
School Nurses on the Front Line:



Challenges in Meeting the Diverse Health Needs of Rural Pennsylvania School Children



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School Nurses on the Front Line: Challenges in Meeting the Diverse Health Needs of Rural Pennsylvania School Children

A report by

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Project Summary

Contents

Introduction	5
Project Goals and Objectives	6
Research Methodology	6
Policy Review	6
Quantification of Nurse-Student Ratios and School District Characteristics	6
Three-Way Survey	6
Results	7
Policy Standards for Nurses in Pennsylvania Public Schools	7
Perceived Effectiveness and Satisfaction With Current Nursing Services in Schools	11
Perceived Need for Improvements in School Nursing Services	12
Conclusions	13
Policy Considerations	14
References	15

School nurses are the health professionals most consistently involved with the health needs of children, particularly in rural areas where primary care providers are less likely to be located. To understand the scope and effectiveness of nursing services for school districts throughout Pennsylvania, the researchers conducted a study in 2005 to: 1) identify and evaluate state policy standards for nurses in Pennsylvania schools; 2) identify current school nurse-student staffing levels in Pennsylvania school districts, including demographic, economic, and social characteristics of the school districts that are served; 3) quantify the health care services provided by nurses in rural and urban schools; 4) evaluate the effectiveness of school nurses in meeting students' health care needs; and 5) formulate policy considerations that facilitate effective health promotion among children in rural Pennsylvania schools.

These goals were accomplished through a review of policy standards from governmental and professional sources; quantification of nurse-student ratios and district characteristics by integrating data from the Pennsylvania Department of Health, the U.S. Census Bureau, and the National Center for Educational Statistics; and surveys of school nurses, school principals, and parents of children enrolled in rural and urban Pennsylvania schools.

Project findings led to the following conclusions:

- There is considerable overlap in policy standards among professional organizations and those in Pennsylvania law, but the mandated nurse-student ratio in Pennsylvania is twice as high as the ratio recommended by professional organizations;
- Most Pennsylvania school districts are in compliance with the currently mandated 1:1,500 nurse-student ratio, however the majority would not be in compliance with the 1:750 ratio recommended by professional groups and the Healthy People 2010 objectives;
- Nurses in both rural and urban school districts deal with a complex array of health problems affecting children;
- Instruction on many health-related topics is provided in both rural and urban school settings in roughly equal proportions, however it is not universally provided; furthermore nurses express less satisfaction related to the amount of education they can currently provide than to any other aspect of school nursing services;
- Three-quarters of both rural and urban nurses perceive that they occupy a leadership role in developing health policies and programs in their schools, and assumption of this leadership role has significant implications for the health care provided to students; and
- Nurses, parents, and principals tended to have very favorable perceptions of current nursing service provision in schools, however each group identified multiple areas in need of improvement.

Policy considerations for the Pennsylvania General Assembly include lowering the maximum school nurse-student ratio from 1:1,500 to 1:750 and raising financial reimbursement levels for school health services. Policy considerations for the Pennsylvania Department of Health include providing additional educational opportunities for school nurses and resources for nurse provided education of students and school staff members, as well as facilitating communication between physicians and school nurses.

Introduction

Many children have significant health needs, some of which may not have been identified and appropriately managed in early childhood, by the time they first enter school. These problems include: hearing impairment, communication disorders like speech impediments, and language delay; vision problems; growth disorders; chronic physical conditions, such as allergies, asthma and other respiratory conditions; coordination difficulties ranging from clumsiness to cerebral palsy; and emotional and behavior problems. Further health concerns that may emerge over the elementary and secondary school ages include impairment related to accidental injury; depression and other psychiatric disorders; chronic illnesses, such as diabetes and cancer; the development of eating disorders; obesity; conduct disorders; adoption of health risk behaviors, such as tobacco, alcohol, and illicit drug use; and participation in unprotected sexual activity.

School nurses are often the health professionals most consistently involved in dealing with the health needs of school-aged children (Guttu et al., 2004). This is particularly true in rural areas,¹ where primary health care providers are less likely to be located. For example, in Pennsylvania, there is only one pediatrician for every 3,636 children in rural areas, compared to one pediatrician per 1,303 children in the commonwealth as a whole (Pennsylvania Partnerships for Children, 2001). There were more than 350,000 school-aged children living in rural Pennsylvania counties in 2000, and their numbers have increased in most age groups since 1990 (Ollivier, 2002). Based on prevalence data from national surveys, a sizeable proportion of these children have health conditions that regularly require school nurse services. For example, around 12 percent (42,000) are likely to have been diagnosed with asthma at some point in their childhood, about 7 percent (24,500) are under treatment for attention deficit hyperactivity disorder, and approximately 14 percent (49,000) have a health problem requiring regular use of prescription medication for at least three months of the year (Dey et al., 2004).

School nursing practice in Pennsylvania is complicated by system-level factors that impact the need for and provision of high-quality nursing services. For example, federal laws, including the Education for All Handicapped Children Act and the Individuals with Disabilities Act (IDEA), which mandate access to public school for children with severe disabilities, have led to the increased need for time-intensive, one-on-one nursing care in the school setting (Wolfe and Selekman, 2002). The current Pennsylvania state nursing regulations also tend to limit

the capacity of school nurses to provide care in that school districts need only maintain a ratio of one school nurse for every 1,500 students. This is twice as many students per nurse as considered adequate by the National Association of School Nurses (1995). A third relevant factor is the current and projected shortage of nurses in the commonwealth. According to the National Center for Health Workforce Analysis within the U.S. Department of Health and Human Services (DHHS), Pennsylvania currently faces a 9 percent shortfall in the supply of nurses relative to demand, with this shortage projected to increase to 30 percent by 2020. The unmet demand is expected to increase within all employment settings where nurses work, including public schools (U.S. DHHS, 2002).

