



What is the evidence on school health promotion in improving health or preventing disease and, specifically, what is the effectiveness of the health promoting schools approach?

March 2006

ABSTRACT

This is a Health Evidence Network (HEN) synthesis report seeking to determine the effectiveness of health promotion in schools and, more specifically, the effectiveness of the “health promoting schools” approach.

The review of evidence covers mental health, aggressive behaviour, healthy eating, physical activity, substance use and misuse, driver education, and peer approaches. The report shows that effectiveness of different types of programmes varies. School-based programmes that promote mental health, healthy eating and physical activity are amongst the most effective, while programmes on preventing substance use, and suicide are among the least effective of school health promotion programmes.

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Summary

The issue

School health promotion, based on a wide range of research and practice, has evolved over the course of the last 50 years, alongside health promotion in other settings. During the 1990s, WHO, working jointly with the European Commission and the Council of Europe, developed the health promoting schools initiative. It is a multifactorial approach that covers teaching health knowledge and skills in the classroom, changing the social and physical environment of the school, and creating links with the wider community. This synthesis seeks to determine the effectiveness of health promotion in schools and, more specifically, the effectiveness of the “health promoting schools” approach. The synthesis builds on the last comprehensive review in this field, published in 1997.

Findings

This synthesis identified good quality systematic reviews that covered mental health, aggressive behaviour, healthy eating, physical activity, substance use and misuse, driver education, and peer approaches.

Reviews of programmes that promoted mental health in schools (including preventing violence and aggression) show these programmes to be among the most effective ones in promoting health. Of these programmes, the ones that were most effective were of long duration and high intensity, and involved the whole school. New reviews that focused on promoting healthy eating and physical activity confirmed an earlier review, which found that multifactorial interventions, particularly those involving changes to the school environment, were effective. Four new reviews of programmes that focused on promoting the prevention of substance use confirmed previous findings that these programmes are relatively ineffective. Also, programmes on preventing suicide reduced suicide potential, depression, stress and anger, but less rigorous studies suggested a potential harmful effect in young males. In some (but not all) studies, peer-delivered health promotion was found to be effective, compared with teacher-led interventions, and this approach was highly valued by the young people involved.

The systematic review, which evaluated health outcomes of programmes that used elements of the health promoting schools approach, included small studies of variable quality. It found apparent benefits to the social and physical environment of the school, and some studies found the programmes benefited health-related behaviour (dietary intake and physical fitness). No reviews evaluated the cost-effectiveness of the programmes or interventions.

Policy considerations

Health promotion in schools can improve children's health and well-being. Among the most effective programmes are those that promote mental health, healthy eating and physical activity. Programmes on preventing substance abuse have not been shown to be effective and may be better addressed in a more holistic programme that promotes mental health. Programmes on preventing suicide can reduce suicide potential, but potential harmful effects in young males should be considered. Although programmes based on peer-delivered health promotion are highly valued by young people, their effectiveness varies.

Some evidence supports key components of the health promoting schools programme – namely, that programmes should be sustained, multifactorial, whole school approaches that provide appropriate training. However, there is a lack of evidence on all the elements that contribute to an effective health promotion programme, or to the health promoting schools approach as a whole. A holistic evaluation of programmes in local settings is needed.

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Type of evidence

This review is based on robust systematic reviews of controlled trials of school-based health promotion initiatives. Reviews on school health services and screening programmes were not included.

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Introduction

School health promotion

Since the 1950s, schools have been a popular setting for health promotion and health education (1). Early programmes focused on teaching children about health and its determinants, but the importance of enabling them to develop the skills to resist unhealthy lifestyles was soon recognized. Most programmes now teach these skills.

The development of school health promotion programmes has been influenced in general by developments in health promotion policy. The Declaration of Alma-Ata in 1978 (2), which aimed to provide a framework for the development of health strategies in WHO Member States, called for multisectoral approaches to health promotion and for public participation in developing and providing health programmes.

Health promoting schools

The Ottawa Charter for Health Promotion (3) drew attention to the effect of the environment on health and health promotion and to the importance of developing personal skills. The latter, developing personal skills, advocated the settings approach to health promotion and formed the basis for the development during the 1990s of the health promoting schools initiative, led by WHO in collaboration with the European Commission and the Council of Europe.

In 1995, WHO produced a set of guidelines towards which schools aspiring to the status of health promoting school were required to work (4). The guidelines covered six areas:

1. school health policies
2. the physical environment of the school
3. the social environment of the school
4. school/community relationships
5. the development of personal health skills
6. school health services.

Schools that aspire to be health promoting schools will focus on developing programmes that promote health, extending the teaching beyond health knowledge and skills to take account of the school social and physical environment and to develop links with the community.

The concept of whole school approaches has been emphasized in the context of implementing the health promoting schools initiative in Europe and Australia (5): the study describes the importance of the so-called hidden curriculum in either reinforcing desirable attitudes or contradicting undesirable attitudes to health taught in the explicit (or formal) curriculum. This hidden curriculum includes the following:

- the ethos (culture) established by the atmosphere of the school
- the school's code of discipline
- the prevailing standards of behaviour
- the attitudes adopted by staff towards pupils
- the values implicitly asserted by its mode of operation.

Subsequent guidelines on health promoting schools (6) have emphasized related issues, such as the following:

- development of good relationships within the school
- the promotion of staff health and well-being
- promotion of self-esteem among pupils
- consideration of staff exemplars in health-related issues.

In line with the Declaration of Alma-Ata, the health promoting schools initiative stresses participatory approaches. School commitment and involvement are regarded as keys to success, and schools are encouraged to develop programmes that conform to their strategies and timetables (7).

The health promoting schools initiative is popular. Thirty-seven countries have participated in the European Network of Health Promoting Schools since 1997 (8) and a survey in England that year found that three quarters of Local Authorities were running a health promoting schools scheme (9). In 2006 the total number of participating countries is forty-three. Some governments have now backed the development of health promoting schools. In the United Kingdom, the Department for Education and Skills, together with the Health Development Agency, have developed a National Healthy Schools Standard based on the health promoting schools approach. Australia (10,11), the Asia-Pacific region (12) and South Africa (13) have also implemented health promoting schools initiatives.

