INTRODUCTION

There is an abundant body of evidence to demonstrate that the health of students constitutes a major factor affecting their capacity to learn (Lavin et al., 1992; Allensworth, 1997; WHO, 1997; Ziglio, 1997). The school environment has a direct impact on the self-esteem, educational achievement and health of its pupils and staff (Hopkins, 1987; Sammons et al., 1994). However, the traditional, knowledge-based approach alone is insufficient to help make healthy choices and change behaviours (Klepp et al., 1994). A school health education programme is effective if it combines health education with other health-promoting initiatives in the school, and involves parents and families (Seffrin, 1990; Young, 1993; Denman, 1994) and the community at large (Aaro et al., 1983).

The concept of health-promoting school (HPS) or healthy school was first identified in the early 1980s and has been advocated as an effective approach to promote health in schools for the last decade (Nutbeam, 1987; Young and William, 1989). It embodies a whole school approach in which a broad health education curriculum is supported by the environment and ethos of the school (Parsons et al., 1996).

During 1995, a set of guidelines comprising of components in six areas on the establishment, improvement and maintenance of HPS was produced and endorsed by the member states of the Western Pacific Region of the WHO (WHO Regional Office for the Western Pacific, 1996). The areas identified were:

- School health policies.
- The physical environment of the school.
- The school’s social environment.
- Community relationships.

The framework, which is based on the WHO (Western Pacific Regional Office) Guidelines for HPS, is described in detail. The appropriate instruments for data collection are described and their origins identified. The evaluation plan and protocol, which underpinned the very comprehensive evaluation in Hong Kong, are explained. Finally, a case is argued for evaluation of HPS to be more in line with the educational dynamics of schools and the research literature on effective schooling, rather than focusing primarily on health-related measures.

Key words: health-promoting schools; evaluation; framework
• Personal health skills.
• School health services.

The implementation of HPS is a complex issue as it involves a number of components from the above six domains. Multiple methods will be needed for data collection and data analysis to judge the success of the HPS interventions. This paper describes the various evaluation framework developed in Hong Kong to measure the effects of HPS initiatives.

SELECTING RELEVANT EVALUATION METHODS FOR HPS

The information on effectiveness and efficiency on health intervention programmes have usually been based on gathering ‘hard’ scientific evidence leading to development of a research evidence hierarchy, with the randomized controlled trials (RCTs) being considered as the ‘gold standard’ for quantitative evaluative research followed by non-randomized control trials or quasi-experimental designs, then observational studies such as cohort and case control studies, and with descriptive studies such as surveys or reports at the bottom (Mahon et al., 1996; Kunz and Oxman, 1998; Guyatt and Rennie, 2002).

Yet this hierarchy is often not appropriate in choosing evaluation approaches, which seek to understand and explain HPS interventions. Evaluation research in health promotion and education must gain insights into the processes involved in programme implementation and the social and environmental context in which they take place (Tones and Tilford, 2001). Demonstrating positive change in six key areas of HPS should also contribute to health promotion effectiveness. The RCT might not necessary always be appropriate for health promotion (Sheldon et al., 1993; Baum, 1995).

A well-conducted quasi-experimental design or even a sound observational study may provide better ‘evidence’ of effect than a poor RCT. Nutbeam et al. (Nutbeam et al., 1990a) have illustrated these competing requirements in the development of a form of bipolar sliding scale. The outcomes can be broadly divided into four types: health and social outcomes, intermediate health outcomes, health promotion outcomes and health promotion actions (Nutbeam, 1996).

Health and social outcomes
The health and social outcomes represent the end-point of health and medical interventions, and are usually expressed as health outcomes in terms of mortality, morbidity; disability and dysfunction; health status; and social outcomes such as quality of life, life satisfaction and equity.

Intermediate health outcomes
The intermediate health outcomes represent the determinants of health and social outcomes such as healthy lifestyles, healthy environments (the physical environment, economic and social conditions that has direct impact on health and support healthy lifestyle) and also effective health services.

Health promotion outcomes
The health promotion outcomes represent those personal, social and environmental factors, which are modifiable to change the determinants of health. They are health literacy (the personal cognitive and social skills for individuals to maintain good health), social actions (organized effort to enhance actions and influence healthy lifestyles and healthy environment), and healthy public policy and organization practices (health cities, healthy schools and healthy workplace).

Health promotion actions
The health promotion actions include three main domains: education, facilitation and advocacy. Education consists primarily of the creation of opportunities for learning, which are intended to improve health skills. Facilitation is action taken in partnership or groups to mobilize human and material resources for health. Advocacy is action taken on behalf of individuals and/or communities to overcome structural barriers to achieve positive health (Nutbeam, 1996).