Given the critical role that school nurses play as front-line caregivers for children, there is surprisingly little research that addresses the range of services school nurses provide and the effectiveness of those services (Wainwright et al., 2000; Bradley, 1998). This stems in part from confusion as to exactly what the scope of school nurse practice should encompass. A *New York Times* article, “For School Nurses, More Than Tummy Tending,” (Goldberg, 1999) reported that, in interviews conducted around the country, “school nurses uniformly said their jobs were changing because American life has changed.” There appears to be “a growing public sense that a school is, in part, a health-care provider.” Professional organizations have also identified expanding responsibilities that fall under the purview of school nurses, although various organizations identify somewhat different sets of duties and responsibilities (National Association of School Nurses, 2002; American Academy of Pediatrics, 2001).

Although these nursing roles have been identified, scant research attention has been paid to evaluating the extent to which each of these duties is being carried out in practice, and how effective the efforts of school nurses are in meeting children’s health needs. A recent review by Stock and her colleagues (2002) concluded that the existing literature deals with only a limited portion of school nursing services, centering primarily on health education and prevention. While this research documents positive outcomes, such as increased knowledge (Harrell et al., 1999; Bartfay and Bartfay, 1994) and lower rates of health-damaging behavior (Cameron et al., 1999; Harrell et al., 1999) resulting from specific interventions in selected settings, more comprehensive information is needed about the scope of nursing services being provided to the school-aged population more generally and their effectiveness.

¹ This research used the Center for Rural Pennsylvania’s rural definition; a county is rural when the number of persons per square land mile is less than the statewide average of 274.

This project provides information about the scope and effectiveness of nursing services for school districts throughout Pennsylvania. Special emphasis is placed on rural areas, where school nurses are likely to function with more limited resources, more severe time constraints due to lower staffing levels, and fewer health professional colleagues in the community with whom to collaborate.

Project Goals and Objectives

The goals and objectives of the project were to:

1: Identify and evaluate state policy standards for nurses in Pennsylvania's public schools;

2: Identify current school nurse to student staffing levels in Pennsylvania's school districts and in individual school buildings, including demographic, economic, and social characteristics of the school districts that are served;

3: Quantify the health care services provided by nurses in rural and urban school buildings;

4: Evaluate the effectiveness of school nurses in meeting students' health care needs; and

5: Formulate policy considerations to facilitate effective health promotion among children in rural Pennsylvania schools.

Research Methodology

The goals and objectives of this study were accomplished through: a review of policies relating to school nurse practice in Pennsylvania; a quantification of nurse-student staffing ratios and demographic, economic, and social characteristics of Pennsylvania public schools; and a three-way survey that gathered information from school nurses, school principals, and parents associated with public school buildings throughout Pennsylvania, conducted in collaboration with the Pennsylvania State University Survey Research Center.

Policy Review

Policy standards for school nurses in Pennsylvania were identified from official commonwealth legal documents, including the School Nurse Services subchapter of the Pennsylvania Code (official publication of commonwealth rules and regulations), the School Health Services Certification and Assignment Scope (K-12) from the Pennsylvania Department of Education, and licensure information from the Pennsylvania Bureau of Professional and Occupational Affairs. Additional information was obtained from professional organizations including the American Nurses Association, the National Association of School Nurses, the American Academy of Pediatrics, the Pennsylvania State Nurses Association, the National Association of School Nurses, and the Pennsylvania Association of School Nurses and Practitioners.

Quantification of Nurse-Student Ratios and School District Characteristics

Nurse staffing ratios for each of Pennsylvania's 500 active public school districts² were obtained from the Pennsylvania Department of Health's Division of School Health. Nurse staffing ratios were also calculated for individual school buildings with data from the nurse

survey. Economic, financial, and social characteristics of school districts were obtained from the Census Bureau, the National Center for Educational Statistics, and the Pennsylvania Department of Education.

Three-Way Survey

Information about the content and effectiveness of school nursing services was gathered from three relevant perspectives—from school nurses themselves, from the principals of their schools, and from parents of children enrolled in the schools where the nurses practice. A random sample of 997 Pennsylvania public school buildings was drawn from a list of all public schools in the commonwealth, stratified in such a way as to include one elementary and one secondary school building within each of the 500 active school districts. Because three of the active school districts contained only one school, the final sample was 997 rather than 1,000.

The surveys were designed to assess the content and effectiveness of school nurse services. A survey packet was mailed to each school building in the study sample and addressed to the school nurse. In about 90 percent of schools there was only one nurse per building, and in cases where there was more than one, questionnaires could be completed by any of the nurses. A cover letter to the school nurse explained the study and invited her or him to complete the two-page survey. Also included in the packet were a one-page (double-sided) questionnaire for the school principal and a one-page questionnaire for a parent. The school nurse was asked to forward these additional envelopes to the principal and the PTO/PTA president or other parent, respectively.

There were 615 school nurse surveys completed for a response rate of 61.7 percent overall, which is considered to be relatively high and more than adequate for purposes of data analysis. The response rates for rural and urban school nurses are shown in Figure 1. The difference between these response rates is not statistically significant.

² The Bryn Athyn School District, Montgomery County, was not active at the time of the study.

There were 431 surveys returned from school principals, resulting in a response rate of 43.2 percent. The response rate for the parent survey was 34.8 percent (347 returned). These somewhat lower response rates were likely due to logistical issues involved in having the principal and parent surveys delivered by school nurses rather than mailed or otherwise provided directly to these respondents by the Survey Research Center.

Figure 1. Rural/Urban Nurse Survey Response Rates

Locale	Number Responding	Total in Sample	Response Rate
Rural	309	484	63.8%
Urban	306	513	59.6%
Totals	615	997	61.7%

Results

Policy Standards for Nurses in Pennsylvania Public Schools

Figure 2 on Page 8 presents policy standards for school nurses from governmental bodies and professional organizations. The first row presents standards and requirements specified in Pennsylvania law and in policy documents, including a summary report on the role of school nurses by the Pennsylvania Joint State Government Commission (2004), which had considerable input from the Division of School Health. While the actual duties of school nurses are assigned by school districts (Pennsylvania Joint State Government Commission, 2004), schools must provide the specific services listed and school nurses generally perform them.

