



SCOTTISH EXECUTIVE

Literature Review into the Effectiveness of School Drug Education

Education



LITERATURE REVIEW INTO THE EFFECTIVENESS OF SCHOOL DRUG EDUCATION

Conducted for Scottish Executive Education Department

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1. drug* AND school AND (education OR prevention)
2. “substance use” AND school AND (education OR prevention)
3. (alcohol OR tobacco) AND school AND (education OR prevention),

Where possible, limits to English Language and Human Subjects. were used in the databases to narrow the relevancy of the citations lists returned. The Cochrane Database of Systematic Reviews was also searched for other relevant literature reviews.

The returned citation list (in title and abstract form, or just title if abstracts not available) was printed for each search. This yielded over 800 citations containing the key terms. There was a huge amount of overlap in the results. As there is an obvious similarity between the three search strings (as well as overlap between the databases themselves) the same citation may appear in each of the three searches per database. A set of exclusion and inclusion criteria were then developed to help filter the citations. Citations were **excluded**:

- if the programme was not based in a primary or secondary school (or equivalent ages outside the UK);
- if the article only described the development, content or theoretical basis of the programme as opposed to reporting original research conducted to evaluate the programme;
- if no indication of sample size was provided, or the study had a weak methodology;
- if the article reported data from the intervention evaluation to explore something other than the impact of the intervention (eg. to explore the relationship between drug use or attitudinal variables but not to examine the impact of the programme);
- if the article was an opinion piece reporting no empirical research or containing no substantial review of the literature;
- if the article was published before 1980. This criterion was applied because it was judged that the bulk of relevant work has been conducted since 1980; pre-1980 studies are in any case covered thoroughly in early systematic reviews.

Dissertation abstracts were also excluded as time and resource constraints did not allow for their retrieval.

Included in the citation collection were:

- evaluations of drug education and prevention programmes based in schools or with a school-based component;
- systematic reviews and meta-analyses;
- non-systematic reviews of literature;
- discussion pieces and guides to good practice based on substantial reviews of the literature or empirical research (eg. studies of experts’ views on effectiveness in drug education);

The inclusion/exclusion criteria detailed above were applied in order to sift out non-relevant citations. The remaining studies were then obtained in full text and read to assess their relevance to the review.

Fifty-two programmes covered in the review examined smoking outcomes. Twenty-one had a positive short-term effect on smoking behaviour, and four were partially effective (eg. for one gender only). Thirteen had no effect, two programmes had potentially harmful effects, and in 12 programmes the results were unclear. Three studies examined longer-term impacts. Programmes were effective for between six months and two years after delivery (Murray et al 1989, Flay et al 1989), but not at six year follow-up. Programmes involving peers in delivery appeared to be more effective than those without peer delivery. The majority of effective programmes involved resistance skills. Involving parents did not seem to increase effectiveness.

Thirty programmes covered in the reviews examined short-term impact on cannabis behaviour. Four were effective and five were partially effective. Six had no effect, one had a harmful effect, and in 14 studies the results were unclear. Four studies examined longer-term impact on cannabis use. Two were effective (Pentz et al 1989, 1990; Horan & Williams 1982), one partially effective (Botvin et al 1990, 1995), and one not effective (Ellickson & Bell 1990, Ellickson et al 1993a, 1993b), in the long-term. Programmes involving peers tended to be as effective as programmes overall. The majority of effective programmes involved resistance skills and normative education. All four of the programmes involving parents had some effect.

In conclusion, Lister-Sharp et al note that systematic reviews, like primary studies, vary in quality, and that there is considerable disagreement between them both in what studies they include and in how they assess effectiveness. Differing assessments of programme effectiveness in the reviews contributed to the large number of studies deemed by Lister-Sharp as having ‘unclear’ effects.

Overall, Lister-Sharp et al note that between one-third and two-thirds of studies found a positive short-term impact on behaviour. Tobacco and cannabis use were more likely to be influenced positively than alcohol use. Effectiveness in the longer-term tended to be consistent with short-term effectiveness rates. They state “These reviews demonstrate that it is possible to impact at least on the initiation of substance use and misuse, but that programmes cannot be relied upon to be successful” (p50).

Resistance skills and norm setting programmes were more likely to be effective, but not in every case; the same was true for peer involvement. Parental involvement appeared to increase effectiveness slightly, although it was difficult to draw conclusions from the small number of studies. As interventions involving parents tend to be sophisticated multi-component interventions, there may be other confounding influences.

Tobler 1986

In the first of several meta-analyses of drug prevention (see below), Tobler reviewed 98 studies reporting on 143 school-based drug prevention programmes. Studies were published between 1972 and 1984 and included equal opportunities of randomised and non-randomised quasi-experimental designs.

Effect sizes were calculated for knowledge, attitudes and use. Not all studies measured all effects (only 91 measured behaviour).

Tobler classified programmes into five ‘modalities’ reflecting their “type or strategy”: Knowledge Only (equated by Tobler with “didactic ‘scare tactics’” p539); Affective Only, which made no reference to drugs but focused on “intrapersonal and social growth” (p539); Peer Programmes which are concerned with peer influence, and are sub-divided into two further categories, Refusal Skills and Social/Life Skills; Knowledge plus Affective; and Alternatives, which included both what would now be termed diversionary activities, and intensive tutoring and other interventions for at risk young people.

Meta-analysis using effective sizes found that, overall, programmes had the strongest effect on knowledge, followed by behaviour, and then attitudes. When behavioural effects were analysed by type of drug, the programmes overall had strongest effects on tobacco, followed by ‘all drugs’, alcohol and soft drugs, in order.

Regression analysis found that ‘peer programmes’ had the strongest overall effects of the five categories, followed by Alternatives, Knowledge plus Affective, Knowledge Only and Affective Only programmes. When behaviour effects were specifically examined in the regression analysis, Peer Programmes were “dramatically more effective” than other programmes.

