Educational Research and Reviews Vol. 3 (1), pp. 023-028, January, 2008
Available online at http://www.academicjournals.org/ERR
ISSN 1996-0786 © 2008 Academic Journals

Full Length Research

Developing a knowledge exchange tool for school-based health policies and programs

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Accepted 18 December, 2007

Youth smoking and physical inactivity are significant public health issues, with implications for both health and education stakeholders, as school-based policies and programs have the potential to reach a broad population of youth to address these issues. Knowledge exchange tools designed around comprehensive school-level data collection systems allow for dissemination of evidence into such policies and programs. The purpose of this manuscript is to describe the process of developing knowledge exchange feedback reports for school-based health policies and programs, using the School Health Action, Planning and Evaluation System (SHAPES) data collection system. SHAPES-Ontario is a project that utilized the SHAPES research platform to collect student-level behavioural data and school-level policy and programs data on tobacco and physical activity in 81 secondary schools across Ontario, Canada. Methods used to develop the feedback reports involved categorizing and scoring survey response options based on extensive research evidence and expert feedback. Feedback report scores were aggregated into overall grades and presented in a short and long version of a feedback report for school administrators. These reports present prime examples of how to use the principles of knowledge exchange in developing a tool to bridge the gap between research and practice.

Keywords: Secondary schools, health policies, tobacco, smoking, physical activity.

INTRODUCTION

Youth smoking and physical inactivity are harbingers of continually escalating public health issues in Canada. In 2005, 19% of youth aged 15 to 19 were current smokers, with 13% reporting daily smoking (Health Canada, 2005). Additionally, only 44% were considered physically active and just 18% were sufficiently active to meet international recommendations for optimal growth and development (Statistics Canada, 2002). The school environment has the potential to reach a large number of youth at critical periods of development (Botvin, 2004) and tends to socially reinforce behaviours (Alexander et al., 2001). Schools are therefore important settings for smoking and physical activity interventions.

Evidence-informed decision-making is critical to maximizing the effectiveness of school-based health programs and policies, as differences in school context can modify or mediate the final impact of behavioural interventions or educational curricula (Cameron et al., 1999; Rosendahl et al., 2002). Incorporating evidence into school practices requires the appropriate tools and resources; educators and public health personnel need school-level data to be able to appropriately target their interventions (Leatherdale and Manske, 2005; Cameron et al., 2007). Unfortunately, it is not always the case that health policies and programs in the school environment are based on the best available evidence (Green, 2006).

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Knowledge exchange tools designed around comprehensive school-level data collection systems allow for dissemination of research knowledge in a user-friendly format with locally relevant content (Cameron et al., 2007). The School Health Action, Planning and Evaluation System (SHAPES) is an example of a data collection and knowledge exchange system that facilitates the incorporation of research evidence into school health programs and policies (Cameron et al., 2007; Leatherdale et al., in press). SHAPES collects data on students' health behaviours (smoking, physical activity, eating behaviours), in addition to administrator-level information on related policies, programs, and facilities. While the SHAPES-Ontario project provides schools with detailed reports on student-level data such as smoking behaviours and physical activity, information regarding the health-related programs and policies are not reported back to schools. An additional tool to facilitate knowledge exchange with the school-level data was therefore needed to add value to school stakeholders for making evidence-based policy and programming decisions.

The purpose of this manuscript is to describe the process used to develop knowledge-exchange tools for educators and public health practitioners using the school-level physical activity and tobacco policy and program data collected within the SHAPES-Ontario project. Our approach to develop these tools is within the context of a model of knowledge use (Manske, 2001) (refer to Figure 1).Cousins and Leithwood (1993) originnally developed this model for education (Cousins and Leithwood, 1993) and Manske (2001) refined it for the public health context.

The model identifies three domains as influencing knowledge use. Typically, attempts to share scientific evidence focus on the content (that is, the "what"). Ro-gers (2003) and others confirmed the critical role that factors like relevance, timeless, and credibility of the information play in adoption of evidence. The model also suggests that context characteristics (that is, the "where") at different levels, including the organization, need to be considered (Elder et al., 2007). For instance, priorities of the organization may trump strong evidence, as will a history of applying other sources of information. A third domain (the "how") reflects the social processes that facilitate knowledge construction (Ottoson, 1997). This contextualizing of knowledge mediates most of the influence of the content and context domains on knowledge use, which serves as the dependent variable or goal of knowledge exchange. The model views knowledge use on a continuum from conceptual (e.g., adding to understanding), through to instrumental (e.g., implementing a recommendation, program, or innovation) (Weiss and Buclavas, 1980). Within this manuscript we focus primarily on the content domain in relation to our school-based knowledge exchange activities, although we also indicate how the remaining two domains are addressed in our work.

