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An Excel Spreadsheet Model for States and Districts to Assess the Cost-Benefit of School Nursing Services

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Abstract

This paper describes a user-friendly, Excel spreadsheet model and two data collection instruments constructed by the authors to help states and districts perform cost-benefit analyses of school nursing services delivered by full-time school nurses. Prior to applying the model, states or districts need to collect data using two forms: “Daily Nurse Data Collection Form” and the “Teacher Survey.” The former is used to record daily nursing activities, including number of student health encounters, number of medications administered, number of student early dismissals, and number of medical procedures performed. The latter is used to obtain estimates for the time teachers spend addressing student health issues. Once inputs are entered in the model, outputs are automatically calculated, including program costs, total benefits, net benefits, and benefitcost ratio. The spreadsheet model, data collection tools, and instructions are available at the NASN website (<http://www.nasn.org/The/CostBenefitAnalysis>).

Keywords

school nursing services; cost-benefit analysis; spreadsheet model; data collection tools

Over the past few decades, there has been an increased demand for school nursing services as a result of increased numbers of students with chronic health conditions and mental health problems (Akinbami, Moorman, Garbe, & Sondik, 2009; Branum & Lukacs, 2009; Centers for Disease Control and Prevention, 2011; Perrin, Bloom, & Gortmaker, 2007; Walkup, Stossel, & Rendleman, 2014), increased numbers of students with special care needs (Department of Health and Human Services, 2013), and improved medical technology that allows more services to be done outside of clinical settings. Consequently, school nursing services have expanded greatly from a focus on reducing communicable disease–related absenteeism to providing episodic care, managing chronic conditions, caring for students with disabilities, supporting health promotion, enrolling children and families in health insurance plans, connecting them with health care providers (or medical homes), tracking communicable diseases, and handling medical emergencies (Robert Wood Johnson Foundation, 2010). While the demand for school nursing services has increased

significantly, funding for school nursing services has not. Budget cuts have forced many school districts to cut school nursing services by eliminating nurses, reducing their hours, or replacing them with undertrained, untrained, or inconsistent employees (Delack, 2009; Vollinger, Bergren, & Belmonte-Mann, 2011).

A growing body of research has examined the effect of school nursing services and found that on-site school nursing services were effective in improving student health (Noyes et al., 2013) and student attendance (Telljohann, Dake, & Price, 2004; Weismuller, Grasska, Alexander, White, & Kramer, 2007), reducing early dismissals (Allen, 2003; Pennington & Delaney, 2008; Wyman, 2005), and reducing teacher time spent dealing with student illness or injury (Baisch, Lundeen, & Murphy, 2011; Hill & Hollis, 2012). However, in this cost-conscious era, it is no longer sufficient to rely solely on effectiveness to justify funding. Issues of practical concern to policymakers and decision makers are cost (whether they can afford a particular program), cost-effectiveness (whether the effects of a program justify its cost), and cost-benefit (whether the benefits of a program justify its costs). Given the growing pressure on education budgets, school nursing services must not only be shown to be effective but also cost-effective or cost-beneficial.

In 2014, the “Cost-Benefit Study of School Nursing Services,” a case study of the Massachusetts Essential School Health Services program delivered by full-time registered school nurses, was published (Wang et al., 2014). As the first economic study of school nursing services, it has drawn strong interest from school nurses and physicians as well as legislators at both state and Congressional levels. To address interest in replicating this study in other states or districts and meet requests for assistance, the authors constructed a spreadsheet-based Excel model and two data collection instruments to support states and districts in collecting data and performing cost-benefit analyses of their own programs. The aim of the current paper is to describe the spreadsheet and the data collection instruments as well as provide step-by-step instructions on data collection and analysis. With the spreadsheet and the data collection tools, states or districts can collect data and perform cost-benefit analyses of their own school nursing programs.

Overview of the Model

A spreadsheet model is an analytical tool built in a spreadsheet program that processes and performs calculations on the data entered by the user. It typically includes a set of inputs and a set of outputs (e.g., in the equation $4 + 5 = 9$, numbers 4 and 5 are the inputs, and number 9 is the output). Often the formulae in a spreadsheet are hidden; only the results are displayed. A spreadsheet model also allows users to enter different values for input variables to examine how these changes affect the outputs.