Magnitude of the problem

Early school health promotion initiatives were developed in the tradition of the medical model to prevent specific diseases or health problems. Since then, programmes have been developed to address all the major public health problems of the 20th and 21st centuries, including drug and alcohol misuse, smoking, healthy eating, physical activity, mental illness, obesity, sexual health and human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS), and injuries. Many current school programmes for promoting health, including all health promoting schools initiatives, have holistic goals that aim to promote the health and well-being of students, staff, and even parents, as well as to prevent disease. In this respect, their effect cannot be gauged solely by the scale of the problems or diseases.

This synthesis reviews the effectiveness of initiatives that, in general, promote health in schools and, in particular, the health promoting schools approach.

Sources of evidence

This synthesis is a systematic review of robust, systematic reviews of the impact of school health promotion initiatives on some aspects of health or well-being. It builds on a comprehensive, high-quality review of reviews, commissioned by the United Kingdom Health Technology Assessment Programme (14), for which searches were undertaken in 1997. Details of the search process, selection criteria and definitions of key concepts are presented in Annex 1.

Findings

Fifteen rigorous systematic reviews were identified, most of which focused on a specific health topic or approach. Five reviews focused on promoting mental health, three on preventing substance use, two on promoting healthy eating and physical activity, and two on peer-led approaches. However, none of the reviews used the same inclusion criteria, and the overlap among studies was relatively small. One review (15) covered two reviews: one on interventions that promote mental health and one on interventions that promote healthy eating and physical activity. This same work also reviewed reviews of mental health promotion among young people, and it systematically examined literature about

research on barriers and facilitators to effective health promotion among young people. The results of this review are described in both the mental health and physical activity sections of this synthesis. Three reviews (15–17) covered interventions that promote health among young people in any setting. They are included here because the great majority of studies focused on school-based initiatives.

The starting point for this synthesis about the health promoting schools approach was the United Kingdom Health Technology Assessment Programme review (14). It included a review of primary studies of initiatives that adopted elements of the health promoting schools approach, and this is included in the present synthesis. Two other reviews, which addressed the health promoting schools approach, were identified; however, they did not meet the inclusion criteria of the synthesis. One of these reviews (8) was a non-systematic review that critically appraised the content and health outcomes reported in 11 studies of interventions that take this approach in primary schools. The other review (18) included a systematic review of 86 studies of school-based health promotion interventions to prevent smoking or alcohol misuse, or to promote solar protection; it examined the extent to which the interventions incorporated the components of health promoting schools initiatives, but did not examine health outcomes.

The next section summarizes the findings of the United Kingdom Health Technology Assessment review of reviews (14) and then continues by summarizing the findings of 15 more recent reviews, which are grouped by topic area or approach. A table that summarizes the focus of each review and its findings is presented in Annex 2.

Review of reviews of health promotion in schools

Health promotion in schools and health promoting schools: two systematic reviews (14)

Thirty-two reviews – covering studies of interventions on nutrition and exercise, safety, mental and sexual health, substance misuse, oral health, and solar protection – were included. There were many more reviews of substance misuse programmes and of nutrition and exercise programmes than of other types of programmes. Only one review of initiatives for promoting mental health was identified. Most interventions used classroom-only approaches, aiming to develop student knowledge and skills. Some interventions combined a curriculum approach with changes to the school ethos and environment, or with family and community involvement. Although environmental approaches varied in different areas of health need, interventions that included these approaches were more likely to be effective than those that did not. Interventions involving families varied in intensity and approach and were inadequately described in many reviews. Overall, interventions that involved families were more likely to be successful than those that did not. Almost all interventions for which family involvement was reported demonstrated improvements in health knowledge, but improvements in health attitudes, health behaviour and health were less reliable.

Some effective or partially effective interventions were identified in most areas; however, many appear to be ineffective, and a small number were found to have adverse effects. Interventions to promote healthy eating and physical activity, to prevent injuries and to promote mental health were the most likely to be effective. Those aiming to prevent substance misuse or to promote safe sex or oral hygiene were the least effective.

Mental health promotion and the prevention of mental health problems

Two reviews focused on studies of interventions to promote mental health and three focused on studies of interventions to prevent violence and aggression. The latter three are included because violence and aggression are mentally unhealthy, may be manifestations of a mental health problem, are conducive to disorder, and have a well recognized effect on the mental health of others (19).

A systematic review of universal approaches to mental health promotion in schools (20)

This review identified seventeen studies that evaluated interventions that included all pupils and aimed to promote some aspect of positive mental health or prevent some aspect of mental illness. The review included only controlled trials with at least 40 individuals in each condition – that is, intervention or control – and with less than 30% lost to follow-up. The interventions studied ranged from programmes offering only to develop classroom skills (through participation in community helper activities and changes to the school social environment) to comprehensive programmes lasting several years with whole school and parental involvement, which aimed to change the ethos of the school as well as offer classroom teaching. The interventions covered the resolution of conflicts, antisocial behaviour, prevention of depression and suicide, and promotion of self-esteem and emotional literacy.

Evidence of the effectiveness of an intervention was obtained for programmes that adopted a whole school approach and included key elements of the health promoting schools approach, such as changing the school environment, developing personal skills in class, involving parents and the wider community, and actively involving the school. The review suggested that programmes that fell short of a whole school approach were more likely to be effective if they were implemented continuously for more than a year and were aimed at promoting mental health rather than preventing mental illness.

Barriers and facilitators to the health of young people (15)

This review synthesized studies of interventions to promote mental health in young people, especially those from socially excluded backgrounds. The aim of the review was to identify barriers and facilitators of good mental health in this age group. It identified 30 studies and 7 systematic reviews. Of the seven systematic reviews identified, four looked at the promotion of mental health in general, two focused on suicide prevention and one focused on the promotion of self-efficacy (the ability to cope with the environmental demands of a stressful situation) and self-concept (an aspect of self-esteem that focuses on the individual's concept of themselves).

