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SYNTHESIS REPORT ON THE EFFECTIVENESS OF ALCOHOL EDUCATION IN SCHOOLS IN THE EUROPEAN UNION

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Executive Summary

Background

This report is a synthesis of the evidence base to 2005 summarised by the European Union commissioned Anderson and Baumberg (2006) review, and more recent evidence (to August 2009) identified by a multi-European language literature search conducted August 2009.

The report was commissioned in response to a request made at the European Alcohol and Health Forum plenary meeting on 11/03/2009 for a summary report on effective school-based education. Terms of reference, subsequently developed, aimed to build on the evidence base that informed the European Union strategy to support member states in reducing alcohol-related harm with the objective of highlighting best practice.

The more recent evidence included is drawn from evaluated alcohol education interventions in schools across the EU 27 member states drawn from peer reviewed academic literature and from commissioned reports and systematic reviews.

Methodology in review of recent additions to evidence base

A comprehensive literature search strategy was designed to identify recent papers for inclusion in the report. Selection criteria were intentionally as inclusive as possible. Relevance criteria were delivery of some or the entire programme in the school setting, to students under 18 years of age, with some measure of effect on alcohol behaviours as a result of the intervention. A summary of issues relevant to evaluation of school-based interventions intended, and used to inform the conduct of this review is provided in the report.

The post-2005 EU 27 member state language review update generated a total of nine intervention evaluation reports/papers, plus one systematic review. These are presented as case studies in the report and summarised in the Data Extraction Tables (Appendix 2). The reviews, papers and reports generated by the literature search and considered for inclusion but which did not meet relevance criteria are summarised in the Exclusion Tables (Appendix 3).

Summary of findings of recent additions to European evidence base

Outcomes and conclusions from the nine included interventions:

- A community programme that incorporated both supply-reducing and demand-reducing interventions, including school education, reported moderate sustained reductions in hazardous alcohol consumption.
- Evaluation of two programmes targeting families via school settings reported some positive short term effects on alcohol behaviours and the prevalence of family risk factors for alcohol misuse for one of the programmes. The studies noted that attrition appeared greater amongst higher risk families.
- A school-based social influences training programme demonstrated short term moderate reductions in harmful alcohol use.
- Five other programmes reported no significant effect on alcohol related behaviours.
- Of those five studies two did report a small impact upon one outcome measure.
- Four interventions reported an effect on alcohol related knowledge and attitudes.
- There was some evidence that impact upon alcohol related attitudes of parents was not matched by youth attitude change.

- Only two studies reported on cost effectiveness and the information in both was very limited. This underlines conclusions by previous reviews that that there is a paucity of evidence on cost effectiveness.

Key conclusions on the international evidence base for school-based interventions

- There are many gaps in the evidence base, which make drawing firm conclusions on best practice difficult.
- There is insufficient reporting of implementation practice (process evaluation) to maximise learning on the effect of variability in implementation on final outcomes and the transferability of interventions. Outcome evaluation methods are highly variable and often poorly designed which makes comparing intervention impact difficult and unreliable. There is very little research on cost efficiency which is a serious impediment to evaluating or demonstrating value for money.
- Most studies focus on short term measures, and generally find no effects or partial effects (for example, reported outcomes measures on self-reported frequency of drinking episodes, drunkenness, and consumption levels are most usually a mix of no effect and small effects with no overall trend reported).
- High attrition rates are a common characteristic of interventions and many evaluation studies do not adequately control for this in their analysis of results.
- There is a lack of clear evidence on the benefits of combining or separating alcohol and other substance misuse interventions.
- These factors all severely limits the learning potential from past experience and extrapolating from this for future better practice.

Global learning points on the effectiveness of school-based interventions:

- Supporting the development of general life and social skills such as learning to cope with anxiety and stress, refusal assertiveness, and problem solving increases youths' sense of empowerment when faced with risky alcohol behaviour choices. An interactive approach and training practitioners in these methods appears to be important but the evaluation and reporting on this is not sufficient to provide detailed guidance on best practice. Some studies have found partial short term effects and some found no effect. Similarly, a few studies found some evidence of longer term reductions in alcohol misuse, but most found no sustained impact.
- Family interventions may be more effective than interventions targeting youth only, but are more challenging in delivery and evaluation. Interventions targeting high risk families show the greatest promise. There is evidence that localisation/modification of the Strengthening Families Programme originally developed in the US, can have a positive impact on alcohol behaviours of young people, and increasing family and parental support for reduced risk. The evidence remains insufficient to draw firm conclusions on best practice. In any case thorough testing and development is recommended in the planning and delivering of any new initiative.
- Early stage intervention (that is before alcohol consumption behaviours have become established) may have the potential to be more effective than interventions targeting older youth. The limited evidence base suggests reinforcement through additional intervention in later adolescence is also necessary. Further research on how, when and what type of reinforcement might be most effective is needed.
- School culture, sometimes described as value added education (how the school is run, curriculum delivered, discipline, rewards, and activities) is associated with reduced

alcohol misuse. There is insufficient evidence to determine if this is a direct effect or simply an association with other changes that improve health and wellbeing of the school environment and its students. Value added education policy could in theory include more intensive intervention such as the provision of clinical brief intervention services but this is not reported or evaluated in the literature and therefore cannot be explored in this report.

- Community based interventions may enhance the effectiveness of school based education. The evidence suggests that community interventions need to be driven from grassroots and in partnership to maximise effectiveness. They offer the potential benefit of reducing alcohol-related social/community problems as well as reductions in individual health harms,

Recommendations to improve future practice:

- Thorough testing and development of intervention initiatives, with a strong emphasis on the involvement of young people, before widespread implementation.
- Greater investment and planning from the outset of intervention preparation in process and outcome evaluation and reporting of the research and intervention methods and the evaluation results.
- More research on cost effectiveness is essential to better understand value for money of interventions.
- Research on safety and unintended effects is also recommended, as poorly designed interventions have sometimes resulted in undesirable behaviours.
- School-based education should integrate and be consistent with other interventions and policy efforts to reduce alcohol-related harms.

Conclusions on the effectiveness of alcohol education in schools for Europe

School-based education is useful as a conditioning and complementary element to more comprehensive strategies to reduce alcohol-related harms. It is reported to be the most common form of intervention implemented in Europe but more investment in formative research and evaluation of outcomes would provide insight on its value for money and guidance on better practice for future school-based activities.

Overall the findings of this review align with the conclusions of the most recent systematic review of the evidence base, conducted on behalf of the National Institute for Health and Clinical Excellence (NICE) by Jones et al (2007). This review included 136 studies, which collectively examined 52 programmes delivered partially or wholly through primary and secondary schools. Results from the 52 programmes found evidence of partial effectiveness for 10 of the programmes and no significant effects for the remainder. The review also examined 14 systematic literature reviews, which collectively identified evidence of effects on prevention or reduction of alcohol use for three programmes. Jones et al (2007 p.180) therefore concluded:

"There is a lack of clear long-term evidence for the effectiveness of school-based interventions and the applicability of the few programmes that have demonstrated partial effectiveness warrants further study before widespread implementation can be supported"

Similar conclusions were reported by the Anderson and Baumberg (2006) review. The Anderson and Baumberg report was informed by an extensive body of review literature and

individual papers. The Anderson and Baumberg review conclusions on school-based interventions was substantially informed by the Cochrane Collaboration review of primary prevention for alcohol misuse by young people, led by Foxcroft et al (2002), and by Babor et al (2003) review of research and public policy approaches to reducing adverse alcohol-related impacts on public health. An overview, based on Babor et al (2003), of the relative effectiveness of approaches aimed at reducing alcohol misuse and harmful outcomes, including school-based interventions, is included as Appendix 1.

In summary the conclusions of researchers and reviewers in the field are that alcohol education in schools can have some positive impact on knowledge and attitudes. Overall, school-based interventions have been found to have small or no effects on risky alcohol behaviours in the short term, and there is no consistent evidence of longer term impact. A limited number of interventions have been found to show some promising outcomes. The evidence base suggests that only school-based interventions, which support and integrate with policies and strategies for which there is a stronger evidence base of effectiveness, are likely to impact behaviours and/or provide value for money.

Rationale

This short report features a synthesis of the findings from recent systematic reviews of the evidence base, as well as findings from peer reviewed published studies conducted since the publication of the Anderson and Baumberg review (2006). This more recent evidence is drawn from evaluated alcohol education intervention activities in schools relevant to the EU 27 member states published subsequent to the Anderson and Baumberg review (2006). The report builds upon the summary and conclusions of Anderson and Baumberg's (2006) review of English language peer reviewed literature on the effectiveness of school-based programmes in effecting alcohol-related behaviour change and other related pre-determinants (such as knowledge, attitudes, awareness). This evidence base update is drawn from peer reviewed published papers, commissioned reports and systematic reviews published since 2005 to date.

References to interaction with the home and family environment, and health and welfare support services provided through school were particularly examined during the review process, as per the terms of reference. The very limited information found on this is included in the report. The report is intended to contribute to comparative analysis of practice and effectiveness across the member states.

The report represents a response to the recommendations/request of the 11th March 2009 Plenary[1] for a summary report on effective school-based education. The report is consistent with key aims of the EC Alcohol Strategy, namely to protect young people from alcohol-related harm; to inform educate and raise awareness of potential alcohol harms; to develop a common evidence base. Anderson and Baumberg (2006) note that school-based education interventions are the most common type of alcohol risk reduction programme implemented in Europe. It is therefore of concern to many researchers in the field, including Anderson and Baumberg, Foxcroft et al (2002), Babor et al (2003) and more recently Jones et al (2007) that despite the prevalence of school-based interventions, there is lack of good quality evaluation of their effectiveness. The evidence base is undermined by poor quality evaluation design including lack of measures on sustainability of any effects, considerable variability in outcome measures making comparative analysis difficult, and inadequate reporting of process, methods and analysis.

Objectives

- Summarise the evidence base that informed the Anderson and Baumberg Report and its conclusions regarding school-based educational interventions.
- Explore issues that need to be considered when discussing school-based alcohol education and appropriate evaluation measures.
- Present a brief synopsis of interventions including information on location, design, relevant contextual information (such as national policy, school-family interaction, and school health and welfare support services) as well as evaluated outcomes.

[1] Fourth Plenary Meeting, Brussels 11 March 2009 Summary Report
http://ec.europa.eu/health/ph_determinants/life_style/alcohol/Forum/ev_20090311_en.htm

- Summarise key elements that characterise effective interventions, with particular emphasis on family and home elements and school-based welfare support services, along with indicators of their success and/or ineffectiveness.

Scope

The search parameters were evaluated alcohol education interventions, and broader substance misuse interventions across the EU 27 member states. Evaluation criteria were any/all measures of impact on alcohol behaviours and behavioural determinants. The same search databases were used as in the as Anderson and Bamberg report (ie. PsycINFO and Medline/PubMed) with additional searches in the Web of Knowledge database and electronic hand searches. This new report extended search parameters to include non-English language publications as well as English language reviews and papers, as appropriate. The report includes post-2005 peer reviewed papers, systematic reviews, and commissioned reports on interventions in EU member states in any official European language. The report therefore particularly contributes to the evidence base because it is not restricted to publications in English language only, unlike previous reviews.

Structure and Content

The focus was on behavioural outcomes and determinants of behaviours. However, where cost-effectiveness estimates or commentary were included in evaluation studies, this information is also presented.

Where the role of, and interaction with, home and family, was reported, this has been highlighted in the intervention description and evaluation summaries.

Interventions are grouped by the conceptual approach used to guide the programme. The following headings were used: life/social skills approach, family based approach, social influences approach, social learning theory, community-based/systems approach, and targeting childhood disruptive behaviours. A synopsis of each of the included interventions is given in the data extraction table (see Appendix 2), detailing the intervention name, authors, the setting and participants, details of the interventions, and results of the outcome evaluations.

Methodology

A literature search strategy was designed to identify systematic literature reviews, meta-analyses, and studies evaluating alcohol education interventions in schools in the European Union published since the beginning of 2005.