In conclusion, Tobler argues that the results undermine the assumption that knowledge-attitude-behaviour change occurs in sequence: programmes were better at changing behaviour than attitudes. She argues that solid evidence exists for discontinuing the use of Knowledge Only and Affective Only programmes.

Tobler and Stratton 1997

A second meta-analysis by Tobler reviewed 90 studies reporting on 120 school-based programmes published between 1978 and 1990. It differed from the 1986 review in using a different programme classification scheme and in that all included studies measured effects on drug use behaviour.

Programmes were coded both for content and by delivery style. Programmes in which young people interacted with one another were classified as Interactive, while those delivered in a more didactic style with little group involvement were classified as Non-interactive. These were then combined into six sub-categories:

- Non-interactive Knowledge Only.
- Non-interactive Affective Only.
- Non-interactive Knowledge-plus-Affective. Knowledge-plus-Affective included sub-categories of programmes, Values clarification and DARE or DARE-type.
- Interactive Social Influences.
- Interactive Comprehensive Life Skills.
- Interactive Others.

‘Interactive Others’ refers to programmes delivered interactively but not including a refusal skills component. The first two interactive categories seem to relate to what were defined as Peer Programmes in the 1986 review. Use in the past month was most frequently used as the main behavioural outcome. Studies were rated for methodological quality, and additional more rigorous analyses conducted on a subset of 56 high-quality programmes.

Meta-analysis of effect sizes for both the total set of programmes and the high-quality subset found that the Interactive programmes had stronger overall effect sizes than the Non-interactive programmes. Analysis of the high-quality subset found that the Interactive Comprehensive Life Skills and Interactive Others had slightly higher effect sizes than Interactive Social Influences programmes; all three interactive types of programme had higher effect sizes than the three Non-interactive types (Knowledge Only, Affective Only, Knowledge and Affective). When effects were analysed by types of drug, the Interactive programmes appeared to have similar magnitude of effect (success) with tobacco, alcohol and cannabis, while the Non-interactive programmes appeared to be equally unsuccessful with the substances. A comparison of programmes by the delivery agent (teacher, peer, health professional or other) found that each were similarly effective in the Interactive programmes. There were no significant differences in effectiveness between longer more intense programmes and shorter less intense programmes, although the former tended to be slightly more effective.

In conclusion, Tobler argued that the additional classification of programmes by degree of interactivity avoids the equivocal picture found in some earlier reviews. She stated that “although not all drug prevention programmes work, the Interactive programmes consistently were more effective than the Non-interactive programmes” (p108). Interactive programmes were effective in changing knowledge, attitudes and skill, while Non-interactive programmes tended only to change knowledge.

Tobler identified two programmes whose continued use, according to the review findings, was not justified - Here’s Looking at You (Hopkins et al 1988) and Project DARE (see Ennett et al 1994 for a summary of DARE studies) - and two efficacious programmes which should be more widely adopted, Project STAR (Pentz et al 1989) and the Minnesota Heart Health Programme (Perry et al 1989).

Tobler et al 2000

A third review by Tobler and colleagues updated and expanded the 1997 meta-analysis. It reviewed 144 studies reporting on 207 programmes published between 1978 and 1998. Drug use in the last month was the main behavioural outcome examined, and effects on knowledge and attitudes were not assessed. As in the 1997 analysis programmes were classified according to both content and delivery style, combining to produce eight programme types:

Non-interactive:

- Knowledge Only
- Affective Only
- Decisions/Values/Attitudes
- Knowledge-plus-Affective
- DARE-type

Interactive:

- Social influences
- Comprehensive Life Skills
- System-wide change

The last category comprised both multi-component school-plus community/media/family programmes and programmes designed to produce “change in the entire school system” (p287). Over a third of all programmes were classified as Interactive: Social Influences and around a quarter as Interactive: Comprehensive Life Skills. Nine other potential predictors of programmes effectiveness were also examined: sample size, delivery agent, type of control group, programme attrition, population characteristics, type of drug targeted, school grade, programme intensity, and baseline substance use. Nearly three-quarters of the Interactive programmes targeted a single drug, compared to around half of the Non-interactive programmes. As in the previous review, analyses were conducted both for the full set of studies and for a subset of 93 methodologically higher quality studies.

Analysis of weighted effect sizes indicated that the Interactive programmes had stronger effects than the Non-interactive programmes. Within the Interactive group, ‘System-wide change’ programmes were the most effective, followed by Comprehensive Life Skills and Social Influences programmes. Within the Non-interactive groups, Knowledge programmes were slightly more effective (although still less effective than any of the Interactive types), while Affective and Decisions/Values/Attitudes programmes were less so, often having little effect.

When analysis was conducted by programme characteristics, smaller Interactive programmes were more effective than larger Interactive programmes (although there was little difference by size for Non-interactive programmes).

Health professionals appeared to be more effective as delivery agents in larger Interactive programmes, followed by teachers, peers and others; however, there were no differences in effectiveness in smaller Interactive programmes. Higher intensity (longer) Interactive programmes appeared to be more effective than lower intensity Interactive programmes. Regression analyses suggested that programmes with larger sample sizes were less effective than smaller sample programmes, although Interactive programmes were generally more effective than Non-interactive programmes over a range of programme sizes, while Non-interactive programmes tended to be similar (in)effective whatever their size.

Tobler et al suggested that Interactive programmes may suffer in delivery quality when delivered on a large scale, while Non-interactive programmes, because they are likely to be more didactic and standardised, were possibly unaffected by scale.

