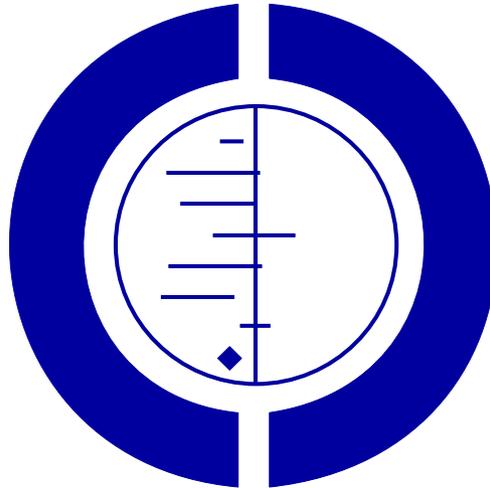


Primary prevention for alcohol misuse in young people (Review)

Foxcroft DR, Ireland D, Lowe G, Breen R



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ABSTRACT

Background

Alcohol misuse is a cause of concern for health services, policy makers, prevention workers, the criminal justice system, youth workers, teachers and parents.

Objectives

1. To identify and summarize rigorous evaluations of psychosocial and educational interventions aimed at the primary prevention of alcohol misuse by young people.
2. To assess the effectiveness of primary prevention interventions over the longer-term (> 3 years).

Search strategy

Databases searched (no time limits): Project CORK, BIDS, PSYCLIT, ERIC, ASSIA, MEDLINE, FAMILY-RESOURCES-DATABASE, HEALTH-PERIODICALS-DATABASE, EMBASE, BIDS, Dissertation-Abstracts, SIGLE, DRUG-INFO, SOMED, Social-Work-Abstracts, National-Clearinghouse-on-Alcohol-and-Drug-Information, Mental-Health-Abstracts, DRUG-database, ETOH (all searched Feb-June 2002).

Selection criteria

1. randomised controlled and non-randomised controlled and interrupted time series designs.
2. educational and psychosocial primary prevention interventions for young people up to 25 years old.
3. alcohol-specific or generic (drugs; lifestyle) interventions providing alcohol outcomes reported.
4. alcohol outcomes: alcohol use, age of alcohol initiation, drinking 5+ drinks on any one occasion, drunkenness, alcohol related violence, alcohol related crime, alcohol related risky behaviour.

Data collection and analysis

Stage 1: All papers screened by one reviewer against inclusion criteria.

Stage 2: For those papers that passed Stage 1, key information was extracted from each paper by 2-3 reviewers.

Main results

20 of the 56 studies included showed evidence of ineffectiveness. No firm conclusions about the effectiveness of prevention interventions in the short- and medium-term were possible. Over the longer-term, the Strengthening Families Program (SFP) showed promise as an effective prevention intervention. The Number Needed to Treat (NNT) for the SFP over 4 years for three alcohol initiation behaviours (alcohol use, alcohol use without permission and first drunkenness) was 9 (for all three behaviours). One study also highlighted the potential value of culturally focused skills training over the longer-term (NNT=17 over three-and-a-half years for 4+ drinks in the last week).

Authors' conclusions

1. Research into important outcome variables needs to be undertaken.
2. Methodology of evaluations needs to be improved.

3. The Strengthening Families Programme needs to be evaluated on a larger scale and in different settings.
4. Culturally-focused interventions require further development and rigorous evaluation.
5. An international register of alcohol and drug misuse prevention interventions should be established and criteria agreed for rating prevention intervention in terms of safety, efficacy and effectiveness.

PLAIN LANGUAGE SUMMARY

Many studies that have evaluated educational and psychosocial prevention programmes were considered and appraised in this systematic review. A number of programmes showed evidence of ineffectiveness. Those that reported longer-term evaluations (over three years follow-up) were examined in more detail and several promising studies were re-analysed to provide a better indication of the potential impact of the prevention programme. On the basis of this re-analysis, the Strengthening Families Programme (SFP) in particular but also culturally focused skills training appear to offer promise. However, all of the studies included in the review showed some methodological weaknesses and it is therefore necessary to replicate these studies with more robust design and analysis, and across different settings.

BACKGROUND

DEFINITIONS

Alcohol Dependence (APA 2000) is a maladaptive pattern of use, leading to clinically significant impairment or distress, as manifested by three or more of the following within the same 12-month period:

- tolerance;
- withdrawal;
- alcohol taken in larger amounts or over longer period of time than intended;
- persistent desire or unsuccessful efforts to cut down or control use;
- a great deal of time is spent in activities necessary to obtain alcohol or recover from its effects;
- important social, occupational, or recreational activities are given up or reduced because of use;

alcohol use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by alcohol.

In young people alcohol dependence has often not had time to develop. However, a lack of dependency amongst adolescent drinkers does not detract from concern about such individuals, some of whom may be abusing alcohol or may be putting themselves at risk for alcohol abuse and dependence in later life: there is some evidence that early drinking experiences are linked to subsequent alcohol dependence (Grant 1997).

Alcohol Abuse (APA 2000) is a maladaptive pattern of use leading to clinically significant impairment or distress, as manifested by one or more of the following, within a 12-month period:

- recurrent alcohol use resulting in a failure to fulfill major role obligations at work, school, or home;
- recurrent alcohol use in situations in which it is physically hazardous;
- recurrent alcohol-related legal problems;
- continued alcohol use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of the alcohol;
- the symptoms have never met the criteria for alcohol dependence.

Alcohol misuse can be defined as alcohol-related disturbance of behaviour, disease, or other consequences that are likely to cause an individual, his/her family or society, harm now or in the future. Alcohol misuse is a more useful concept when considering primary prevention because the DSM-IV diagnostic criteria exclude alcohol use associated with other types of problems (e.g. intentional and unintentional injury, single episodes of drinking and driving, alcohol-related violence, and risky sexual behaviour). Moreover, the DSM-IV diagnostic criteria would exclude drinking patterns that are not harmful in the short-term but are risk factors for future abuse, dependence or ill-health, and are therefore legitimate targets for prevention.

PATTERNS AND PREVALENCE

Worldwide, 5% of all deaths of young people between the ages of 15 and 29 are attributable to alcohol use (Jernigan 2001, Murray 1997). Globally, 140 million people are suffering from alcohol dependence. Around the world, alcohol takes a heavy toll - damaging public and private life with countless traffic fatalities and injuries, home fires, drownings, suicides and violent crimes. But also debt problems, ruined careers, divorces, birth defects, and children with permanent emotional damage. In Europe, one in four deaths of men in the age group 15 to 29 is related to alcohol. In parts of

Eastern Europe, the figure is as high as one in three. All in all, 55 000 young people in Europe died from causes related to alcohol use in 1999 (WHO 2001).

A substantial proportion of older adolescents in the United Kingdom drink more than the recommended safe limits (Marsh 1986, Goddard 1988). Some young people are drinking so heavily that they can be considered to have 'dangerous' intake levels, in that these levels are linked with severe long term physical or psychological damage (Goddard 1988). One early study suggested that alcohol misuse in adolescence does not predict drinking problems in early adulthood (Bagnall 1991), although more recently age of onset of alcohol use has been shown to predict unintentional injury after drinking (Hingson 2000) and lifetime alcohol dependence (Grant 1997). Excessive drinking behaviour by young people is more apparent in males than in females, and the consequences of such behaviour are described as potentially: alcohol related violence and crime, and mild damage to the heart, liver, brain and immune system. (Goddard 1988, p.6).

The Annual Report of the Chief Medical Officer of the Department of Health (England and Wales) (Donaldson 2001) highlights a worrying trend for teenagers who drink alcohol to consume larger quantities. In 1998, average consumption among 11-15 year-old drinkers was 9.9 units of alcohol a week (1 unit contains 8g. of pure alcohol), compared to 6.0 units a week in 1992. A major European study has recently provided comparative international data. The European School Survey Project on Alcohol and other Drugs (ESPAD) (Hibbell 1999) focussing on 15-16 year olds showed that in the United Kingdom nearly 40% of young people had been drunk by the time they reached 13 years, over one-fifth of students had been intoxicated three times or more during the previous 30 days, and nearly one third of students reported having five or more drinks in a row (binge drinking). In each case the United Kingdom was amongst the worst of the 30 countries studied. The Chief Medical Officer (Donaldson 2001) also raises a concern about the increasing number of deaths from chronic liver disease in young people. In the last 30 years of the 20th Century the death rate amongst people aged 35 to 44 years increased 8-fold in men and 7-fold in women; and amongst 25-34 year-olds a four-fold increase was seen over the 30 year period.

Media reports have indicated that in the United Kingdom up to 1,000 people a week suffer serious facial injuries as a result of drunken assaults, and 18,000 young people are scarred for life each year. In scientific studies alcohol use has been associated with delinquent and violent behaviours in young people, even after adjusting for personality and behavioural risk (Komro 1999) , although Rossow 1999 reported that there was only a small direct effect of alcohol intoxication on violent behaviour after controlling for various relevant confounders (e.g. criminal activities) in a large national sample study of Norwegian adolescents aged 12 to 20 years; though in cross-sectional studies the size and strength of relationships need to be interpreted cautiously.

The range of harms that are relevant to alcohol use in young people make a straightforward classification and definition of alcohol misuse difficult, but include immediate harm to self through alcohol overdose and alcohol-related injury, immediate harm to others through drinking and driving and alcohol related injury, and longer-term harm to self through the development of inappropriate drinking behaviour and patterns. One potentially good indicator of longer-term harm is age of first drinking experiences. Results from the National Longitudinal Alcohol Epidemiologic Survey (Grant 1997) (N=27,616) showed that the lifetime alcohol dependence rate of those who initiate alcohol use by age 14 is four times as high as those who start by age 20. Adjusting for potentially confounding variables, the odds of dependence decreased by 14% with each additional year of delayed initiation.

However, many studies of adolescent alcohol misuse report quantity / frequency measures of drinking behaviour, and the interpretation of these in terms of alcohol misuse or harm is more difficult. Further work is needed in quantifying the longer-term relevance of these 'proxy' (i.e. indirect) measures of alcohol misuse in young people. For this reason, this systematic review has not excluded studies where the relevance of the alcohol use and misuse measures is unknown, although future updates of this systematic review will take into account any further information concerning the predictive validity of proxy measures of alcohol misuse.

PREVENTION

The 'Traditional Public Health' model (Blane 1976) involves three levels of prevention. These are 1. Primary: "projects that have services directed toward reducing the incidence or prevalence of alcohol misuse and related problems or influencing knowledge, attitudes and behaviours related to drinking beverage alcohol"(Staulcup 1979); 2. Secondary: "projects involved in the early identification, referral and treatment of persons with alcohol problems (Staulcup 1979), and "arresting a disorder before it becomes fully developed" (Blane 1976); and 3. Tertiary: treatment of problem drinkers and/or alcoholics. Schaps 1981 suggest that primary prevention is: "those activities which are directed at reducing drug abuse incidence rates. Primary prevention differs from secondary and tertiary prevention in that it deals with populations which are not selected to receive services on the basis of symptomatology such as drug abuse. The clients of primary prevention are typically the total populations within particular schools, age levels, neighbourhood etc. In contrast, the clients of secondary and tertiary prevention programs are individuals who are already involved in some form of drug abuse." (p.18-19).

The incidence and prevalence of alcohol misuse and the harm caused by the alcohol misuse of young people is an area of concern for policy makers, health promotion workers, the criminal justice system, youth workers, teachers and parents. It is therefore important to have a clear understanding of the effectiveness of alternative interventions in the PRIMARY on of alcohol misuse by young people.

OBJECTIVES

1. To identify and summarize rigorous evaluations of psychosocial and educational interventions aimed at the primary prevention of alcohol misuse by young people.
2. To assess the effectiveness of primary prevention interventions over the longer-term (> 3 years).

CRITERIA FOR CONSIDERING STUDIES FOR THIS REVIEW

Types of studies

Because some of the interventions to prevent alcohol misuse in young people are social or organisational interventions we have not restricted included studies to randomised controlled trials. The following study designs are included:

1. Randomised controlled trial (RCT).
2. Controlled clinical trial (CCT).
3. Controlled prospective study (CPS).
4. Controlled before after (CBA).
5. Interrupted time series (ITS).

Types of participants

Young people up to 25 years-old. For the purpose of this review, young people are defined as children, adolescents and young adults aged up to 25 years-old. This is consistent with a previous systematic review (Foxcroft 1997) and although arbitrary, is specified so that all school and college based interventions can be included. If a study contains some individuals aged over 25 then this study can be included providing the results are clearly relevant and generalizable to young people under 26 years. Similarly, if a study of older adults also contains data on young people then these results are included in this systematic review providing the results on the young people subset are clearly distinguishable, relevant and generalizable to other young people.

Types of intervention

Included studies have evaluated psychosocial or educational interventions aimed at preventing the onset of alcohol use or alcohol misuse by young people. Psychosocial interventions are defined as those interventions that specifically aim to develop psychological and social skills in young people (e.g. peer resistance) so that they are less likely to misuse alcohol. Educational interventions are defined as those interventions that specifically aim to raise awareness of the potential dangers of alcohol misuse (e.g. increased knowledge) so that young people are less likely to misuse alcohol. Studies can be included if the intervention is not primarily aimed at alcohol misuse prevention but alcohol misuse outcome measures are reported, for example generic drug education programmes or healthy school or community initiatives. Interventions will, as far as possible, be classified according to their setting (family, school,

community), duration (brief, intensive, medium/long term, follow-ups), specificity (alcohol, generic) and target group (parents, peers, young people).

Types of outcome measures

Direct measures: studies were included if they reported objective or self-report measures of alcohol use and misuse. Therefore studies that reported drinking behaviour are included providing comparisons are available to quantify changes in drinking behaviour associated with a particular intervention. Studies that reported alcohol-related problems, including alcohol related risky sex, anti-social behaviour, violence and crime (including drinking and driving) were included. For example, relevant outcome measures / indicators include:

- alcohol use (yes / no);
- alcohol initiation (age);
- alcohol use (quantity / frequency index);
- drinking 5+ drinks on any one occasion (yes/no);
- drunkenness (incidence);
- alcohol related violence (yes/no);
- alcohol related crime (yes/no);
- alcohol related risky behaviour (yes/no);

Note that this is an indicative rather than an exhaustive list. Many studies have developed their own indicators of use and misuse and these have been reported if the study met the criteria for inclusion.

SEARCH METHODS FOR IDENTIFICATION OF STUDIES

See: Cochrane Drugs and Alcohol Group methods used in reviews.

The Drugs and Alcohol Collaborative Review Group search strategy was revised for use in this systematic review. The following search terms were used to revise the search strategy, and syntactic variations made for different databases:

1. Alcohol
drink*
alcohol*
liquor*
beer*
wine*
spirits
drunk*
intoxicat*
binge
2. Population group

adolescen*
teenage*
youth*
young people
early adult
young adult

3. Intervention
intervent*
educat*
promot*
programme*
adverti*
counsel*
treatment*
campaign*
mass media
policy
policies
legislation
hazard*
harm*

4. Outcome
prevent*
reduc*
improv*
increas*
decreas*
chang*
cessation
drink driv*
dui
health
abstain*
stop*
problem
intoxicat*
drunk*

5. Evaluation
evaluat*
success*
effectiv*
measur*
examin*
assess*
compar*
trial*
rct

Between February 2001 and June 2001 we searched the following databases and information sources, varying the above search strategy to accommodate each database:

- Project CORK
- BIDS ISI (Bath Information and Data Services)
- Conference proceedings on BIDS
- Current contents on BIDS
- PSYCLIT
- ERIC (U.S.A.)
- ERIC (Australia, Canada and U.K.)
- ASSIA
- MEDLINE
- FAMILY RESOURCES DATABASE
- HEALTH PERIODICALS DATABASE
- EMBASE
- Dissertation Abstracts
- SIGLE
- DRUG INFO
- SOMED (Social Medicine)
- Social Work Abstracts
- National Clearinghouse on Alcohol and Drug Information
- Mental Health Abstracts
- DRUG INFO.
- DRUG database
- Alcohol and Alcohol Problems Science Database - ETOH

METHODS OF THE REVIEW

Stage 1: All papers identified were screened by one reviewer for relevance (did the paper report an evaluation of an alcohol or drug misuse prevention programme) , outcome (were alcohol-relevant outcome variables reported) and design (did the design of the evaluation meet our inclusion criteria) . All searches included non-English language literature and studies with English abstracts were assessed for inclusion (using relevance, outcome and design criteria). When considered likely to meet inclusion criteria, translations were obtained. All obtained papers and review articles were hand searched for relevant citations.

Stage 2: Review Group guidelines for the assessment of methodological quality were followed for those papers that passed Stage 1.

Key information was extracted by two reviewers and confirmed if necessary (in case of discrepancy) by consultation with other

reviewers. Discrepancies that could not be resolved easily were referred to the rest of the project team. If important data was missing, attempts were made to contact the first author to complete the information necessary for the critical appraisal. Studies that have been published in duplicate were only included once, although duplicate references are included in the references section of this review. The CRG checklist for assessing the methodological quality of studies was used to guide selection. This supplemented a detailed data extraction pro-forma for systematically extracting information on the methods, quality and results of each study, including:

- was the study properly controlled
- what methods of randomisation or allocation to intervention groups were used
- were the groups comparable at baseline
- were steps taken to maximise the validity of self-reported behaviour
- were adjustments made for confounding
- what was the attrition rate and how was this dealt with
- did the unit of analysis correspond to the unit of randomisation

Finally, the roles of chance, confounding and bias in the study were considered and the decision taken whether or not to include the paper in the review

Analysis

As the heterogeneity of settings, design of studies, source and format of interventions, outcomes measured and target group was substantial, an overall estimate of effect would have little practical meaning. Therefore the main results are presented in tabular form and analysed in the style of a narrative systematic review (see Table of Included Studies). The Comparison Tables, Metaview Charts and Additional tables (Table 01; Table 02) are presented for longer-term outcomes (> 3 years) and comprise a re-analysis of study results on an intention-to-treat basis as this information is of more relevance to health care professionals and policy makers.

DESCRIPTION OF STUDIES

Systematic electronic database searches produced over 6000 titles, although many titles appeared more than once. A number of papers, including unpublished reports, were also found from other sources. After these titles and abstracts were previewed, over 600 papers/ reports/ dissertations were obtained and screened against the inclusion criterion of design, relevance and outcome and many papers were excluded at this stage. Detailed examination of remaining papers through the completion of systematic data extraction forms led to a substantial number being rejected, leaving 56 studies that met the quality inclusion criteria detailed above. This

is an increase of 23 studies to the previous systematic review report (Foxcroft 1997).

The majority (84%) of the evaluations have taken place in the United States. Of the others, three were Canadian, two British, one Swedish, one Norwegian, one Australian, and one was an international study encompassing Australia, Chile, Norway and Swaziland. Thirty-two interventions were generic drug (including alcohol) education programs, where alcohol baseline and outcome measures were clearly reported. The remaining 24 studies reported interventions targeted specifically at alcohol.