The spreadsheet model presented in this paper is an analytical tool that can be applied to estimate the cost-benefit of school nursing services delivered by full-time school nurses in any state or district. The analytical model is programmed into a Microsoft Excel spreadsheet, with the formulae imbedded in the model, thus reducing the need for computing and analytical skills of the user. A detailed description of the analytical methods used in

the model (i.e., formulae and assumptions) is provided in the “Cost-Benefit Study of School Nursing Services” (Wang et al., 2014).

There are two groups of model inputs.

1. For the first group of inputs, local data must be collected and entered in the spreadsheet. The user must provide number of student health encounters, number of student early dismissals, number of medical procedures performed by school nurses, number of medications administered by school nurses, number of minutes teachers spend per day addressing student health concerns, number of schools, number of students, number of nurses, number of teachers, average nurse salary and fringe benefits, average teacher salary and fringe benefits, percentage of students enrolled in a Medicaid program, and per student costs of medical equipment and supplies.
2. For the second group of inputs, obtaining parameter values would be far more complex, involving processes such as multistep calculation, multistep data generation, and use of published estimates. For the convenience of users, we provide parameter values within the spreadsheet, including the value of a lost hour per parent, parents’ time spent on traveling and administering medications at school, average number of school hours missed per dismissal, percentage of students dismissed when nurse is not present, minutes teachers spend per day dealing with illness/injury when a nurse is not present, percentage of medication doses that would have been administered by parents at school when a nurse is not present, as well as medical procedure costs.

Model outputs include costs of school nursing services, savings in medical care costs, teachers’ productivity loss costs, and parents’ productivity loss costs, net benefit, and benefit-cost ratio. Once local inputs are entered in the model, the outputs are shown in the spreadsheet. To help states or districts collect data for model inputs, the authors designed two data collection tools for school nurses and teachers.

Instructions for Data Collection and Analysis

Step 1: Collect Data

Prior to applying the model, states or districts need to collect data that can be done using two data collection tools developed by the authors. First, the “Daily Nurse Data Collection Form” can be used to record daily nursing activities, including number of student health encounters, number of medications administered, number of student early dismissals due to illness/injury, and number of medical procedures performed for both students and staff (see Figure 1). The form includes 22 types of medical procedures typically performed by school nurses. Many of these procedures were formerly performed in a medical setting and required professional nursing care and monitoring. School nurses need to collect these data every day for one school year. At the state or district level, data collected by individual school nurses need to be compiled into an annual, aggregate form before inputting the data into the spreadsheet model.

Second, the brief “Teacher Survey” can be used to obtain estimates for the time teachers spend addressing student health issues with and without a nurse present at their schools (see Figure 2). The survey asks teachers to think about a typical day in their current school year and estimate the number of minutes that they spend each day addressing student health issues. Additional data need to be obtained from state or district information and payroll systems, including number of schools in a district or state, number of students, number of nurses, number of teachers, average nurse salary and fringe benefits, average teacher salary and fringe benefits, percentage of students enrolled in a Medicaid program, as well as medical equipment and supply costs per student.

Step 2: Enter Data

The analytical model is built across three Excel worksheets (see Figures 3–5). Sheet 1 (Figure 3) is created for users to enter input data. Values in green are examples from the Massachusetts case study to illustrate how input data are entered, how the model operates, and what outputs the model generates. Users must replace the example data with their own state or district data. Users only need to enter data in the appropriate cells of Sheet 1 (Figure 3). Data collected in Step 1 by individual school nurses should be combined into an annual aggregate form and entered in Sheet 1 (Figure 3). Nursing services data (number of health encounters, number of medication administrations, number of early dismissals, and number of minutes teachers spent) should be entered into cells C11–C14, number of medical procedures performed for students and staff should be entered into B16–B37, and C16–C37, respectively. All other data obtained from state or district information and payroll systems (number of schools, students, teachers, and nurses; teacher salary; nurse salary; percentage of students enrolled in Medicaid; and costs of medical equipment and supplies per student) should be entered in Sheet 1, cells C3–C10 (Figure 3).

