SCHOOL NURSE SERVICES COSTS-BENEFITS STUDIES

Literature Review

September 10, 2015 / Cheryl Scott, RN, MN/MPH

Objectives

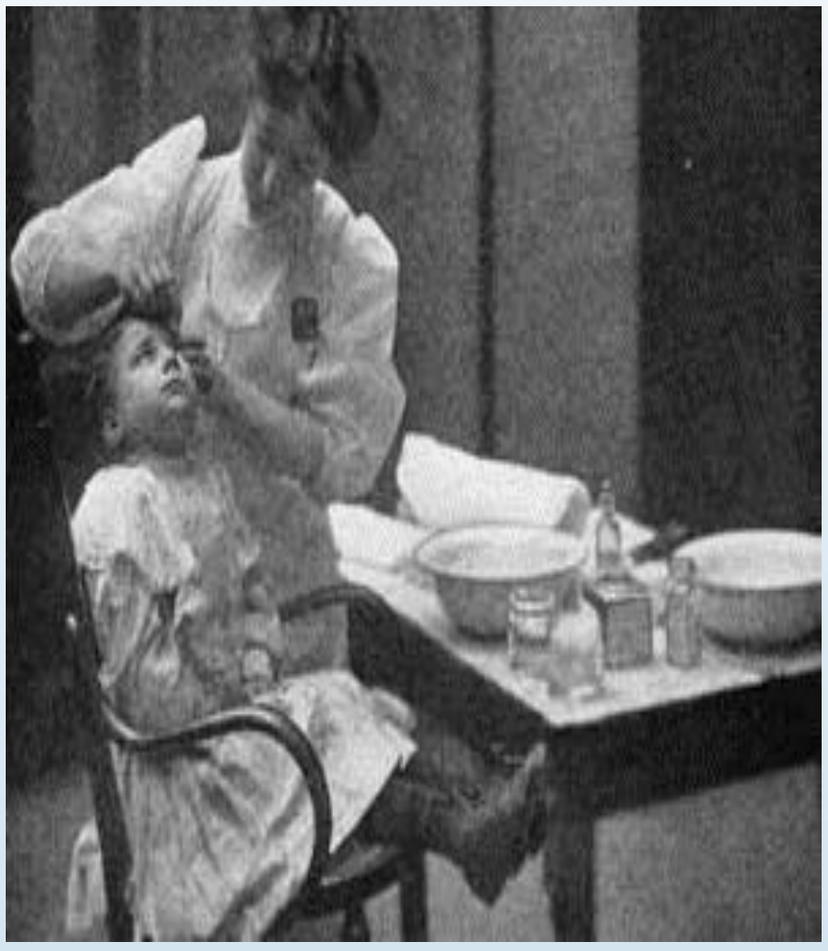
Literature Review

Return on Investment for School Health Nursing

I. Vital Role of School Nurses in Durham Public Schools
II. Cost-Benefit Studies of School Nursing Services
III. Summary
IV. Questions

Vital Role of School Nurses

- Attendance
- Academics
- Time
- Staff Wellness
- Accountability



School Nurse Staffing Recommendations

Recommendation

Nurse: Student ratio of 1:750

Cost-Benefit Studies of School Nursing Services

Evidence-Based Research on the Value of School Nurses in an Urban School System

Importance

- Increasing acuity of student health problems.
- Increasing rates of poverty among urban families.
- Widening ethnic/racial health disparities in child and adolescent health indicators.

Source: *Journal of School Health*, February 2011.
Baisch, M.J., Lundeen, S.P. & Murphy, M.K.

MILWAUKEE
PUBLIC SCHOOLS

Cost-Benefit Studies of School Nursing Services

Objective

- To evaluate the impact of school nurses on promoting a healthy school environment and healthy resilient learners.

