



# Coordinated School Health Program for Asthma

## Year Five and Five-Year Evaluation Report

Prepared for the  
Centers for Disease Control and Prevention  
Annual Progress Report

# ALBUQUERQUE PUBLIC SCHOOLS

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# **Executive Summary**

## **APS Coordinated School Health Program for Asthma 2003-2008 Year 5 Annual & Five-Year Cumulative Evaluation Report**

Asthma is estimated to affect over seven percent of children in New Mexico and is a leading cause of missed school days. The Health and Wellness department of Albuquerque Public Schools (APS) initiated the Coordinated School Health Program for Asthma in the fall of 2003, with a five-year grant from the Centers for Disease Control and Prevention (CDC). The overall program goal is “to improve health outcomes and reduce absenteeism for youth with asthma who attend APS elementary schools, by raising awareness of asthma and ensuring that students have asthma care plans and access to primary care providers.” RDA’s evaluation suggests APS’ asthma program achieved the following outcomes:

### **Improved Health Care Access and Insurance Coverage**

- In 2007-08 the proportion of students with a primary care provider increased for the third year in a row, to an all-time high of 95%.
- Insurance coverage increased progressively each year also to a high of 94% in 2007-08, significantly higher than the statewide children’s insurance rate of 83%.

### **Improved Students’ Asthma Knowledge, Attitudes and Behaviors**

- For the fifth year in a row, students participating in the *Open Airways*<sup>®</sup> curriculum showed statistically significant improvements in asthma knowledge, self-reported asthma management skills, ability to talk to adults about asthma, understanding of asthma triggers, and attitudes about having asthma.
- Nurses report that parents are better informed about asthma and are more likely to send medications to school.

### **Improved the Asthma Knowledge, Attitudes and Behaviors of Nurses and School Staff**

- Over 90% of elementary school nurses report that the asthma program has increased their knowledge, self-confidence and level of activity related to helping students manage asthma.
- Over 95% of elementary school nurses agree or strongly agree that nurses should play a strong role as asthma advocates and change agents at their schools.
- 53% of nurses report that teachers have made adjustments to prevent asthma episodes.
- 71% say the P.E. teacher has made adjustments so students with asthma can participate in P.E. activities.

### **Absence Outcomes are Inconclusive**

- Variations in methods used to collect absence data may obscure program impacts.
- 44% of nurses estimate that asthmatic students were absent less often in 2007-08; they credit students’ improved use of medications, enhanced parent awareness and trust of school health supports, and increased communications with doctors and parents.
- The number of absences fluctuated across years in no consistent direction, averaging between 5.1 and 6.6 absences per student.
- Around 80% of absences were attributed to illness each year.

APS’ new five-year grant from the CDC provides a perfect opportunity to expand upon successes and address challenges identified in the first grant period.

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# APS Coordinated School Health Program for Asthma Year 5 (2007-08) Annual Evaluation Report & Five-Year (2003 - 2008) Cumulative Evaluation Report

## Introduction

Asthma is estimated to affect over seven percent of children in New Mexico and is a leading cause of missed school days. The Health and Wellness department of Albuquerque Public Schools (APS) initiated the Coordinated School Health Program for Asthma in the fall of 2003, with a five-year grant from the Centers for Disease Control and Prevention (CDC). The overall program goal is “to improve health outcomes and reduce absenteeism for youth with asthma who attend APS elementary schools, by raising awareness of asthma and ensuring that students have asthma care plans and access to primary care providers.” To meet this goal, program activities span four domains:

1. *Establish systems and develop capacity:* Optimize APS asthma policies, procedures and tools; inventory and replenish schools’ asthma management supplies; and build partnerships via a community advisory board.
2. *Conduct staff training:* Provide asthma awareness and emergency education for school staff; train nurses to teach the *Open Airways* student curriculum; and provide nurses with in-service trainings on asthma care.
3. *Provide health services:* Nurses assess and address students’ asthma-related needs, including referrals to health care providers and Medicaid.
4. *Educate students and families with asthma:* Provide asthma education to students in grades 3 – 5, conduct community presentations, and produce newsletters.

Eighteen schools participated in the asthma program’s first year (2003-04). The plan was to double school enrollment in the program each year until all elementary schools in the district were participating. Thirty-six schools participated in 2004-05, 54 schools in 2005-06, 85 schools in 2006-07, and 85 in 2007-08.

## Evaluation Purpose and Questions

APS’ Research, Development & Accountability department (RDA) provides evaluation services for the APS Asthma Program and writes the annual evaluation report submitted to CDC. This fifth year report contains evaluation results for the 2007-08 school-year, and contextualizes them with findings from the entire five years of the grant-funded program. The evaluation addresses how well the APS Asthma Program accomplished each of the following goals:

1. Identify students with asthma;
2. Improve the asthma-related knowledge/awareness and attitudes of school staff (nurses, health assistants, PE teachers and coaches, school administrators, teachers);
3. Improve students’ asthma-related knowledge, attitudes, skills and behaviors;
4. Improve health care access;
5. Expand health care insurance coverage; and
6. Reduce absenteeism due to asthma.

## Evaluation Methods

The evaluation employed a mix of quantitative and qualitative methods. Table 1 shows the instruments and data sources used to answer each evaluation question in 2007-08.

**Table 1. Asthma Program Evaluation Questions, Instruments and Data Sources, 2007-08**

<b>Evaluation Question</b>	<b>Instruments &amp; Data Sources</b>
How well did the APS Asthma Program:	
1. Identify students with asthma	Asthma Program Checklist
2. Improve the asthma-related knowledge, awareness and attitudes of school staff (nurses, health assistants, PE teachers and coaches, school administrators, teachers)	Program records Asthma Program Survey of Nurses
3. Improve students' asthma-related knowledge, attitudes, behaviors and skills	ALA pre and post test questionnaires Asthma Program Survey of Nurses
4. Improve health care access	Asthma Program Checklist
5. Expand health care insurance coverage	Asthma Program Checklist
6. Reduce absenteeism due to asthma	SchoolMax absence data

The Asthma Program Checklist is a form used by nurses to record basic information about students with asthma, assess their need for services, and follow up with referrals to Medicaid and parent and doctor contacts to coordinate health care and medications. The checklist includes the student's insurance status, primary care provider, and medications taken for asthma. Nurses submit program checklists to APS Asthma Program staff in early fall. Changes in insurance status and primary care provider are reported as they occur via updated program checklists.