Overall, programmes had weaker effects on alcohol than on tobacco. Analyses examined whether programmes which targeted a single substance were more or less effective than those targeting generic substance use. Interactive programmes targeting tobacco only appeared to be more effective at reducing smoking than Interactive generic substance use programmes. Interactive programmes targeting alcohol only appeared equally effective at reducing alcohol compared with generic substance use programmes].

In conclusion, the review emphasises the superiority of Interactive over Non-interactive programmes and notes that Interactive programmes appear equally effective with tobacco, alcohol and cannabis, and more effective in schools with minority or special needs populations. The review is particularly enthusiastic about ‘Interactive System-wide’ programmes as the future of prevention, and draw attention to Project Northland (Perry et al 1996) as a particularly promising Interactive System-wide change programme.

In conclusion, the review recommends that increasing programme intensity (length) should increase effectiveness, but only with programme types found to be more effective (ie. Interactive programmes). It suggests that smoking may be better prevented through tobacco-specific rather than generic programmes, whereas both alcohol-specific and generic programmes are equally effective in reducing alcohol use.

Tobler et al 1999

This meta-analysis by Tobler and colleagues reviewed 30 studies reporting on 37 school-based programmes which measured cannabis use, and compared them with the 120 programmes reviewed in Tobler & Stratton 1997, specifically focusing on cannabis use outcomes. Programmes were classified into interactive (comprising Social Influences, Comprehensive Life Skills and Other programmes types) and Non-interactive (Affective Only and Knowledge-plus-Affective) categories. As in the previous reviews, delivery and other programme characteristics were analysed. Cannabis use in the past month was the main behavioural effect measured.

Meta-analysis using weighted effect sizes found that the 22 Interactive programmes had much larger effect sizes than the 15 Non-interactive programmes, which were generally ineffective. Analysis of a small subset of studies which compared the full programme with a placebo version using similarly Interactive methods but without the content found that placebo programmes were ineffective, suggesting that both interactivity and content are important to effectiveness.

The Interactive programmes were generally equally as effective with tobacco, alcohol and cannabis, whereas the Non-interactive programmes were generally equally ineffective for the three substances. Programmes involving smaller numbers of participants (<400) were more effective than larger programmes.

Bangert-Drowns 1988

Bangert-Drowns reviewed 33 studies of college- and school-based alcohol and drugs prevention programmes. Programmes which addressed tobacco alongside alcohol and drugs were included but programmes which exclusively targeted tobacco were excluded. Years covered ranged from 1968 to 1986. The effects examined in the review were behaviour, attitudes and knowledge, with most emphasis given to longer-term behavioural effects. Programmes were coded by approach (three categories: information only, affective only and mixed) and various delivery variables such as length of time and delivery agent.

Meta-analysis using effect sizes found that overall the programmes were more successful in changing knowledge and least successful in changing behaviour; the average effect size for behaviour was not significantly different from zero, suggesting little or no impact. However, when programmes were analysed by year of study publication, more recent programmes had a higher behavioural effect size than earlier programmes, potentially suggesting an improvement over time.

In conclusion, the review suggests that school-based alcohol and drug education is effective in increasing knowledge and, to a lesser extent, changing attitudes towards drugs, but of limited effectiveness in changing behaviour.

White and Pitts 1998

White and Pitts reviewed 71 studies reporting on 62 drug education interventions targeting young people aged 8-25. Eighty-nine percent of the interventions were school or college-based. Nearly half of the interventions targeted cannabis, a quarter cannabis and cocaine, and around a quarter did not specify which drugs were targeted. Self reported cannabis use was the main behavioural outcome measured.

Effect sizes were computed, and heterogeneity tests conducted to assess variability. A subset of 20 methodologically stronger studies was examined separately alongside the total set.

Of the 55 school-based interventions which measured impact on drug behaviour, 27% had a significant positive impact. Among the methodologically stronger studies, 56% had an impact on drug behaviour. Ten out of eleven interventions which had been followed up one year had a small but positive effect, and all but two of these ten had positive effects beyond one year. Meta-analysis showed that effects were generally small in size and declined over time. At one year follow-up, the weighted mean effect size was 0.037, and at two-year follow-up or later, the weighted mean effect size was 0.018. To put these figures into context, White and Pitts note that an effect size of 0.037 mean that exposure to school drug education accounts for less than one per cent – 0.14% - of variance in drug use, or, that 3.7% of young people who would otherwise use drugs delay their onset of use as a result of school drug education, or are persuaded never to use drugs. They also note that while such effect sizes seem small, in trials of pharmaceutical drugs they would be considered large enough to provide compelling evidence that a treatment ‘worked’. They conclude their discussion by suggesting “*it is for policymakers to decide whether it is worth seeking to achieve changes among populations of this size*” (p.484).

Effective programmes included knowledge, resistance skills, peer support and life skills. Methodologically sound effective programmes recommended by the review were Life Skills Training (Botvin et al 1990, 1995), Project STAR (Pentz et al 1989, Johnson et al 1990), Here’s Looking at You 2000 with a community component (Stevens et al 1996), and assertiveness training (Horan & Williams 1982). Project ALERT (Ellickson & Bell 1990), two refusal skills programmes (Schinke et al 1998 and Shope et al 1996), and normative education (Hansen & Graham 1991) were effective in the shorter-term.

Cuijpers 2002b

Cuijpers conducted a meta-analysis of 12 studies as part of a larger review (see Cuijpers 2002a in Section 2.2 below). All the studies reported on a school-based drug prevention intervention in which peer-delivery was compared to adult-delivery (of the same intervention). The outcome examined was substance use (tobacco, alcohol or cannabis). A further meta-analysis was conducted on studies focusing on tobacco use.

Peer-delivered interventions were more effective at immediate post-test, but not at one-year or two-year follow-up, both in terms of all substance use and tobacco use specifically. However, the number of studies was small, and the high degree of heterogeneity limited the comparisons which could be made.

