

Effective Elements of School-based Provision for the Promotion of Healthy Lifestyles: A European Delphi Study

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Objective: Schools can serve as settings for promoting their student health, although it is necessary to identify the key elements of provision to leverage change. This study's objective was to develop a Europe-based list of the elements of learning and health support systems judged by a group of experts to be most effective in influencing school student healthy lifestyles education. **Methods:** A 3-stage Delphi study involving a group of 18 Europe-based subject specialists was used to articulate shared expert opinions on the main research question: *what are the most effective elements of learning and health support systems influencing school students' healthy lifestyles education?* Over 3 rounds of data-gathering, experts were asked to assess the effectiveness of 25 specific elements. **Results:** The 3 rounds resulted in the following ranked list: Physical Education (PE), Staff Professional Development, Healthy School Policies, Active Recess, Family & Community Engagement, Healthy Eating, Physical Activity in Classroom Lessons, and Active Transport. **Conclusions:** Cautious of overly generalizing from the results, we suggest the findings offer useful information for evidence-based programs, as well as future research that explores the necessary components of health promotion in schools.

Key words: adolescent health; child health; Delphi study; health education; physical activity; school health

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Worsening health behaviors of children pose a significant public health problem.¹ In the past, youth-based health efforts focused on controlling and preventing infectious diseases, such as smallpox and tuberculosis.² However, current health challenges increasingly relate to non-communicable diseases and associated behavior and lifestyle choices, including physical inactivity and poor diet.³ Rising levels of obesity and overweight are, perhaps, the most commonly cited evidence of these concerns, with more than 50% of the European Union population estimated to be overweight, and nearly one in 6 children overweight or obese.⁴ An array of comorbidities,

such as high blood pressure, diabetes, and mental health issues, both during youth and later life, and associated health costs,⁵ means that declining health adversely impacts individuals and communities. These trends emphasize the need for early intervention through comprehensive health promotion and primary prevention strategies. Schools have frequently been suggested as valuable settings to address this situation, creating a unique opportunity to reach children across the population during a critical period in developing and establishing health behaviors.⁶ However, implementation has often proved to be a challenge.⁷

An early review reported that health promotion

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Table 1
Participant Information

Variable	N
Sex	
Female	9
Male	9
Profession	
University lecturer / professor	12
University researcher	2
School teacher	1
Non-government organization staff	2
Medical / Public health doctor	1
Country of work	
Czech Republic	1
Denmark	1
Estonia	1
Finland	1
Germany	2
Hungary	1
Ireland	2
Italy	1
Netherlands	1
Serbia	1
Spain	2
Switzerland	1
United Kingdom	3

programs were most likely to be effective when informed by whole-school involvement, a supportive psychosocial environment, the development of personal skills, the involvement of families and the wider community, and long-term implementation.⁸ Subsequent research suggested that interventions were most effective when key stakeholders were empowered to make interventions sustainable.⁹ The “Whole School, Whole Community, Whole Child” (WSCC) model highlights the dynamic relationships among intrapersonal, interpersonal, and community levels. It also stressed the importance of evidence-based policies and practices and explicitly identifies 10 components of an effective school-based health-promotion strategy (including physical education and physical activity, Nutrition Environment and Services, and Social and Emo-

tional School Climate).¹⁰ These components reiterate findings from other studies demonstrating the value of including specific practices that can act as focal points for healthy lifestyle promotion.¹¹

This study’s objective was to develop a Europe-based list of the most effective elements of learning and health support systems influencing school students’ healthy lifestyles education. Europe benefits from a network of agencies with an expressed interest in health and education, including the European Union, the European Commission, and the World Health Organization Regional Office for Europe, and the development of policy and guidance tends to be relatively coordinated. Therefore, the potential for multi-national policy development and implementation is relatively strong, compared to less centralized regions.¹²

METHODS

Participants

A 4-step procedure identified experts. First, organizations within the HEPAS (Healthy and Physically Active Schools in Europe) Project (see Acknowledgements) suggested individuals with extensive experience of aspects of school-based health promotion. Second, the authors independently sought known researchers and practitioners from across Europe, addressing gaps in region and expertise. Third, a provisional cohort was drafted that balanced subject expertise and geographical coverage. Finally, following email communication with the identified experts, the selection process was repeated to add new experts to the study. The resulting group came from 13 European countries and included schoolteachers, university professors, and non-government organization specialists. Following published guidance,¹³ recruitment aimed for a pool of between 15 and 35 experts, so the non-probabilistic, purposive sample of 18 people fulfilled this goal (Table 1). Each participant was sent information about the study via email, with a direct link to the online questionnaire landing page, reiterating project information and informed participants of the anonymity and confidentiality of individual responses and their right to informed, voluntary consent. The experts were invited to participate in each of the 3 rounds.