Many researchers have argued that health promotion must be concerned with issues to do with equity, public health policy, community involvement, accessibility of health services and social well-being (Whitehead, 1991; MacDonald and Bunton, 1992; Tones and Tilford, 2001). One should not limit effectiveness studies on health promotion to interventions solely concerned with changes in population health status. Studies should also look into the relative effectiveness...
of the means used to achieve these changes (MacDonald et al., 1996). The researchers should gain insight into the processes by which the effects of health promotion and education were achieved in assessing the effectiveness (Mullen et al., 1992).

Evidence of success in health promotion and education is comprehensive when derived from several different sources making use of qualitative as well as quantitative information (Steckler et al., 1992; Baum, 1995). Triangulation using multiple methods can be used to improve confidence in research findings (Gifford, 1996; Tilford, 1996). Different types of triangulation are used to ensure the validity of data collection and the associated interpretation made. For example:

- **Data source triangulation.** This involves using different kinds of information to investigate given research questions, such as school and students' health records, minutes, documents and interviews.
- **Researcher triangulation.** This involves more than one researcher in data collection and analysis. Naturally researchers will be controlled for bias by standardization of data collection procedures.
- **Methods of triangulation.** This involves using a number of different methods, such as focus group discussions, individual interviews, participant observations and self-administered questionnaires.

Measuring the success of school health promotion and education interventions solely based on changes in health and social outcomes as indicators is inappropriate and unrealistic. It is more relevant to judge the effectiveness by measuring the health promotion outcomes, which recognizes the educational dynamics of the school.

Allensworth (Allensworth, 1994) carried out an assessment of the state of health education and promotion in the USA in the early 1990s. Following the review, a number of components of an effective school-based intervention were identified. These include:

- The use of multiple theories and models when planning interventions.
- Focus on priority health behaviours.
- An expanded curriculum.
- The use of multiple strategies to address ‘problem’ behaviour.

- Co-ordination of school and community health promotion activities.
- Co-ordination of whole school programme through all subjects.
- Active student participation and use of active learning methods.
- Focus on the development of life skills.
- Wider view of all aspects of school life such as developing a caring and nurturing environment.
- Close co-operation with parents.

(Allenworth, 1994)

These components have been used as the building blocks in developing the evaluation framework for HPS in Hong Kong (Lee, 2002; Lee et al., 2003).

**THE FRAMEWORK FOR EVALUATION OF HPS IN HONG KONG**

In Hong Kong, the Centre for Health Education and Health Promotion at the Chinese University of Hong Kong (CUHK) first launched the HPS programme in 1998, and further developed the concept of the Hong Kong Healthy Schools Award Scheme (HKHSA) in 2001. The aim of the HKHSA is to promote educational achievements, and to enhance the well-being of school students and staff. The expected outcomes of the HKHSA are:

(i) **Students** will increase their awareness and knowledge of health issues, and become equipped with the skills necessary to practise healthy habits.

(ii) **Schools** will make health a key consideration in school improvement plans, provide health education to ensure all students have the knowledge and skills to lead healthy lives and promote the concept of collaboration and encourage school community members to work together for the students.

(iii) **School sites** will be a safe and healthy environment for pleasurable learning and working.

(iv) **Schools** will develop an ethos, which respects equity, justice, tolerance and care.

(v) **Schools** will promote community awareness about how to educate young people in healthy living in order to complement other health initiatives occurring in the community.

During the first stage of HKHSA, 43 schools were involved in evaluation. The HKHSA has
a number of components with targets for the school to achieve, taking reference from the WHO Regional Guidelines for HPS (WHO Regional Office for the Western Pacific, 1996; Appendix). Evaluation of school-based health promotion action will include measuring the outcomes of these initiatives across the school, which is a very dynamic health promotion intervention planning like Intervention Mapping (Bartholomew et al., 1998). In Intervention Mapping, the programme development requires a linkage between a resource system (developers), an intermediate-user system (implementers) and end-user system (programme participants) (Orlandi et al., 1990). The planning process begins with needs assessment including the analysis of behavioural and environmental causes of the problems and what is known about the determinants, and resources in the community. The evaluation framework of HPS is based on the measurable goals and objectives from the needs assessment such as health status, quality of life, behaviours and environmental conditions.

