

Communication and Education About Asthma in Rural and Urban Schools

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Objective.—To assess the quality of communication and education about asthma in Pennsylvania public schools.

Methods.—Survey of a stratified random sample of school nurses in rural and urban Pennsylvania public schools ($n = 996$) concerning communication with school nurses about asthma by physicians and parents, nurses' perceived obstacles to asthma management at school, and utilization of and need for education about asthma.

Results.—A total of 757 surveys were received (response rate 76%). Thirty-nine percent of school nurses rated their communication with physicians about asthma as either poor or very poor. Urban nurses were significantly more likely to report poor/very poor physician communication ($P = .09$). Fifty-two percent of the nurses overall (43% rural, 56% urban) also cited lack of communication with parents as an important obstacle to asthma management. Forty-nine percent of school nurses (43% rural, 52% urban) reported attending an asthma education pro-

gram during the previous year, and 75% (83% rural, 71% urban) expressed interest in additional education. Education about asthma was provided for classroom teachers in 54% of schools (56% rural, 54% urban) and provided for students in 58% of schools (54% rural, 60% urban).

Conclusions.—These findings document need for improvement in communication about children's asthma between school nurses and physicians. Although communication appears better in rural relative to urban schools, it is a salient issue in both settings. Study findings also indicate the need for expanded professional education opportunities for school nurses and improved access to appropriate curricular materials for school staff, parents, and students.

KEY WORDS: asthma; communication; rural; school health services; urban

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Over 14% of school-age children in the United States have been diagnosed with asthma at some time during their lives,¹ and any given classroom will usually have at least one student with asthma.² The dynamic nature of asthma symptoms requires consistent monitoring and periodic adjustments in treatment plans. Because children spend approximately one-third of their time in school on most weekdays,³ school nurses are the health professionals most likely to identify signs and symptoms of acute asthma exacerbations and are best positioned to coordinate symptom treatment and adjustments to maintenance therapy.

Ongoing communication about children's asthma among school nurses, pediatricians, school staff, and families is a key element in facilitating disease management^{2,4–7}; however, how much communication occurs in practice is unclear. Evidence from several mostly local area studies suggests that problems exist in communication about children's asthma. One exploratory study of 2 groups of school nurses caring for young children with asthma, for example, found that none communicated routinely with physicians about asthma management,⁸ and

only 10% of St Louis–area school nurses attending an asthma conference reported more than occasional communication with primary care providers.⁹ A study of teachers and other personnel in 5 elementary schools in the Bronx, New York, found that half of respondents had learned of a student's asthma only through informal conversation with the student or parent, and 28% said they were not usually informed about a student's asthma status.¹⁰ Twelve percent of school nurses in Maryland and the District of Columbia¹¹ reported never interacting with teachers concerning asthma issues, and an additional 36% did so less than once a month. Moreover, only one-third of the school nurses documented asthma episodes by sending a letter home to parents.

The studies to date of communication about asthma have largely been small in scale and have not evaluated school nurses' communication with the full spectrum of people involved in caring for school-age children with asthma—physicians, parents, and other school staff members—in both elementary and secondary school settings. Moreover, most studies have focused on urban school nurses, although characteristics of rural school districts could be expected to differentially affect communication. Because rural schools tend to have lower per-pupil expenditures than do urban schools,¹² rural schools might be expected to have differentially fewer resources to devote to asthma-related services. In addition, rural school nurses often have responsibility for several schools that are miles away from one another,¹³ and as a result they may have a less consistent presence at a particular site to coordinate asthma management with physicians, staff, and parents.

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The present study seeks to add to current knowledge about asthma-related communication in exploring the following research questions: How adequately and by what means do school nurses communicate about children's asthma with physicians, parents, and school staff? Does communication differ among rural and urban school nurses?