METHODS

From September 2005 to June 2006, tobacco and physical activity modules of SHAPES were administered to grade 9 to 12 students at 81 secondary schools in Ontario. The corresponding administrator-level program and policy surveys were also collected for each module. The tobacco administrative survey was based on the "Survey of School Smoking Policies" (Lovato et al., in press), while the administrator-level physical activity survey employed the "School Capacity Survey" (developed by the Canadian Fitness and Lifestyle Research Institute). At each participating school, the administrator identified as being most knowledgeable about tobacco control and physical activity programming completed the respective survey. Typically, the school's vice principal or principal completed the survey and worked with the SHAPES team throughout the data collection process.

The objectives of developing a knowledge-exchange tool for school smoking and physical activity policies/programs included the following: to complement feedback reports based on student survey data, to draw links between influences in the school environment and individual behaviours (Elder, 2007), to facilitate collaboration between schools and local public health departments to strengthen efforts to promote health among young Ontarians, to enable evidence-informed action by schools to increase their capacity to create health-promoting environments that prevent tobacco use and increase physical activity levels among all students. Schools wanted this tool to have locally relevant information presented back to them in a way that helps them quickly identify the key issues. Consistent with the critical content features identified in the model guiding our knowledge exchange (Manske, 2001), we chose a school-level feedback report design which resembles a 'report card' format to succinctly present the survey results to schools to facilitate knowledge use (e.g., planning, action).

Literature reviews helped identify published guidelines and research studies pertaining to school tobacco and physical activity policies and programs, in order to guide the development of the preliminary feedback report layout and scoring. Consistent with the previously published guidelines, questions from the "Survey of School Smoking Policies" were categorized into five feedback report categories: development and communication, prohibitions, enforcement, programs, and outcomes (refer to Table 1). Similarly, the "School Capacity Survey" (physical activity) questions were divided into categories based on the literature: facilities, programs, policy, social climate, and outcomes (refer to Table 2).

The survey questions in each category served as specific indicators for the respective feedback reports. For each question, response options were converted into categorical scores (excellent, satisfactory, needs improvement) initially based on evidence in the literature, published guidelines and further refined after expert review (refer to Table 3 for sample scoring). Eight tobacco experts and six physical activity experts provided feedback on the proposed categories, indicator scoring, and whether specific indicators or categories needed to be weighted more heavily in relation to the others. An iterative process refined categories and indicator algorithms.

Weights were applied to tobacco indicators and categories, to emphasize their importance in the feedback report. Weight values were based on averaged suggestions provided by the expert advisors. The general consensus among the physical activity reviewers was that indicators and categories should all be weighted equally, reflecting that each area is important to a comprehensive and effective approach to promoting youth physical activity in the school environment.

After scoring algorithms were finalized for each survey question (indicator), a system was devised to convert categorical scores excellent, satisfactory, and needs improvement into numeric scores (e.g. excellent = 2 points, satisfactory = 1 point, needs improvement

