Objective: To examine e-mail communication between student physicians and schoolchildren, in the context of a school-based tobacco prevention program, as a way to teach communication skills and model physician-patient interactions.

Design: Twenty medical students and pediatric residents were partnered with groups of children as part of HealthQuest, a tobacco prevention program implemented in 2 kindergarten through grade 12 Vermont schools. Medical students and residents acted as mentors for their group and provided support to the schoolchildren through e-mail and occasional site visits. E-mail messages were transmitted and stored in a Web server and monitored by preceptors. Content analysis of the messages was performed to identify emerging themes.

Results: During the 2-year intervention period, 1187 messages were exchanged between children, teachers, and the student physicians. Thirty-two percent (n=383) of the messages involved tobacco, of which 54% addressed health effects; 23% were related to social influences of tobacco use, 15% to cessation by parents and others, and 7% to cessation by students. Other categories included nontobacco health issues (n=135), personal questions (n=294), and classroom information (n=735). Many inquiries required medical students and residents to research their answers, and several required collaboration with preceptors, because the questions raised serious medical or psychosocial issues. With feedback, medical students and residents adjusted their responses so that they were appropriate for the developmental level of the children.

Conclusions: The e-mail component of this program provided important learning opportunities for student physicians in tobacco control, child development, communication skills, and developing a physician-patient relationship. This model also offers potential benefits for medically underserved pediatric populations.

PARTICIPANTS AND METHODS

HealthQuest was pilot-tested at 2 Vermont kindergarten through grade 12 schools. The program was structured as an interscholastic competition in which students in grades 3 through 12 solved age-appropriate problems that prompted them to learn about tobacco and develop tobacco prevention interventions for their peers. Sixteen student teams (8 elementary classes, 5 middle school classes, and 3 high school groups) solved HealthQuest problems and presented their solutions at year-end tournaments.

We paired a student team with a physician in training, who was called a “Koop Student Doc” (KSD), because of the program’s affiliation with the C. Everett Koop Institute at Dartmouth College. The KSDs visited their assigned class at least once per month and communicated with students regularly by e-mail. Training for the KSDs consisted of a 4-hour introductory session that included a brief review of child development issues and learning theories. Koop Student Docs received a HealthQuest handbook and reference books on tobacco prevention and cessation. Two additional training sessions per year were used to discuss actual e-mail exchanges in a group setting.

The HealthQuest electronic communications system consisted of a Web server that enabled students to create and send messages directly to their KSD. The server copied the messages to a database and parsed them out to the e-mail account of the appropriate KSD. We electronically precepted the KSDs by accessing the database weekly, reviewing the messages, and providing feedback. To facilitate the use of the Web site, each school received 2 computers with Internet access. Elementary grade children had scheduled access to the computers, whereas older students used them at their own discretion. Students were told that their messages would be read by KSDs and other members of the HealthQuest team at the start of the program and were reminded throughout. The program was approved by the Committee for the Protection of Human Subjects at Dartmouth College.

We performed a content analysis of the messages and identified 11 themes or topics that were consistently featured. A dichotomous coding scheme was used to indicate the presence or absence of each theme for every message. Many messages contained questions or correspondence from 2 or more students. We counted these as a single message and, if appropriate, coded multiple themes.

To evaluate interrater reliability, 2 coders independently coded 12% of the messages. Overall, 96% of the items were in agreement. All messages or excerpts are printed exactly the way they were written, except the names were changed to protect confidentiality. We did not code messages exchanged with the HealthQuest educator (n = 226) because we were primarily interested in interactions between the KSDs and students and teachers.

INTRODUCTORY MESSAGES

A list of questions a grade 3 class sent to their KSD before meeting him includes the following:

How did you decide to be a doctor? Nicole
Why did you want to become a Koop Doctor? Emma
How do you get to be a Healthquest Doctor? Rosemary
Where do you work? Is it in a hospital? Cal
How many people die from smoking each year? Mindy
What is your middle name? John
How do people get lung cancer? Kelven
Do you have kids? Kelsey
How do you get worms? Edward
Why does smoking affect your eyes? Ryan M.
Have you ever smoked? Bradley
Do you like turkey? Scott

Only 5 of the 17 questions were about tobacco and related health issues, 7 were about what it is like to be a physician, 4 were personal “finding out” questions, and 1 was a personal health concern unrelated to tobacco. These questions typify the types of things asked by curious grade 3 students. In fact, children of all ages were curious about the medical profession and training.