Academic Databases and Search Terms

Three academic literature databases were chosen for the searches, including the two databases Anderson and Baumberg (2006) used (Medline and PsycINFO). See Table 1 for a brief description of each database's scope and content. Each of these databases has an

English language interface and the records for all non-English language literature have at least the title translated into English (the majority have a translated abstract also).

Table 1: Electronic databases used for the literature search

Database	Description
PsycINFO	The American Psychological Association's resource for journal articles, book chapters, books and dissertations containing peer reviewed literature in behavioural sciences and mental health (+2,400 international journals in +27 languages). A subscription access database via EBSCOHost.
PubMed	The US National Library of Medicine and the National Institutes of Health database of published medical literature. Includes citations from MEDLINE (+4,900 international journals in +30 languages) and other life science journals. An open access database (http://www.ncbi.nlm.nih.gov/pubmed).
ISI Web of Knowledge	Includes the MEDLINE database plus the Web of Science database, itself made up of 4 subject indices: the Science, the Social Sciences, the Arts & Humanities and the Conference Proceedings Citation Indices. (Content is in +57 languages). A subscription access database from Thomson Reuters.

The date parameters for searches were from the beginning of 2005 to date, with the database searches run between the 31st July and the 5th August 2009. Figure 1 shows the search terms used. Alcohol terms were combined with school terms and searches were run for the terms in the title, abstract and keyword fields in the databases' records. Some search terms were database-specific (eg. see the PsycINFO and PubMed examples in Figure 1), and these were also incorporated into the search strategies.

Figure 1: Search terms

A. General search terms for all databases

Alcohol Terms	School Terms
alcohol$	class room$
drug education	classroom$
substance misuse	education$
substance abuse	highschool$
	school$

($ denotes word truncation to enable all permutations of the root word to be searched for.)

B. Examples of database-specific terms

PsycINFO	PubMed
Early Intervention	Alcohol Drinking
Education Programs	Alcoholic Beverages
School Based Intervention	Schools
School Counselling	Substance-related Disorder
Student Personnel Services	

As this report aimed to include any relevant non-English language studies, the searches were run twice; first for non-English language studies, then for English language studies using the databases' language limit settings. This ensured the time-consuming process of full text translations could be started early. Four papers were translated from their original language (one each in Czech and German, plus two Spanish) into English; one of these is included in the report.

Additional Sources of Literature

Academic Peer-reviewed Literature

To inform the terms of reference for this report, pilot searches for recent (in the last 12 years) reviews of school interventions to prevent alcohol misuse by young people were conducted.

The bibliographies/data sets of these reviews were also checked for relevant studies for this report. In-house resources were also searched for literature.

Commissioned Reports
A number of internet searches were run to identify other commissioned reports (not published through the common academic channels) that described the evaluation of an alcohol education intervention in EU27 schools. The *yahoo.com* search engine (http://uk.search.yahoo.com/web/advanced) was used on the 28th September 2009 to run the searches described in Table 2.

Table 2: Web searches using *yahoo.com*

Search terms to appear in any part of web page	Limits	Results reviewed
alcohol school program	**File format:** PDF documents	First 200 hits
alcohol school program	**File format:** Microsoft Word documents	First 200 hits
alcohol school effective	**Country:** results from UK only	First 50 hits
alcohol school effective alcohol school effective alcohol school effective alcohol school effective	**Country:** results from Austria only **Country:** results from Belgium only …. *Ditto for each country in EU27 (excluding UK)*** …. **Country:** results from Spain only **Country:** results from Sweden only	First 30 hits* (x26)
alcohol school effective	**Site/domain:** domain ending "europa.eu"	First 100 hits
alcohol school effective	**Site/domain:** domain ending "emcdda.europa.eu"	First 100 hits

*Search terms are in English thus would expect fewer relevant hits
**Where *yahoo.com* did not supply a country limiter, a country's web domain was used as limiter (eg. ".bg" for Bulgaria, ".cy" for Cyprus)

A separate search was made on the 28th September 2009 in the European Monitoring Centre for Drugs and Drug Addiction's (EMCDDA) Exchange on Drug Demand Reduction Action (EDDRA) portal (http://www.emcdda.europa.eu/themes/best-practice/examples). It provides examples of evaluated best practice from European countries (last updated 29th June 2009). All the "Harm Reduction" outcome and impact evaluations on young people and the "Prevention" outcome and impact evaluations were hand-searched for relevant reports of school evaluations.

Selection of Literature for Inclusion in the Report
Results from the searches were initially appraised for inclusion (see the level 1 criteria in Figure 2) using their titles and/or abstracts by one reviewer. Following this initial scan, the relevant results from the three databases were downloaded and combined in one database using the bibliographic software Reference Manage® v.11. The combined contents were de-duplicated and any pre-2005 records, or those referring to studies already included in Anderson and Baumberg (2006) review, were deleted. Records were then screened at the level 2 criteria (see Figure 2) by title and abstract by one reviewer. All records passing this stage were obtained in full text.

Figure 2: Literature inclusion criteria

Level 1

1. Published in or after 2005 (and not included in Anderson and Baumberg's 2006 review)
2. Published in the official language of an EU member state (EU27)
3. Publication is a study or a systematic review of studies

Level 2

4. Publication must **evaluate** an alcohol education intervention in schools (curricular or extra-curricular) in EU27. Therefore the study must fulfil the following criteria:
    - Is it an alcohol education intervention or a broader substance misuse/health education intervention with an alcohol component?
    - Does the intervention take place within a school setting (not a college or university) targeting youth aged 18 or under?
    - Are any of the sample schools in one or more EU27 countries?
    - Does the evaluation include measures of impact on alcohol behaviours and behavioural determinants?

The full text studies were screened by one reviewer and where doubt existed over inclusion a second reviewer. The final dataset of nine studies and one systematic review was reviewed by three reviewers with 100% agreement on what should be included. A list of papers screened in full text and excluded, and the reasoning, is available in Appendix 3.

Limitations of Search Strategy

Although the databases selected for the searches contain different types of academic publications (journal articles, books, conference/symposia abstracts) and in many different languages, they are English language interfaces so it would be expected that they would not index all European language academic publications. It was beyond this report's terms of reference to do extensive grey literature searches and make speculative contact with individuals for publications.

Quality

All the studies except one (El Gobierno de La Rioja 2009) presented in the report are peer reviewed and published in academic literature, but are not quality assessed by the report authors. Decisions about inclusion in the final report were based on initial relevance criteria and were not subject to further selection based on appraisal of quality of research design. Additional quality appraisal would have resulted in more studies being excluded from the final report.

Data Extraction and Synthesis

Data extraction of the studies was conducted by two reviewers. See Appendix 2 for the data extraction tables for the 11 papers covering nine studies and one systematic review (note that one study was covered by two papers). A formal meta-analysis was outside the terms of reference for this report. Furthermore, the quality and level of data detail provided in the studies included in the report was not sufficient to conduct a combined quantitative analysis. Instead, the evidence has been presented as a narrative synthesis.

Issues to Consider in the Evaluation of School-based Alcohol Education

Scope of Intervention Aims and Reach

The provision of alcohol education in schools is one of the most common settings through which alcohol education is delivered, and is reported to be the most common of all types of intervention delivered in Europe.

School-based alcohol education may have a number of aims, including:

- Provision or strengthening of knowledge and skills to encourage young people to make healthy, informed choices about alcohol.
- Increased awareness of the risks of harmful drinking behaviours and to encourage positive attitudes towards responsible alcohol consumption (including compliance with legal restrictions).
- Strengthening social skills and resistance strategies that may be protective against hazardous alcohol consumption.
- Support strategies for endogenous psychological traits that may be protective against hazardous alcohol consumption, for example building self-efficacy, training in higher order thinking and problem solving.
- Correction of misperceptions of alcohol norms such as peer drinking behaviours and prevalence of binge drinking.
- Provision of activities that offer alternative behaviours to alcohol consumption, for example, sporting activities.

Many interventions also target other substance misuse, usually tobacco and illicit drugs.

Some programmes aim to supplement school-based delivery by explicitly invoking parent and family involvement. Some of the larger-scale interventions also aim to modify environmental factors such as school environment/ethos as well as community variables such as availability of alcohol in the community and the influence of the media.

School-based programmes may be delivered through regular school staff, external specialists, peer-educators or a combination of these.

Intervention projects almost always develop customised educational materials aimed at diminishing demand. In general, only those with strong community-focused objectives appear to ever directly address supply-side influences. Evaluation of materials can draw on both process and outcome evaluation measures.

Evaluation Aims and Objectives

Comprehensive, credible and rigorous evaluation is essential to building an evidence base that can contribute to the development of effective and cost-efficient policy and practice. The diversity of approaches and objectives inevitably presents challenges in comparisons of efficacy and cost-effectiveness of interventions. Well designed evaluation however, can and should support decisions on best use of scarce resources, the avoidance of unintended, possible harmful consequences, better future practice and guidance on future research.

Outcome Evaluation

Outcome evaluation measures most commonly include:

- Changes in self-reported range of alcohol behaviours, including age of initiation into alcohol consumption, frequency of consumption, frequency of episodic excessive alcohol consumption, overall consumption levels, nature and strength of alcoholic drinks consumed.
- Changes in prevalence or strength of known endogenous risk factors and protective traits for alcohol-related behaviours such as knowledge, attitudes, perceptions of normal and acceptable behaviours, self-efficacy.
- The persistence of any measured effects over time.
- Changes in prevalence or strength of protective skills against substance misuse such as problem solving, resistance to peer pressure.
- Changes in frequency or severity of consequences of alcohol-related behaviours such as alcohol-related injury.

Process Evaluation

Process evaluation is also helpful in the development of effective and cost-efficient policy and practice if it helps to explain why an intervention was or was not effective. Process evaluation that simply describes intervention development and delivery without reference to effect is unlikely to contribute to the evidence base. It is therefore important for any critique to consider if process and outcome evaluation is integrated and complementary.

Useful process evaluation measures, that may help in the analysis and interpretation of intervention effects include:

- Fidelity of implementation – many interventions are delivered within an environment of competing priorities and multiple perspectives which may directly impact on delivery.
- Scalability and transferability of intervention – does evaluative analysis provide sufficient information on the moderating impact of environmental factors on efficacy and cost-effectiveness, for example. Relevance to target age group is emphasised as particularly critical to success by Welham (2007). Cultural specificity is also an important consideration for the European region.
- Unintended consequences – there is some evidence that some interventions may result in undesirable effects (see for example Hansen 1980, 1982, cited in Anderson and Baumberg 2006; Werch and Owen 2002, cited in Jones et al 2007).
- Acceptability of the intervention to the target group and other stakeholders – Espada et al (2008) for example comments, that in Spain messages discouraging ‘moderate’ consumption of alcohol by youth may be initially rejected but those about excessive consumption are more readily accepted.
- Opportunities to improve programme design and delivery – the feedback of both target audiences and those delivering or observing the intervention can provide insights into modifiable programme-specific and environmental factors that may improve efficacy, uptake, scalability, transferability etc.
- Information on ecological factors that may confound outcomes. Interventions are usually delivered as natural experiments. The most robust evaluations will measure effects over prolonged time frames to assess sustainability. Changes to the environmental context are therefore likely and may attenuate impact.
- Insight on the mediating factors and processes involved in the pathway from intervention to alcohol-related behavioural outcome. Many researchers and practitioners comment that interventions should be theory based. However, there is no

clear consensus on most appropriate behaviour change frameworks to reduce harmful alcohol consumption behaviours.

Economic Evaluation

Assessing value for money is integral to evaluation. Economic appraisal is one of the most rigorous methods and is valuable for comparative purposes. Full economic evaluation considers both cost of intervention and the consequences of implementation, compared to the cost of inaction. There are a number of methods used, but all require some measure or estimate of the health outcomes and in some instances also social costs (such as criminal damage, violence and productivity effects). Economic estimates of the costs of consequences and cost savings derived from reduced alcohol misuse require accurate data input and complex modelling. The WHO (World Health Organization) has developed an analysis of the costs to health and counter-measures to hazardous alcohol consumption, Anderson et al (2009) recently updated this model to present a comparison of the cost-effectiveness of intervention strategies. Many school-based interventions are judged to be low cost because of low implementation costs – Anderson et al (2009) for example estimate European school-based educational interventions to cost less than 1 dollar per person per year on average. However, without measures for long term effectiveness on consumption levels, it is not possible to draw firm conclusions on cost-effectiveness or value for money.