Instruments

The approach chosen for eliciting an expert group's view was a 3-stage Delphi study. The Delphi Method is a method of eliciting and refining group judgment based on the rationale that a group of experts is better than one expert when exact knowledge is not available. Specifically, Delphi involves a group of experts who anonymously reply to questionnaires and subsequently receive feedback in the form of a statistical representation of the group response, after which the process repeats itself. The goal is to reduce the range of responses and arrive at an expert consensus.¹⁴

The protocol collated opinions on the main research question: *What are the most effective elements of learning and health support systems influencing school students' healthy lifestyles education?* Opinions were submitted to repeated rounds of analysis and reorganization, and the experts were invited

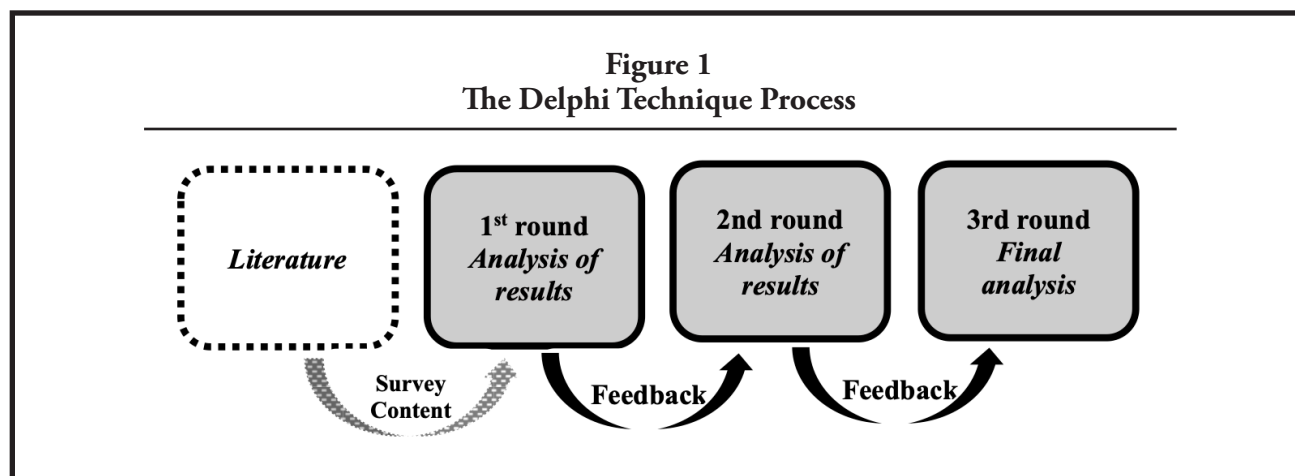
to engage with increasingly aggregated iterations of the group's shared decision-making. Anonymity throughout the process, and multiple rounds of data collection, data analysis, and controlled feedback, helped limit the influence of comments from individuals.¹⁵ All rounds of data-gathering were administered electronically, using an online software program (www.surveymonkey.com). The utilization of an online procedure allowed much greater flexibility in the exercise's administration and provided time for reflection. Because the timing of this study coincided with the outbreak of COVID-19, this approach made research tenable. Following discussions with participants, it was decided to continue with the study.

Procedure

The research process took place between December 2019 and April 2020, with the data-gathering and analysis occurring between February and April 2020. An initial review of English-, French- and German-language sources identified 52 discrete school-based practices associated with promoting healthy lifestyles.^{10,16-19} This list was reviewed by 5 experienced, linguistically diverse researchers from within the HEPAS project, who were invited to identify additional information sources, modifications of terms, duplications, and other feedback. They did not take part in the expert panel. The study authors undertook an iterative process of reducing the list of elements by eliminating redundancies, removing duplicates, and forming new, conceptually coherent themes by merging closely related topics and trialing terms. Altogether, 25 elements resulted from this process which formed the content of the first round of the Delphi analysis.