The National Association of School Nurses and the American Nurses Association (2002) have identified specific roles of school nurses, which generally encompass the state-specified services and functions but tend to be written in more broad terms. Similarly, a policy document from the American Academy of Pediatrics (2001) discusses the school nurse role generally, and explicitly supports the professional nursing organization policies. It is notable that in regard to children with special health care needs, the American Academy of Pediatrics document does specify that specific health care procedures be performed when needed, including tracheostomy suctioning, bladder catheterization, ostomy care, nasogastric feeding, maintenance of orthopedic devices, and ventilator care.

An additional policy document related to school health is included in the table from the Centers for Disease Control and Prevention (2005). While nursing functions are not addressed specifically, the CDC outlines components of a ‘Coordinated School Health Program’ that requires input from school nurses, physicians, and other agencies and individuals in the community.

There is divergence among the policy documents cited with regard to recommended nurse to student ratios. Each of the professional organizations, as well as the Healthy People 2010 objectives (2000), identifies one nurse to

750 students as desirable. While the Pennsylvania Division of School Health expresses support for this recommendation in principle,³ state law mandates a ratio of one certified school nurse to 1,500 students. This ratio provision was originally enacted on December 7, 1965 (Pennsylvania Joint State Government Commission, 2004). Schools in Pennsylvania have the option of employing additional nurses who may perform the complete range of school nurse duties but have not completed an approved certification training program; however, the requirement states only that there must be one school nurse for each 1,500 students in the school district, and that that nurse must be appropriately certified.

Pennsylvania Nurse-Student Ratios and School District Characteristics

A summary of the statistics concerning school nurse staffing and nurse-student ratios, student characteristics, and district demographics are presented in Figure 3 on Page 9.

Figure 3 indicates that the average ratio is considerably below the mandated ratio (1:1,012). All but 10 of the 500 active school districts had certified school nurse-student ratios at or below 1:1,500. Of the 10 schools that have ratios above 1:1,500, one is rural. The average certified school nurse-student ratio in rural school districts is 1:936, which is more favorable than the 1:1,084 average in urban districts. Although the average number of certified school nurses is smaller for rural districts, their average student body size is considerably smaller, resulting in the more favorable certified school nurse-student ratio observed. It is interesting to note that 17 percent of Pennsylvania school districts currently meet the lower 1:750 ratio advocated by professional organizations; 8 percent of urban districts have achieved this ratio, as compared to 25 percent of rural districts.

The Division of School Health also collects statistics on the number of additional health support personnel

³ Personal communication with the director of the Division of School Health within the Pennsylvania Department of Health.

Figure 2. Policy Standards for School Nurses

Organization/Governing Body	Standards/Requirements/Recommendations
<p>Pennsylvania State Government Regulations, as summarized by Pennsylvania Joint State Government Commission (2004). Incorporates information from the 28 Pa. Code §§ 23.1-23.87, the Pennsylvania Department of Education, and the Pennsylvania Bureau of Professional and Occupational Affairs</p>	<p><u>Mandated school health services:</u> 1) School nurse services; 2) Medical examination; 3) Dental examination; 4) Vision screening; 5) Hearing screening; 6) Scoliosis screening; 7) Height and weight measurement; 8) Maintenance of health records; 9) Tuberculin testing; and 10) Immunization assessment. <u>Major school nurse functions:</u> 1) Conduct health screenings; 2) Administer medications; 3) Supervise first aid services; 4) Promote health and wellness programs; 5) Provide support for medically fragile children; 6) Refer students and their families for further care; 7) Facilitate access to health insurance; 8) Serve on support teams for at-risk students; 9) Develop individual healthcare plans; 10) Participate in individual education plans; 11) Maintain confidential health records; 12) Monitor immunizations; 13) Educate faculty and staff on student health issues. <u>Nurse-student ratio:</u> Each certified school nurse should serve no more than 1,500 students.</p> <p>Additional information from the director of Division of School Health within the Pennsylvania Department of Health: The Pennsylvania School Code mandates that every child of school age be provided with school nursing services as part of the school health program. The actual duties of school nurses are assigned by the school districts, and the Dept. of Health prescribes the technical content of the nurses' responsibilities (i.e. providing the school districts with health services procedural manuals and minimum standards for health screenings).</p>
<p>National Association of School Nurses (NASN) and the American Nurses Association (2002)</p>	<p><u>Roles of the school nurse:</u> 1) Provide direct health care to students and staff; 2) Provide leadership for the provision of health services; 3) Provide screening and referral for health conditions; 4) Promote a healthy school environment; 5) Undertake health promotion activities; 6) Serve in a leadership role for health policies and programs; and 7) Serve as a liaison between school personnel, family, community, and health care providers. <u>Nurse-student ratio:</u> The school nurse to student ratio should not exceed 1:750 in the general school population, with smaller ratios for special needs students.</p>
<p>Pennsylvania Association of School Nurses and Practitioners (PASNAP)</p>	<p><u>Nurse-student ratio:</u> The school nurse to student ratio should not exceed 1:750</p> <p>Professional duties expected of school nurses may exceed those mandated in state regulations.</p>
<p>American Academy of Pediatrics (2001)</p>	<p><u>School nurse role:</u> Functions include 1) Membership on, and often coordinate, the school health services team; 2) Collaborating with primary care physicians, specialists, and local public health and social service agencies to ensure a full spectrum of effective and quality services; 3) Providing acute, chronic, episodic, and emergency health care; 4) Providing health education and health counseling; 5) Providing care to children with special health care needs including developing a health care plan for management of health problems in the school setting, and providing safe and effective direct services or facilitating the performance of health care procedures, such as tracheostomy suctioning, bladder catheterization, ostomy care, nasogastric feeding, maintenance of orthopedic devices, and ventilator care for students needing them. <u>Nurse-student ratio:</u> 1:750 recommended.</p> <p>The AAP policy statement explicitly supports recommendations of the National Association of School Nurses and the Healthy People 2010 Objectives.</p>
<p>Healthy People 2010 (U.S. DHHS, 2000)</p>	<p><u>Nurse-student ratio:</u> Recommendation that school nurse to student ratios not exceed 1:750.</p>
<p>Center for Disease Control's 'Coordinated School Health Program' Components (CDC, 2005)</p>	<p><u>Eight components of a 'Coordinated School Health Program':</u> 1) Health education; 2) Physical education; 3) Health services; 4) Nutrition services; 5) Health promotion; 6) Counseling; 7) Environment; and 8) Family and community.</p> <p>The CDC states: "A coordinated school health program model consists of eight interactive components. Schools by themselves cannot, and should not be expected to, address the nation's most serious health and social problems...schools could provide a critical facility in which many agencies might work together to maintain the well-being of young people."</p>