Sixteen of the group of thirty studies identified were included in these four systematic reviews. Of the remaining 14 studies, only 5 were included in the new review. Two of these five studies were aimed at preventing depression, one was aimed at preventing suicide and two evaluated interventions for promoting self-esteem. The approaches taken in these interventions ranged from three lectures to an eight-session programme for developing health promotion skills.

The results of these studies and reviews are mixed, with those focusing on primary prevention showing medium to large effects and those focusing on developing self-esteem showing modest effects. Knowledge-based programmes, however, were not effective. The review of school-based programmes on preventing suicide identified reduced suicide potential, depression, perceived stress and anger; however, limited effects were found for knowledge and attitudes, and some harmful effects were identified, particularly among young males.

The effects of school-based intervention programmes on aggressive behaviour: a meta-analysis (21)

This review identified 221 studies. The meta-analysis demonstrated that interventions reduced aggressive behaviour. The most methodologically robust study designs showed greater reductions than other designs. Greater reductions in aggressive behaviour were shown for high-risk youths than for low-risk youths. Programmes were more effective in children 5 years old and under and in adolescents 14 years old and over than in other age groups. Also, poorly implemented programmes were less effective, but a range of different types of programmes displayed similar levels of effectiveness. Moreover, greater beneficial effects were shown in studies of demonstration programmes than in routine practice programmes.

School violence in children and adolescents: a meta-analysis of the effectiveness of current interventions (22)

This review identified 16 studies that covered school-based programmes for preventing violence. The programmes were based on cognitive, behavioural and combined approaches for all age groups. Individual study results suggested that both cognitive and behavioural strategies could be effective. Programmes implemented in multi-setting atmospheres and adopting a primary preventive approach were most effective. Qualified programme leaders and a longer period of implementation contributed to the effectiveness of programmes.

School-based violence prevention programmes (23)

This review included 44 randomized controlled trials (RCTs) of interventions that were at least partially school based. Thirty-eight of the trials compared intervention with no intervention. Studies that reported aggressive behaviour on standardized inventories showed a small to moderate reduction in aggressive behaviour. The smaller number of studies that reported on school or agency responses to aggression (such as detention and suspension) showed a moderate benefit that was of borderline significance. Both programmes on non-response training and relationship training were effective. The effects of the interventions were similar in primary and secondary schools. Most programmes focused on boys, but greater improvements appeared in programmes with mixed sexes.

Substance use prevention

Three reviews focused on studies of interventions to prevent substance use: one covered illicit drugs alone, one covered smoking alone, and one covered two combinations of alcohol, tobacco and illicit drug use. One of these three reviews also reviewed reviews of programmes.

School-based programmes for preventing smoking (24)

This review identified 76 randomized controlled studies (with and without family and community components) that measured smoking rates before and after interventions. Sixteen of the studies were classified as the most valid, and interventions were classified as: information, social competence, social influences, combined social influences and social competence, and multi-modal programmes. Half the studies of social-influence interventions showed positive results. Also, there was limited evidence of the effectiveness of multifactorial approaches, including those that involved the community. Moreover, there was a lack of high-quality evidence on the effects of combining programmes on social influences with those on social competence.

School-based adolescent drug prevention programmes: 1998 meta-analyses (25)

This meta-analysis identified 207 studies of universal school-based prevention programmes for students in grades 6 through 12 (in the United States). The studies covered alcohol only, tobacco only and all drug education programmes. Programmes were classified as knowledge only, affective only, decision/values/attitudes, knowledge plus affective, DARE (drug abuse resistance education) type, social influences, comprehensive life skills and system-wide change. Regression analyses showed that prevention programmes that focus on knowledge presented in non-interactive lectures are less effective than interactive lectures. Though interactive programmes that foster the development of personal skills showed greater benefits, the magnitude of the benefits was small. Also, small programmes were nearly twice as effective as larger programmes, but their impact ranged only from small to very small.

Educating young people about drugs: a systematic review (16)

This review identified 62 studies of psycho-education interventions designed to prevent or delay the onset of drug use or minimize drug-related harm in young people (aged 8-25 years). Eighteen studies showed some evidence of effectiveness, but only two studies provided hard evidence on the effect on drug use. A meta-analysis showed a small effect that favoured intervention groups at one-year follow-up. The benefit was even smaller in studies with a two-year follow-up. The authors concluded that the best that programmes can achieve is a short-term delay in substance use and a short-term reduction in the amount consumed.

Promotion of healthy eating and physical activity

Two reviews of studies of interventions to promote healthy eating and physical activity were identified – one focusing on physical activity alone and one on physical activity and healthy eating.

Barriers and facilitators to the health of young people (15)

This review synthesized studies of intervention programmes on healthy eating and physical activity in young people, especially those from socially excluded backgrounds. Twenty-two studies of interventions that promoted healthy eating and twelve studies of interventions that promoted physical activity met the inclusion criteria. Only seven studies were considered methodologically sound on the basis of critical appraisal. Of these seven studies, four addressed physical activity and healthy eating and three addressed healthy eating alone. All programmes were delivered in secondary schools and all were multifactorial interventions. Most programmes were effective, but effects due to age and gender were observed, with greater benefits being observed in girls and older students. The programmes that were effective adopted whole school approaches and provided healthy food in school canteens. Also, peer-led interventions were effective for young women, especially in terms of healthy eating. However, where teachers were involved, training was important.

Effects of physical activity interventions in youth: review and synthesis (17)

This review and synthesis identified 14 completed controlled studies and 8 studies in progress. Most studies were school based and focused on students in upper elementary school grades. There were few studies of community interventions, and results were mixed. However, studies that showed the greatest benefits used more extensive interventions. Some studies showed persistent longer-term benefits from participation in physical activity.

Other topics

Four other reviews were identified: one focusing on prevention programmes for eating disorders, one on driver education programmes for the prevention of traffic accidents and two on the effect of interventions delivered by peers.

