

Community Hospital-School Partnership to Treat Asthma Episodes at School and Improve Management

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CASE STUDY OBJECTIVES

- To create a partnership between a school district, a hospital, and various community stakeholders to address the increasing burden of asthma on children
- To implement a program enabling school nurses to treat asthma episodes at school
- To reduce the number of times that children are sent home or to an emergency department (ED) as a result of asthma episodes
- To educate children, families, school nurses, and health care professionals about asthma
- To implement a coordinated referral system to specialist care and case management for children with uncontrolled asthma

SCHOOL DEMOGRAPHICS

Wide variation exists among the demographic and socioeconomic characteristics and in the prevalence of asthma in our program's school districts. Student populations range from 309 students in Garrison, our smallest district, to 31,686 students in Yonkers, our largest district. In Bronxville, a small and wealthy Westchester community, school nurses report that 4% of the district's students have a history of asthma. In Westchester's 2 largest and poorest cities, Mount Vernon and Yonkers, school nurses report asthma prevalence rates of 13.1% and 11.4%, respectively.¹ School nurse-to-student ratios range from 1:309 in Garrison to 1:668 in Tarrytown, with a mean nurse-to-student ratio of 1:553 for all schools.

Yonkers, the fourth largest city in New York State, was our principal area of focus. The city is an ethnically diverse community with a large documented and undocumented immigrant population, originally from the Caribbean, Central and South America, the Middle East, and Asia.

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Students in the Yonkers schools are 46% Hispanic, 30% African American, 19% Caucasian, and 5% Asian.² Although Yonkers constitutes less than 41% of Westchester County's total population, it has more than 81% of its Hispanic and 80% of its African-American population.

PROGRAM CONTEXT

Prior to school year 1998-1999, children with asthma in the Yonkers schools who experienced asthma episodes had to be sent home with a parent or to an ED. No protocols or equipment and medication were available to provide treatment. In the spring of 1998, the Yonkers school district and St John's Riverside Hospital (St John's), a local hospital, joined together to create a novel school-based partnership to assist the increasing number of children experiencing asthma episodes at school. Implementation of a proactive clinical treatment program proved very effective in keeping children with asthma in school and greatly reducing the number of times that they were sent home or to an ED. The partnership also conducted asthma educational programs for children at school and for families, school nurses, and other health care professionals. Through July 2005, with support from the New York State Department of Health, the business community, and private foundations, the program has expanded to 248 schools and 28 preschool and day care centers in 41 school districts throughout Westchester and Putnam counties.

CASE STUDY

Background

In New York State, children with asthma who have parental and physician permission are allowed to carry a metered dose inhaler (MDI) and use it self-directed. Because MDIs, especially with a spacer, are quick and effective, all children with asthma should carry one and be trained in its use. However, despite the legislation, a gap in school asthma care continues to exist because many children do not have their MDIs with them when an episode occurs. School nurses routinely report that parents may not have supplied the MDI or the MDI has been forgotten, lost, or empty when needed. Without backup medication at school, children experiencing asthma episodes are sent home or to an ED.

In January 1998, a child's death at school became a catalyst for the Yonkers schools and St John's to find a solution, the formation of a partnership between the hospital and the school district to address asthma care in the schools. In the fall of 1998, St John's obtained funding for donating asthma treatment equipment to 55 Yonkers schools and provided education and training for the equipment's use. Analysis of the first year's data clearly indicated the program's effectiveness. As a result, Rhone-Poulenc Rorer, Inc, The Children's Dream Foundation, The Thomas and Agnes Carvel Foundation, and The Frances L. & Edwin L. Cummings Memorial Fund provided additional funding

and support, making it possible to offer the program to other school districts. At the end of the 1999-2000 school year, the program expanded to 2 neighboring school districts in Ardsley and Dobbs Ferry.

When St John's received a 3-year \$600,000 grant from the New York State Department of Health in July 2000 to participate in a statewide asthma initiative to reduce the burden of pediatric asthma, the program expanded further. The Thomas and Agnes Carvel Foundation provided additional financial support, and by the end of the 2001 school year, 84 schools from 9 school districts were participating.