working in schools, which consists of a mix of registered nurses, LPNs, and health aides. When these additional personnel are considered, the ratios fall considerably, to one health-related staff member to 556 students overall.

Results from the nurse survey relate to individual schools rather than to school districts as a whole. Mirroring the district staffing patterns, the nurse to student ratio in rural schools (1:526) was lower than the urban ratio (1:590). These school-specific ratios are considerably lower than the overall district ratios because of the imprecise nature of nurse-student ratio computation using the nurse survey data: a nurse is counted as being fully present in a school for the purposes of the ratio calculation no matter whether she is in that school daily or for as little as an hour per week. The overall nurse to student ratios for districts, as reported in Figure 3, provide a more accurate picture of actual nursing coverage because they take into account the total nursing caseload of students, which is often distributed among multiple schools. It is interesting, however, to compare staffing patterns related to various types of nursing personnel in the rural and urban schools surveyed, as shown in Figure 4. Urban schools were more likely than rural schools to employ more than one registered nurse. They were also more likely to employ nurse practitioners, although 9 percent of rural schools employed one nurse practitioner and 1 percent of rural schools employed two. LPNs were employed in just over one-third of both rural and urban schools. Urban schools were more likely to employ one or more health aides than rural schools, and nursing clerks were employed in only 13 percent of schools in either setting.

Additional analyses of the nurse survey data revealed that demographic characteristics of rural and urban registered nurse respondents were similar. The mean age for registered nurses in rural schools was 47.2 years as compared to 48.9 years in urban schools. The number of years worked at the present school was 10.3 years among rural nurses and 9.2 years among urban nurses; total number of years worked as a nurse was 22.8 years among rural school nurses and 23.2 years among urban school nurses.

Figure 3 indicates that population sizes were comparatively smaller in rural school districts, and those populations had a considerably lower median family income and higher poverty rate. A significant positive correlation was found

Figure 3. Nurse Staffing and School District Characteristics, 2004-2005

Indicator	All PA Districts	Rural Districts	Urban Districts
Staffing			
Mean number pupils per certified school nurse	1012	936	1084
Mean number pupils per nursing/health support staff	556	539	572
Mean number certified school nurses per district	4.1	2.4	5.7
School District Characteristics			
Mean student body size	4,050	2,203	5,781
Mean teacher-pupil ratio	1:15.4	1:15.2	1:15.7
Mean number school buildings per district	10.7	5.3	15.7
School District Demographics			
Mean total population size per district	24,514	13,608	34,786
Median family income	\$48,937	\$42,662	\$54,848
Mean proportion of families in poverty	9.4%	10.6%	8.3%

Data source: Nurse staffing ratios and school district characteristics and demographics reported in this table were summarized from data provided by the Department of Health's Division of School Health. Median family income and proportion of families in poverty are based on data gathered in the U.S. Census and quantified using the Census Bureau's definition of poverty.

between median family income in the school district and the ratio of certified school nurses to students overall and within rural and urban districts; in other words, districts with higher median incomes tended to have more students per school nurse. This finding might seem surprising, since more wealthy districts might be expected to devote more of the available resources to providing for greater school nurse coverage, thereby reducing the school nurse to student ratios. It does not appear from the data that this is the case.

Health Needs in School Nurse Caseloads and Nursing Services Provided

Figure 5 on Page 10 provides information from the nurse survey about services that rural and urban school nurses provide daily, shown separately for elementary and secondary schools. On average, nurses provide services to between 36 and 47 students daily, representing 5 percent to 8 percent of the total student body. In both types of schools, a larger proportion of the student body

Figure 4. Nursing Personnel Employed in Surveyed Schools

Type of Nursing Personnel*	Number Employed in Surveyed School			
	0	1	2	3
Registered Nurses				
% Distribution in Rural Schools	2%	92%	5%	1%
% Distribution in Urban Schools	1%	85%	12%	1%
Nurse Practitioners				
% Distribution in Rural Schools	91%	9%	1%	--
% Distribution in Urban Schools	86%	14%	--	--
LPNs				
% Distribution in Rural Schools	63%	34%	1%	1%
% Distribution in Urban Schools	64%	33%	2%	--
Health Aides				
% Distribution in Rural Schools	75%	23%	2%	--
% Distribution in Urban Schools	64%	34%	1%	--
Nursing Clerks				
% Distribution in Rural Schools	87%	13%	--	--
% Distribution in Urban Schools	87%	13%	--	--

(Rural n=292; urban n=291). *Percentages in all distributions may not total 100 percent due to rounding error.

receives services on average in rural relative to urban schools. About eight students per day receive medications supervised by nursing personnel in each setting.