METHODOLOGICAL QUALITY

In this systematic review only a small number of the many intervention studies found in the literature search have been well-designed and adequately evaluated, even those that were judged to be of sufficient quality to be listed in this systematic review (i.e. sufficient but not excellent quality). Problems with poor quality studies that were excluded from the systematic review included lack of suitable control groups (non-random allocation or non-equivalent groups), lack of pre-test information, high levels of attrition, inappropriate analysis for the unit of allocation, and more generally a poor quality presentation of results, often in well-respected peer reviewed journals. The difference between those studies included and those excluded fall into two categories: all RCTs were included, and non-RCTs were only included if, on the whole, the quality of the study was reasonably good. The decision to include non-RCT studies was taken by at least 2-3 members of the review team based on a judgement of the quality of the particular study. This notwithstanding, there remain concerns about the methodological quality of most included studies, RCT or otherwise.

Of the 56 included studies, 41 were RCTs, 14 were non-randomised control group designs with before and after measures, and there was one Interrupted Time Series (ITS) design (see Table of Included Studies for full details). On the whole, the RCTs were of better methodological quality than the non-randomised, matched control group studies. However, for the RCTs included in this systematic review there was no clear reporting of allocation concealment and for many studies method of randomisation was not reported. None of the studies used blinding to improve the quality of the evaluation but this would have been nonsensical and impractical.

Over and above these concerns, there were two major methodological limitations of most included studies. The first is that in most of the studies the unit of allocation (usually class, school or community) and the unit of analysis (usually individuals) were different (see Table of Included Studies). The studies of Baldwin 1990, Cook 1984, Duryea 1988, Magura 1994, Marlatt 1998, Monti 1999, Palinkas 1996, Werch 1996a; Werch 1996b; Werch 1998; Werch 2000a; and Werch 2000b avoided this problem as

they randomised and analysed by individual. However, in these studies contamination is a concern as interventions are often delivered at a group, rather than an individual, level. For the other studies in which unit of allocation and unit of analysis are different this is potentially a problem as individuals from a single setting (class, school or community) tend to be more like one another than they are like individuals in a different setting, and the within-setting correlation in the data (indexed by the intra-class correlation coefficient, ICC) adds an additional component of the variability to an intervention group's mean over and above that attributable to either the individuals or the interventions themselves (Donnor 1990). Unless this component is accounted for in the analysis, the evaluation of the intervention effects will be positively biased in proportion to the magnitude of the ICC and the number of respondents in each setting (Zucker 1991). Only the studies of Botvin 1995a, Clayton 1991; Hansen 1991; and Klepp 1995 appeared to use a statistical approach, in some analyses, that took account of the ICC. It is technically beyond the scope of this systematic review to reassess each set of results in the light of this analytical shortcoming in most studies. One can only point this out and strongly encourage future evaluations to report, where possible, appropriate analyses.

The second major limitation concerns the often high levels of attrition in some of these studies, especially those with longer-term follow-up. Higher attrition, in the absence of an intention-to-treat (ITT) analysis, threatens the validity of the results. Attrition is the number or proportion of individuals recruited into a study who did not receive the intended intervention or were not assessed at follow-up using the study's instruments. Such drop-out can occur at various stages from recruitment to short- or long-term follow up and may threaten the continued comparability of treatment and control groups and otherwise weaken the internal validity of the study. For example, participants may drop out of a study because they do not like the intervention. Excluding these participants from the analysis could result in an overestimate of the effectiveness of an intervention because it hides information about how acceptable or tolerable an intervention is. Many journal editors and referees like to see attrition rates at no more than 20%, although in large-scale social and community interventions with a medium to long-term follow up this is difficult to achieve. In any case, all authors should clearly describe attrition rates, how they varied between different treatment and control groups, and how attrition was dealt with in any statistical analysis, for example through an intention-to-treat analysis. In the studies included in this review (see Table of Included Studies) the following 21 studies had attrition rates of less than 20%: Allison 1990; Beaulieu 1988; Botvin 1984; Bremberg 1994; Caplan 1992; Cook 1984; Duryea 1988; Hansen 1991; Harmon 1993; Marlatt 1998; Monti 1999; Ringwalt 1991; Schinke 2000; Perry 1988; Perry 1996; Spoth 2002; Werch 1996a; Werch 1996b; Werch 2000a; Wilhelmson 1994; and Williams 1968.

RESULTS

As the heterogeneity of settings, design of studies, source and format of interventions, outcomes measured and target group was substantial, an overall estimate of effect has little practical meaning. Therefore the main results are presented in tabular form and analysed in the style of a narrative systematic review. Detailed information on each study included in the systematic review is provided in the Table of Included Studies, including design (RCT or otherwise), sample size, a description of the intervention, attrition and effect size as reported by the authors. An additional intention-to-treat re-analysis is presented for selected studies reporting positive outcomes in longer-term (> 3 years) evaluations (see additional tables).

Some studies reported partial effectiveness (see below), in that some self-report measures of drinking behaviour (often only one or two measures amongst several) were positively influenced by the intervention programme. Ineffective interventions were regarded as those that had no statistically significant influence on subsequent self-reported drinking behaviour. There were also some interventions that had an unforeseen negative effect on subsequent self-reported drinking behaviour, and these are reported for completeness. Follow-up periods were split into three groups: short-term (one year or less); medium-term (from one to three years); and long-term (over three years).

INTERVENTIONS WITH SHORT-TERM FOLLOW-UP (UP TO 1-YEAR)

Fifteen studies reported partially effective short-term interventions (Baldwin 1990; Cook 1984; Monti 1999; Caplan 1992; Gilchrist 1987; Glikzman 1983; Hansen 1991; Harmon 1993; Holder 1997; Pentz 1989; Perry 1988; Werch 1996a; Werch 2000a; Wilhelmson 1994; Williams 1968). It is difficult to assess the potential of these projects from such short-term results, especially as the pattern and scale of positive outcomes for these studies is unconvincing. Many of these studies reported some effective and some ineffective outcomes, and it is difficult to know what to make of such mixed results.

Twenty-four interventions with only a short-term follow-up reported some non-significant outcomes (Allison 1990; Beaulieu 1988; Botvin 1984; Bremberg 1994; Brewer 1991; Cook 1984; Durrant 1986; Goldberg 2000; Goodstadt 1983; Hansen 1991; Harmon 1993; McBride 2000; Magura 1994; Moskowitz 1984; Newman 1992; Palinkas 1996; Perry 1988; Ringwalt 1991; Werch 1996a; Werch 1996b; Werch 1998; Werch 2000a; Wilhelmson 1994; Williams 1968), and there were no clear or systematic differences between those judged partially effective and those judged ineffective. Indeed, some interventions reported both significant and non-significant effects, depending on the outcome variable used.

Four studies reported interventions which appeared to increase drinking behaviour (relative to control groups) in the short-term

(Brewer 1991; Ellickson 1990; Goodstadt 1983; Werch 2000a). The interventions carried out in these studies did not appear to be characteristically different from the studies described above as partially effective or ineffective; most interventions combined social skills training with knowledge-based education. This phenomenon may be artefact, due to poor design, method or analysis (e.g. post-hoc tests) and should therefore be interpreted cautiously.

INTERVENTIONS WITH MEDIUM-TERM FOLLOW-UP (FROM 1- TO 3-YEARS)

Of the twelve studies reporting medium-term partially effective interventions (Bagnall 1990; Botvin 1995a; Botvin 1995b; Duryea 1988; Hansen 1988a; Hopkins 1988; Marlatt 1998; Shope 1996b; Scaggs 1985; Perry 1996; Wagenaar 2000; Werch 2000b), few were convincingly effective, and most were marred by methodological shortcomings. Studies worth noting are (a) the STARS school and family intervention (Werch 2000b), based in two schools, comprising a strong design, low attrition, and significant effects on alcohol use and misuse, although the effect sizes seem small; (b) Botvin 1995b's culturally focused intervention evaluation, although design limitations hamper generalisability; and (c) Scaggs 1985 PhD work based on the "self-in-situation theoretical model", although with this study differential attrition is a problem.

Nineteen studies that carried out a medium-term follow-up found no evidence of intervention effectiveness (Bagnall 1990; Botvin 1995a; Dielman 1986; Duryea 1988; Ellickson 1990; Hansen 1991; Hopkins 1988; Klepp 1995; Marlatt 1998; Pentz 1989; Sheehan 1996; Shope 1996a; Shope 1996b; Sussman 1998; St Pierre 1992; Scaggs 1985; Rosenbaum 1994; Wagenaar 2000; Werch 2000b). Several of these had previously reported some short-term significant effects, and this suggests that any early reductions in drinking behaviour achieved by the intervention had eroded in the medium-term.

Two interventions were found to increase drinking behaviour in the medium-term. Duryea 1988 reported that the intervention group (knowledge and social skills programme; U.S. teenagers) reported more excessive drinking than a control group three years later. Hopkins 1988 found evidence of a negative effect of an intervention (social skills and affective education; U.S. teenagers) in 10% of alcohol-related variables. As mentioned above, this phenomenon may be artefactual, due to poor design, method or analysis (e.g. post-hoc tests) and should therefore be interpreted cautiously.

INTERVENTIONS WITH LONG-TERM FOLLOW-UP (OVER 3-YEARS)

Three studies reported effective longer-term interventions: Botvin 1995a followed up several thousand U.S. teenagers six years after initial administration of a Life Skills Training (LST) intervention, which is a multi-modal drug education programme. They reported significantly less self-reported drunkenness in those teenagers who received the intervention compared with a control

group, although the effect size seems small. Botvin 1995a also report more convincing results for those teenagers who attended at least 60% of the intervention sessions - a "Hi-fidelity sample" - but this analysis is flawed as the direct comparability of this subgroup with the full control group is compromised (i.e. this is not an "intention-to-treat" analysis).

Schinke 2000 reported a long-term follow-up of a culturally focused school and community intervention with Native Americans. A skills based intervention group were around 7% less likely than a control group to be weekly drinkers three and a half years after baseline measurement. This was statistically significant although the public health impact of this effect is difficult to judge.

Spoth 2001 conducted an evaluation of a family-based intervention using a strong design, and although there was a moderate attrition rate, there was also a consistent pattern of effectiveness across the three drinking behaviour variables they reported. Importantly, the effectiveness of this intervention seemed to increase over time, reflecting the developmentally oriented intervention outcome model on which the intervention is based. This intervention deserves further consideration and study on the basis of these results.

Five other studies reported long-term follow-ups. Ellickson 1990 report from a large sample study of U.S. teenagers in a trial of Project ALERT, which incorporated information and social skills education. Early signs of partial effectiveness were not repeated over the long-term - by the end of High School (five year follow-up) no effects of the intervention remained. Longer-term outcome results from Project Northland (Perry 1996) showed that at four year follow-up there were no significant effects of the Project Northland intervention over the control group. Wynn 1997 reported a longer-term follow-up of the Alcohol Misuse Prevention (AMPS) Study of Dielman and colleagues (Dielman 1986) and stated that there was no significant effect of the AMPS curriculum on tenth grade alcohol misuse. Clayton 1991 followed up a Drug Abuse Resistance Education (DARE) intervention after five and ten years (when participants were 20 years-old), and found that DARE status was unrelated to alcohol use at follow-up. The evaluation by Loveland-Cherry 1999 showed a mixed pattern of results. There was a significant but very small positive effect of the intervention on alcohol use, no significant effect on alcohol misuse, and the authors also showed in a post-hoc sub-group analysis that those individuals in the intervention group who were already drinkers at baseline were less likely to use and misuse alcohol at follow-up compared with similar controls.

INEFFECTIVE INTERVENTIONS

Of the interventions described above as reporting no effects of the intervention over the short, medium or longer-term, it may be that some were poorly evaluated and that therefore ineffectiveness has not been confirmed. For many interventions, however, it is probably reasonable to say that the evidence base does not support their continued use in the primary prevention of alco-

hol misuse for young people, other than in further research studies. These interventions are (see Table of Included Studies for details): "DAPPER" (Allison 1990), "Alcohol Education in Schools" (Bagnall 1990), "A Drug Abuse Prevention Programme" (Beaulieu 1988), "It's your decision" (Bremberg 1994), "DARE" (Clayton 1991, Ringwalt 1991), "AMPS" (Dielman 1986; Shope 1996b), "Multi-component Inoculation Programme" (Durrant 1986), "Project ALERT" (Ellickson 1990), "HLAY" (Hopkins 1988), "Shifting Gears" (Klepp 1995), "A Drug Education Course" (Moskowitz 1984), "RPDD" (Newman 1992), "PALS" (Palinkas 1996), "MPP" (Pentz 1989), "Project Northland" (Perry 1996), "PASS" (Sheehan 1996), "Stay SMART" (St Pierre 1992) and "Towards No Drug Abuse" (Sussman 1998).

COMMUNITY INTERVENTIONS

It is also worth highlighting separately three recent large-scale community based interventions. Community interventions have attracted much interest recently as a more theoretically robust approach than individually oriented interventions (Gorman 2001) and one community trial (Holder 1997) has demonstrated a 10% annual reduction in alcohol-related crashes amongst all drivers (not specifically youth) across three communities. A cost-effectiveness analysis estimated that for each \$1 spent on the interventions there was a saving of \$2.88. In the same trial, a greater reduction in the number of retail outlets selling alcohol to apparent under-age buyers was found in the intervention communities (around 30%) than in the control communities (12%) in the first year of follow-up. However, it is unclear whether changes in under-age sales will result in reduced alcohol use and misuse (i.e. will young people obtain alcohol elsewhere).

The second large community trial reported recently is the Communities Mobilizing for Change on Alcohol programme (Wagenaar 2000). This study has reported three year follow-up results, but there have been no clear statistically significant effects in the intervention communities compared to the control communities for under-age retail sales, self-reported drinking or heavy drinking. One just statistically significant effect ($p=0.05$) that was found concerned arrests for drinking and driving amongst 18-20 year-olds. The net difference between the intervention and control communities from pre- to post-test measures of drink driving arrests was -30.296 arrests per 100,000 population per year. Put simply, there were around 30 fewer arrests per 100,000 population across the intervention communities than in the control communities. Longer-term results and cost-effectiveness analysis of these data will be important.

The third large community trial is Project Northland (Perry 1996) although this intervention is predominantly school based with strong parental and community involvement. Phase II of the intervention study, currently under way, increases the community aspect significantly. The phase I evaluation included in this systematic review found significant effects of the intervention on drinking behaviour whilst the intervention was ongoing, but this ef-

fect dissipated once the intervention halted. As reported above, at four year follow-up there were no significant effects of the Project Northland intervention over the control group.

FURTHER RIGOROUS ANALYSIS

Intention-to-treat is an analysis in which data for all subjects are analysed on the basis of the groups/interventions to which participants were allocated, even if some participants did not in fact receive the full intervention. This is an important concept in public health and health policy development, because only a proportion of the population that an intervention is targeted at would accept/tolerate/receive the intervention, yet the health of the population needs to be considered as a whole and not just the subset of people who accept or receive an intervention. In this systematic review we have concentrated on an intention-to-treat analysis for those studies reporting longer-term outcomes (> 3 years), as the longer-term impact of alcohol misuse prevention programmes is of most interest to public health and health policy makers.

A slightly conservative test of the effectiveness of an intervention is to include all the individuals measured at baseline in the final analysis and to assume that any missing data (ie data from those lost to follow-up) would accrue to be equivalent to the results in the control group - regardless of whether the individuals were originally allocated to the intervention or to a control group. For example, if 1000 people were randomly allocated to two groups of a trial (a control or an intervention) but only 600 provided data at follow-up (300 in each group), this would leave missing results from 200 people in each group. As these people would have dropped out at various stages, some may have received the intervention and some may not, but if an assumption is made that they all did not and that therefore their outcomes were unlikely to be affected by the intervention, then it is reasonable to also assume that these 400 drop-outs would have had similar results to the 300 people followed-up in the control group. The approach used in this re-analysis was based on this assumption that the event rate for the drop-outs in both groups was the same as for those students in the control group who were assessed. This is a reasonable and slightly conservative approach provided attrition is unrelated to factors which influence outcome.

In this systematic review, only the partially effective longer-term studies have been re-analysed on an intention-to-treat basis. The only reason for re-analysing the other studies would be to determine which interventions could be harmful. The appropriate re-analysis would be to assume worst case for intervention drop-outs i.e. the same event rate as for intervention assessed. Since the control drop-out rate would again be taken as the same as the control assessed rate this would have no effect on the analysis. It might be more realistic to expect the drop-outs to be the worse cases and therefore more likely to have a poor response (an event). This could be modelled by a higher event rate in both drop-out groups but provided there is no differential between the groups this will not materially affect conclusions about the intervention effect.

The partially effective longer-term studies included in this intention-to-treat re-analysis are Botvin 1995a, Schinke 2000 and Spoth 2001. As stated above, it would not be meaningful to re-analyse the others in the same way; however this does run the danger of presentation bias.

The design of all three studies (Botvin 1995a, Schinke 2000, Spoth 2001) is hierarchical. Intervention was at the school level (schools were randomised to receive one of two interventions or no intervention, sometimes with blocking). The response variable summarised in this systematic review is dichotomous (yes/no to a relevant event). Botvin 1995a used school as the unit of measurement. If interest focuses on the effect of intervention on the individual student then school level analysis is inappropriate, the well-known "ecological fallacy". However it could be argued that the social/community effect is the focus of interest and that it is appropriate to estimate the average effect of intervention by school. Schinke 2000 used individual student as the unit of analysis. This is erroneous and will result in inflated type I errors (or equivalently too narrow confidence intervals) with even quite small intra-class correlation (ICC), especially with such large within school samples. Spoth 2001 used multilevel modelling for analysis of frequency of past month/year use of alcohol, but used student as the unit of analysis for the dichotomous responses referred to in this review, rather than a multilevel binomial model. This is erroneous as described above.

As mentioned earlier, it was beyond the scope of the systematic review paper to allow for ICC and generally not possible with the information available. Moreover, the re-analysis presented in this section relies on the results presented in the papers and will therefore carry forward the erroneous original analysis. The impact of this threat to internal validity is not known for Schinke 2000 and Spoth 2001, though it can be estimated for Botvin 1995a by duplicating the ITT analysis at the level of the individual and the level of the school. When this was done (not presented but details available from the author) there was little practical difference between the results.

In Table 01 and Table 02 the proportions (pI and pC) of individuals with events (including the estimated number of events for drop-outs) in each group were calculated. The absolute risk reduction (ARR) was the difference between the proportions (pC - pI). A 95% confidence interval was found for the ARR using the normal approximation for the difference between proportions. The standard error of each proportion was estimated using the number assessed (not the number analysed/estimated; NB this explains why re-analysis of ineffective or negative studies would give the same result for the confidence intervals as well as for the estimate) since estimated data does not provide extra information. The ARR and its confidence limits were inverted to give the number needed to treat (NNT) (Cook 1995) with 95% confidence interval.