School-based prevention programs for eating disorders (26)

Twenty-nine controlled studies were identified: nineteen that reported on universal programmes and ten that reported on targeted programmes. All of the studies reported on classroom-based approaches, some covering cognitive techniques and dissonance-based approaches – the latter aim to help subjects appreciate the gap between subjective and objective views of their body size. Universal prevention programmes had an effect on knowledge, but only two showed an effect on behaviour. Also, targeted programmes were more effective, with five of the eight reporting positive changes in behaviour.

School-based driver education for the prevention of traffic crashes (27)

This review identified three RCTs. These studies found that school-based driver education leads to earlier licensing, but they provided no evidence that such education would reduce road accidents.

Peer-delivered health promotion for young people: a systematic review of different study designs (28)

This review identified 64 school- and community-based controlled studies in which face-to-face contact with peer leaders was the main method of delivering the intervention. A great variety of approaches to peer-led education were evaluated, but studies were excluded if peers were only involved in the delivery of one component of multifactorial interventions, if they assisted other providers, or if they used peer counselling. They were also excluded if they used peer mediation or if the main mode of peer delivery was video, theatre or newsletters. Only 12 of the studies were considered methodologically robust, and 7 of these found peer-delivered interventions to be effective. Also, five robust studies that compared peer-led with teacher-led interventions showed contradictory results. Qualitative evaluations overwhelmingly reported highly positive appraisals by young people of peer-led interventions.

Peer-led and adult-led school health education: a critical review of available comparative research (29)

This review identified 13 controlled studies of school-based health education programmes delivered by peers in comparison with those delivered by adults. Methodological difficulties in the studies limited conclusions, but this research suggests that peer leaders among children are at least as effective as adults in achieving gains in knowledge and behaviour.

Health promoting schools

Health promotion in schools and health promoting schools: two systematic reviews (14)

This review identified 12 controlled before-and-after studies that evaluated school-based interventions that involved health promoting activities in three areas: the school ethos or environment, or both; the curriculum and the family or community, or both; and demonstrations of the school's active participation. Schools were not required to have signed up for the health promoting schools initiative, and studies of programmes developed before the 1990s were included. Only two studies were adequately powered, with random allocation to groups. None of the schools implemented all the components of the health promoting schools approach. The health promoting schools approach was found to have a beneficial effect on: the social and physical environment of the school, staff development, provision of school lunch, provision of exercise programmes, and the school's social atmosphere. Some, but not all, studies found an improvement in health-related behaviour (such as dietary intake) and some aspects of health (such as physical fitness). There was some evidence that the health promoting schools approach was able to benefit aspects of mental and social well-being, such as greater self-esteem and reduced bullying. Many of the studies were small, and study quality was variable.

Discussion

Gaps in the evidence

It is clear from the one review that focused on health promoting schools initiatives (14) that no studies have researched initiatives that adopted all the components of this approach. This finding is supported by two other reviews (8,10), which were not included in the present synthesis either, because they

were non-systematic or because they did not include health outcomes. It is also confirmed in a further systematic review of health promoting schools initiatives, which was published after the searches for this synthesis were undertaken (30). However, the review of health promoting schools initiatives that was included (14) did identify a number of studies that researched approaches similar to the health promoting schools approach, although the schools involved were not formally enrolled in national health promoting schools programme and, thus, did not label their programme as a health promoting schools initiative. Some of the studies covered in the mental health reviews – in particular, Wells et al. (20) – came close to implementing all aspects of the health promoting schools approach, without being developed or labelled as health promoting schools initiatives.

Conflicting evidence

Two reviews (15,22) suggested that universal, primary preventive approaches were more effective than targeted approaches, but two other reviews (21,26) suggested the opposite. Such differences may be due to the choice of outcome measures selected for the study. The effect of targeted interventions may be more readily demonstrated with outcome measures valid in clinical populations. Because of ceiling effects some measures do not pick up changes in so-called normal young people. The choice of outcome measures is clearly of importance in study design, and measures of holistic well-being may need to be developed to capture the effects of some school programmes for promoting health.

After the literature search was performed, the Health Evidence Network (HEN) produced a synthesis that included work on suicide prevention in schools (31). This used stricter quality inclusion criteria than those used by Shepherd and co-workers (15). The HEN synthesis found that, in the general school population, suicide prevention programmes based on behavioural change and coping strategies were effective. It also found that school-based suicide prevention programmes based on skill training and social support appeared to reduce risk factors and enhance protective factors in adolescents at high risk. Potential negative/harmful effects were not identified, as these arose from less rigorous studies that did not meet the quality criteria for inclusion in the present synthesis.

Gender issues

Several reviews found gender-sensitive results, with some intervention programmes being more effective with girls and others with boys. Some reviews found age effects, with some intervention programmes being more effective in older children and others in younger children. Such findings may be based on post hoc, subgroup analyses of study results and may have limited validity. They should be tested in new prospective analyses.

Cost-effectiveness

None of the reviews provided information on the costs or cost-effectiveness of health promotion programmes in schools.

Strength of evidence

This synthesis includes only robust systematic reviews of initiatives that promote health in schools, some of which only include RCTs. Therefore, this synthesis represents a partial view of research on promoting health in schools. Systematic reviews focus on experimental studies, particularly RCTs, with quantitative outcomes. The pros and cons of different research methodologies are under active debate among health promotion researchers, and one group involved in research policy-making in WHO has concluded that, in the field of health promotion, RCTs are inappropriate, misleading and unnecessarily expensive (32). Health promoting interventions cannot be expected to work unless they are appropriately implemented; to be clear that this has happened, process evaluations are needed alongside trials. It is, however, unusual for process evaluations to be undertaken, or for those reporting controlled trials to include information on the extent to which programmes were implemented. These

problems are compounded in reviews where, due to constraints on space, even the nature of the planned interventions is not always clear from the reports of the studies.