The American Lung Association's (ALA) *Open Airways for Schools Questionnaire* is used to evaluate the effectiveness of the asthma education student curriculum. Participants completed this questionnaire at the start and at the end of the six-class program.

The APS Asthma Program Survey of Nurses was developed by RDA and administered on-line to all school nurses in the spring of 2008. Via close-ended and open-ended items, the survey collected nurses' perceptions of asthma program impacts, asthma-related attitudes and practices and perceived program success factors. The vast majority of elementary school nurses (85%, 56 out of 66) responded to the survey.

Student absences and their reasons were retrieved from the SchoolMax student information system by district asthma program staff. School nurses were expected to monitor student absenteeism in order to address health-related truancy problems. However, unlike previous years, nurses were not expected to verify student absences or reason codes.

## Limitations

The APS asthma program succeeded in improving the completeness of program data over the grant period. In 2004-05, core evaluation data from the asthma program checklist were missing for as many as 25% of students enrolled in the asthma program. By 2007-08, core data were missing for only one to four percent of students with asthma. This improvement is likely due to persistent efforts by program staff to educate and encourage nurses to secure information for every item on the asthma program checklist. In the last year of the grant, program staff members visited schools to supplement the work of nurses who did not submit complete data. Data completeness reduces one potential source of false evaluation conclusions.

The completeness and integrity of absence data, on the other hand, remain problematic. Absence data collection varied each year due to changes in the district's student information system, changes in asthma program policies, and turnover in school nursing personnel. Variations in data collection practices limit the comparability of absence data from one year to the next. Comparisons with non-asthmatic students cannot be made because extra data validation steps were taken only for students in the asthma program. Finally, the attribution of absence rate variations is confounded by a host of uncontrollable factors, including: yearly variations in student selection into the asthma program, seasonal effects on asthma symptoms, and changes in parent reporting.

Evaluation findings are derived from data collected specifically for the asthma program. The evaluation lacks comparable data from non-intervention schools and students without asthma. Without comparison data, it is difficult to draw solid conclusions, and generalizations to other sites and programs cannot be made with confidence. When available, state and national statistics are presented to provide context for program results.

## Results

### Identify Students with Asthma

The number of students enrolled in APS' asthma program increased incrementally for the first four years, as new schools were added. In 2007-08, the asthma program identified and tracked a total of 1,782 students in all 85 elementary schools.<sup>1</sup> This was a slight reduction compared to 2006-07, when 1,962 students were enrolled.<sup>2</sup> The decline may be due to asthma's exclusion from emergency cards produced by the district's new student information system. Program representatives also surmise that increasingly accurate asthma assessment and reporting by school nurses may have suppressed program enrollment. After five years of program activities, school nurses may have become more precise in identifying and recording only students with current and persistent asthma.

**Table 2. Numbers of Schools and Students Enrolled in the APS Asthma Program by Year**

	2003-04	2004-05	2005-06	2006-07	2007-08
Schools	18	36	54	84	85
Students	450	1017	1229	1962	1782

Identifying students with asthma is a challenging process complicated by parent underreporting. APS relies on parents to record their children's asthma condition on emergency cards completed for school registration. According to local and national studies, voluntary self-reporting results in severe underestimates of asthma cases. One study revealed that 50% of asthma cases identified by survey had not been documented on school health cards.<sup>3</sup> A local study conducted in three Albuquerque schools in 2001 found an asthma rate three times higher than the average reported by parents.<sup>4</sup> APS' asthma identification rates, as shown in Table 3, have been consistently lower than asthma prevalence rates reported for children at the community (6.2%), state (8.1%) and national (9%) levels.

APS' school nurses agree that parent under-reporting is a significant barrier to asthma case identification. On the spring 2008 Asthma Program Survey of Nurses, over three-quarters of elementary school nurses said families pose the main barrier, as follows:

- 69% said families don't inform the school nurse;
- 14% said families lack knowledge or deny there's a problem; and
- 2% said families want to address asthma without school involvement.

<sup>1</sup> One of APS' elementary schools split into two schools, increasing the total number of schools to 85 in 2007-08.

<sup>2</sup> Source: Asthma Program Checklists

<sup>3</sup> Vargas, P.A., Magee, J. S., Bushmiaer, M., Simpson, P.M., Jones, C.A., Field, C.R., Jones, S. M. (2006). School-Based Asthma Case Finding: The Arkansas Experience. *Journal of School Health*, 76(6): 223-226.

<sup>4</sup> Albuquerque Environmental Health Department (2001). Healthy Learners Project Pilot Study.



Data from the first four years of APS’ asthma program show that asthma identification rates<sup>5</sup> vary widely across schools, within schools across years, and for every program cohort. No particular trends are discernible. For example:

- At one typical school, the asthma identification rate was 4% in 2003-04, 12% in 2004-05, 2% in 2005-06, 3% in 2006-07 and 5% in 2007-08.
- School-level asthma identification rates range as widely as 1% to 12% across the years. The wide variation is true for every program year and cohort of schools. In 2007-08 school identifications rates range from a low of 0.6% to a high of 9.6%.

At the district level, the average asthma identification rate is fairly stable across years, at about 4% as shown in Table 3.

**Table 3. Cohort-Level Percentages of Students With Asthma, by Program Year**

Asthma Program Cohorts of Schools	Program Year				
	2003-04	2004-05	2005-06	2006-07	2007-08
Cohort 1 (18 schools)	4%	7%	5%	5%	4%
Cohort 2 (18 schools)		5%	4%	5%	4%
Cohort 3 (18 schools)			4%	4%	4%
Cohort 4 (31 schools)				4%	4%
<b>Overall</b>	<b>4%</b>	<b>6%</b>	<b>4%</b>	<b>4.5%</b>	<b>4%</b>

Since identification rates are stable overall across the years, school-level fluctuations may be explained in part by student mobility between schools. Approximately 20% of APS elementary school students switch schools at least one time during the school year, according to participation data from the 2006-07 New Mexico Standards Based Assessment. Another explanation for school-level fluctuations appears to lie in program enrollment changes from one year to the next. Fewer than half of students enrolled in APS’ 2007-08 asthma program were also enrolled in 2006-07. A total of 725 (45%) of 3<sup>rd</sup> through 5<sup>th</sup> grade students on the 2007-08 asthma program checklists also had asthma checklists on file the previous year.

