

Systematic review of the effects of schools and school environment interventions on health: evidence mapping and synthesis

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Disclaimer: This report contains transcripts from interviews synthesised in the course of the research which may contain language that may offend some readers

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Executive summary

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Executive summary

Background and rationale

The health of young people in the UK is among the worst in Europe. The effects of curriculum-based health education interventions in schools show mixed results. A complementary 'school environment' approach has been used instead to modify the school physical and social and cultural environment to promote health. This report presents a systematic review of school environment studies addressing multiple questions and using diverse types of evidence.

School environment interventions are supported by the World Health Organization (WHO) framework for Health Promoting Schools (HPS). A Cochrane review of HPS interventions (which address school environment alongside parent/community involvement and curriculum) is under way. Our review is different because it focuses on interventions addressing the school environment alone in order to isolate environmental effects (which is not possible when combining environment with curriculum components). Process evaluation studies are also reviewed, as they are useful for informing decisions about the wider implementation of interventions. Because health outcomes also vary between schools in the absence of specific interventions, and research suggests that these differences are attributable to school-level measures of the school social and physical environment, we have also included quantitative studies of school-level effects in our review. Although existing reviews have examined such research, they have not drawn authoritative conclusions because of methodological limitations in the studies they have included. We have therefore applied more rigorous inclusion criteria to review quantitative studies of school-level health effects. We also review qualitative studies examining the processes underlying such effects.

Aim and research questions

This systematic review aims to synthesise evidence relating to the health effects of school environment interventions and of school-level measures of the social and physical environment and the processes underlying these. The review was conducted in two stages. In stage 1, we identified and descriptively mapped a broad array of potentially relevant literature, including research involving all aspects of the school environment and student health as well as teacher health. Stage 2 focused specifically on student health and defined the school environment more narrowly in terms of how schools are organised/managed, how they teach, how they provide pastoral care and discipline and/or the school physical environment. It involved five in-depth reviews to address the following research questions (RQs):

Research question 1

What theories and conceptual frameworks are most commonly used to inform school environment interventions or explain school-level influences on health? What testable review hypotheses do these suggest?

Research question 2

What are the effects on health and health inequalities among school students aged 4–18 years of school environment interventions (modifying how schools are organised/managed, how they teach, provide pastoral care to and discipline students, and/or the school physical environment) that do not include health education or health services as intervention components and which are evaluated using prospective experimental and quasi-experimental designs? What are their direct and indirect costs?

Research question 3

How feasible and acceptable are the school environment interventions examined in studies addressing RQ2? How does context affect this?

Research question 4

What are the effects on health and health inequalities among school students aged 4–18 years of school-level measures of school organisation/management, teaching, pastoral care and discipline, student attitudes to school or relations with teachers, and/or the physical environment (measured using 'objective' data rather than aggregate self-reports from the same individuals who provide data on outcomes), examined using multilevel quantitative designs?

Research question 5

Through what processes might these school-level influences occur, examined using qualitative research?

We review each of the five RQs in separate chapters. We then assess the review hypotheses developed under RQ1 in relation to the totality of empirical evidence in our final chapter's overall synthesis.

Methods**Stage 1: identifying and describing the literature**

To locate evidence and theory, 16 databases were searched between 30 July 2010 and 23 September 2010, including the British Educational Index, the Cumulative Index to Nursing and Allied Health Literature, the Health Management Information Consortium, EMBASE, MEDLINE and PsycINFO. A priori criteria were developed to identify relevant references based on title and abstract, and these were descriptively coded (e.g. country of study, health topic, school level) to develop an evidence and theory map. We consulted with key stakeholders, including young people, about the map and the implications for stage 2.

Stage 2: in-depth synthesis

An in-depth synthesis was conducted for each of the five RQs. Specific exclusion criteria, quality assessment and data extraction tools were developed for each synthesis. Additional searches were conducted by checking references of included reports and contacting study authors. A narrative synthesis approach was used for RQ1–4 and a meta-ethnography approach was used for RQ5.

Results

A total of 1144 references were included in the evidence and theory map. Most were references to primary research conducted in high-income countries. The main health topics identified at the mapping stage were student violence, bullying, harassment, diet and physical activity. The main aspects of the school environment identified were school management/policies, catering services/vending machines and sport/active transport.

