The Feasibility of Collecting School Nurse Data

MARTHA DEWEY BERGREN
DNS, RN, NCSN, APHN-BC, FHASN, FASHA, FAAN
University of Illinois, Chicago College of Nursing

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Abstract

To benefit from education and instruction in school, children must be healthy and ready to learn. Although studies demonstrate the effectiveness of school nursing on some child health and education outcomes, significantly more research is needed. Yet, school nurses cite barriers to collecting data on the wide range of care they provide. This descriptive study evaluated the feasibility of collecting school nurse data on selected child health and education outcomes over 5 days. Outcome variables included: School health office visits; health provider, parent and staff communication; early dismissal; and medications administered. On an average day, the school nurse cared for 43.5 students, administered 14 medications, and contacted eight parents, eight school personnel, and one health care provider, for an average of 17 daily communications. Forty-two nurses responded to at least one item on Day 1 of the data collection survey. By day 5, 32 were still participating. Day 1 data collection times averaged 15 minutes or less. By day 5, 6.6 minutes was needed to complete the survey. Data collection was feasible for 76% of those who opted to participate. Feasibility is enhanced by limiting the number of data points and the number of days for data collection using friendly data collection interface. Data is necessary to make the case for school nursing services for children and to advocate against further cuts in school health services. This pilot study lays the foundation for school nurse research that measures the impact of school nurse presence and interventions on child health and education.

Introduction

To benefit from education and instruction in school, children must be healthy and ready to learn. School nurse positions are often cut as schools struggle with decreased state funding and lower property tax revenues still recovering from the recession (Ellerson, 2012). Although there are studies that demonstrate the effectiveness and cost savings attributed to school nurses across a wide range of child health and education outcomes (Wang et al., 2014; Maughan, 2003; Bergren, 2013), significantly more research and statistics supporting school nurse practice outcomes is needed.

The American Federation of Teachers (AFT) School Nurse Advisory Committee identified that the dearth of research on school nursing's impact on school and child outcomes limited their ability to argue effectively against school nurse cuts or advocate for additional school nursing positions. Evidence to protect school nurse positions is largely anecdotal (Bell, 2014). Yet, when projects have been undertaken to collect comprehensive data when nurses' jobs are at risk, the school nurses' response has been lackluster (Bell, 2013; Bell, 2014; Hall, 2014; Personal communication, Luann Powers, Anchorage School District). Nurses reported that comprehensive data collection that attempted to document all of the potential activities conducted during the day for a series of weeks was overwhelming and laborious (Personal communication, Luann Powers, Anchorage School District).

The School Nurse Advisory Committee proposed conducting a pilot investigation into the feasibility of collecting data from school nurse AFT members. The advisory committee identified that to be palatable to the participants, the data points needed to be:

- Limited, not comprehensive
- Important
- Easy to measure
- Ideally, data that are already collected

The advisory committee also felt strongly that data should be collected from both school nurses who used electronic student health records and those who used paper records to capture the practice of all AFT members. Since comprehensive data collection that attempted to collect all school nursing activities was previously found to be so overwhelming that the nurses did not participate (Personal communication, Luann Powers, Anchorage School District), the committee suggested that limiting the data collection to a few salient data points collected for a a short period of time was more likely feasible and palatable to potential participants. This snapshot of school nursing activities may be extrapolated across the school year. The study evaluated the feasibility of collecting school nurse generated data on selected child health and education outcomes.

The outcome variables collected in the study were selected from a list of 57 child health and educational outcomes (Table 1) that were identified by the Research Committee of the National Association of School Nurses Board of Directors as potentially being sensitive enough to measure the impact of school nursing presence and interventions (Selekman, Vessey & Bergren, 2012; Bergren 2011). Additional measures were added to that list from the National Quality Forum Child Health Outcome Measures (National Quality Forum, 2012) and the National Database of Nursing Quality Indicators (NDNQI) list of nursing sensitive outcome measures (Montalvo, 2007). The four data points selected by the advisory committee were (Table 2):

- School health office visits
- Health provider, parent and staff communication
- Early dismissal
- Medications administered
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Purpose

The purpose of this study is to evaluate the feasibility of collecting school nurse generated data on child health and education outcomes.

Methodology

The study is a descriptive study of the feasibility of collecting data that are representative of the crucial health services school nurses deliver.

