



IMPLICATIONS FOR COMMUNITIES

Teaching Children about Health: An Example of Secondary Gain in an Academic–Community Partnership

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ABSTRACT **Context:** *The Partners in Health Education (PHE) program is an elective that pairs first and second year medical students with local classroom teachers to promote health messages to students in kindergarten through grade eight. Designed with the primary goal of helping medical students improve their communication skills through the process of teaching children about health, the PHE program has secondary goals of supporting community teachers in their efforts to promote health and of teaching children about health and the prevention of disease and injury. This report contains the results of the assessment of program impact on the school children.*

Methods: *A total of 327 elementary grade students in 14 experimental classrooms and 13 comparison classrooms comprised the participants for the study. Students were individually interviewed twice over an eight-week period using a structured interview form designed to capture self-report information about health and healthy living. Repeated measures analysis of variance was conducted. The effect of interest in each case was the treatment \times time interaction.*

Results: *There were significant treatment \times time interactions for several measures of children's reported knowledge and attitudes about health.*

Discussion: *Although designed primarily to help medical students improve their communication skills, the PHE program produced a secondary gain such that elementary students in participating classrooms reported learning more about health than did students in comparison classrooms. Programs such as PHE can provide ways to meet the goal of helping children become empowered to take charge of their own health and to make healthy choices.*

KEYWORDS *Health education, health behavior, preventive health.*

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The Partners in Health Education (PHE) program is an elective that pairs medical students with classroom teachers to promote health messages to students in kindergarten through grade eight. Jointly sponsored by the C. Everett Koop Institute at Dartmouth, Dartmouth Medical School, and several public school districts in the Upper Connecticut Valley region of the states of New Hampshire and Vermont, the program was designed with the primary goal of helping medical students improve their communication skills through the process of teaching children about health. Secondary goals of the program were to support community teachers in their efforts to promote health and to teach children about health and the prevention of disease and injury.

Medical students and school children represent two kinds of learners with differing needs. Medical students need to learn *how* to communicate about health so that they can become effective physicians, while children need to learn *about* health so that they can make healthy decisions. The PHE program is a unique academic–community partnership that has been formed to meet both sets of needs.

Context

The Centers for Disease Control and Prevention have identified six behavioral categories accounting for 70% of adolescent morbidity and mortality: abuse of alcohol and other drugs, injuries, unplanned pregnancies and sexually transmitted diseases, illnesses related to the use of tobacco, and illnesses and health problems related to lack of physical activity and to inadequate diet (Kann *et al.*, 1995). In their recent report on schools and health, the Institute of Medicine (1997) labels these behaviors as “social morbidities,” which, they suggest, are most often initiated in childhood, continue into adulthood, and are related to one another. These problems are behaviorally based and are, therefore, amenable to strategies aimed at changing or preventing the behavior. Recognizing that effective health education during the elementary years provides a solid base for the critical years of adolescence, the Institute of Medicine Committee on Comprehensive School Health Programs in Grades Kindergarten–12 (1997) has recommended that health education be provided to all students every year.

Utilizing health care professionals to teach health in schools has long been advocated (American Academy of Pediatrics, 1972), but there appear to be relatively few studies of the effectiveness of such programs. Rockowitz & Stebbins (1975) examined a program where pediatric residents consulted on a school health team. Program evaluation focused on the residents’ knowledge and attitudes and on school personnel’s reactions to the program and found overall positive changes. The impact of the program on students was not evaluated. Similarly, Bass and his colleagues (1978) studied the benefits of participating in community-based extensions of pediatric residency training. Residents consulted with public schools and with local day care and Head Start programs. Program

evaluation focused only on the residents' satisfaction. In one of the few studies of the impact of health care professional teaching on children, Bass and his colleagues (1982) examined a program in which pediatric residents taught one health session to elementary school children. They found that the children enjoyed the session and that many of them gained specific factual knowledge about the topic covered.