In Table 01 (Spoth 2001 study) only new-users were counted as events and the total assessed were the non-users at baseline who

were subsequently assessed (estimate of non-users at baseline = (total at baseline) x (10th grade follow-up assessed) / (10th grade follow-up completed). For the ITT analysis it is therefore more appropriate to adjust the numbers at baseline to reflect only non-users. This has been done in Table 01. In Table 02 the ITT results are given for Botvin based on school as the unit of analysis. The standard error for ARR was estimated using the standard errors given in the paper for the proportions of students in each group with events. NB: one of these, 0.55, is unusually large and may be an error in the paper. When the proportion of events in the intervention group is the same or higher than the control group the re-analysis is not appropriate and so has been omitted from Table 01 and Table 02.

The most interesting result from the intention-to-treat reanalysis is the NNT of 9 (Spoth 2001, see Table 01). This indicates that for every 9 individuals who receive the intervention, there will be one fewer person reporting that they have ever used alcohol, used alcohol without permission, or ever been drunk, four years later. The 95% confidence interval indicates that the true (population) value will be in this range 95% of the time. When the 95% confidence interval for the NNT includes infinity, then this simply indicates that the statistic is not significant. However, the sample size needs to be considered as the width of the confidence interval is directly proportional to the size of the sample. It may be that a more promising intervention has a wider confidence interval simply because of a smaller sample size in the evaluation, but this does not mean that the intervention has less potential (Sterne 2001).

DISCUSSION

The 56 studies included in the systematic review reported a range of different prevention interventions over the short-, medium- and longer-term. These different prevention interventions represented a number of different theoretical perspectives, from knowledge only programmes through to normative, social learning and multi-component community based interventions. Different settings for prevention programmes and a range of different outcome measures added to the diversity of studies included in this systematic review. Although 56 studies is a large number of studies to include in a Cochrane systematic review the diversity of approaches to prevention, of settings, and of outcome measurement precluded a formal meta-analytic synthesis of results: no two studies were sufficiently similar. Therefore the main results of this systematic review are presented in the form of a narrative synthesis, structured by follow-up period. Alternative ways of presenting, or stratifying, the main results (see Table of Included Studies) were considered, including theoretical orientation, setting, study design, sample size, and outcome measure. However, on examining the diverse studies selected for inclusion in the systematic review it became clear that there were no clear differences or patterns based on any of the stratification criteria we considered (these variables are listed for

each study in the Table of Included Studies so that users of this systematic review can verify our approach). Therefore we chose length of follow-up as a useful way of structuring the narrative synthesis: useful for policy makers and prevention workers who may prefer to consider the effectiveness of a prevention intervention over the longer-term.

Evidence of ineffectiveness is also an important consideration for policy makers and prevention workers, and in this regard we have identified a number of prevention interventions (see Results section) where the evaluation evidence shows evidence of ineffectiveness, despite limitations of the evaluations. It was more difficult to draw conclusions about evidence of effectiveness in the short- and medium-term. Studies with a short-term follow-up provided no clear evidence of effectiveness that would be useful to policy makers and prevention workers. Over the medium-term three interventions were highlighted but two of these had limiting methodological shortcomings (Scaggs 1985; Borvin 1995b) and in the third (Werch 2000b) the effect sizes were small and of questionable public health, and therefore policy, relevance.

Over the longer-term, the results of this systematic review point to the potential value of the Strengthening Families Program (SFP; Spoth 2001) as an effective intervention for the primary prevention of alcohol misuse. The Number Needed to Treat (NNT) for the SFP over 4 years for three alcohol initiation behaviours (alcohol use, alcohol use without permission and first drunkenness) was 9 (for all three outcomes). Other interventions worth considering are culturally-focused interventions. One study highlighted the potential value of culturally focused skills training over the longer-term (NNT=17 over three-and-a-half years for 4+ drinks in the last week). The Life Skills Training approach (LST) showed less promise.

Community interventions also need to be considered by policy makers as the potential benefit goes beyond youth. If community interventions can have a significant impact on important youth alcohol misuse outcomes at the same time as impacting on other groups within a community (e.g. Holder 1997) then there may ultimately be an economy of scale. Instead of different interventions for different groups, a single community intervention that covers all these groups may be more cost-effective.

Whether interventions focused on alcohol alone, or alcohol as one of a number of drugs, appeared to have no effect on outcome in the studies reviewed. However, the majority of these studies were conducted in the U.S.A., where the goal of misuse prevention programmes tends to be abstinence from any substance use (including alcohol). This may not be the target outcome for drinking behaviour in other countries, where the emphasis tends to be sensible drinking rather than abstinence. Different philosophies underlie the two approaches so caution must be taken if the adoption of intervention programmes from the United States is contemplated. For example, in Britain different messages are given for alcohol

compared with tobacco or illegal drugs - sensible age-related use for the former, abstinence for the latter.

Furthermore, it is difficult to judge the relative merits of different interventions if evaluations report different outcomes and the public health relevance of these different outcomes is unknown. What is needed is a thorough systematic review of the evidence for subsequent alcohol misuse and alcohol-related problems provided by such indicators, using the International Guide for Monitoring Alcohol Consumption and Relation Harm (WHO 2000) as a framework for systematically reviewing these indicators. This would draw together the evidence on age of initiation (e.g. Grant 1997), age of first drunkenness, regular consumption, and mean drinking frequency index scores as predictor variables. This should lead to greater clarity over the sort of measures to be included in future intervention evaluations.

This review of the methodological quality of evaluations and effectiveness of interventions highlights a number of important issues. The poor quality of much research into the effectiveness of interventions must be stressed. If we want to know if an intervention is working then a proper assessment of its effectiveness should be made, preferably over the longer-term. In this systematic review only a small number of the many intervention studies found in the literature search have been well-designed and adequately evaluated, even those that were judged to be of sufficient quality to be listed in this systematic review. Problems with poor quality studies included lack of suitable control groups (non-random allocation or non-equivalent groups), lack of pre-test information, high levels of attrition, inappropriate analysis for the unit of allocation, and more generally a poor quality presentation of results, often in well-respected peer reviewed journals.

It might be helpful, in terms of promoting better quality evaluations, if public health policy makers were to develop and use a register for the adoption and use of prevention interventions based on what is known about the effectiveness of the intervention. A suggested framework for classifying prevention interventions for adoption by policy makers and prevention workers is:

A Safety, efficacy and effectiveness established: prevention intervention may be used

B Efficacy established. Further evaluation required to confirm effectiveness and safety: prevention intervention can be used as part of a primary research programme or a surveillance programme.

C Safety and efficacy not proven: prevention intervention should be used only as part of a primary research programme, using appropriate methodology.

D Safety and/or efficacy shown to be unsatisfactory: prevention intervention should not be used.

The World Health Organisation is probably best placed to take the lead on the development and promotion of a prevention intervention register. Only those interventions where there is good evidence for efficacy, effectiveness and safety would be given the

highest rating and approved for use, whereas interventions where less is known would not be approved for widespread use until further evidence is provided.

AUTHORS' CONCLUSIONS

Implications for practice

The results of this systematic review point to the potential value of the Strengthening Families Program (Spoth 2001) as an effective intervention over the longer-term for the primary prevention of alcohol misuse. The Strengthening Families Program needs to be evaluated on a larger scale and in different settings to confirm the current results.

Other interventions worth considering are culturally-focused interventions. Schinke 2000 highlighted the potential value of culturally focused interventions over the longer-term, but as with the Strengthening Families Program, further study is required.

Community interventions also need to be considered by policy makers as the potential benefit goes beyond youth. If community interventions can have a significant impact on important youth alcohol misuse outcomes at the same time as impacting on other groups within a community (e.g. Holder 1997) then there may ultimately be an economy of scale. Instead of different interventions for different groups, a single community intervention that covers all these groups may be more cost-effective.

An international register of alcohol and drug misuse prevention interventions should be established and criteria agreed for rating prevention intervention in terms of safety, efficacy and effectiveness. This register should be aimed at public health policy makers and prevention workers.

Implications for research

1. Research into the important outcome variables needs to be undertaken. There is no single outcome measure of youth drinking behaviour that is used in evaluation studies, and no clear understanding of which outcome measures are important predictors of alcohol misuse, morbidity and mortality in later life.

2. Methodology of evaluations needs to be improved. Large scale RCTs are possible and preferable for rigorous scientific evaluation of discrete interventions, but appropriate statistical analysis needs to be undertaken to take account of the intra-class correlation coefficient (ICC). For large Community interventions where

RCTs are not practical then a Comparative Interrupted Time Series (CITS) design with sufficient pre- and post-intervention measurement time points should be considered. In addition, all researchers should clearly describe attrition rates, how they varied between different treatment and control groups, and how attrition was dealt with in any statistical analysis, for example through an intention-to-treat analysis.

3. The Strengthening Families Programme needs to be evaluated on a larger scale and in different settings to confirm the current results. Cost-effectiveness analyses would be useful.

4. Culturally-focused interventions require further development and rigorous evaluation, including cost-effectiveness assessment.

NOTES

The review is dedicated to the memory of Deborah Lister-Sharp who sadly died in 2002 after a long illness.

POTENTIAL CONFLICT OF INTEREST

None.

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*Indicates the major publication for the study

TABLES

Characteristics of included studies

Study	Allison 1990
Methods	Design: RCT (by teacher)

Primary prevention for alcohol misuse in young people (Review)

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Characteristics of included studies (Continued)

	Follow-up 1 year Attrition: 18%
Participants	Age: 5th Grade (ages 10-11) Sex: Male & Female (no details) Size: N=266 Setting: school Country: Canada
Interventions	Programme: Drug Abuse Prevention Program -An Education Resource (DAPPER) Focus: Alcohol & other drugs Programme type: social and life skills Theoretical base: "several underlying frameworks" Key components: 3 groups varies by intensity of staff training. Group A: intensive staff training; Group B: less intensive training (1-2 hours only); Group C: Given curriculum guidelines only. Curriculum for all groups: Knowledge; motivations; problem solving, decision making and social skills; awareness of healthy lifestyles. Duration: 5 x 3hr sessions Primary staff: teachers (trained)
Outcomes	Intervention by intensively trained staff (A) reduced likelihood of intention to drink compared to other groups. No differences in actual drinking behaviour found at follow-up.
Notes	Teacher training had no clear effect on outcome measures. Possibility of contamination between A and B in some schools.
Allocation concealment	B – Unclear

Study	Bagnall 1990
Methods	Design: Before/after with non randomised concurrent controls (by school) 3 Groups: A; Teachers involved; B; No teachers; C: Control Follow-up: 18 months Attrition: no detail
Participants	Age: mean = 13.1 (range 12-13 years) Sex: 51.2% male Size: N = 1560 Setting: school Country: G.B. (England, Scotland & Wales)
Interventions	Programme: Alcohol education in schools. Focus: Alcohol Programme type: knowledge & social skills Theoretical base: social influences approach; health action model key components: alcohol content of different drinks. Examine media messages, parental attitudes & peer pressure Duration: 4-5 weeks (part of curriculum)

Characteristics of included studies (Continued)

	Primary staff: teachers (some helped develop the programme)
Outcomes	Some increase in knowledge & slight decrease in one (of five) reported measures of alcohol consumption. No change in attitudes. Prop'n drank alcohol in last 7 days (p<0.05) A: 21% B: 25% C: 31%
Notes	No strong evidence that intervention effective. Sample may not be representative. Baseline and follow-up measures not anonymous
Allocation concealment	B – Unclear

Study	Baldwin 1990
Methods	Design: RCT (by individual) Follow-up: 1-year Attrition: Exp't: nil Ctrl: 40%
Participants	Age: 17-21 years Sex: males only Size: 29 (14 Exp't., 13 Ctrl) Setting: young offenders in secure settings Country: Scotland
Interventions	Programme: Pre-release Alcohol Education for Young Offenders in secure settings (Behavioural AEC) Focus: alcohol (and offending) Programme type: knowledge and social skills Theoretical base: no details Key components: Exp't: alcohol and self-monitoring, drinking and offending, personal values and offending, preventing re-offending. Ctrl: no intervention (normal work routine) Duration: 2 hours/week for six weeks Primary staff: prison psychologist/teacher/social worker
Outcomes	Change in mean units/week (p<0.05) Exp't: -77 units/week Ctrl: +87 units/week Change in mean units/session (p<0.05) Exp't: -9 units/session Ctrl: +22 units/session Mean no. of offences against property (p<0.05) Exp't: -16.6 offences Ctrl: +1.7 offences Mean no. of "rules offences" (p<0.05) Exp't: -14.4 offences Ctrl: -2.0 offences

Characteristics of included studies (Continued)

Notes Behavioural AEC reduced drinking and offending behaviour compared with controls
Small N and higher attrition in Control Group
Not clear if sample is representative

Allocation concealment B – Unclear

Study **Beaulieu 1988**

Methods Design: RCT (by class)
Follow-up: immediate post-test
Attrition 19%

Participants Age: 7th Grade (ages 12-13)
Sex: Black males and females
Size N=73
Setting: school
Country: U.S.A

Interventions Programme: A Drug Abuse Prevention Program
Focus: alcohol and other drugs
Programme type: Knowledge and social skills
Theoretical base: no details
Key components: information giving, decision making, problem solving techniques, social competency building skills, peer helpers and role models
Duration: One 45 min session per week for eight weeks
Primary staff: teacher and peer helpers (trained)

Outcomes No differences between intervention groups and control groups in drinking behaviour at post-test

Notes Intervention and control groups may not have been comparable: baseline differences in drug knowledge were not accounted for

Allocation concealment B – Unclear

Study **Botvin 1984**

Methods Design: RCT (by school)
Follow-up: 4 months (post-test)
Attrition: 10%

Participants Age: 7th Grade (ages 12-13)
Sex: Male & female (no other details)
Size N=1311
Setting: school
Country: U.S.A.

Interventions Programme: Life Skills Training (LST)
Focus: alcohol, tobacco, marijuana
Programme type: Knowledge, social & life skills

Characteristics of included studies (Continued)

	<p>Theoretical base: problem behaviour theory</p> <p>Key components: Groups A & B: information on myths, media influences, social skills in decision making, coping with anxiety, self improvement & assertiveness. Group C : Control</p> <p>Duration: 20 sessions</p> <p>Primary staff: Group A: peer leaders (trained selected as good role models). Group B: teachers (trained)</p>
Outcomes	Significant improvements in knowledge and attitudes for peer-led Group (A) over other Groups (B & C). No details given for drinking behaviour, but authors suggest that alcohol consumption was less in peer-led Group. No differences were found in levels of drunkenness between Groups A, B and C.
Notes	<p>No detailed figures/results provided for behaviour change.</p> <p>Reportedly effective (but few details of pre-test results). No discussion of attrition.</p> <p>Mainly white middle class</p>
Allocation concealment	B – Unclear

Study	Botvin 1995a
Methods	<p>Design: RCT (by school, stratified by smoking behaviour)</p> <p>Follow-up: 3 years and 6 years</p> <p>Attrition: 3 years: 25%; 6 years: 40% (no diffs between Groups) Remaining N at 6 years = 3597, Hi-fidelity sample (i.e. those S's who attended 60% or more of the intervention sessions) = 2752</p>
Participants	<p>Age: 7th Grade (ages 12-13)</p> <p>Sex: 52% male</p> <p>Size: N=5954</p> <p>Setting: school</p> <p>Country: U.S.A</p>
Interventions	<p>Programme: Life Skills Training (LST)</p> <p>Focus: tobacco, alcohol and drugs</p> <p>Programme type: knowledge, social & life skills</p> <p>Theoretical base: social learning theory; problem behaviour theory; communication theory</p> <p>Key components: cognitive-behavioural skills to raise self-esteem, resistance, assertiveness, relationship, anxiety management & communication skills</p> <p>Duration: 15 sessions + 10 + 5 booster sessions in following years</p> <p>Primary staff: Group A: teacher (formal training + feedback); Group B: teacher (video training); Group C: Control</p>
Outcomes	<p>3 year follow-up: significant improvements in knowledge and attitudes reported. No clear effect for drinking behaviour: No sig. differences for frequency or quantity measures. Sig less drunkenness in one experimental condition. Drunkenness in last month (*p<0.05 from C) (9 point scale)</p> <p>A: 2.31 (s.e.=0.04)</p> <p>B: 2.19 (s.e.=0.04)*</p> <p>C: 2.32 (s.e.=0.04)</p> <p>6 year follow-up: (Full sample)</p> <p>(NB; measures dichotomized, 0=no, 1=yes) No differences between Groups for monthly, weekly or 3+ drinks/occasion measures.</p> <p>Drunkenness in last month (*p<0.05) form C; 1 tailed tests)</p>

Characteristics of included studies (Continued)

A: 0.34 (s.e.=0.02)*

B: 0.33 (s.e.=0.03)*

C: 0.40 (s.e.=0.02)

6 year Follow-up:

(Hi-fidelity sample: caution, see comments) (measures dichotomized 0=no, 1=yes) Sig. differences on all drinking measures:

Monthly drinking (*p,0.05 from C)

A: 0.58 (s.e. = 0.03)

B: 0.54 (s.e. = 0.03)*

C: 0.60 (s.e. = 0.02)

Weekly drinking (*p<0.05 from C)

A: 0.24 (s.e. = 0.02)*

B: 0.20 (s.e. = 0.02)*

C: 0.29 (s.e. = 0.02)

3+ drinks/occasion (*p<0.05 from C)

A: 0.53 (s.e. = 0.03)*

B: 0.52 (s.e.= 0.02)*

C: 0.59 (s.e. = 0.02)

Drunkenness in last month (*p<0.05 from C)

A: 0.31 (s.e. =0.03)*

B: 0.28 (s.e. = 0.03)*

C: 0.40 (s.e. = 0.02)

Notes

Thorough study. Mostly white middle class suburban sample. Intervention most effective in reducing frequency of drunkenness, although magnitude of effect is quite small.

No clear justification for post hoc tests, therefore critical sig. levels in these tests questionable

High attrition at 6 years, and "Hi-fidelity" to programme important, but no attempt made to match "Hi-fidelity" sub group in Control Group - may compromise results as not a true comparison or an "intention to treat" analysis

Effect sizes small - unclear public health benefit

Allocation concealment B – Unclear

Study

Botvin 1995b

Methods

Design: Matched control study (by school)

Follow-up: 2 years

Attrition: 757 students at baseline (no information on refusals), 456 (60%) followed-up.

Attrition analysis indicated no differential attrition by pre-test drinking status.

Participants

Age: 7th grade students (mean age at follow-up = 14.96 years)

Sex: 53% female

Size: N = 757 (6 schools)

Country: USA

Interventions

Programme: Generic Skills Intervention (GSI) and Culturally Focused Intervention (CFI)

Focus: Alcohol & other drugs

Programme type: Knowledge, social and life skills.

Theoretical base: social learning theory, problem behaviour theory, communication theory

Characteristics of included studies (Continued)

Key components:CFI: classroom based sessions aimed at developing personal and social skills, with particular emphasis on social influences and pressure to use substances - teaching of cognitive behavioural skills to raise self-esteem, resistance to peer pressure, managing stress and anxiety, communicating effectively and developing positive personal relationships (15 sessions)

GSI: normative education re: substances plus CFI programme (but without cultural emphasis) (15 sessions)

Control: Information only (5 sessions)

Duration: CFI & GSI: 15 sessions + 8 booster sessions in 8th grade.