Many of the reviewers commented on the poor quality of the studies they identified, and those reviews that demanded rigorous methodological criteria to be fulfilled included only a small minority of existing studies. The difficulties involved in carrying out controlled trials in this area and the pros and cons of such research methodologies were rarely discussed. Many reviewers recommended that more high-quality RCTs should be carried out without critical thought as to whether these were the optimal research designs. Only a small number of reviewers extracted data or reported on the quality of implementation of an intervention. Their results therefore represent the so-called black box approach to health promotion, aiming to identify whether an intervention worked without asking questions about what was actually involved in the intervention.

In many of the studies included in these reviews, sample sizes were too small to ensure that the studies were statistically robust, and some studies may have reported negative results for interventions that would have proved effective in a larger trial. However, one review found that smaller initiatives, which offered more opportunity for attention to the details of implementation, were more effective than larger initiatives. A few reviewers commented that, as might be expected, poorly implemented initiatives were less effective, and they reported demonstration projects as more effective than practice-based interventions. Many other methodological problems were mentioned, including high rates of loss to follow-up and outcome measures that were insensitive to the sort of changes expected as a result of the intervention.

The strength of controlled trials is that they are less likely to attribute to an intervention effects that would have occurred in their absence or that are not reliably replicable. As such, they do have a role to play in developing an evidence base for health promotion initiatives, and it is valuable to consider the findings of such studies. The results presented in this synthesis, however, need to be interpreted in light of the weaknesses of the studies reported, and policy-makers need to be aware of the need for more large complex expensive controlled trials.

Scope of this synthesis

This synthesis could be criticized for excluding reviews of the effectiveness of school health and welfare services. The search strategy for this synthesis did identify one such review (33), and it is likely that it would have identified others had they existed. The focus of the review excluded was the effectiveness of the school entry medical examination, and the authors concluded that the quality of the studies included in their review was so poor that it was impossible to draw conclusions about the effect on health of this programme.

Appropriate research to study health promotion

The evidence base for promoting health in schools has grown over the years, with contributions from practitioner experience and from observational and qualitative research. This knowledge is widely regarded by policy-makers as inferior to that obtained from experimental studies.

Also the appropriateness of RCTs to study interventions that promote health is questionable. School-based interventions are usually delivered to young people in groups (either a class or a school). For this reason, cluster trial designs (34) are usually appropriate. However, the sample size for cluster trials can be large, and large numbers of clusters are usually required. The intervention therefore needs to be implemented consistently in a large number of schools or classes. The health promoting schools approach, which allows each school a degree of autonomy over the development of their programmes, thus sits uncomfortably within the RCT paradigm. Schools are likely to end up implementing somewhat different initiatives, and the interventions can be so heterogeneous that it makes no sense to combine their results. Changing the ethos and environment of a school can take a long time, as can

achieving the active participation of staff in initiatives that promote health. Large cluster trials depend on interventions that can be reliably and quickly implemented in many schools at the same time, and this may be impossible to deliver in the context of a well implemented intervention.

Experimental studies of initiatives that promote health in schools can also be criticized for their lack of attention to the details of implementation and lack of understanding of health promotion theory developed from experience. As a result, practitioners often ignore the findings of experimental studies.

It is becoming increasingly clear that research on promoting health requires a variety of methodological approaches, including process- and outcome-based evaluation, and quantitative and qualitative methods. This synthesis covers some of the most robust evidence from one type of research (quantitative controlled trials that report effects on health outcomes), and its conclusions need to be read in conjunction with those of syntheses of other research approaches – for example, the HEN synthesis on factors that influence the effectiveness of health promotion programmes for children and adolescents (35).

Conclusions

School health promotion

In answer to the first part of the synthesis question – about the existence of evidence on school health promotion improving health or preventing disease – this synthesis provides sound evidence that these programmes can be effective, but also that they are by no means always so. It also provides evidence that programmes to promote some aspects of health are more effective than those that promote other aspects. The most notable development since the last review of reviews of promoting health in schools (14) was published has been the proliferation of reviews of initiatives that promote mental health, including programmes on preventing violence and aggression.

Arguably, the most important finding of this synthesis is that school-based programmes that promote mental health are effective, particularly if developed and implemented using approaches common to the health promoting schools approach: involvement of the whole school, changes to the school psychosocial environment, personal skill development, involvement of parents and the wider community, and implementation over a long period of time. Moderate to large effects were reported in reviews that undertook quantitative analyses.

The effectiveness of different types of programmes varies. Programmes to improve conflict resolution and reduce violence and aggression were among the most effective. Suicide-prevention programmes showed evidence of beneficial effects for suicide potential, but the less rigorous studies also identified negative/harmful effects in young males. Programmes for developing self-esteem were less effective. The promotion of self-esteem has been combined with many other programmes – for example, the prevention of substance misuse. One review reported that programmes that focused on self-esteem in its own right were more effective than those that combined it with other goals.

This synthesis confirmed the findings of previous reviews that programmes on preventing substance use are among the least effective of school health promotion programmes. At best, programmes were reported as delaying the onset of drug use and reducing the quantity of drugs consumed, but most of these programmes were ineffective. Also, no new reviews of interventions on sexual health were identified to overturn the finding of lack of effectiveness found in the previous review of reviews (14). The results of the review of programmes on injury prevention contrasted with those of the previous review, which demonstrated programmes on injury prevention to be relatively effective. Moreover, driver-education programmes were either ineffective or counterproductive.

As reported in the previous review of reviews (14), interventions that promoted healthy eating and physical activity were effective. These programmes were among the most sophisticated, and the ones that were effective were more likely to involve changes to the environment of the school and involvement of parents. In this area, as well as in mental health programmes, a range of different types of programmes proved effective.

Health promoting schools

The school health promotion programmes that were effective in changing young people's health or health-related behaviour were more likely to be complex, multifactorial and involve activity in more than one domain (curriculum, school environment and community). These are features of the health promoting schools approach, and to this extent these findings endorse such approaches. The findings of the synthesis also support intensive interventions of long duration. These were shown to be more likely to be effective than interventions of short duration and low intensity. This again reflects the health promoting schools approach, which is intensive and needs to be implemented over a long period of time.