The basic Delphi process used in this study is summarized here:

1. The researchers identified a specific question (*What are the most important / impactful components of learning and health support systems influencing school students' healthy lifestyles education?*)
2. They then compiled a list of possible answers to this question (statements) based on published literature, policy documents, etc.⁷⁻¹¹ This list contained 52 statements.
3. A panel of experts was recruited, comprised of people who could offer credible insight into



- the question, specifically related to healthy lifestyle policy development in European schools. The resulting list contained 25 items.
4. The researchers distributed the questions that made up the Delphi study via email, with a link to a specialist online survey site (survey-monkey.com).
 5. The experts gave their responses to statements related to the questions by rating their importance on a 9-point Likert scale ('Round 1').
 6. The consensus criteria were *a priori* determined as a measure of central tendency within a specific range. As there is no consensus regarding the consensus threshold in the Delphi method,¹³ the cut-point with mean scores of less than 7.0 seemed appropriate for the study. Accordingly, the responses were analyzed and mean scores were weighed, and the list refined and shortened with statements eliciting ratings of less than 7.0 (70%) removed from the list. This reduced the list of statements to 12, which was sent to the list of experts.
 7. The experts ranked the shorter list of statements. Once again, 7.0 was used as the cut-point of acceptance ('Round 2'), resulting in a list of 12 elements.
 8. The researchers analyzed and weighed the revised list and invited the experts to rank the final list ('Round 3').
 9. The statements that remained after this process were selected as the final list and ranked by the experts. The top-ranked statements became the final list of 8 elements.

Figure 1 shows the process used in this study.

This was the first study of experts' perceptions of the elements influencing school students' healthy lifestyles education in Europe, and as such, it can be understood as a scoping study. The lack of previous research in this area suggests that a qualitative investigation might usefully act as a launchpad for subsequent research.

Response rates for the different stages of the study were: round 1, 18 responses; round 2, 16 responses; and round 3, 16 responses. This represents an 89% completion rate, which, according to some authors is considered above the rate that would guarantee the rigor for multiple-round surveys.^{20,21}

Data Analysis

In the first round, we asked experts to rate the efficacy of 25 elements using a 9-point Likert-type scale. Weighted means of the total scores for each element were calculated using the formula $(x_1w_1 + x_2w_2 + x_3w_3 \dots x_nw_n) / \text{total}$; where w = weight of answer choice, and x = response count for answer choice); the element with the highest mean ranking was judged the most preferred choice overall. The elements with a weighted mean of 7.00 or higher for the first and 6.00 or higher for the second round $(x_1w_1 + x_2w_2 + x_3w_3 \dots x_nw_n) / \text{total}$ response count), the provisional points of consensus, formed the bases of the subsequent rounds. In the final round, participants ranked responses according to their judgments of effectiveness.

RESULTS

Of the 25 elements listed in the first round, 12 (48%) reached the threshold point for retention; 8

Table 2
Rounds of Delphi Survey (Ordered by Weighted Mean of 9-point Likert-type Scale)

Round 1		Round 2		Round 3	
Physical Education (compulsory school lessons)	8.56	Physical Education	9.00	Physical Education	7.27
Staff professional development (training for school staff responsible for health and/or teaching)	7.94	Healthy school policies	8.08	Staff professional development	5.27
Family & Community Engagement (links between school and students' families / communities)	7.83	Staff professional development	7.77	Healthy school policies	4.73
Active Recess/Breaks (free time from lessons)	7.72	Family & Community Engagement	7.46	Active Recess/Breaks	4.67
Social & emotional education (mental health, emotional well-being, anti-bullying)	7.56	Active transport	7.23	Family & Community Engagement	3.67
Healthy eating (cooking, diet & nutrition)	7.50	Active Recess/Breaks	7.08	Healthy eating	3.67
Physical activity in classroom lessons (classroom activity breaks and active thinking)	7.44	Healthy eating	6.77	Physical activity in classroom lessons	3.67
Healthy school policies (written statements promoting a healthy school)	7.39	Physical activity in classroom lessons	6.62	Active transport	3.07
Sex education (relationships, sexual health and parenthood)	7.28	Social & emotional education	5.46		
Active transport (active travel to and from school)	7.22	School sports clubs	4.31		
School sports clubs (before and/or after school)	7.22	Health promotion programs for staff	4.23		
Health promotion programs for staff (school employee well-being)	7.11	Sex education	3.00		
Substance abuse prevention (alcohol, tobacco and drug use)	6.94				
Appropriate use of screen and electronic devices time (use of mobile phones, tablets, etc.)	6.72				
Road safety education (lessons in schools)	6.67				
Vaccinations (school-based program)	6.67				
Hygiene (lessons in keeping oneself and the school clean)	6.56				
Counselling, psychological, and social services (support services)	6.39				
Personal safety and injury prevention (individual and community safety)	6.39				
First Aid (emergency care and assessment)	6.28				
Health screening (assessment of health measures)	6.22				
Intramural sports (competitions within schools)	5.61				
Homework (home study related to healthy lifestyles)	5.61				
Extramural sports (competitions with other schools)	5.39				
Rest periods (time to rest / sleep at school)	4.61				