In addition to communication issues, the extent to which school nurses, teachers and other staff, and students are knowledgeable about asthma and know what to do in the event of an asthma attack influences the quality of asthma management in schools. Improvements in school-based asthma education and training opportunities have been widely recommended^{4,6,14}; however, school nurses continue to identify the need for continuing professional education about asthma.^{11,15} Additionally, classroom teachers have limited knowledge about asthma and its management,¹⁶⁻¹⁹ and many nurses report that their schools lack effective programs for training school faculty, staff, and students.^{11,15,19,20} To better understand asthma-related educational needs, we also asked: How prevalent are asthma education programs for school staff and students? What are school nurses' perceived needs and preferences regarding continuing education about asthma?

METHODS

Within each of the 500 Pennsylvania school districts in 2004, two schools were randomly selected from the universe of all public elementary, middle, and high schools. Because 3 districts contained only one school, the final sample size was 997 schools. Approximately half of the school districts ($n = 243$) were classified as rural, using the criteria of fewer than 274 persons per square mile as recommended by the Center for Rural Pennsylvania.¹² The remaining school districts were classified as urban according to the Center for Rural Pennsylvania criteria. Pennsylvania school districts, both urban and rural, are required to provide school nurse services.

The nurse survey instrument drew on question formats used in previous asthma-related research,^{11,21} as well as content reflecting recommendations from the National Heart Lung and Blood Institute's "Resolution on Asthma Management at School."⁷ The survey consisted of 21 questions and took approximately 15 minutes for respondents to complete. Study participants were assured that the information they provided would remain anonymous and would not be identified with their specific school practice settings, in order to reduce the likelihood of eliciting socially desirable responses.

Questionnaire items related to the research questions encompassed 2 domains: communication about asthma, and the educational needs of staff, students, and school nurses about asthma and its management. The perceived level of school nurse communication with physicians, parents, and school staff was elicited by using a 5-point Likert scale response set, ranging from *excellent* to *very poor* to the following: "In general, how would you rate the level of communication you have with ___ about students' asthma?" Additional multiple-choice questions elicited ways in which communication was conducted with phy-

sicians and parents, with choices including telephone, written notes, and an "other" category, as well as an option stating that the nurse doesn't usually communicate about asthma symptoms during school. Nurses were asked to provide information about the proportion of children with asthma in their school for whom an asthma action plan facilitates communication about disease management. In addition, nurses were asked whether they perceived lack of communication with health care providers and with parents as obstacles they faced in managing asthma in their school setting.

A second series of questionnaire items assessed asthma educational needs. Items related to the question "Which of the following are true of this school?" included: "Classroom teachers are taught about asthma," "Students are taught about asthma," and "Classroom teachers are routinely notified when they have students with asthma." In each case, respondents were asked to check either "Yes," "No," or "Don't Know." Similar questions asked about continuing education: "Have you attended asthma education programs during the current school year?" and "Would you be interested in additional asthma education?" Respondents were asked to select the types of information they would find helpful from a list including "General asthma facts," "Current best practices/guidelines," "Update on asthma medications," "Teaching tools for staff/families," "Asthma triggers," "Emergency care for child with asthma attack," and "Other." Another questionnaire item elicited the preferred format or formats for additional asthma education among the following choices: "Classes with CEUs," "Informal talks with physicians/nurses/health educators about asthma," "Demonstrations," "Written information such as pamphlets," and "Other."

The survey also included an open-ended question to elicit nurses' recommendations for improving asthma management.

Each school in the sample received an introductory letter addressed to the attention of the school nurse, along with the survey form and postage-paid return envelope. The option of an Internet-based questionnaire was also provided. The introductory letter included detailed information about all aspects of the study, and notified participants that a returned survey implied informed consent. The study protocol and procedures were reviewed and approved by the Pennsylvania State University Office of Research Protections. In the few cases in which a nurse whose practice involved multiple schools received surveys at 2 schools, he or she was instructed to answer each questionnaire pertaining only to the school to which it was addressed. A monetary incentive of \$2 accompanied each survey.