Step 3: View Results

Sheets 2 and 3 (Figures 4, 5) contain all the formulae needed to calculate the costs, benefits, and benefit-cost ratio. Once the values of all model inputs are entered in Sheet 1 (Figure 3), the following outputs will show in Sheets 2 and 3 (Figures 4, 5).

- Costs of school nursing services: Sheet 3, B24 (Figure 5)
- Medical procedure costs averted: Sheet 2, I26 (Figure 4)
- Parents productivity loss averted: Sheet 3, B32 (Figure 5)
- Teachers productivity loss averted: Sheet 3, B36 (Figure 5)
- Total benefits: Sheet 3, B37 (Figure 5)
- Net benefits: Sheet 3, B38 (Figure 5)
- Benefit-cost ratio: Sheet 3, B39 (Figure 5).

Step 4: Interpret Model-Generated Results

Costs of school nursing services include school nurse salary, fringe benefits, and costs of medical supplies. Medical procedure costs averted are the costs of performing the same medical procedures in a medical facility when there is no nurse present in school. Parent

productivity loss averted is the increased parent productivity associated with reduced early dismissals and reduced medication administration by parents. Teacher productivity loss averted is the increased teacher educational productivity associated with spending less time on addressing student health concerns. Total benefits are the sum of medical procedure costs averted, parents' productivity loss averted, and teachers productivity loss averted. Net benefits is the total benefits of school nursing services minus its total costs. A benefit-cost ratio (BCR) is an indicator that summarizes the overall return on investment of a project. The BCR generated in the model is the ratio of the total benefits of school nursing services relative to its costs. The higher the BCR, the better the investment. A general rule of thumb is that if the ratio is greater than 1, the project is a good investment. In the Massachusetts example, a 2.3 BCR means for every dollar invested in the program, society would gain \$2.30.

Additional information Users Need to Know

In Sheet 2 (Figure 4), Medicaid and non-Medicaid cost estimates for the 22 types of medical procedures are provided (numbers in blue in Columns E and F) in 2009 dollars. However, if state-specific data are available, users can replace these estimates with their own data. Please note that the medical cost estimates are in 2009 dollars. If a state or district program is delivered in a later year, those cost numbers need to be adjusted to later year dollars before performing the analysis. Multiply the 2009 cost numbers by 1.03, 1.06, 1.11, 1.13, 1.16, and 1.18 for a program delivered in 2010, 2011, 2012, 2013, 2014, and 2015, respectively. The multipliers for future years including 2016 will be provided at the end of each year at the NASN website.

In Sheet 3 (Figure 5), the values of the six parameters listed in the following are provided (data in blue) in Spreadsheet 3 and can be used directly for any state or district. Detailed description on how each parameter estimate was generated is provided elsewhere (Wang et al., 2014). However, they can be replaced if more reasonable or site-specific estimates are available:

- value of a lost hour per parent,
- parents' time spent on traveling and administering medications at school,
- average number of hours missed per dismissal,
- percentage of students dismissed when nurse is not present (2.5 times the percentage of students dismissed when nurse is present),
- minutes teachers spend per day dealing with illness/injury when a nurse is not present (20 minutes more than that when a nurse is present),
- percentage of medication doses that would have been administered by parents at school when a nurse is not present.

Please note that the value of a lost hour per parent is in 2009 dollars. If a state or district program is delivered in a later year, the value of a lost hour needs to be adjusted to later year dollars before performing the analysis. Multiply the 2009 value number by 1.01, 1.05, 1.07, 1.08, 1.10, and 1.10 for a program delivered in 2010, 2011, 2012, 2013, 2014, and 2015,

respectively. The multipliers for future years including 2016 will be provided via the NASN website at the end of each year (<http://www.nasn.org/The/CostBenefitAnalysis>).

