

School Nurses and Children With Diabetes: A Descriptive Study

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BACKGROUND Managing diabetes in children is complex. The aims of this descriptive study were to describe the care provided to children with diabetes by school nurses using case management, to identify differences in care on the basis of the workload of the nurse and the age of the child, to explore the role of the nurse in responding to emergencies, and to describe the relationship between case management and quality of life.

METHODS School nurses completed an expanded health assessment. Individualized goals were established and interventions were provided on the basis of a protocol. Quantitative and qualitative data for children enrolled during the 2009-2010 academic year were analyzed.

RESULTS Eighty-six children were enrolled. The most common goals were related to establishing a safe school environment. Interventions varied depending on the workload of the nurse and the age of the child. Nurses assigned to 1-2 schools provided more intervention days (mean, 40.3 days) than did nurses assigned to 3-4 schools (mean, 24.4 days) ($P < .05$), particularly in the area of direct care. A total of 25 students experienced an emergency at school that initiated a cascade of events involving the parent (in 100% of cases), the teacher (in 96%), management of hyperglycemia (in 100%), and/or management of hypoglycemia (in 96%). For teens, case management improved quality of life, particularly the ability to communicate with health professionals.

LIMITATIONS The sample was small, and there was no comparison group.

CONCLUSIONS School nurses are effective in using case management to enhance the health and well-being of children with diabetes. This study should be replicated with a larger sample, a comparison group, and the inclusion of clinical outcomes.

Federal legislation requires that children with diabetes are educated in a safe environment, with the same educational opportunities as their classmates without diabetes [1, 2]. In North Carolina, children with diabetes must have an individual diabetes care plan initiated at the written request of a student's parent or guardian. The plan must address staff development for school personnel, emergency care, and actions to be taken by school personnel to support the student [3]. The school nurse is the most appropriate person to plan, coordinate, and monitor the care of students with diabetes [4, 5]. However, the basic education of a nurse includes minimal training in school nursing. In contrast to nurses in health care settings, the school nurse is often the only health professional in a school, and most school nurses are assigned to >1 school. While the National Association of School Nurses and Healthy People 2020 recommends a ratio of 1 nurse for every 750 school-age children, during the 2009-2010 academic year [6, 7], the ratio for North Carolina was 1:1,185 [8]. A recent systematic review of type 1 diabetes care in schools found no known research on how often children with diabetes see a school nurse [9]. In addition, there is some evidence that school nurses have only a moderate level of self-efficacy related to their ability to provide diabetes care, but this improves with training and experience [10].

Although some countries do not allow the delegation of diabetes care in school to unlicensed personnel [11], the practice is common in the United States. Individual states vary in the ways they provide diabetes care [12, 13]. In North Carolina, legislation requires that, when a child with diabe-

tes attends school, at least 2 members of the school staff receive individual training in diabetes care management, including the administration of insulin and glucagon [3]. The American Diabetes Association provides guidance for training and care [14]. Of particular importance is the need for health care plans and emergency action plans [15]. Research on the effectiveness of school personnel providing diabetes care at school suggests that, even with training of school personnel, children, parents, and school staff feel that the school environment is less than optimal for meeting the needs of children and adolescents with diabetes [16-23].

To improve diabetes care, several strategies have been proposed. Some urban school districts have developed programs in which a diabetes resource nurse provides education and support to practicing school nurses [24]. Another model involves university-based diabetes centers that provide outreach programs [25, 26]. However, neither of these approaches is practical for rural school districts with limited resources.