A data collection web interface via Survey Monkey *(*www.surveymonkey.com/) was designed by the Principal Investigator for the participants to daily enter data on the four data points (the number of student health office visits per care provider (school nurse or unlicensed assistive personnel), school nurse communications with parents, providers or staff, early dismissal (the number of students dismissed early and the number sent back to class); and medications administered (Table 3). The tool required responses to 15 items daily with 14 additional demographic questions answered only on day 1.

The American Federation of Teachers' School Nurse Advisory Committee conducted a trial run of the data collection interface. The feedback revealed data collection via the interface was feasible, and easy to use. Data was collected on the school nurse demographics and school characteristics as well as frequency of the selected measures. Each day a novel medication was reported in a text box, that medication was added to the drop down menu to reduced data entry time on the following days. The advisory group reported that it took approximately 15 minutes to enter the data into the web interface. No revisions in the data collection tool were recommended by the advisory committee.

Human Subjects Approval for the study was obtained from the University of Illinois-Chicago Institutional Review Board. The school nurses' identities are known, but the nurses' names were coded and only aggregate results reported. No students were identified and no personal student information was collected. Only the primary investigator has access to the nurses' codes

To reach school nurses who were AFT members, a blast email was sent by National Association of School Nurses Director of Research to the 991 self-identified AFT members who belong to NASN. The initial goal was to identify-school nurse participants for a convenience sample willing to collect data in their school health role. Qualifications for inclusion were: Full time registered nurse working directly with school aged children in a regular Pre-K-12 school environment. Excluded were school nurses who did not have any direct care responsibilities, part time school nurses or school nurses who work in non-regular school settings. A variety of school nurse settings (elementary, middle and high school) and student and building ratios were desired.

The National Association of School Nurses blast email invited the school nurses to participate in the study and directed them to a link if they were interested in learning more about the investigation. The link collected their name and email. The Principal Investigator responded, sending an email containing the informed consent and an invitation to a webinar to explain the study.

Eight nurses contacted the Principal Investigator to report that they did not meet the criteria for inclusion in the study. They included university professors or school nurse administrators who did not provide direct care to students, or nurses who were going to be absent on some or all days of the data collection. Ninety–two eligible nurses of the 991 who were invited responded to the recruitment email; 90 of those respondents provided an email address. It is unknown how many of the 991 emails were inactive, incorrect, or blocked by the email domain. The eligible respondents were sent a link to an audio streamed PowerPoint webinar recorded by the Principal Investigator. The webinar provided additional information about the study, advising that it involved a 5 day commitment, that the survey was reported to take 15 minutes or less per day, and oriented the potential participant to the web based data collection tool. The participants were informed that they could choose to self-identify or select a pin number to allow the investigator to track the data they reported over the 5 days of data collection.

A Web interface Link for data collection was sent out daily via email for 5 days over a one week period in the spring of 2014. Care was taken to select a week that was "typical," e.g. not during spring break. The primary investigator's phone number and email was provided daily for technical assistance.

Data Analysis

Responses on the web-based data collection tool were converted to Excel spreadsheets. Data frequencies were calculated. Each day some responses were left blank or marked not applicable, usually without explanation.

Results

Demographics

The demographic information (Table 2) was only collected and tallied on the first day of data collection. Forty-two respondents replied to at least one question on Day 1 of data collection.

On Day 1, 41 nurses responded to the question of how many students and how many school buildings they served. Two of the respondents admitted they did not know the exact number of students they served and provided an estimate. An additional 8 responses were numbers that may or may not have been exact and may have been estimates (e.g. 1500, 900). The nurses' average reported caseload was 996 students, ranging from 47-4500 students per nurse. They provided health services in 1 – 6 schools, with respondents serving an average of 1.66 schools.

The nurses who volunteered to participate in the study were well educated. Forty-one respondents reported their highest level of nursing preparation. Three nurses were either Associate Degree or Diploma educated. The largest group, 15 (37%) had a Bachelor's Degree in Nursing, and 11 (27%) had a Master's Degree in Nursing. An additional 3 had Bachelor's Degrees in other fields, and 9 had Master's in other fields, equaling 29%. In all, 92% of the respondents had at least four years of college education. Many also held national (15), and state certification (23),

some holding both. Only 12 respondents were did not hold specific credentials in school nursing.