Discussion

The spreadsheet model and the data collection tools presented in this article can help states or districts collect data and assess the cost-benefit of their own school nursing programs. Using data from Massachusetts as an example, this paper helps users understand how local data are entered in the spreadsheet, what input data are already provided, how the model operates, and what outputs the model generates. The model results will provide evidence on the costs, benefits, and cost-benefit of school nursing programs as well as help policymakers make informed decisions about school nursing positions and funding.

In addition, the spreadsheet model presented in this paper allows users to carry out a “what if” analysis. For example, in Sheet 2 (Figure 4), the Medicaid cost estimates used for the 22 types of medical procedures are based on the Massachusetts Medicaid Fee Schedule. If the Medicaid Fee Schedule is higher in a user’s state, the user can increase the Medicaid cost estimate for each medical procedure by 10% to 30% and find out how the total medical costs averted, net benefits, and benefit-cost ratio will change.

There are two limitations to the spreadsheet model as presented. First, because some data are not available, not all the benefits of school nursing services are quantified in the model. For example, the model does not take into account the benefits of school nursing services in reducing 911 calls, emergency room (ER) visits, or hospitalizations; the benefits of early detection of diseases/conditions; or the benefits of health education and health promotion. Since the model measured all the program costs of school nursing services and only partial program benefits, the cost-benefit results should be considered as conservative estimates. Second, for the convenience of users, the values of several input parameters are provided in the model. However, these estimates (i.e., early dismissal rate and the excess time teachers spent on addressing student health issues when there is no nurse present, value of a lost hour per parent, and average number of hours missed per dismissal) were obtained from published studies, Massachusetts data (i.e., Massachusetts Medicaid Fee Schedule, percentage of medications that are prescription medications), or are based on the authors’ assumptions (i.e., the average number of minutes parents spend administering medications at school when no school nurse is present). It is only justifiable to use these estimates when there are no site-specific estimates. Because of these limitations, the model results should be interpreted with caution. When communicating with policymakers about the cost-benefit results, it is important to note that they are model-generated results based on best available data and reasonable assumptions.

To a large extent, the success of performing a cost-benefit analysis of a school nursing services program depends on local data collection. To fully and accurately implement the spreadsheet model, school nurses should regularly record their service activities, such as the number of encounters, medications administered, and medical procedures. The success of data reporting in Massachusetts suggests that school nurses can do this with minimal burden or negative impact on the delivery of services. School nurses can also work with

other school staff members to set up methods for collecting data on school absences, early dismissals, and 911 calls related to illness or injury.

In addition, states and districts should explore opportunities for quantifying the benefits of school nursing services to the greatest extent possible. For example, in a district where most students use the same health care providers, it will be easier for the district to collect data on ER visits and hospitalizations among students with chronic conditions. The district can work with the health care providers to assess the number of ER visits and hospitalizations between schools with a full-time nurse and schools with no nurse at all. Another possible way of collecting data on 911 calls, ER visits, and hospitalizations is to set up routine communications with parents of students with chronic conditions and ask parents monthly about their children's 911 calls, ER visits, or hospitalizations during school hours for the past month and then compare the annual data between schools with a nurse and schools without a nurse.

Data and cost-benefit analysis such as this can be used by school nurses locally to illustrate what they do and how their work benefits the district and community. At a state level, such information can be helpful for allocating funds, developing policies on data collection, and legislative activities regarding school health funding (e.g., Medicaid reimbursement). The more benefits of school nursing services are quantified, the stronger the cost-benefit evidence on school nursing services, providing policymakers with information they need to make informed resource allocation decisions about school nursing positions and funding for school nursing programs.