This is a surprise given that nurses are instructed to send checklist forms to families of all children on previous year program enrollment lists, even if current emergency cards do not report asthma. Possibly, families did not return asthma checklist forms. Nurses may or may not have followed up with unresponsive families. Nurses may have become more discerning about which students have current and persistent asthma and therefore warrant inclusion in the program. New program enrollments may also be the result of faculty education efforts. Many nurses reported on the APS Asthma Program Survey of Nurses that teachers at their schools helped identify new cases of asthma. One nurse provided the following exemplar:

*One of my school's kindergarten teachers brought a child into my office several weeks ago who she had noticed was coughing during exercise. He has since been diagnosed with exercise-induced asthma and has medical orders and an inhaler at school. She told me later she remembered the information from the Asthma Poster presentation and the posters around school and thought she should follow*

<sup>5</sup> “Asthma identification rates” are the number of students identified by the asthma program divided by the number of students enrolled in each school on the 40<sup>th</sup> day of the school year.

*up with me about him. I let her know how much I appreciate that kind of input from teachers!!*<sup>6</sup>

APS asthma identification rates mirror patterns reported in national studies. One study aimed at improving asthma case identification in a Maryland public school system found great variability in asthma prevalence rates across schools, clusters and years. Variability was considered evidence of unreliable data. The authors identified individual nurses as one important source of variation. Nurses new to large schools often counted students with current asthma incorrectly. Over-counting occurred when nurses included students with a history of asthma but no current asthma or students who had transferred or dropped out of school. Undercounting occurred when parents did not report asthma on the emergency card and other resources were not checked.<sup>7</sup> Nurse-related variations may affect APS as well, particularly since 44 new school nurses were hired between 2006-07 and 2007-08.

Wheeler & Boyle (2006) conclude that “accurate prevalence counts are not necessary to serve the students with the highest asthma morbidity. Good case identification and tracking with school-based lists are sufficient to target resources within a school.”<sup>8</sup> APS’ asthma program takes this pragmatic approach. Its focus is not on determining asthma prevalence but on optimizing health care for students with moderate to severe asthma. Further, the program educates nurses, staff and parents so they can recognize and refer potential new cases.

According to nurses’ survey responses, asthma program efforts are succeeding at raising asthma awareness, cultivating attitudes of responsibility, and mobilizing staff to help identify and support students with asthma. Out of the 56 elementary school nurses who responded to the spring 2008 survey:

- 89% (50) reported that the program increased their awareness of how many students have asthma.
- 87% (49) embraced responsibility for identifying students with asthma. According to asthma program staff, this represents a significant, positive evolution in nurses’ attitudes.
- 73% (41) reported that at least one teacher approached them in 2007-08 to get asthma information or discuss a student’s asthma-related needs.

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<sup>6</sup> APS Asthma Program Survey of Nurses, spring 2008.

<sup>7</sup> Wheeler, L.S., Boyle, S. (2006) Attempting to Use a District-Wide Asthma Case Identification Ssystem for Asthma Prevalence. *Journal of School Health*, 76(6): 219-222. Wheeler, L.S., Boyle, S. (2006).

<sup>8</sup> Wheeler, L.S., Boyle, S. (2006)

## Improve Staff Knowledge, Awareness & Attitudes

The APS asthma program targets nurses, teachers, principals and other school and district staff for asthma education. The purpose is to activate all school personnel as allies and advocates for students with asthma.

### *School Nurses*

School nurses are the heart of APS' asthma program. Nurses are trained and provided with resources so they can deliver comprehensive school-based asthma care services and educate staff, students and families in asthma care prevention and management. High nurse turnover rates mean that the asthma program must continually offer a full spectrum of education services. In August 2007, 63 elementary school nurses new to the asthma program received training in asthma care best practices, absence tracking and how to implement the *Open Airways*® curriculum.

In November 2007, APS asthma program staff facilitated interactive educational sessions for 116 nurses and health assistants on symptom sign scores and management of asthma emergencies. They also provided continuing education at monthly meetings of all nurses in the district. In 2007-08 nurses received two sessions specific to asthma and one session on Medicaid and state insurance programs.

Nurse training and support activities are designed to facilitate the following asthma care best practices:

- establish contact with and provide asthma program information to parents/guardians of all asthma-identified students;
- gather information on all asthma-identified students through program checklists;
- educate students and family members in how to manage asthma on a daily basis, including coordination of *Open Airways*® education;
- develop Individual Health Plans for all asthma-identified students and Asthma Action Plans for all students with medication orders;
- address students' health care access and insurance needs;
- supervise proper medication administration;
- help schools establish asthma-friendly policies and plans;
- educate staff about asthma and asthma triggers;
- advocate for students' inclusion in school activities and for appropriate accommodations;
- collaborate to improve school environmental health;
- facilitate collaboration and communications with health care providers;
- assemble asthma materials and resources; and
- manage asthma episodes and emergencies.

Performing asthma care best practices has required nurses to expand their knowledge of asthma, take on new responsibilities, and become part of a systemic improvement process. Many nurses have had to conceptualize their job roles in new ways. APS program staff reported resistance from some school nurses. However, results from the Asthma Program Survey of Nurses suggest that most nurses have accepted their expanded role and value the impacts they see.

Overwhelmingly, nurses report that the APS asthma program has increased their knowledge, self-confidence and level of activity related to helping students manage asthma. Table 4 displays the percentages and numbers of elementary school nurses reporting agreement or strong agreement with each survey item.