The group had many years of experience in nursing and school nursing. Forty-two nurses answered both questions. The respondents had 1-45 years of nursing experience, with the nurses reporting an average of 26.5 years of nursing experience. They had 1-31 years' experience in the school nursing subspecialty, serving children in schools an average of 12.4 years.

Only 38 of the group responded to the item requesting the percent of the student body that had Free and Reduced Lunch. Of the 38, 13 (34%) admitted they did not know what percentage of the students qualified for Free and Reduced Lunch. It is possible the other 3 respondents also did not know and skipped the question.

Eighty-three percent or 35 respondents reported using electronic health records in the school health office.

When the nurse was not in school, 29% of the nurses did not have a nurse or health trained substitute, with half being cared for by a secretary or other non-health trained staff or and half having no one identified as responsible for children with health problems during the school day in the nurses' absence.

In all, the group of respondents was well educated, many with additional school nursing credentials. As a group, they had many years of nursing and school nursing subspecialty experience. Their caseloads were large, serving 996 students and 1.66 schools on average. The large majority used electronic health records. A significant percentage did not have a registered nurse substitute when they were not at work. One-third did not know the Free and Reduced Lunch composition of the student body they served and a smaller number did not know the exact number of students they served.

Data Collection

Participation across the week. Following the audio streamed webinar, 42 nurses responded to at least one item on Day 1 of the data collection survey with three of the 42 nurses answering N/A to many of the items. By day 5, 32 were still participating. Data collection time decreased daily. Day 1 data collection times ranged from 1 – 45 minutes, with the majority at 15 minutes or less. By day 5, the amount of time to complete the survey was 6.6 minutes.

Health office visits. On day 1 alone, 1443 students visited the health office, 4 percent of the total enrollment of students served by the participants. Over the 5 day study period, there were a total of 7403 visits to the school health office. On an average day, 43.5 student health office visits were recorded per nurse. The average number of student visits ranged from 38-49 per nurse per day, Friday having the fewest visits, and Tuesday having the highest total. During the 6.7 hour average school day in the United States (Snyder & Dilow, 2013), during the 5 days of this study, 6.5 students visited the health office per hour. Each student encounter was recorded. Therefore, multiple visits by the same student were counted each time.

Early Dismissal. Over the 5 days of the study, seven students were sent to the hospital or emergency room, and one student was sent to the primary care provider for a head injury. Few students were sent home or were seen by the primary care provider for minor ailments, with the large majority of students being returned to class.

Medication administration. Fifty-nine unique medications were administered over the 5 days (Table 3), many of which were psychotropic medications for serious mental health disorders (see Appendix I). Each day, novel medications were added to the drop down menu. In 5 days, 2,261 medications were administered by the participants, an average of 68 medications administered per week per nurse, or 14 per day.

Communication: Parents. Many school nurses commented on the amount of time required for individual communications with parents. Although the duration of each communication was not requested, nor is that typically documented in students' health records, many nurses volunteered that they had spent 30 – 60 minutes with an anxious parent or parents of children with special health care needs on the phone during a single day. Over the course of the 5 days of data collection, nurses communicated with parents 1309 times, an average of 8 parent contacts per day.

Communication: School personnel. The nurses reported 1312 student health related communications with school staff, administrators and teachers during the 5 day study period, an average of 8 communications per day.

Communication: health providers. Health care providers were contacted by the school nurse 198 times over the 5 day study period, an average of one contact per day per nurse.

Data collection time. The amount of time required to tally and record the data requested for the study varied across the week. The second day of the study, a Monday, nurses reported on average needing 8.7 minutes to tally and record the data, ranging from 1 minute to 45 minutes. On the final day of the study, the nurses required 6.6 minutes to complete the data collection, ranging from 1 minute to 15 minutes. The average amount of time needed to collect and report the data was 7.5 minutes per day.

The average day. On an average day during the 5 day study period, the school nurse was visited by 43.5 students or 6.5 students per hour, administered 14 medications, and contacted 8 parents, 8 school personnel, and one health care provider, or an average of 17 communications daily.

Qualitative responses

Comments volunteered by the participants were extremely helpful in putting the data into context. Nurses mentioned Pertussis outbreaks, "a slow day", anaphylaxis in a previously undiagnosed student, 911 called, "lots of injuries from weekend mishaps", etc.

