each instrument. An Alcohol Use Disorders Identification Test, Consumption (3 items) (AUDIT-C) score of  $\geq 3$  was the optimal cut-off point for at-risk drinking (sensitivity 0.89, 95% CI 0.89 to 0.91; specificity 0.97, 95% CI 0.96 to 0.97), monthly episodic alcohol use (sensitivity 0.76, 95% CI 0.73 to 0.80; specificity 0.98, 95% CI 0.97 to 0.98) and alcohol abuse (sensitivity 0.91, 95% CI 0.85 to 0.95; specificity 0.90, 95% CI 0.88 to 0.91). A score of 7 for the full Alcohol Use Disorders Identification Test was considered the optimal cut-off point for identifying alcohol dependence (sensitivity 0.96, 95% CI 0.89 to 0.99; specificity 0.90, 95% CI 0.88 to 0.91).

## Conclusions

We found associations of alcohol consumption and earlier onset of drinking with poorer health and social functioning. EDs offer opportunities to identify at-risk alcohol use in adolescents. A simple, short, self-completed screening instrument, the AUDIT-C, is an effective tool for identifying adolescents who are at risk of alcohol-related problems, or engage in monthly heavy episodic alcohol use or in harmful alcohol use, according to the ICD-10 criteria. A score of 7 on the AUDIT-C is effective in identifying adolescents who are alcohol dependent.

## Work package 2: exploratory modelling of the interventions

This work package developed age-appropriate alcohol interventions in collaboration with the target audience through a series of focus groups and evaluations.

### *Personalised feedback and brief advice*

The personalised feedback and brief advice (PFBA) intervention is structured brief advice that takes approximately 5 minutes to deliver. It is based on an advice leaflet from Screening and Intervention to Promote Sensible drinking (SIPS), Brief Advice About Alcohol Risk, and was adapted for the target age group in this study. The advice covers recommended levels of alcohol consumption for young people; summarises the screening test results and their meaning; provides normative comparative information on prevalence rates of high- and low-risk drinking in young people; summarises the risks of drinking and highlights the benefits of stopping or reducing alcohol consumption; outlines strategies that the young person might employ to help stop or reduce alcohol consumption; and indicates where to obtain further help if they are unsuccessful or need more support.

### *Electronic brief intervention based on smartphone or web*

The electronic brief intervention (eBI) smartphone intervention is an offline-capable mobile web application that works on a variety of platforms, but it was optimised for recent iPhone (Apple Inc., Cupertino, CA, USA) and Android (Google Inc., Mountain View, CA, USA) phones. It has been developed using the concept of gamification so that users can navigate, explore, learn facts and figures about alcohol, receive personalised feedback and set goals in an engaging format. The content adapts to provide the most pertinent information and advice for high- or low-risk drinkers. Game components of the web application supported high-risk drinkers to reduce or stop their alcohol consumption and low-risk users to maintain abstinence or low-risk drinking.

## Work package 3: linked randomised controlled trials of face-to-face and electronic brief intervention methods to prevent alcohol-related harm in young people aged 14–17 years presenting to emergency departments

In work package 3, we conducted two linked RCTs to evaluate the clinical effectiveness and cost-effectiveness of PFBA and eBI (the two alcohol interventions described above), compared with screening alone, in 14- to 17-year-olds attending 10 EDs in England. One trial focused on at-risk adolescent drinkers (AUDIT-C score of  $\geq 3$ ) and the other focused on abstinent or low-risk drinkers (AUDIT-C score of  $< 3$ ). Our primary (null) hypothesis was similar for both trials: PFBA and personalised feedback plus eBI are as effective as screening alone in reducing or preventing alcohol consumption, in standard UK units (1 unit = 8 g of ethanol), over the past 3 months, at 12 months after randomisation, as measured with the AUDIT-C. Our secondary (null) hypothesis for related health economics states that PFBA and eBI are as cost-effective as screening alone.

## Methods

We undertook participant recruitment, baseline data collection, randomisation, intervention delivery and follow-up electronically via an ad hoc, secure computer tablet application developed as part of this programme. We recruited 1639 participants into the trials from 10 EDs: 756 high-risk drinkers and 883 low-risk drinkers or abstainers. Follow-up at 6 and 12 months was 82.9% and 73.0%, respectively.