Elliott et al 2002

Elliott et al reviewed evidence on the effectiveness of treatment and care interventions targeting drug using young people up to 16 years old. Seven reviews and 11 primary studies were included, reporting on interventions in a range of settings including schools. Only school-based programmes aimed at reducing drug use and harm among young people already using drugs were included; universally-targeted school-based drug education was excluded. However, the criteria appear to have been somewhat confusingly applied, as at least one universally-targeted school-based programme has been included in the review (Stead et al 2001, 'NE Choices'). Results are presented in a narrative synthesis.

The review found "weak evidence" that school-based programmes were effective in reducing drug use among drug-using young people, but also conclude that "purely education programmes" and "multi-faceted school-based programmes" are ineffective. The extreme heterogeneity of the interventions examined - including outpatient treatment, intensive counselling, 12-step programmes and family therapy - and the rather confusing inclusion criteria limit the usefulness of this review to the present review.

Ennett et al 1994

Ennett and colleagues reviewed ten studies reporting on eight separate evaluations of one programme, Project DARE. Effect sizes were computed for six outcomes reflecting DARE's aims: knowledge, attitudes, social skills, self-esteem, attitudes towards the police, and drug use. Across the eight evaluations, DARE had the greatest effect on knowledge, followed by social skills, attitudes towards the police, attitudes towards drugs, self-esteem and drug use, on which it had the smallest effect. When usage outcomes for different drugs were examined, DARE had a significant effect only on tobacco use. A comparison with Tobler & Stratton's (1997) meta-analysis indicated that DARE's effects on drug use and social skills were more than a third smaller than the comparable effects for Tobler's category of 'interactive' programmes, and were smaller in all comparisons than those of the interactive programmes. DARE had larger effects on knowledge, attitudes and social skills than Tobler's non-interactive programmes.

Gottfredson and Wilson 2003

Gottfredson and Wilson reviewed 130 documents reporting on 94 school-based prevention programmes for alcohol and other drug use (excluding tobacco). The time frame is not given. Programmes coded according to whether they were delivered to a universal school population or selectively to a high risk group; the age of young people in the programme; programme delivery agents; and programme duration.

Effect sizes were calculated based on the contrast between intervention and comparison groups. Where studies investigated multiple intervention-comparison group contrasts, these were also included in the meta-analysis, producing 136 contrasts.

Meta-analysis using effect sizes indicated that programmes targeting high risk young people appeared to be more effective than programmes targeting universal school populations, although the analysis was based on a small number of studies and the authors caution that it is “weak” evidence. Programmes targeting middle/junior high school pupils appeared to be slightly more effective than those targeting younger or older age groups. The authors suggest that the variations in follow-up period may have confounded this result, as programmes targeting younger pupils tend to be followed up for longer (allowing more time for effects to wear off). Regression analysis to explore this possible confounding suggested that length of follow-up period did appear to influence effect size; in other words, programmes delivered to middle/junior high school students did appear to be slightly more effective than programmes delivered to younger children.

Analysis by programme duration showed no relationship between length and effect. No relationship was found between who delivered the programme (teachers, peers, police, health professionals, others) and effect, although analysis of a subset of programmes which involved peers in delivery found that programmes delivered only by peers had higher effects than programmes delivered by peers and teachers (the authors caution that this may be confounded by features other than who ran the programme).

In conclusion, the authors note that the possibility that selective high risk programmes are more effective than universal programmes needs further investigation, not least because of the potential cost and ethical implications of targeting only high risk young people. They suggest that the case for targeting prevention before middle/junior school is still unproven, but cannot be ruled out. They also note that longer programmes (over 4 months) are not necessarily better than shorter programmes, and that peer-only delivery is more effective than either teacher-only or teacher-plus-peer delivery: in other words, the benefits of peer involvement in delivery may disappear if peers share delivery with teachers.

Wilson et al 2001

Wilson and colleagues reviewed school-based interventions targeting criminal and violent behaviour, school-disaffection, rebelliousness and substance use. Two hundred and nineteen studies/reports reporting on 165 programmes were reviewed.

Nearly three-quarters of the programmes targeted a universal student population, while the rest targeted high-risk populations. Programmes were categorised as environmentally-focussed (addressing classroom management, class reorganisation or school discipline) or individually-focused; the latter group included social competence, cognitive behavioural, mentoring, counselling, recreational and ‘other instructional’ interventions.

Effect sizes were computed, for those studies which provided sufficient information, in four categories: criminal behaviour, alcohol and other drug use, dropout and non-attendance and other problem behaviours.

Overall, the review finds some evidence that alcohol misuse prevention interventions can work, but many studies had very mixed results. The majority of the 56 interventions examined (42) were entirely school-based; a further four were school plus community or school plus family, with the others being delivered in non-school settings. The review did not set out to compare school-based interventions with interventions in other settings, and school-based interventions were represented reasonably proportionally in both the 'effective' and 'ineffective' intervention groups. In other words, the review is not able to say whether school-based alcohol prevention is more or less effective than prevention in other settings, only that there is evidence from some studies that it works and from others that it does not.

Foxcroft et al do not draw any conclusions about the relative merits of different approaches overall. However, they draw attention in their conclusions to a number of programmes for which they feel "it is probably reasonable to say that the evidence base does not support their continued use in the primary prevention of alcohol misuse for young people" (p8). The list is somewhat confusing, as it includes several studies Foxcroft et al rate elsewhere in the review as effective or partially effective in the short- and medium-term.

They also highlight the Strengthening Families family-based programme (Spath 2001) as a particularly promising programme, and a culturally-focused school and community intervention for Native American young people (Schinke et al 2000). They are less enthusiastic about Life Skills Training (Botvin 1995), arguing that its longer-term effects were weak, although in the desired direction.