In the fall of 2001, Pinnacle Healthcare, Inc, a consortium of 5 Westchester County hospitals, joined our partnership and over the next 4 years helped to support expansion to 28 preschool and day care centers and 248 schools in 41 school districts in 2 counties. During this time, the New York State Department of Health increased its funding for 2 additional years, and additional financial support was received from The Walshin Foundation, CIBC—Canadian Imperial Bank of Commerce, Inc, Ciba, Inc, GlaxoSmithKline, Inc, Merck, Inc, and AstraZeneca, Inc.

During 1999-2000, the program broadened to include asthma educational programs in the Yonkers schools. Through the end of June 2005, St John's asthma team had conducted 65 programs for 901 children with asthma. In addition, educational programs had been conducted for families, school nurses, and other health care professionals.

During school year 2001-2002, the program added a social worker whose responsibilities included assistance in obtaining treatment orders and interacting with school nurses and families to help address the issues of controller medication use, insurance, and health and other psychosocial family issues. The social worker receives referrals from Yonkers school nurses and arranges appointments for children with St John's Asthma Center. Since 2002, over 100 children have been referred for specialist care and case management within this care triangle of nurse to social worker to asthma center.

Materials and Methods

Each school received a compressor, a case of disposable mini-nebulizers with tubing, a peakflow meter, a box of disposable 1-way valve peakflow meter mouthpieces, a nomogram for determining predicted peakflows, and albuterol 0.083% unit doses.

To monitor the program's effectiveness, nurses used logs to record the equipment used (peakflow meter or nebulizer) and to document student outcomes after treatment (returned to class, sent home, or sent to an ED). At the end of the school year, the nurse at each school received a questionnaire asking the nurse to transcribe the data from the log to the questionnaire and return the questionnaire to the asthma program director for compilation and analysis.

The first questionnaire was sent to Yonkers school nurses at the end of intervention year I, the 1998-1999 school year. To establish a baseline for comparison, the questionnaire asked for the number of times that students had been sent home or to an ED in the previous school year (1997-1998). Measures of program success were the percentage of times that students returned to class and the reduction in times that students were sent home or to an ED after treatment became available. For simplicity, we did not ask school districts entering the program after intervention year I for preintervention data and instead maintained outcome statistics as a rolling program.

Results

Data received from the first questionnaire documented that, during the base year (1997-1998), students were sent home 183 times and sent to an ED due to asthma episodes 35 times. For intervention year I (1998-1999), 12.7% of schools reported using peakflow meters and 45.4% reported using nebulizers (Table 1). School nurses administered 937 treatments, following which students returned to class 893 times (95.3%), were sent home 37 times (3.9%), and were sent to an ED 7 times (0.8%)

Table 1
School Participation and Use of Equipment*

School Year	Schools in Program N	Schools Reporting N	Schools Using PF Meters N	Using PF Meters %	Schools Using Nebulizers N	Using Nebulizers %	Nebulizer Tx Given N
1997-1998	0	0	0	0	0	0	0
1998-1999	55	55	7	12.7	25	45.4	937
1999-2000	64	64	15	23.4	39	60.9	1295
2000-2001	84	84	29	34.5	58	69.0	1840
2001-2002	226	200	88	44.0	130	65.0	2899
2002-2003	277	252	113	44.8	186	73.8	4737
2003-2004	273	239	111	46.4	188	78.7	5192
2004-2005	276	220	72	32.7	123	55.9	5211
Total	1255	1114	435	39.0	749	67.2	22,111

* PF, peakflow.

(Table 2). Compared to the base year, after receiving treatment from the nurse, 80% fewer students were sent home and 80% fewer students were sent to EDs.

Through June 2005, school nurses had administered 22,111 nebulized albuterol treatments. Of these 22,111 treatments, 17,760 (80.3%) were given at elementary schools, 2634 (11.9%) were given at middle schools, 950 (4.3%) were given at preschools, and 767 (3.5%) were given at high schools. Students returned to class 94.7% of the time, 5.0% were sent home, and 0.3% were sent to an ED after receiving treatment. The nurses' 7-year survey-return rate was 88.8%. Nurses reported no adverse reactions and communicated excellent satisfaction with the program.