Comments offered by the participants revealed that many school nurses are anxious to participate in data collection. They understood the importance of quantifying their work with school age children.

- "SNs are responsible for serious student health conditions that have the potential for negative outcomes daily."

- "Glad to participate. Interesting to see #'s, for ourselves as well! Important to define and quantify what we do; thank you for these efforts. Will be glad to participate in future projects!"

- "I think it's easier than we realize with detailed and thoughtful questions and consistent data collection."

- "Cannot wait to see the results and put them to good use!"

Some frustration was voiced that data was not collected on activities that took much of their time. "I think this study needs to be much more extensive." School nurses mentioned prepping for students with health concerns for field trips, participating in Individualized Education Plan (IEP) meetings with parents and staff, and special procedures such as catheterizations, tube feedings and tracheostomy care.

However, participation in the study validated the work they accomplished each day and provided satisfaction. "Loved doing this, I like looking back at what I actually did during the day"

Limitations

The small sample size limits the generalizability. The actual response rate was difficult to evaluate. National Association of School Nurses members were recruited for participation in the study. NASN does not share personally identifiable member information with researchers. NASN sent out the initial email blast to the 911 AFT NASN members. Since the investigator did not send the invitation to participate, it is unknown how many received the email. Many school email domains block emails sent to multiple addresses and the invitation may have been diverted to Spam folders. The investigator received complaints from nurses who are self-identified AFT NASN members and who did not receive the invitation, and who would have participated.

Many NASN/AFT members contacted the investigator that they were not eligible for the study – they were supervisors who did not have a school assignment or were university faculty who were members of the faculty bargaining unit. It is unclear how many of the 911 self-identified AFT members in the NASN database were ineligible to participate.

It is unclear if 25% attrition over the week was a result of participants deliberately leaving the study or if they stopped receiving the daily email sent with the link to the data collection web interface. Some participants contacted the investigator when they did not receive subsequent emails through the week and some provided alternate email addresses to assure their participation throughout the 5 days of the study.

Some respondents indicated that they reported some data via recall, not from records, especially communications with parents, staff and health care providers. Recollected rather than recorded data threatens the reliability of those data.

Implications

Some school nurses were unsure of the number of students they served or the salient characteristics of the student populations they served. To effectively advocate for student health, school nurses need to be able to confidently share data about the populations they serve and the services they provide with health and education stakeholders and decision makers. The US Department of Education National Center for Education Statistics (NCES) provides demographic data for every school system across the country (http://nces.ed.gov/globallocator/). The school

nurses should be able to identify the student enrollment per building, the teacher student ratios, the number of students eligible for Free and Reduced Lunch, and the racial and ethnic diversity of the student body.

School nurses reported 17 student health communications daily. School nurses play a pivotal role in the care coordination for children with chronic conditions (AAP, 2008; ANA/NASN, 2011). However, many school nurses reported they are not documenting communication with parents, providers and staff. Communications between the nurse and parents, staff, administrators and health care providers are essential for positive student care outcomes. Documenting communications also quantifies the amount of time school nurses shoulder the burden of health interactions that would be otherwise performed by administrators, educators, and school staff. Baisch, Lundeen and Murphy (2011) found that school nurses save all school personnel 13 hours a week they would otherwise need to spend on student health concerns, including saving principals an hour daily. Having a full-time school nurse present allows other school personnel to focus on their primary role in student instruction and achievement (Hill & Hollis, 2012). When communications with all in the child's care team are not recorded, one of the most significant nursing interventions, care coordination, is not quantifiable, and evidence of the school nurses' value is lost. With the emphasis on nurses and school nurses role in care coordination of individuals with chronic conditions, it is imperative that all communication / coordination activities with parents, staff, and health care providers be documented completely and consistently.

School nurses over the 5 days of this study saw over 43 students per day, almost all of whom returned to class. When a school nurse is present full-time, students are 57% less likely to be sent home (Wyman, 2005; Pennington & Delaney, 2008). It is difficult to estimate the number of unnecessary emergency room or primary care provider visits that the school nurses prevented, let alone the number of parents who were able to stay at work because the nurse was able to accurately assess the student and keep them in school. The cost of a full-time nurse is offset by preventing unnecessary health care costs and the costs of missing work to the parents and their employers (Wang et al., 2014). Each dollar spent on a school nurse amounts to a savings of $2.20 (Wang et al., 2014).