Thomas 2004: School-based smoking prevention (Cochrane Review)

Thomas reviews 76 randomised controlled trials of school-based smoking prevention programmes. The studies are grouped into three categories according to methodological quality:

- Better quality studies had minimal selection, performance, attrition and detection bias, and performed power calculations and appropriate statistical analysis.
- Medium quality studies had one or more design problems which could threaten validity of their conclusions.
- Poor quality studies had "serious problems in design or conduct that precluded drawing any conclusions".

Studies are also grouped into five categories according to the type of programme:

- Information-only.
- Social competence.
- Social influence.
- Combined social influence and social competence.
- Multi-model (multi-component programmes combining school-based and other components such as media or policy).

Because of the heterogeneity of studies, Thomas argues that quantitative synthesis (ie. meta-analysis) of data is not appropriate, and instead reports results in a narrative systematic review structured by the type of programme. The outcome of interest is smoking prevalence.

In the information-only category, one out of four medium quality studies found an effect on smoking behaviour, while three studies did not. In the social competence group, the sole better quality study found an effect (there were no medium quality studies). In the social influences group, eight out of fifteen better quality studies found an effect, and seven did not; in the same group, thirteen medium quality studies found an effect and seven did not or were unclear. In the combined social influence and social competence group, the sole better quality study and all eleven medium quality studies found an effect. Finally, in the multi-model programme group, one out of three better quality studies found that a multi-component programme was more effective than a school-only component, and two did not.

Overall, Thomas' review provides reasonably strong evidence that school-based programmes can be effective in reducing smoking prevalence. Effects on smoking behaviour are found in some studies but not in others. Thomas' review also points to some types of prevention programme being more effective than others. Although there was some evidence that information-only could be effective, in the majority of programmes it was not, suggesting that the evidence is weak. Of the relatively large number of social influences programmes examined, more were effective than were not. In the other categories examined, results were more mixed.

Thomas draws conservative conclusions from the findings. Although conceding that "there is some evidence that school programmes incorporating social influences models can affect smoking behaviour in the short term", Thomas also argues that "these studies must be weighed against the findings of the Hutchinson Prevention Project which failed to find a sustained effect of a social influences intervention programme on smoking behaviour" (p27). The Hutchinson programme (Peterson et al 2000) was "the largest and most rigorous test of a social influences model" to date (p29).

Sowden et al 2004: Community interventions to prevent youth smoking (Cochrane Review)

Sowden et al reviewed 17 community interventions for preventing smoking in young people which met methodological quality criteria. Community interventions were defined as "coordinated, widespread programmes in a particular geographic area ... which support non-smoking behaviour" (p2-3). Fifteen of the programmes included a school-based component; however, there was wide diversity in the type of school component, as well as in the mix and focus of the other intervention elements (eg. media, policy). Outcome measures of interest were self-reported smoking and objectively measured (eg. through saliva testing) smoking behaviour. Both randomised and non-randomised controlled trials were included. Young people up to age 25 were included. The extreme heterogeneity of the interventions and study methods made a meta-analysis inappropriate.

Twelve studies compared the effectiveness of a community intervention with no intervention or health promotion activities as normal. Two reported significant and sustained reductions in smoking behaviour (Perry et al 1994, Vartiainen et al 1998) - in the latter case, significantly decreased youth tobacco use was still found at 15-year follow-up. A third study found that where the school-based component of the community intervention was delivered in an intensive 12-week block there was a reduction in youth smoking behaviour, but no reduction was found where the programme was delivered over a 3-year period (Piper et al 2000). Nine studies found no effects on smoking; some of these included sizeable school components, while two were non-school-based.

seldom included exactly the same studies as other reviewers, and focused on different outcome effects. They also differed in the standards of evidence they required: it is notable that Cochrane reviews tended both to include fewer studies than other reviews (because their methodological quality criteria are particularly stringent) and to be more cautious in their conclusions. These differences in focus, sample and stringency mean that there is sometimes limited consensus on the key questions of drug education effectiveness.

- Despite these differences, it is possible to draw conclusions from the reviews. There IS evidence that school-based drug education is effective. All the reviews examined here, regardless of method or whether they examined tobacco, alcohol or generic drug education, found at least some drug education programmes which had a significant impact on behaviour. Effect sizes tended to be modest, translating into approximate reductions in substance use behaviour ranging between 3 and 29%, to take examples from two reviews. While these reductions may appear small, it is worth noting that similar sized effects in clinical trials might be judged compelling enough evidence of effectiveness to terminate a trial. It is for drugs education policymakers to decide whether they are compelling enough in a drug education context.
- Effects were not found for all programmes, but the fact that not all programmes are effective does not negate the principle: the evidence shows that it is possible to prevent youth smoking, even if it does not happen in every programme. None of the reviews concluded that school-based drug education was ineffective or not worthwhile.
- In nearly all reviews, programmes which had a negative or harmful effect – ie. which increased substance use – were in a very small minority, suggesting that on balance drug education is either positive or neutral in its impact. However, negative effects have been found in a small number of studies, typically increases in alcohol consumption. There is insufficient high quality evidence to identify the reasons for negative effects.
- There is evidence that drug education programmes can influence all types of substance use. However, the evidence suggests that they are slightly more effective at influencing use of tobacco than at influencing use of alcohol and illicit drugs. Drug education programmes are more likely to have *no* effects, or *harmful* effects, on alcohol use than on use of other substances. The reasons for this differential effectiveness are not clear and have not been fully explored, but may reflect the adoption of less realistic ‘abstinence’ goals in alcohol education programmes.
- Many of the reviews compared effects across different programme types to identify whether particular programme characteristics, such as approach or teaching method, were associated with increased effectiveness. These findings are examined in more detail in the next section, Section 3.