One week after the initial survey was mailed, all schools in the sample received a reminder postcard. A third mailing, composed of another copy of the survey, a follow-up letter, and a postpaid reply envelope, was sent to nonrespondents approximately 3 weeks after the initial mailing. Staff in the Pennsylvania State University Survey Research Center coordinated survey administration and data entry.

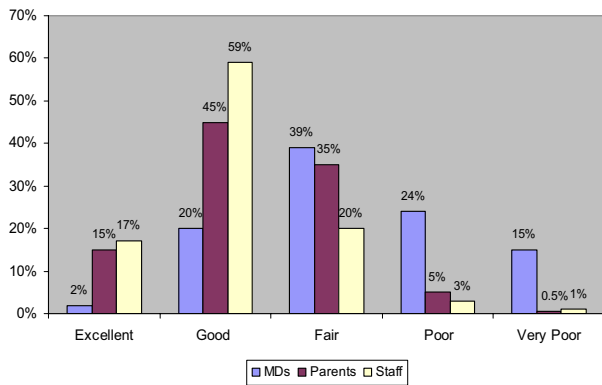


Figure. Communication with physicians, parents, and staff about asthma, Pennsylvania school nurses, 2004.

Sampling weights were used to take the survey design into account, and Pearson design-based F statistics were calculated to determine the significance of differences in categorical study variables among rural and urban school settings including the Likert scale ratings of communication with physicians, parents, and staff, methods of communication, perceived obstacles to asthma management, asthma education for teachers and students, and nurses' continuing education participation and preferences. All analyses were conducted with Stata version 8.2 statistical software (Stata Corp., College Station, TX).

RESULTS

There were 757 completed surveys, with 365 surveys received from nurses in rural schools and 392 from urban schools. The overall response rate was 76%, without significant differences between rural and urban schools. Almost all questionnaires ($n = 746$) were returned by postage-paid return mail, with the remainder submitted via the Web-based interface.

Communication With Physicians, Parents, and Staff

The Figure shows school nurse ratings of their level of communication about asthma with children's physicians, their parents, and other school staff members. More than one-third of school nurses rated their communication with physicians as either poor or very poor. Urban nurses were significantly more likely than rural nurses to describe poor or very poor communication, and were significantly less likely than rural nurses to rate their communication with physicians as excellent, good, or fair ($F = 2.17$; $P = .09$).

Overall, school nurses tended to assign more positive ratings to their communication with the parents of their students with asthma. Sixty school nurses reported that they had excellent or good communication with parents about children's asthma, and only 5% felt that communication was poor or very poor. Similarly, only a relatively small proportion of school nurses reported poor or very poor communication with other school staff about asthma, and three-quarters of school nurses reported this communication to be either excellent or good. No significant differences were seen among rural and urban school nurses in ratings of parental or staff communication.

School nurse perceptions of communication differed between elementary and secondary school settings. Nurses practicing in elementary schools reported significantly better communication about children's asthma with all 3 groups—physicians ($F = 3.77$; $P = .01$), parents ($F = 2.34$; $P < .10$), and school staff ($F = 3.89$; $P < .01$)—relative to nurses practicing in secondary schools.

Table 1 displays additional findings concerning communication about asthma, stratified by rural/urban location. When asked about the methods used to communicate with children's physicians, 59% of rural nurses and 53% of urban nurses stated that they do not usually communicate with physicians at all about children's asthma. When

Table 1. Communication About Asthma in Rural and Urban Pennsylvania Public Schools, 2004

Characteristic	Rural, %	Urban, %	P Value*
Methods of School Nurse Communication			
With physicians			
Telephone	45	44	.97
Written notes	16	30	.05
Don't usually communicate with child's physician	59	53	.40
With parents			
Telephone	99	99	.73
Written notes	59	62	.72
Don't usually communicate with child's parents	5	4	.57
School Nurse Perceived Obstacles to Asthma Management			
Lack of communication with physicians is an obstacle	47	57	.12
Lack of communication with parents is an obstacle	43	56	.06
Communication and Education About Asthma at School			
Classroom teachers are routinely notified when a student has asthma	91	95	.05
Classroom teachers are taught about asthma	56	54	.53
Students are taught about asthma	54	60	.39

*Statistical significance associated with Pearson χ^2 statistic.