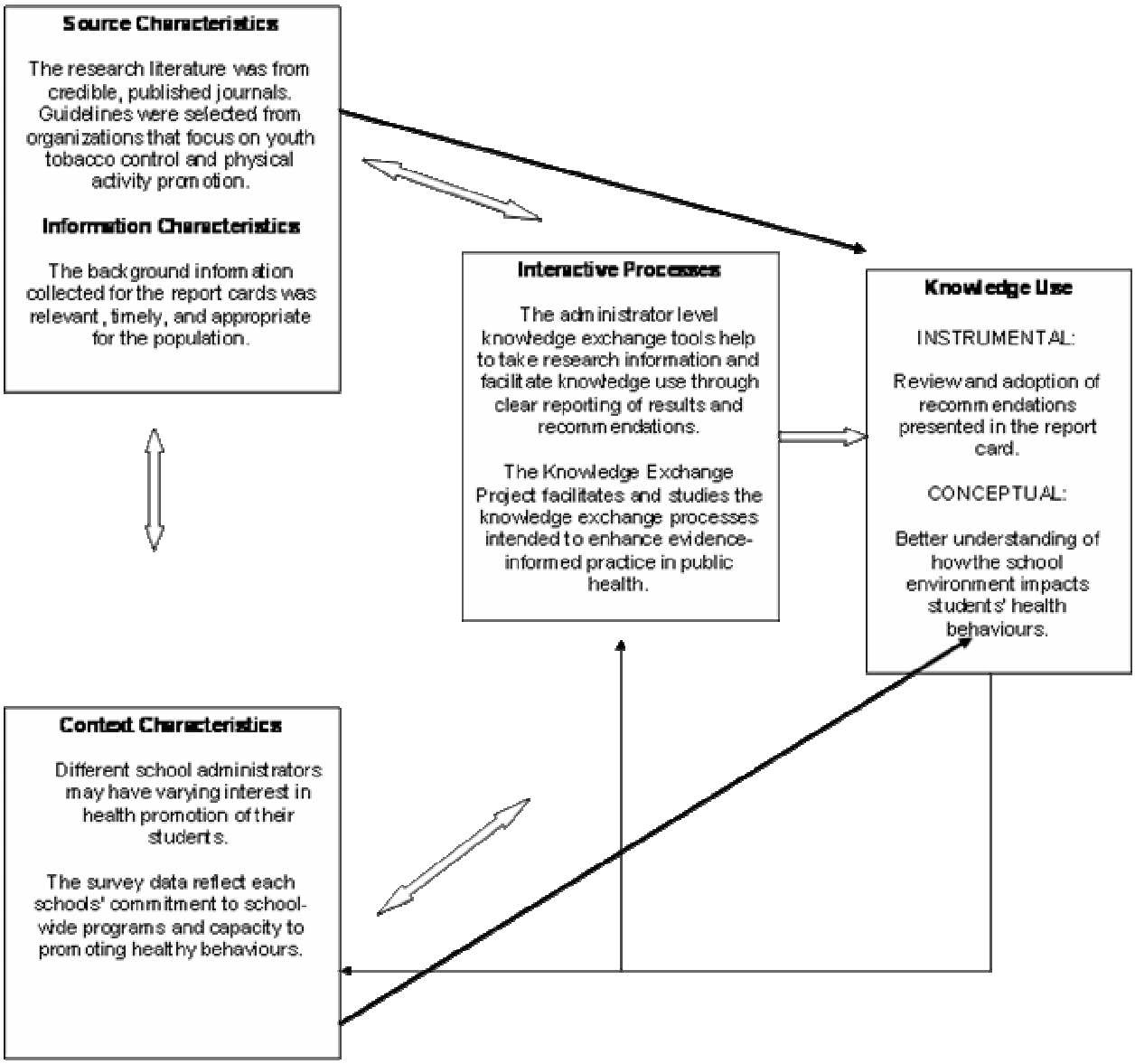

Figure 1. SHAPES administrator knowledge-exchange tool development, framed with the Manske and Leithwood (2001) knowledge-use model.

= 0 points). Summing the indicator scores and categorizing again led to separate "letter grades" for each school regarding Tobacco Policy and Programs and Physical Activity Capacity. For the final led to separate "letter grades" for each school regarding Tobacco Policy and Programs and Physical Activity Capacity. For the final scores, an additional category was used ("good") to describe the scores at a finer level of detail.

In accord with suggested guidelines (CHSRF, 2006), feedback reports were developed to present schools' tobacco and physical activity scores in two user-friendly formats developed to meet the needs of various users. For example , the long version of the smoking (12 pages) or physical activity (13 pages) report included background information on youth smoking or physical activity, detailed methodology, a presentation of all scores, in addition to recommendations and resources on how to obtain an excellent score for each indicator. The short (2-page) version offered a précis of content to allow schools to see their scores at a glance (refer to Figure 2). Using evaluation forms, schools could comment on the value and accuracy of their individual feedback reports, and how the reports could be improved upon in the future.

DISCUSSION

Comprehensive school health approaches attempt to ensure that the school "ecology" has health promoting, rather than health degrading outcomes for the students and staff in the education system (Manske et al., 1997). The approximately 25 hours each week students spend in classrooms throughout the school year makes the school an effective setting to reach a high proportion of young people with relative ease (Darling et al., 2006).