Since the investigator was not privy to NASN's recruitment process, it is difficult to know if the 10% response rate is accurate. It is not known how many of the 911 who were invited to participate were ineligible, how many email invitations were never received, how many were ineligible, and ultimately, how many potential participants opted out of a study requiring data collection over several days. For those who attended the orientation, only half opted to participate in the study. However, 76% of the respondents who participated on Day 1 completed all 5 days of data collection.

By limiting the study period to a few days of collection and to a few salient items, a significant amount of data was collected. The nurses spent on average 7.5 minutes a day collecting and reporting the data for this 5 day study, and that time decreased over the study period. Nurses felt validated by summarizing even a small sample of data that represented what they had accomplished days' end.

Even in this small sample, the volume and complexity of the medications delivered daily by school nurses is daunting. This study confirmed previous studies that the range of the medications for serious health conditions has escalated (McCarthy, Kelly, Johnson, Roman, & Zimmerman, 2006;

Clay et al. 2008). The number of psychotropic medications validates the trend that mental health issues are outpacing physical health concerns for students in school (Slomski, 2012). Despite the high volume of potentially dangerous medications administered by the participants, the study echoes earlier findings (Vollinger, Bergren, & Belmonte-Mann, 2011) that 29% of the nurses reported they did not have a nurse or health trained lay substitutes when they were not present. The trend to replace nurses with unlicensed personnel carries risk for the child and family, and the nurse who delegates medication administration. Unlicensed personnel are more likely to make medication errors of incorrect dosage, missed dosages, administering expired medication and inconsistent documentation of medications than registered nurses (Canham et al., 2007; Farris, McCarthy, Kelly, Clay & Gross, 2003; McCarthy, Kelly, & Reed, 2000; Price, Dake, Murnan, & Telljohann, 2003). Collecting and reporting medication data is imperative to allow thoughtful and informed decision making for those making school health staffing decisions.

Summary

The study aimed to determine the feasibility of collecting school nurse generated data on selected child health and education outcomes. This study demonstrated that collection is feasible by busy school nurses if the data items are viewed as important, limited to a few data points and conducted over a time limited period. Data is necessary to support that the school nurse and school nursing services provide one of the supports needed for children to be healthy, in school, and ready to learn. The school nurses who participated in this study embraced the importance of the endeavor to provide data that describes what they do. It is important for school nurses who advocate for student health to be knowledgeable about their caseloads and characteristics of the student population as well as the literature that supports the positive outcomes of school nursing practice (Bergren, 2013). This pilot study lays a foundation for school nurse data collection that measures the impact of school nurse presence and interventions on child health and education.

Collecting data on school nurse activities and outcomes benefits both the children and communities they serve, but also demonstrates the value and cost savings to the education system and the health care system (Baisch, Lundeen & Murphy, 2011; Wang et al., 2014). Decisions about short term savings of eliminating professional school nursing staff must weigh both the safety and health of the students, the care burden on teachers and other school staff, and the costs to health care systems and society.

This study has already advised work and guided the methodology on the NASN/ NASSNC Joint Project (2014) to identify a Core Uniform Data Set collected nationally (Galemore, Gerdes & Maughan, 2014). The project, *Stand Up and Be Counted,* Standardized Data Set For School Nursing Services, is in its first year with data collected on three data points (number of school nurses, number of students with diagnosed chronic d conditions; disposition of children seen by the school nurse) in 50 states (Maughan et al., 2014; Patrick, et al., 2014). Ultimately, the goal is to develop a national data set that accurately measures the health care administered to students in school daily.

References

American Academy of Pediatrics (AAP). (2008). *Role of the school nurse in providing school health services*. Elk Grove Village, IL: AAP. Retrieved from http://aappolicy.aappublications.org/cgi/reprint/pediatrics;121/5/1052.pdf. doi: 10.1542/peds.2008-0382

American Nurses Association (ANA) and National Association of School Nurses (NASN). (2011) *Scope and standards of practice school nursing, 2nd Edition.* Silver Spring, MD: Nursebooks.org

Baisch, M. J., Lundeen, S. P. & Murphy, M. K. (2011). Evidence-based research on the value of school nurses in an urban school system. *Journal of School Health, 81,* 74 – 80. doi: 10.1111/j.1746-1561.2010.00563.x.