A Summary of the Systematically Reviewed Evidence Base

The most recent systematic review of the evidence base was conducted in 2007 by Jones et al for the UK's National Institute for Health and Clinical Excellence (NICE). This was an international review of interventions delivered in primary and secondary schools to prevent and/or reduce alcohol use by young people under the age of 18. Its conclusions were -

> *'There is a lack of clear, long term evidence for the effectiveness of school-based interventions and the applicability of the few programmes that have demonstrated partial effectiveness warrants further study before widespread implementation can be supported'.*

The 2007 NICE review found the strongest evidence for effectiveness were for a family-based intervention programme and a life skills training approach. The review also noted that a culturally focused programme for Native Americans had resulted in measurable sustainable effects but commented its transferability may be limited.

The 2007 NICE review concluded that the evidence for two classroom-based, teacher-led life skills training interventions appeared to indicate some medium to long term reductions in consumption and misuse. The effects of externally-led interventions however, were found to be inconsistent overall and the effects of other in-school approaches were not found to be sustained.

The 2007 NICE review also investigated the evidence for cost-effectiveness and concluded there was

> *'inconsistent and insufficient evidence to determine cost-effectiveness of school-based interventions'.*

A more recent discursive review by Anderson et al (2009) again concluded that the evidence base consistently indicates that school-based education does not reduce alcohol-related harm. The authors' conclusions reflect the conclusions of other reviews suggesting some evidence of positive impact on knowledge and attitudes but not on behaviour. The authors also comment that public education does have a role in raising awareness, and increasing acceptance of alcohol as an important policy issue.

Anderson and Baumberg's (2006) review concluded that school-based alcohol education appeared to have some positive impact on knowledge and attitudes but found a lack of evidence that school-based interventions reduced harmful consumption. The review also concluded that there was no evidence that the measured effects of school-based interventions were sustained. Anderson and Baumberg's review drew on an extensive body of research and reviews of the evidence base. The Cochrane-commissioned review by Foxcroft et al (2002) was a main source of evidence of effects of interventions targeting children and young people (up to 25 years age), and specifically examining the evidence base for school-based educational interventions. The Foxcroft review included 56 studies in its final analysis. Twenty studies found school-based interventions to be ineffective and two 'showed promise'.

Anderson and Baumberg, therefore concluded that:

> *'Despite many years of research, the effect sizes for most school based programmes are small and programme failures are common. This suggests that, until there is more evidence for effectiveness, it is not a good use of scarce resources to invest heavily in school based education programmes'.*

Babor et al (2003) also concluded that school-based alcohol education was one of the least effective intervention options. A précis of the Babor et al (2003) comparison table on the effectiveness and cost effectiveness of intervention approaches is provided in Appendix 1.

Recent Interventions: A Synopsis of Approaches and Case Studies

Life/Social Skills Approach

An approach several school-based drug abuse (including alcohol abuse) prevention programmes have taken is to educate school pupils about life/social skills to deliver drug abuse prevention programmes. These skills include refusal assertiveness, general personal assertiveness effective communication, coping with anxiety and stress, goal setting, and problem solving (Botvin et al 1980, WHO 1997). The empirical evidence supporting the effectiveness of the life/social skills approach is equivocal. A Cochrane review suggests this approach may be effective in reducing drug use (Faggiano et al 2005), but less effective in reducing alcohol abuse (Foxcroft et al 2002).

The Allgemeine Lebenskompetenzen und Fertigkeiten (ALF) (general life competencies and skills) programme in Germany (Bühler et al 2008) used this approach. Social and life skills promoted were self-awareness and empathy, creative and critical reasoning, communication, decision making, problem solving, coping with stress and other emotions and refusal assertiveness. The intervention was delivered in seven 'Realschulen' (schools for non college/university-bound students) to students aged 10-11 years. The programme featured eight sessions of general life skills training and four sessions on substance use (tobacco and

alcohol) related issues, delivered by trained teachers in class. Outcome evaluation compared pre and post-intervention (12 months) measures. Measures included knowledge of alcohol harms, attitudes to alcohol consumption, and intentions about future alcohol consumption. These responses were computed to generate a score for likelihood of alcohol misuse (described as 'distance' from risk by the researchers). Behaviour measures were self-reports of consumption of alcohol ever; consumption of alcohol over past 30 days, amounts of alcohol consumed The evaluation found a statistically significant increase in students' more critical attitudes to alcohol consumption, but not sufficient to reduce the overall risk/distance score, and an increase in knowledge and life skill resources. Reductions in alcohol use however, were not significant.

The IPSY (Information + Psychosocial Competence = Protection) life skills programme evaluated intervention found modest positive effects on life skills, attitudes and behaviours (Weichold et al 2006). The intervention targeted alcohol attitudes and use of students aged 10-11 years in Thuringia, Germany; and students in grade 6 in schools in Turin, Italy. Using the Life-Skills model of education, the programme aimed to delay onset of, and reduce consumption levels of alcohol. Teachers delivered a programme of training on life and social skills with lessons including manuals, leaflets, interactive role-play, group interactions and group discussions. Outcome measures were collected 7 month post-intervention in Germany and 2 months after intervention delivery in Italy and compared to baseline (pre-intervention) results. Measures were frequency of drinking over lifetime, and during the previous 30 days separately for beer, wine, spirit, mixed drinks as well as expectations about future consumption during the next 12 months. Results demonstrated that the intervention resulted in partial effects on consumption of alcoholic beverages amongst some of the intervention group but these were of low statistical significance ($p < 0.1$). Social skill competencies and future intentions to drink alcohol were improved amongst the intervention group but did not correlate with reported drinking behaviours of individuals. The researchers concluded that the age at which regular alcohol use and related behaviours started may be positively influenced in both the German and Italian samples because changes in attitudes and expectations are a necessary precursor to behaviour change. However, they recognised that this assertion could not be validated because of time limitations and small, statistically low significance effect sizes.

Family Based Approach

Another approach used in youth alcohol use prevention programmes is to involve families. There is some evidence that using a family based approach can be effective in reducing underage drinking (Foxcroft et al 2002). Parents are normally targeted as a key component of interventions delivered through schools. For example, classroom curriculum on alcohol issues may be supplemented by a parental curriculum, training, workshops, meetings between parents, teachers and trained specialists, and mail outs of information leaflets to parents.

A schools based substance misuse education programme that used a family based approach was the Familias que Funcionan (Families that Work) programme, in Asturias, Spain (Errasti Pérez et al 2009). The intervention was an adaptation of the programme designed in North America called the Strengthening Families Programme 10-14 years, which was adapted and transferred into a Spanish context (more information at http://www.mystrongfamily.co.uk/espanol/SFP_spain.html). The programme was delivered in four secondary schools in Asturias targeting children aged 10-14 years. First the school sent parents' information about the intervention. Then a meeting was held between parents, teachers and the team of specialist monitors delivering the intervention. Pupils and parents

then attended a series of seven main sessions and four maintenance sessions of the prevention programme, on a weekly basis. Each session lasted about two hours and consisted of two parts. In the first part the parent's group and the children's group met separately with their mentor, and in the second hour the whole family met in order to perform a series of tasks. The programme content included visual and written information, such as leaflets and DVDs. The programme aimed to encourage individual self-esteem and social skills, improved parent-child relationships, role modelling, stress management. The intervention also aimed to strengthen positive relationships with the schools and other pupils. The maintenance sessions were designed to revise the programme content and address any queries. Outcome measures were self-reported use over the last 30 days for ten different types of drugs including alcohol, and self-assessment of the presence and intensity of family risk factors such as parental attitudes to alcohol and drugs, family conflict levels, family communications and emotional bonds between parents and children. Data was collected at baseline (students aged 10-14 years), and at 1 year and 2 year follow-up. Overall the study reported that attendance at the majority of sessions in the programme strengthened familial and parental protective factors and reduced the incidence of substance misuse. However, specific details of reductions in alcohol use were not reported. The authors also reported a very low level of uptake (only 6% of families invited to attend actually participated in the intervention).

The Örebro Prevention Programme in Sweden also used the family based approach (Koutakis et al 2008). The intervention targeted 13-16 year old adolescents with the aim of changing attitudes and behaviours in relation to alcohol. Schools facilitated a series of parent-teacher meetings in schools, comprising one intensive session and four maintenance sessions. Parents were encouraged to maintain a strict attitude towards alcohol use and to encourage their children's involvement in organized adult-led activities such as sports and hobbies. Furthermore all parents of school pupils received information on the programme by mail. Data was collected at baseline, at 18 months and 30 months after intervention. Impact on alcohol consumption was measured by a single question about how many times they had felt drunk in the last four weeks. Other measures of impact on student were about number of acts of delinquency in the past year, and levels of involvement in activities intended to provide an alternative to delinquency and alcohol misuse. Measures of impact on parents' were collected using a self-assessment of their attitudes to alcohol use by their children. At the end of the programme, frequency of self-reported drunkenness was found to be lower in the intervention group than in the control group. It was also found that the implementation of the programme successfully influenced parents' attitudes against underage drinking. The authors summarised effects size on frequency of drunkenness, over the 3 year period of intervention as low-medium to medium.

The design of the intervention was reported to be low cost and requiring minimal additional resources, when compared to other national parenting programmes. However, no details of how economic analysis was computed were provided.

Social Influences Approach

A further approach to school-based alcohol prevention programmes has been the use of a social-influences approach (Kelman 1958). Social influence can be defined as changes in a person's thoughts, feelings, attitudes, or behaviours as a result of interaction with other individuals. Within intervention programmes this typically involves a curriculum intended to encourage critical thinking, decision making, problem solving, creative thinking, effective communication, interpersonal relationship skills, self awareness, empathy, coping with

emotions and stress, normative belief, and knowledge about the harmful health effects of drugs (Sussman et al 2004).

EU-Dap school prevention programme adopted a social influences approach. The intervention targeted school pupils aged 12-14 years from 170 schools, in seven EU countries: Austria, Belgium, Germany, Greece, Italy, Spain and Sweden (Faggiano et al 2008). The programme was a school-based substance abuse prevention programme targeting tobacco, alcohol and illicit drugs. The programme consisted of a classroom based curriculum delivered by trained teachers, based on the social influences approach. Implementation was delivered through three intervention arms with different conditions and one control. The three interventions consisted of curriculum only; curriculum with peer involvement and activities; curriculum with parental involvement and activities. The control group experienced no intervention activities. Behavioural and psychometric outcomes were collected at baseline and 3 months after intervention. Data was collected through a self-completed anonymous 37 item questionnaire. Behavioural questions investigated lifetime, past year, past month and current use of alcohol, with additional specific questions on drunkenness over lifetime, past year and past month. Short term outcome evaluation found that the programme was effective in reducing episodes of drunkenness. However, substantial variation across the two behavioural measures indicates this conclusion may not fully reflect impact of the intervention. For example absolute risk reduction in the intervention group compared to control group for any drunkenness in the previous thirty days was 3.3% but only 1.2 % for frequent episodes of drunkenness. No significant differences in general alcohol use between control and intervention groups were reported. Changes in potential psychosocial determinants of substance misuse were not significant. The authors reported this to be a low cost intervention, based on costing of intervention materials and training costs at €200 per school, but no formal economic evaluation was performed.

The school-based alcohol education intervention for 7th graders (12-13 years age), implemented in Schleswig-Holstein, Germany (Morgenstern et al 2009) also used the social influences approach. The intervention was delivered in school classrooms by teachers and consisted of four interactive lessons featuring a range of materials, supplemented with booklets for parents. The main message of the materials used in the intervention was ‘no alcohol for minors.’ Outcome measures of impact were: knowledge, attitudes, life-time alcohol consumption, (ever used alcohol without parental knowledge, ever been drunk, and ever binge drinking) and past month alcohol use. Data was collected at baseline (pre-intervention), 4 months and 12 months. It was found that the intervention was successful in increasing knowledge about alcohol related issues and some (small) reduction in binge drinking frequency. However no significant effects were found with respect to student’s attitudes, intentions to drink, and other measures of drinking behaviours.