Measuring instruments

Research literature strongly indicated that multiple methods are needed to assess the outcomes of HPS action, compromising the very broad range of objectives such as those mentioned above (Nutbeam et al., 1990b; Steckler et al., 1992; Allenworth, 1994; Baum, 1995; Gifford, 1996; Tones and Tilford, 2001). Triangulation of data collection was utilized including questionnaires to students and school principals; documentary review; school observation; curriculum review; focus groups for teachers and students; semi-structured interviews of school principals and parents. Student questionnaires, school observation and policy review provide the data collected from the control group. Table 1 summarizes the indicators and measuring instruments for different types of outcomes. Figure 1 summarizes the evaluation plan.

Student questionnaires

Questionnaires for the students were adapted from other research studies. These included the Centre for Disease Control and Prevention—Youth Risk Behaviour Surveillance (Kolbe et al., 1993); Wessex Healthy Schools Award Scheme Students Evaluation Questionnaire (Moon, 1999; Moon et al., 1999). The CUHK’s questionnaire covered different areas such as socio-demographic data, perception of health and academic performance, oral health, personal safety, food/nutrition, body weight, physical activity, violence-related behaviours, mental health, smoking, alcohol drinking, drugs and sexual behaviours, eating behaviour and attitudes towards diet, and self perception towards body weight.

In the area of mental health, the measuring instruments included the Satisfaction with Life Scale (LIFE) and the Depression Self-Rating Scale (DSRS). The LIFE instrument was used to assess a person’s judgment of his/her quality of life (Diener et al., 1985), and the Chinese adaptation has been reported with adequate reliability.

<table>
<thead>
<tr>
<th>Types of outcomes</th>
<th>Indicators to be measured</th>
<th>Measuring instrument</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health and social outcomes</td>
<td>Depressive symptoms, life satisfaction, perceived health status, perceived academic achievement</td>
<td>Validated questionnaires: Satisfaction with LIFE, DSRS, Youth Risk Behaviour Survey (YRBS).</td>
</tr>
<tr>
<td>Intermediate outcomes</td>
<td>Attitudes, lifestyles and risk behaviours</td>
<td>Questionnaires to students and schools, school observation, documentary review, interviews</td>
</tr>
<tr>
<td></td>
<td>School environment and school ethos</td>
<td></td>
</tr>
<tr>
<td></td>
<td>School health services</td>
<td></td>
</tr>
<tr>
<td>Health promotion outcomes</td>
<td>Health skills and knowledge, and self efficacy</td>
<td>Questionnaires to students and schools, curriculum review, documentary review, individual or focus group interviews, participant observation</td>
</tr>
<tr>
<td></td>
<td>School health policies</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Networking with parents, the local community and other schools to launch health programmes</td>
<td></td>
</tr>
<tr>
<td>Health promotion actions</td>
<td>School timetable for health education activities (formal and extra-curricular)</td>
<td>Documentary review</td>
</tr>
<tr>
<td></td>
<td>PTA and community involvement</td>
<td></td>
</tr>
</tbody>
</table>
The DSRS contains 18 items, which covers affective, cognitive and behavioural symptoms of depression; and was used to measure moderate to severe depression among young adolescents (Birleson, 1981; Asarnow and Carlson, 1985; Firth and Chaplin, 1987). The Chinese version had been utilized in the local population and was found to have adequate reliability (Cheung, 1996).

The questionnaire content was validated for face validity and content validity. The questionnaire was pilot-tested on students from different age groups. They were asked to give feedback on the contents of the questionnaire to ensure that the questions were well understood by students. There were also discussions between research team members, school principals and teachers as well as external experts to ensure the quality of the questionnaire. The revised questionnaire was pilot-tested again amongst students from different age groups to test the internal consistency of the scale. The questionnaire included data to assess the health and social outcomes, and intermediate outcomes.

**Assessment of school health profile**

The school health profile was assessed based on the six key areas of the HPS. The profile was examined to identify the key factors for success of HPS; factors determining the health and social outcomes of students, i.e. school environment and health services; and also the factors which would impact the determinants of health, i.e. personal

**Fig. 1:** Evaluation plan.
health skills, school health policies and organizational practices.

Questionnaires were sent to each school before the visit of the evaluation team, so to maximize the visitation period. The questionnaire was designed in template format to allow much of the information to be entered as quantifiable data. The template also facilitated the entry of qualitative or quantitative data. The CUHK team then visited the school, and supplemented the information by reviewing school documents, examining the school curriculum, observing the school physical environment, and interviewing with school teachers and school principals.

School observation
Apart from observation of school environment during the school visit, the health promotion co-ordinators at the CUHK had been following up the schools giving them advice and also assisting them in developing their schools to become model HPS. They had kept detailed field notes of various health-related activities (both formal and extra-curricular) launched by the school. Their field notes included data that covered the processes and impacts of the various activities.