Design, Setting and Participants

- Mixed methods (Cross sectional design; Quasi-experimental design)
- MPS Schools
- School Nurses
- School Staff

MILWAUKEE
PUBLIC SCHOOLS

Cost-Benefit Studies of School Nursing Services

Interventions

- Placed an additional RNs in 27 schools
- Ratio Goal of 1:750
- Surveys
    - School staff satisfaction with school nurse
    - Perceptions of efficient management of health concerns
- Data from Electronic School Records

MILWAUKEE
PUBLIC SCHOOLS

Cost-Benefit Studies of School Nursing Services

Milwaukee Public Schools SY 2006-2007

Average Time /Employee Spent Daily on Health Issues by Milwaukee Public School Staff			
Education	Before Hire SN	After Hire SN	Time Returned to School Staff for
Principals	67	11	56
Teachers	26	6	20
Clerical	63	17	46

Baisch, M.J., et al. 2009. Title I Funded Nursing Services 2006-2008 Program Evaluation. Report to the Milwaukee Public Schools by the University of Wisconsin-Milwaukee College of Nursing, Institute for Urban Health Partnerships.

MILWAUKEE
PUBLIC SCHOOLS

Cost-Benefit Studies of School Nursing Services

Results

- Immunization compliance rates improved
- Increased identification of chronic and life threatening conditions
- Educational time restored to teachers
- Cost analysis:

  Thirteen (13) hours/day school staff spent on student health concerns.

  Annual estimated cost of $133,174.89 in salary/fringe benefits,

  Almost 2X cost of hiring an MPS school nurse.

MILWAUKEE
PUBLIC SCHOOLS

Cost-Benefit Studies of School Nursing Services

Evidence-Based Research on the Value of School Nurses in an Urban School System

Conclusions and Relevance

- School Nurses, when in the school everyday, improve health educational outcomes.
- More quality evaluation data is needed to justify hiring and retaining school nurses to support improved school environments.

MILWAUKEE
PUBLIC SCHOOLS

Cost-Benefit Studies of School Nursing Services

Cost-Benefit Study of School Nursing Services

Importance

- Several US school districts have cut on-site delivery of health services by reducing or eliminating qualified school nurses.

- Providing cost benefit information will help policy makers and decision makers better understand the value of school nursing services.

Massachusetts Department of Public Health

Wang, L.Y., Vernon-Smiley, M., Gapinski, M.A., Desisto, M., Maughan, E., & Sheetz, A. (2014). *Cost-benefit study of school nursing services. Journal of the American Medical Association (JAMA) Pediatrics, 168 (7), 642-648.* doi:10.1001/jamapeidatrics.2013.5441

Cost-Benefit Studies of School Nursing Services

Objective

- To conduct a case study of the Massachusetts Essential Health Services (ESHS) program to demonstrate the cost- benefit of school health services delivered by full time registered nurses.

Design, Setting and Participants

- Standard cost-benefit analysis methods
- ESHS costs and benefits vs. setting with no school nursing services
- ESHS program report data; other published studies
- 477,163 students/933 MA ESHS schools/78 school districts/2009-2010 SY

Massachusetts Department of Public Health

Cost-Benefit Studies of School Nursing Services

- ***Design, Setting and Participants***

*The "no school nursing scenario is **hypothetical** and is based on:*

- *Projected medical procedure costs*
- *Teachers' productivity loss (addressing student health issues)*
- *Parents' productivity loss (early dismissals)*
- *Medication Administration by school staff*

Massachusetts Department of Public Health

Cost-Benefit Studies of School Nursing Services

Interventions

School Health services provided by full time registered nurses

- 1,157 FTE RNs/933 schools
- 4,946,757 student health encounters
- 99,903 school staff health encounters
- 1,016,140 medical procedures
- 1,191,060 medication doses
- 6.2% early dismissals

September 1, 2009-June 30, 2010

Massachusetts Department of Public Health

Cost-Benefit Studies of School Nursing Services

Table 1. Medical Procedure Costs if Performed by Physicians or Nurses in a Medical Setting