**Table 4. Perceived Improvements in Elementary School Nurses’ Asthma-Related Knowledge, Confidence and Actions: Survey of Nurses, Spring 2008**

<b>As a result of the APS Asthma Program, elementary school nurses report they:</b>	<b>Percent</b>	<b>Number</b>
Know more about asthma	91	51
Know more about how to help students control their asthma	91	51
Feel more confident in their ability to help students with asthma	95	53
Do more to help students manage their asthma	89	47
Do more to educate <i>students</i> about asthma	91	51
Do more to educate <i>families</i> about asthma	85	47
Do more to educate <i>school staff</i> about asthma	93	51

Survey results also suggest that most school nurses have come to accept, and even embrace, their role as change agents at their schools. All but two nurses agree that school nurses should play a strong role in improving asthma awareness and management. All but three agree that nurses should play a strong role in improving school policies and practices that affect students with asthma. Many agree strongly, as shown in Table 5.

**Table 5. Nurses Attitudes About Their Roles: Survey of Nurses, Spring 2008**

<b>School nurses should play a strong role in:</b>	<b>Agree</b>		<b>Strongly Agree</b>		<b>Total Percent</b>
	<b>Percent</b>	<b>Number</b>	<b>Percent</b>	<b>Number</b>	
Improving asthma awareness and management at their schools.	52	29	45	25	96
Improving school policies and practices that affect students with asthma.	61	34	34	19	95

*Teachers and Other School and District Staff*

In 2007-08, the APS asthma program reached at total of 6,046 staff members with one or more of the following educational activities:

- *Asthma Basics* DVD-supported presentations which cover the importance of asthma, asthma symptoms, asthma triggers, basic treatment information, episode and emergency response procedures and key asthma program components;
- *Emergency information cards* on how to handle asthma episodes, distributed to APS bus drivers and food service employees; and
- *Web-based information & curriculum* on asthma management and emergency procedures, designed for PE teachers and coaches, including “The Coach’s Clipboard Program: Winning with Asthma.”

Most nurses responding to the spring 2008 Asthma Program Survey of Nurses agree that the program’s asthma education activities improved the knowledge and practices of teachers, principals and physical education instructors. Even more critically, nurses report the kinds of staff behaviors that create asthma-friendly schools. As shown in Table 6, 87% of nurses report that their school’s principal made sure staff had adequate time to receive Asthma Basics training. Almost three-quarters of responding nurses say that the physical education teachers at their schools have made adjustments so students can participate in P.E. activities. For example, P.E. teachers:

- Provided students with modified activities such as walking instead of running;
- Allowed students to run but monitored them to make adjustments if they went into their ‘yellow zone’; and
- Recognized warning signs and triggers and sent students to the health room with another student or called 911 as necessary.

**Table 6. Perceived Impacts on Staff Knowledge and Actions Related to Asthma: Survey of Nurses, Spring 2008**

<b>Nurses agree or strongly agree that:</b>	<b>Percent</b>	<b>Number</b>
More classroom teachers know about asthma	86	48
Teachers have made adjustments to help prevent asthma episodes.	53	29
The principal knows more about asthma	70	39
The principal made sure staff had adequate time to receive Asthma Basics training this year.	87	46
My school provided an adequate space for Open Airways classes this year.	89	48
The PE teacher knows more about asthma	77	43
The PE teacher at my school has made adjustments so students with asthma can participate in PE activities	71	40

Half of responding nurses (53%) report that teachers at their schools have made adjustments to help prevent asthma episodes. For example, teachers:

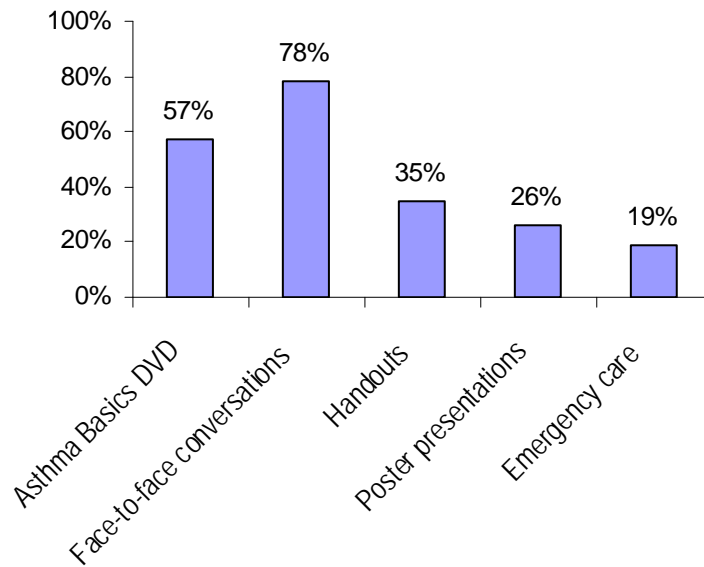
- Removed guinea pigs from an ISP classroom;
- Reduced or eliminated potentially allergenic substances used in classroom projects;
- Stopped using individual dry erase boards and/or chalk boards with erasers;
- Requested air quality checks of their classrooms;
- Stopped wearing perfumes;
- Put Individual Health Plans in their substitute teacher notebooks;
- Took students inhalers on field trips and outings;

- Reminded students to take medications before PE or helped students make decisions to stay inside on windy, dusty days; and
- Recognized asthma symptoms and send students to the health room more quickly and with accompaniment.

Reducing the incidence of asthma episodes reduces students’ time away from instruction. Nurses also note that health office visits decline as teachers learn about asthma management and support students in self-medicating and avoiding asthma triggers.

Face-to-face conversations and Asthma Basics DVD presentations are viewed by many nurses as the most effective approaches to raising staff awareness of asthma. Smaller percentages of nurses see handouts, poster presentations and emergency care as most effective. These results suggest that the program should continue to support nurses with an array of strategies and tools.

**Figure 1. Activities That Raise Staff Awareness and Percent Nurses Who Perceive Them As Effective: Asthma Program Survey of Nurses, Spring 2008**



## Improve Students' Asthma-Related Knowledge, Attitudes, Skills & Behaviors

Every year since 2003-04, APS has provided a six-session asthma education curriculum, called Open Airways®, for 3<sup>rd</sup> through 5<sup>th</sup> grade students with asthma. School nurses teach the classes. Participants are given handouts to take home for family education about asthma.

Over five years, 1,370 students at all 85 elementary schools have received Open Airways® asthma education.<sup>9</sup> In 2007-08, a total of 338 students at 84 schools participated.<sup>10</sup> Numbers per school ranged from one to ten students.