## Results

The mean age of participants was 16.1 [standard deviation (SD) 0.9] years in the high-risk study and 15.2 (SD 1.0) years in the low-risk study. There was a similar proportion of male and female participants, with 50.7% female overall. Primary analysis employed an intention-to-treat approach, in which participants were allocated as members of their allocated group irrespective of the treatment received. Analysis of the primary outcome, namely average weekly alcohol consumption in standard UK units (1 unit = 8 g of ethanol) at month 12, was conducted using analysis of covariance, adjusting for baseline values, age and gender. There were no significant differences between the three groups in either trial: in the high-risk trial, the mean difference compared with control was 0.57 (95% CI -0.36 to 1.70) for PFBA and 0.19 (95% CI -0.71 to 1.30) for eBI; in the low risk trial, the mean difference compared with control was 0.03 (95% CI -0.07 to 0.13) for PFBA and 0.01 (95% CI -0.10 to 0.11) for eBI. No significant interactions were observed between baseline alcohol consumption and allocated intervention. Alcohol consumption at 12 months was predicted at baseline by higher alcohol consumption, younger age at first drink, older age, being female, greater positive alcohol expectancy and greater alcohol-related problems. Health economic analysis supported the null hypothesis that neither PFBA nor eBI is more cost-effective than screening alone in both trials.

## Conclusions

Findings from this research indicate that both face-to-face and electronic interventions were neither more effective nor more cost-effective than screening alone in reducing or preventing alcohol consumption in 14- to 17-year-olds attending EDs.

## Qualitative study

Once follow-up was completed for all trials, we interviewed a sample of participating adolescents to explore their understanding of the study, as well as their views about the information and advice they received.

## Methods

We interviewed 27 adolescents aged 14–17 years. Audio-recorded interviews were transcribed verbatim and thematically analysed, guided by four ethical principles (autonomy, beneficence, non-maleficence and justice).

## Results

Participants were broadly positive about their experience of being approached and involved in the research process, and the emergency care context was felt to be acceptable. Participants reported a 'need to know' about risks from alcohol consumption, as this behaviour was seen to be common among young people. However, the presence of a primary caregiver during screening procedures could influence a young person's disclosure about alcohol use. The majority of participants demonstrated a high degree of moral agency, that is, an awareness and capacity to be responsible for actions related to their own health and well-being, and this extended to providing consent, on their own behalf, to participate in the relevant clinical trial.



## Conclusions

There is limited evidence regarding effective behaviour change interventions for young people attending health services owing to concerns about involving vulnerable adolescents in research. However, even relatively young adolescents reported the capacity to provide informed consent and showed a clear interest in research that was relevant to them and had potential to benefit young people like them.

## Discussion

The results of both the low- and the high-risk trials showed that we were able to recruit a sufficient number of participants to each trial to meet our target. We were also able to exceed the minimum follow-up targets in both trials. However, in both trials no significant differences in outcome were found between groups on either primary or secondary outcome measures. This supported the null hypothesis that PFBA and eBI are no more effective in preventing or reducing alcohol consumption in either low- or high-risk drinkers than screening alone.

In both trials, we found that engagement with the eBI was low among participants randomised to eBI. Only one-third of participants engaged with the eBI platform after leaving the ED. This may have limited the impact of the eBI compared with the control intervention. However, as these were pragmatic trials, this is likely to be the level of engagement expected in the typical patient recruited from an ED.

Low application program (app) usage or engagement is a common issue. The vast majority of apps, and other online interventions, are not used 1 month after they are downloaded. We also know that patients are less likely to engage in extended interventions when the onus to engage is on them.

A large proportion of the literature based on eBI has focused on the provision of websites, as opposed to smartphone apps. Arguably, the most important problem with developing an effective eBI app is engaging participants enough for them to find it useful.

Further research should explore strategies to improve engagement with the intervention.

## Patient and public involvement

We worked closely with the British Youth Council and the Family and Parenting Institute, which facilitated focus group workshops in London and Newcastle. About 150 members of our target age group contributed to both methodology and materials. This activity changed our screening and intervention, notably the use of tablet computers for consent and data collection, and the design of specific materials, notably our PFBA brief advice leaflet and SIPS City app (version 2.1, King's College London, London, UK). We now maintain a database of young people interested in taking this work forward, whom we intend to engage in disseminating study findings.

## Overall conclusions

This research programme was designed to address key gaps in the evidence base for the most clinically effective and cost-effective SBIs for adolescents attending EDs. The research has advanced our understanding of the nature and prevalence of AUDs in adolescents, and provided a firm foundation for future research to improve care for this population. We established the prevalence of AUDs and consequences of drinking in young people attending EDs using validated research tools. We developed age-appropriate and acceptable interventions for this population, in partnerships with national and local organisations, and tested them in two linked randomised trials.

## Trial registration

This trial is registered as ISRCTN45300218.

## Funding

This project was funded by the National Institute for Health Research (NIHR) Programme Grants for Applied Research programme and will be published in full in *Programme Grants for Applied Research*; Vol. 8, No. 2. See the NIHR Journals Library website for further project information.