More recent work has demonstrated the effectiveness of medical students in teaching school children. In Cleveland, teams of medical students worked with school children thrice weekly for supplemental physical activity sessions (Stephens & Wentz, 1998). Children participating in the program showed significant improvements in physical fitness compared to non-participating children. Morton and his colleagues (1996) studied a program in which medical students taught high school students about HIV. Pre-post questionnaires showed that students' knowledge about HIV increased significantly after the educational program.

Each of these programs had a specific focus rather than being part of a broad health curriculum. The PHE program described here differs from these programs in a number of ways.

The Partners in Health Education Program

First and second year medical students at Dartmouth Medical School electing the PHE experience were paired with community elementary classroom teachers. The medical students worked collaboratively in training seminars to develop lessons for their classroom teaching. Seminar faculty, including medical school faculty, health educators, and advisors from the Upper Valley Teacher Training Program (UVTTP), provided general input on health messages and age-appropriate teaching strategies and also provided specific input and feedback on developing lessons.

During the term, medical students spent six sessions in the elementary school classrooms. The first session was observational, providing an introduction to the classroom. Subsequently, students worked with the classroom teacher to plan, design, and implement an abbreviated health curriculum consisting of five 45–60 minute lessons. Lessons were typically designed to provide rich, dynamic experiences for the children. Medical students frequently provided materials and actively engaged students in demonstrating principles related to health. One example was using a set of cow lungs to demonstrate the negative impacts of smoking on health. Another example demonstrated the transfer of germs by having children shake hands with each other after one child's hands had had glitter rubbed onto the skin.

Classroom sessions were at times mutually agreeable to both student and teacher, and generally occurred every one to two weeks. An advisor from the

UVTTP observed and videotaped the first and fourth lessons, and provided feedback to the medical student.

C. Everett Koop, former US Surgeon General and a founder of the PHE program, believes that children, teachers, and medical students have much to learn from each other and that all groups can benefit from an experience such as PHE. At his request, a comprehensive evaluation of the program was undertaken in 1996–1997. The program design and evaluation were established both to monitor the program's effects and to establish a model that could be duplicated in other communities. This report presents the results of the assessment of program impact on the school children.

Methods

The participants in this study were 327 students in grades 1–5 (aged six years to approximately 11 years) from six public schools. These students were from 14 experimental classrooms (with a PHE medical student) and 13 comparison classrooms (without a PHE medical student). The experimental classroom teachers volunteered to be part of the program. Comparison classrooms were selected by asking the experimental teachers to suggest a colleague. Parental permission was obtained to interview students individually and parents were assured that their children's information would remain confidential. Students were never identified by name, but were each assigned a confidential ID number.

Data were collected with a self-report survey instrument, consisting of a projective picture and 23 questions about health and healthy living. Most questions were open-ended and therefore uncued. Pilot work with the questionnaire allowed researchers to classify students' free responses into categories. During actual administration of the questionnaire, student responses were coded by category. Responses not fitting a category were coded as "other" and were recorded verbatim on the interview form. Some questions, such as those asking children how much they had learned about health, allowed students to choose from among specific response options. Highly trained interviewers individually interviewed all 327 children twice. Children in the experimental classrooms were interviewed before the medical students' first visit (pre) and four to eight weeks after the last visit (post). The interviews in the comparison classrooms took place at the same points in time. The amount of health-related instruction children in the comparison classrooms received during this time frame was not assessed.

Questions selected for analysis were those that explored the amount children reported that they had learned about health, both in general and in relation to health-content-related material, those that asked children how much they liked studying health in school, and those that asked children how much they talked about health to others.

Repeated measures analysis of variance was conducted using time (pre, post) as a within-subjects measure and treatment condition (experimental, comparison)

as a between-subjects measure. The effect of interest in each case was the treatment \times time interaction. Since this work is exploratory, all interactions were investigated further with paired and independent t -tests to determine the nature of the interaction. As the investigation involved all four possible pairwise t -tests, the significance levels of these tests were adjusted for multiple comparisons using the Bonferroni inequality (Hays, 1988). Thus, to reach a significance level equivalent to 0.05 unadjusted, the adjusted p value required for significance was 0.0125. Values of p greater than 0.0125 but less than 0.05 were considered marginally significant.