None of the reviews extracted data or commented on the contribution of other key features of the health promoting schools approach – for example, the active participation of the school in developing the programme or changing the school ethos. Most of the studies covered in the reviews focused on relatively short-term, class-based programmes to improve knowledge and skills, and these were the least effective of the programmes.

The answer to the second part of the synthesis question – about the effectiveness of the health promoting schools approach – is therefore yes and no. There is evidence to support some of its features, but no evidence that the approach in its entirety is more effective than other approaches to health promotion in schools.

Generalizability of findings

The majority of studies included in the reviews have been carried out in the United States, and the extent to which the findings of these studies are relevant to Europe must be considered. Most of the studies in the reviews covered entire school populations, so to this extent they are generalizable. Some reviews suggested that certain initiatives might be more effective in high- than in low-risk populations, but in general the reviews did not discuss the potential contribution of cultural factors to effectiveness.

Policy considerations

School health promotion can be effective, particularly in improving mental health and in promoting healthy eating and physical activity. However, it is by no means always effective, and programmes to prevent substance use are among those that are least effective. Therefore, programmes that promote mental health may represent a better investment than programmes on preventing substance use.

It can be argued, on the basis of evidence, that mental health should be a feature of all school health promotion initiatives and that effective mental-health promotion is likely to reduce substance use and improve other aspects of health-related lifestyles that may be driven by emotional distress. Given the evidence of the relative ineffectiveness of programmes on preventing substance use, programmes that promote mental health may represent a better investment for schools and health authorities than the former programmes.

Programmes on healthy eating and physical activity are also among the most effective health promotion programmes. Although suicide-prevention programmes can reduce suicide potential,

potential harmful effects in young males should be considered. Also, peer-led health promotion appears to be a promising approach, but one whose efficacy has not been reliably proven.

No experimental studies have been conducted on initiatives adopting the health promoting schools approach in its entirety. However, several reviews found that components of the approach – for example, multifactorial approaches – contribute to effectiveness. Changes to the school environment are particularly important. The duration and intensity of programmes are also important to the success of programmes.

As this synthesis focused on systematic reviews of controlled trials, it cannot directly address questions that are important to the success of health promotion initiatives, such as: How did this initiative work? Why did it succeed in this context and not that? What might make this initiative more effective? However, there is evidence to show that sustained, multifactorial, whole school approaches are effective. These are important elements in the health promoting schools approach, but there are no studies that evaluate the approach in its entirety.

Further research on promoting health in schools is needed. Such research should include a wide range of methodologies, to establish what works and what does not. Research should use outcomes appropriate to the population being studied (universal or targeted), should consider issues of implementation and, where possible, should include evaluations of cost-effectiveness.

Annex 1: Search methods and definitions of key concepts

This synthesis is based on systematic searches undertaken to identify systematic reviews of the effect of school-health promotion initiatives on some aspect of health or well-being. The following databases were searched from 1997 to the end of 2003:

- Medline (1996 to Week 2 of November 2003)
- EMBASE (1996 to Week 50 of 2003)
- PSYCINFO (1985 to Week 2 of December 2003)
- ERIC (1997 to January 2004)
- CINAHL (1982 to Week 1 of December 2003)
- ASSIA (from origin to November 2003)
- British Education Index (1976 to September 2003)
- ISI Social Science Citation Index (1997 to 2003, searched on 5 January 2004)
- EPPICENTRE and HDA PROMIS (searched on 5 January 2004).

The search strategy was as described for the review of reviews in the 1997 United Kingdom Health Technology Assessment Programme report (14).

Inclusion criteria

Reviews were included if they met the following criteria:

- were published since 1997;
- covered health promotion initiatives based in schools;
- examined health promotion initiatives for young people where a majority of interventions were school based;
- were systematic – that is, explicitly described the intervention, setting, comparators and outcomes to be examined;
- specified details of the search, including literature sources;
- presented *a priori* inclusion and exclusion criteria for studies, based on methodological quality;
- included at least one experimental study (RCT, controlled trial or before and after study); and
- included studies that assessed the impact of health promotion in schools on some aspect of health and well-being.

Exclusion criteria

Reviews were excluded if they met the following criteria:

- covered only initiatives based on screening programmes or
- examined initiatives restricted to individuals with particular diseases or health problems;
- focused on school clinics; and
- were published before 1997.

Definition of school

As school health promotion may extend into the community and cover institutions labelled “colleges”, it is important to define what we mean by “school”. For this review, schools were defined as institutions serving young people aged 4–19 years and offering primary or secondary education. We have included all reviews that covered programmes with a school base, regardless of the setting in which they were delivered. Such programmes may involve (and be provided for) anyone associated with the school, including staff and parents, as well as young people.

Definition of health promotion in schools

This review focuses on initiatives to promote health in schools. We elected to exclude reviews of studies of secondary and tertiary preventive approaches to health improvement. These include screening programmes, which aim to identify disease in its early stages and institute early treatment, and programmes to improve the health of individuals who suffer from specific diseases or health problems. We therefore did not specifically search for reviews of studies of the effectiveness of school-health or welfare services.

Definition of health promoting school initiative

A health promoting school initiative was defined as a school health promotion programme where schools will use the principles of the WHO health promoting schools initiative and actively participate in the programme and where activities cover the curriculum and the school environment, and involve the community or families of pupils, or both.

In total, 448 titles and abstracts were downloaded and scrutinized for relevance, and 45 papers and reports were scrutinized for further details.