Social Learning Theory

A similar behavioural theory to social influences theory which is influenced by sociology and psychology is social learning theory. Social learning theory posits that people’s behaviours are learned, and influenced according to their environment and psychological factors. People will learn behaviours through overt reinforcement or punishment, or via observational learning of the social actors in their environment. In social learning theory behavioural outcomes are facilitated by three requirements: retention, reproduction and motivation (Bandura 1977).

An intervention which used social learning theory as a conceptual framework was the Drug Prevention Programme in the La Rioja region, in Spain (El Gobierno de La Rioja 2009) introduced in 1993. The programme targeting secondary school students, had three sub-programmes: drinking prevention for 2nd year middle school students (aged 13-14 years), as well as smoking prevention for 1st year students (aged 12-13 years) and drug use prevention for 3rd year students. The programme consisted of eight educational sessions delivered in the classroom by trained external professionals (two primary school teachers, one pedagogue, and one doctor) over a single school year. Objectives were educating students about health problems associated with alcohol use, behavioural guidelines to lower risk, changes in perception of risks through reflection and analysis, and the development of personal and social skills to resist peer and social pressure. Outcome evaluation was measured and compared to baselines results at the end of the intervention and then at 2 years and 4 year follow up. Results demonstrated that the intervention group were better informed about the health problems associated with alcohol use. Details of behaviour change measures used were not provided but the study did report there were no statistical differences between the experimental and control group in terms of drinking behaviours.

Community Systems Approach

The community systems approach to the prevention of alcohol related problems is heavily influenced by the work of Holder (1998) and involves framing such issues in a wider context rather than merely targeting problem individuals or groups. This approach can be defined as: aiming to address a wide range of problem behaviours, surveying the entire population, and suggesting interventions that impact upon the behavioural environment and promote the desired decision making processes and behaviours. Key in the design and delivery of interventions using such an approach is the concept of community ownership. In such cases it is important that the local community, and not specialist outsiders, drive the delivery of the programme.

The Trelleborg Project in Sweden used the community systems approach to deliver an intervention that sought to reduce harmful drinking behaviour, and reduce alcohol related accidents and violence amongst adolescents aged 15-16 years attending schools in the area (Stafström and Östergren 2008, Stafström et al 2008). In the intervention the local community developed a policy programme designed to help develop alcohol prevention strategies for children and adolescents. The wider community programme goal was to reduce alcohol related violence and accidental injury to young people. Specific aims were to decrease binge drinking, delay initiation into alcohol use, and change attitudes towards alcohol. A school policy and action plan on alcohol was introduced. This included a comprehensive school curriculum, with a wide range of activities and support materials, and a curriculum for parents. Information in the form of textbooks, booklets and leaflets and was also issued to students and parents. Evaluation of alcohol consumption was measured through questions on any alcohol consumption in the past six months, self-reported frequency of drinking leading to drunkenness, frequency of binge drinking (defined as at least six cans of beer, a bottle of wine volume or half a bottle of spirit). Additional questions investigated who bought the alcohol consumed by the young people. Data was collected at baseline, one year, two year and four year follow up. Cross-sectional outcome evaluation indicated that the Trelleborg Prevention Programme resulted in a moderate decrease in all drinking behaviours over the study period. Changes in alcohol purchase patterns were not significant. Regression analysis indicated that changes in hazardous drinking behaviours were primary mediating factors in the reduction of alcohol-related accidents and violence experienced by young people during the intervention period.

Targeting Childhood Disruptive Behaviour Problems (DBP)
There is an established evidence base demonstrating an association between childhood disruptive behaviour problems and early onset of substance use problems, including alcohol abuse (Elkins et al 2007, Ernst et al 2006, Fothergill and Ensminger 2006, Kuperman et al 2005). Various prevention programmes developed to prevent the onset of childhood disruptive problems have been found to be effective in reducing substance misuse, including alcohol (Greenberg et al 2001).

This approach was used in a school-based setting in the Good Behaviour Game (GBG) project, delivered to school children aged seven years, from 13 elementary schools in Rotterdam and Amsterdam, the Netherlands (Van Lier et al 2009). The intervention targeted disruptive behaviour problems. Its primary aim was to modify the development of disruptive behaviours, but a secondary aim was to diminish subsequent alcohol and tobacco usage (as measured at age 10-13 years). The GBG project design had earlier been trialled in the USA (Kellam et al 1991). In the intervention teachers and students formulated a set of class rules accompanied by pictograms. Thereafter, teachers assigned children to one of three or four teams containing an equal number of disruptive and non disruptive children, based on observations of rule breaking behaviours. Team members were then encouraged to regulate their own and team mates' behaviour. Each team received a set of cards, and in instances of rule breaking, teachers would take a card from the team. Rewards were issued at the end of the game to teams that had cards remaining. The programme was implemented in three stages, with the GBG being played three times per week for 10 minutes in the introduction phase, which was then expanded in terms of time, settings and target behaviour in the expansion phase, before in the generalisation phase it was emphasised that the GBG rules apply at all times. Evaluation research used a self-report questionnaire, and promised confidentiality of their responses. The questionnaire was completed annually from age ten to thirteen inclusive (i.e. 4 survey waves conducted annually). Alcohol use measures were any consumption in the past year, past month and past week. No effect on alcohol behaviours such as initiation into drinking or frequency of consumption was detected, with the exception of a small improvement in the age-related rate of increase in consumption over the past week.

Economic Appraisal

The NICE review (Jones et al 2007) found a lack of economic evaluation studies. Of the 52 studies included in the review, only two met criteria for inclusion as economic evaluation studies. The two evaluations were published in 1998 and 2004 and were therefore not new to the systematic literature review. One study (Swisher et al 2004, cited by Jones et al 2007) was unable to draw any conclusion in comparative cost effectiveness because of lack of measurable sustained effects of the life skills training programme. The other study (Pentz 1998, cited by Jones et al 2007) found a net cost of $10 per each monthly reduction in drunkenness incidents. The review concluded that both had design limitations, and advised caution in interpretation of their findings.

The NICE reviewers conducted additional cost-benefit analysis on three programmes and these results were reported noting wide variation in costs, from £257.47 to £34,254.70 cost per case of hazardous/harmful drinking averted.

The NICE review concluded that a review of published economic evaluations, and cost-effectiveness analyses is limited by large gaps in the evidence base and therefore little can be determined on whether alcohol education in school programmes provide value for money.

Anderson et al (2009) updated the WHO analysis of the health costs and effects of population as well as individually based measures for countering hazardous alcohol use in the WHO regions, from 2000 to 2005 dollar prices. The cost of school-based alcohol education in Europe was computed to be $0.34 per head per annum overall. However, cost effectiveness could not be determined because effect sizes were very small and therefore cost effectiveness was minimal, equivalent to zero.

Anderson et al (2009) therefore summarise –

> *'many systematic reviews have assessed school-based education and conclude that classroom-based education is not an effective intervention to reduce alcohol-related harm'.*

This review also found little additional evidence on economic evaluation in the studies included in this report.

Morgenstern et al (2008) who evaluated a school-based short term intervention (see page 15 for more details) estimated the short term effects on alcohol misuse (mainly assessed as change in knowledge) produced a positive cost: benefit ratio. However, the descriptive rationale given for this was that implementation costs were low, and even small effects were beneficial because of the high social costs associated with alcohol misuse, but no econometric data was provided to support this statement.

Koutakis et al (2008) compared the cost-effectiveness of the parent-targeted Örebro Prevention Programme against the two cost-effectiveness studies included in the NICE review (Jones et al 2007). The authors described the implementation costs of the Örebro programme as 80% lower than the family based programme included in the NICE review. However, the authors acknowledged that measures of effectiveness were not directly comparable because the Örebro programme measured only short term effects, and the comparison programme measured longer term effects. Also, the self-reported behaviours used to assess effects were different.

In summary, the evidence base is insufficient and inconsistent. There is no scientific basis to use low implementation cost as an alternative indicator of value for money. The evidence base that is available therefore does not overall demonstrate that school-based educational interventions represent value for money.

Key Learning: Elements for Effectiveness

- From several of the included interventions the findings suggest that favourable prevention outcomes may be influenced through building understanding and experience in general life skills. Life skills training has been used in both alcohol-specific and multi-substance use prevention programmes. There is some evidence of short-term effectiveness, but evidence for sustainability is less certain. Fidelity and completeness of delivery has been highlighted as a critical factor in determining effectiveness.

- Using the evidence from interventions utilising the family based approach the role of parents is found to be an important one in alcohol prevention programmes. There is evidence however to suggest that in such interventions the majority of participants are parents who are already motivated, and worried about their children's welfare. A key challenge therefore is to design strategies that encourage participation in prevention programmes among families with a higher risk profile of alcohol use/abuse.

- There is some evidence which suggests that universal prevention programs should be implemented in early adolescence, when substance use is unlikely to be an established behaviour (Botvin and Griffin 2007, Bisset et al 2007). This thinking influenced the rationale for several of the included interventions (Van Lier et al 2009, Errasti Pérez et al 2009, Weichold 2006), although the majority of studies did focus on adolescents aged 12-16 years. The intervention that targeted children at a very early age was the Good Behaviour Game intervention in the Netherlands (Van Lier et al 2009) but this found almost no sustained impact on alcohol related behaviours.

- One lesson extrapolated from the included interventions is that the prevalence of substance use in school is influenced by the school culture. How the school is run, curriculum delivered, and how discipline, rewards, activities are administered can influence substance misuse (Bisset et al 2007). Developing an understanding of the mechanism through which the school can add value to the educational experience of pupils may lead to more effective prevention programmes (Botvin and Griffin 2007, Bisset et al 2007). More research is needed to explore and test this approach.

- The ability of short term interventions to influence knowledge appears to be relatively established (see Morgenstern et al 2008). However it should be noted that the evidence of any sustained effectiveness on behaviour is limited (Foxcroft et al 2002).

- Alcohol is often one component of wider substance misuse prevention programmes delivered in schools. The question of whether it is more effective to deliver combined substance misuse interventions or whether interventions focusing solely on alcohol would achieve better results has not been explicitly examined in the research literature to date.

Conclusions

School-based alcohol education forms one of the most widespread intervention approaches used in Europe. Despite this, reviewers of the evidence base continue to find much of the research on effectiveness is of poor and therefore unreliable quality. More investment in research would improve intervention practice and value for money. Recommendations to improve research are given below under Implications for Research.

Overall, the evidence suggests that school-based interventions have at best small effects on harmful alcohol consumption reduction and there is little evidence of the sustainability of any effects. Extrapolating findings to develop recommendations for best practice are therefore severely constrained, and further evaluation of the most promising interventions are needed to do so. Nevertheless, provisional recommendations are given below under Implications for Practice.

There is a lack of evidence on the cost effectiveness of school-based interventions. This is partly due to the difficulties in conducting economic evaluation when effects sizes are very small. There is also a simple lack of economic evaluation on interventions to date.

Overall, the report finds the evidence base as summarised in Anderson and Baumberg (2006) as well as previous (Foxcroft et al 2002) and subsequent reviews (Jones et al 2007) remains largely unchanged - the effects on alcohol behaviours of school-based alcohol education are very small and there is a lack of evidence that effects are sustained.

Anderson and Baumberg's review was informed by the Cochrane review, led by Foxcroft et al (2002). This reviewed interventions to prevent alcohol misuse by young people under twenty five years of age. The review included fifty six studies, judged to be relevant and of sufficient quality. Limitations of methodology and statistical analysis meant no meaningful results could be drawn from many of these. For those where design was adequate to measure effects, fourteen demonstrated partial effectiveness in the short term, twenty found no effects and three produced negative effects such as increased drinking. The authors note that problems with methodological quality limit the conclusions that may be drawn from these findings on short term effects and reported that they were unable to draw conclusions on medium and long term effects with any certainty.