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TABLE 1.
Goals and Interventions for Children with Diabetes

| Goal(s) | Intervention(s) |
|--|---|
| I. Safe school environment | I. Direct care |
| EAP developed and implemented | Supervise/provide insulin |
| IHP developed and implemented | Supervise/provide oral medication |
| Medication orders/ authorization at school | Supervise/perform blood glucose |
| Medication/monitoring equipment at school | Assist student with management of hyperglycemia |
| Emergency contact information at school | Assist student with management of hypoglycemia |
| Teacher/staff complete diabetes training | Assist student with insulin pump |
| Staff demonstrates knowledge of diabetes | Supervise/provide urine test |
| Staff provides classroom accommodation | Assist/provide carbohydrate count |
| Staff demonstrates appropriate care | Provide emergency care |
| II. Symptom management | II. Student education/counseling |
| Decrease episodes of hypoglycemia | Diabetes overview |
| Decrease episodes of hyperglycemia | Hypoglycemia |
| Reduce symptoms (fatigue, irritability) | Hyperglycemia |
| III. Self-care | Carbohydrate count |
| Demonstrates age-appropriate knowledge of oral meds | Meal/snack plans |
| Demonstrates age-appropriate knowledge of insulin | Exercise |
| Recognizes symptoms of abnormal blood sugar and takes appropriate action | Medication administration |
| Uses insulin pump correctly | Testing blood sugar |
| Demonstrates age-appropriate knowledge of exercise and activity | Insulin pump |
| Demonstrates age-appropriate knowledge of diet | Urine testing |
| Self-administers or receives insulin according to EAP and IHP | Living with diabetes |
| Improve self-esteem | Making good choices |
| Performs carbohydrate count and takes appropriate action | Complications |
| Follows prescribed diet | Preventing emergencies |
| Maintains current weight | Teacher/academic issues |
| Loses weight | Psychosocial support |
| Improved self-management of diabetic regimen | Dealing with peers/friends |
| Demonstrates ability to check blood sugar and take appropriate action | Family issues |
| Demonstrates ability to check for ketones and take appropriate action | III. Parents/family interventions |
| IV. Academic success | Phone call to parent/guardian |
| Decrease number of health-related absences | Home visit |
| Decrease tardiness or time out of class | School visit by parent |
| Improve academic performance | Note sent home |
| Reduce disruptive classroom behavior | IV. Teacher/staff education |
| Increase participation in physical education/exercise | Classroom visit |
| Increase participation in extracurricular activities | Teacher |
| V. Family/peer relations | Cafeteria staff |
| Improve relationships with peers/friends | Bus driver |
| Improve family collaboration with school nurse | Custodian |
| Family improves psychosocial support to student | Physical education teacher |
| Family provides low box at school | Principal |
| Family provides medication/monitoring supplies | Assistant principal |
| Increase family understanding of child's illness and treatment | Guidance counselor |
| Family/guardian participates in care outlined in IHP | Secretary |
| VI. Health care coordination | V. Care coordination |
| Reduce emergency department visits/hospitalizations | Call to physician |
| Improve use of primary health care | Call to other health care professional |
| Improve coordination of care among health care professionals | Referral to (specify) |
| | Follow-up on referral |
| | Accommodations planning meeting |
| | Attend appointment with student |

Note. EAP, emergency action plan; IHP, individual health plan.

nesses by funding a collaborative project between East Carolina University (ECU) College of Nursing and the North Carolina Department of Health and Human Services to implement a case management program. The program was targeted to smaller school districts that did not have a formal program. School districts were asked by the regional school nurse consultants to participate. If the districts agreed, a memorandum of understanding was developed between the school district and ECU College of Nursing. The regional consultants, project director, and project coordinator collaborated with the participating school nurses to develop a protocol for providing case management. The protocol was based on a nursing process model that included assessment, planning, intervention, and evaluation. Specific protocols were developed for asthma, diabetes, severe allergies, seizures, sickle cell anemia, weight management, behavioral/affective disorders, and pregnancy. The protocol included a set of goals and interventions that were used by the nurse to provide care. Educational resources were made available at the project Web site (available at: <http://www.cmpnc.org>). As part of the memorandum of understanding, school nurses attended 3 educational sessions during the school year on different aspects of case management. The project coordinator, who was an experienced school nurse, was available and responded to questions promptly, usually within an hour. A description of the conceptual model and general procedures related to the project has been published previously [27].