The “screening” section of Table 6 contains information from the school nurse survey on the rates of various types of health screenings performed in rural and urban Pennsylvania schools. Not all services in the table are officially required by Pennsylvania law and some, such as screening for mental health problems, are likely to be done only when a problem is suspected. It is clear, however, that nurses perform multiple screening tests on a majority of the students in their schools.

Neither rural nor urban schools consistently screen a disproportionately larger proportion of their total student population.

The “referral” section of Figure 6 indicates the percentage of students screened who are referred for further assessment and/or treatment. Oral health and vision screening tended to yield the highest proportion of positive findings requiring referral in both settings. Mental and behavioral screening also yielded relatively high referral rates in urban secondary schools.

Figure 7 depicts the number and proportions of students in rural and urban schools who have various special health care needs. A large number of conditions were included in the survey questionnaire, not all of which appear in the figure. For readability, the figure reports only those conditions for which the reported prevalence was at least 1 percent in either rural or urban schools. Other conditions were reported, however, including arthritis, autism, cancer, cerebral palsy, diabetes, eating disorders, hemophilia, spina bifida, and sickle cell or trait.

These data suggest that school nurses must deal with a number of complex health problems in their practice settings. Asthma is the most common condition, affecting 8 percent to 10 percent of the school age population. The prevalence of asthma in urban schools is greater than in rural schools, as are severe allergies, the second most prevalent health problem. At elementary school ages, rural school children have a higher reported prevalence of weight disorder than urban children. As eating disorder was asked in a separate question in the survey, it is likely that the weight disorder category reflects predominantly overweight and obese children. In the secondary school population, the reverse is seen in that a greater proportion of urban children relative to rural children have weight disorders. Secondary schools also have

Figure 5. Number and Percentage of Students Receiving Nursing Services in a Typical School Day, 2004-2005

	Rural Schools		Urban Schools	
	Mean Number Students Receiving Services/Day	Percentage of Students Receiving Services	Mean Number Students Receiving Services/Day	Percentage of Students Receiving Services
Elementary (n=376)	36	8.1%	38	7.4%
Secondary (n=229)	42	6.3%	47	5.4%

	Rural Schools		Urban Schools	
	Mean Number Students Receiving Medications/Day	Percentage of Students Receiving Medications	Mean Number Students Receiving Medications/Day	Percentage of Students Receiving Medications
Elementary (n=379)	8	1.8%	8	1.5%
Secondary (n=232)	8	1.2%	8	0.9%

significant numbers of children with depression, which was less commonly reported at earlier ages.

In view of the multitude of special health care needs in school nurse caseloads, it is not surprising that school nurses are called upon to provide a variety of specialized technical procedures. Figure 8 provides information on the proportion of rural and urban schools that provided specific procedures in the 2004-2005 school year. Few significant differences were seen among rural and urban schools in the procedures provided.

In addition to screening and treating illnesses and health conditions, school nurses provide instruction on a variety of health-related topics, as shown in Figures 9 and 10 on Page 12. Both rural and urban school nurses provided information to students on the topics assessed, and the proportions of nurses reporting the various topics

Figure 6. Screening and Referral Rates in Elementary and Secondary Schools, 2004-2005

Elementary Schools Screening Test	SCREENING		REFERRAL	
	Rural Schools Percentage of Students Screened Annually	Urban Schools Percentage of Students Screened Annually	Rural Schools Percentage of Students Screened Referred	Urban Schools Percentage of Students Screened Referred
Height and Weight	99.9%	99.6%	3.5%	3.8%
Vision	99.4%	99.6%	13.7%	14.6%
Hearing	65.9%	72.5%	3.6%	4.0%
Body Mass Index	55.2%	49.4%	4.9%	4.6%
Oral Health	27.1%	26.3%	17.4%	14.2%
Scoliosis	15.1%	12.3%	2.9%	1.1%
Behavioral Problems	3.9%	4.2%	8.4%	6.2%
Mental Health	3.4%	2.6%	9.0%	5.0%

Secondary Schools	SCREENING		REFERRAL	
	Rural Schools Percentage of Students Screened Annually	Urban Schools Percentage of Students Screened Annually	Rural Schools Percentage of Students Screened Referred	Urban Schools Percentage of Students Screened Referred
Height and Weight	98.6%	98.7%	3.7%	4.9%
Body Mass Index	38.3%	32.4%	4.2%	4.8%
Vision	98.4%	98.3%	12.5%	13.5%
Hearing	40.4%	45.4%	2.9%	2.5%
Scoliosis	29.1%	34.0%	3.5%	3.4%
Oral Health	19.2%	20.1%	13.2%	9.1%
Tuberculosis	0.3%	0.0%	0.0%	0.0%
Mental Health	3.5%	5.5%	5.0%	11.5%
Behavioral Problems	3.9%	4.9%	3.5%	11.9%

Figure 7. Students With Special Health Care Needs, Rural and Urban Pennsylvania Schools, 2004-2005

Elementary Schools	SCREENING		REFERRAL	
	Rural Schools Percentage of Students Screened Annually	Urban Schools Percentage of Students Screened Annually	Rural Schools Percentage of Screened Students Referred	Urban Schools Percentage of Screened Students Referred
Height and Weight	99.9%	99.6%	3.5%	3.8%
Vision	99.4%	99.6%	13.7%	14.6%
Hearing	65.9%	72.5%	3.6%	4.0%
Body Mass Index	55.2%	49.4%	4.9%	4.6%
Oral Health	27.1%	26.3%	17.4%	14.2%
Scoliosis	15.1%	12.3%	2.9%	1.1%
Behavioral Problems	3.9%	4.2%	8.4%	6.2%
Mental Health	3.4%	2.6%	9.0%	5.0%
Secondary Schools	Rural Schools Percentage of Students Screened Annually	Urban Schools Percentage of Students Screened Annually	Rural Schools Percentage of Screened Students Referred	Urban Schools Percentage of Screened Students Referred
Height and Weight	98.6%	98.7%	3.7%	4.9%
Body Mass Index	38.3%	32.4%	4.2%	4.8%
Vision	98.4%	98.3%	12.5%	13.5%
Hearing	40.4%	45.4%	2.9%	2.5%
Scoliosis	29.1%	34.0%	3.5%	3.4%
Oral Health	19.2%	20.1%	13.2%	9.1%
Tuberculosis	0.3%	0.0%	0.0%	0.0%
Mental Health	3.5%	5.5%	5.0%	11.5%
Behavioral Problems	3.9%	4.9%	3.5%	11.9%

covered were similar among rural and urban nurses. Nurses were more likely to use small group or one-on-one instruction rather than a classroom setting for most health education topics.