The NICE review (Jones et al 2007) included fourteen systematic reviews and meta-analyses, and 134 primary studies which evaluated 52 programmes. The NICE review reported similar concerns to Foxcroft et al (2002) with quality of evaluation including methodological design, conduct of research, methods of analysis, reporting and lack of consistency in measures used, and making comparison of interventions and outcomes difficult. The NICE review concluded that the most promising evidence for effectiveness in the medium and long term was reported in the Foxcroft et al (2002) review for the Strengthening Families Programme (Spoth 2001, 2002 as cited in Foxcroft et al 2002, more information at: http://www.extension.iastate.edu/sfp/index.php). The NICE Review also assessed the evaluation by Foxcroft et al (2002) of Botvins' life skills training (for more information see http://www.lifeskillstraining.com/evaluation.php) as indicating some promise in longer term effectiveness[2].

Of the more recent interventions reviewed and reported here, only three reported significant effects on alcohol related behaviours (Faggiano et al 2008, Koutakis et al 2009, Stafström et al 2006). Six reported no significant effect on alcohol related behaviours (Buhler et al 2008, El Gobierno de La Rioja 2009, Morgenstern et al 2008, van Lier et al 2009, Weichold et al 2006, Errasti Pérez et al 2009). Two of these five studies did report a small impact upon one outcome measure, van Lier et al (2009) reported a reduced rate in the growth of alcohol use from age 10 to 13 years old amongst intervention children; and Weichold et al (2006) reported a small decrease in wine consumption post intervention.

Four interventions reported an effect on alcohol related knowledge and attitudes (Buhler et al 2008, El Gobierno de La Rioja 2009, Morgenstern et al 2008, Stafström et al 2006). One study (Koutakis et al 2009) reported an impact upon alcohol related attitudes of parents but not children in the intervention group.

[2] NICE also noted some promising evidence of effectiveness for a culturally focused, community based programme targeting Native Americans but that this was unlikely to have generalisability outside this setting.

A multi-component risk-reduction programme reported a small impact on family alcohol risk factors, but no effect on alcohol consumption and very low participation rates (Errasti Pérez et al 2009).

Implications for Practice:

- The evidence on knowledge-based interventions strongly indicates that these do improve knowledge and attitudes, but do not affect behaviours.

- School-based programmes which develop youth life skills (such as problem solving, assertiveness training and coping with stress) and which engage families and/or link to the community context appear strengthen student's ability to make informed decisions about alcohol misuse and risky behaviours.

- School culture appears to be associated with reduced risk but there is no firm evidence that this impacts as a direct effect.

- In terms of implementation approaches, interactive programmes and training for teachers in interactive approaches has been recommended (see McBride et al 2002, 2003, 2005, cited by Anderson and Baumberg 2006).

- Formative research which involves young people in the development of the programme and is thoroughly tested before implementation is recommended. Setting and communicating behavioural goals that are relevant to young people has also been emphasised in best practice recommendations (see Anderson and Baumberg 2006).

- Targeting children and young people early, at relevant ages and with follow up boosters is also regarded as best practice, although there is no firm evidence to date for effectiveness or cost effectiveness of this.

- Practitioners should also be aware that inappropriate interventions may also result in undesirable unintended effects, including increased alcohol use (for example, see Goodstadt 1983 and Hansen 1988a as cited by Foxcroft et al 2002). Foxcroft et al recommend that all interventions should be piloted and fully evaluated for safety as well as efficacy.

Implications for Research:

There is a gap in research and understanding on the causal chain that leads to alcohol misuse amongst youth. Research on the mediating pathways from intervention to reduced risk for alcohol and other substance use that is hazardous to health would inform better practice.

Recommended improvements in research design include more extensive collection and reporting of pre-intervention, and of control and intervention group respondent data. High levels of attrition are common and without adequate provision any results and conclusions are doubtful. Well established statistical methods can overcome this and more appropriate statistical analysis generally is needed. The reporting of many studies is found to be inadequate and outcome measures are highly variable. All of these factors make comparison and extrapolation of findings very difficult. An agreed minimum standard for evaluation design and outcome measures is recommended by reviewers of the evidence base. Process and outcome evaluation is recommended for all interventions, to maximise collaborative learning and practice.

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APPENDIX 1: Ratings of selected youth-relevant strategies and interventions, adapted from Babor et al*

Strategy or intervention	Effectiveness	Strength of evidence	Cost to Implement
Regulating physical availability			
Total ban on sales	***	+++	High
Minimum legal purchase age	***	+++	Low
Server liability	***	+	Low
Different availability by alcohol strength	**	++	Low
Taxation and pricing			
Alcohol taxes	***	+++	Low
Altering the drinking context			
Training to prevent and better manage aggression	*	+	Moderate
Voluntary codes of bar practice	0	+	Low
Enforcement of on-premise regulations and legal requirements	**	+	High
Promoting alcohol-free activities/ events	0	++	High
Community mobilization	**	++	High
Education and Persuasion			
Alcohol education in schools	0	+++	High
College student education	0	+	High
Public service messages	0	+++	Moderate
Warning labels	0	+	Low
Regulating alcohol promotion			
Advertising bans	*	++	Low
Advertising content controls	?	0	Moderate
Drink-driving counter-measures			
Low BAC for young drivers	***	++	Low
Graduated licensing for novice drivers	**	++	Low

*Adapted from Table 16.1 of Babor et al. (2003, pp. 286-266), who were also responsible for the expert ratings. Babor T, Caetano R, Casswell S, Edwards G, Giesbrecht N, Graham K, Grube J, Gruenewald P, Hill L, Holder H, Homel R, Österberg E, Rehm J, Room R, Rossow I (2003). *Alcohol: No Ordinary Commodity*. Oxford: Oxford University Press; ISBN: 978-0192632616.

Key

Evidence of effectiveness
0 = not effective
* = limited
** = moderate
*** = high

Strength of evidence
0 = no well designed studies
+ = 1 well designed study only
++ = 2-4 studies
+++ = 5 or more studies

APPENDIX 2: Data Extraction Table

Intervention Name, Year(s) of Delivery & Authors	Participants & Setting	Intervention	Results
Allgemeine Lebenskompetenzen und Fertigkeiten (ALF)' (general life competencies and skills) Delivery year not stated Bühler et al 2008	643 fifth graders (aged 10-11 years) from 22 classes, across 7 'Realschulen' (non-college bound schools) in Germany.	Quasi-experimental prevention study. The (ALF)' (general life competencies and skills) program for fifth graders was delivered by trained teachers to the intervention group consisting of 8 sessions on general life skills training (communication, interpersonal relationships, critical thinking, self-awareness, problem solving, coping with stress and emotions) and 4 sessions on substance use-related issues (information about immediate effects of nicotine and alcohol use and short-term and long-term negative consequences, normative education, discussion about motivation to smoke and drink, media and social influences on use, resistance skills training). The program uses interactive methods and emphasized reference to the personal daily life of students. Control classrooms did not receive any systematic drug prevention activity.	**Evaluation Design:** A baseline and follow up survey at 1 year post intervention was collected using a questionnaire administered by project staff in the classroom. **Knowledge:** Mediation analyses based on a sample of 442 fifth graders 1 year post intervention, revealed that increased knowledge about life skills paralleled an increase in students' distant/less positive attitudes toward alcohol use. **Attitudes:** Students participating in the intervention program developed a more critical view against alcohol consumption after the program ($P < 0.001$). In the control group, students' also became more critical measures of distant/less positive attitudes were lower than the intervention group. **Behaviours**: No effect was found on alcohol related behaviours.

Intervention Name, Year(s) of Delivery & Authors	Participants & Setting	Intervention	Results
Drug Use Prevention Programme: La Rioja Delivery year unclear, evaluation conducted 2004-2005 El Gobierno de La Rioja 2009	8190 middle school students (aged 13-14 years old) in schools in La Rioja region of Spain.	The programme targeting secondary school students, had three sub-programmes: drinking prevention for 2nd middle school students (aged 13-14), as well as smoking prevention for 1st year students (aged 12-13) and drug use prevention for 3rd year students. Consists of eight educational classroom sessions delivered by trained outside professionals (2 primary school teachers, 1 pedagogue, 1 doctor),. Programme educates students about health problems associated with alcohol use, behavioural guidelines to lower risk, perception of risks through reflection and analysis, and the development of personal and social skills to resist peer and social pressure.	**Evaluation Design:** Experimental and control groups design. Bi annual self completion questionnaire completed by students at the beginning and end of the 1 year programme. **Knowledge:** Outcome evaluation demonstrated that the intervention group were better informed about the health problems associated with alcohol use. Ability to identify alcoholism as an addiction increased from pre-test: 56%; to post-test: 100%). **Attitudes:** No direct indicators included in evaluation, although change in attitudes was a stated objective. See intention change below. **Behaviours**: Self-report measures on resistance skills were as follows: 'Able to say no when your friends urge you to drink'. *Always: pre-test: 45%; post-test: 98%. *Usually: pre-test: 21%; post-test: 2%. *Sometimes: pre-test: 25%; post-test: 0%. *Never: pre-test: 9%; post-test: 0%.However no statistical differences were found between the experimental and control group in terms of drinking behaviours.

Intervention Name, Year(s) of Delivery & Authors	Participants & Setting	Intervention	Results
'Familias que Funcionan' (Families that work) programme Delivery year not stated Errasti Pérez et al 2009.	380 pupils aged 10-14, across 4 secondary schools in Asturias, Spain.	The 'Families that Work' programme consisted of a family based drug use prevention intervention adapted from the North American 'Strengthening Families Program 10-14.' The programme was delivered through schools, with the school sending parents' information on the intervention. A meeting between parents, teachers and the team of specialist monitors delivering the intervention was then held. Pupils and parents then attended a series of seven main sessions and four maintenance sessions of the prevention programme.	**Evaluation Design:** A self report questionnaire based survey was administered at baseline, and again at follow up 1 and 2 years after the intervention. Only 26 of 380 invited families attended some of the sessions and of those 17 attended the main maintenance sessions resulting in a small sample size to assess outcomes. Differences of "drug use" including alcohol use in adolescents were assessed between the pre-test (baseline) and the follow-ups carried out one and two years after the intervention, and between the first and second years of follow-up. **Attitudes:** Significant changes in parental attitudes to the use of alcohol by their children and improve family bonds were assessed as increasing protective factors. **Behaviours**: Consistent attendance (based on attendance of over eight sessions) in the "Familias que Funcionan" program reduced the increase in the consumption of alcohol, commonly observed during adolescence.

Intervention Name, Year(s) of Delivery & Authors	Participants & Setting	Intervention	Results
'Unplugged' the EU-Dap school prevention programme 2004-2005 Faggiano et al 2008	7079 school pupils aged 12-14 from 170 schools, in 7 EU countries: Austria, Belgium, Germany, Greece, Italy, Spain and Sweden.	A school-based drug abuse prevention programme developed in the EU-Dap study to prevent the use of tobacco, alcohol and drugs at post-test. Three intervention arms were devised, delivering the curriculum only, curriculum with the involvement of peers and activities, and curriculum with parental involvement and activities. The control group received no intervention activities. The programme consisted of a 12 hour classroom based curriculum delivered by trained teachers, based on the social influences approach. This included sessions on critical thinking, decision making, problem solving, creative thinking, effective communication, interpersonal relationship skills, self awareness, empathy, coping with emotions and stress, normative beliefs, and knowledge about the harmful effects of drugs. In the peer arm, 2 students elected as class representatives conducted short meetings with classmates to monitor reflections on, and experiences of, the programme. In the parental arm, parents of the students participated in 3 interactive workshops as part of the programme.	**Evaluation Design:** Cluster randomised control trial. A pre test survey was carried out at baseline, and a post test survey was conducted in all schools 3 months after the end of the programme using a self completed questionnaires. **Knowledge, attitudes, skills:** Changes were treated as secondary outcomes and not reported in the paper. **Behaviours**: Programme effects were found for episodes of drunkenness in the past 30 days (POR=0.72; 0.58–0.90 for at least one episode, POR=0.69; 0.48–0.99 for three or more episodes). Adding parental or class peer components to the curriculum did not appear to increase effectiveness. However small sample sizes limit an assessment of their added effect.