Table 1. Summary of feedback report categories for tobacco knowledge-exchange tool

Feedback Report Category	Description
Development and Communication	- Existence of a written school tobacco policy - Stakeholder involvement in developing the policy Methods used to inform students, teachers, and parents of the policy
Prohibitions	Description of which tobacco or tobacco-related products are prohibited, by whom, where, and when
Enforcement	Consequences of students, teachers, and parents violating the school tobacco policy - How the consequences are determined - Consistency of enforcing the policy
Programs	- Availability of instruction on avoiding tobacco use - Access to cessation programs
Outcomes	- Perceived adherence to the policy according to administrators and students - Students' awareness of the school tobacco policy and its consequences

Table 2. Summary of feedback report categories for physical activity knowledge-exchange tool

Feedback Report Category	Description
Facilities	- Availability of physical activity facilities on or near school grounds - Access to school facilities - Adequacy of facilities and space for physical activity
Programs	*Curricular Physical Education* - Duration and size of physical education classes - Variety and evaluation of programming - Training of physical education teachers
	Extracurricular Physical Activities - Availability of intramural, interscholastic and other physical activity opportunities - Provision of transportation to activities off school grounds - Costs associated with participation
Policy	- Existence of written school policies to ensure the provision and promotion of opportunities for students to participate in physical activity
Social Climate	- School emphasis on physical activity - Support for involvement of students, teachers, parents, and community members
Outcomes	- Student participation in school physical activities and overall physical activity levels

School-level policies and programs form a critical component of efforts directed at reducing youth smoking and increasing physical activity levels (Rosendahl et al., 2002). To facilitate the development and implementation of such policies and programs, schools require effective, evidence-based tools (Cameron et al., 2007; Leatherdale administrator knowledge-exchange feedback reports provide schools with feedback on the strengths and weaknesses of their health policies and programs, based on research evidence. The feedback reports follow established principles of knowledge exchange (Rogers, 2003) to present this information in a user-friendly format that enables schools to focus their efforts where they are needed most.

Table 3. Example of scoring a physical activity survey question into an indicator.

Question: Are students allowed to use school physical activity facilities outside of school hours? ○ **Indoor facilities** ○ **Outdoor facilities**	
Excellent	Checked "yes" for both *Indoor facilities* AND *Outdoor facilities*
Satisfactory	Checked "yes" for either *Indoor facilities* OR *Outdoor facilities*
Needs Improvement	Checked "no" for both *Indoor facilities* AND *Outdoor facilities*
The scoring is based on recommendations that school facilities should be made available to students before, during and after school, on weekends, and during summer and other vacations (Centers for Disease Control, 1997).	