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Annex 2: Details of studies included

Study and year of publication	Focus of review	Number of studies	Findings	Comments
Wells et al. 2003	<i>Mental health</i> Controlled trials of interventions adopting a universal approach to mental health promotion	17	Some programmes were effective. Effective programmes were more likely to have adopted a whole school approach, to have been implemented continuously for more than a year, with emphasis on promoting mental health rather than preventing mental illness.	Narrative synthesis unable to calculate average effect.
Wilson et al. 2003	<i>Mental health</i> All controlled trials of violence- and aggression-reduction programmes	221	Average reduction of one third of a standard deviation on measures of violence and aggression. Least effective in children aged 6–13 years (better in children 5 years of age and under and in young adults aged 14 years and over).	Meta-analysis of results of wide range of approaches. Demonstration programmes and those evaluated in RCTs showed greater effect. Studies dating from 1950 included.
Scheckner et al. 2002	<i>Mental health</i> Controlled trials of school-based violence-prevention programmes	16	Average reduction of greater than one third of a standard deviation in half of the studies and less than one third on the other half. Effectiveness was increased by: primary prevention approach, implementation in multiple settings, length of programme and more qualified staff.	Meta-analysis not possible due to small numbers.
Mytton et al. 2002	<i>Mental health</i> Randomized controlled trials of violence-prevention programmes using high risk or secondary preventive approach	44	Average reduction across all trials of one third of a standard deviation. Both non-response training and relationship training were effective.	Meta-analysis of results on a range of standardized inventories. Most programmes focused on boys.

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Study and year of publication	Focus of review	Number of studies	Findings	Comments
Shepherd et al. 2002	<i>Mental health</i> Controlled studies, not already included in good quality systematic reviews, of prevention of suicide, depression or self-harm, or promotion of self-esteem	14, of which 5 were considered sound	Results were mixed. Primary prevention was more effective than secondary, but suicide prevention programmes were less so. Self-esteem promotion programmes had a modest impact.	Wide range of approaches included, from lectures to skill development sessions. Conclusions drew on findings from review of systematic reviews, as well as findings from new studies.
Thomas 2002	<i>Substance misuse</i> Randomized controlled study of all classroom smoking-prevention programmes with or without family or community components	76	Results were mixed. Programmes based on social influences were most effective, but only half of these were positive.	Results influenced by 16 studies judged most valid. Included programmes where smoking and drug prevention were combined.
Tobler 2000	<i>Substance misuse</i> Controlled studies of universal school-based drug prevention programmes	207	Results were mixed. The average impact was small to very small. Interactive programmes fostering skill development were more likely to be effective than lecture-orientated programmes.	Included smoking only and alcohol only programmes. Meta-analysis with regression. Small studies more likely to show positive results than large studies.
White et al. 1998	<i>Substance misuse</i> Controlled studies of interventions to prevent illicit drug use	62	Eighteen studies showed some evidence of effectiveness. The average impact was very small at one year and even less at 2 years.	Meta-analysis of wide range of approaches. Authors conclude that short-term delay and short-term reduction are all that can be achieved.
Shepherd et al. 2002	<i>Healthy eating and physical activity</i> Controlled studies of interventions designed to increase physical activity or exercise	22 healthy eating; 12 physical activity, of which 7 were considered sound	Most programmes were effective. More impact was apparent on girls and older students. Effective programmes adopted whole school approaches and provided healthy food in canteens. Teacher training was important.	All programmes based in secondary schools and all multi-component

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Stone 1998	<i>Healthy eating and physical activity</i> Controlled studies of physical activity interventions	14	Results were mixed. Studies showing greatest effectiveness used more extensive interventions. Some showed persistent beneficial effects.	Interventions in community settings included.
Grave 2003	<i>Eating disorders</i> Controlled trials of eating disorder prevention programmes	29	Results were mixed. Targeted programmes were more effective in changing behaviour.	--
Roberts 2003	<i>Injury prevention</i> Randomized controlled trials of driver education programmes	3	Programmes led to earlier licensing and did not reduce road accidents.	--
Harden et al. 2001	<i>Peer delivery</i> Controlled studies of peer-delivered programmes	64, of which 12 were methodologically sound	Seven of twelve sound studies showed impact, but studies comparing peers with teachers showed contradictory results.	Studies of interventions in which peers had only minor involvement excluded Qualitative studies and also reviews, and showed highly positive appraisals by young people.
Mellanby 2000	<i>Peer delivery</i> Controlled studies of peer-led interventions	13	Peers were at least as effective as adults.	--
Lister-Sharpe et al. 1999	<i>Health promoting schools approach</i> Experimental studies (including non-controlled studies) of interventions adopting a health promoting schools approach	12	Results were mixed on behaviour. Some interventions had effects on healthy eating, physical activity and possibly self-esteem and bullying. The approach had an effect on the social and physical environment of the school.	Wide range of disparate interventions, mostly small studies. Health promoting schools approach defined as interventions involving each of three areas: ethos and environment of school, curriculum and family/community.