The second most common diagnosis (after asthma) among students enrolled has been diabetes. The aim of this article is (1) to describe the care provided to children with diabetes, (2) to identify differences in care on the basis of the workload of the nurse and the age of the child, (3) to explore the role of the school nurse in responding to emergencies, and (4) to describe the impact of school nurse interventions on quality of life.

Methods

Approval from the University and Medical Center Institutional Review Board at ECU was obtained. A parent or guardian provided consent before enrollment of students. The consent form was available in Spanish for parents of Hispanic children. School nurses enrolled students if the student had a chronic illness and ≥ 1 of the following: recent or new diagnosis, noncompliance with health care regimen, unstable illness, lack of health care, poor attendance, difficult family situation, transportation issues, poor academic performance, difficulty with peers and/or friends, and behavioral problems.

In addition to the usual health assessment performed by the school nurse, the nurse completed an expanded assessment that included written input from the parent and teacher on how well the child was managing in school and suggestions for working with the child. The nurse had the child complete the PedsQL 3.0 Type 1 Diabetes Module [28]. This

is a measure of quality of life for children with diabetes. It is a 28-item instrument that has 5 subscales: symptoms, treatment barriers, treatment adherence, worry, and communication. It includes 3 slightly different versions that are based on age (ie, 5-7 years, 8-12 years, and 13-17 years). Responses are recorded on a 3-point scale for children 5-7 years old and on a 5-point scale for older children. All scores are converted to a score of 0-100 for interpretation. Although quality of life is not usually part of a school nurse's health assessment, it was included because there is some evidence that a supportive school environment improves quality of life [29-30]. Of particular relevance for this project was the subscale related to communication, which asks the child how much difficulty they have in talking to physicians and nurses, asking questions, and explaining their illness to other people. Improvement in this area was considered to be an indication that the school nurse had helped the student improve their ability to recognize and express their needs to physicians or other health care professionals.

After the nurse completed the assessment, individualized goals were determined. The nurse chose goals from a set of potential goals grouped into 6 categories: safe school environment, symptom management, self-care, academic success, family and peer relationships, and health care coordination. At the end of case management, the nurse evaluated the goals as "met," "partially met," or "unmet." To meet the goals, the nurse provided interventions grouped into 5

TABLE 2.
Characteristics of 86 Participating Children With Diabetes

| Characteristic | Children, no. (%) |
|--------------------------|-------------------|
| Sex | |
| Male | 50 (58) |
| Female | 36 (42) |
| Race | |
| White | 57 (66) |
| African American | 23 (27) |
| Hispanic | 3 (3.5) |
| Other | 3 (3.5) |
| Education level (grades) | |
| Elementary (K-5) | 45 (52) |
| Middle (6-8) | 24 (28) |
| High school (9-12) | 17 (20) |
| Age | |
| 5-7 y | 14 (16) |
| 8-12 y | 45 (52) |
| 13-17 y | 27 (31) |
| Medicaid recipient | |
| No | 45 (52) |
| Yes | 37 (43) |
| Unknown | 4 (5) |