Table 2. Asthma Continuing Education Among School Nurses in Pennsylvania Public Schools, 2004

Characteristic	Rural, %	Urban, %	P Value*
Continuing Education About Asthma			
School nurses attending asthma education programs in current year	43	52	.21
School nurses interested in additional asthma education	83	71	.09
Types of Asthma Information Needed			
Update on asthma medications	84	88	.35
Current best practices and guidelines	85	85	.99
Emergency care for a child with an asthma attack	72	74	.69
Teaching tools for school staff and families of children with asthma	67	74	.18
Asthma triggers	38	50	.09
General asthma facts	32	47	.05
Format Preferred for Continuing Education About Asthma			
Written information, such as pamphlets	65	72	.21
Classes offering continuing education credit	63	69	.34
Informal talks with physicians, nurses, and health educators	47	52	.49
Demonstrations	38	50	.08

*Statistical significance associated with Pearson F statistic.

communication does occur it is most likely by telephone, and less often by written notes.

Nurses much more commonly reported communication with parents, with almost all nurses using telephone calls as the primary means of contact.

Over one-quarter of students with asthma were reported to have an asthma action plan on file. When asked about obstacles to asthma management in schools, about half of both rural and urban nurses identified lack of communication with physicians as a significant barrier. Close to half of nurses in each setting also noted lack of communication with parents as an obstacle by close.

Notification and Education About Asthma

Table 1 also presents survey findings about notification and educational programs about asthma in schools. In the majority of schools, classroom teachers are notified when one of their students has asthma. Nine percent of rural and 5% of urban nurses, however, reported that this notification does not routinely take place in their schools. Only about half of rural and urban school nurses reported asthma education programs in their schools.

Both rural and urban school nurses surveyed displayed a high level of participation and interest in continuing education about asthma (Table 2). Forty-three percent of rural and 32% of urban nurses reported attending an asthma education program during the current school year, and about three-quarters of each group expressed interest in additional educational programming. The most requested topics included information on medications, best practices and guidelines for asthma management, emergency care for a child with an asthma attack, and teaching tools for school staff and families of children with asthma. About 40% of respondents also asked for information concerning asthma triggers and general asthma facts. Few significant rural-urban differences were noted in preferred continuing education topics or presentation format.

Recommendations for Improvement

Thirty-eight percent (n = 288) of the school nurses offered suggestions for improving asthma management in their schools, mainly in 3 topic areas: (1) increased school nursing coverage through reduction of nurse-to-student ratios and increased funding; (2) increased education about asthma for students, teachers, parents, and some community physicians who are perceived by nurses as providing care that does not conform to recommended guidelines; and (3) improved cooperation of parents in providing information from physicians, as nurses perceive recent privacy legislation to have made it more difficult to obtain information about their students' health status and treatment plans directly from physicians.

DISCUSSION

Although ongoing communication among health care providers, school nurses, school staff, parents, and children about asthma is generally regarded as essential for appropriate disease management,^{2,4,6,7} findings from the current study indicate widespread communication problems. Although present in each communication realm assessed, negative ratings were particularly prominent with regard to school nurse-physician interaction. Over one-third of nurses rated their communication with physicians as either poor or very poor, and half cited lack of physician communication as an obstacle to asthma management. A majority of respondents reported no usual communication with children's physicians, either by telephone or written notes.