QUESTIONS ABOUT TOBACCO

When we started the program, KSDs were not yet experts on tobacco, child development, or teaching. Fortunately, the asynchronous nature of e-mail permitted them to gather the scientifically correct information and develop age-appropriate responses in a timely, but not immediate, manner. However, in one instance, the KSD did not research the answer and the teacher provided feedback:

Dear Koop Doc, does smoking hurt your bones or affect bone growth?
The KSD's answer: As a rule of thumb, no, smoking doesn't affect bone growth.

The third-grade teacher's response was as follows:

Dear Tom, Hi! Just thought I'd touch base to let you know where we are with our class study. We are learning about the skeleton as it ties in with their interest with x-rays. Also, it provides a framework to locate and discuss internal body parts. I found an article in Science News (Feb. 1992), which states that smoking does effect bone regeneration.

Children asked difficult questions about tobacco use, which required KSDs to think about the developmental level of children and how they perceive and experience their world to craft an appropriate response.

Dear Koop Doc, does smoking relieve depression? Is it worth the satisfaction? Are there better ways? From Al.
The KSD’s response was as follows:

Dear Al, I think there are definitely better ways to get satisfaction and relieve depression. Smoking hasn’t been shown to be good at relieving depression. There are many ways to help with depression that are good for you, and have been proven by scientists to help with depression. Exercise is a really good example. Going out and playing sports or running or walking all have been shown to help with depression and are good for you and make you healthier on top of that! What sports do you play? Koop Doc Mike

TOBACCO CESSATION

Younger children asked about cessation because they were concerned that smokers they love would become sick and die. When students revealed these concerns, KSDs developed responses that were sensitive, encouraging, and helpful. High school students asked about tobacco cessation because they wanted to quit. A KSD encouraged dialogue with 1 high school smoker who wanted to quit. Appropriately, the KSD elicited information about the student’s level of addiction and motivations for quitting.

The initial exchange was as follows:

Dear Dr Pepperman, I need your help on about how to quit. From Dina.

Dina, let me ask you some questions. How long have you been smoking? How much do you smoke? Why do you want to quit? What was it that got you started? Do you want to quit? JKP

The student answered his questions:

Dear Dr Pepperman, Hi this is Dina and I will answer the questions that you asked me from before. The first answer is I have been smoking for about 7 years off and on. I smoke when ever I get the chance to. I wont to quit because it is not healthy and it is giving me a shortig of breth. The thing that got me started was the stress. YES I do wont to quit.

The student received the following advice:

The reason I asked you those questions, was to get a feeling for where you are and how difficult ti will be for you to quit. This is the time for you to quit, before it becomes a true habit. I think the best way for you to quit is to get some extra support; someone you can talk to about the troubles quitting. It might be helpful to find a friend who also wants to quit. That way if you feel the urge to light up, then you would have someone to talk to. How does that sound?

The dialogue continued, with the KSD offering support and encouragement. He suggested the possibility of creating a support group of others in the student’s class who were also writing him and trying to quit. Dina made attempts to quit but was unsuccessful.

MEDICAL STUDENTS AS TEACHERS

By participating in HealthQuest, medical students also gained classroom teaching experience. Good teachers, like good physicians, need to learn to communicate effectively. In the classroom setting, student teachers learn through trial and error, observation, and evaluation. In the example below, Kip sensed that he may have lost the students during a classroom presentation. He e-mailed Tracy, an experienced teacher, with his concern and received some helpful advice and strategies:

Tracy, please also let me know of any helpful critique you may have of my performance with your class. I don’t know much or anything really about their appropriate intellectual level. I found myself wanting to explain complicated topics and having to restrain, I hope I didn't go over their heads too often. thanks, Kip

Hi Kip, . . . The kids seemed to enjoy your visit, and most of it was easy enough for them to grasp. They especially liked when you talked about your own childhood experiences. Their attention spans are still a bit short for that amount of lecture/discussion. They respond more actively and enthusiastically if they have to DO something. Maybe for another visit we can think of some games or hands-on activities that you can lead them
Students learned that even physicians do not have all the answers all of the time. In the following exchange, the KSD admitted to a grade 5 student that he “had to do a little searching.” Notice how this KSD created a problem for the student to solve using the information he found. He praised the child for asking a good question and by responding with another question, encouraged the child to think harder about the topic:

After smoking or chewing, how long do your blood vessels stay constricted? Carol

Carol, This is an excellent question that I had to do a little searching to figure out. The constriction of your blood vessels is due to nicotine. . . . The half-life of nicotine in your body is about 1 hour. This means that when you take in a little nicotine as a result of smoking or chewing tobacco, one half of that nicotine that you took in will be gone in one hour . . .