Control: 5 sessions + 3 booster sessions in 8th grade

Primary staff: CFI & GSI = external "intervention providers" and peer leaders

Outcomes	Adjusted follow-up mean scores: (i) Drinking frequency GSI: 1.94 CFI: 1.61 Control: 2.25 (p< 0.05) (ii) Drinking amount GSI: 1.65 CFI: 1.25 Control: 1.85 (p< 0.05) (iii) Drunkenness frequency GSI: 1.40 CFI: 1.25 Control: 1.64 (p< 0.05) (iv) Proportion of current drinkers GSI: 10% CFI: 6% Control: 13% (sig. not stated)
Notes	CFI showed best results, although design limitations means generalisability is also limited. Potential for selection bias as not a RCT. Allocation by school but analysis by individual; high attrition.No clear indication of public health relevance of effect sizes - possibility of statistical significance without impact on public health
Allocation concealment	B – Unclear
Study	Bremberg 1994
Methods	Design: Before-after study with non-randomised, matched concurrent controls (by class) Follow-up: 5 & 10 months Attrition: 20%
Participants	Age: Grade 9 (ages15-16) Sex: Exp't: 22 male, 43 female Size: Exp't: 65, Control: 59 N = 124 Setting: school Country: Sweden
Interventions	Programme: "It's your decision" Focus: general health enhancement

Characteristics of included studies (Continued)

	<p>Programme type: alternatives: competence</p> <p>Theoretical base: coping behaviour theory; self-efficacy; social modelling theory</p> <p>Key components: clarification of health; development of health enhancing goal; health enhancing activities</p> <p>Duration: 6 sessions (group & individual)</p> <p>Primary staff: health counselors (teacher, school social worker, school nurse)</p>
Outcomes	No effect of counseling programme on alcohol consumption or on perceived negative effects of alcohol. No difference between Exp. & Control groups at 5 or 10 months
Notes	<p>Students don't attribute alcohol as a health issue.</p> <p>Small samples.</p> <p>Both groups in same school: possibility of contamination.</p>
Allocation concealment	B – Unclear

Study	Brewer 1991
Methods	<p>Design: RCT (by class, matched for substance use and gender)</p> <p>Follow-up: 6 months</p> <p>Attrition: no details</p>
Participants	<p>Age: Grade 10 (ages 15-16)</p> <p>Sex: 50% male</p> <p>Size: 54 in three groups (18 in each condition)</p> <p>Setting: school</p> <p>Country: USA</p>
Interventions	<p>Programme: Here's Looking at You, 2000 (HLAY2) - social skills component only</p> <p>Focus: alcohol and other drugs</p> <p>Programme type: social skills</p> <p>Key components: Intervention group: development of social skills through 5 steps; recognizing need for skills; modelling 5 steps; role playing; rehearsal; feedback. Placebo group: video tapes of drug and alcohol material - information only. Control group: no treatment</p> <p>Duration: 9 x 40 minute sessions over 9 weeks in intervention and placebo groups</p> <p>Primary staff: researcher (school psychologist) and guidance counselor</p> <p>Theoretical base: problem behaviour theory; social learning theory</p>
Outcomes	<p>No significant effect (level of significance adjusted for family wise error rate) of intervention for initiation, experimental and regular alcohol use</p> <p>Significant ($F = 4,863$, $df = 2$, $p = 0.014$) effect of intervention over placebo and control in unexpected direction:</p> <p>Alcohol use ($p < 0.05$)</p> <p>(19 point composite scale: 0=non-user)</p> <p>Int: 10.7(+3.1)</p> <p>Plac: 13.0 (no change)</p> <p>Ctrl: 13.1(-0.7)</p>
Notes	No significant positive effects of social skills training. Some indication of potential negative effects.

Characteristics of included studies (Continued)

Small sample size and no details of attrition
Good design in terms of using placebo group to account for Hawthorne effect
Possible contamination effects as study in one school only

Allocation concealment B – Unclear

Study **Caplan 1992**

Methods Design: RCT (by class, stratified by ability groupings)
Follow-up: immediate post-test
Attrition: 16% from Exp't gp., 18% from ctrl gp.

Participants Age: Grades 6 & 7, median=12 yrs (ages 11-13)
Sex: urban 55% male; suburban 54% male
Size: urban = 206; suburban = 76; N=282.
Setting: school
Country: USA

Interventions Programme: Positive Youth Development Program (PDYP)
Focus: self-reported substance use intentions and excessive alcohol use
Programme type: social & life skills
Theoretical base: bio psychosocial theories of social competence
Key components: school-based social competence training; stress management; self-esteem; problem solving; substances and health; assertiveness; social networks
Duration: 20 sessions (15 weeks)
Primary staff: health educators & trained classroom teachers

Outcomes Significant effects for intentions to use and for attitudes (in expected direction).
Authors report significantly more drinking in Control group for three measures: 3+ drinks/occasion; having too much to drink; and amount drunk on one occasion, but no figures/scores given.

Notes No detailed scores given in results
Programme children might contaminate controls (only 2 schools, and randomised by class within schools)
Effects were reported to be better in some programme classes than others
Comparable results inner-city & suburban samples

Allocation concealment B – Unclear

Study **Clayton 1991**

Methods Design: RCT (by school)
Follow-up: 5 years & 10 years
Attrition: 45% at 5 years; 52% at 10 years

Participants Age: 6th Grade (ages 11-12)
Sex: 51% male
Size: N=2091 (31 schools)

Characteristics of included studies (Continued)

	Setting: school
	Country: USA
Interventions	Programme: Drug Abuse Resistance Education (DARE) Focus: drugs including alcohol Programme type: social & life skills Theoretical base: no details Key components: resistance training, self-esteem, social skills, information, role-play Duration: 16 sessions/16 weeks Primary staff: uniformed police officer (trained)
Outcomes	Some positive effects of DARE on negative attitudes but no effects on behaviour at immediate post-test 5 year follow-up: no effects of DARE on drinking behaviour 10 year follow-up: DARE status unrelated to alcohol use at age 20
Notes	No details about curriculum content for control group Clayton et al 1999 used sophisticated analysis to account for school and individual level effects
Allocation concealment	B – Unclear

Study**Cook 1984**

Methods	Design: RCT (by individual) Follow-up: immediate post test Attrition: 16%
Participants	Age: Group 1: mean age 15.3 yrs. Group 2: mean age 13.9yrs Sex: 47% male Size: N=242 Setting: school Country: USA
Interventions	Programme: Positive Alternatives For Youth (PAY) Focus: drugs including alcohol Programme type: alternatives: competence Theoretical base: no details Key components: PAY: orientation, communication, self-concept, self care, activities, physical, creative self-expression, consciousness alteration; Ctrl: no intervention Duration: 2-3 sessions/week over 1 semester Primary staff: teachers, programme co-coordinator, alternatives specialist
Outcomes	PAY students in Group 1 decreased hard liquor use over controls: Hard liquor use (p<0.01): (yes/no response) PAY: (-0.13) Ctrl: (+0.06)

Characteristics of included studies (Continued)

	No difference between PAY and Ctrl. in group 2
Notes	Differences in baseline characteristics of PAY groups and controls only taken into account in Group 2 analyses. Significant Group 1 effect may be artefact Marked differences at baseline between PAY groups and controls PAY & Ctrl groups in same schools, therefore possibility of contamination.
Allocation concealment	B – Unclear

Study	Dielman 1986
Methods	Design: RCT (by school, stratified by SES, race and ability) Follow-up: immediate post-test; 1, 2, and 3 year follow-up (Wynne et al also followed up a subset in Grade 10, four years post-baseline) Attrition: post-test: 4%; 2 years: 28%(?)
Participants	Age: Grades 5 & 6 (ages 10-12) Sex: male & female Size: N=2589 (Wynne et al sampled a subset of N=400 for further analysis) Setting: school Country: USA
Interventions	Programme: Alcohol Misuse Prevention Study (AMPS) Focus: Alcohol Programme type: social & life skills Theoretical base: social learning theory Key components: information & social skills. Awareness of risks and pressures to drink. Advertising information. Peer pressure resistance & refusal skills. Duration: Group A: 180 mins Group B: 180 mins. & 135 mins. booster; Group C: Control Primary staff: trained project staff and teachers
Outcomes	Successful in communicating basic information in short term - knowledge increased in Groups A and B. No short term or long term behavioural effects. Wynne et al longer-term 4 year follow-up on a sample subset found no significant effect of the AMPS curriculum on tenth grade alcohol misuse.
Notes	Few details about participants. Attrition rates not clearly reported across publications Complex pattern of results presented, but no sig. diffs between conditions and Control Group at any of follow-up periods, for both alcohol use and misuse
Allocation concealment	B – Unclear

Study	Durrant 1986
Methods	Design: RCT (by school, stratified by school size, minority population and no. of free lunches) Follow-up: immediate post-test Attrition: no details
Participants	Age: Grade 6 (ages 11-12)

Characteristics of included studies (Continued)

	Sex: 48% male Size: N=191 Setting: schools Country: USA
Interventions	Programme: Multi-component "inoculation programme" Focus: alcohol & other drugs Programme type: knowledge & social skills Theoretical base: social learning theory Key components: anti-smoking strategy applied to alcohol & other drugs: emphasizing healthy lifestyles; negative effects of drug use; decision making skills; skills to resist social pressures Duration: 9 x 45 min. sessions over 22 weeks Primary staff: researchers and school counselors
Outcomes	No significant difference at post-test between intervention and control group in proportion reporting liquor use
Notes	No details of attrition and small sample size. Good design and use of bogus pipeline technique to increase validity.
Allocation concealment	B – Unclear

Study

Duryea 1988

Methods	Design: RCT (by individual) Follow-up 3 years Attrition: 1984a analyses: 46%; 1984b analyses: <2%; 3 years: 16%
Participants	Age: Grade 9 (ages 14-15) Sex: male & female Size: N=155 Setting: school Country: USA
Interventions	Programme: Preventive alcohol education Focus: alcohol Programme type: social skills Theoretical base: psychological immunisation Key components: film, question & answer session; highlighting specific alcohol related concepts; role playing and ability to refuse. Some booster activities Duration: 6 sessions/2 weeks Primary staff: teacher (trained)
Outcomes	3 year follow-up: No sig. effects of frequency of riding with a drink-driver, accepting or refusing drinks. Sig. difference in excess drinking measure, but in unexpected direction: Excess drinking (p=0.05)

Characteristics of included studies (Continued)

	Expt: 1.48 (s.d.=0.82) Ctrl: 1.28 (s.d.=0.47)
Notes	No details of measurement procedures. Not enough statistical details about results. Expt & Ctrl Groups from same school, therefore possibility of contamination. Small sample. Greater attrition in Control Group. Questionnaires administered by teacher (possibility compromising validity)
Allocation concealment	B – Unclear
Study	Ellickson 1990
Methods	Design: RCT (by school) Follow-up: 3, 12, 15 months, 2 and 5 years Attrition: 15 months: 40%; 2 years: 25%; 5 years: 45%
Participants	Age: Grades 7 & 8 (ages 12-14) Sex: 52% male Size: N=6527 Setting: school Country: USA
Interventions	Programme: Project ALERT Focus: alcohol, tobacco, other drugs Programme type: social & life skills Theoretical base: social influence model; health belief model; self-efficacy theory Key components: develop reasons not to use drugs, discuss pressures to use drugs, resistance skills, prevalence of drug use. Duration: 7th grade - 8 sessions; 8th grade - 3 sessions Primary staff: Group A: adult health educator. Group B: educator & teen leader; Group C: Control
Outcomes	3, 12 and 15 month follow-ups: Slight reductions in consumption among all risk Groups, i.e. pre-test non-users & experimenters. Reduced non-drinkers initiation of drinking. Effects mainly due totem leader curriculum. Drinking in last month(*<0.05 from C) Non-users at pre-test, 3 month follow-up: A: 6%* B:8% C:11% Experimenters at pre-test, 12 month follow-up (effect in unexpected direction): A: 38%* B: 33% C: 31% 2 year and 5 year follow-ups: Few early reductions in drinking among 7th Grade had eroded by 8th Grade. Teen leaders achieved larger reduction in pro-drug attitudes but not in use. By the end of High School (5 years) no effects remained.
Notes	High generalisability as varied sample, but fairly high attrition.

Characteristics of included studies (Continued)

Complex patterns of results reported - many tests carried out, but only few reached significance - may be spurious.

Inadequate details of attrition - different papers report different rates (probably due to analyses within different time frames).

Allocation concealment B – Unclear

Study **Gilchrist 1987**

Methods Design: Before-after study with non-randomised concurrent controls (by school)

Follow-up: 6 months

Attrition: 20-25%

Participants Age: mean age 11.34

Sex: 49% female

Size: N=102

Setting: school (American Indian Adolescents)

Country: USA

Interventions Programme: Skills Enhancement Program

Focus: alcohol and other drugs

Programme type: social & life skills

Theoretical base: skills enhancement model

Key components: skills enhancement: myths and stereotypes; health education; decision making; peer guest speakers; practice skills; and message reinforcement

Duration: 10 sessions

Primary staff: Indian researcher and indigenous leader

Outcomes Significant differences in prevalence of self-reported alcohol use between intervention Group and Control Group

Change in mean frequency of use ($p < 0.01$) (5 point scale)

Int: -0.14

Ctrl: +0.09

Notes Little detailed information about results provided. Small sample.

Possible contamination between groups

Native American Indian population - may have limited generalisability

Allocation concealment B – Unclear

Study **Glikzman 1983**

Methods Design: Before-after study with non-randomised concurrent controls

Follow-up: immediate post-test

Attrition: 28%+

Participants Age: Grades 9 and 10 (ages 14-16)

Sex: males and females

Size: N=1000

Characteristics of included studies (Continued)

	Setting: school
	Country: Canada
Interventions	Programme: Theatrical performance - Booze
	Focus: alcohol only
	Programme type: knowledge only
	Theoretical base: no details
	Key components: 4 groups: A: theatrical performance - series of skits depicting drinking problems and drunkenness; B: performance and lessons (myths, driving, sexuality); C: lessons only; D: Control
	Duration: A & B: five skits/one afternoon; B & C: four lessons
	Primary staff: Performing Arts students and teachers
Outcomes	Significant intervention group effects on knowledge and attitudes. Significantly more alcohol problems (measured by Adolescent Alcohol Involvement Scale - AAIS) in control Group (D): AAIS (p<0.01) A: 29.4 B:31.3 C:31.0 D:30.8
	Significant effects of intervention were also found for previous weeks drinking: Consumption in last 7 days (p<0.01) A: 65.6 B:81.0 C:73.8 D:146.7
Notes	Theatrical performance offered most benefit in terms of drinking behaviour. But only short-term results reported - impact may be on self-reports rather than actual drinking
	Little detailed information about results
	Possible contamination between groups
Allocation concealment	B – Unclear

Study **Goldberg 2000**

Methods	Design: RCT (by school, matched pair allocation)
	Follow-up: 1 year
	Attrition: 21.3%
Participants	Age: 15-16 years
	Sex: 100% male
	Size: 31 schools, N= 3207 athletes
	Setting: High school football teams
	Country: USA
Interventions	Programme: Adolescents Training and Learning to Avoid Steroids Programme
	Focus: Primarily anabolic steroids (AS)
	Programme type: Knowledge

Characteristics of included studies (Continued)

	<p>Theoretical base: no details</p> <p>Key components: Int: classroom curriculum addressing physiology and effects of AS - Exercise and weight training; pocket sized guides on diet</p> <p>Ctrl: anti-AS leaflet</p> <p>Duration: 8-14 sessions</p> <p>Primary staff: coaches and peer leaders</p>
Outcomes	<p>Cumulative occurrence (incidents) of drinking and driving</p> <p>Baseline:</p> <p>Int: 5.0</p> <p>Ctrl: 4.6</p> <p>Follow-up:</p> <p>Int: 10.7</p> <p>Ctrl: 12.1</p> <p>(n.s. by school but $p < 0.05$ by individual)</p>
Notes	<p>Strong design overall</p> <p>Marginal significance and small effect size. Not significant by school and this is the appropriate level of analysis although sample size is small at this level</p> <p>Analysis also used one-sided significance levels</p>
Allocation concealment	B – Unclear

Study	Goodstadt 1983
Methods	<p>Design: RCT (by class)</p> <p>Follow-up: 6 months</p> <p>Attrition: 21.3%</p>
Participants	<p>Age: no details (High school)</p> <p>Sex: 41% male</p> <p>Size: N=540</p> <p>Setting: school</p> <p>Country: Canada</p>
Interventions	<p>Programme: "Three approaches"</p> <p>Focus: alcohol only</p> <p>Programme type: knowledge & affective</p> <p>Theoretical base: no details</p> <p>Theoretical grounding: no details</p> <p>Key components: 3 groups: Cognitive: detailed examination of alcohol and it's role in society; Decision making; facts, social influence, behavioural options; Values: reinforcement of values in life</p> <p>Duration: 10 sessions/10 days</p> <p>Primary staff: researchers</p>
Outcomes	Significant improvements in knowledge (but not attitudes) for intervention groups over Control.