# SYNOPSIS

## Setting the scene

The excessive consumption of alcohol is a major global public health issue,<sup>1</sup> and, in Europe, alcohol accounted for 6.5% of deaths and 11.6% of disability-adjusted life-years in 2004.<sup>2</sup> Although the main burden of chronic alcohol-related disease is in adults, its foundations often lie in adolescence.<sup>3</sup> The proportion of young people in England aged between 11 and 15 years who reported that they had drunk alcohol decreased from 62% to 54% between 1988 and 2007, but the mean amount consumed by those who drank doubled (from 6.4 to 12.7 units of alcohol per week) between 1994 and 2007.<sup>4</sup> About 10% of 11- to 15-year-olds and 33% of 15- to 16-year-olds in England report alcohol intoxication in the past month.<sup>5,6</sup> Adolescents in the UK are now among the heaviest drinkers in Europe.<sup>6</sup> The Chief Medical Officer for England provided recommendations on alcohol consumption in young people in 2009,<sup>7</sup> based on an evidence review.<sup>8</sup> These advise that children abstain from alcohol before the age of 15 years and that 15- to 17-year-olds should not drink, but, if they do drink, then they should consume no more than the recommended limits for adults (currently 14 units per week).<sup>7</sup>

Alcohol consumption and related harm increase steeply from the age of 12 to 20 years.<sup>9</sup> In early adolescence, alcohol use and alcohol use disorders (AUDs) (alcohol abuse, harmful alcohol use and alcohol dependence) are relatively uncommon. However, alcohol has a disproportionate effect on younger adolescents, for example by predisposing them to alcohol dependence in later life<sup>10,11</sup> and damage to the developing brain.<sup>12</sup> In middle adolescence (ages 15–17 years), binge drinking emerges. Although binge drinking does not necessarily meet the criteria for AUDs, it is associated with increased risk of unprotected or regretted sexual activity, criminal and disorderly behaviour, suicidality and self-harm, injury, drink driving, alcohol poisoning and accidental death.<sup>6,13–16</sup>

## Alcohol screening

Opportunistic alcohol screening and brief interventions (SBIs) in emergency departments (EDs) capitalise on the 'teachable moment' when a connection can be made between alcohol consumption and ED attendance.<sup>17–20</sup> Alcohol SBI in EDs has shown efficacy in adults<sup>20</sup> and adolescents,<sup>17,18,21</sup> with evidence of cost-effectiveness in adults.<sup>22</sup> Over the past 15 years, the World Health Organization, the US Surgeon General, the American Medical Association and the American Academy of Pediatrics have called for practitioners to carry out SBIs for adolescent drinkers.<sup>23–26</sup> The alcohol strategies for both England and Scotland identify adolescents as a key target group in which to reduce alcohol consumption and related harm.<sup>27,28</sup> However, although there has been an increase in alcohol SBIs for adults, adolescents remain a neglected group. A recent audit of EDs in Scotland found that only 5% of alcohol-related attenders aged < 18 years receive an alcohol intervention before discharge, and that ED staff focus more on those young people presenting with acute intoxication or self-harm.<sup>29</sup> Of the 12 EDs in the north-east of England and London approached during our research programme, none used routine alcohol screening in 10- to 17-year-olds and only three did so in adults.

Several alcohol screening methods have been developed in the USA but have not been evaluated in the UK. A recent systematic review of alcohol SBIs in young people (aged 10–17 years) and adults (aged ≥ 18 years), conducted for the National Institute for Health and Care Excellence (NICE),<sup>30</sup> examined 51 studies of alcohol screening. Questionnaires were found to perform better than blood markers or breath alcohol concentration in all age groups. In adolescents, the Alcohol Use Disorders Identification Test (AUDIT) questionnaire was found to have greater sensitivity and specificity than other questionnaires, including CAGE (Cut Down, Annoyed, Guilty, Eye Opener), TWEAK (Tolerance, Worried, Eye-opener, Amnesia, K/Cut Down),

CRAFFT (Car, Relax, Alone, Forget, Friends, Trouble), RAPS4-QF (Rapid Alcohol Problems Screen – Quantity Frequency), FAST (Fast Alcohol Screening Test), RUFT (Cut-Riding, Unable, Family/Friends, Trouble, Cut down) and POSIT (Problem Oriented Screening Instrument for Teenagers). AUDIT sensitivities for adolescents range from 54% to 87% and specificities range from 65% to 97%.<sup>31</sup> However, the majority were at the lower end of these ranges and are therefore suboptimal for effective screening.