Nurses in the survey sample were asked about health-related procedures in place at their schools when no nurse is present. One question referred specifically to medica-

tion administration: nurses were asked to specify who else might administer medication in the absence of a nurse. School principals were, by far, the school staff member most often mentioned by the nurses (44 percent of rural school nurses and 48 percent of urban school nurses). Others included classroom teachers (11 percent of rural school nurses and 8 percent of urban school nurses) and the head teacher (3 percent of rural school nurses and 5 percent of urban school nurses). Rural/urban differences in these percentages were not statistically significant. Nurses were also asked to respond to the following question: "In the event of a medical emergency, such as a severe allergic reaction to a bee sting, what procedures are followed when a nurse is not present in this school?" Answers to this open-ended question can generally be classified into the following five groups in descending order of frequency of reporting (Note: many nurses reported more than one of these answers):

1. Call 911 or EMS;
2. Principal or other school staff have been trained to administer Epi-pen and follow other emergency protocols;
3. The question is not relevant because a nurse is always present;
4. Notify parent; and
5. Call nurse in another nearby school or school building.

Figure 8. Percentage of Schools Providing Specialized Nursing Care Procedures, 2004-2005

Elementary Schools	Rural Schools (n=185)	Urban Schools (n=196)
	Percentage of Schools Providing This Care	Percentage of Schools Providing This Care
Nebulizer Treatments	71.4%	78.6%
Blood Sugar Testing	67.0%	67.4%
Insulin Injection	51.4%	43.9%
Insulin Pump Management	35.1%	17.9%
Catheterization	15.1%	12.8%
Gastrostomy Tube Feedings	10.3%	8.7%
Oxygen Therapy	6.0%	5.6%
Ostomy Care	4.3%	4.1%
Suctioning	2.2%	4.6%
Tracheostomy Care	2.2%	3.1%
Intravenous Therapy	1.6%	2.0%
Nasogastric Tube Feedings	1.1%	0.5%
Secondary Schools	Rural Schools (n=124)	Urban Schools (n=110)
	Percentage of Schools Providing This Care	Percentage of Schools Providing This Care
Blood Sugar Testing	87.9%	91.8%
Insulin Injection	70.2%	69.1%
Insulin Pump Management	68.6%	60.9%
Nebulizer Treatments	60.5%	57.3%
Catheterization	16.9%	18.2%
Gastrostomy Tube Feedings	8.1%	10.0%
Oxygen Therapy	3.2%	13.6%
Ostomy Care	4.0%	7.3%
Suctioning	4.0%	3.6%
Tracheostomy Care	0.8%	1.8%
Intravenous Therapy	1.6%	0.9%

The National Association of School Nurses and the American Nurses Association specify that school nurses serve in leadership roles to develop school health policies and programs. Nurses in the sample were asked to rate whether they strongly agreed, agreed, disagreed or strongly disagreed that they occupy this sort of leadership role. Approximately 75 percent of both rural and urban nurses either agreed or strongly agreed that they performed a leadership role in their schools.

Perceived Effectiveness and Satisfaction With Current Nursing Services in Schools Nurses

Nurses were generally quite satisfied with health screening, medication administration, therapeutic procedures, health care for students and staff, and communication with students, staff and parents. They were less satisfied with the amount of health education for students and staff, and also less satisfied with communication with community physicians⁴ and overall

⁴ The nurse survey asked respondents to rate their satisfaction with communication with "community physicians" and did not offer more details. The question was meant to refer to students' non-school related health providers, but may have been interpreted to refer to community health clinic providers or other physicians.

Figure 9. Health Related Instruction Provided in Rural and Urban Elementary Schools, 2004-2005

	Rural Schools (n=185)		Urban Schools (n=196)	
	Classroom Instruction	Small Group or 1:1 Instruction	Classroom Instruction	Small Group or 1:1 Instruction
Personal Hygiene	58.4%	82.2%	60.2%	79.6%
Oral Health	45.4%	62.7%	37.2%	61.7%
Nutrition/Dietary Behavior	30.8%	67.6%	28.1%	67.4%
Physical Activity/Fitness	23.8%	52.4%	16.3%	55.1%
Growth and Development	55.7%	43.2%	54.6%	46.9%
Human Sexuality	30.8%	22.2%	35.2%	21.9%
Pregnancy Prevention	3.2%	13.0%	2.6%	10.2%
HIV Prevention	14.1%	15.1%	23.0%	12.2%
STD Prevention	8.1%	10.3%	7.1%	9.7%
Emotional/Mental Health	4.9%	53.0%	6.1%	45.9%
Consumer Health	8.1%	26.0%	5.6%	28.1%
Suicide Prevention	0.5%	16.8%	0.5%	16.3%
Death and Dying	0.5%	26.5%	0.5%	24.0%
Tobacco Use Prevention	17.9%	35.7%	16.3%	33.2%
Alcohol/Drug Use Prevention	11.9%	26.5%	13.8%	25.0%
Violence/Bullying Prevention	10.8%	35.7%	10.2%	38.8%
Injury Prevention	19.5%	62.7%	16.3%	56.6%
Cardiopulmonary Resuscitation	7.6%	13.0%	12.2%	13.3%
First Aid	14.1%	41.6%	14.8%	39.8%
Importance of Immunization	2.7%	43.2%	5.1%	40.8%
Skin Cancer Prevention	16.8%	48.7%	14.8%	43.9%
Environmental Health	3.8%	15.7%	5.1%	18.9%