Bell, M. (2013, January, 18). *Alaska School Nursing Data Collection Pilot Project Guide.* Anchorage, AK: State of Alaska, Department of Health and Social Services.

Bell, M. (2014). Alaska's school nurses: An overview. *The Alaska Nurse, 64*(1),4-5, 7. http://www.aknurse.org/layouts/aknurse/files/documents/AKNURSE/AKNurseFeb14Final.pdf

Bergren, M.D. (2013). The case for school nursing: Review of the literature. *NASN School Nurse, 28,* 48-51. doi: 10.1177/1942602X12468418

Bergren, M.D. (2011). Does school nursing matter? School nurse sensitive outcome measures. *NASN School Nurse, 26,* 72-75.

Canham, D., Bauer, L., Concepcion, M., Luong, J., Peters, J., & Wilde, C. (2007). An audit of medication administration: A glimpse into school health offices. *Journal of School Nursing, 23*(1), 21-27. doi:10.1177/10598405070230010401

Clay, D., Farris, K., McCarthy, A.M., Kelly, M.W. & Howarth, R. (2008). Family perceptions of medication administration at school: Errors, risk factors, and consequences. *Journal of School Nursing, 24,* 95 - 102. doi: 10.1177/10598405080240020801

Ellerson, N.M. (2012). *Weathering the storm: How the economic recession continues to impact school districts*. Alexandria, VA: American Association of School Administrators. Retrieved from https://www.aasa.org/uploadedFiles/Policy_and_Advocacy/files/Weathering_the_Storm_Mar_2012_FINAL.pdf

Farris, K.B., McCarthy, A.M., Kelly, M.W., Clay, D.L., & Gross, J.L. (2003). Issues of medication administration and control in Iowa schools. *Journal of School Health*, *73*(9), 331-337

Galemore, C., Gerdes, J., & Maughan, E. (Speakers). (2014, August 28). *National Standardized Data Set for School Health Services: Step Up and Be Counted!*. [Audio podcast]. Retrieved from http://nas.sagepub.com/site//misc/Podcasts.xhtml

Hall, M. (2014). School nursing: Before and after budget cuts in the Juneau School District. *The Alaska Nurse, 64*(1), 8-9, 11. http://www.aknurse.org/layouts/aknurse/files/documents/AKNURSE/AKNurseFeb14Final.pdf

Hill, N. J. & Hollis, M. (2012). Teacher time spent on student health issues and the school nurse presence. *Journal of School Nursing, 28,* 181-186. doi: 10.1177/1059840511429684

Maughan, E.D., Johnson, K.H., Bergren, M.D., Wolfe, L.C., Cole, M., Pontius, D.J., . . . Patrick, K. (2014). Standardized Data Set for School Health Services: Part 1—Getting to Big Data. *NASN School Nurse, 29*, 182-186, doi:10.1177/1942602X14538414

Maughan, E. (2003). The impact of school nursing on school performance: A research synthesis. *Journal of School Nursing*, *19*, 163-171. doi: 10.1177/10598405030190030701

McCarthy, A.M., Kelly, M.W., & Reed, D. (2000). Medication administration practices of school nurses. *Journal of School Health*, *70*, 371-376. doi: 10.1111/j.1746-1561.2000.tb07277.x

McCarthy, A.M., Kelly, M.W., Johnson, S., Roman, J., & Zimmerman, M.B. (2006). Changes in medications administered in schools. *Journal of School Nursing*, *22*(2), 78-83. doi: 10.1177/105984050602200207

Montalvo, I. (2007).The National Database of Nursing Quality Indicators (NDNQI). *OJIN: The Online Journal of Issues in Nursing*, *12* (3). Retrieved from http://www.nursingworld.org/MainMenuCategories/ANAMarketplace/ANAPeriodicals/OJIN/TableofContents/Volume122007/No3Sept07/NursingQualityIndicators.html

National Association of School Nurses and the National Association of State School Nurse Consultants. (2014). *Stand Up and Be Counted,* Standardized Data Set For School Nursing Services. Silver Spring, MD: NASN. http://www.nasn.org/Research/StepUpBeCounted