	DARE, and programmes to “improve moral character etc”). Behaviour modification and thinking strategies. Peer programmes. Counselling & mentoring (excluding peer counselling). Recreational alternatives.	
Hansen 1992	Information/values clarification Affective Social influences Comprehensive	COMPREHENSIVE programmes are more frequently effective, followed by SOCIAL INFLUENCES programmes, with AFFECTIVE and INFORMATION/VALUES CLARIFICATION programmes being often neutral in effect, although programmes from all four groups have been found to be effective.
Lister-Sharp et al 1999	No statistical comparison of categories, but programme content features are discussed in narrative synthesis.	Programmes including resistance skills, stress management and/or norm setting are generally more effective on alcohol behaviour than programmes not using these approaches. The majority of programmes effective with drug and smoking behaviour involve resistance skills and/or normative education.
Rooney & Murray 1996	Social influences Generic social skills Resistance skills	All three types of intervention are equally effective, apart from when programmes are not solely smoking-focused, in which case SOCIAL INFLUENCES programmes were more effective.
Rundall & Bruvold 1988	Rational Innovative	INNOVATIVE programmes are generally more effective although not for all outcomes.
Thomas 2004	Information-only Social Competence Social Influence Combined Social Influence & Social Competence Multi-modal (Multi-component)	SOCIAL INFLUENCES programmes appear to be more effective than other programme types, but evidence is mixed. INFORMATION programmes are generally ineffective.
Tobler 1986	Knowledge only Affective only Peer Programmes Knowledge + Affective Alternatives	PEER Programmes (comprising refusal skills and social/life skills approaches) are most effective, followed by AFFECTIVE, KNOWLEDGE + AFFECTIVE, KNOWLEDGE ONLY and AFFECTIVE ONLY.
Tobler & Stratton 1997	Non-interactive Knowledge Only. Non-interactive Affective Only. Non-interactive Knowledge-plus-Affective. <i>Included 2 sub-categories: Values clarification and DARE-type.</i> Interactive Social Influences. Interactive Comprehensive Life Skills. Interactive Others.	INTERACTIVE programmes as a whole have stronger effects than NON-INTERACTIVE programmes. Interactive OTHERS programmes are slightly more effective than COMPREHENSIVE LIFE SKILLS programmes, which are slightly more effective than SOCIAL INFLUENCES programmes.
Tobler et al 1999	Interactive Social Influences Interactive Comprehensive Life Skills Interactive Others Non-interactive Affective only Non-interactive Knowledge + Affective	INTERACTIVE programmes of all types are more effective than NON-INTERACTIVE programmes.
Tobler et al 2000	Non-interactive: Knowledge Only Affective Only Decisions/Values/Attitudes Knowledge-plus-Affective	INTERACTIVE programmes have stronger effects than NON-INTERACTIVE programmes. Of the interactive programmes, SYSTEM-WIDE CHANGE are the more effective, followed by COMPREHENSIVE LIFE SKILLS and

	<p>Class management. Regrouping pupils/classes.</p> <p>Individual change: Instruction (includes factual information, social influences, DARE, and programmes to “improve moral character etc”). Behaviour modification and thinking strategies. Peer programmes. Counselling & mentoring (excluding peer counselling). Recreational alternatives.</p>	<p>Promising programmes (found to be effective in one study) are ENVIRONMENTAL programmes which build school capacity, teach in smaller units, and improve class management.</p>
Lister-Sharp et al 1999	<p>No statistical comparison of categories, but programme content features are discussed in narrative synthesis.</p> <p>HEALTH PROMOTING SCHOOL approaches, as well as health promotion interventions <i>in</i> schools, were reviewed.</p>	<p>School programmes with a parent component were possibly more effective than school programmes without, but numbers too small to compare.</p> <p>Evidence from one intervention that a health promoting schools approach was effective in reducing tobacco use, but numbers were too small and programmes too variable to draw firm conclusions.</p>
Sowden et al 2004	<p>Review compared: community interventions including a school-based component with the school-based component alone; community intervention with a school component with the community component alone; and a media plus school intervention with the school intervention alone.</p>	<p>Modest evidence overall for the effectiveness of community interventions in reducing smoking.</p> <p>Community and multi-component programmes sometimes performed better than single component programmes, and sometimes there was no difference.</p>
Thomas 2004	<p>Compared “multi-modal” and “single-component” interventions.</p>	<p>Mixed. One school-plus-media intervention performed better than a school-only intervention; in another study, there was no differences between the two types of intervention.</p>
Tobler 2000	<p>One category of programme, SYSTEM-WIDE CHANGE, was defined as including “knowledge, refusal skills and parent, community or media components”.</p>	<p>System-wide change programmes had consistently higher effect sizes than Knowledge, Affective, Decisions/Values/Attitudes, Knowledge-plus-Affective and DARE-type approaches. Were slightly more effective than Social Influences and Comprehensive Life Skills approaches.</p>
Tobler & Stratton 1997	<p>One category of programme, OTHER, was defined as including peer counselling, parent involvement, community involvement, homework, rewards and reinforcement.</p>	<p>‘Other’ programmes appeared to have higher effect sizes than all other approaches apart from Comprehensive Life Skills (which were equally effective). But confusing definition of programme type.</p>
White & Pitts 1998	<p>No statistical comparisons were made, but features of programmes found to be effective are discussed.</p>	<p>The impact of some school-based programmes may have been enhanced by being part of community intervention.</p>
Wilson et al 2001	<p>Environmentally-focused (eg. classroom management, school rules) Individually-focused (eg. social competence, cognitive behavioural, mentoring, recreational)</p>	<p>Some types of ENVIRONMENTALLY-FOCUSED programmes are effective; some types of INDIVIDUALLY-FOCUSED programmes are ineffective.</p>