Figure 10. Health Related Instruction Provided in Rural and Urban Secondary Schools, 2004-2005

	Rural Schools (n=124)		Urban Schools (n=110)	
	Classroom Instruction	Small Group or 1:1 Instruction	Classroom Instruction	Small Group or 1:1 Instruction
Personal Hygiene	16.9%	93.6%	19.1%	95.5%
Oral Health	8.1%	75.8%	8.2%	77.3%
Nutrition/Dietary Behavior	8.9%	91.9%	10.9%	90.0%
Physical Activity/Fitness	11.3%	66.9%	8.2%	73.6%
Growth and Development	12.1%	65.3%	12.7%	69.1%
Human Sexuality	8.9%	66.1%	8.2%	63.6%
Pregnancy Prevention	4.8%	82.3%	6.4%	70.0%
HIV Prevention	5.7%	66.9%	8.2%	64.6%
STD Prevention	6.5%	77.4%	7.3%	70.9%
Emotional/Mental Health	4.8%	80.7%	4.6%	88.2%
Consumer Health	2.4%	66.9%	6.4%	66.4%
Suicide Prevention	2.4%	61.3%	3.6%	56.4%
Death and Dying	2.4%	62.1%	0.9%	50.9%
Tobacco Use Prevention	10.5%	79.0%	6.4%	78.2%
Alcohol/Drug Use Prevention	9.7%	81.5%	5.5%	75.5%
Violence/Bullying Prevention	7.3%	61.3%	3.6%	63.6%
Injury Prevention	5.7%	75.8%	6.4%	73.6%
Cardiopulmonary Resuscitation	20.2%	30.7%	18.2%	34.6%
First Aid	14.5%	61.3%	13.6%	60.9%
Importance of Immunization	2.4%	74.2%	5.5%	71.8%
Skin Cancer Prevention	7.3%	73.4%	2.7%	73.6%
Environmental Health	0.8%	40.3%	1.8%	35.5%

promotion of a healthy school environment. Most of these ratings were very similar for rural and urban nurses, however communication with community physicians was rated as much less satisfactory among urban as compared with rural school nurses (56 percent urban nurses vs. 71 percent rural nurses stating they were satisfied or very satisfied).

Analyses were also performed to determine whether lower nurse-student ratios were associated with greater nursing satisfaction and perceived effectiveness of the level of health care for students. A significant correlation was found between lower nurse-student ratios and greater nurse satisfaction with health care provided for students.

In other words, in schools where nurses had relatively fewer students in their caseloads, nurses were more likely to express greater satisfaction with the health care that is provided.

Lower nurse-student ratios also were not associated with greater provision of school nursing services. In fact, the reverse was true for some services. Nurses in larger districts, which tended to have higher nurse-student ratios, tended to perform comparatively more services, such as diabetes-related procedures and one-on-one health counseling.

School Principals

By and large, rural principals surveyed were extremely satisfied with nursing services offered at their schools and rated them highly on effectiveness. The aspects of nursing services rated less effective than others were procedures and health education, but over 80 percent of principals rated even these aspects as effective or very effective. Urban school principals were also positive, with patterns quite similar to those seen among rural principals.

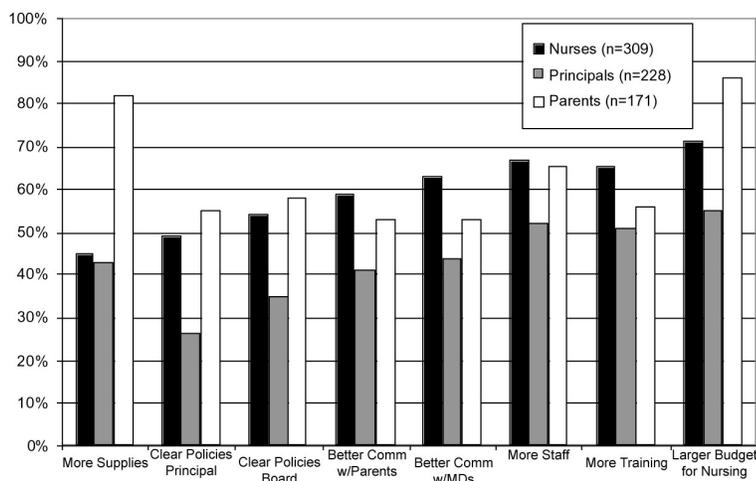
Parents

As was the case for school principals, parents in both rural and urban settings expressed high levels of satisfaction and tended to rate school nursing services as highly effective. The least effective ratings were assigned to health procedures, with only three-quarters of parents rating them as effective or highly effective. Rural parents tended to rate the effectiveness of health procedures more highly than did urban parents. Notably, about 90 percent of parents in both settings rated nurses' communication with parents as satisfactory or very satisfactory, and an even higher percentage of parents rated this communication as effective or very effective.

Perceived Need for Improvements in School Nursing Services

School nurses, principals, and parents were asked whether they strongly agreed, agreed, disagreed, or strongly disagreed that improvements in school nursing services were needed regarding more supplies, more clear administrative policies from the principal, more clear administrative policies from the school board, better communication with parents, better communication with community physicians, more staff, more training, and a larger budget for nursing services. Their perceptions are compared in Figure 11.

Figure 11. Needs Perceived by Rural School Nurses, Principals and Parents



The areas most in need of improvement from the perspective of rural school nurses appear to be the budget for nursing services, staffing levels, training opportunities, and communication with community physicians. Those areas were also likely to be mentioned by urban school nurses, although they also cited communication with parents somewhat more often than rural school nurses. Principals, on the other hand, were the least likely to express the need for improvement in any of the dimensions assessed. The most salient aspects of nursing services needing improvement from their point of view were the budget for nursing, staffing levels, training opportunities, and supplies. Parents were most likely to mention a larger budget for nursing services and more supplies as needed improvements.