Communication with parents was generally rated more positively than with physicians. Even here, however, close to half the nurses identified lack of parental communication as an obstacle in managing asthma in their schools, almost the same percentage that identified lack of communication with physicians as an obstacle. Even though nurses consider their interaction with parents to be more

favorable, they believe that the care of children with asthma would improve with better communication with both parents and physicians.

School nurses should maintain communication with physicians and families about children's asthma, especially because children spend such a large portion of their time at school. Regular updating of asthma action plans can help health care providers to communicate key aspects of disease management such as the recommended protocol for treating an individual child's asthma attacks and preferred regimen for peak flow monitoring. Both the National Heart, Lung and Blood Institute⁷ and the National Association of School Nurses²² recommend use of written asthma action plans. In addition, school nurses report that the presence of an asthma action plan gives them increased confidence in their ability to care for children with asthma.⁹

Comments by nurse respondents suggest that federal legislation aimed at protecting the privacy of medical information represents a barrier to them in obtaining asthma management plans and other information directly from physicians' offices. This suggests two related strategies that may facilitate transfer of asthma-related information. On one hand, school nurses should inform parents that privacy laws affect communication between the nurse and the child's physician related to their children's health and often requires documented parental permission. Health care providers could facilitate the transfer of information by having parents routinely sign releases to allow faxing of asthma action plans directly to the school nurse.

Another strategy to increase communication about children's asthma identified by survey respondents involves increasing the amount of time available to school nurses for care coordination through optimizing school nurse staffing ratios. A significant correlation exists between lower school nurse-to-student ratios and increased services provided to children with asthma as well as other conditions.²³ Pennsylvania law requires one school nurse for every 1,500 students,¹² which is comparable or more favorable than that found in many states²⁴ but above the 1:750 ratio recommended by public health²⁵ and professional nursing²⁶ organizations.

Consistent with previous studies,^{11,15} school nurses express strong interest in augmenting their own expertise about asthma through continuing education, particularly related to medications, current best practices, and management of acute asthma attacks. These findings suggest the need for additional opportunities for school nurses to learn from primary and asthma specialty care providers through educational presentations as well as informal discussion and demonstration sessions.

Despite the geographic and financial constraints commonly seen in rural areas, study findings among rural school nurses were similar to those of their urban counterparts in most respects. Significant differences were seen, however, in aspects of school nurse-physician communication about asthma. Contrary to expectations, these differences suggest that rural school nurses perceive a comparatively favorable level of physician communica-

tion. It may be the case that in rural communities school nurses and physicians are more likely to be personally acquainted with one another, and may therefore feel more comfortable initiating contact to discuss children's asthma management. In addition, enrollment statistics reported to the Pennsylvania Department of Health indicate that rural school districts in the Commonwealth tend to have somewhat lower school nurse-to-student ratios, such that rural school nurses may have comparatively more time available to establish and maintain lines of communication. Additional research would be helpful in identifying factors that serve to facilitate or inhibit school nurse-physician communication in both rural and urban settings.

Findings from the present study are generalizable to rural and urban schools in Pennsylvania; however, they may not necessarily pertain to rural and urban schools in other parts of the country. Nonresponse bias is also a potential consideration in interpreting the finding, although the 76% response rate achieved in this study is acceptable by established standards of survey research.²⁷ Differential representation of responses by location within Pennsylvania does not appear to be an issue, in that response rates among urban and rural school nurses were comparable.

In conclusion, the study findings strongly suggest that improvements in communication about children's asthma are needed, particularly between school nurses and physicians. Although this communication appears somewhat better in rural relative to urban schools, it is a salient issue in both settings. More consistent use of asthma action plans as well as the establishment of more favorable school nurse-to-student ratios are strategies that could facilitate communication among school nurses, physicians, and families regarding asthma management. Study results also highlight the need for expanded opportunities for continuing professional education about asthma for school nurses, as well as improved access to appropriate educational materials for school staff, parents, and students.

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