**Table 7. Numbers of Students and Schools Participating in Open Airways® Asthma Education: 2003-04 through 2007-08**

	2003-04	2004-05	2005-06	2006-07	2007-08	5-Year Total
Students	168	192	239	433	338	1370
Schools	18	36	54	84	84	85

The ALA Open Airways® questionnaire is designed to measure changes in students' asthma-related health care behaviors and attitudes. In 2007-08, a total of 323 children from 82 schools completed Open Airways® questionnaires at pre-test. Of these students, 296 completed post-test questionnaires.<sup>11</sup>

Questionnaire results indicate that the Open Airways® curriculum increased students' knowledge about asthma, asthma management skills, ability to talk to adults about asthma, and understanding of asthma triggers.<sup>12</sup> As shown in Figure 3, students increased their:

- knowledge about when and how much asthma medicine to take (questions 1 and 2);
- ability to talk to teachers about their asthma and about removing asthma triggers from the classroom (questions 9 and 10);
- ability to inform an adult and stay calm when asthma symptoms begin (questions 7 and 8); and
- ability to recognize asthma triggers and gauge the severity of asthma episodes (questions 3 4, 5, 11 and 12).

The increase in students' reported ability to remember what to do when wheezing or coughing (Question 6) approached statistical significance ( $p < .10$ ). A large proportion of students reported this ability on the pre-test (83%). Overall, about three-quarters or more of post-test respondents reported possessing essential asthma management knowledge and abilities by the end of the six Open Airways® sessions.

The three areas that students are most likely to find difficult even after the Open Airways® training are the ability to predict asthma symptoms (Question 3), the ability to identify triggers in

<sup>9</sup> The student total may include students who participated more than once and were counted each time.

<sup>10</sup> One school did not provide Open Airways education in 2007-08.

<sup>11</sup> Three schools, which provided Open Airways to a total of 15 students, did not submit pre-test data.

<sup>12</sup> Paired samples t-tests showed statistically significant gains on all questions but Question 6.

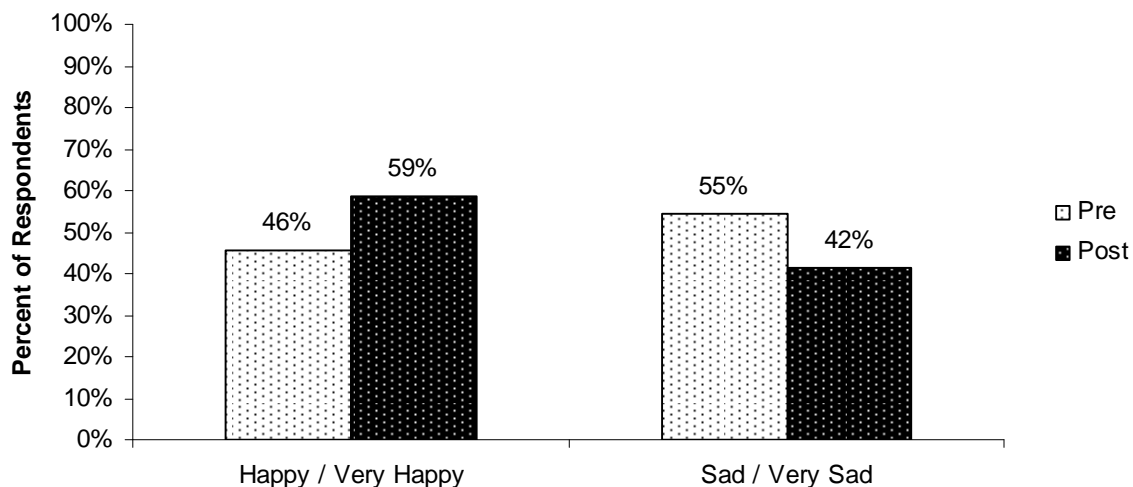
the school or classroom (Question 5), and the ability to talk to teachers about removing asthma triggers from the classroom (Question 10). This is true across all years of grant funding.

Results from the spring 2008 Survey of Nurses provide additional evidence of the program's impact on the health care knowledge, behaviors and attitudes of students and parents. Nurses say improvements stem not only from Open Airways® education but also from one-on-one educational opportunities. Nurses report:

- less use of rescue inhalers;
- more regular use of control and preventive medications;
- improved inhaler use;
- more students monitoring peak flows;
- more parents sending medications for use at school;
- more students accessing primary care provider support and gaining medications for controlling their asthma;
- fewer health room visits as students use techniques for controlling and preventing episodes;
- increased parent awareness and comfort with asthma management;
- increased student awareness of and ability to avoid triggers; and
- more students with doctors orders on file.

ALA questionnaire results and nurses' survey responses suggest also that Open Airways® education enhanced students' overall attitudes about having asthma. As seen in the figure below, the proportion of students expressing sadness about having asthma declined to under half (42%) at the conclusion of Open Airways® sessions, from over half (55%) at its start ( $p < .05$ ). Similar positive effects have been documented for every program year since 2003-04.