The findings of the theory map and the consultations with key stakeholders suggested that the most important school environment interventions and determinants to focus on were those relating to how schools are organised and managed, how they deliver teaching, pastoral care and discipline, and schools' physical environments.

Research question 1: theory synthesis

A total of 24 theories were cited in either stand-alone theory papers or empirical reports addressing RQ2–5. The most commonly cited theories were ecological systems theory (cited in 10 reports), social control theory ($n=6$), social disorganisation theory ($n=5$), social learning theory ($n=5$), theory of human functioning and school organisation ($n=5$) and social cognitive theory ($n=4$).

Inclusion criteria were developed to assess which theories should inform our primary and secondary review hypotheses. Three theories informed our primary review hypotheses:

- social capital theories – schools will foster health by having a stable student and staff body, good relationships between staff and students and a positive school ethos of stable shared norms
- social development model – schools reduce antisocial behaviour by providing opportunities for students to participate fully in learning and community life, develop the skills necessary for such participation and ultimately gain recognition
- theory of human functioning and school organisation – schools foster student autonomy and health by reducing social boundaries between staff and students and among students, and ensuring student-centred framing of learning, management and other school systems.

Research question 2: outcome evaluations

A total of 16 reports of 10 studies were included that evaluated the outcomes of interventions aiming to modify the school environment without simultaneously addressing school health curricula. Of these 10 studies, six were randomised controlled trials (RCTs) and four were quasi-experimental studies. Across all reports, more measures were reported as providing significant benefits than as not significantly affecting outcomes, and none reported significant harms.

Five outcome evaluations examined interventions that encouraged staff and students to build a stronger sense of community and/or better interpersonal relations at school. Such studies have been conducted in a range of school settings in elementary, middle and secondary/high schools. All except the Healthy School Ethos (HSE) intervention (UK) were conducted in the USA. Evaluations reported benefits regarding some but not all measures of emotional health, conflict resolution, aggression, victimisation and perceived student safety. However, the strongest evaluation in this category, the Aban Aya Youth Project (AAYP), found school environment change to be associated with fewer significant health benefits than curriculum only.

Two RCTs assessed an intervention that combined changes to US middle schools' food and physical activity environments alongside actions which aimed to empower students to contribute to achieving these changes. These were well conducted and both reported intervention benefits for student physical activity but not for healthy eating. The mediation analysis in the Healthy Youth Places (HYP) study suggested that student empowerment partly explained intervention effects. Three quasi-experimental evaluations of an intervention to improve playgrounds in British primary schools reported mixed findings on students' physical activity with indications that benefits were greater for younger children and when break time was longer.

The outcome evaluation studies provide little information on the likely impact of school environment interventions on health inequalities. Two studies of playground interventions reported costs although none reported on cost-effectiveness.

Research question 3: process evaluations

We examined process evaluations of interventions included in our review of outcome evaluations. Six reports of four separate studies were included. These employed various research methods, most frequently drawing on quantitative data collected from students and/or teachers. These reported positively on intervention feasibility, fidelity, reach and acceptability. The single study that examined context suggested that it was important, facilitating implementation when this built on schools' existing ethos and when senior staff championed the intervention.

Research question 4: multilevel studies

Multilevel studies measure outcomes at the individual level and explain these in terms of school- and individual-level student characteristics. Unlike ecological studies they can disentangle the effects of school-level factors that can also be represented at the individual level. We included 42 reports of multilevel studies (drawing on a total of 34 different data sets) examining the health effects of school-level factors measured 'objectively' (i.e. not merely aggregating data from individuals from whom outcome data were

collected). We confined our narrative synthesis to 10 reports that adjusted for key potential confounders and which did not overadjust for factors that might mediate school effects on health.

We found consistent evidence from studies of middle schools in the USA ($n=1$) and secondary schools in the UK ($n=3$) that schools with higher academic attainment and attendance than would be expected judging from the social profile of their students (i.e. a 'value-added' measure) had lower rates of substance use. The US study also reported that these schools have lower rates of group fighting and suggests that these school effects are generalisable to low-income, ethnic minority young people.