elements (67%) met the threshold after the second round and were carried over to the final round. The third round gave the experts an opportunity to review the results from the previous round and adjust their responses according to the group response if deemed necessary. The change in scores reflected the consensus-seeking aim of the Delphi method and the opportunity given to reconsider.²¹ Table 2 presents the results from the 3 rounds of the Delphi process.

DISCUSSION

Schools are potentially valuable settings for the promotion of healthy lifestyles. This has traditionally focused on classroom-based health education lessons and the provision of school health services, but these approaches have largely failed to demonstrate significant reductions in health risk behavior.²² Whole-school approaches are typically framed within socio-ecological perspectives that acknowledge the need to engage school stakeholders (students, teachers, parents, and the wider community).²³ However, the caution expressed earlier in this paper needs to be recalled in interpreting the findings of this consensus study. The discrete elements of healthy lifestyles analyzed here represent the explicit tools and resources that can help schools achieve and promote cultures of health. Many factors have been identified that can support the realization of this goal, including national and local policies, capital investment, and assessment of relevant opportunities,¹⁰ and the specific strategies need to be understood as parts of this synergistic whole. In other words, the implementation of the elements of healthy lifestyles examined in this paper might be valuable, or even necessary conditions for the generation of a culture of health in school, but they are not sufficient. Nevertheless, such elements are important, as both the settings in which healthy behaviors are manifested and the most readily identifiable expressions of schools' commitments to promoting their students' health. Empirical studies²⁴ and evidence-informed guidance¹⁰ support the importance of these discrete strategies in implementing school-based health promotion. This was the starting point for the present study. By articulating specific components of healthy schools, the findings offer guidance to policymakers and practitioners regarding the potential priorities for action. From an

initial list of potential components developed from the literature review, 8 were identified by the expert group as effective for promoting healthy lifestyles in schools.

Curricular physical education has long been associated with health outcomes and continues to be aligned with health education in several countries.²⁵ Besides its role in supporting physical health, physical activity in schools supports mental health, academic achievement, and other positive outcomes.^{26,27} As the only source of regular, structured physical activity guaranteed to almost every student, physical education classes are well-placed to promote healthy lifestyles.²⁸ Every physical education curriculum in Europe includes reference to health or healthy lifestyles, particularly health-enhancing physical activity (HEPA). In some countries, such as Finland, Italy, Poland, Norway, Slovenia, and Spain, classroom lessons on physical activity and health are also available as elective courses in high schools.²⁹ The extent to which schools successfully utilize physical education in this way is difficult to judge due to the contested nature of the subject's aims and content.³⁰ However, research suggests that many lessons involve relatively low physical activity levels, and health behaviors do not consistently track to other aspects of children's lives.^{31,32} This situation has led to calls for a closer alignment of the goals of physical education with public health agendas.³³ In this context, teachers of physical education might need to take broader responsibility for supporting the development of the knowledge, skills, attitudes, and values associated with healthy and active lifestyles.³³

Effective professional development is essential to the implementation of school-based health promotion.¹⁹ Studies highlighted the importance of staff engagement as a necessary condition for realizing health-related changes.^{34,35} Yet, as teacher education in Europe rarely includes such content, professional development opportunities are even more crucial in fostering healthy lifestyles in schools.⁹ The movement from classroom-based health education to whole-school approaches requires, as a minimum, coordinated efforts in school policies, physical environment, social environment, community links, and health-sector partnerships,³⁶ so the promotion of healthy lifestyles in schools plac-

es high demands for change to teachers, as well as other stakeholders.^{37,38}

Policy is a crucial determinant of school-based health provision in Europe,³⁹ but the trajectory from policy formulation to implementation is complex and mediated by numerous actors and factors, such as funding, time, programming, staffing, and stakeholder support.³³ Effective school-level policies have been associated with a range of outcomes, including improved school nutrition,⁴⁰ reduced student obesity,⁴¹ increased physical education time and children's participation in physical activity,⁴² and social-emotional learning.⁴³