References

1. WHO. *Expert Committee on School Health Services: report on the first session*, Geneva, 7-12 August 1950. Geneva, World Health Organization, 1951 (Technical Report Series, No. 30; http://whqlibdoc.who.int/trs/WHO_TRS_30.pdf, accessed 23 December 2005).
2. WHO. *Primary health care. Report of the International Conference on Primary Health Care*, Alma-Ata, USSR, 6–12 September 1978. Geneva, World Health Organization, 1978 (Health for All Series, No 1; (<http://whqlibdoc.who.int/publications/9241800011.pdf>, accessed 23 December 2005).
3. WHO. *Ottawa charter for health promotion: an International Conference on Health Promotion, the move towards a new public health*, November 17–21, 1986, Ottawa, Ontario, Canada. Ontario, Canada, Health and Welfare Canada, 1986; or Geneva, World Health Organization, 1986.
4. WHO Regional Office for Europe. *Regional guidelines: development of health-promoting schools: a framework for action*. Manila, WHO Regional Office for the Western Pacific, 1996 (Health Promoting Schools, Series 5; <http://whqlibdoc.who.int/wpro/1994-99/a53203.pdf>, accessed 23 December 2005).
5. Piette D, Rasmussen V, eds. *Towards an evaluation of the European Network of Health Promoting Schools – the EVA Project: a manual for national coordinators of the ENHPS and their collaborators*. Copenhagen, WHO Regional Office for Europe, 1995.
6. Parsons C, Stears D, Thomas C. The health promoting school in Europe: conceptualising and evaluating the change. *Health Education Journal*, 1996, 55:311–321.
7. Nutbeam D. The health promoting school: closing the gap between theory and practice. *Health Promotion International*, 1992, 7:151–153.
8. St Leger LH. The opportunities and effectiveness of the health promoting primary school in improving child health – a review of the claims and evidence. *Health Education Research*, 1999, 14(1):51–69.
9. Health Education Authority. *Health Promoting Schools: National Survey Report*. London, Health Education Authority, 1997 (unpublished).
10. Lynagh M et al. Lessons learned from the Hunter Region health promoting schools project in New South Wales, Australia. *The Journal of School Health*, 1999, 69(6):227–232.
11. Booth M, Samdal O. Health promoting schools in Australia: models and measurement. *Australian and New Zealand Journal of Public Health*, 1997, 21(4): 365–370.
12. Rowling L, Ritchie J. Health promoting schools: issues and future directions for Australia and the Asia-Pacific Region. *Asia Pacific Journal of Public Health*, 1996–1997, 9:33–37.
13. Swart D, Reddy P. Establishing networks for health promoting schools in South Africa. *Journal of School Health*, 1999, 69:47–50.
14. Lister-Sharp D et al. Health promoting schools and health promotion in schools: two systematic reviews. *Health Technology Assessment*, 1999, 3(22):1–207.
15. Shepherd J et al. *Barriers to, and facilitators of, the health of young people: a systematic review of evidence on young people's views and on interventions in mental health, physical activity and healthy eating – Vol. 2: complete report*. London, Evidence for Policy and Practice Information and Co-ordinating Centre, 2002 (http://eppi.ioe.ac.uk/EPPIWebContent/hp/reports/composite_report01/Vol%202_Web.pdf, accessed 23 December 2005).

16. White D, Pitts M. Educating young people about drugs: a systematic review. *Addiction*, 1998, 93(10):1475–1487.
17. Stone E et al. Effects of physical activity interventions in youth: review and synthesis. *American Journal of Preventive Medicine*, 1998, 15(4):298–315.
18. Lynach M, Schofield J, Sanson-Fisher R. School health promotion programs over the past decade: a review of the smoking, alcohol and solar protection literature. *Health Promotion International*, 1997, 12(1):43–60 (<http://heapro.oxfordjournals.org/cgi/reprint/12/1/43>, accessed 25 January 2006).
19. Krug EG et al., eds. *World report on violence and health*. Geneva, World Health Organization, 2002 (<http://whqlibdoc.who.int/hq/2002/9241545615.pdf>, accessed 24 December 2005).
20. Wells J, Barlow J, Stewart-Brown S. A systematic review of universal approaches to mental health promotion in schools. *Health Education Journal*, 2003, 103(4):197–220.
21. Wilson SJ, Lipsey MW, Derzon JH. The effects of school-based intervention programs on aggressive behaviour: a meta-analysis. *Journal of Consulting and Clinical Psychology*, 2003, 71(1):136–149.
22. Scheckner S et al. School violence in children and adolescents: a meta-analysis of the effectiveness of current interventions. *Journal of School Violence*, 2002, 1(2):5–33.
23. Mytton J et al. School-based violence prevention programs: systematic review of secondary prevention trials. *Archives of Pediatrics and Adolescent Medicine*, 2002, 156(8):752–762.
24. Thomas R. School-based programmes for preventing smoking. *The Cochrane Database of Systematic Reviews*, 2002, Issue 2, Art. No.: CD001293. DOI: 10.1002/14651858.CD001293 (<http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD001293/frame.html>, accessed 25 January 2006).
25. Tobler N et al. School-based adolescent drug prevention programs: 1998 meta-analysis. *The Journal of Primary Prevention*, 2000, 20(4):275–336.
26. Grave RD. School-based prevention programs for eating disorders: achievements and opportunities. *Disease Management & Health Outcomes*, 2003, 11(9):579–593.
27. Roberts I, Kwan I, the Cochrane Injuries Group Driver Education Reviewers. School based driver education for the prevention of traffic crashes. *The Cochrane Database of Systematic Reviews*, 2001, Issue 3. Art. No.: CD003201. DOI: 10.1002/14651858.CD003201 (<http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD003201/frame.html>, accessed 25 January 2006).
28. Harden A, Oakley A, Oliver S. Peer-delivered health promotion for young people: a systematic review of different study designs. *Health Education Journal*, 2001, 60(4):339–353.
29. Mellanby AR, Rees JB, Tripp, JH. Peer-led and adult-led school health education: a critical review of available comparative research. *Health Education Research*, 2000, 15(5):533–554.
30. Mukoma W, Flisher A. Evaluations of health promoting schools: a review of nine studies. *Health Promotion International*, 2004, 19(3):357–368.
31. WHO Regional Office for Europe. *For which strategies of suicide prevention is there evidence of effectiveness?* Copenhagen, WHO Regional Office for Europe, 2004 (<http://www.euro.who.int/document/e83583.pdf>, accessed 24 December 2005).
32. WHO European Working Group on Health Promotion Evaluation. *Health promotion evaluation: recommendations to policy-makers: report of the WHO European Working Group on Health Promotion Evaluation*. Copenhagen, WHO Regional Office for Europe,

1998 (document number: EUR/ICP/IVST 05 0103;
<http://www.who.dk/document/e60706.pdf>, accessed 3 January 2006).

33. Barlow J, Stewart-Brown S, Fletcher J. A systematic review of the school entry medical. *Archives of Disease in Childhood*, 1998, 78(4):301–311.
34. Donner A, Klar N. *Design and analysis of cluster randomization trials in health research*. London, Arnold, 2000.
35. WHO Regional Office for Europe. *What are the main factors that influence the implementation of disease prevention and health promotion programmes in children and adolescents?* Copenhagen, WHO Regional Office for Europe, 2005 (<http://www.euro.who.int/document/e86766.pdf>, accessed 24 December 2005).