- Drug education programmes which are multi-component in nature and/or which target young people's environment – their school, family or community - are possibly more effective than those which are single-component in nature and which primarily target the individual. There is moderate evidence for this conclusion. However, there have been too few studies to assess which mix of components is the most effective: for example, school plus media or school plus parent? Environmental interventions have the advantage of also being effective at preventing other behaviours such as delinquency and school disaffection. The evidence base for whole school, or health promoting school, approaches is still evolving, and they are difficult to evaluate, although one study to date has shown effects on smoking.
- **Who should deliver drug education?**
There is reasonably strong evidence that peers should be involved in the delivery of drug education, but insufficient evidence to state whether they should be the sole deliverers, as some reviews claim. There is also evidence that trained teachers and health professionals can be effective. The effectiveness of a particular delivery agent is likely to be strongly bound up with programme type, amount of training, programme implementation quality and the perceived credibility of the deliverer in the eyes of students participating in the programme.
- **Is there a relationship between duration or intensity of drug education and effectiveness?**
There is no clear relationship between effectiveness and overall programme duration, intensity or number of sessions. It is likely that programme design and implementation quality are as or more important than length of programme or number of lessons: a very intensive but theoretically unsound or badly taught programme is unlikely to be effective. Nevertheless, reviews agree that programmes should be of 'sufficient' length and intensity to achieve change; no reviews recommend ad hoc single sessions, for example. On average, evaluated drug education programmes have comprised around ten sessions, often with follow-up sessions the following year.
- **Should drug education target single drugs or adopt a generic approach?**
The evidence on this is unclear. Two reviews suggest that tobacco-only programmes may be more effective than wider focus programmes, and one review suggests the opposite; one review suggests that generic programmes are more likely to have harmful effects on alcohol use than alcohol-only programmes. Generic programmes may be less effective than single drug programmes because they risk making some drugs appear less harmful than others (and therefore safe to try). Certainly the messages will be more complex in generic programmes, particularly if the programme simultaneously promotes a harm reduction/moderation message for alcohol and a prevention message for tobacco and illicit drugs.
- **Is drug education more effective at specific ages?**
Overall it does not seem that drug education is more effective at particular ages or grade levels. However, it is important to note that desired effects are likely to vary at different ages, as is the ability of a study to detect an impact (it is difficult, for example, to assess behaviour change in a cohort of young people who are too young to have started experimenting in sizeable numbers). Nevertheless, the evidence from these reviews suggests that there is no good reason to restrict drug education to particular ages, and that drug education should be expected to achieve age-appropriate effects at all ages.

- **Other features**

Reviews have also suggested that drug education programmes are likely to be more effective if implemented to a high quality, although more attention is needed to the process of delivery in drug education studies and reviews. Drug education may also be more effective with high risk groups if it is specifically targeted at those groups (rather than at whole school or year group populations).

Drug education is likely to be more effective if relevant and meaningful to target groups, and tailored to their needs. Culturally appropriate interventions are likely to be more effective with specific ethnic and cultural groups.

The guidance contains both general and specific recommendations about drug education. General recommendations include the statement that health education should be taught in a “supportive and encouraging climate” using “interactive learning and teaching approaches” (p.3). However, it is not explained that research has proved interactive approaches to be more effective in drugs education. The recommendations also emphasise the concepts of continuity and progression in drug education, with topics being revisited throughout schooling as students mature. It is recommended that drug education is taught within the context of a strategic whole school approach to health promotion. Various planning considerations are listed, including the involvement of all staff, pupils and parents in health education provision; the ability to make a planned response to incidents, and efficient management and coordination of health education and drug education.

More specific guidance concerns topics to be covered at different levels of maturity. Drug education is specifically referred to in several of the attainment targets. Specific attainment targets are outlined for each of six levels, A to F, at each of three strands – physical, emotional and social health. Drugs are specifically mentioned in five of the six physical health attainment targets (eg. ‘show safe use of medicine’ Level A; ‘choosing not to use harmful substances’ Level D; ‘risk assessment on issues such as substance misuse’ Level E). Other attainment targets in emotional and social health are also relevant to drug education, although the link is not explicitly made (eg. ‘show safe ways of dealing with risky situations’ Level C; ‘recognise peer and media influences on health’ Level D; ‘demonstrate ways of seeking help’ Level E).

The HMIE report *How Good is Our School? Two Health Issues: Education about Drugs/Education about Responsible Relationships and Sexuality* (2003) contains guidance for schools on evaluating their progress towards National Priorities. It states that effective drug education “has an important role to play in supporting all of the Scottish Executive’s National Priorities for Education”, most notably, through contributing to the creation of a health promoting school (National Priority 2), supporting pupils in the development of respect for self and others (4), and helping to equip them with the skills and attitudes to prosper in a changing society (5).

Ten quality indicators are highlighted to help schools evaluate their provision of drug education. They are:

- Teachers’ planning of programmes and day-to-day activities
- Teaching process: range and appropriateness of teaching approaches and teacher-pupil interaction
- Pupils’ learning: extent to which learning environment stimulates and motivates; pace of learning; personal responsibility for learning; interaction with others
- Meeting pupils’ needs: choice of task, activity, resources; provision for different abilities
- Pastoral care: ensuring care and welfare of pupils
- Personal and social development: use of planned approaches
- Links with local authority or other managing body
- Partnership with parents, School Board and community
- Organisation and use of resources
- Staff review procedures and development

Aims and approach

A qualitative study by Fitzgerald (2003) examined in more depth the actual nature of drug education in Scottish schools and teachers' perceptions of its aims and approach. Qualitative interviews were conducted with 13 respondents in 9 Grampian schools, following which an indepth case study was conducted in one school, comprising lesson observation, focus group interviews with pupils and interviews with school staff.