Findings on the influence of school policies were mixed. A German cross-sectional study of secondary schools reported that a complete smoking ban for students at or around school was associated with reduced smoking. However, a cross-sectional survey of secondary schools in the USA and Australia found no association between various forms of school smoking policies (including policies with constructive sanctions for students caught smoking) and any measures of student smoking. These differences between studies may reflect a 'ceiling' effect for the impact of smoking bans, which have already been widely implemented in US and Australian but not German schools. A cross-sectional study of Dutch secondary schools reported no associations between school policies on alcohol use at school or school sanctions and heavy drinking among students aged 12–16 years.

A cross-sectional study found that students in US middle schools with larger total campus and playground areas per student had higher rates of physical activity at school. A cross-sectional study of US high school students found that the number of unobservable/unsupervised places at school was associated with some measures of the use of alcohol and marijuana in school in the previous 12 months but not overall use in the past year. Finally, a cross-sectional study reported that the following school-level factors were not associated with alcohol use among students aged 13–14 years in rural schools in the USA: whether eighth graders are located within the same school as high school students or are in separate schools, school size and pupil–teacher ratio.

These multilevel studies provide little evidence on the impact of schools on health inequalities. Only one well-adjusted study of school effects examined subgroup effects (defined in terms of baseline health behaviour rather than socioeconomic status) and found no significant differences.

Research question 5: qualitative studies

In total, 21 qualitative studies were synthesised to explore the processes through which school-level influences might occur. Various pathways were identified. First, aggressive behaviour and substance use may be students' active responses to schools when they feel educationally marginalised or unsafe, which may in turn exacerbate disengagement and anxiety. Second, positive teacher–student relationships appear to be critical in promoting student well-being and limiting risk behaviour, although certain aspects of schools' organisation may have the potential to undermine these. Third, because of having so little involvement in decision-making in schools, students can fail to develop what social control theory defines as a 'stake' in their school, thus increasing the likelihood that they will instead look for a sense of identity and social support through health-risk behaviours. Fourth, students' lack of satisfaction with school can cause them to seek sources of 'escape', either through heavy drug use and drinking, or by leaving school at lunchtime or for longer unauthorised spells.

Conclusions

We focused on how schools are managed, designed and built and provide learning and teaching, pastoral care and discipline. There is evidence for the potential of school environment interventions addressing these to promote health, but the evidence is far from definitive. Five outcome evaluations examined interventions encouraging staff/students to build a stronger sense of community and/or better interpersonal relations in a range of US/UK school settings. These evaluations generally reported benefits for measures

related to emotional health and aggression. Two evaluations assessed interventions modifying American middle schools' food/physical activity environments and empowering students' involvement in this, reporting benefits for physical activity measures but not for diet. Process evaluations positively reported on interventions' feasibility, fidelity, reach and acceptability. To develop a fuller picture of the effects of school environment interventions, the results of our own review should be read in conjunction with those of the Cochrane review of HPS interventions, which include school environment alongside curriculum and parent/community components.

Outcome and process evaluations were subject to methodological limitations, and were not informed by nor aimed at testing any of our review theories. Most of the interventions employed multiple components addressing different aspects of schools' organisation and practice and so they do not lend themselves to testing specific hypotheses. However, the evidence from these lends broad support to each of our three primary hypotheses arising from the social development model (regarding the importance for health of participation in school activities), social capital theory (regarding the effects of trusting relationships) and the theory of human functioning and school organisation (regarding the importance of eroding rigid social boundaries between staff and students and how more student-centred framing of activities will enable better health outcomes).

The multilevel studies provide greater insights regarding our review hypotheses, most notably regarding the theory of human functioning and school organisation, which several studies explicitly aimed to test and provided evidence for.

The meta-ethnography of qualitative studies also supported the theory of human functioning and school organisation, suggesting that a lack of safety at schools, weak student-staff relationships, lack of student participation in decisions and educational disengagement may harm student health.

We have concluded that, although existing interventions suggest the potential for school environment interventions to promote young people's health, the evidence base is currently far from definitive. There is a need for better-conducted RCTs, studies outside the USA and studies on interventions focused on outcomes other than violence, healthy eating and physical activity. The multilevel studies and qualitative evidence reviewed have suggested potential new foci for intervention studies, such as interventions addressing student engagement, attainment and attendance, student participation in decisions, and the school physical environment. More trials are also needed to improve the evidence base concerning interventions addressing school community building and interpersonal relationships, particularly in secondary schools and outside the USA. RCTs of playground improvements are also required.

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