Characteristics of included studies (Continued)

	No significant differences between intervention groups and Control at 6 months for frequency of drinking or usual quantity of drinking
	The "Values" Group reported significantly more drinking in the previous 6 months than the other programme groups, though no specific scores/details are given
Notes	Little detailed information about results provided
	Possible contamination between groups
	No details of attrition
Allocation concealment	B – Unclear

Study **Hansen 1988a**

Methods	Design: RCT (by school)
	Follow-up: 12 month and 24 month follow-ups
	Attrition: 21 months: 37% 24 months: 52% (differential rates for 3 groups)
Participants	Age: 7th Grade (ages 12-13)
	Sex: 49% female
	Size: N=2863
	Setting: school
	Country: USA
Interventions	Programme: Project SMART
	Focus: "Gateway drugs" (tobacco, alcohol, marijuana)
	Programme type: social skills & affective
	Theoretical base: social psychological theories
	Key components: social pressure resistance training, affective education. 3 Groups: Group A: social (motivations; norms; consequences; resistance; role play; adult and media influences); Group B: affective (motivations; alternatives; goal setting; consequences; self-esteem; decision making; assertiveness); Group C: control
	Duration: 12 weeks intervention
	Primary staff: staff health educators, teachers (trained), peer opinion leaders
Outcomes	Lower drinking in Group A (social programme) compared to control
	Group B (affective programme) increased drinking compared to control (differences only at borderline significance and only low drinking categories, e.g. "sips"
	No differences between Groups in heavier drinking categories
Notes	Differential rates of attrition
	Pre-test differences between groups in drinking measures
	No detailed scores/figures given in paper - graphical representation only
Allocation concealment	B – Unclear

Study **Hansen 1991**

Methods	Design: RCT (by school, stratified by size, ability and ethnicity)
	Follow-up 1-2 years

Characteristics of included studies (Continued)

	Attrition: 20%
Participants	Age: 7th Grade (ages 12-13) Sex: male & female (no details) Size: N=3011 Setting: school Country: USA
Interventions	Programme: Adolescent Alcohol Prevention Trial (AAPT) Focus: alcohol & other drugs Programme type: social & life skills (including social norms) Theoretical base: social influence; social norms Key components: 4 groups: information on consequences of drug use (ICU); normative education (NE); resistance training(RT); combined programme (C) Duration: 4 to 10 sessions Primary staff: research staff (trained)
Outcomes	Groups NE and C had significantly less drunkenness and alcohol related problems at follow-up (no detailed scores given - results depicted graphically) Donaldson et al (1995) showed in further analyses of RT groups that resistance skills training was only effective if adolescents believed it was not acceptable to drink (perceived norms) 2 years Palmer et al (2000) re analysed data taking into account unit (individual, class, school) effects and found that normative education had a small but significant effect over information only at 2 years at both the individual and the class level, but not at the level of the school
Notes	Good replicable study, well designed Some differences between groups at baseline in ethnic mix The analysis by Palmer et al (2000) is a sophisticated and takes into account unit of allocation and analysis factors. However, the effect sizes are small and there is no clear indication of the potential public health benefit of these effects
Allocation concealment	B – Unclear
Study	Harmon 1993
Methods	Design: Before/after with non-randomised concurrent controls (by school) Follow-up: immediate post test Attrition: 16%
Participants	Age: Grade 5 (ages 10-11) Sex: 41-64% male (each school) Size: N=708 Setting: school Country: USA
Interventions	Programme: Drug Abuse Resistance Education (DARE) Focus: drugs including alcohol

Characteristics of included studies (Continued)

	<p>Programme type: social & life skills</p> <p>Theoretical base: no details</p> <p>Key components: resistance training self-esteem, social skills, information, role-play</p> <p>Duration: 17 sessions/17 weeks</p> <p>Primary staff: uniformed police officer (trained)</p>
Outcomes	<p>No differences in frequency of self-reported alcohol in last month between intervention and Control Group</p> <p>Significant difference ($P < 0.05$) in proportion who reported drinking beer, wine or liquor in last year</p> <p>Int: 10% (+2%)</p> <p>Ctrl: 13% (+7%)</p>
Notes	<p>No correction made for high number of statistical tests carried out</p> <p>Change in proportion drinking in last year may be due to self-report bias by intervention Group (intervention only 17 weeks and no difference in frequency of drinking in last month)</p>
Allocation concealment	B – Unclear

Study Holder 1997

Methods	<p>Design: Complex interrupted Times Series</p> <p>Follow-up: 1 year</p> <p>Attrition: NA</p>
Participants	<p>Age: target group: under age alcohol purchases</p> <p>Sex: NA</p> <p>Size: Three experimental communities: South Carolina, Southern and Northern California. Random samples of N=100 off-sale outlets in each community selected for purchase survey</p> <p>Setting: Community trial</p> <p>Country: USA</p>
Interventions	<p>Programme: Community Prevention Trials Project</p> <p>Focus: Underage purchase of alcohol</p> <p>Programme type: Legislative, community</p> <p>Theoretical base: none stated</p> <p>Key components:</p> <p>(i) enforcement of underage sales laws</p> <p>(ii) retailer training and retail policy development</p> <p>(iii) media advocacy for enforcement efforts</p> <p>Duration: 148 outlets visits by police to enforce sales laws (22 citations issued) over study period; newspaper and TV coverage during study period</p> <p>Primary staff: Police and local instructors</p>
Outcomes	<p>Overall reduction in selling alcohol to apparent under age buyers Experimental (with training) 29% Experimental (no training) 34% Control 12%</p>
Notes	<p>Large and complex trial. Showed good positive effect size on under age alcohol sales</p> <p>Unclear whether change in under age sales will result in reduced alcohol misuse (i.e. will young people obtain alcohol elsewhere)</p> <p>Insufficient number of time points pre- and post to provide robust time series analysis</p>

Characteristics of included studies (Continued)

Allocation concealment B – Unclear

Study	Hopkins 1988
Methods	Design: Before/after with non-randomised concurrent controls (by school) Follow-up: short term: 1 month; long term: 2 years Attrition: short-term: 9% long-term: very high
Participants	Age: Grades 4 to 12 (ages 9-18) Sex: 50% male Size: N=6808 Setting: school Country: USA
Interventions	Programme: Here's Looking At You (HLAY) Two Focus: alcohol Programme type: social skills & affective Theoretical base: no details Key components: enhance self-esteem; rationalize and strengthen decision making skills; increase knowledge; instill appropriate attitudes Duration: short-term: 15 sessions; long-term: up to 3 x 15 sessions Primary staff: teacher
Outcomes	Short-term: Of 91 gain score analyses, 60 indicated no significant gain; 24 indicated positive gain and 7 indicated negative gain using linked/fore post test Longer-term: Evidence of beneficial effect in 33% variables and of negative effect in 10% variables
Notes	No systematic pattern to results No exact figures reported in results
Allocation concealment	B – Unclear

Study	Klepp 1995
Methods	Design: Before/after with non-randomised concurrent matched controls (two communities - one intervention and one control) Follow-up: 3 years Attrition: 45% intervention and 69% control
Participants	Age: Ninth grade in 1986 (intervention year) Sex: No details Size: 2376 across 13 grade schools in two communities (NB - sample taken from a longer term cohort study with initial N = 2376 at baseline in 1983)
Interventions	Programme: "Shifting Gears" Focus: Tobacco, alcohol and marijuana Programme type: social skills Key components: Focus on building social skills enabling students to resist pressures to use drugs or engage in hazardous behaviour such as drinking and driving. Taught media skills and focused on provision of credible positive role models and setting non-drug use norms. Duration: 6 sessions Primary staff: Teachers and peer leaders

Characteristics of included studies (Continued)

Outcomes	(i) mean number of drinking occasions (past 30 days) Int: 1.9 - 2.5 Ctrl: 2.2 - 2.5 (n.s) (ii) 5+ drinks in a row in last 2/52 Int: 32% - 42% Ctrl: 21% - 37% (n.s) (iii) drinking and driving in last 3/12 Int: 8% - 21% Ctrl: 17% - 18% (n.s)
Notes	Baseline differences noted Appropriate analysis (by school as unit of intervention) No positive effects of the intervention in the longer term
Allocation concealment	B – Unclear
Study	Loveland-Cherry 1999
Methods	Design: RCT (by family) Follow-up: 4 years Attrition: 19% (but complete data available only from 428/892 and only these were used in analyses) No information on differential attrition rates, although final analysis shows much lower N in intervention group (90) than in control group (338)
Participants	Age: initially age 9 Sex: 54% female Size: N = 892 Students in grade 4 (from 8 schools) Setting: family Country: USA
Interventions	Programme: Child and Parent Relations (CAPE) Project Focus: Alcohol Programme type: social skills and parenting Theoretical base: social cognitive and problem behaviour theory Key components: The sessions focused on general parenting skills and family functioning as well as on factors specific to alcohol use/misuse Duration: Three hour long in-home sessions, family meetings afterwards, and follow-up telephone calls. Followed by booster sessions Primary staff: Trained field staff recruited from communities
Outcomes	(i) Alcohol use - mean scores Int: 0.2 - 0.7 Ctrl: 0.2 - 0.8 (p<0.05) (ii) Alcohol misuse - mean scores Int: 0.1 - 0.6 Ctrl: 0.2 - 0.7 (n.s)
Notes	Post-hoc analyses conducted by authors indicate significant difference in outcome according to prior drink status Prior drinkers (already drinking by time of intervention showed marked decrease in alcohol use and misuse if they were in the intervention group) High attrition through data analysis and possibility of differential attrition
Allocation concealment	B – Unclear

Study **Magura 1994**

Methods Design: Before/after with non-randomised concurrent controls (by individual)

Characteristics of included studies (Continued)

	Follow-up: 10 months after baseline; and 5 months after release
	Attrition: 34%
Participants	Age: Median 17.8 years Sex: males Size: Exp. N=110; Ctrl. N=301 Setting: young offenders Country: USA
Interventions	Programme: Intensive AIDS Education for adolescent drug users in jail Focus: drugs including alcohol Programme type: knowledge, social and life skills Theoretical base: problem solving therapy techniques Key components: Exp't: general health knowledge, consequences of drug use and risky sex. Ctrl: "waiting list" control group - no intervention Duration: 4 1-hour small group sessions (over 2 weeks) Primary staff: male counselor
Outcomes	No differences in self-reported frequency of drinking between Exp't. and Ctrl. Groups at follow-up.
Notes	Possible contamination between intervention group and "waiting list" controls
Allocation concealment	B – Unclear

Study

Marlatt 1998

Methods	Design RCT (by individual) Follow-up: 2 years Attrition: 18% in treatment group; 10% in no treatment control NB: sampling i) mail out 4000 questionnaires ii) 2041 returned questionnaires iii) 2041 wishing to participate iv) 508 high risk students invited to participate v) 366 agreed vi) 18% attrition from 366 recruited
Participants	Age: Freshmen no older than 19 years Sex: 54% female in high risk group; 55% female in comparison group Size: 366 in high risk group; 115 in comparison group Setting: Freshmen (college students in their first year) screened as being at high risk on frequency/quantity criteria Country: U.S.A
Interventions	Programme: Motivational interviews for college students at high risk of heavy drinking Focus: Alcohol only Programme type: Social/life skills Theoretical base: motivational interviewing

Characteristics of included studies (Continued)

	<p>key components: interview and personalised feedback to students self-reported drinking habits. Subsequently set personalised feedback pertaining to their reports of drinking at baseline and follow-up</p> <p>Duration: interview length not stated</p> <p>primary staff: clinical psychologists or clinical psychology trainees</p>
Outcomes	<p>i) Drinking frequency change -0.4 in intervention group and -0.2 in control group ($p < 0.05$)</p> <p>ii) Drinking quantity change -0.8 in intervention and -0.4 in control group ($p < 0.05$)</p> <p>iii) Rutgers alcohol inventory(RAP): change -4.2 in intervention and -2.9 in comparison group ($p < 0.05$)</p> <p>iv) alcohol dependence scale (n.s)</p>
Notes	<p>Strong design and consistent pattern of results indicating potential value of motivational interviewing</p> <p>Weaknesses include selection bias and lack of intention to treat analysis, plus effect sizes although significant are small</p> <p>Proportion recruited is small, indicating potential acceptability/generalisability problem</p>
Allocation concealment	B – Unclear
Study	McBride 2000
Methods	<p>Design: RCT (by school)</p> <p>Follow-up: 1 month</p> <p>Attrition: 26.3%. Differential attrition between intervention and control groups.</p>
Participants	<p>Age: 13-17 years</p> <p>Sex: no details</p> <p>Size: 2343 (N = 855 (intervention) and N = 872 (control) at follow-up</p> <p>Setting: school</p> <p>Country: Australia</p>
Interventions	<p>Programme: The School Health and Alcohol Harm Reduction Project (SHAHRP)</p> <p>Focus: alcohol</p> <p>Theoretical base: primarily social inoculation</p> <p>Key components: 17 consecutive skills based activities</p> <p>Duration: 17 sessions incorporated over 8-10 lessons</p> <p>Primary staff: teachers</p>
Outcomes	<p>Control group had significantly greater increase in a consumption and the number of alcohol related harms than the intervention group.</p>
Notes	<p>Baseline differences between the intervention and control were statistically significant for both context of use and harms associated with their own use of alcohol. Therefore there is a possibility of selection bias.</p> <p>No Intention to Treat analysis.</p>

Characteristics of included studies (Continued)

Multiple post-hoc statistical tests - possibility of chance findings. Short term follow-up, with a possibility of self-report bias in intervention group.

Allocation concealment B – Unclear

Study **Monti 1999**

Methods Design: RCT (2 groups, by individual)
Follow-up: 6 months
Attrition: 94/141 eligible agreed to participate in the study and 84 (89%) were followed up at 6 months
No significant difference in follow-up by group or gender

Participants Age: 18-19 years
Sex: 68% male
Size: N = 94 (42 exp't; 52 control)
Setting: hospital emergency room/accident and emergency setting
Country: U.S.A

Interventions Programme: Brief motivational interview (MI) for alcohol positive adolescents in an emergency room
Focus: alcohol misuse
Programme type: Social/life skills
Key components: MI group: MI provides normative comparisons, with personalised feedback, in a non-threatening empathic interview developing discrepancy, self efficacy and personal choice.
Standard Care (SC) Group: Consistent with normal ER practice - handout on avoiding drinking and driving
Duration: Interview of 35-40 minutes
Primary staff: Qualified ER staff with 1-2 years experience who had completed extensive MI training and whose MI skills were regularly monitored

Outcomes i) Drinking and Driving
Standard care nearly four times more likely to drink and drive (OR = 3.92, 95% CI = 1.21 to 12.72)
ii) Moving violation
MI group significantly less likely to have a moving violation (23% vs 3% p<0.05)
iii) Alcohol related injury
MI group significantly less likely than SC group to have sustained an alcohol related injury (21% vs 50%) (OR = 3.94, 95% CI = 1.45 to 10.79)
iv) Alcohol related problems
MI group reported significantly fewer alcohol related problems (mean = 0.89 (sd = 1.18)) than SC group (mean 1.44 (sd = 1.43)), effect size = 0.23

Notes Strong design with strong analysis. States intention to treat analysis although not clear to what extent this was achieved.
Consistent pattern of results across all alcohol misuse variables.
Potential generalisability problem (note high refusal to participate rate 47/141)

Allocation concealment B – Unclear

Study **Moskowitz 1984**

Methods Design: RCT (by class, stratified by attitudes and involvement)

Characteristics of included studies (Continued)

	Follow-up: 1 year
	Attrition: 26%
Participants	Age: Grades 7 to 9 (ages 12-15) Sex: males and females (no details) Size: N = 473 Setting: school Country: USA
Interventions	Programme: A Drug Education Course Focus: Drugs including alcohol Programme type: knowledge & affective Theoretical base: no details Key components: models of motivation and decision making, advertising influence, assertiveness training/role play, knowledge of drugs Duration: 12 sessions/12 weeks Primary staff: research staff
Outcomes	No significant effects of intervention group over controls for alcohol involvement at 1 year follow-up
Notes	No details about curriculum content for control group Both intervention and control groups in same schools so possible contamination
Allocation concealment	B – Unclear

Study

Newman 1992

Methods	Design: RCT (by school) Follow-up: post-test 4-6 weeks after programme; 1 year follow-up Attrition: no details
Participants	Age: 9th Grade (ages 15-16) Sex: male & female (no details) Size: 87 classes (approx. N = 3500 students) Setting: school Country: USA
Interventions	Programme: Resisting Pressure to Drink and Drive (RPDD) Focus: alcohol (drinking and driving) Programme type: refusal skills Theoretical base: problem behaviour theory; social cognitive theory; role theory; educational immunisation Key components: Exp't. Group: video showed typical adolescent drinking situations, followed by role play; information about alcohol. Ctr'l. Group traditional alcohol education programme Duration: 10 lessons incorporating 5 20 minute videos Primary staff: teachers (trained)
Outcomes	Increase in knowledge for both Exp't. and Ctrl. Groups at follow-up (and Expt. > Ctrl.)

Characteristics of included studies (Continued)

	No. significant difference at follow-up between Exp't. and Ctrl. Groups in perceived ability to resist pressures
	No significant difference at follow-up between Exp't. and Ctrl Groups in self-reported drinking behaviour
	No significant difference at follow-up between Exp't. and Ctrl. Groups in riding with a drink driver
Notes	Few details about participants
	Attrition rates not reported
	Random allocation by school but class was unit of analysis
Allocation concealment	B – Unclear

Study	Palinkas 1996
Methods	Design: RCT (by individual) Follow-up: 3 months Attrition: PALS group - 25.9% no-PALS group - 19.1%
Participants	Age: 14-19 years (mean = 16 years) Sex: 100% female Size: Skills group: 144; no skills group: 152 Setting: community, high risk, multi-ethnic cohort of female adolescents Country: USA
Interventions	Programme: Positive Adolescent Life Skills (PALS) training Focus: Drugs including alcohol Programme type: normative, social & life skills Theoretical base: Social skills/normative education Key components: PALS group: Facts of Life curriculum and 16 sessions over 16 weeks involving a combination of cognitive and behavioural training through facts, modelling, role play, feedback and practice Non-PALS group: Facts of Life curriculum over 16 weeks (including 2 sessions on interactive education on alcohol and alcohol risks) Duration: 16 weeks x (1 hour Facts of Life curriculum and 90 minutes PALS training) Primary staff: Masters level social workers, PALS skilled adults and peers, qualified medical centre staff
Outcomes	(i) Alcohol use PALS: 55.1% no PALS: 57.4% (ii) Alcohol use (baseline users) PALS: 69.4% no PALS: 75.9% (n.s.) (iii) Alcohol use (baseline non-users) PALS: 42.9% no PALS: 37.7% (n.s.)
Notes	RCT but no details of randomisation methods No impact of PALS training on alcohol use at three months follow-up
Allocation concealment	B – Unclear

Characteristics of included studies (Continued)

Study	Pentz 1989
Methods	Design: before/after with non-randomised concurrent controls (by school) Follow-up: 1 and 2 years; subset of 8 schools followed up at 3 years (N=1607; Johnson et al 1990) Attrition: year 1:16%; year 2:75%; year 3: 31% in subset of schools
Participants	Age: 6th&7th graders (ages 11-13) Sex: 50% female Size: Exp't. N=3011; CTL. N=2054 Setting: school and community ("multiple environment") Country: USA
Interventions	Programme: Midwestern Prevention Program (MPP) Focus: drugs including alcohol Programme type: social skills & affective Theoretical base: social psychological theories; motivational theories Key components: 7 components including resistance training, home work with parents, media coverage, consequences of use, attitudes & social skills Duration: 10 sessions + 10 homework sessions Primary staff: teachers & peers (both trained)
Outcomes	1 year follow-up: alcohol use lower compared with Control Group Drank in last month (p<0.05): E: 11% (4% increase) C: 16% (9% increase) Drank in last week (p<0.05): E: 4% (2% increase) C: 7% (5% increase) 2 year follow-up: authors suggest effects for alcohol maintained at 2 years, though no figures are given (graphical depiction only) 3 year follow-up: No sig. effect of prevention programme on alcohol use at 3 years in subset of schools
Notes	Intervention effective in reducing/slowing alcohol use over Control. 1 year results robust, but high attrition at 2 year follow-up No effect in 8 school subset at 3 years. Sig. reduction reported for tobacco and marijuana use, but not alcohol Some effect on parental drinking (see Pentz et al 1989b)
Allocation concealment	B – Unclear

Study	Perry 1988
Methods	Design: RCT (by school within country) Follow-up: immediate post-test Attrition: 7-8%
Participants	Age: Grades 8&9 (ages 13-15)