TABLE 3.
Goal Attainment for 84 Participating Children With Diabetes

| Goal(s) | Had goal, children, no. (%) | Goal status, children, % | | |
|--|--------------------------------|--------------------------|------------|-------|
| | | Met | Partly met | Unmet |
| I. Safe school environment | | | | |
| EAP developed/implemented | 77 (92) | 100 | 0 | 0 |
| IHP developed/implemented | 68 (81) | 94 | 3 | 3 |
| Medication orders/authorization at school | 77 (92) | 99 | 1 | 0 |
| Medication/monitoring equipment at school | 81(96) | 95 | 5 | 0 |
| Emergency contact information at school | 84 (100) | 98 | 2 | 0 |
| Teacher/staff complete diabetes training | 82 (98) | 99 | 1 | 0 |
| Staff demonstrates knowledge of diabetes | 81 (96) | 84 | 16 | 0 |
| Staff provides classroom accommodation | 80 (95) | 100 | 0 | 0 |
| Staff demonstrates appropriate care | 79 (94) | 92 | 8 | 0 |
| II. Symptom management | | | | |
| Decrease episodes of hypoglycemia | 58 (69) | 66 | 34 | 0 |
| Decrease episodes of hyperglycemia | 67 (80) | 46 | 46 | 8 |
| Reduce symptoms (fatigue, irritability) | 47 (56) | 77 | 21 | 2 |
| III. Self-management | | | | |
| Demonstrates age-appropriate knowledge of oral meds | 16 (19) | 69 | 31 | 0 |
| Demonstrates age-appropriate knowledge of insulin | 58 (69) | 79 | 17 | 4 |
| Recognizes symptoms of abnormal blood sugar and takes appropriate action | 67 (80) | 72 | 27 | 1 |
| Uses insulin pump correctly | 31 (37) | 77 | 19 | 3 |
| Demonstrates age-appropriate knowledge of exercise and activity | 53 (63) | 74 | 26 | 0 |
| Demonstrates age-appropriate knowledge of diet | 60 (71) | 45 | 52 | 3 |
| Self-administers/receives insulin according to EAP/IHP | 64 (76) | 84 | 13 | 3 |
| Improve self-esteem | 57 (68) | 51 | 46 | 3 |
| Performs carbohydrate count and takes appropriate action | 40 (48) | 45 | 43 | 12 |
| Follows prescribed diet | 28 (33) | 93 | 7 | 0 |
| Maintains current weight | 12 (14) | 42 | 25 | 33 |
| Loses weight | 57 (68) | 53 | 40 | 7 |
| Improved self-management of diabetic regimen | 66 (79) | 83 | 15 | 2 |
| Demonstrates ability to check blood sugar and take appropriate action | 37 (44) | 76 | 19 | 5 |
| Demonstrates ability to check for ketones and take appropriate action | 35 (42) | 77 | 23 | 0 |
| IV. Academic success | | | | |
| Decrease number of health-related absences | 42 (50) | 69 | 24 | 7 |
| Decrease tardiness or time out of class | 36 (43) | 64 | 25 | 11 |
| Improve academic performance | 38 (45) | 50 | 32 | 18 |
| Reduce disruptive classroom behavior | 16 (19) | 63 | 37 | 0 |
| Increase participation in physical education/exercise | 26 (31) | 81 | 19 | 0 |
| Increase participation in extracurricular activities | 22 (26) | 73 | 5 | 22 |
| V. Family/peer relations | | | | |
| Improve relationships with peers/friends | 26 (31) | 89 | 11 | 0 |
| Improve family collaboration with school nurse | 44 (52) | 73 | 27 | 0 |
| Family improves psychosocial support to student | 29 (35) | 72 | 28 | 0 |
| Family provides low box at school | 47 (56) | 85 | 4 | 11 |
| Family provides medication/monitoring supplies | 64 (76) | 89 | 11 | 0 |
| Increase family understanding of child's illness and treatment | 41 (49) | 66 | 34 | 0 |
| Family/guardian participates in care outlined in IHP | 41 (49) | 81 | 17 | 2 |
| VI. Health care coordination | | | | |
| Reduce ED visits/hospitalizations | 29 (35) | 83 | 14 | 3 |
| Improve use of primary health care | 31 (37) | 87 | 13 | 0 |
| Improve coordination of care among health care professionals | 30 (36) | 87 | 10 | 3 |

Note. EAP, emergency action plan; ED, emergency department; IHP, individual health plan.