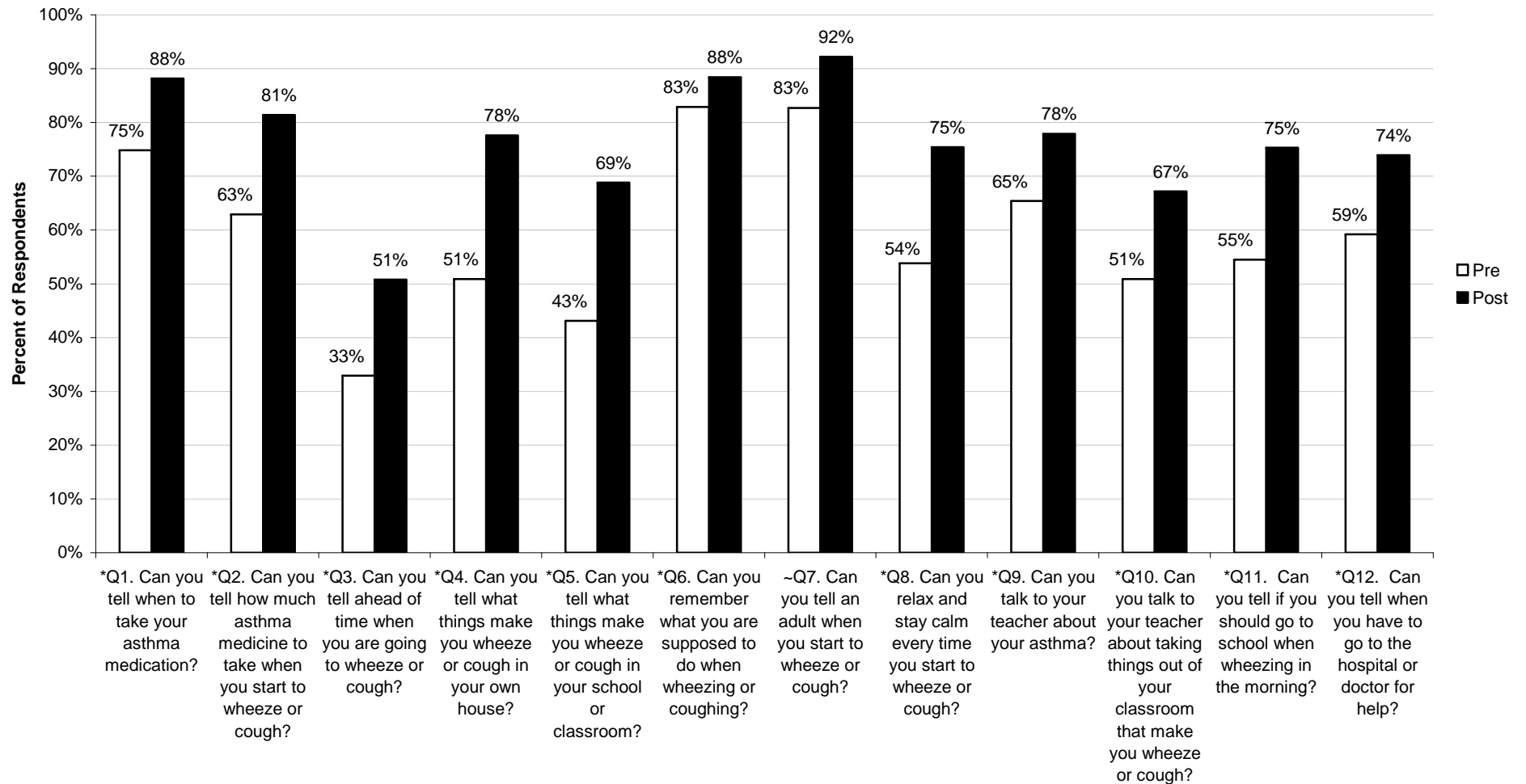
**Figure 2. Changes in How Students Feel About Their Asthma, Fall 2007**



Q13. Circle the face that shows how you feel about having asthma  
Source: Fall 2007 ALA Open Airways Questionnaire



**Figure 3. ALA Open Airways Questionnaire Results Fall 2007: Percent Respondents Answering “Can do it” (n=323)**

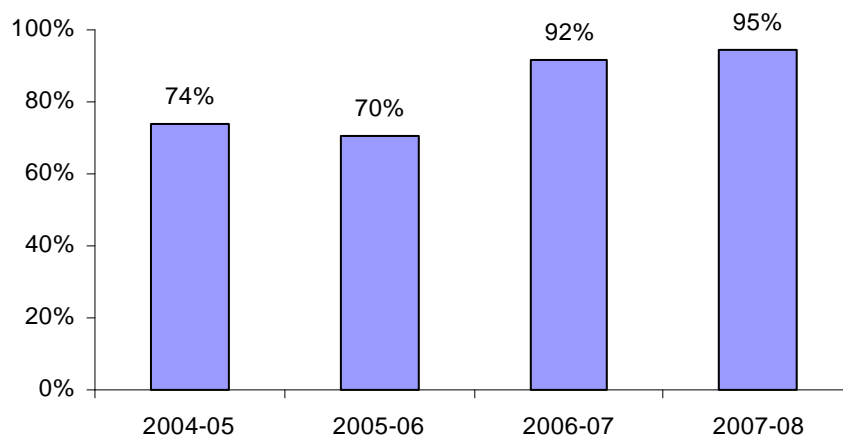


## Improve Health Care Access

One of the asthma program goals is to ensure that all students have access to health care. The proportion of students with a primary care provider (PCP) is therefore a key indicator of program success. At the beginning of each school year, nurses identify students without primary care providers and take actions to fill gaps in care, with support from asthma program staff. The asthma program updates data on primary care providers throughout the school year. The final number of students with a documented primary care provider is therefore considered evidence of asthma program impact.

In 2007-08, the proportion of students reported to have a PCP increased for the third year in a row, to a high of 95%. The increase appears to reflect real improvements in health care access, at least in part. Out of 725 students enrolled in the asthma program in both 2006-07 and 2007-08, eight were reported as not having a PCP in 2006-07. Program records show that seven of these eight students have PCPs in 2007-08.

**Figure 4. Percent Students in APS' Asthma Program With Documented Primary Care Providers: Years 2 – 5**



Source: APS Asthma Program Checklists

As shown in Table 8, missing PCP data decreased by three percentage points compared to 2006-07. However, comparisons between data provided in 2006-07 and 2007-08 for the same 725 students suggest that data inaccuracies and/or incompleteness may explain another part of the apparent increase in PCP rates.

- Out of the 36 students for whom the program lacked PCP data in 2006-07, 34 students had PCPs on record in 2007-08. It is impossible to know how much of the 94% improvement is due to actual gains in PCPs and how much is due to improvements in data collection.
- Out of the 681 students who had identified PCPs in 2006-07, 661 (97%) had PCPs in the asthma program's 2007-08 records, 3 were identified as not having a PCP and 17 had no PCP information. These results suggest that more could be done to confirm pre-existing PCP information.