Focus group
The evaluation framework involves conducting focus groups with group of students, staff and parents of selected schools in the intervention group. The selection of schools for the focus groups was based on the summation of all the other data where the schools are divided into three categories: above average, average and below average. Two schools were selected from each category to explore why and how the schools achieved the outcomes, and whether the students had the opportunities to gain skills with respect to specific and relevant health issues, and also develop competencies in decision-making, communication and problem solving.

The assessment was conducted before the intervention as baseline, and then re-assessed after an interval to evaluate the effectiveness of the programme. Table 2 summarizes the different frameworks of evaluation at a different time phrase for the first batch of schools enrolled in May 2001.

How to use the data in evaluating the effectiveness
Combinations of different kinds of data will enable further validation on the effects due to intervention processes. For example, one would examine whether the improvement of the psycho-social health of the students based on the data collected by student health survey related to the changes of school social environment, personal health skills training in psycho-social issues as reflected by data extrapolated from

<table>
<thead>
<tr>
<th>Time phase</th>
<th>Evaluation purpose</th>
<th>Source of data</th>
<th>Methods</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. June to July 2001</td>
<td>Analysis of school health profile</td>
<td>Performance on six key areas of HPS</td>
<td>Structured questionnaires, documentary review and interviews</td>
<td>Quantitative data</td>
</tr>
<tr>
<td>2. September to November, 2001</td>
<td>Analysis of the youth risk behaviours, mental well-being and perceived academic performance</td>
<td>YRBS, LIFE, DSRS</td>
<td>Validated structured self administered questionnaires</td>
<td>Quantitative analysis utilizing statistical tests, e.g. chi-squared test, ANOVA, multiple logistic regression</td>
</tr>
<tr>
<td>3. June to July 2001</td>
<td>Analysis of school physical and social environment</td>
<td>Observation and interviews</td>
<td>Field notes, photos and videos, participant observation</td>
<td>Transcription of observation notes, interview transcripts, visual observation and video tapes to organize raw data for categorization</td>
</tr>
<tr>
<td>4. Initial assessment in late 2001 and re-assessment in 2003/2004</td>
<td>Analysis of the schools’ achievements and outcomes</td>
<td>Interviews with some staff, parents and students</td>
<td>Focus groups</td>
<td>Identification of patterns from interview transcripts and/or audiotapes</td>
</tr>
</tbody>
</table>
observation, documentary review, semi-structured interviews or focus groups. One would also review the policies in several areas such as healthy eating, anti-violence and see whether the changes of the policies were related to changes in associated variables in school physical and social environment with data collected by observation and/or interviews, and changes in students’ behaviours with data collected by questionnaires.

To demonstrate the changes of health behaviours, e.g. suicidal thoughts before and after the intervention, a sample size of 470 would be adequate if one would like to detect a decrease from 15% based on previous survey (Lee et al., 2004) to 10% with 80% statistical power and Type I error of 5% \( n = \frac{1.28 \times (0.1 \times 0.9)^{-2} + 1.96 \times (0.15 \times 0.85)^{-2}}{0.05^2} \) (Kirkwood, 1988). Most of the schools in Hong Kong have over 500 students so the statistical power is sufficient to detect the changes before and after intervention in each school.

Although we have discussed the problems of using RCTs in evaluating the effectiveness of health promotion, one still needs a well-conducted quasi-experimental design or even a sound observational study. Triangulation of data collection and analysis of the interrelationships amongst the various kinds of data collected would throw light on intervention processes and effects making the observation study more sound and solid. For comparing between the intervention and control schools as a case control study, assuming the odds ratio of 2 with the control school having prevalence of 15% of students with suicidal ideas and the intervention schools having the prevalence of 10%, a sample size of 636 was needed for each group \( n = \frac{1.28 \times \left[ P_1 \times (1 - P_1) + P_2 \times (1 - P_2) \right]^{-2} + 1.96 \times \left[ 2 \times P_0 (1 - P_0)^{-2} / (P_1 - P_1)^2 \right]^{-2}}{P_1 = \text{proportion of control, } P_2 = P_1 \times \text{OR}/(1 + P_1 (\text{OR} - 1); P_0 = P_1 + P_2^2} \) (Kirkwood, 1988). Each intervention school would then match with a control school in same geographic area with students of a similar academic attainment. The control schools were selected from two long-established school organizations in Hong Kong, which manage schools of different academic levels, in different geographical areas throughout the territory. The control group did not participate in HKHSA and had no intention to launch any new health education and health promotion programmes during the study period. This would enable comparison between the intervention schools with control schools in quasi-experimental condition.