categories: direct care, education and counseling, family and peer interventions, teacher and staff education, and care coordination. The goals and interventions are listed in Table 1. During the intervention period, nurses were asked to be proactive, to intervene at least weekly, and to focus not only on responding to problems but also on self-management. The education they provided to school personnel was based on the North Carolina Public Schools Diabetes Awareness Training and Action curriculum [31], which was available at our Web site. This curriculum is consistent with the requirements outlined in North Carolina Senate Bill 911 [3]. When the nurse provided an intervention, it was recorded on a flow sheet by logging into a password-protected, secure server. All interventions on a particular day were entered as 1 visit, and the unit of analysis was an intervention-day (ID). There may have been as many as 4-5 encounters with the child on a particular day. Therefore, an ID represents a conservative estimate of the actual number of encounters. The intervention sheet included space for narrative comments. These comments were analyzed informally by members of the research team and used to interpret the quantitative data. All data, including the comments, were downloaded into an Excel spreadsheet (Microsoft) and loaded into SPSS, version 17.0 (SPSS), for analysis. Independent-groups t tests were used to compare mean IDs between nurses assigned to 1-2 schools and nurses assigned to 3-4 schools. The paired-samples t test was used to compare quality of life scores between baseline and end of case management. Statistical significance was assessed at an α level of .05.

Results

Eighty-six students were enrolled. The mean length of time a child received case management was 7.1 months, and the median duration was 6.8 months. Most students were white (66%) and male (58%). Of the 63 participating nurses, the majority were assigned to 1 or 2 schools (25% and 43%, respectively), but 32% were assigned to 3 schools (25%) or 4 schools (7%). Factors related to the need for case management were unstable illness (62% of students), noncompliance (35%), recent or new diagnosis (29%), fam-

ily situation (26%), and academic performance (25%). The characteristics of participating students are summarized in Table 2.

First, we examined the goals established by the school nurse. Data on goal attainment are listed in Table 3. Establishing a safe school environment was a priority. To do this, nurses developed emergency action plans and individual health plans. They trained staff in diabetes care. School nurses also accomplished goals related to self-management, academic success, and family and peer relations.

Next, we examined the interventions provided by the nurse and how these varied on the basis of the workload of the nurse and the educational level of the child. We believed that nursing care would vary on the basis of these 2 factors. Because of the sample size, statistical testing was limited to comparing interventions on the basis of workload. The average number of IDs was greater for nurses assigned to 1-2 schools than for nurses assigned to 3-4 schools. In addition, nurses assigned to fewer schools provided more direct-care IDs than did nurses assigned to more schools. Both of these differences were statistically significant and are described in Table 4. Nurses assigned to more schools provided slightly more teacher and staff education than did nurses assigned to fewer schools. This was possibly a reflection of the nurse's goal to ensure a safe school environment when the nurse was not present.

In terms of grade level, elementary school children received more direct care than did older students, but this was affected by the number of schools assigned to the nurse. On average, children in elementary school received 30.3 direct-care IDs when the school's nurse was assigned to 1-2 schools and 13.9 direct-care IDs when the school's nurse was assigned to 3-4 schools. Students in high school received more education and counseling than did children in lower grades, but again the number of assigned schools had an impact. When the nurse was assigned to 1-2 schools, the high school student received 18.9 IDs for education and counseling, and when the nurse was assigned to 3-4 schools, the student received 10.4 IDs. Nurses provided more teacher and staff education for elementary school chil-

TABLE 4.
Comparison of Total Intervention-Days and Categories of Interventions, by Number of Schools Assigned to the Nurse

| Intervention | Intervention-days, no., mean \pm SD | |
|------------------------------|---------------------------------------|--------------------------|
| | Assigned to 1-2 schools | Assigned to 3-4 schools |
| Overall | 40.3 (31.6) ^a | 24.4 (13.9) ^a |
| Direct care | 25.3 (31.8) | 11.7 (8.6) ^a |
| Student education/counseling | 14.2 (13.9) | 11.6 (6.7) |
| Teacher/staff education | 13.4 (16.5) | 14.9 (14.7) |
| Family education/counseling | 14.5 (18.5) | 10.9 (6.2) |
| HCP coordination | 2.6 (2.3) | 2.9 (2.5) |

Note. A total of 59 nurses were assigned to 1-2 schools, and 27 nurses were assigned to 3-4 schools. HCP, health care professional; SD, standard deviation.