Procedure	*CPT* or *HCPC* Code	No. of Procedures Performed Monthly		$				
				Medicaid Fee or Midpoint of Fee Range[a]	Non-Medicaid Fee or Midpoint of Fee Range[b]	Weighted Mean of Medicaid and Non-Medicaid	Annual Procedure Costs	
		Students	Staff				Students	Staff
Administer immunizations	90471	5141	1288	16.52	29.50	24.84	1 277 064	379 960
Auscultate lungs[c]	T1002/S9123	14 216	261	9.09	15.85	13.42	1 908 240	41 369
Blood glucose testing	82962	31 013	81	2.96	20.00	13.88	4 305 820	16 200
Blood pressure monitoring	99211	2805	1735	10.05	49.50	35.34	991 223	858 825
Carbohydrate insulin calculation[c]	T1002/S9123	11 655	4	9.09	15.85	13.42	1 564 472	634
Catheter care[c]	T1002/S9123	2307	3	9.09	15.85	13.42	309 673	476
Central line care[c]	T1002/S9123	89	1	9.09	15.85	13.42	11 947	159
Check ketones	81000	1408	2	4.01	24.00	16.83	236 901	480
Device adjustment	99002	1571	9	0.00	39.00	25.00	392 734	3510
Insulin pump care[c]	T1002/S9123	11 047	185	9.09	15.85	13.42	1 482 859	29 323
IV infusion care[c]	T1002/S9123	4474	3	9.09	15.85	13.42	600 553	476
Nebulizer treatment	94640	35	3	11.78	60.00	42.69	14 941	1800
Ostomy care	43760	1079	6	164.54	369.50	295.92	3 192 957	22 170
Oxygen administration[c]	T1002/S9123	408	2	9.09	15.85	13.42	54 767	317
Oxygen saturation check	94760	190	3	1.94	40.00	26.34	50 039	1200
Peak flow monitoring[c]	T1002/S9123	3993	100	9.09	15.85	13.42	535 988	15 850
Physical therapy	97110	1279	26	11.82	57.50	41.10	525 671	14 950
Suctioning[c]	T1002/S9123	786	5	9.09	15.85	13.42	105 506	793
Tracheostomy care[c]	T1002/S9123	182	0	9.09	15.85	13.42	24 430	0
Tube care or use[c]	T1002/S9123	88	1	9.09	15.85	13.42	11 812	159
Weight measurement[c]	T1002/S9123	3484	1	9.09	15.85	13.42	467 664	159
Wound care	97597	458	187	33.62	104.00	78.73	360 605	194 480

Abbreviations: *CPT*, *Current Procedural Terminology*; *HCPC*, *Healthcare Common Procedure Coding*; IV, intravenous.

[a] Data were from the Massachusetts Medicaid Fee Schedule.

[b] Data were from Physicians' Fee and Coding Guide 2009 and the *HCPC* system.

[c] Procedures are not directly transferable to *CPT* codes or fees unavailable; costs are based on registered nurse services up to 15 minutes.

Cost-Benefit Studies of School Nursing Services

Table 2. Parameters Used in Estimating Costs of School Nursing Services and Costs of Lost Productivities[a]

Parameter	Value	Source
No. of districts	78	ESHS report, 2009-2010
No. of schools	933	ESHS report, 2009-2010
No. of students	477 163	ESHS report, 2009-2010
No. of nurses	1157	ESHS report, 2009-2010
No. of teachers	34 283	2009-2010 Massachusetts Teacher Salaries Report
Teacher, $		
Annual salary	70 196	2009-2010 Massachusetts Teacher Salaries Report
Salary and fringe benefits	91 255	Authors' calculation
Hourly salary and fringe benefits	63	Authors' calculation
Nurse, $		
Annual salary	53 438	ESHS nurse director survey
Salary and fringe benefits	69 469	Authors' calculation
Value, $		
A day lost per parent	145	Bureau of Labor Statistics[19]
An hour lost per parent	18	Authors' calculation
No. of hours missed per dismissal (range)	3 (2-4)	Authors' assumption
No. of student encounters due to illness or injury	4 289 589	ESHS report, 2009-2010
Students dismissed from school due to illness or injury when a nurse is present, %	6.2	ESHS report, 2009-2010
Students dismissed from school due to illness or injury when a nurse is not present (range), %	14.8 (11.0-18.6)	Assumption (midpoint between 11.0% of non-ESHS schools and 18.6% of published studies)
Parents' time spent on traveling and administering medications at school (range), min	30.0 (15.0-60.0)	Authors' assumption
Teachers' time spent per day on dealing with illness or injury when a nurse is present, min	6.2	Baisch et al[18]
Teachers' time spent per day on dealing with illness or injury when nurse is not present, min	26.2	Baisch et al[18]
Time saved per teacher per day (range), min	20.0 (0.0-40.0)	Baisch et al[18] and author assumption
No. of medication doses administered	1 191 060	ESHS report, 2009-2010
Medication doses that would have been administered by parents at school if nurse was not present (range), %	0.74 (0.60-1.00)	Authors' assumption based on ESHS report, 2009-2010
Medical equipment and supply costs per student, $	4.53	ESHS nurse director survey

Abbreviation: ESHS, Essential School Health Services.