References

- Akinbami LJ, Moorman JE, Garbe PL, & Sondik EJ (2009). Status of childhood asthma in the United States, 1980–2007. *Pediatrics*, 123 (Suppl 3), S131–S145. [PubMed: 19221156]
- Allen G. (2003). The impact of elementary school nurses on student attendance. *Journal of School Nursing*, 19, 225–231.
- Baisch MJ., Lundeen SP., & Murphy MK. (2011). Evidence-based research on the value of school nurses in an urban school system. *Journal of School Health*, 81, 74–80. [PubMed: 21223274]
- Branum AM, & Lukacs SL (2009). Food allergy among children in the United States. *Pediatrics*, 124, 1549–1555. [PubMed: 19917585]
- Centers for Disease Control and Prevention. (2011). National diabetes fact sheet: National estimates and general information on diabetes and prediabetes in the U.S Retrieved from http://www.cdc.gov/diabetes/pubs/pdf/ndfs_2011.pdf.
- Delack S. (2009). Vision, voice, and visibility: charting the course. *National Association of School Nurses: School Nurse*, 24, 176–177. [PubMed: 20440924]
- Department of Health and Human Services. (2013). *The National Survey of Children with Special Health Care Needs chartbook 2009–2010*. Rockville, MD: U.S. Department of Health and Human Services.
- Hill NJ, & Hollis M. (2012). Teacher time spent on student health issues and school nurse presence. *Journal of School Nursing*, 28, 181–186.
- Noyes K, Bajorska A, Fisher S, Sauer J, Fagnano M, & Halterman JS (2013). Cost-effectiveness of the School-Based Asthma Therapy (SBAT) program. *Pediatrics*, 131, e709–e717. [PubMed: 23400614]
- 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.

- Perrin JM, Bloom SR, & Gortmaker SL (2007). The increase of childhood chronic conditions in the United States. *Journal of the American Medical Association*, 297, 2755–2759. [PubMed: 17595277]
- Robert Wood Johnson Foundation. (2010). Unlocking the potential of school nursing: Keeping children healthy, in school, and ready to learn. Retrieved from <http://www.rwjf.org/files/research/cnf14.pdf>
- Telljohann SK, Dake JA, & Price JH (2004). Effect of full-time versus part-time school nurses on attendance of elementary students with asthma. *Journal of School Nursing*, 20, 331–334.
- Vollinger LJ, Bergren MD, & Belmonte-Mann F. (2011). Substitutes for school nurses in Illinois. *Journal of School Nursing*, 27, 111–119.
- Walkup JT, Stossel L, & Rendleman R. (2014). Beyond rising rate: Personalized medicine and public health approaches to the diagnosis and treatment of attention-deficit/hyperactivity disorder. *Journal of the American Academy of Child and Adolescent Psychiatry*, 53, 14–16. [PubMed: 24342381]
- Wang L, Vernon-Smile M, Gapinski M, Desisto M, Maughan E, & Sheetz A. (2014). Cost-benefit study of school nursing services. *JAMA Pediatrics*, 168, 642–648. [PubMed: 24840710]
- Weismuller PC, Grasska MA, Alexander M, White CG, & Kramer P. (2007). Elementary school nurse interventions: Attendance and health outcomes. *Journal of School Nursing*, 23, 111–118.
- Wyman LL (2005). Comparing the number of ill or injured students who are released early from school by school nursing and non-nursing personnel. *Journal of School Nursing*, 21, 350–355.

Name of school:	No. of person times	
	Student	Staff
Student health encounters due to illness/injury		
Medications administered		
Early dismissals due to illness/injury		
Medical procedures performed	Student	Staff
Administer Immunizations		
Auscultate Lungs		
Test Blood Glucose		
Monitor Blood Pressure		
Calculate Carbohydrate/Insulin		
Provide Catheter Care		
Provide Central Line Care		
Check Ketones		
Adjust Device		
Provide Insulin Pump Care		
Provide IV Infusion Care		
Administer Nebulizer Treatment		
Provide Ostomy Care		
Administer Oxygen		
Monitor Oxygen Saturation		
Monitor Peak Flow		
Provide Physical Therapy		
Administer Suctioning		
Provide Tracheostomy Care		
Provide Tube Care or Usage		
Measure Weight		
Provide Wound Care		

Figure 1.
Daily Nurse Data Collection Form
See procedure descriptions in the eTable in the Supplement of Wang et al., 2014.