^aP \leq .05.

dren than for middle or high school students. There was less variation by workload. For example, in elementary schools, nurses assigned to 3-4 schools provided a few more days of teacher and staff education than did nurses assigned to fewer schools (19.7 IDs vs 17.0 IDs), which may be related to attempts to ensure the safety of the students when they were not present.

Next, we examined emergency events. Twenty-five of 86 students had a total of 46 emergency events identified by the nurses. Most (68%) of the emergencies occurred among elementary school children, and most (72%) were documented by nurses assigned to 1-2 schools. For the 25 children who had emergencies, the nurse initiated a series of interventions. In all cases, the nurse assisted with hyperglycemic management, and in 96% of the cases, the nurse initiated hypoglycemic management. Nurses did not always record the exact blood sugar measurement, but 8 children had a blood sugar level of <70 mg/dL, and 4 had a blood sugar level of <50 mg/dL. There were 3 children whose blood sugar level was >500 mg/dL. The nurses' comments suggested that these extremes were often related to malfunctions of equipment, particularly insulin pumps. Other reasons for emergencies were episodic illnesses (diarrhea or nausea), negative behavior (student refused to eat or take medication), or parental issues (did not provide supplies or adjusted the insulin in a way that was not indicated by the medical plan). In addition to managing blood sugar levels, the nurse always called the parent. In some cases, the parent was unavailable or unwilling to become involved, and the nurse called several family members. During an emergency, the nurse worked closely with the teacher (in 96% of cases) and the principal (in 60%). They administered insulin (in 92% of cases), provided urine testing (in 72%), and helped the student count carbohydrates (in 88%), while counseling the child about meal and snack planning (in 88%) and making good choices (in 76%). The school nurse visited the classroom (in 68% of cases) and called the physician's

office (in 56%). In some cases, the nurse noted that the policy of the physician's office was to speak only to parents, who relayed information to the nurse.

Finally, we examined the relationship between case management and quality of life, particularly the communication scale, by comparing baseline scores with final scores on the PedsQL 3.0 Type 1 Diabetes Module. These data are summarized in Table 5. Significant improvements were seen in both total scores and communication scores for adolescents but not for other groups.

Discussion

This descriptive study demonstrates the complexity of providing diabetes care in public schools. School nurses promote a safe school environment by initiating emergency action plans and individual health plans and by training school personnel. When nurses are assigned to fewer schools, they are able to provide more direct care, and this may be important for elementary school students, who need help with their diabetes care. Taras [32] suggests that, in the school environment, it is safer when a nurse administers insulin than when unlicensed personnel administer insulin, because insulin administration at school has inherent risks that are not present at home. When nurses work with high school students, they focus on education and counseling, rather than on direct care, and this appears to have a positive effect on quality of life, particularly in relation to the teen's ability to communicate with other health professionals. Previous research suggests that higher quality of life might be related to better glycemic control [25, 29, 33]. This improvement was not seen with younger children, who may not be developmentally ready to accept this responsibility.