National Association of School Nurses (NASN) & National Association of State School Nurse Consultants (NASSNC). (2014). School Nursing Services Data: Standardized documentation, collection, and utilization Joint Resolution**.** *NASN School Nurse, 29*, 200. doi:10.1177/1942602X14533774

National Quality Forum (2011, January 26*). National Quality Forum endorses Child Health Outcome Measures.* Washington, DC: National Quality Forum. Retrieved from: http://www.qualityforum.org/News_And_Resources/Press_Releases/2011/NQF_Endorses_Child_Health_Outcome_Measures.aspx

Patrick, K., Mendonca, L.L., Maughan, E.D., Wolfe, L.C., Dewey Bergren, M., Johnson, K.H., Gerdes, J., Watts, E., Pontius, D.J., & Cole, M. (2014). National Standardized Data Set for School Health Services: Step Up and Be Counted! *NASN School Nurse, 29*(5), 236-240, doi:10.1177/1942602X14544448

Pennington, N. & Delaney, E (2008). The number of students sent home by school nurses compared to unlicensed personnel**.** *Journal of School Nursing, 24,* 290 – 297. doi: 10.1177/1059840508322382

Price, J.H., Dake, J.A., Murnan, J., & Telljohann, S.K. (2003). Elementary school secretaries' experiences and perceptions of administering prescription medication. *Journal of School Health*, *73*, 373-379. doi: 10.1111/j.1746-1561.2003.tb04179.x

Selekman, J., Vessey, J. A. & Bergren M.D. (2012). School nurses role in research and evidence based practice (pp. 142-162). In J. Selekman (Ed.) *School nursing: A comprehensive textbook*. Philadelphia: F. A. Davis.

Slomski, A. (2012). Chronic mental health issues in children now loom larger than physical problems. *JAMA, 308*, 223-225. doi:10.1001/jama.2012.6951

Snyder, T.D., & Dillow, S.A. (2013). *Digest of Education Statistics – 2012.* (NCES 2014-015) Washington, DC: National Center for Education Statistics, US Department of Education. Retrieved from nces.ed.gov/pubs2014/2014015.pdfVollinger, L. , Bergren, M.D. & Belmonte, F. (2011). Substitutes for school nurses. *Journal School Nursing, 27,* 111-119. doi: 10.1177/1059840510388517

Wang, L.Y., Vernon-Smiley, M., Gapinski, M.A., DeSisto, M., Maughan, E. & Sheetz, A. (2014).Cost-benefit study of school nursing services. *JAMA Pediatrics,* doi:10.1001/jamapediatrics.20135441

Wyman, L. (2005). Comparing the number of ill or injured students who are released early from school by school nursing and nonnursing personnel. *Journal of School Nursing*, *21*, 350-355. doi: 10.1177/10598405050210060901

Table 1. Potential School Nursing Sensitive Outcomes

911 calls
Absenteeism
Anaphylaxis response
Asthma response
Attendance
Community partnerships
Deaths
Dental health
Depression
Early dismissal
Emergency room utilization/Hospitalizations
Failure to rescue
Graduation rates
Health care costs
Health office visits
Immunization rate
Immunization rate
Improved behavior
Inclusion / exclusion
Inclusion / exclusion
Increased AAPlans
Increased case management
Increased FAAPlans
Increased planned care
Increased quality of life
Injury
Instruction time
Insurance
Medical home
Medications missed dose
Medications wrong dose
Nutrition – healthy foods
Obesity
Parent communication
Parent involvement
Parent lost time from work
Parent satisfaction
Physical activity
Policy changes

Pregnancy
Revenue: 3rd party
Revenue: Grants
Revenue: Medicaid
Safer school environment: Bullying
Safer school environment: Hazing
Safer school environment: IAQ
School Connectedness
Serendipitous case finding
Specific health and education outcomes: etc (identify)
Staff communication
Staff preparedness
Staff satisfaction
Test scores – achievement
Wellbeing

Table 2: Variables to be measured in study

Demographics / Structure variables

- Highest level of Education
- State certification
- National Certification
- Years of nursing experience
- Years of school nursing experience
- Number of Buildings assigned
- Full time or part time
- Total school enrollment
- Number of students in caseload
- Number and percent time of other school health office personnel
- Who subs for you when sick or needing a day off for personal reasons or professional education? (another registered nurse with their own assignment, a registered nurse from a sub list, no one, a non-nurse, an LPN)