Additional shortcomings of existing alcohol screening methods for adolescents have been identified.<sup>31</sup> Existing approaches do not sufficiently take into account the age and developmental stage of adolescents. Any alcohol consumption under 15 years of age is of concern, whereas the identification of AUDs is more relevant in older adolescents. There is therefore a need for screening methods that are sensitive to the developmental stage of the adolescent to maximise opportunities for intervention. Alcohol screening has been mostly studied in older adolescents and young adults of college age (18–24 years). Therefore, the validity of alcohol screening methods in younger adolescents is unclear. Questionnaires such as the AUDIT may be too lengthy (10 items) to implement in busy EDs, pointing to the need for briefer tools for routine clinical practice. Methods to increase compliance, particularly by younger adolescents, are also needed. The use of computer screening and interviewing adolescents confidentially and separately from parents has shown some promise in the USA.<sup>32,33</sup>

## Alcohol brief interventions in health settings

Several systematic reviews have noted the effectiveness of SBIs in adults in health settings.<sup>34–38</sup> Less research in this area has been conducted in adolescents. A systematic review of brief alcohol interventions for young people attending health settings identified nine randomised controlled trials (RCTs) between 1999 and 2008.<sup>30</sup> Eight were based in the USA<sup>17–19,21,39–41</sup> and one was based in Australia.<sup>42</sup> Most trials were considered to be methodologically sound, although two were considered to be weak in randomisation and allocation concealment.<sup>40,42</sup> Sample sizes ranged from 34 to 655 and ages ranged from 12 to 24 years. Three trials<sup>40–42</sup> targeted socioeconomically disadvantaged groups among whom drug and alcohol misuse were more prevalent. Four trials<sup>17–19,21</sup> were based in EDs to maximise the potential for ‘teachable moments’ when the connection between alcohol consumption and its adverse consequences can be more readily highlighted. Two studies<sup>39,40</sup> recruited adolescents during routine general check-ups in primary care and one<sup>43</sup> recruited in a university health centre. The remaining trials targeted homeless adolescents<sup>41</sup> and those attending a youth centre that delivered health services.<sup>42</sup>

Six trials<sup>17,18,21,40,41,43</sup> tested brief interventions based on one or two sessions of motivational interviewing (MI) that lasted between 20 and 45 minutes. Delivery was carried out by a range of trained professionals, including physicians, nurse practitioners, psychologists, addiction clinicians and youth workers. One trial tested a more intensive programme of four MI sessions over 1 month.<sup>42</sup> Two studies used information technology to deliver brief interventions, one using an audio programme in primary care<sup>39</sup> and the other using an interactive computer program in a minor injury unit.<sup>19</sup> The length of follow-up ranged from 2 to 12 months. Loss to follow-up was generally low (0–20%), although the authors of one study<sup>40</sup> reported that 34% of their study population were lost to follow-up.

Five trials<sup>17,18,21,42,43</sup> reported significant positive effects of brief interventions on a range of alcohol consumption measures. Bailey *et al.*<sup>42</sup> reported that brief intervention participants showed increased readiness to reduce alcohol consumption, an initial reduction in alcohol consumption and an improvement in knowledge of alcohol and related problems, compared with control subjects. Schaus *et al.*<sup>43</sup> also reported reductions in blood alcohol concentration, number of drinks per week and risk-taking behaviour. Monti *et al.*<sup>18</sup> reported that brief intervention subjects were less likely than control subjects to drink and drive or to experience alcohol-related injury, although both treatment groups significantly reduced their alcohol consumption. A subsequent trial, conducted by the same research group,<sup>17</sup> reported that alcohol consumption also significantly decreased in both the brief intervention group and the control group. Last, Spirito *et al.*<sup>21</sup> reported a significant reduction in alcohol consumption at follow-up in both the brief intervention group

and the control group. However, adolescents who screened positive for alcohol problems at baseline reported more change after MI than the control subjects.

Three trials reported null effects after brief intervention.<sup>19,40,41</sup> One trial that used an audio-taped programme with 12- to 17-year-old adolescents<sup>39</sup> reported an increase in alcohol use and binge drinking among brief intervention subjects, representing a possible adverse effect of this type of intervention.

## Summary

In summary, there is a need to develop more effective alcohol screening tools for adolescents in the ED, which are age appropriate and cover a wider range of alcohol consumption and alcohol-related problems than do existing methods. Furthermore, as most of the existing research has been conducted in the USA, screening methods appropriate to EDs are needed in the UK context of the NHS.

Moreover, the majority of alcohol SBI studies among adolescents in health-care settings were conducted in EDs and reported positive outcomes. However, three trials reported alcohol consumption reductions in both the intervention group and the control group, and three more trials reported no effect of brief intervention. None of these trials was in the UK and few studies were conducted in young adolescents. Thus, although there is evidence to suggest that brief intervention may be beneficial for adolescents, particularly in EDs, there is a clear need for a UK trial of this.

This monograph describes the results of our findings linked to the original programme objectives (a full list of publications arising from our programme of work can be found in *Overall conclusions, Dissemination*).