Emergency situations are relatively common in school, particularly among younger children. Nurses assigned to fewer schools identified more emergencies, although there was no evidence to suggest that the children they cared for were more unstable. When the nurse is not present,

TABLE 5.
PedsQL Scores at the Beginning and End of the School Year

| Score type | Score, mean ± SD, by child age | | |
|------------------------|--------------------------------|---------------|----------------------------|
| | 5-7 y | 8-12 y | 13-17 y |
| Overall QOL | | | |
| Beginning | 70.33 (21.71) | 69.07 (13.23) | 64.97 (13.48) |
| End | 66.82 (15.64) | 69.40 (13.19) | 70.57 (11.11) |
| Change | -3.51 (24.32) | 0.32 (9.17) | 5.60 (10.20) ^a |
| Communication subscale | | | |
| Beginning | 70.51 (36.74) | 74.71 (23.61) | 63.26 (30.17) |
| End | 65.38 (30.02) | 76.55 (24.14) | 74.62 (21.12) |
| Change | -5.13 (38.72) | 1.84 (17.59) | 11.36 (20.01) ^b |

Note. A total of 13 children were aged 5-7 years, 43 were aged 8-12 years, and 22 were aged 13-17 years. In the text, the beginning of the school year is referred to as the baseline score, and the end of the school year is referred to as the final score. QOL, quality of life; SD, standard deviation.

^aP = .05.

^bP = .01.

emergencies are identified by someone else or are missed. Dealing with an emergency requires a significant amount of judgment and coordination. Sophisticated equipment, such as insulin pumps, can make living with diabetes easier. However, our data suggest that the consequences of equipment failure are serious and result in wide fluctuations in blood sugar measurements. Recognition and treatment of these problems is an area that requires professional judgment.

There are several limitations of this study. Most notably, it represents a very small percentage of children with diabetes in North Carolina public schools. Our focus was on developing the case management program, and we did not have adequate resources to collect data on children not enrolled in the program. Therefore, this study should be repeated with a larger sample and a comparison group. Another limitation was that all nurses did not have access to the students' hemoglobin A_{1c} levels, so we were not able to measure the impact of the interventions on diabetes control.

We believe that this study demonstrates the complexity of diabetes care in schools, as well as the need for school nurses who are well-trained professionals. North Carolina faces a severe budget crisis, and some have suggested that cutting school nurse positions is one way of reducing costs. However, the cost-effectiveness of school nursing must be evaluated in terms of not only what it costs to hire a nurse but also the costs incurred when a nurse is not present. These include less teacher time for direct education. One nurse commented on the intervention flow sheet that "the teacher is angry about...the amount of time focused each day on just this student and her inability to teach when checking blood sugar [levels] 6 or 7 times per day, dealing with low [levels], and supervising him to make him eat snacks and lunch."

Previous research suggests that school nurses are more likely to remedy health problems and send the child back to class, compared with other school personnel, thereby improving attendance [34]. School nurses can be a lifeline for a student with diabetes who is resistant to following their plan of care. One nurse stated that a student "refused to eat lunch and was placed in silent lunch and still would not eat. [I] sat with him and got him to eat.... It took him another 10 minutes while his class had left the cafeteria for him to eat."

Another cost relates to the liability incurred when the child does not receive appropriate care. Federal and state laws have been enacted to protect the rights of children with diabetes [1-3]. After one nurse called a parent about a low blood sugar measurement, the parent responded to the nurse, "[He] is not responsible. The school is [responsible], and the law will make you be responsible."

School nurses have been referred to as the "hidden health care professionals." They may be invisible to other health care professionals. Several nurses reported that some physicians' offices would not share information with them. While it may be preferable to have the parent be the main point of contact, there are situations in which the parent is not reli-

able and the child is at risk. As one nurse described, "Dad wants me to give one-third dose of insulin each hour and check blood sugar [level] hourly during the pizza party. I explained that I needed doctor's orders for this."

Diabetes is only one chronic illness, and providing care to children with chronic illnesses is only one component of the school nurse's role. Health screening, managing and monitoring communicable diseases, health promotion for students and staff, and developing programs to create a safe school environment are other key roles. Our data suggest that school nurses are vital in promoting the health and academic success of children. The question for North Carolina and other states that are facing economic constraints is, Will we meet this challenge or ignore it? **NCMJ**

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