Results

Mean scores of health-related variables at both testing times are shown in Table 1.

There was a significant treatment \times time interaction for the amount children reported that they learned about health ($F_{1, 244} = 29.75, p < 0.0005$). Multiple comparisons of individual means showed no difference between the groups prior to the treatment ($t_{269} = 0.95, p = 0.34$), a significant increase from pre-test to post-test for the experimental group ($t_{136} = -10.37, p < 0.0005$) and no difference from pre-test to post-test for the comparison group ($t_{108} = -1.80, p = 0.075$). There was a significant difference between the groups after treatment ($t_{292} = -7.76, p < 0.005$).

There was a significant treatment \times time interaction for the amount of health-content-related material children listed when asked what they had learned about health in school this year ($F_{1, 325} = 16.48, p < 0.0005$). Multiple comparisons of individual means showed a significant difference between the groups prior to the treatment ($t_{325} = 2.93, p = 0.004$), with the comparison group listing more material prior to treatment. There was a significant increase from pre-test to post-test for the experimental group ($t_{185} = -6.39, p > 0.0005$) and no difference from pre-test to post-test for the comparison group ($t_{140} = -0.68, p = 0.501$). There was a difference between the groups after treatment that approached significance after adjustment for multiple comparisons ($t_{325} = -2.29, p = 0.023$).

There was a significant treatment \times time interaction for the number of items children listed when asked what they can do to be healthy ($F_{1, 325} = 5.65, p = 0.018$). Multiple comparisons of individual means showed a significant difference between the groups prior to treatment ($t_{325} = 2.74, p = 0.006$), with the comparison group listing more items prior to treatment. There was an increase from pre-test to post-test for the experimental group that approached significance after adjustment for multiple comparisons ($t_{185} = -2.00, p = 0.047$). There was no difference from pre-test to post-test for the comparison group ($t_{140} = -0.01, p = 0.159$). There was no difference between the groups after treatment ($t_{325} = -0.01, p = 0.994$).

Table 1. Mean scores and standard deviations of health-related variables at pretest and posttest

Measure	Comparison						Experimental						
	Pre-test			Post-test			Pre-test			Post-test			
	Mean	SD		Mean	SD		Mean	SD		Mean	SD		
Criterion													
Reported amount learned about health in school	2.57	0.94		2.79	1.00		2.41	1.04		3.51	0.72		
Number of health content items listed	0.77	0.79		0.82	0.78		0.53	0.68		1.02	0.83		
Number of items one can do to be healthy listed	1.50	0.85		1.40	0.82		1.26	0.76		1.40	0.81		
Reported amount talked to parents about health	2.71	0.91		2.70	0.86		2.88	1.04		2.59	0.79		
Reported amount liked learning about health in school	3.56	0.74		3.35	0.85		3.50	0.77		3.59	0.68		

There was a significant treatment \times time interaction for the amount that children reported that they talked to their parents about health ($F_{1, 288} = 4.62$, $p = 0.032$). Multiple comparisons of individual means showed no difference between the groups prior to treatment ($t_{313} = 1.80$, $p = 0.073$). There was a significant decrease from pre-test to post-test for the experimental group ($t_{160} = 3.16$, $p = 0.002$), indicating that children in the experimental classrooms talked less to their parents about health after the treatment, and no significant change for the comparison group ($t_{128} = 0.18$, $p = 0.857$). There was no difference between the groups after treatment ($t_{300} = 1.56$, $p = 0.119$).

There was a significant treatment \times time interaction for the amount children reported that they liked studying health in school ($F_{1, 253} = 7.61$, $p = 0.006$). Multiple comparisons of individual means showed no difference between the groups prior to treatment ($t_{285} = 0.25$, $p = 0.802$). There was a significant decrease from pre-test to post-test for the comparison group ($t_{109} = 2.56$, $p = 0.012$), indicating that children in the comparison classrooms liked studying health less over the time frame of the study, and no change for the experimental group ($t_{144} = -1.21$, $p = 0.277$). The two groups were significantly different from each other following the treatment ($t_{287} = -2.67$, $p = 0.008$).