The study found that very few of the schools had developed their own written drug policy on drug education, reporting that they planned their drug education on the basis of existing guidelines and therefore an inhouse written policy was unnecessary. However, national guidelines were rarely mentioned, and *"in the absence of clear direction in relation to goals and key messages, confusion was widespread among teaching staff particularly in relation to difficult issues such as harm reduction"* (Fitzgerald 2003, p.4). The drug education curriculum tended to evolve unsystematically – for example, in response to a new resource becoming available, or to practical issues such as staffing. There was little involvement of pupils, parents or the community in drug education planning, and uncertainty among schools as to the value of involving these groups.

The core message of drug education was most commonly described by schools as promoting informed choice by supplying pupils with drug information "so that they could make their own choices" (p.5). Staff appeared to be aware that a 'just say no' approach would not work, but, in Fitzgerald's view, frequently provided information and messages designed specifically to support the decision not to use drugs, and sometimes used materials adopting a "scare tactics" approach. From lesson observation it was apparent that many lessons involved a low level of interactivity, relying on teacher-led discussion, worksheets, and videos, although small groupwork and class discussion were also evident.

In conclusion, Fitzgerald reports that the quality of drug education observed in the study "was considerably below best practice as defined by the research literature and current national guidelines" (p.6).

Does practice reflect official guidance and the evidence base?

From the limited number of Scottish studies to date, it is possible to assess only to a limited extent whether practice reflects official guidance and evidence. To the extent that the guidance recommends that all schools provide drug education and that this should be continuous throughout pupils' learning career, practice is in line with guidance: both primary and secondary schools do so. There is a high level of coverage of all the substances recommended in official guidance, medicines, alcohol, tobacco, solvents and controlled drugs.

Assessing the match between guidance and approach is difficult. Schools are described by Lowden and Powney (2000) as perceiving the aims of drug education to be information provision and the promotion of decision-making skills and self-esteem, although it is not clear on what this is based.

As Section 3 has demonstrated, there is limited evidence that self-esteem approaches are theoretically valid or effective. There is slightly stronger evidence for the usefulness of decision-making skills in drug education; however, it is notable that these seems to be limited awareness of the social influences approach, and particularly normative education, at school level.

5 INDICATORS AND RECOMMENDATIONS FOR EFFECTIVE DRUG EDUCATION

This final section of the review identifies a series of indicators and recommendations for effective drug education. The indicators derive directly from the systematic review evidence examined in Sections 2 and 3. The recommendations emerge from Section 4's examination of current guidance and practice in drug education.

Evidence-based indicators

1. Drug education should be highly interactive. Interactive delivery is a proven feature of effective drug education programmes. Non-interactively delivered programmes are consistently less effective.
2. Drug education should include but should not rely solely on information provision.
3. Drug education should not rely solely on 'affective' approaches designed to boost self-esteem and generic social competence. Whatever their other potentially positive effects, these approaches have proven consistently to be less effective at reducing substance use.
4. Drug education should include life skills elements, but not without the social influences elements listed below.
5. Drug education should be based on a social influences approach, specifically including resistance skills and normative education elements. Programmes based on these approaches have proven consistently to be more effective. Normative education – examining and challenging perceptions of the prevalence and acceptability of drug use – in particular is a significant mediator of programme effectiveness.
6. Drug education programmes which are part of multi-component and 'environmental' programmes are likely to be more effective than those delivered in isolation. Environmental approaches such as improved classroom management and alternative groupings of pupils are promising approaches, as are whole school/health promotion school approaches.
7. Peer education approaches should be considered, as peer involvement in drug education programmes is associated with increased effectiveness. Peers, teachers and other professionals can all be effective deliverers of drug education programmes providing they deliver to a high standard and are perceived as credible and trustworthy by students.
8. Drug education programmes should be of a sufficient length to achieve impact; longer programmes may be better than shorter programmes, but it is not entirely clear.
9. Both generic programmes (addressing all drugs) and single-drug programmes can be effective. If generic programmes are implemented, care needs to be taken to ensure that messages about the effects and risks of different drugs do not cause confusion or give the impression that because some drugs are particularly risky, others are safe.

10. Drug education should be delivered in both primary and secondary schools. There is no evidence to suggest that it is more effective at older or younger ages, although clearly the objectives and content should be age-specific.
11. Drug education should be relevant and socially and culturally specific to the targeted population.
12. Drug education programmes should be delivered to as high a quality as possible, recognising that the optimum delivery conditions which usually apply during an experimental trial are unlikely to apply during 'real world' delivery. It is difficult to specify what delivery quality standard should be attained – it is likely to vary for different programmes and in different contexts. Nonetheless, better results are generally obtained when programmes are delivered to a higher quality.

Recommendations

1. Official guidance should emphasise the importance of using evidence-based approaches in drug education. Misconceptions about the value of certain approaches should be corrected. Schools should be discouraged from using approaches which evidence has found to be ineffective and strongly encouraged to use approaches which have been found to be effective. The reasons for the greater efficacy of these approaches – for example, their theoretical basis and 'active ingredients' - should be clearly communicated.
2. Consideration should be given to developing a list of recommended effective programmes. Programmes and materials included on the list should have been thoroughly evaluated or, *at the very least*, have been designed following evidence-based recommendations regarding approach, content and delivery style. Claims made by programme designers that their programmes are effective and evidence-based should not be taken on trust but verified independently.
3. National and local guidance needs to focus strongly on improving quality and consistency in drug education practice. Training and other support is needed to boost teachers' confidence and skills in using the types of interactive methods required for drug education programmes to be effective.
4. More research is needed to investigate the possibility that drug education is less effective at influencing alcohol use than use of tobacco and other drugs. More realistic harm reduction rather than prevention goals should be adopted for alcohol programmes.

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