[a] Values are presented as means unless otherwise indicated.

Cost-Benefit Studies of School Nursing Services

Table 3. Base-Case Analysis Results[a]

Characteristic	Nurse		Difference
	With	Without	
School nursing services costs, $			
School nurse salary and fringe benefits	76 902 415	0	76 902 415
Medical equipment and supply costs	2 145 293	0	2 145 293
Parents' productivity loss costs, $			
Due to early dismissals	14 437 432	34 520 467	20 083 035
Due to giving medications at school	0	8 030 722	8 030 722
Teachers' productivity loss costs due to dealing with students' illness or injury, $	40 319 125	169 417 864	129 098 738
Procedure costs if performed by physicians and nurses in a medical setting, $	0	20 009 129	20 009 129
Total costs of school health services, $			79 047 709
Total benefits, $			177 221 624
Net benefits, $			98 173 915
Benefit-cost ratio			2.24

[a] All costs were estimated in 2009 US dollars. The difference between the sum of the first two sets of numbers in the last column and the total cost is due to rounding.

Cost-Benefit Studies of School Nursing Services

Table 4. Multivariate Sensitivity Analysis Results[a]

Costs and Benefits	Results of 95% of Simulation Trials
School nursing services costs, $	
School nurse salary and fringe benefits	76 902 415
Medical equipment and supply costs	2 145 293
Reduced parents' productivity loss, $	
Due to reduced early dismissals	12 081 820 to 29 647 080
Due to reduced medication administration by parents at school	5 190 689 to 15 984 340
Reduced teachers' productivity loss in addressing student health issues, $	6 438 192 to 251 742 200
Savings in medical procedure costs, $	19 068 550 to 20 945 790
Total costs of school health services, $	79 047 709
Total benefits, $	56 269 360 to 302 059 400
Net benefits, $	22 778 350 to 223 011 700
Benefit-cost ratio	0.7 to 3.8

[a] The difference between the sum of the first two sets of numbers in the last column and the total cost is due to rounding.

Cost-Benefit Studies of School Nursing Services

Results Base Case Analysis Results

Benefit cost ratio: Every $1.00 spent saved $2.20

Program costs: $79 million ***Net Benefit: $98.2 million***

Costs averted:

Medical care	$20.0 million
Teacher productivity loss	$129.1 million
Parent productivity loss	$28.1 million

Massachusetts Department of Public Health

Cost-Benefit Studies of School Nursing Services

Cost-Benefit Study of School Nursing Services

Conclusions and Relevance

- School Nurse Services in this Massachusetts ESHS schools' study were a cost-beneficial investment.

Massachusetts Department of Public Health

Summary

- Limitations (Studies)
- School Nurses are one of the most cost effective, unrecognized health care resources in the country.

Questions?

References

Allen, G. (2003). The impact of elementary school nurse on student attendance. *Journal of School Nursing, 10 (4), 225-231.*

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(2), 74-80.* doi:10.0000/j.1746-1561. 2010.00563.x

Baisch, M.J., Lundeen, S.P., Stetzer, F., Kelber, S. & Holmes, M.B. (2009) Evaluation of the nursing component of the Milwaukee public schools coordinated school health program, *University of Wisconsin Milwaukee*

Massachusetts Department of Public Health*. The Essential School Health Services Program Data Report, 2009-2010 School Year. 2011. http://www.mass.gov/eohhs/docs/dph/com-health/school/eshs-report-09-10.pdf. Accessed August 27, 2015.*

Robert Wood Johnson Foundation. *Unlocking the Potential of School Nursing: Keeping Children Healthy, In School and Ready to Learn.* Washington, DC: Robert Wood Johnson Foundation; 2010.

Stock, J.L., Larter, N., Kieckehefer, G.M., Thronson, G. & Maire, J. (2002). Measuring outcomes of school nursing services. Journal of School Nursing, 18(6), 353-9.

Wang, L.Y., Vernon-Smiley, M., Gapinski, M.A., Desisto, M., Maughan, E., & Sheetz, A. (2014). Cost-benefit study of school nursing services*. Journal of the American Medical Association (JAMA) Pediatrics, 168 (7), 642-648.* doi:10.1001/jmampediatircs.2013.5441