Outcome variables

- Number of student health office visits
  - Students seen by the nurse
  - Students seen by anyone in nurse's absence
- Communication
  - Parent communication – total of all calls, parent visits to school nurse, nurse visits to parents
  - Staff communication - total of all calls, staff visits to school nurse, nurse visits to staff member
  - Communication with primary or specialty health care provider
- Early Dismissal
  - number of student dismissed
  - number of students sent back to class.
- Medications administered

Table 3. 59 Unique Medications administered during the 5 day study

Acetazolomide (Diamox)
Albuterol HFA
Alprazolam (Xanax)
Amphetamine dexmethylphenidate (Adderall)
Amphetamine salts
Atomoxetine (Strattera)
AYR nasal gel
Baclofen
Budesonide
Bupropion (Wellbutrin)
Carbamazepine (Tegretol)
Cephalexin
Cetirizine (Zyrtec)
Clobazam (Onfi)
Clonazepam (Klonopin)
Clonidine
Clotimazole
Cyproheptadine HCL (Periactin)
Dexmethylphenidate (Focalin)
Dextroamphetamine (Dexedrine)
Divalproex sodium (Depacote)
Diphenhydramine (Benadryl)
Erythromycin
Felbamate (Felbatol)
Fluoxetine (Prozac)
Gabapentin cyproheptadine
Guanfacine (Intuniv, Tenex)
Hydrocortisone
Ibuprofen
Insulin
Lactase (Lactaid)
Levabuterol
Levetiracetam (Keppra)
Lisdexamfetamine dimesylate (Vyvanase)
Lithium
Methylphenidate (Ritalin, Concerta)
Olanzapine (Zyprexa)
Oxcarbazepine
Pancreatic enzymes (Creon)
Pedialyte
Pediasure
Propanalol
Quentiapine (Seroquel)
Risperidone (Risperdal)
Setraline (Zoloft)

Sodium Benzoate
Sunscreen
Valproic acid
prn
Acetaminophen
Albuterol / Albuterol MDI
Antipyrine-Benzocaine ear drops
Benzocaine gel
Calamine lotion
Diphenhydramine (Benadryl)
Dicyclomine (Bentyl)
Fioricet
Hydrocortizone
Hydrixyzine (Atarax)
Ibuprofen
Midol (any type)
Naproxen
Sumatriptan (Imitrex)
Hay fever / Allergy (not specified)

APPENDIX V

Medications administered.

Pain reliever	Epilepsy	Asthma	ADD/ADHD	Allergy	Antibiotic	Anti-anxiety /Anitpsychotic / Bipolar	Antidepressant	Other
Acetaminophen	Acetazolomide (Diamox)	Albuterol HFA	Amphetamine dexmethylphenidate (Adderall)	Cetirizine (Zyrtec)	Cephalexin	Hydroxyzine (Atarax)	Alprazolam (Xanax)	Baclofen
AYR nasal gel	Carbamazepine	Budesonide	Amphetamine salts	Cyproheptadine HCL (Periactin)	Erythromycin	Lithium	Bupropion (Wellbutrin)	Dicyclomine (Bentyl)
Benzocaine gel /eardrops	Clobazam (Onfi)	Levabuterol	Atomoxetine (Strattera)	Diphenhydramine (Benadryl)		Olanzapine (Zyprexa)	Fluoxetine (Prozac)	Clotimazole
Fioricet	Clonazepam (Klonopin)		Clonidine	Gabapentin cyproheptadine		Quentiapine (Seroquel)		Insulin
Ibruprophen	Divalproex sodium (Depacote)		Dexmethylphenidate (Focalin)	Hydrocortisone		Risperidone (Risperdal)		Lactase (Lactaid)
Midol (any type)	Felbamate (Felbatol)		Dextroamphetamine (Dexadrine)			Setraline (Zoloft)		Pancreatic enzymes
Naproxen	Levetiracetam (Keppra)		Guanfacine (Intuniv, Tenex)			Valproic acid		Pedialyte
Sumatriptan (Imitrex)	Oxcarbazepine		Lisdexamfetamine dimesylate (Vyvanase)					Pediasure
			Methylphenidate (Ritalin, Concerta)					Propanalol
								Sodium Benzoate
								Sunscreen