Intervention Name, Year(s) of Delivery & Authors	Participants & Setting	Intervention	Results
NICE Systematic Review Delivery year not applicable Jones et al 2007	Reviewed a total of 120 primary studies across 10 countries. Three studies were from the UK, 2 from the Netherlands, 1 from Spain and 1 from Sweden published from 1990 to 2003. Studies were eligible for inclusion if they included children and young people aged less than 18 years old	**Review parameters** The review's objective was to determine which interventions delivered in primary and secondary schools are effective and cost-effective for preventing or reducing alcohol use in young people under the age of 18 years. Twenty databases were searched for systematic reviews and meta-analyses, randomised controlled trials (RCTs), controlled non-randomised trials (CNRTs), controlled before and after studies and economic evaluation studies published since 1990. Studies were eligible for inclusion if they reported changes in alcohol-related behavioural outcomes. 134 articles met the criteria for inclusion in the review of effectiveness and two published economic evaluations were identified for inclusion in the review of published economic evaluations. In addition to 14 systematic reviews and/or meta-analyses, a total of 120 primary studies were identified including: 77 RCTs, 26 CNRTs, and 17 controlled before and after studies. Of the primary studies identified, 101 studies were conducted in the USA and 19 were from other countries Of the two studies identified for inclusion in the review of published economic evaluations, one study was a cost-effectiveness analysis and the second study presented a cost-benefit and a cost-effectiveness analysis (both conducted in the USA).	**Overall findings** The review concluded that "there is a lack of clear, long term evidence for the effectiveness of school-based interventions and the applicability of the few programmes that have demonstrated partial effectiveness warrants further study before widespread implementation can be supported."

Intervention Name, Year(s) of Delivery & Authors	Participants & Setting	Intervention	Results
The Örebro Prevention Programme Delivery year not stated (2.5 years duration) Koutakis et al 2009	900 pupils aged 13-16 in junior high schools in Örebro, Sweden.	Quasi-experimental design, featuring intervention and control groups; targeting drinking among 13-16 year olds. The programme used a family based approach. In the Örebro Prevention Programme, parents of school pupils received information by mail, and during parent meetings in schools delivered by trained teachers, urging them to maintain strict attitudes against youth alcohol use, and to encourage their youth's involvement in adult-led organized activities such as sports, hobbies, religious activities, music, theatre, art and politics. The costs of implementing the programme were negligible, especially when compared to other parenting programmes due to the simple design, and low training costs.	**Evaluation Design**: Pre and post (at 18 and 30 months) test evaluation was conducted using classroom administered self report questionnaires for children, and postal questionnaires for parents. **Attitudes:** The implementation successfully influenced parents' attitudes against underage drinking, but not youth participation in organized activities. **Behaviours**: At the end of the programme, drunkenness and frequent drunkenness were lower in the intervention group than in the control group. At post-test, youths in the intervention group reported less drunkenness and delinquency. Effect sizes were 0.35 for drunkenness and 0.38 for delinquency, described as low-medium to medium by the authors. Findings were similar for boys and girls, and for early starters.

Intervention Name, Year(s) of Delivery & Authors	Participants & Setting	Intervention	Results
School-based alcohol education intervention for German 7th graders 2005-2006 Morgenstern et al 2008	1686 7th graders (aged 12-13 years), across 30 public schools, in Schleswig-Holstein, Germany.	School-based alcohol education intervention, based on a social influences approach. The intervention consisted of four interactive lessons conducted by teachers which included a schedule, an overarching theme, main objectives, and a range of hands-on materials. Booklets for students and booklets for parents were also produced and issued. The main message of the materials was 'no alcohol for minors.'	**Evaluation Design**: Cluster randomised control trial design. .Outcome evaluation compared measures at pre-intervention, and at 4 and 12 months after baseline using a self report questionnaire. **Knowledge and attitudes:** Inclusion in the intervention group was associated with more general knowledge about alcohol. No significant effects were found with respect to students' self-reported attitudes and intentions to drink. **Behaviours**: Life-time alcohol use and past-month alcohol use. There was no statistically significant intervention effect for any of the alcohol use outcomes except for life-time binge drinking. Intervention students were significantly less likely to report life-time binge drinking at post-test [adjusted odds ratio (OR) 0.56; 95% confidence interval (CI): 0.41, 0.77] as well as the 12-month follow-up (0.74; 0.57, 0.97). In the case of the other drinking outcomes, estimates of the intervention effect for the post-test and the 12-month follow-up, although not statistically significant, were always in the direction of a prevention effect. The results indicate that the intervention had a small short-term preventive effect on alcohol misuse.

Intervention Name, Year(s) of Delivery & Authors	Participants & Setting	Intervention	Results
The Trelleborg Project 1999-2003 Stafström and Östergren 2008 & Stafström et al 2008	1376 9th graders (aged 15-16), in schools in Trelleborg, Sweden.	A community based intervention to reduce harmful drinking behaviour, and reduce alcohol related accidents and violence, based on the community systems approach. A community led policy programme was implemented which aimed to develop alcohol and drug prevention strategies for children and adolescents, decrease heavy episodic drinking, delay the onset of alcohol consumption, and achieve changes in attitudes towards alcohol and drinking behaviour. As part of the wider community programme a school policy and action plan on alcohol and drug management was implemented. A comprehensive evidence based curriculum on alcohol was introduced in schools, including a textbook. A curriculum for parents was also devised, as well as a mail out of information leaflets to parents.	**Evaluation Design**: Cross sectional survey data was collected using a classroom administered self report questionnaire at baseline in 1999, in 2000 and 2001 and post intervention in 2003. **Attitudes and knowledge**: not measured. **Behaviours**: Logistic regression analysis indicated a decrease in harmful drinking behaviour and alcohol-related accidents and violence when comparing baseline with post intervention measurements. Consumers of alcohol' decreased from 81.7% in 1999 to 67.2% in 2003. The proportion of students who experienced 'excessive drinking' dropped from 37.2% in 1999 to 23.7% in 2003. The rate of those reporting 'heavy episodic drinking' during the previous month decreased from 44.5% in 1999 to 27.5% in 2003. The odds ratio for alcohol-related accidents was significantly lower, comparing the baseline in 1999 with follow up in 2003 (OR 0.5, 95% CI 0.27–0.76). There was also an indication that self-reported alcohol-related violence had decreased between 1999 and 2003 (OR 0.7, 95% CI 0.43–1.01).

Intervention Name, Year(s) of Delivery & Authors	Participants & Setting	Intervention	Results
Good Behaviour Game (GBG) 1999-2001 Van Lier et al 2009	477 children aged 7-9 years, from 13 elementary schools in Rotterdam and Amsterdam, the Netherlands.	A school-based universal prevention intervention targeting disruptive behaviour problems on alcohol use from ages 10-13. The approach used in the GBG aims to prevent the onset, or reduce the further development of childhood disruptive problems. Given the link between disruptive behaviour problems and substance use, the programme aimed to impact upon substance use. The GBG focuses on preventing school children's aggressive, opposition and ADHD symptoms. In the GBG teachers and students choose positively formulated class rules. Based on behavioural observations of rule breaking, teachers assign children to one of 3/4 teams ensuring that each team contains an equal number of disruptive and non-disruptive children. The children are then encouraged to manage their own and team mates behaviour. Each team receives a number of cards, and teachers take a card when a rule is violated. Teams are rewarded when at the end of the game at least 1 car remains. The GBG was implemented in 3 stages, in the introduction stage the GBG was played 3 times per week for 10 minutes, in the expansion stage the GBG was expanded in terms of time, settings and target behaviour, with rewards delayed until the end of the week or month. In the generalisation phase it was emphasised that GBG rules apply at all times.	**Evaluation Design**: Randomised control trial design. Follow up research was conducted in later years using a self report longitudinal questionnaire at ages 10, 11, 12 and 13 to assess whether the GBG programme had any influence on children's subsequent alcohol use. **Attitudes and knowledge**: not measured. **Behaviours**: For alcohol use, no overall effect of intervention during childhood was found. However, intervention children self-reports' did suggest a lower probability of alcohol consumption over time, based on a question about alcohol use in the last week. The results suggested that the rate of increase of alcohol use from age 10 to 13 years among intervention children was slower than in the control group. When using 'alcohol use over past year and past month as criterion for use, no effect of intervention was found.

Intervention Name, Year(s) of Delivery & Authors	Participants & Setting	Intervention	Results
The Life/Skills Programme: IPSY (Information + Psychosocial Competence = Protection) 2003-4 Weichold et al 2006	1382 grade 5 students (mean age = 10.46) in Thuringia, Germany; and 181 grade 6 students (mean age 11.14) in Turin, Italy.	The IPSY programme used the Life-Skills model of education with the aim of delaying the onset and reducing levels of alcohol consumption. The intervention consisted of a programme delivered by trained teachers, combining social skills and resistance skills training with the training of generic intra- and interpersonal life skills such as self awareness, stress and problem coping strategies, assertiveness, and communication skills. The programme consisted of 15 lessons (10x90 minutes & 5 x 45 minutes). Lessons included manuals, leaflets, interactive role-play, group interactions and group discussions.	**Evaluation Design**: Randomised control trial design. All students completed a pre and post test self report questionnaire Post-intervention results were collected 2 months after intervention in Italy and 7 months after intervention in Germany. **Attitudes, knowledge, skills:** The paper reports a mix of partial and no effects amongst the groups and measures. For example, in Italy, the intervention was associated with an increase in positive effects on school-related attitudes and perceptions, but not in the German sample. In Germany sample, expectations about future regular alcohol consumption remained stable across time in the intervention group but increased in the control group. **Behaviours**: In the German sample, the programme had no effects on frequency or amount of consumption per drinking occasion in adolescents who drank at the pre-test and maintained their drinker status. Logistic regression analyses for the subsample of adolescents who drank alcohol at the pre-test revealed a significant effect for the intervention on wine consumption (yes/no) during the prior 30 days when measured at the post-test. Also, wine drinkers at the pre-test were less likely to maintain their drinker status after participating in the programme, *Exp (B) = 1.65, p*< .05). No significant effects of the intervention on drinker status were found for beer, mixed drinks, or spirits at the post-test. Italian students in the intervention group who had consumed alcohol pre-test, decreased the quantity of wine consumed on the last drinking occasion, and increased in the control group ($p < .05$). There were no significant effects of the intervention on overall alcohol consumption (no/yes) during the 30 days prior to the post-test.