**Table 8. Counts and Percents With Primary Care Provider, Years 2 – 5**

	Counts				Percents			
	2004-05	2005-06	2006-07	2007-08	2004-05	2005-06	2006-07	2007-08
Have a Primary Care Provider	780	864	1795	1686	74%	70%	92%	95%
Missing Data	247	348	144	77	24%	28%	7%	4%

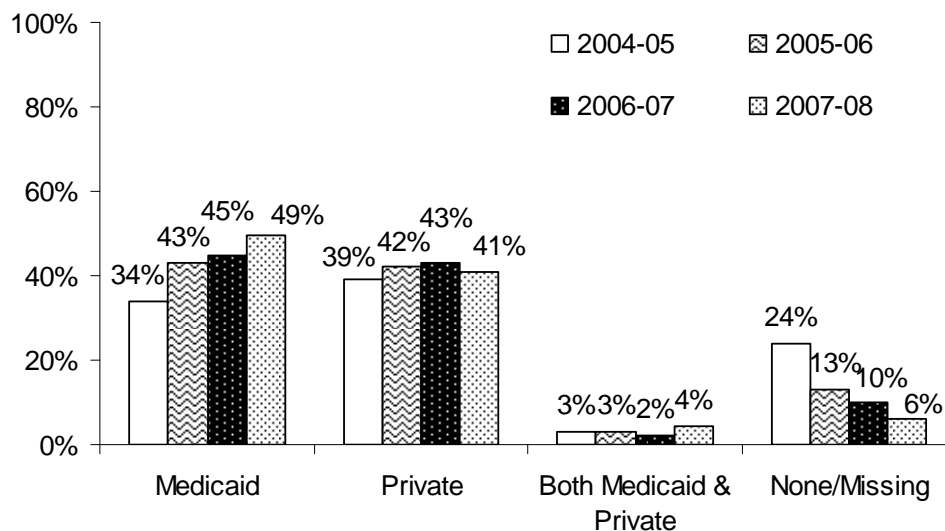
Source: APS Asthma Program Checklists

## Expand Health Insurance Coverage

Information collected about students' insurance suggests that the asthma program's efforts to ensure that every student has health care insurance coverage are succeeding. In 2007-08:

- Ninety-four percent of asthma program students are covered by insurance. This continues the steady upward trend from 76% in 2004-05.
- Six percent of asthma program students are uninsured.<sup>13</sup> This is lower than all previous years.
- The proportion of asthma program students without insurance is lower than the percent of uninsured children reported at both the state (17%) and national (11%) levels.<sup>14</sup>

**Figure 5: Percent Students With Insurance, by Type of Insurance, Years 2 - 5**



**Table 9: Insurance Status, Years 2 - 5**

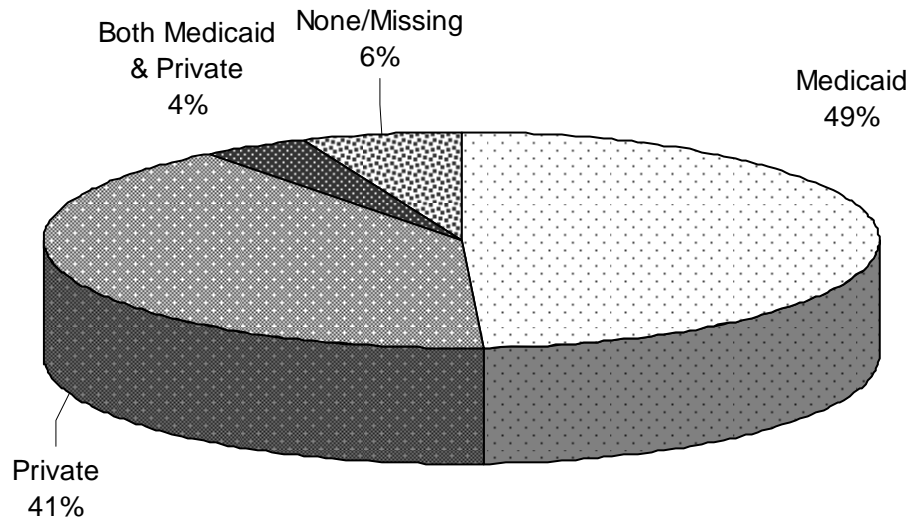
	2004-05		2005-06		2006-07		2007-08	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
<b>Total Insured</b>	<b>797</b>	<b>76%</b>	<b>1075</b>	<b>87%</b>	<b>1766</b>	<b>90%</b>	<b>1674</b>	<b>94%</b>
Medicaid	356	34%	525	43%	890	45%	874	49%
Private	407	39%	515	42%	841	43%	724	41%
Medicaid & Private	34	3%	35	3%	35	2%	76	4%
<b>Uninsured</b>	<b>255</b>	<b>24%</b>	<b>154</b>	<b>13%</b>	<b>196</b>	<b>10%</b>	<b>108</b>	<b>6%</b>
<b>Total</b>	<b>1052</b>	<b>100%</b>	<b>1229</b>	<b>100%</b>	<b>1962</b>	<b>100%</b>	<b>1782</b>	<b>100%</b>

<sup>13</sup> "Uninsured" includes missing data and those students marked "no" for both Medicaid and Private insurance.

<sup>14</sup> Annie E. Casey Foundation (2007). *Kids Count Data Center*. Retrieved May 16, 2008 from [http://www.kidscount.org/datacenter/profile\\_results.jsp?r=33&d=1&c=11&p=5&x=146&y=11](http://www.kidscount.org/datacenter/profile_results.jsp?r=33&d=1&c=11&p=5&x=146&y=11)

As shown in Figures 5 and 6, over half of students (54%) are on Medicaid insurance. Almost fifty percent report Medicaid insurance alone. This represents a continuing rise in Medicaid insurance, from 37% in 2004-05 and 47% in 2006-07. The increases may be due to APS nurse referrals. In 2007-08, elementary school nurses referred 599 students for Medicaid enrollment.

**Figure 6: Insurance Status of Students in the APS Asthma Program, 2007-08**



Source: APS Asthma Program Checklist, spring 2008

An analysis of students who were enrolled in the asthma program in both 2006-07 and 2007-08 increases confidence that program data reflect real improvements in health care insurance coverage. The analysis shows that:

- Only five of the 52 students without insurance in 2006-07 still lack insurance in 2007-08.<sup>15</sup>
- All three of the students without insurance data in 2007-08 had insurance coverage in 2006-07, suggesting that they may have been miscategorized.
- 21 students identified as not having insurance in 2007-08 were on record as having insurance in 2006-07. These students may have been miscategorized as well.