Barriers

We encountered several barriers for which we found several creative solutions.

Cost. Supplying a backup albuterol MDI at a cost of approximately \$7 each and a spacer at between \$15 and \$25 to more than 3000 Yonkers students with a history of asthma would have been very expensive and would have created storage problems. Purchasing a compressor for \$60 reduced the cost of each nebulizer treatment to 75 cents (10 cents for 1 ampoule of unit dose of albuterol and 65 cents for the mini-nebulizer plus tubing). The disposable tubing and mini-nebulizer are used once and discarded; compressor maintenance requires dust filter replacement as needed.

Treatment Orders. Obtaining an order permitting treatment, an essential component of the treatment protocol, has been a constant challenge for nurses. Nurses have expressed frustration about the small percentage of parents responding to requests for an order. The addition, during the 2001-2002 school year, of the social worker, who assisted with obtaining treatment orders, addressed this issue. Lack of fax machines has also been a barrier to Yonkers school nurses receiving physicians' treatment orders. During the 2003-2004 school year, St John's obtained funding to donate fax machines to nurses' offices in all Yonkers public schools.

Nebulizer Use. During 1998-1999, the first intervention year, approximately 55% of the schools did not use nebulizers. Of these, one third were parochial schools where nurses are available to administer treatment only once or twice a month. Nurses in 22% of public schools were initially reluctant to use nebulizers but were won over when they observed the successful outcomes in other schools.

In Yonkers, what started as an initiative to provide clinical treatment has developed into a comprehensive, coordinated school-based asthma program. Elementary school 18, which at 17.9% has one of the highest asthma prevalence rates in the district, provides an example of successful collaboration. As a result of the school nurse's efforts to arrange for educational programs and persistence in contacting parents and physicians and making referrals to our social worker, all 49 students with active disease had an order for treatment and the 29 students with persistent symptoms were put on controller medication. The school principal reported a 30% reduction in absenteeism related to asthma during the 2003-2004 school year.

Our program has yielded extensive benefits. Children are spending more time in class. Parents are more at ease while their children are at school. School nurses are more comfortable dealing with asthma episodes. The reduction in ED visits, ambulance services, and unscheduled visits to physicians' offices has reduced the cost of health care. More children are receiving individual case management and care from specialists.

LESSONS LEARNED

- When physicians' orders are available in advance, providing schools with a nebulizer and albuterol is highly effective in keeping children in school and out of EDs. One standard protocol can be applicable in many school settings.
- Having a nebulizer and medication available at school is an incentive for parents and school nurses to get a signed order for treatment at school.

Table 2
Student Treatment and Disposition

School Year	Nebulizer Tx Given N	Student Outcomes Post Treatment					
		Times Returned to Class	N %	Times Sent Home N	N %	Times Sent to ED N	N %
1998-1999	937	893	95.3	37	3.9	7	0.8
1999-2000	1295	1251	96.6	38	2.9	6	0.5
2000-2001	1840	1700	92.4	136	7.3	4	0.3
2001-2002	2899	2734	94.3	157	5.4	8	0.3
2002-2003	4737	4472	94.4	252	5.4	13	0.2
2003-2004	5192	4927	94.9	252	4.9	13	0.3
2004-2005	5211	4973	95.4	225	4.3	13	0.2
Total	22,111	20,950	94.7	1097	5.0	64	0.3

- After a student has been sent home because an order was not available, the parent or nurse is more likely to get an order at school.
- Parents' failure to send orders for treatment and children's failure to have their medication with them at the time of an asthma episode need to be addressed when providing asthma care in schools.
- Partnerships between hospitals, school districts, and various community stakeholders can be effective strat-

egies for supporting school health programs such as those addressing asthma, especially in economically distressed urban areas. ■

References

1. Byrne J. St John's Riverside Hospital/Yonkers, New York Schools Asthma Partnership annual report for school year 2003-2004.
2. Yonkers, New York Public Schools, Health Services Annual Report for School Year 2003-2004.

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