APPENDIX 3: Excluded Studies

Study reference	Reason for exclusion from review
Agentur prevnet gmbh. *Sign-project: addiction prevention and violence prevention at 117 schools in Germany/lower Saxony*. EMCDDA-EDDRA. Online: http://www.emcdda.europa.eu/modules/wbs/dsp_print_project_description.cfm?project_id=3523 [accessed 28th September 2009].	Outcome evaluation not reported, only the process evaluation
Al-Halabí Díaz S, Perez JM, Hermida JR, Crespo JL, Villa R, Rodriguez O. The school and family risk factors in attendance at family-based programmes for the prevention of drug use. *Adicciones* 2009; 21(1):39-48.	Part of same study as Errasti Pérez et al 2009 paper - only looks at parental involvement with programme (no alcohol measures).
Allamani A, Sani IB, Centurioni A, Ammannati P. Preliminary evaluation of the educational strategy of a community alcohol use action research project in Scandicci (Italy). *Substance Use & Misuse* 2007; 42(12-13):2029-2040.	No alcohol behaviour measures for school component
Allen D, Coombes L, Foxcroft DR. Cultural accommodation of the strengthening families programme 10-14: UK phase I study. *Health Education Research* 2007; 22(4):547-560.	Evaluates the intervention's translation to the UK, not its effectiveness.
Altobelli E, Rapacchietta L, Tiberti S, Petrocelli R, Cicioni L, di Orio F et al. Associazione tra l'uso di sostanze stupefacenti, alcool e tabacco negli adolescenti e contesto socio-familiare. [Association between drug, alcohol and tobacco use in adolescents and socio-familiar factors]. *Annali di Igiene: medicina preventiva e di comunità* 2005; 17(1):57-65.	Although the abstract mentions an aim to "evaluate a substance abuse prevention programme", in the full text it reports on a prevalence survey only.
Anderson P, Baumberg B. *Alcohol In Europe A Public Health Perspective A report for the European Commission*. London: Institute of Alcohol Studies.	The basis for this review
Anderson P, Chisholm D, Fuhr DC. Effectiveness and cost-effectiveness of policies and programmes to reduce the harm caused by alcohol. *Lancet* 2009; 373(9682):2234-2246.	Review of reviews – includes Jones et al 09 NICE review.
Anderson P. Message 10: "Know the risks of alcohol". *Archives of Hellenic Medicine* 2008, 25(Suppl 1): 65-71.	Non-systematic review – includes Jones et al 09 NICE review.
Baker PJ. Developing a Blueprint for evidence-based drug prevention in England. *Drugs-Education Prevention and Policy* 2006; 13(1): 17-32.	Describes background and development of programme only
Barnett N P, Read J P. Mandatory alcohol intervention for alcohol-abusing college students: a systematic review. *Journal of Substance Abuse Treatment*.2005;**29**(2):147-158.	Systematic review - sample university and college students, not school students
Bisset S, Markham WA, Aveyard P. School culture as an influencing factor on youth substance use. *Journal of Epidemiology & Community Health* 2007; 61(6):485-490.	Does not relate to an intervention
Blanck P, Hensing G, Spak F. "We do what we think is the best" - A content analysis of experiences of alcohol problem prevention in Sweden. A short report. *Substance Use & Misuse* 2007; 42(12-13):2073-2083.	No alcohol behaviour measures taken
Blueprint Evaluation Team. *Blueprint Drugs Education: The Response of Pupils and Parents to the Programme*. Report produced by the Blueprint Evaluation Team, with support from the Home Office. Online at: http://www.ism.stir.ac.uk/pdf_docs/Blueprint/finalreport.pdf.	The study did not have any statistically significant measurable behaviours outcomes (the study's design was not intended for this)
Botvin GJ, Griffin KW. School-based programmes to prevent alcohol, tobacco and other drug use. *International Review of Psychiatry* 2007; 19(6):607-615.	Review - none of the 2005 onwards studies cited are from EU27

Study reference	Reason for exclusion from review
Bühler A, Schröder E, Silbereisen RK. Welche Lebensfertigkeiten fördert ein suchtpräventives Lebenskompetenzprogramm? Quantitative und qualitative Ergebnisse einer schulbasierten Interventionsstudie. [Promoting life skills through a school-based substance abuse prevention program. Quantitative and qualitative results.]. *Zeitschrift für Gesundheitspsychologie* 2007; 15(1):1-13.	**Beyond cut-off date for receiving data - waiting for full text**. Reports on same study as Bühler et al 2008 in *Health Education Research*)
Cahill HW. Challenges in adopting evidence-based school drug education programmes. *Drug and Alcohol Review* 2007; 26(6):673-679.	Non-systematic review
Cormaio dML, Pelizzari MG, Ubaldeschi D, Girardengo C. Adolescenti e adulti: Un incontro possibile? Esperienze di educazione tra pari nella prevenzione delle dipendenze. [Teenagers and adults: A possible alliance? Experiences of peer education in the prevention of dependence.]. *Gruppi* 2005; 7(1):71-84.	**Beyond cut-off date for receiving data - waiting for full text**
Craplet M. La prévention 'mise à la question': Éducation ou contrôle. II -- La prévention des mésusages de l'alcool et du tabac au risque de la science. [Questions concerning prevention: Education or control. II - Alcohol and smoking prevention.]. *Alcoologie et Addictologie* 2007; 29(1):67-79. **& English version:** Craplet M. Prevention of alcohol- and tobacco-related harms. Education or control--must we choose? *Nordisk Alkohol & Narkotikatidskrift* 2007; 24(3):299-319.	Opinion/review
Crombie IK, Irvine L, Elliott L, Wallace H. How do public health policies tackle alcohol-related harm: A review of 12 developed countries. *Alcohol and Alcoholism* 2007; 42(5):492-499.	Non-systematic review. Does not review effectiveness of education policies.
Degi CL. A review of drug prevention system development in Romania and its impact on youth drug consumption trends, 1995-2005. *Drug and Alcohol Review* 2009; 28(4): 419-425.	Review of drug prevention developments in Romania and effects on drug consumption. Does not relate to a specific intervention
EFRD. *Communication on Alcohol & Health: EFRD Scientific Focus on Alcohol Education Programmes*. Brussels: European Forum for Responsible Drinking (EFRD). Online: http://www.efrd.org/communication/docs/Focus%20on%20the%20role%20of%20Education-%20May%2007.pdf [accessed 28th September 2009].	Review - 1 UK post 2005 study cited (Allen et al 2006) but already excluded.
EFRD. *EFRD Scientific Focus on Cost-Effectiveness of Alcohol Abuse Prevention for Young People*. Brussels: European Forum for Responsible Drinking (EFRD). Online: http://www.efrd.org/communication/docs/Focus%20on%20cost-effectiveness%20of%20alcohol%20abuse%20prevention.doc [accessed 28th September 2009].	Review. Highlights another review Pacileo & Fattore 2007 (unavailable at the source given - see Pacileo & Fattore 2009).
Elder RW, Nichols JL, Shults RA, Sleet DA, Barrios LC, Compton R. Effectiveness of school-based programs for reducing drinking and driving and riding with drinking drivers: a systematic review. *American Journal of Preventive Medicine* 2005; 28(5 Suppl):288-304.	Systematic review but no EU country interventions included
Eriksson L, Johansson J (2008). *Alkoholprevention i gymnasieskolan - en systematisk litteraturöversikt [Alcohol Prevention in Uppper School - a systematic literature review]*. Bremberg: Statens folkhälsoinstitut, Östersund.	Systematic review - identifies 4 new studies published since Foxcroft et al 2002 – all from USA
Espada JP, Lloret D, Garcia del Castillo JA. Applying drug dependence research to prevention interventions in Spain. *Evaluation and the Health Professions* 2008; 31(2):182-197.	Review of Spanish drug education efforts, includes brief mention of interventions but none post 2005.
Faggiano F, Richardson C, Bohrn K, Galanti MR. A cluster randomized controlled trial of school-based prevention of tobacco, alcohol and drug use: The EU-Dap design and study population. *Preventive Medicine* 2007; 44(2):170-173.	Includes the baseline data only, not the follow-up data.

Study reference	Reason for exclusion from review
Faggiano F, Vigna-Taglianti FD, Versino E, Borraccino A, Lemma P, Zambon A. School-based prevention for illicit drugs use: A systematic review. *Preventive Medicine* 2008; 46(5):385-396. & Faggiano F, Vigna-Taglianti FD, Versino E, Zambon A, Borraccino A, Lemma P. School-based prevention for illicit drugs' use. *Cochrane Database of Systematic Reviews* 2005;(2):CD003020.	Systematic review – includes 1 pre-2005 UK intervention (Hurray & McGurk 1997 RCT - Project Charlie - Intention to use and substance used, including tobacco and alcohol, were measured with ad hoc tools.)
Ferrara M, Gentile A, Langiano E, De VE, La TG, Ricciardi G. Alter Ego. Drug and brain--information to prevent. Compared analysis of opinions, knowledge and habits among a multicentric sample of secondary school students about drug addiction. *Journal of Preventive Medicine and Hygiene* 2006; 47(1):8-11.	Prevalence survey only. Measures taken before intervention.
Fletcher A, Bonell C, Hargreaves J. School effects on young people's drug use: A systematic review of intervention and observational studies. *Journal of Adolescent Health* 2008; 42(3):209-220.	Systematic review – includes 1 pre-2005 UK intervention (West et al 2004 - "West of Scotland study") and 1 pre-2005 Netherlands intervention (Cuijpers et al 2002 "Healthy School and Drugs" project).
Gallà M, Jaspers D, Lee H, Daatland Chr. "Effective drug prevention in schools", Chapter 2 in Gallà M, Jaspers D, Lee H, Daatland Chr (eds.) *Making Schools a Healthier Place! Manual on Effective School-Based Drug Prevention*. Utrecht: Trimbos-instituut, 2002; pp. 23-37. Online: http://www.trimbos.nl/Downloads/Producten/EHSD-Enge%20handboek%20binnenwerk.pdf [accessed 28th September 2009]. & Gallà M. *A Guide for Policymakers and Funders to School-Based Drug Prevention*. Utrecht: Trimbos-instituut, 2003. Online: http://www.trimbos.nl/Downloads/Producten/Policymaker%20folder.pdf [accessed 30th September 2009].	Review – no post 2005 studies included
Gates S, McCambridge J, Smith LA, Foxcroft DR. Interventions for prevention of drug use by young people delivered in non-school settings. *Cochrane Database of Systematic Reviews* 2006;(1):CD005030.	Systematic review - non-school settings.
Giacomuzzi S, Ertl M, Zima J, Gruner P, Vigl A, Kemmler G et al. Drogenprävention aus Sicht Jugendlicher. [Adolescents' views on drug prevention.]. *Neuropsychiatrie* 2005; 19(1):15-24.	Pupils' opinions on source of message. No alcohol measures.
Giesbrecht N. Reducing alcohol-related damage in populations: rethinking the roles of education and persuasion interventions. Addiction 2007; 102(9):1345-1349.	Opinion/non-systematic review.
Guldbrandsson K, Bremberg S. Two approaches to school health promotion - a focus on health-related behaviours and general competencies. An ecological study of 25 Swedish municipalities. *Health Promotion International* 2006; 21(1):37-44.	Comparison of intervention methodologies, not specific interventions
Healy A, Connolly T. ThinknDrinkn? - An Evaluation of the use of Games Based Learning (GBL) for Alcohol Awareness. *2nd European Conference on Games Based Learning* 2008;175-186.	A process evaluation. Alcohol behaviours not measured.
Holder HD. The power of local alcohol prevention and the Trelleborg Project in southern Sweden. *Addiction* 2006; 101(6):763-764.	Editorial
ICAP. "Alcohol Education". Module 1 in Evans K, Grant M, Martinic M and Robson G (eds.). *The ICAP Blue Book: Practical Guides for Alcohol Policy and Prevention Approaches*. Washington DC: International Center for Alcohol Policies (ICAP), 2007. Online: http://www.icap.org/PolicyTools/ICAPBlueBook/BlueBookModules/1AlcoholEducation/tabid/162/Default.aspx [accessed 30th September 2009].	Review – no post-2005 studies included