So let’s do a little experiment:

1. Joe smokes one cigarette and this gives him 4 units of nicotine. After one hour, how much nicotine is left in Joe’s body? ANSWER: 2 units remain in Joe’s system.

Once again, great question. Keep up the good work, and if any of this is too complicated, just let me know. See you soon, Geoff

Some of the KSDs were more skillful than others at finding a teachable moment.

Dear Arthur, What is your favorite color? Adam

ADAM: My favorite color is blue, but green is a close second. Arthur

Dear Mitch, Do you like the color blue? I like the color blue and purple. Sherri

Sherri, You BET I like the color blue! Blue is the color of fresh clean air, and yes, it is my favorite color too! Think about what happens to the color of the air when people smoke and what that does to their lungs! What color do you think smokers’ lungs are? Mitch “Koop Doc”

ADDRESSING PERSONAL HEALTH CONCERNS

There were a number of instances in which children shared personal concerns about their health that was not related to tobacco use.

Dear Koop Doctor, I need to lose some weight. I am in 3rd grade and eight years old. Would you please suggest some exercises? I like to do push-ups, jumping jacks, and monkey bars. Kelly

In this case, the KSD appropriately asked for more information. He was careful not to sound judgmental and encouraged her to continue exercising in the ways she liked:

KELLY: Could you tell me some more about yourself before I answer your questions? How much do you weigh? Who says you need to lose weight? In the mean time, pushups, jumping jacks, and playing on the monkey bars sounds like a great idea. Kelly “loved” the KSD’s message. It gave her a way to share her concern about her weight with her classmates who call her “fat.” Kelly’s teacher told us that after Kelly read her message in class, the children no longer teased her about her weight and they began to support her efforts to change.

The following message we received from one of the students was alarming. When the program was designed, we anticipated that students might send messages that warranted school or medical intervention. In these instances, the KSDs were instructed to contact their supervisor immediately so that the information could be transmitted to the appropriate school official.

Dear David, Hello! I need to ask you something. My friend Jamie killed himself. I can’t get over it. I have lost two people in the last four months and man is it hard. I don’t know how to get over it. I am very depressed and am on the signs of suicide. I have been on Zoloft for about 2 years now and it is not helping. I was wondering if you had any suggestions on what I could do instead of trying to commit suicide? Thanks. Please write back As soon as possible! Thanks, Cathy

By providing a reason for the communication to take place and a process to assess the content, this component of HealthQuest enabled medical students and residents to form relationships with children through e-mail. Communication through e-mail allows time for student physicians to research information, seek opinions, and carefully craft their responses. Although this pilot project was limited to tobacco prevention, similar programs could be used to promote other preventive health behaviors or provide support to children with chronic illnesses.

Supporting e-mail communication as part of a school-based health program meets the objectives recommended by proponents of medical curriculum reform. It offers the opportunity to teach skills related to disease prevention and health promotion in the community, and establishes an infrastructure for outreach programs to medically underserved populations. Involving medical students and residents in school-based programs is consistent with the service-learning approach proposed by the Pew Health Professions Commission, in that it is truly a collaborative effort in which the learning experience is equally balanced with the service being provided to the community. Furthermore, by requiring medical students to learn with and communicate through computers, it prepares students for the increasing use of the Internet and computer technology in medicine.

In a focus group, KSDs communicated that they believed the experience gave them a better understanding of child development and tobacco use and that it taught them how to communicate more effectively with children. The results of this project are limited by the small number of participating medical students and residents. We recommend several modifications to evaluate it with a larger number of participating medical students. First, we would eliminate classroom visits by KSDs. Although their visits were
popular among the schoolchildren and teachers, they would be difficult to implement on a larger scale. Second, computers and Internet access must be available in all classrooms, because teachers found it difficult to schedule access for shared computers. Third, the Web server could be modified so that messages are posted on a bulletin board system, which uses encrypted transport protocol. This would provide a more secure communication system than e-mail. Finally, we recommend structuring this experience as an elective communications course for second-year medical students.

CONCLUSIONS

We believe this project demonstrates that e-mail can be used to teach important lessons and skills to medical students and could be adapted for adjunct to ambulatory teaching. At the same time, it offers the potential to benefit schoolchildren and their families, especially those in remote rural areas. Given the high level of access to the Internet in schools, computer-mediated communication is now a feasible way to establish physician-patient relationships.

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