Recess (or break time) is a feature of most schools in the European Union.⁴⁴ It has been identified as a potentially valuable setting for promoting healthy behaviors, especially physical activity,⁴⁵ with the potential to contribute up to 40% of daily physical activity recommendations.⁴⁶ Evidence also suggests that active recess can improve fundamental movement skills, weight status, and cognitive performance.⁴⁷

The developmental importance of the families and the communities in which students live is well-established, with 6 types of involvement identified as especially relevant: parenting, communicating, volunteering, learning at home, decision-making, and collaborating with the community.⁴⁸ Their roles in the specific context of nurturing healthy lifestyles have received much less attention from researchers, although available evidence supports the claim that family and community involvement are necessary conditions of sustainable health-based strategies.⁴⁹ Community-based interventions have resulted in positive outcomes in terms of healthy eating⁵⁰ and physical activity promotion.⁵¹ By observing active behaviors and lifestyles in their families and communities, students can internalize healthy habits, especially if health messages are shared among the triad of school-family-community.⁵²

Schools are among the most influential places for the encouragement of healthy eating, and many European Union member states have developed specific policies, guidance, and initiatives to improve the diets of children and young people.³⁴ In addition to the substantial amount of time spent at school, children often consume food and drinks during this time, and school staff can engage with both children and parents to stimulate healthy eat-

ing.⁵⁰ Healthy eating programs can also impact engaged students acting as change agents, spreading messages throughout the school population, families, and the community.⁵² A systematic review of European school-based interventions concluded that multi-component interventions can combine easier access to fruit and vegetables within classroom lessons, elicit parental involvement, improve students' diets, and reduce obesity.⁵³

Classroom lessons are the least active parts of a young person's day in European schools.⁵⁴ Two main strategies have been proposed for increasing physical activity in classroom lessons: movement breaks, short bursts of aerobic (eg, marching with arm movements, jumping, hopping) or anaerobic activities (eg, strength and coordination exercises) between periods of academic instruction;⁵⁵ and physically active learning, which teaches content through purposeful movements.⁵⁶ Movement breaks have been found to offer a popular, time- and cost-efficient way of increasing students' daily physical activity without interfering with the achievement of lesson objectives.⁵⁷ Active learning research is less-developed, but findings have been generally positive. Studies have focused on a diverse range of school subjects,^{58,59} as well as cross-curricular themes within physical education lessons, such as thinking and social skills, and personal responsibility.⁶⁰

Active transport is another source of physical activity for children and young people, involving walking or cycling to and from school, in contrast to passive commuting by car or bus. Compared with other forms of physical activity, active transport has the advantage of being relatively convenient and accessible. One survey found that promotion of walking and cycling to school was a common strategy in European cities.⁶¹ Walking and cycling provide several benefits, such as reducing children's energy intake⁶² and body mass index (BMI),⁶³ both associated with healthy weight. Communities with active transport policies also have reduced car use,⁶⁴ contributing to healthier local environments. Despite these benefits, active transport has significantly declined in most European countries over the last 30 years,⁶⁵ influenced by increasing car use, changes in social norms, and parental anxieties about safety and security.⁶⁶ These factors highlight the importance of safe routes between home and school as a precondition for sus-

tainable active transport practices.

By examining the components of effective school-based healthy lifestyle promotion, the present study builds on the lessons learned by the WSCC program,¹⁰ and it is important to acknowledge that these components represent only the most explicit features of effective provision. The WSCC model also emphasizes the importance of a supportive psychosocial and educational climate and a holistic approach designed to emphasize the whole suite of settings to support each student's development.⁶⁷ The importance of a whole-school approach is a recurring theme in the literature.⁶⁸ Nevertheless, in light of evidence that most European schools are currently a long way from a whole-school approach to healthy lifestyle promotion, it is worth considering the content and the relative efficacy of discrete elements of provision.