Study reference	Reason for exclusion from review
ICAP. "Life Skills". Module 2 in Evans K, Grant M, Martinic M and Robson G (eds.). *The ICAP Blue Book: Practical Guides for Alcohol Policy and Prevention Approaches*. Washington DC: International Center for Alcohol Policies (ICAP), 2007. Online: http://www.icap.org/PolicyTools/ICAPBlueBook/BlueBookModules/2LifeSkills/tabid/163/Default.aspx [accessed 30th September 2009].	Review – no post-2005 studies included
ICAP. "Young People and Alcohol". Module 11 in Evans K, Grant M, Martinic M and Robson G (eds.). *The ICAP Blue Book: Practical Guides for Alcohol Policy and Prevention Approaches*. Washington DC: International Center for Alcohol Policies (ICAP), 2007. Online: http://www.icap.org/PolicyTools/ICAPBlueBook/BlueBookModules/11YoungPeopleandAlcohol/tabid/172/Default.aspx [accessed 30th September 2009].	Review – no relevant post-2005 studies included
Jarvis J, Stark S. Partnership working and the involvement of parents in the health education of 7-11 year-olds. *Primary Health Care Research and Development* 2005; 6(3):208-216.	No alcohol behaviour measures taken
Koning IM, Vollebergh WAM, Smit F, Verdurmen JEE, van den Eijnden RJJM, ter Bogt TFM et al. Preventing Heavy Alcohol Use in Adolescents: Cluster Randomized Trial of Three School-Based Interventions. *Alcoholism-Clinical and Experimental Research* 2009; 33(S1):42A.	Meeting abstract only, full-text version not available
Kunze B, Loss J, Stander V, Toppich J, Nagel E. Efficiency assessment of an interactive school intervention to the addiction prevention: Results evaluation of clear vision a pair course for participation on tobacco and alcohol. *Das Gesundheitswesen* 2008; 70(7):479.	Only abstract available, no published literature on outcome evaluation as was ongoing when abstract written. No information on intervention design and implementation available.
Larimer ME, Cronce JM. Identification, prevention, and treatment revisited: individual-focused college drinking prevention strategies 1999-2006. *Addict Behav*. 2007 Nov;32(11):2439-68.	Review - sample university and college students, not school students
Lilja J, Giota J, Hamilton D, Larsson S. An example of international drug politics - The development and distribution of substance prevention programs directed at adolescents. *Substance Use & Misuse* 2007; 42(2-3):317-342.	Related to process evaluations.
Lilja J, Giota J, Hamilton D. How cultural factors influence school-based substance use prevention programs. *Substance Use & Misuse* 2007; 42(2-3):485-494.	Review – no new EU studies.
Lubman DI, Hides L, Yucel M, Toumbourou JW. Intervening early to reduce developmentally harmful substance use among youth populations. *Medical Journal of Australia* 2007; 187(7 Suppl):S22-S25.	Review – no new EU studies.
Madill E, James T and Kellow A. *Evaluation of the Mentor Foundation UK's Alcohol Misuse Prevention Awards Scheme. (Now known as The Mentor UK CHAMP Awards scheme (Promoting Children's Health through Alcohol Misuse Prevention))*. Madill Parker Research and Consulting Ltd for The Mentor Foundation, June 2008. Online: http://www.mentorfoundation.org/uploads/UK_Award_Evaluation_June_2008.pdf	Not an evaluation of an education intervention. (Notes that the "outcomes of GEAAP's [The Greater Easterhouse Alcohol Awareness Project's Primary School programme] interventions will be evaluated against a control group over a 12 month period" but no more details given.)
Mallick J. Parent drug education: A participatory action research study into effective communication about drugs between parents and unrelated young people. *Drugs: Education, Prevention and Policy* 2007; 14(3): 247-260.	Not a school intervention. Uses baseline and evaluation questionnaires however alcohol measures not detailed in paper.
McCambridge J. A case study of publication bias in an influential series of reviews of drug education. *Drug and Alcohol Review* 2007; 26(5):463-468.	Non-systematic review
Mentor UK. *First Measures. A guide to alcohol misuse prevention work with children*. Supported by Diageo GB. London: Mentor UK, 2007.	Handbook with a checklist of best practice - recommends outcome evaluations and contains case studies but limited details.

Study reference	Reason for exclusion from review
Moral Jiménez MdlV, Ovejero Bernal A. Un programa de intervención psicosocial para la mejora de las habilidades sociales de adolescentes consumidores de alcohol y otras sustancias psicoactivas. [A psychosocial programme for the improvement of social skills of adolescent consumers of alcohol and other drugs.]. *Apuntes de Psicología* 2005; 23(1):3-26.	Describes the same intervention in Asturias as Errasti Pérez et al 2009 paper, however this paper does not report alcohol related outcomes, only social skill related outcomes
Moreira MT, Smith LA, Foxcroft D. Social norms interventions to reduce alcohol misuse in University or College students. *Cochrane Database of Systematic Reviews* 2009, Issue 3. Art. No.: CD006748. DOI: 10.1002/14651858.CD006748.pub2.	Systematic review - sample university and college students, not school students
National Focal Point on Drugs and Drug Addiction (Bulgaria). *Study among the pupils in the city of Pernik*. Online: http://www.nfp-drugs.bg/en/?&itype=185&info=1731 [accessed 28th September 2009].	Prevalence study only
National Focal Point on Drugs and Drug Addiction (Bulgaria). *Study among the pupils in the city of Shoumen*. Online: http://www.nfp-drugs.bg/en/?&itype=185&info=1730 [accessed 28th September 2009].	Prevalence study only
Nešpor K, Csémy L. Krátká intervence pro problémy působené alkoholem může probíhat v různých prostředcích. [Short intervention for problems caused by alcohol may proceed in various environments.] *České Pracovní Lékařství* 2007; 8(1): 22-25. **&** Nešpor K, Csémy L. Krátká intervence pro problémy působené alkoholem může probíhat v různých prostředcích. [Brief intervention for alcohol related problems can be used at various environments]. *Casopís Lékarů Ceských* 2005; 144(12):840-843.	Discursive piece reviewing brief intervention approach to alcohol problems. Does not discuss or relate to alcohol education in school or specific interventions.
Orte C, Touza C, Ballester L, March M. Children of drug-dependent parents: prevention programme outcomes. *Educational Research* 2008; 50(3):249-260.	Not a school intervention. Alcohol behaviour outcomes not relevant (eg. the number of clear family rules concerning alcohol and drug use)
Pacileo G, Fattore G. Alcohol abuse prevention in young people: An economic simulation. *Journal of Substance Use*, 2009; 15 Jun. [advance access].	**Beyond cut-off date for receiving data - waiting for full text** Full text unavailable. May include EU27 studies in its 26 references.
Petrie J, Bunn F, Byrne G. Parenting programmes for preventing tobacco, alcohol or drugs misuse in children <18: a systematic review. *Health Education Research*.2007;22(2):177-191.	Systematic review - no EU studies
Petronyte G, Zaborskis A, Veryga A. Risk factors for alcohol use among youth and main aspects of prevention programs. *Medicina (Kaunas, Lithuania)* 2007; 43(2):103-109.	Review of other countries, based on USA literature
Pirskanen M, Pietila AM, Halonen P, Laukkanen E. School health nurses and substance use among adolescents - towards individual identification and early intervention. *Scandinavian Journal of Caring Sciences* 2006; 20(4):439-447.	Not an alcohol *education* intervention
PREVENIR Association. *Grow Up Playing: a prevention programme for primary schools*. EMCDDA-EDDRA. Online: http://www.emcdda.europa.eu/modules/wbs/dsp_print_project_description.cfm?project_id=3536 [accessed 28th September 2009].	Outcome evaluation not reported, only the process evaluation
Salmon D, Orme J, Kimberlee R, Jones M, Murphy S. Implementing the Rock Challenge: Young people's perspectives on a drug-prevention and performing arts programme. *Journal of Research in Nursing* 2005; 10(3):339-353.	Qualitative measures taken but not quantitative.
Smit E, Verdurmen J, Monshouwer K, Smit F. Family interventions and their effect on adolescent alcohol use in general populations; a meta-analysis of randomized controlled trials. *Drug and Alcohol Dependence* 2008; 97(3):195-206.	Meta-analysis but all USA studies (RCTs)

Study reference	Reason for exclusion from review
Spak F, Blanck P. Implementing a national alcohol consumption prevention program at the local level: What does early evaluation tell us? *Substance Use & Misuse* 2007; 42(12-13):2063-2072.	Focus of paper is on community, not on schools
Spoth R, Greenberg M, Turrisi R. Preventive interventions addressing underage drinking: state of the evidence and steps toward public health impact. *Pediatrics* 2008; 121 Suppl 4:S311-S336.	Review - no new EU Studies. Includes 1 pre-2005 Netherlands intervention (Cuijpers et al 2002 "Healthy School and Drugs" project) and 1 German family intervention, not school.
Stead M, Stradling R, Macneil M, Mackintosh AM, Minty S. Implementation evaluation of the Blueprint multi-component drug prevention programme: fidelity of school component delivery. *Drug and Alcohol Review* 2007; 26(6): 653-664.	Reliability of delivery rather than effectiveness of intervention
The Amsterdam Group: The European Forum for Responsible Drinking. "The Impact of School-based Education", Chapter 10 in *Health, Social and Economic Impact of Alcohol. Stakeholders' Workshop, 20 January 2005,* pp. 19-23. Online: http://ec.europa.eu/health/ph_determinants/life_style/alcohol/documents/ev_20050120_co03_en.pdf [accessed 28th September 2009].	Review – no post 2005 studies included
The Welsh Assembly Government. *All Wales Schools Liaison Programme*. EMCDDA-EDDRA. Online: http://www.emcdda.europa.eu/modules/wbs/dsp_print_project_description.cfm?project_id=2008 [accessed 28th September 2009]. & Markit Training and Consultancy Ltd. *The National Evaluation of the All Wales School Liaison Core Programme* Cardiff: The Welsh Assembly Government; 2008. Online: http://addysg.cymru.gov.uk/dsjlg/research/schoolliaison/reporte.pdf?cr=3&lang=en&ts=3 & Tregidga J, Williamson H, Noaks L. *Realism, Relevance and Respect? A formative evaluation of the All Wales Police Schools Liaison Programme*. Cardiff: The Welsh Assembly Government; 2005. Online: http://addysg.cymru.gov.uk/dsjlg/research/realismrespect/report.pdf?cr=3&lang=en&ts=3	Baseline data only – follow-up evaluation in progress
Thom B & Bayley M (2007). *A new approach to prevent and reduce alcohol-related harm*. London: Joseph Rowntree Foundation, March.	Review of multi-component programmes identified from the published literature and expert consultation. Fourteen EU studies but all pre-2005 except one UK study which does not cover school education intervention.
Thomas RE, Baker PRA, Lorenzetti D. Family-based programmes for preventing smoking by children and adolescents. *Cochrane Database of Systematic Reviews* 2007, Issue 1. Art. No.: CD004493. DOI: 10.1002/14651858.CD004493.pub2.	Systematic review - all the study programmes that included alcohol were from USA
Thomas RE, Lorenzetti D, Spragins W. Mentoring of children and adolescents for preventing drug and alcohol use. (Protocol). *Cochrane Database of Systematic Reviews* 2008, Issue 4. Art. No.: CD007381. DOI: 10.1002/14651858.CD007381.	Systematic review still at protocol stage
Toumbourou JW, Stockwell T, Neighbors C, Marlatt GA, Sturge J, Rehm J. Interventions to reduce harm associated with adolescent substance use. *Lancet* 2007; 369(9570):1391-1401.	Review with brief section on education interventions – no new EU studies
van der Kreeft P, Wiborg G, Galanti MR, Siliquini R, Bohrn K, Scatigna M, Lindahl AM, Melero JC, Vassara M, Faggiano F, and the EU-DAP Study Group. "Unplugged": a new European school programme against substance abuse. *Drugs: Education, Prevention and Policy* 2009; 16(2): 167-181.	Process evaluation and reach – but not evaluation of its effectiveness at preventing substance abuse.

Study reference	Reason for exclusion from review
van Lenthe FJ, de Bourdeaudhuij I, Klepp KI, Lien N, Moore L, Faggiano F, Kunst AE, Mackenbach JP. Preventing socioeconomic inequalities in health behaviour in adolescents in Europe: Background, design and methods of project TEENAGE. *BMC Public Health* 2009; 9: 125.	Review and background methodology to project TEENAGE only
Welham CA. A study of the effectiveness of a healthy lifestyles approach to drugs education with children between 7+ and 11 years of age. *International Journal of Adolescence and Youth* 2007; 13(3):149-173.	The study measures changes in knowledge over time and does not include any controls
Wiggins M, Bonell C, Sawtell M, Austerberry H, Burchett H, Allen E et al. Health outcomes of youth development programme in England: prospective matched comparison study. *British Medical Journal* 2009; 339(b2534).	Non school-based intervention, delivered through youth group networks.
Wood E, Shakeshaft A, Gilmour S, Sanson-Fisher R. A systematic review of school-based studies involving alcohol and the community. *Australian and New Zealand Journal of Public Health* 2006; 30(6):541-549.	Systematic review of English language studies, published 2000-2004. Same studies as from other reviews above.