Characteristics of included studies (Continued)

	Sex: male and female Size: N=2536 Setting: school Country: Australia, Chile, Norway & Swaziland
Interventions	Programme: WHO collaborative study Focus: alcohol Programme type: knowledge, social & life skills Theoretical base: problem behaviour theory Key components: developed from early LST - normative expectancies; peer influences; consequences of alcohol use; understanding mass media influences. Booster sessions to reinforce abstinence. Duration: 5 sessions (4 weeks + booster) Primary staff: teachers & peers (both trained). 3 groups: Group A: teacher-led; Group B: peer-led; Group C: control
Outcomes	Peer-led group had sig. lower alcohol use scores than controls for males and females who were non-drinkers at pre-test, and for females who were drinkers at pre-test (combined samples) Few significant differences in alcohol use within each country. For non-drinkers at pre-test, peer-led group had sig. lower alcohol use scores than controls in Chile and Norway. For drinkers at pre-test, there were no significant effects of any intervention Group (A or B) over controls (C).
Notes	Cross-cultural relevance. No clear-cut pattern of results across different countries for any alcohol use variable. Few baseline details provided Analyses were not reported by sex within each country Although apparently effective overall, wisdom of combining different countries questionable. Within country analyses more appropriate
Allocation concealment	B – Unclear

Study

Perry 1996

Methods	Design: RCT (by school district) Follow-up: 2.5 and 4 years Attrition: 19% (no significant differences in attrition analysis)
Participants	Age: sixth grade at baseline Sex: 51.3% male Size: 2351 students at baseline Sub-group/setting: Community intervention Country: USA
Interventions	Programme: Project Northland Focus: Alcohol Programme type: Social skills and parental socialisation Theoretical base: Not stated Key components:

Characteristics of included studies (Continued)

	6th grade: "Slick Tracy Home Team Program" - 4 sessions of activity story books completed as homework with parents- Notes for parents also issued.
	7th grade: "Amazing Alternatives! Program" - parents evening; 3 week peer-led classroom sessions; home programme booklets mailed to parents; further notes for parents
	8th grade: "Powerlines" - an 8 session classroom curriculum, a theatre production, further notes for parents and continuation of peer-led/participation programmes
	Community intervention task force: Comprising civic leaders, law enforcers, parents & volunteers, focused on law enforcement and underage alcohol sales, plus business involvement
	Duration: see above
	Primary Staff: Teachers, peer leaders and community based adults
Outcomes	2.5 years: i) Past month alcohol use: Int: 6.9% - 23.6% Ctrl: 3.9% - 29.2% (p<0.05) ii) Past week alcohol use: Int: 3.8% - 10.5% Ctrl: 20% - 14.8% (p<0.05) 4 years: Perry et al (2000) report no significant differences between intervention and control groups at a four year follow-up (after two years without an intervention programme).
Notes	Good design with low attrition rates Analysis by individual but allocation by school district Significant positive effect of intervention in medium term, although this effect dissipated when the intervention was withdrawn
Allocation concealment	B – Unclear

Study	Ringwalt 1991
Methods	Design: RCT (by school) Follow-up: immediate post test Attrition: 9%
Participants	Age: grades 5&6 (ages 10-12) Sex: 48% male Size: N=1402 Setting: school Country: USA
Interventions	Programme: Drug Abuse Resistance Education (DARE) Focus: drugs including alcohol Programme type: knowledge, affective & social skills Theoretical base: social learning theory Key components: resistance training, self-esteem, social skills, information, role-play Duration: 17 sessions/17 weeks Primary staff: uniformed police officer (trained)
Outcomes	Some positive effects of DARE on negative attitudes but no effects on behaviour

Characteristics of included studies (Continued)

	Attitudes not related to behaviour
Notes	High proportion of black children (50%). Initial differences between groups partialled out Good sample size with low attrition rate
Allocation concealment	D – Not used

Study Rosenbaum 1994

Methods	Design: Before/after with non-randomised matched concurrent controls (by school) Follow-up: 1 and 2 years Attrition: year 1:12%; year 2:26%
Participants	Age: grades 5&6 (ages 10-12) Sex: 50.3% male Size: N=1800 Setting: school Country: USA
Interventions	Programme: Drug Abuse Resistance Education (DARE) Focus: drugs including alcohol Programme type: knowledge, affective & social skills Theoretical base: social learning theory Theoretical grounding: strong Key components: resistance training, self-esteem, social skills, information, role-play Duration: 17 sessions/17 weeks Primary staff: uniformed police officer (trained)
Outcomes	Year 1 follow-up: No clear-cut effects on attitudes or beliefs. No overall effect on alcohol initiation, increase or cessation. Interesting results by sex: Quitting drinking (p<0.05): females exposed to DARE more likely to quit drinking (O.R.=2.10); Males exposed to DARE less likely to quit drinking (O.R.=0.69) Year 2 follow-up: No overall effects reported on alcohol initiation, heavy drinking or cessation
Notes	Large broad sample, relevant elsewhere. Well reported study - replicable. More urban participant dropped out at 2 year follow-up No reporting of confidence intervals for statistics
Allocation concealment	D – Not used

Study Scaggs 1985

Methods	Design: RCT (by class) Follow-up: 2 years Attrition: 23%
Participants	Age: 14-18 year-olds (mostly Grade 9: ages 14-16) Sex: 48% male

Characteristics of included studies (Continued)

	Size: N=121
	Setting: school
	Country: USA
Interventions	Programme: The Substance Abuse Awareness Program Prevention Model Focus: alcohol and drugs Programme type: knowledge, social skills & affective Theoretical base: self in-situation model Key components: Exp't. Group: focus on personal use and on decision making skills, focus on family drinking, focus on drinking and driving, knowledge of substances. Ctrl Group: normal science lessons Duration: 45 mins/day for 15 days Primary staff: researcher and teachers
Outcomes	No difference between Exp't. and Ctrl. Groups in proportion of drinkers at follow-up for males. Exp't Group females less likely to report use at follow-up, whereas Ctrl Group females more likely to report use: Females reporting alcohol use: Exp't: 33% (-8%) Ctrl: 59% (+29%)
Notes	Apparently significant impact of intervention for females confounded by small sample size and high attrition. Only 7 females (from 12) were followed up after 2 years Discrepancy between reported attrition rates and cell sizes in analyses. Possible contamination between groups
Allocation concealment	B – Unclear

Study	Schinke 2000
Methods	Design: RCT (by school) Follow-up: 3.5 years Attrition: 14.11% from pre-test sample (and no differential attrition)
Participants	Age: 3rd-5th Grades (mean age = 10.28 at pre-test) Sex: 49% female Size: N=1396 from 27 schools and 5 states Setting: school and community Country: USA
Interventions	Programme: Culturally focused skills and community-based prevention for Native American Youth Focus: Alcohol and other drugs Programme type: Societal life skills (culturally focused) Key components: A: Problem-solving, personal coping, interpersonal communication - all incorporating native American myths, legends and stories B: As A but also involving local community residents C: Control
Outcomes	Weekly drinking (4+ drinks): A: 22.87%

Characteristics of included studies (Continued)

	B: 25.44% C: 30.17% (p<0.05)
Notes	Strong design and low attrition. No details of randomisation procedure but baseline equivalence in all groups. Allocation by school but analysis by individual - could compromise results Skills based group showed approx 7% reduction in proportion of weekly drinkers compared to controls over 42 months Impact of this effect size in reducing alcohol misuse/problems is not known
Allocation concealment	B – Unclear

Study	Sheehan 1996
Methods	Design: RCT (by school) Follow-up: 3 years Attrition: 38% (but described as a 62% randomly selected follow-up sample!)
Participants	Age: 17+ (young drinkers) Sex: 59% female Size: 4,545 at baseline (41 schools) Setting: School Country: Australia
Interventions	Programme: Plan a Safe Strategy (PASS) Focus: Drinking and Driving Programme type: Theory of Reasoned Action Key Components: Modification of students' attitudes and beliefs towards drink driving, subjective beliefs and norms, and perceived control over their own behaviour. Extensive use of role play and interactional activities Duration: 12 lessons Primary staff: Teachers who received specific in-service training
Outcomes	i) Weekly drinkers: Int: 10% - 36% Ctrl: 13% - 34% (n.s.) ii) Drinking and driving information: Int: 3% - 7% Ctrl: 5% - 9% (n.s.)
Notes	Good design although analysis by individual rather than school. No impact of intervention on longer-term (3 year) outcomes
Allocation concealment	B – Unclear

Study	Shope 1996a
Methods	Design: Before/after study with concurrent controls (attempted randomisation failed) Follow-up: 2 years Attrition: 47% from baseline

Characteristics of included studies (Continued)

Participants	Age: Grade 10 at intervention Sex males and females Size: N=2031 at baseline Subgroup/setting: School Country: USA
Interventions	Programme: AMPS (see Dielman et al) Focus: Alcohol Programme type: Social and life skills Theoretical base: Social learning theory Key components: Information and social skills; increasing students' awareness of alcohol effects, risks of alcohol misuse, and situations and social pressures to misuse alcohol Duration: 5 sessions x 45 minutes each Primary staff: Certified teachers trained for 16 hours
Outcomes	i) Alcohol use (mean scores) Int: 1.98 - 2.71 Ctrl: 1.98 - 2.87 (n.s.) ii) Alcohol misuse (mean scores) Int: 1.63 - 2.12 Ctrl: 1.58 - 2.41 (p<0.05) iii) Drinking and driving (mean scores) Int: 0.09 - 0.60 Ctrl: 0.10 - 0.69 (n.s.)
Notes	This study suffers from high attrition and attrition analysis indicated that those lost to follow-up had significantly alcohol use, misuse and drinking and driving scores at baseline. Interestingly, the intervention group was less likely to be lost to follow-up than the control group. These methodological limitations severely limit the validity of the results and therefore the generalisability of results
Allocation concealment	D – Not used

Study

Shope 1996b

Methods	Design: Two group comparison study Follow-up: 2 and 5 years Attrition: 2 years 703 pre-tested students not available for analysis (therefore attrition = 38%) but no details of number of students unwilling to participate initially. 5 years: 262 followed-up (therefore attrition = 77%)
Participants	Age: Grades 6-7 (12-13 years) Sex: 48.7% male Size: Year 2: N = 442. Year 5: N = 262 (NB This is a carefully selected sub-set from a larger cohort trial) Setting: School Country: USA
Interventions	Programme: School Based Substance Abuse Prevention Programme (similar to AMPS - see Dielmann et al)

Characteristics of included studies (Continued)

	Focus: Substance use
	Programme type: Social and life skills
	Theoretical base: Social learning theory
	Key components: Students taught about various pressures to use substances and ways to resist these pressures
	Duration: 7 or 8 40-50 minute sessions
	Primary Staff: Teachers
Outcomes	Two year i) Alcohol use (mean) Int: 0.44 - 0.66 Ctrl: 0.42 - 1.33 (p<0.05) ii) Alcohol misuse (mean) Int: 0.31% - 0.66 Ctrl: 0.41 - 0.99 (n.s) 5 Year: males i) Alcohol use (mean) Int: 0.41 - 2.76 Ctrl: 0.76 - 2.48(n.s) ii) Alcohol misuse (mean) Int: 0.31 - 1.69 Ctrl: 0.63 - 1.45 (n.s) Five year (females) i) Alcohol use (mean) Int: 0.29 - 2.15 Ctrl: 0.21 - 2.36 (n.s) ii) Alcohol misuse (mean) Int: 0.21 - 1.41 Ctrl: 0.02 - 1.22 (n.s)
Notes	Attrition analysis showed that students lost to follow-up had significant higher alcohol use at pre-test. Therefore results need to be interpreted cautiously. Authors report lack of success with randomisation into groups, suggesting possibility of selection bias.
Allocation concealment	B – Unclear
Study	Spoth 2001
Methods	Design: RCT (by school) Follow-up: 2 and 4 years Attrition: 2 years: 293 families completed 2 year follow-up. Therefore attrition = 34% from baseline. 4 years: 303 families completed 4 year follow-up. Therefore attrition = 32%. An attrition analysis showed no differential attrition between families or schools
Participants	Age: 6th Grade at baseline Sex: 54% female adolescents Size: 846 families recruited, 446 completed baseline tests (238 ISFP, 208 controls) Setting: Universal, family focused interventions (with allocation and recruitment through schools) Country: USA

Characteristics of included studies (Continued)

Interventions	<p>Programme: Iowa Strengthening Families Programme (ISFP)</p> <p>Focus: Drugs including alcohol</p> <p>Programme type: Parenting/family socialisation</p> <p>Theoretical base: bio psychosocial model</p> <p>Key components: ISFP: Parents & children taught to clarify expectations, appropriate discipline, manage strong emotions and communicate effectively. Children also taught peer skills</p> <p>Ctrls: information leaflets only</p> <p>Duration: 7 family sessions/once per week (ave, 2 hours each)</p> <p>Primary Staff: 2-3 person teams</p>
Outcomes	<p>i) Alcohol initiation index (mean(s.e.)scores)</p> <p>1 year follow-up: ISFP: 0.50 (0.07) Ctrl: 0.73 (0.07), Effect size = 0.26</p> <p>2 year follow-up: ISFP: 0.78 (0.10) Ctrl: 1.43 (0.10) Effect size = 0.39</p> <p>Following results: baseline - yr1 - yr2 - yr4</p> <p>ii) Ever used alcohol: ISFP: 12.4% - 26.7% - 35.3% - 49.6% Ctrl: 16.1% - 36.1% - 56.0% - 67.5%</p> <p>iii) Ever used alcohol without permission: ISFP: 2.5% - 8.7% - 19.0% - 39.9% Ctrl: 4.5% - 20.0% - 41.8% - 58.6%</p> <p>iv) Ever been drunk: ISFP: 1.9% - 6.8% - 9.8% - 26.4% Ctrl: 1.9% - 9.0% - 19.1% - 44.0%</p>
Notes	<p>Strong design but high attrition although robust attrition analysis.</p> <p>Striking and important results for the effectiveness of ISFP; increasing effect size over time and at 2 and 4 year follow-up the effect size is large.</p> <p>The four year follow-up also included results for a second intervention group in this study - the 5 session "Preparing for the Drug Free Years (PDFY)" programme. However no baseline alcohol data were presented for this group and statistical tests showed no significant effect of this intervention over the control group (although there was a significant trend).</p>
Allocation concealment	B – Unclear

Study Spoth 2002

Methods	<p>Design: RCT (by school)</p> <p>Follow-up: 1 year</p> <p>Attrition: 18% overall (similar rates in each group)</p>
Participants	<p>Age: 7th Grade</p> <p>Sex: 53% male</p> <p>Size: N = 1664</p>

Characteristics of included studies (Continued)

	LST + SFP: 549 LST: 621 Ctrl: 494 Setting: school Country: U.S.A
Interventions	Programme: Strengthening Families programme and Life Skills Training Focus: alcohol and other drugs Programme type: strengthening families programme and life skills training Theoretical base: SFP: Bio psychosocial model LST: social learning Key components: SFP: including parent and youth building and practice promoting skill development and knowledge acquisition. Duration: SFP: 7 x 2 hour evening sessions and 4 similar booster sessions 1 year later. LST: 15 x 40 minute classroom sessions and 5 similar booster sessions 1 year later. Primary staff: facilitators and teachers. Primary staff: facilitators and teachers.
Outcomes	1 year follow-up i) new alcohol users LST: 35.2% LST + SFP: 25.7% Control: 36.7%
Notes	SFP appears to be the important component in the combined LST and SFP intervention. Low attrition and baseline equivalence in all groups. Rigorous analysis.
Allocation concealment	B – Unclear

Study **St Pierre 1992**

Methods	Design: Before/after with non-randomised concurrent controls (by clubs) Follow-up: 3, 12 and 27 months Attrition: 20% at 3 months, 35% at 15 months, 47% at 27 months
Participants	Age: 13 years Sex: 65% male Size: N=311 Setting: boys and girls club Country: USA
Interventions	Programme: Stay SMART Focus: alcohol, cigarettes and marijuana Programme type: social and life skills Theoretical base: from Botvin's LST: social learning theory; problem behaviour theory

Characteristics of included studies (Continued)

Key components: life skills, social skills, resistance training, assertiveness, relationships, stress coping. Booster sessions. 3 Groups: A: SMART (12 sessions); B: SMART + booster (12+8 sessions); C: Control

Duration: see above

Primary staff: prevention programme leaders (trained)

Outcomes	Some effect on alcohol attitudes of SMART + booster (B) compared with SMART only (A) and Control (C). No differences in behaviour between intervention groups and Control at follow-ups.
Notes	Initial differences in Groups partialled out. Fairly small samples with high attrition
Allocation concealment	B – Unclear

Study Sussman 1998

Methods	Design: RCT (by school) Follow-up: 13.5 months Attrition: 72% from potential sample; 46% from baseline (final N=1074)
Participants	Age: 14-19 (93% aged 16-18, mean age = 16.7 years) Sex: N=21 schools, 3813 students available for recruitment Setting: School Country: USA
Interventions	Programme: Towards No Drug Abuse Focus: Alcohol and other drugs Programme type: social skills/decision making Theoretical base: Leventhal's motivation theory and Eggert's social skills/decision making theory Key components: A: classroom only - lessons on health motivation, social skills, decision making, approached to drug abuse prevention B: As A plus semester long 'school as community' component C: Control Duration: A, B: nine 50 minute sessions over 3 weeks Primary staff: trained project staff (health educators)
Outcomes	30 day alcohol use (adjusted follow-up means) A: 8.15 B: 7.16 C: 8.61 (n.s.)
Notes	Strong design but analysis by individual rather than school. High attrition.
Allocation concealment	B – Unclear

Study Wagenaar 2000

Methods	Design: RCT (by community after matching for population size and presence of a college) with nested ITS Follow-up: 6 year baseline data and 3 year follow-up data (during intervention) (1987 to 1995) Attrition: N/A
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Characteristics of included studies (Continued)

Participants	Age: A. Aimed at 18-20 year olds; B. 18-20 year olds and 12th grade students Sex: A. N/A; B. (1995) 12th grade: 48% male, 18-20 year olds: 51% male Size: A. 15 Mid-western counties B. size (response rate): 12th graders: 1982 (baseline): N=5885 (92.8%) 1995: N=3694 (83.5%) 18-20 year olds: 1992 (baseline): N=3095 (92.5%) 1995: N=1721 (93.9%) Setting: Community trial Country: USA
Interventions	Programme: Communities Mobilising for Change on Alcohol (CMCA) Focus: Reducing youth access to alcohol Programme type: Legislative/behavioural (policy and norms of alcohol retailers re: underage sales) Theoretical base: not stated Key components: Int: community organisers worked with local public officials, alcohol merchants, media and other community institutions to change policies and practices re: youth access to alcohol (7 communities) Ctrl: no community organiser (8 communities) Duration: 2-5 years intervention period Primary staff: Community alcohol worker
Outcomes	A.i) driving under the influence net difference between intervention (I) and control (C) communities from pre to post measures was - 30.296 arrests per 100,000 population per year (p=0.05) ii) drinking related car crashes, net difference was -01882 crashes/100,000 population per year (n.s.) B. Net difference: (I 95 - I 92) - C 95 - C 92) 12th graders: i) 30 day use: -0.85 (n.s.) ii) episodic heavy drinking: -1.49 (n.s.) iii) number of drinks on last occasion: -0.02 (n.s.) iv) number of drinking occasions in last month: -0.08 (n.s.) 18-20 year olds: i) 30 day use: -3.69 (n.s.) ii) Episodic heavy drinking: -0.77 (n.s.) iii) Number of drinks on last occasions: -0.03 (n.s.) iv) number of drinking occasions in last month: -0.04 (n.s.)
Notes	Strong design and sophisticated analysis Some evidence of benefit on alcohol related incidents (drinking and driving). Longer follow-up and cost-effectiveness analysis would be useful. No statistically significant effects of intervention on drinking behaviour.
Allocation concealment	B – Unclear
Study	Werch 1996a
Methods	Design: RCT (by individual)