Limitations

The present study has several limitations. The Delphi method has some inherent constraints, such as the duration of the process, influence on the responses due to question formulation, and difficulty in assessing the group's expertise because they never meet. Also, whereas a specific population was identified in advance, the potential for bias remained due to self-selection, under-coverage, and non-response. Disadvantages associated with the online approach may have been balanced by benefits inherent in asynchronous data entry, such as anonymity and greater time to reflect on responses.⁶⁹ There was also a problem internal to this study. A suitable cohort from a diversity of linguistic, organizational, and disciplinary backgrounds was achieved using most of the experts at least partially worked in areas related to physical activity. Therefore, there was a danger that responses were skewed. This limitation must be acknowledged, as we intend to scope and initiate further inquiry in what is undoubtedly an under-researched area.

Conclusion

We report the first study to consolidate experts' views on the most effective school-based strategies to promote healthy lifestyles in a European context. Using an iterative process of consensus building, we sought to identify the key elements within such provision and give some sense of the relative efficacy of

different practices. Cognizant of the inherent limitations of any exploratory study, which are likely to be magnified during the unprecedented circumstances in which it took place (ie, the COVID-19 pandemic), the authors are cautious of being overly optimistic or forming generalized conclusions from the data presented here. Nevertheless, findings do offer insight into effective provision.

It has been suggested that Europe offers a potentially fruitful context for discussing whole-school health promotion initiatives due to its relatively well-developed network of related agencies and the coordinating role of the European Union and cooperating countries. National and local contexts vary, but there are also substantial similarities in health promotion's intended outcomes, namely encouraging healthy behaviors during childhood and youth and laying the foundation of healthy lifestyles. Whereas the present study is a preliminary step towards conceptualizing school-based programs' elements, its findings offer useful information for evidence-based programs and as future research that explores the necessary components of health promotion in schools.

IMPLICATIONS FOR HEALTH BEHAVIOR OR POLICY

If schools are to adopt a health-promoting role and contribute to this World Health Organization (WHO)⁷⁰ priority health topic, they must identify the most effective strategies and elements for the promotion of healthy lifestyles on 2 levels:

- On a general level, staff professional development, family and community engagement, and healthy eating should be part of healthy school policies developed within school development measures.
- On a more specific level, promoting physically active lifestyles throughout the school day should be supported by quality physical education, active recess, physical activity in classroom lessons, and active transport.

Recommendations for Researchers

We propose the following recommendations for researchers:

- The research community should continue to examine school-based strategies, focus-

ing on a comprehensive approach and context-specific issues of implementation and adaptation.

- Researchers should focus efforts in less-researched areas of school-based strategies to promote healthy lifestyles, such as the role of families and communities and physically active learning.
- They should extend existing local, regional, and national research networks towards transnational collaborations across Europe, and beyond.

Recommendations for Practitioners (Teachers or Other School Staff Members)

We propose the following recommendations for practitioners:

- Initiatives providing opportunities for healthy lifestyles throughout the school day need to be conceptualized within a whole-school framework, taking advantage of both new and existing opportunities throughout the school day, adaptable to individual schools' distinctive contexts.
- Opportunities to discuss and promote healthy lifestyles should be identified and promoted so students and their families better-understand ways in which healthy behaviors can be incorporated into all aspects of school life and life beyond school.
- The promotion of healthy lifestyles should be embedded in school policies and development plans. Teachers of physical education should be trained and supported to take broader responsibility for supporting the development of the knowledge, skills, attitudes, and values associated with the healthy and active lifestyles of school children and school staff.

Recommendations for Local-, Regional-, or National-level Policymakers

We propose the following recommendations for policymakers:

- Policymakers at every level should support initiatives providing opportunities that are supportive of healthy lifestyles within a whole-school approach by assuring neces-

sary funding, time, programing, staffing, and stakeholder support.

- Guidance and ring-fenced funds should be made available through local, regional or national agencies to allow schools to implement cost-effective practices, such as school-specific professional development and active transport schemes.
- The promotion of healthy lifestyles throughout the school day and beyond should be embedded within local policies bringing together with relevant community stakeholders.
- The coordinated implementation of the components of health promoting schools as outlined by the WHO⁷⁰ is likely to prove an administrative and professional challenge, so priorities need to be identified, and implementation considered a long-term project. The efforts should be undertaken based on negotiated agreement among stakeholders – school leaders, teachers, parents, community-based decision-makers, and students – and included in school development plans.

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Human Subjects Approval Statement

Ethical approval was granted by the Executive Board of the European Council of Research in Physical Education and Physical Activity.

Conflict of Interest Disclosure Statement

The authors have no conflicts of interest.

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