Discussion and Conclusions

Children in classrooms participating in the PHE project reported learning more about health in school after the PHE sessions than did children in comparison classrooms. Additional converging evidence of increased learning four to eight weeks after the program is shown by the fact that (a) these children also listed more health-related content items when asked what they had learned about health in school that year, and (b) they listed more actions that they could do to be healthy than they did at the pre-program interview.

The finding that students participating in the PHE project significantly decreased the amount they talked to their parents about health is an intriguing one. It does not seem that these children were talking more about health to others. (There were non-significant results for talking to friends and teachers about health.) One hypothesis is that as children have their questions about health answered, they have less need to ask those questions elsewhere, hence conversation on the topic decreases. Future research should focus on the different aspects of talking about health—separating question asking from information giving, for example.

The degree to which children in PHE classrooms reported liking studying health remained unchanged. However, students in comparison classrooms reported a significant decrease on this measure. These results may indicate that the PHE program was protective in preventing the decay of liking to study health in school that was reported in children who did not have a medical student in the classroom. Since it is not known whether students in comparison classrooms

received any health-related instruction during this study period, it is not possible to see whether their decrease in liking to study health in school is related to other types of health instruction or to the lack of any such instruction. This is a question for further study.

The PHE program was not designed as a comprehensive health education curriculum, but was designed primarily to provide an experience that would help medical students improve their communication skills. Information on those effects of the program will be forthcoming. However, early evidence indicates that medical students participating in the PHE program did make gains in communication skills. As measured by performance on the Patient Video Interview, an instrument designed to assess communication skills in medical education (Reed, 1998), preliminary analyses indicate that participating medical students directed more communication to the patient as the agent of action and used significantly less medical jargon after their classroom teaching sessions than they did before. This latter finding is in line with earlier work that studied the effect of a program in which medical students taught health-related topics to school children in a classroom setting (Cohen, 1989). Participating medical students later tended to use simpler language and less medical jargon with patients in a clinical setting than did non-participating students.

A secondary gain of the program is that elementary students in PHE classrooms report learning more about health than do students in comparison classrooms. In addition, children who have participated in the PHE program maintain their enjoyment of learning about health. This associated gain provides us with insights into ways to enhance and enrich health education for elementary school children. The personal, hands-on, interactive nature of health education provided to the children may be an important element in producing learning. The goal of learning is not mere retention of knowledge but the transfer of that knowledge into behavior, especially in other contexts. Such transfer is impacted to the extent that information is learned with understanding (National Research Council, 1999). PHE lessons were designed to enhance understanding by actively engaging students in the discovery and learning processes. Work in other educational domains has shown that learners' active engagement in what they are studying can significantly enhance learning (Jernstedt & Chow, 1980).

Another important component of the PHE program is that medical students provided health education to schoolchildren. As previously mentioned, the American Academy of Pediatrics (1972) has long advocated using health care professionals to teach health in schools. The value of this notion is supported by educational researchers who point out that student learning can be enhanced through children's connections to experts in the community (National Research Council, 1999). Medical students, individuals who are becoming doctors, are likely to be seen by both children and teachers as experts on health information. An additional potential advantage of having medical students teach children about health is that while medical students are seen by children as "grownups," they are closer in age to the children than are many other adults with whom they

regularly come into contact, such as teachers and parents. Particularly, as students move from the early elementary years into adolescence, medical students may have more credibility than some other sources of health information both because of their age proximity to students and their status of being “almost a doctor.” This is an area for future research.

Children need to learn about health so that they are empowered to make healthy choices. Medical students need to learn how to be effective communicators of health-related messages. Programs such as the Partners in Health Education program may provide important ways to achieve both of these goals.

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