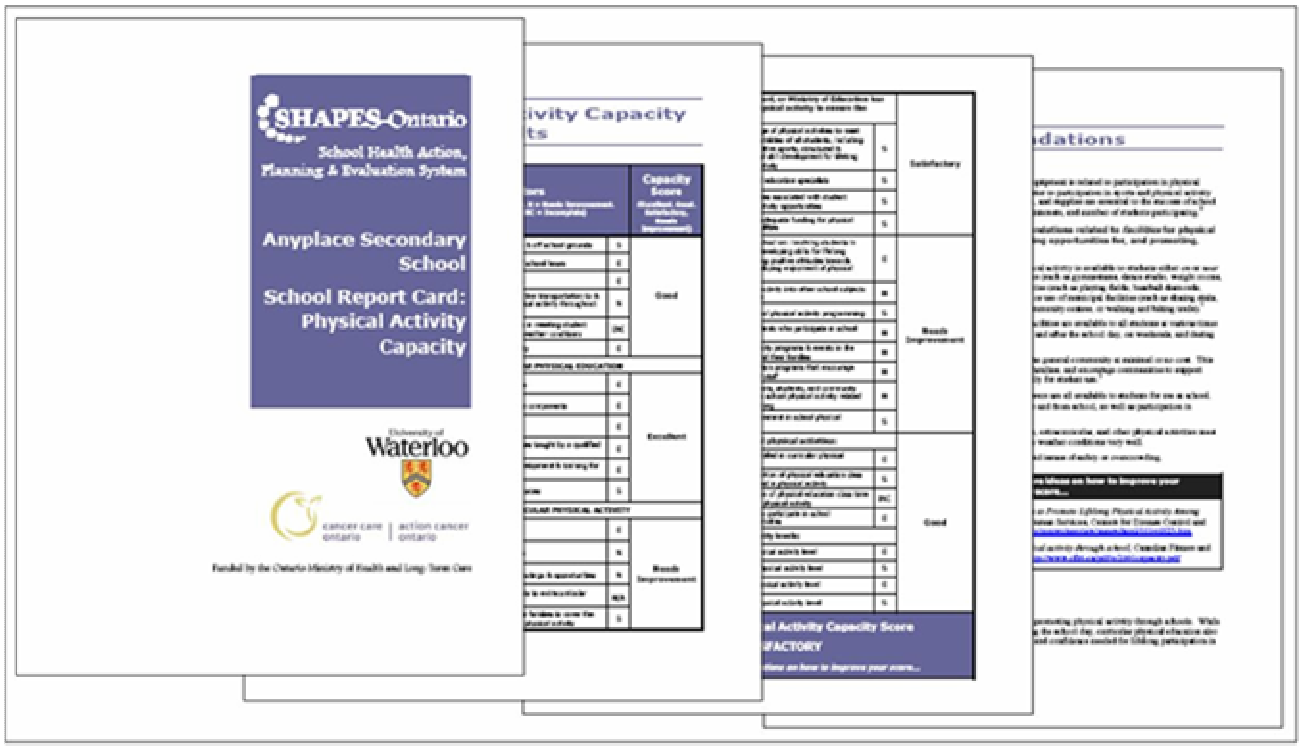

Figure 2. SHAPES feedback report for physical activity (condensed version).

The model guiding the development of the feedback reports indicates that simply providing information with the proper characteristics is a necessary but not sufficient step to increase evidence-informed action in education and public health systems (Manske, 2001). Consequently, we extended the SHAPES-Ontario project to support interaction of researchers, local public health, and education stakeholders in order to determine the particular contexts in which the evidence was to be applied. Public health is able to fulfill part of their mandate (Ontario Ministry of Health, 2007) by working with schools to help interpret the information in the feedback reports to the specific context of the school. The knowledge exchange extension provides technical assistance and training to public health staff who work directly with schools to implement change. For example, each health unit received a data set with data from schools in their jurisdiction, to allow them to conduct their own analyses. Access to a statistician to support those analyses was also part of the knowledge exchange extension.

The knowledge-exchange feedback reports have a number of strengths. The data presented in the tools are school-level and specific to each school's unique circumstances regarding tobacco and physical activity. The scoring approaches are based on research literature, published guidelines, and expert feedback. As such, a considerable amount of evidence was incorporated into the development of each indicator and corresponding category. The format of the report is easy to follow and

allows school administrators to either quickly determine the take-home message (that is, short version), or drill-down to more specific details (that is, long version). Additionally, schools receive resources to further examine ways of improving their scores. These resources help schools take the next steps in learning how to effectively adopt or revise school health policies and programs.

A weakness of the feedback reports is the reliance on information provided solely by one person at each school. Self-reported questionnaires present opportunities for social desirability biases, whereby respondents may consciously or unconsciously respond in a way that makes their school look favourable. There is currently no method used within the SHAPES system to verify responses provided by the administrator. Although this is consistent with other similar types of surveys, we aim to improve this process in future SHAPES projects. Ideally a team or committee would be formed at each school with several people responsible for different survey topics.

Additionally, the indicators were dependent on the questions asked in the “Survey of School Smoking Policies” or “School Capacity Survey”. Therefore, if potentially useful indicators were identified but not addressed in the survey, they could not be included in this first iteration of the feedback reports. For example, physical activity experts identified areas such as the breadth and novelty of extracurricular physical activities offered by the school, but this information was not addressed in the “School Capacity Survey”. The SHAPES-Ontario research team is working with stakeholders to identify the best means for collecting valid data in these areas with low burden on schools.

The SHAPES-Ontario school feedback reports present prime examples of how to use the principles of knowledge exchange in developing a tool to bridge the gap between research and practice. Providing schools with evidence-based tools for developing or improving their tobacco and physical activity policies and programs will enable them to better achieve health promoting environments and improve the health of our future generations.

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