Characteristics of included studies (Continued)

	Follow-up: 2-3 months
	Attrition: 3% from baseline (no information about number eligible for recruitment)
Participants	Age: Grades 6-8 (mean=13.8 years) Sex: 56% female Size: N=104 (1 school) Setting: School Country: USA
Interventions	Programme: STARS (Start Taking Alcohol Risks Seriously) Focus: Alcohol Programme type: Affective (motivational), social skills Theoretical base: social cognitive theory (MCMOS prevention model) Key components: Int: 3 phases: i) Staff instructional module and audio tape; ii) physical nurse consultation; iii) peer consultation at 4-6 weeks Ctrl: Alcohol education booklet Duration: See above Primary staff: Nurses and peers
Outcomes	i) 30 day alcohol frequency (mean scores) Int: 0.06 Ctrl: 0.37 (p<0.05) ii) 30 day alcohol quantity (mean scores) Int: 0.08 Ctrl: 0.44 (p<0.05) iii) 30 day heavy drinking (mean scores) Int: 0.04 Ctrl: 0.18 (n.s.)
Notes	Pilot study with a good design Promising results although small sample size and skewed data limit generalisability
Allocation concealment	B – Unclear

Study	Werch 1996b
Methods	Design: RCT (by individual) Follow-up: 3 months Attrition: 10% (drop-outs significantly more likely to report family drug/alcohol problem)
Participants	Age: 6th grade (mean=12.2 years) Sex: 59% female Size: N=138 (in one school) Subgroup/Setting: School Country: USA
Interventions	Programme: STARS (Start Taking Alcohol Risks Seriously)

Characteristics of included studies (Continued)

	Focus: Alcohol
	Programme type: Affective, social skills
	Theoretical base: Social cognitive theory (MCMOS prevention model)
	Key components: Int: brief nurse consultation followed by 6 weekly focused follow-up consultations, focusing on risk factors and personal behaviour
	Ctrl: no intervention
	Duration: 7 consultations over 7 weeks
	Primary staff: registered nurses
Outcomes	i) 30 day use Int: 5% Ctrl: 10% (n.s.) ii) 30 day heavy use: Int: 0% Ctrl: 5% (n.s.)
Notes	Strong design but risk of contamination between groups (same school) Study probably under-powered due to small sample size
Allocation concealment	B – Unclear

Study

Werch 1998

Methods	Design: RCT (by individual) Follow-up: 1 year Attrition: 30%
Participants	Age: Sixth Grade (mean=12.08 years) Sex: 50% male Size: N=211 (1 school) Setting: School Country: USA
Interventions	Programme: STARS for families (Start Taking Alcohol Risks Seriously) Focus: alcohol Programme type: affective, social skills Theoretical base: social cognitive theory (MC MOS prevention model) Key components: Int: i) brief nurse consultation; ii) physician endorsed parent/guardian letter; iii) up to 9 physician endorsed family based prevention lessons Ctrl: Alcohol misuse leaflet Duration: approx 5 weeks Primary staff: Registered nurses
Outcomes	i) 30 day use at follow-up Int: 7% Ctrl: 4% (n.s.)

Characteristics of included studies (Continued)

	ii) 30 day heavy use at follow-up Int: 5% Ctrl: 1% (n.s.)
Notes	Good design but possibility of contamination between groups (same school) No significant impact of the intervention
Allocation concealment	B – Unclear

Study	Werch 2000a
Methods	Design: RCT (by individual within schools) Follow-up: 1 year Attrition: 8%; similar in both groups and in urban/suburban/ rural settings
Participants	Age: Sixth Grade (mean=12.08 years) Sex: 50% male Size: N=211 (1 school) Setting: Schools with parental involvement
Interventions	Programme: STARS for families (Start Taking Alcohol Risks Seriously)
Outcomes	i) 30 day use at follow-up Urban: Int: 13.8% Ctrl: 7.4% Suburban: Int: 5.9% Ctrl: 15.6% Rural: Int: 0% Ctrl: 20.0% ii) 30 day heavy use at follow-up Urban: Int: 6.9% Ctrl: 0% Suburban: Int: 0% Ctrl: 9.4% Rural: 0% 10%
Notes	Good design although small size and possibility of contamination within schools Baseline differences reported in drinking behaviour Mixed results, with effectiveness possibly varying by school setting - needs following up.
Allocation concealment	B – Unclear

Study	Werch 2000b
Methods	Design: RCT (by individual within school) Follow-up: 2 years

Characteristics of included studies (Continued)

	Attrition: 21% evenly distributed by group
Participants	Age: 6th Grade (mean=12.08 years) Sex: 50% male Size: N=650 from 2 schools (one neighbourhood school and one 'Magnet' school); 87% of those eligible were recruited Setting: School Country: USA
Interventions	Programme: STARS (Start Taking Alcohol Risks Seriously) Focus: Alcohol Programme type: affective, social skills Theoretical base: Social cognitive theory (MCMOS prevention model) Key components: Int: Year 1 - brief one to one consultation with nurse about avoiding alcohol use, followed by 10 prevention postcards to parents/guardians. Year 2 - follow-up nurse consultation (booster sessions) and 4 take home packs for the family Ctrl: 15 page alcohol education booklet Duration: see above Primary staff: Registered nurses
Outcomes	i) 30 day use at follow-up: Neighbourhood: Int: 2.1% Ctrl: 5% Magnet: Int: 9.6% Ctrl: 14.9% (n.s.) ii) 30 day heavy use at follow-up: Neighbourhood Int: 1% Ctrl: 2% Magnet: Int: 3.8% Ctrl: 9.3% (p<0.05)
Notes	Strong design but possibility of contamination between groups Significant effect on 30 day heavy use for both neighbourhood and Magnet schools Unknown public health impact with this effect size
Allocation concealment	B – Unclear
Study	Wilhelmson 1994
Methods	Design: RCT (by school, stratified by location and SES) Follow-up: 4 months Attrition: <1%

Characteristics of included studies (Continued)

Participants	Age: Grade 7 (ages 12-13) Sex: male and female (no details) Size: N=915 Setting: schools Country: Norway
Interventions	Programme: Alcohol Prevention Programmes Focus: alcohol Programme type: refusal skills Theoretical base: social cognitive theory; theory of reasoned action Key components: knowledge of alcohol use and local traditions; norms; managing pressures; attitudes. 3 groups: highly role-specified (HRS) - highly structured intervention; less role-specified (LRS) - loosely structured intervention; and control (C) Duration: 10 sessions/2 weeks Primary staff: teachers/peer leaders (trained)
Outcomes	HRS Group more effective than LRS in terms of attitudes and 'intentions to use' measures. Sig. effect of HRS over LRS and C for frequency of drinking: Frequency of use (ANCOVA $p < 0.05$) (6-point scale) HRS: 0.53 (s.d.=1.4) LRS: 0.90 (s.d.=1.0) C: 0.69 (s.d.=1.3)
Notes	No details about Control Group. Methodology and programme well reported - could be replicated Some evidence that HRS had beneficial effect over LRS and Control but only short-term follow-up
Allocation concealment	B – Unclear

Study Williams 1968

Methods	Design: RCT (by individual) Follow-up: 1 week, 1 month and 1 year Attrition: 14%
Participants	Age: 11th Grade (ages 16-17) Sex: All male Size: N=205 Setting: private Catholic boys school Country: USA
Interventions	Programme: Massachusetts Program Focus: alcohol Programme type: knowledge only Theoretical base: no details Key components: discussion group - examine own and peer attitudes to drinking. Factual information.

	Duration: 5 sessions
	Primary staff: teachers (trained)
Outcomes	Attitudes more positive and knowledge greater in Exp't. Group after 1st and 2nd post-test. Knowledge greater after post-test 3. Some indication of behaviour change at 1 year follow-up, in terms of frequency of intoxication: Intoxicated >5 times in last year (p<0.01) Exp't: 33% (25% at pre-test) Ctrl: 60% (26% at pre-test)
Notes	Risk of confounding as same school provided both groups. High SES and low N. Few detailed results presented in paper.
Allocation concealment	B – Unclear

Characteristics of excluded studies

Study	Reason for exclusion
Abbey 2000	Attitudes only.
Baer 1988	Allocation to groups and delivery of intervention relied on scheduling "convenience". Two year follow-up data not presented because of high attrition (64%).
Biener 1975	The results for the experimental and control groups are not separated out.
Casswell 1982	Incomplete results presented.
Cheadle 1995	Not matched controls.
Chou 1998	Assumptions made about figures to include in the analysis. Results indicate that there was a higher drop-out rate for baseline alcohol users in the control group. Attrition not reported.
Collins 1991	The results by intervention group are not reported for alcohol involvement.
Corvo 1998	Expectancies only outcomes.
Donato 1996	Allocation based on teachers volunteering to participate.
Farrow 1989	Non RCT and unmatched intervention and control groups.
Gislason 1995	The SFA (skills for adolescents) was only partially implemented, this was dependent on the teachers interest and efficiency. Teachers had to find the time for teaching the programme in addition to administering the school curriculum, therefore the findings of the study cannot be generalized due to the possibility of confounding variables.
Goodstadt 1982	No details of allocation to intervention / control, though it appears teacher "interest" was a factor.
Hansen 1987	Baseline differences, numbers of participants in each arm not reported. Validity of the instrument is not reported. Attrition not reported.
Hansen 1988b	No alcohol behavioural outcomes reported.
Hawthorne 1995	Post-test only.
Homel 1981	Follow-up and attrition data not clearly presented.
Hostetler 1997	Baseline differences and very high attrition at 2 year follow-up (75%).
Komro 1996	No randomly selected or matched comparison group.
Lavik 1986	Teachers selected the intervention for their students.
London 1989	Not an RCT or matched control group, therefore there is a strong potential for selection bias between intervention and control groups.

Lynam 1999	There could have been possible contamination within the two groups. Attrition not reported. One of the results could not be accounted for theoretically, students who were exposed to project DARE (Drug Abuse Resistance Programme) in the sixth grade had lower levels of self esteem 10 years later, authors regard this as a chance finding.
Morehouse 2000	The process evaluation indicated that uneven implication of the RSAP (Residential Student Assistance Programme) at different sites compromised research protocol. Internal validity questionable.
Olsen 1989	No control group.
Oster 1983	No details of allocation. No follow-up data.
Perry 2000	No outcomes reported.
Pipher 1982	Students assigned to condition according to their ability to take part.
Portnoy 1980	Students self selected onto different lecture seniors / intervention groups. No details of comparability of groups.
Ross 1998	Implementation of the PAVOT (Promoting Independence and the Will to Fight Drug Abuse) programme needs to be monitored (i.e teachers motivation and ability to present the programme may vary). Teachers need to be observed for their interpersonal and group facilitation skills, they need to be observed for reliability. The PAVOT programme appears to be too limited in any follow-up sessions, being limited to only a one-year follow-up.
Rozelle 1979	No random allocation. Control students were selected from another course. No comparative analysis.
Rozelle 1980	Random allocation to two intervention groups, but the control group was selected form another cohort.
Sarvela 1987	Not matched control.
Schinke 1988	The study doesn't seperate out alcohol related outcomes from other substance abuse.
Schinke 1995	There was no objective evidence of the intervention effects. Possible differences in programme implementation. Million Dollar Machine (MDM) programme has implications for preventing substance use but a more detailed objective is required.
Scott 1999	Not a matched or random allocation.
Shope 1998	Possible confounding, random assignment to equal size experimental and control groups had been sought but not achieved.
Shope 2001	No post test measures. Survey only.
Spoth 1998	The study doesn't seperate out alcohol related outcomes.
St. Pierre 1997	Measures perceived refusal ability only.
Steffian 1999	Initial differences in drinking behaviour between the two groups may have obscured the significance of outcome trends. Not random assignment.
Stevens 1996	Inadequate details.
Swisher 1985	Schools self selected the intervention and were then followed up.
Vitaro 1994	No alcohol use outcome reported. Unclear how individuals were allocated to intervention or control groups.
Wagenaar 1999	Survey only.
Walters 2000	The study is too small. Numbers of participants in each arm not reported. Attrition not reported.
Wodarski 1987a	No information about how individuals were allocated to groups therefore there is a possibility of selection bias.
Wodarski 1987	No information about how individuals were allocated to groups therefore there is a possibility of selection bias.
Wragg 1986	No details of how individuals were allocated to groups. Small sample.
Wynn 1997	Possible contamination between groups. No information on alcohol consumption therefore it is difficult to attribute any significant effects found to the intervention. Large differences in numbers of participants in each arm of the study.
Wynn 2000	No effects of the intervention are reported versus the control group.

Characteristics of excluded studies (Continued)

ADDITIONAL TABLES

Table 01. Intention-to-treat analysis for selected studies (student as unit of analysis)

Program (follow-up)	Outcome	Baseline N	Follow-up N	Outcome event rate	Outcome event N	Est. outcome event N	Tot. outcome event N	ARR (95% CI)	NNT (95% CI)
		(see included studies Table for key)		(follow-up only)	(follow-up only)	(attrition only: control event rate used as basis for estimation in all groups)	(actual + estimated)		(rounded up)
Skills Training (culturally focused) (Schinke et al, 2000) (3.5 years)	4+ drinks in last week	A: 455 B: 462 C: 479	A: 388 B: 399 C: 412	A: 0.23 B: 0.25 C: 0.30	A: 89 B: 102 C: 124	A: 20 B: 19 C: 20	A: 109 B: 121 C: 145	A vs C: 6.23% (0.09% to 12.36%) B vs C: 4.09 (-2.17% to 10.27%)	A vs C: 17 (9 to 1149) B vs C: 25 (10 to infinity)
Strengthening Families Program (SFP) (Spoth et al, 2001) (4 years)	Ever used alcohol	ISFP: 205 PDFY: 187 Ctrl: 174	ISFP: 131 PDFY: 122 Ctrl: 126	ISFP: 0.50 PDFY: 0.60 Ctrl: 0.67	ISFP: 65 PDFY: 73 Ctrl: 85	ISFP: 50 PDFY: 44 Ctrl: 32	ISFP: 115 PDFY: 117 Ctrl: 117	ISFP vs Ctrl: 11.39% (-0.40% to 23.19%) PDFY vs Ctrl: 4.97% (-6.90% to 16.83%)	ISFP vs Ctrl: 9 (5 to infinity) PDFY vs Ctrl: 21 (6 to infinity)
Strengthening Families Program (SFP) (Spoth et al, 2001) (4 years)	Ever used alcohol without permission	ISFP: 232 PDFY: 215 Ctrl: 200	ISFP: 148 PDFY: 140 Ctrl: 145	ISFP: 0.40 PDFY: 0.51 Ctrl: 0.59	ISFP: 59 PDFY: 72 Ctrl: 85	ISFP: 49 PDFY: 44 Ctrl: 32	ISFP: 108 PDFY: 116 Ctrl: 117	ISFP vs Ctrl: 11.98% (0.63% to 23.33%) PDFY vs Ctrl: 4.69% (-6.82% to 16.19%)	ISFP vs Ctrl: 9 (5 to 160) PDFY vs Ctrl: 22 (7 to infinity)
Strengthening Families Program (SFP) (Spoth et al, 2001)	Ever been drunk	ISFP: 232 PDFY: 216 Ctrl: 207	ISFP: 148 PDFY: 141 Ctrl: 150	ISFP: 0.26 PDFY: 0.35 Ctrl: 0.44	ISFP: 39 PDFY: 50 Ctrl: 66	ISFP: 37 PDFY: 33 Ctrl: 25	ISFP: 76 PDFY: 83 Ctrl: 91	ISFP vs Ctrl: 11.27% (0.31% to 22.24%) PDFY vs Ctrl:	ISFP vs Ctrl: 9 (5 to 327) PDFY vs Ctrl: 18 (6 to infinity)

Table 01. Intention-to-treat analysis for selected studies (student as unit of analysis) (Continued)

Program (follow-up)	Outcome	Baseline N	Follow-up N	Outcome event rate	Outcome event N	Est. outcome event N	Tot. outcome event N	ARR (95% CI)	NNT (95% CI)
(4 years)								5.56% (-5.73% to 16.86%)	

Table 02. Intention-to-treat analysis for selected studies (school as unit of analysis)

Program (follow-up)	Outcome	Number of schools	Outcome event rate (follow-up only)	Estimated event rate (ITT)	S.E. of event rate	ARR (95% CI)	NNT (95% CI) (rounded up)
Life Skills Training (LST) (Botvin et al, 1995) (6 years)	Monthly alcohol use	A: 18	A: 0.61	A: 0.61	A: 0.03	A vs C: N/A	A vs C: N/A
		B: 16	B: 0.57	B: 0.58	B: 0.03	B vs C: 1.81%	B vs C: 56 (12 to infinity)
		C: 22	C: 0.60	C: 0.60	C: 0.02	(-5.25% to 8.88%)	
Life Skills Training (LST) (Botvin et al, 1995) (6 years)	Weekly alcohol use	A: 18	A: 0.29	A: 0.29	A: 0.02	A vs C: N/A	A vs C: N/A
		B: 16	B: 0.24	B: 0.26	B: 0.02	B vs C: 3.02%	B vs C: 34 (12 to infinity)
		C: 22	C: 0.29	C: 0.29	C: 0.02	(-2.52% to 8.56%)	
Life Skills Training (LST) (Botvin et al, 1995) (6 years)	3+ drinks per occasion	A: 18	A: 0.57	A: 0.58	A: 0.02	A vs C: 1.21%	A vs C: 83 (15 to infinity)
		B: 16	B: 0.55	B: 0.57	B: 0.55	(-4.34% to 6.75%)	B vs C: 42 (1 to infinity)
		C: 22	C: 0.59	C: 0.59	C: 0.02	B vs C: 2.42% (-105.46% to 110.29%)	
Life Skills Training (LST) (Botvin et al, 1995) (6 years)	Drunkenness in last month	A: 18	A: 0.34	A: 0.36	A: 0.02	A vs C: 3.62%	A vs C: 28 (11 to infinity)
		B: 16	B: 0.33	B: 0.36	B: 0.03	(-1.92% to 9.17%)	B vs C: 24 (9 to infinity)
		C: 22	C: 0.40	C: 0.40	C: 0.02	B vs C: 4.23% (-2.84% to 11.30%)	