1. Does your school have a full-time nurse, part-time nurse, or no nurse at all (If not sure, please ask your school principal)?
- __ Full-time nurse Answer Question 2
- __ Part-time nurse Answer Questions 3 and 4
- __ No nurse Answer Question 2
2. Considering a typical day in the current school year, how many minutes do you spend each day addressing student health concerns?
- _____ Minutes
3. Considering a typical day in the current school year, how many minutes do you spend each day addressing student health concerns on the days when there is no nurse present in your school?
- _____ Minutes
4. Considering a typical day in the current school year, how many minutes do you spend each day addressing student health concerns on the days when there is a nurse present in your school?
- _____ Minutes

Figure 2.
Teacher Survey Questionnaire

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW

F40 : X ✓ fx

	A	B	C	D
1	Sheet 1. Annual summary of state or district level health service activities			
2	Parameters	Value		Data sources
3	Number of schools	933		State or district information system
4	Number of students	473,227		State or district information system
5	Number of nurses	1,107		State or district information system
6	Number of teachers	34,283		State or district information system
7	Teacher salary and fringe benefits (\$)	91,255		State or district payroll system
8	Nurse salary and fringe benefits (\$)	69,469		State or district payroll system
9	% of students enrolled in Medicaid program	35.9		State or district information system
10	Medical equipment and supply costs per student (\$)	4.53		State or district information system
11	Number of student health encounters due to illness/injury	4,289,589		Nurse data collection
12	Number of medications administered	1,191,060		Nurse data collection
13	Number of early dismissals	265,516		Nurse data collection
14	Number of minutes teacher spent on addressing health issues per day when a nurse is present	6.24		Teacher survey
15	Number of medical procedures performed	Students	Staff	
16	Administer Immunizations	51,410	12,880	Nurse data collection
17	Auscultate Lungs	142,160	2,610	Nurse data collection
18	Test Blood Glucose	310,130	810	Nurse data collection
19	Monitor Blood Pressure	28,050	17,350	Nurse data collection
20	Calculate Carbohydrate/Insulin	116,550	40	Nurse data collection
21	Provide Catheter Care	23,070	30	Nurse data collection
22	Provide Central Line Care	890	10	Nurse data collection
23	Check Ketones	14,080	20	Nurse data collection
24	Adjust Device	15,710	90	Nurse data collection
25	Provide Insulin Pump Care	110,470	1,850	Nurse data collection
26	Provide IV Infusion Care	44,740	30	Nurse data collection
27	Administer Nebulizer Treatment	350	30	Nurse data collection
28	Provide Ostomy Care	10,790	60	Nurse data collection
29	Administer Oxygen	4,080	20	Nurse data collection
30	Monitor Oxygen Saturation	1,900	30	Nurse data collection
31	Monitor Peak Flow	39,930	1,000	Nurse data collection
32	Provide Physical Therapy	12,790	260	Nurse data collection
33	Administer Suctioning	7,860	50	Nurse data collection
34	Provide Tracheostomy Care	1,820	0	Nurse data collection
35	Provide Tube Care or Usage	880	10	Nurse data collection
36	Measure Weight	34,840	10	Nurse data collection
37	Provide Wound Care	4,580	1,870	Nurse data collection

Sheet1 Sheet2 Sheet3

Figure 3.
 Sheet 1: Annual summary of state or district level health service activities