Conclusions

There is considerable overlap in policy standards among professional organizations and those encompassed in Pennsylvania law; however, the mandated maximum nurse-student ratio in Pennsylvania is twice as high as the ratio recommended by professional organizations.

Pennsylvania law mandates a certified school nurse-student ratio of 1:1,500, which is twice as large as the 1:750 ratio recommended by nursing and pediatric professional organizations and the Healthy People 2010 objectives. Findings from the school nurse survey indicate that lower nurse-student ratios are associated with greater nurse satisfaction with school health services provided for students.

Most Pennsylvania school districts are in compliance with the currently mandated 1:1,500 nurse-student ratio; however the majority would not be in compliance with the 1:750 ratio recommended by professional groups and the Healthy People 2010 objectives

Currently the mean number of students per certified school nurse in Pennsylvania as a whole is 1,012. Rural school districts have a lower average number of students per certified school nurse than urban school districts (936 vs. 1,084).

Nurses in both rural and urban school districts must deal with a complex array of health problems affecting children in their practice settings.

Asthma is the most common condition, affecting 8 percent to 10 percent of the school age population. However, other problems, including severe allergies, ADHD, weight disorder (primarily overweight and obesity), and depression are each found in over 2 percent of school children. Many school nurses in both rural and

urban areas currently provide technical medical procedures, including nebulizer treatments, blood sugar testing, insulin pump management, and bladder catheterization. In addition, children with special needs often require additional services, including tracheostomy care, intravenous therapy, suctioning, and oxygen therapy.

Instruction on many health-related topics is provided in both rural and urban school settings in roughly equal proportions but it is not universally provided by nurses. Furthermore, nurses express less satisfaction related to the amount of education they can currently provide than related to any other aspect of school nursing services.

Less than three-quarters of secondary school nurses currently provide instruction on important health topics, including HIV prevention, consumer health, suicide prevention, death and dying issues, and violence/bullying prevention. School health education on these and other topics is specified in the U.S. Department of Health and Human Services' Healthy People 2010 objectives for the nation, and the degree to which schools throughout the U.S. have implemented comprehensive health education curricula is periodically assessed by the Centers for Disease Control and Prevention.

Three-quarters of both rural and urban nurses perceive that they occupy a leadership role in developing health policies and programs in their schools, and assumption of this leadership role has significant implications for the health care provided to students.

The National Association of School Nurses and the American Nurses Association specify that leadership in developing school health policies and programs is an important role school nurses should play. Among nurses

in the study sample, those who felt more strongly that they took a leadership role in developing school health policies and programs also expressed greater satisfaction with the health care provided in their schools. Greater leadership was also associated with greater perceived effectiveness of the health care provided in the school.

Nurses, parents, and principals tended to have very favorable perceptions of current nursing service provision in schools, however each group identified multiple areas in need of improvement.

Parents and principals surveyed were generally quite satisfied with the level of nursing services currently provided in their schools, and tended to view those services as effective. Nurses also tended to rate many

aspects of the nursing services they were currently able to provide as satisfactory and effective. However, relatively low satisfaction was expressed in several areas including the amount of health education provided to students and staff, communication with community physicians, and the provision of a healthy school environment.

Over half of all nurses, parents, and principals surveyed expressed the need for a larger budget for school nursing. Other areas identified by close to half were the need for more staff and more training for school nurses. Parents in particular cited the need for more supplies, while 70 percent of nurses expressed the need for better communication with community physicians.

Policy Considerations

Policy Considerations for the Pennsylvania General Assembly

State lawmakers are the key decision-makers regarding legal requirements governing school nurse practice, including maximum allowable nurse-student staffing ratios. In the past there have been unsuccessful attempts to legislate changes in school nurse staffing ratios and other services. In view of the study findings that: 1) nursing and medical professional organizations and the Healthy People 2010 objectives recommend a maximum nurse-student ratio of 1:750; 2) school nurses deal with an increasingly complex array of health problems among their students; and 3) the need for additional resources for instruction on important health topics and other nursing services is widely perceived by nurses, school officials and parents; the researchers recommend that the General Assembly consider enacting legislation that would lower the maximum nurse-student ratio to 1:750.

While representatives from the Department of Health have testified in favor of this provision in the past, they cautioned that such a position would likely impose added financial burdens on local school districts. Accordingly, the researchers recommend that the level of state support, in the form of financial reimbursement levels for school health services, be increased to compensate for the added costs of mandating additional nursing personnel.

Policy Considerations for the Pennsylvania Department of Health

The Division of School Health within the department currently collects a range of health data on the school-aged population, which is used to improve health promotion and disease-prevention efforts. In view of the study

findings that: 1) school nurses deal with a broad array of complex childhood medical conditions; 2) more training for school nurses was identified as a need by many nurses, school principals, and parents; 3) instruction about important health-related topics is not universally provided by school nurses to students in their schools; and 4) school nurses express relatively less satisfaction related to the amount of education they currently provide to students and school staff: the researchers recommend that additional educational opportunities for school nurses be sought, as well as additional resources for educating students and school staff members at both the elementary and secondary school levels. Additional resources should include age-appropriate curricular materials covering relevant health topics, as well as budgetary resources to free up additional time in school nurses' schedules for health education.

An additional issue of particular concern to school nurses involves communication with physicians in the community. The researchers recommend that the Department of Health work to educate physicians about the importance of communication with school nurses about children's health, and encourage both physicians and nurses to establish clear channels of communication so that optimal care coordination may be achieved. Although HIPAA (the Health Insurance Portability and Accountability Act) regulations make such communication more difficult, there are proactive measures that can be taken. For example, physicians could regularly have parents sign releases that allow physicians to fax health-related information, such as asthma management plans and medication regimens, directly to school nurses.

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