**CONCLUSION**

The HKHSA is a comprehensive evaluation of what is actually taking place in HPS, and what outcomes occur due to the school initiatives in the health promotion and health education fields. The health sector has traditionally utilized morbidity and mortality indicators, and largely ignored the vast literature on school organization and improvement, teaching and learning practices, and professional development. Research in HPS needs to identify the key role of teachers in school-based innovation and change, and also how they would address the knowledge and awareness of health issues within the context of their local school community in order to create a quality school health programme (St Leger and Nutbeam, 2000a; St Leger and Nutbeam, 2000b).

The evaluation framework developed for Hong Kong as described here is based on both health and educational frameworks covering appropriate short-, medium- and long-term indicators. The tools for evaluation of HKHSA can identify methods by which schools can be more effective as health-promoting institutions, and the factors that influence this process. The HKHSA evaluation assesses what can be achieved by schools using their own resources. It has applicability to schools in many countries. The comprehensive findings of the Hong Kong HPS evaluation using the above framework will be reported elsewhere.

**ACKNOWLEDGEMENTS**

The authors would like to thank the Quality Education Fund for awarding the grant for the HKHSA project, the HKHSA team of CUHK and also the schools participating in the Award Scheme.

**Address for correspondence:**

Professor Albert Lee  
Centre for Health Education and Health Promotion  
The School of Public Health  
The Chinese University of Hong Kong  
4th Floor Lek Yuen Health Centre  
Shatin, N.T., Hong Kong  
People’s Republic of China  
E-mail: alee@cuhk.edu.hk
APPENDIX

School health policy
School health policies are the clearly defined and broadly promulgated directions that influence the school’s actions and resource allocation in areas promoting health. Many schools might already have overall school policies on a range of issues including those priority health issues for schools. If these existing policies do not already refer to health issues, they could be extended to incorporate them.

Personal health skills
This refers to the formal and the informal curriculum whereby pupils gain age-appropriate knowledge, attitudes and understanding and skills in health, which will enable them to become more autonomous and responsible in individual and community health matters. The school health programmes will be assessed in terms of contents, scope, methods of instruction and instruction hours.

School health services
These are health services that have a responsibility for child and adolescent health care and education, through the provision of direct services to pupils and in partnership with schools. The schools will be assessed whether they have facilitated the students to gain access to appropriate services and follow up those default cases. School health services would be more effective if attention is working collaboratively on partnership (WHO Regional Office for the Western Pacific, 1996; NHMRC, 1997). The school health services also include worksite health promotion for staff.

School physical environment
The physical environment refers to the buildings, grounds, equipment for both indoor and outdoor activities and the areas surrounding the school. The term also refers to basic amenities such as sanitation, toilet facilities, washing and drinking. It also includes recycling of renewable resources and appropriate disposal of waste, and playground space and safety. The aims are not just to assess whether the schools would provide a safe and hygienic environment, but also the environment to promote positive health and healthy lifestyles, and an environment conducive to teaching and learning. Studies in the architectural area have demonstrated the influence that buildings and their surrounding areas can have on the mental well-being of the occupants and their capacity to enjoy life (McKenzie and Williams, 1982).

School social environment
The social environment is a combination of the quality of the relationships among staff, among pupils, and between staff and pupils. Discipline procedures, physical and verbal violence reduction strategies, cultural, religious and tribal celebration, and support mechanisms for students with a physical and/or learning disability are also included. It would also be referred as ‘school ethos’. It is often strongly influenced by the relationship between parents and the school that in turn is set within the context of the wider community. It is also influenced by senior staff from within the school and by health and educational personnel who visit the school, all of whom provide role models for pupils and staff by the attitudes and values they display in their social behaviour.

Community relationship
Community relationships are the connections between the school and the pupils’ families plus the connection between the school and key local groups who support and promote health. By definition a HPS is one where parents are closely consulted and involved in the school’s health promotion activities. A HPS should also establish network with local schools and community to strengthen the health education and health promotion programmes so a quality circle for school health would be established.

REFERENCES


Denman, S. (1994) Do schools provide an opportunity for meeting the Health of the Nation targets? *Journal of Public Health Medicine, 10*, 219–222.


Moon, A. (1999) *Does a healthy school award scheme make a difference?* The evaluation of the Wessex Healthy Schools Award, unpublished PhD Thesis, Department of Public Health Medicine, University of Southampton, United Kingdom.