Sheet 2. Annual medical procedures costs if performed by physicians or nurses in a medical setting									
	CPT or HCPC codes	Annual number of medical procedures performed		Medicaid fee or midpoint of fee range (\$)	Non-Medicaid fee or midpoint of fee range (\$)	Weighted average fee of Medicaid and non-Medicaid (\$)	Annual procedure costs (\$)		
		Students	Staff				Students	Staff	
4	Administer Immunizations	90471	51410	12880	16.52	29.50	24.84	1,277,064	379,960
5	Auscultate Lungs	T1002/S9123	142160	2610	9.09	15.85	13.42	1,908,240	41,369
6	Test Blood Glucose	82962	310130	810	2.96	20.00	13.88	4,305,820	16,200
7	Monitor Blood Pressure	99211	28050	17350	10.05	49.50	35.34	991,223	858,825
8	Calculate Carbohydrate/Insulin	T1002/S9123	116550	40	9.09	15.85	13.42	1,564,472	634
9	Provide Catheter Care	T1002/S9123	23070	30	9.09	15.85	13.42	309,673	476
10	Provide Central Line Care	T1002/S9123	890	10	9.09	15.85	13.42	11,947	159
11	Check Ketones	81000	14080	20	4.01	24.00	16.83	236,901	480
12	Adjust Device	99002	15710	90	0.00	39.00	25.00	392,734	3,510
13	Provide Insulin Pump Care	T1002/S9123	110470	1850	9.09	15.85	13.42	1,482,859	29,323
14	Provide IV Infusion Care	T1002/S9123	44740	30	9.09	15.85	13.42	600,553	476
15	Administer Nebulizer Treatment	94640	350	30	11.78	60.00	42.69	14,941	1,800
16	Provide Ostomy Care	43760	10790	60	164.54	369.50	295.92	3,192,957	22,170
17	Administer Oxygen	T1002/S9123	4080	20	9.09	15.85	13.42	54,767	317
18	Monitor Oxygen Saturation	94760	1900	30	1.94	40.00	26.34	50,039	1,200
19	Monitor Peak Flow	T1002/S9123	39930	1000	9.09	15.85	13.42	535,988	15,850
20	Provide Physical Therapy	97110	12790	260	11.82	57.50	41.10	525,671	14,950
21	Administer Suctioning	T1002/S9123	7860	50	9.09	15.85	13.42	105,506	793
22	Provide Tracheostomy Care	T1002/S9123	1820	0	9.09	15.85	13.42	24,430	0
23	Provide Tube Care or Usage	T1002/S9123	880	10	9.09	15.85	13.42	11,812	159
24	Measure Weight	T1002/S9123	34840	10	9.09	15.85	13.42	467,664	159
25	Provide Wound Care	97597	4580	1870	33.62	104.00	78.73	360,605	194,480
26	All procedures								20,009,151

Figure 4.
 Sheet 2: Annual medical procedures costs if performed by physicians or nurses in a medical setting

FILE		HOME	INSERT	PAGE LAYOUT	FORMULAS	DATA	REVIEW	VIEW
K42								
		A			B			
1	Sheet 3. Productivity loss costs and costs of school nursing services							
2	Parameter							Value
3	Number of schools							933
4	Number of students							473227
5	Number of nurses							1107
6	Number of teachers							34283
7	Teacher salary and fringe benefits (\$)							91255
8	Nurse salary and fringe benefits (\$)							69469
9	Value of a lost hour per parent (\$)							18
10	Parents' time spent on traveling and administering medications at school (hour)							0.5
11	Average number of hours missed per dismissal							3
12	Number of student health encounters due to illness/injury							4289589
13	% of students dismissed due to illness/injury when a nurse is present							6.2
14	% of students dismissed due to illness/injury when nurse is not present							15.5
15	Minutes teachers spent per day on dealing with illness/injury when a nurse is present							6.24
16	Minutes teachers spent per day on dealing with illness/injury when nurse is not present							26.24
17	Number of medication doses administered							1191060
18	% of medication doses would have been administered by parents at school when nurse is not present							74
19	Medical equipment and supply costs per student (\$)							4.53
20	% of students enrolled in Medicaid							35.9
21	Costs of school nursing services							
22	School nurse salary and fringe benefit (\$)							76,902,183
23	Medical equipment and supply costs (\$)							2,143,718
24	Subtotal							79,045,901
25	Parents productivity loss costs							
26	With nurse							
27	Due to medication administration							
28	Due to early dismissals							14,337,864
29	Without nurse							
30	Due to medication administration							7,932,460
31	Due to early dismissals							35,844,660
32	Difference							29,439,256
33	Teachers productivity loss costs							
34	With nurse							40,670,348
35	Without nurse							171,024,028
36	Difference							130,353,680
37	Total Benefits (\$)							179,802,086
38	Net Benefits (\$)							100,756,185
39	Benefit cost ratio							2.3

Figure 5.
Sheet 3: Productivity loss costs and costs of school nursing services