ANALYSES

Comparison 01. Strengthening Families Program (SFP)

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
01 Alcohol Initiation Behaviours (AIB)			Relative Risk (Random) 95% CI	Subtotals only

Comparison 02. Preparing for Drug Free Years (PDFY)

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
01 Alcohol Initiation Behaviours (AIB)			Relative Risk (Random) 95% CI	Subtotals only

Comparison 03. Life Skills Training (LST): teacher-led; formal training with feedback

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
01 Quantity-Frequency measures (by school)			Weighted Mean Difference (Random) 95% CI	Subtotals only

Comparison 04. Life Skills Training (LST): teacher-led; video training

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
01 Quantity-Frequency measures (by school)			Weighted Mean Difference (Random) 95% CI	Subtotals only

Comparison 05. Culturally focused skills training

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
01 Quantity-frequency measures			Relative Risk (Random) 95% CI	Subtotals only

Comparison 06. Culturally focused skills training + community involvement

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
01 Quantity-frequency measures			Relative Risk (Random) 95% CI	Subtotals only

INDEX TERMS

Medical Subject Headings (MeSH)

Adolescent; Alcohol Drinking [*prevention & control]; Alcoholic Intoxication [*prevention & control]; Family

MeSH check words

Adult; Child; Humans

COVER SHEET

Title Primary prevention for alcohol misuse in young people

Primary prevention for alcohol misuse in young people (Review)
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Authors	Foxcroft DR, Ireland D, Lowe G, Breen R
Contribution of author(s)	Foxcroft, Lister-Sharp and Lowe all contributed to the initial non-Cochrane systematic review (Foxcroft 1997) from which the current Cochrane systematic review has developed. Material from the initial systematic review is being updated for the Cochrane review. This previous work was commissioned by the NHS Centre for Reviews and Dissemination on behalf of the Health Education Authority (U.K.). The World Health Organisation and the U.K. Alcohol Education and Research Council have supported the updating of the systematic review with the Cochrane Collaboration through the employment of two part-time research assistants, Diana Ireland and Rosie Breen.
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What's New	Information not supplied by author
Date new studies sought but none found	Information not supplied by author
Date new studies found but not yet included/excluded	Information not supplied by author
Date new studies found and included/excluded	Information not supplied by author
Date authors' conclusions section amended	Information not supplied by author
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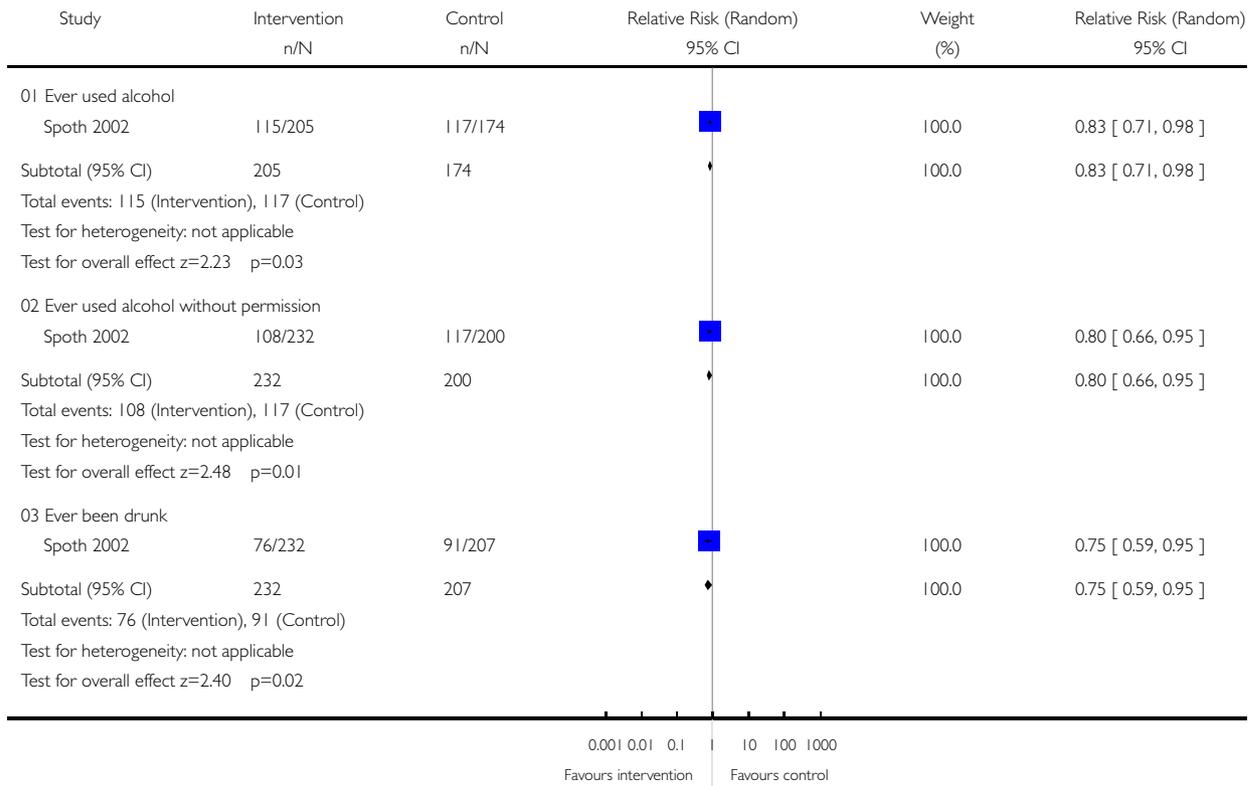
GRAPHS AND OTHER TABLES

Analysis 01.01. Comparison 01 Strengthening Families Program (SFP), Outcome 01 Alcohol Initiation Behaviours (AIB)

Review: Primary prevention for alcohol misuse in young people

Comparison: 01 Strengthening Families Program (SFP)

Outcome: 01 Alcohol Initiation Behaviours (AIB)

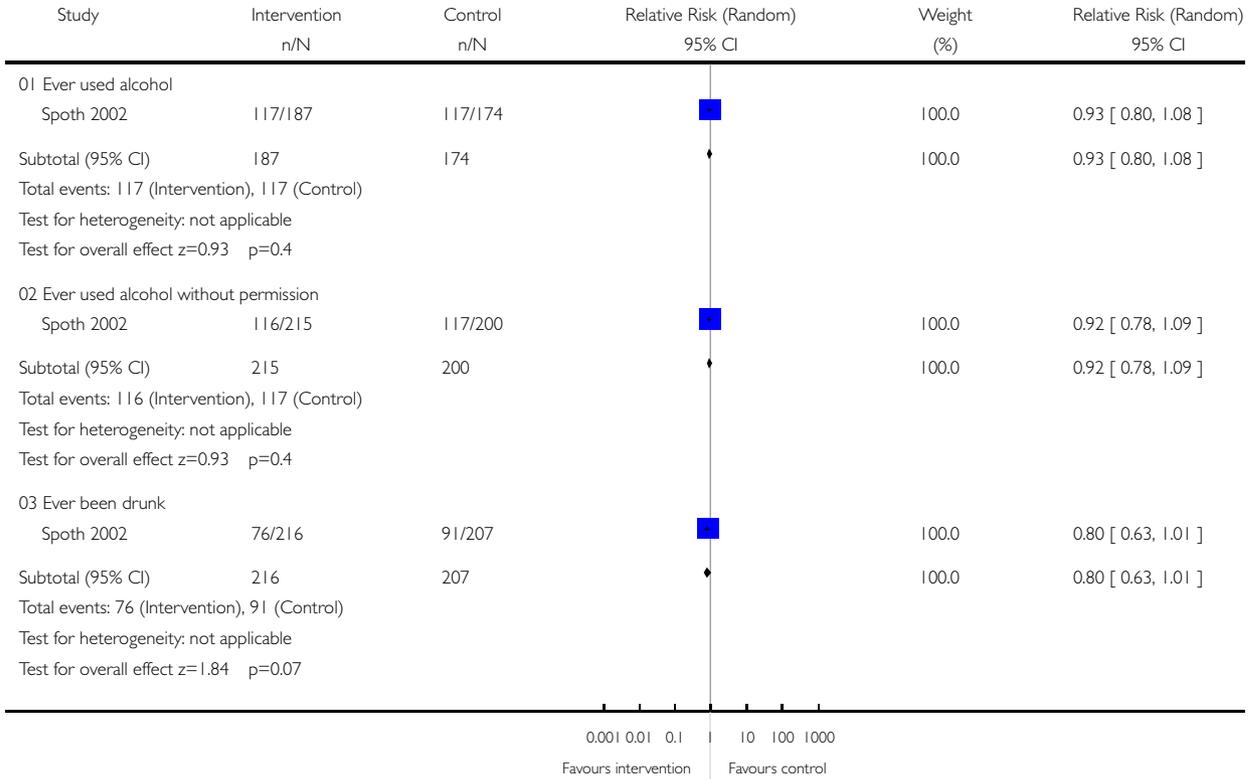


Analysis 02.01. Comparison 02 Preparing for Drug Free Years (PDFY), Outcome 01 Alcohol Initiation Behaviours (AIB)

Review: Primary prevention for alcohol misuse in young people

Comparison: 02 Preparing for Drug Free Years (PDFY)

Outcome: 01 Alcohol Initiation Behaviours (AIB)

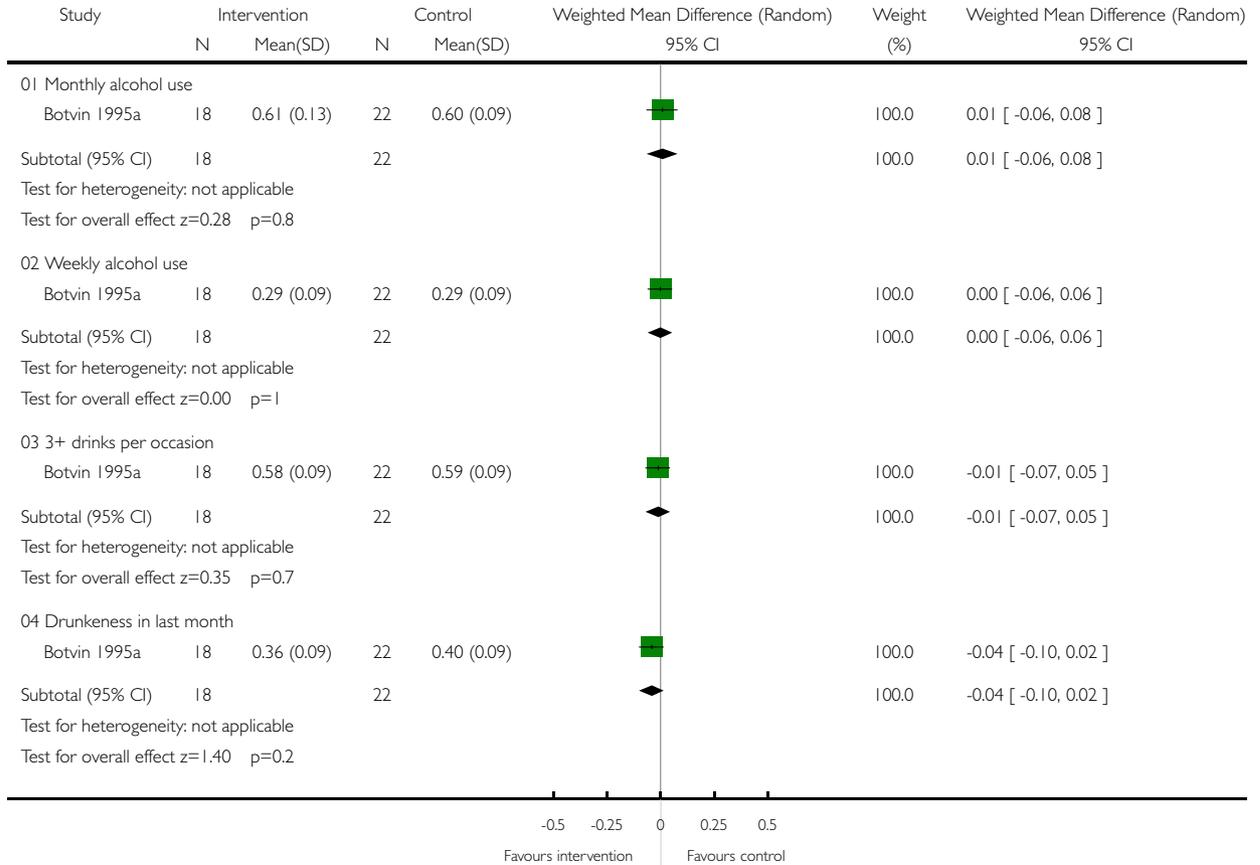


Analysis 03.01. Comparison 03 Life Skills Training (LST): teacher-led; formal training with feedback, Outcome 01 Quantity-Frequency measures (by school)

Review: Primary prevention for alcohol misuse in young people

Comparison: 03 Life Skills Training (LST): teacher-led; formal training with feedback

Outcome: 01 Quantity-Frequency measures (by school)

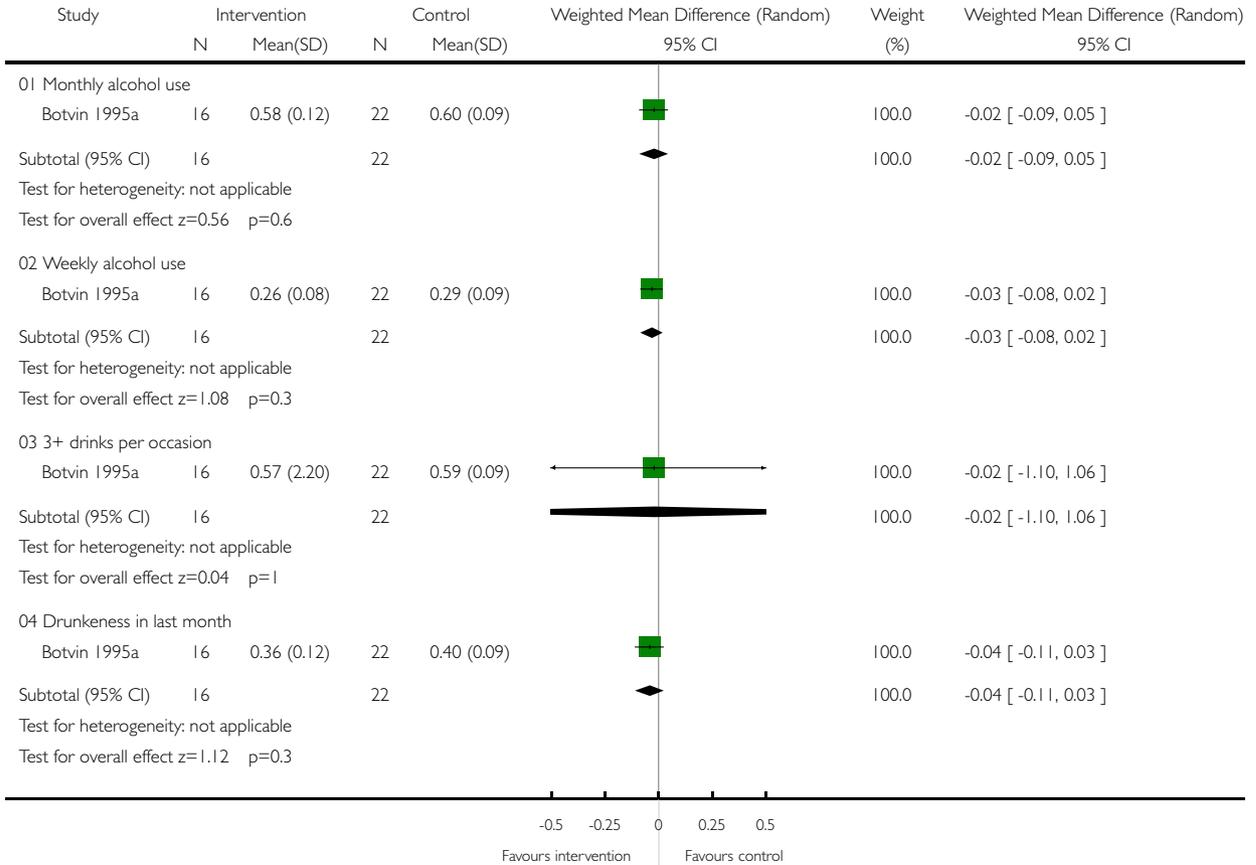


Analysis 04.01. Comparison 04 Life Skills Training (LST): teacher-led; video training, Outcome 01 Quantity-Frequency measures (by school)

Review: Primary prevention for alcohol misuse in young people

Comparison: 04 Life Skills Training (LST): teacher-led; video training

Outcome: 01 Quantity-Frequency measures (by school)

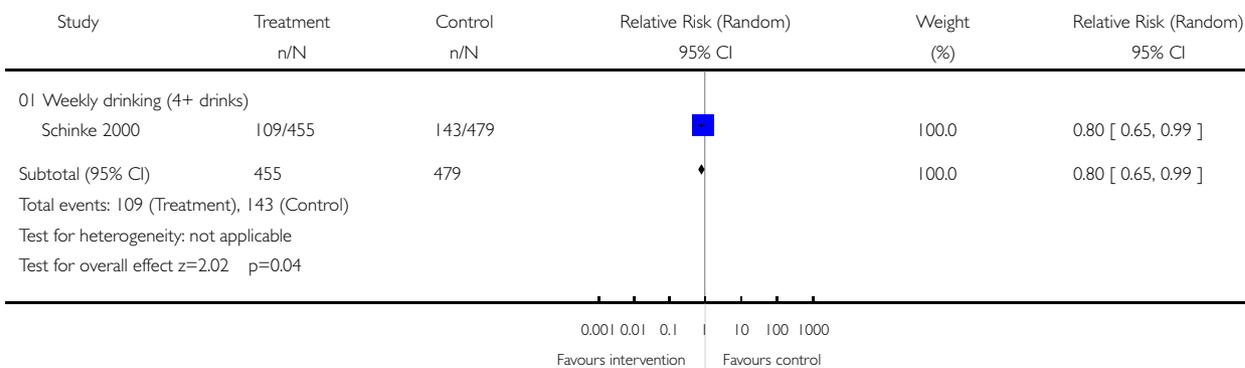


Analysis 05.01. Comparison 05 Culturally focused skills training, Outcome 01 Quantity-frequency measures

Review: Primary prevention for alcohol misuse in young people

Comparison: 05 Culturally focused skills training

Outcome: 01 Quantity-frequency measures



Analysis 06.01. Comparison 06 Culturally focused skills training + community involvement, Outcome 01 Quantity-frequency measures

Review: Primary prevention for alcohol misuse in young people

Comparison: 06 Culturally focused skills training + community involvement

Outcome: 01 Quantity-frequency measures