<sup>15</sup> This analysis includes 725 students enrolled in the 2007-08 program who were also enrolled in 2006-07.  
RDA/dh/121108

## Reduce Absenteeism Due to Asthma

Excessive absenteeism, even during early school years, is an important predictor of high school dropout rates. Attendance influences student learning and achievement, not just of individual students but of the entire student body.<sup>16</sup> Asthma is a leading cause of missed school days. On average, students with asthma miss an additional 2.5 days of school per year, according to one national study.<sup>17</sup> APS asthma program data indicate that APS students miss a little more than one day per year due to asthma. However, survey data collected in the spring of 2007 for an independent evaluation of APS' asthma program suggest a much higher level of asthma-related absenteeism. Eleven percent of middle school respondents reported missing school four or more times in the previous month. Another 30% missed school between one and three times in the previous month because of asthma.<sup>18</sup> For all these reasons, the APS asthma program defined reduction in absenteeism as one of its key goals.

The APS asthma program is relatively unique among programs funded by the CDC in defining student attendance as an outcome indicator. National studies describe many problems inherent in collecting reliable and valid absence data. Also, ascertaining the reason for each absence can be burdensome. Gerald, et. al. (2006) found that school absence records are biased by funding considerations and irregular record-keeping procedures. Their study concludes that parental self-reports of absences may be more accurate than school records. At the same time, they acknowledge that collecting data from parents is extremely difficult and time-consuming.<sup>19</sup>

Despite the challenges inherent in evaluating attendance, APS asthma program staffs persevered. Each year, they fine-tuned the program's approach and procedures for absence tracking. Prior to 2006-07, the asthma program relied on school nurses to collect both the occurrence of student absences as well as the reason for each absence. In the fall of 2006, nurses started using the school district's new student information system, SchoolMax, to identify the occurrence of student absences. Nurses continued to investigate the reasons for student absences.

In 2007-08 absence tracking procedures changed once again. The district's asthma program staff took responsibility for tracking absences via the SchoolMax student information system. School nurses were no longer expected to verify absences and reason codes. This change likely decreased the completeness and accuracy of absence data.

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<sup>16</sup> Epstein, J.L., & Sheldon, S.B. (2002), as cited in Hockert, C., Harrington, S., Vaughn, D., Kelly, K., & Gooden, J. (2005, Winter). Missing Out: Excessive Absenteeism Adversely Affects Elementary Reading Scores. *ERS Spectrum*.

<sup>17</sup> Wang, L.Y., Shong, Y., Wheeler, L., (2005, January). Direct and Indirect Costs of Asthma in School-age Children. *Preventing Chronic Disease*. Retrieved November 2007 from [http://www.cdc.gov/pcd/issues/2005/jan/04\\_0053.htm](http://www.cdc.gov/pcd/issues/2005/jan/04_0053.htm).

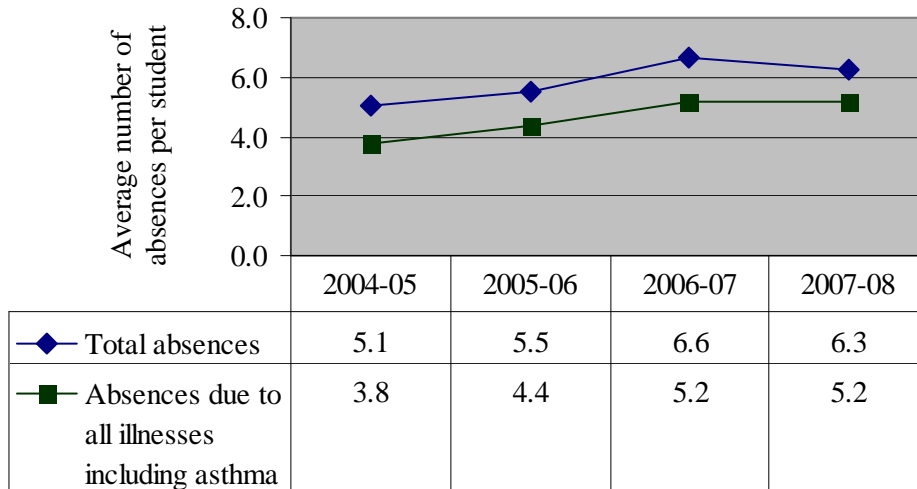
<sup>18</sup> Macro International (2008, February). *A Coordinated School Health Program for Asthma: Albuquerque Public Schools: Rapid Evaluation Final Report* (Centers for Disease Control Contract #200-2002-08562, Task 19).

<sup>19</sup> Gerald, L.B., Redden, D., Wittich, A.R., Hains, C., Turner-Henson, A., Hemstreet, M.P., Feinstein, R., Erwin, S., Bailey, W.C. (2006). Outcomes for a Comprehensive School-Based Asthma Management Program. *Journal of School Health*, 76(6): 291-296.

*Total Absences Per Student*

The average number of absences per student with asthma fluctuated in no consistent direction between 2004-05 and 2007-08, between a low of 5.1 and a high of 6.6 absences (see Figure 7). The range of absences per student was 1 to 45 days during the 108 day period studied each year.

**Figure 7. Average Number of Absences per Student With Asthma: Years 2 – 5**



*Absences Due to Illness*

A large proportion of asthmatic student absences were attributed to illness, and this proportion was relatively stable over time (see Table 10). Figure 7 shows the average number of absences due to illness per student per year, compared to the average number of absences for all reasons combined. For example, in 2007-08 the average student with asthma missed 5.2 days of school due to illness out of a total of 6.3 absences. In other words, 82% of absences were attributed to illness.

**Table 10: Proportion of Absences Due to Illness: Years 2 – 5**

2004-05	2005-06	2006-07	2007-08
75%	80%	78%	82%

*Absences Due to Asthma*

Identifying asthma-related absences is fraught with even more potential error than illness absences or total absences. Prior to 2007-08, reason codes were collected or verified by school nurses. In 2007-08, reason codes were entered into the APS student information system by school clerks. No accountability system supported complete or accurate reason coding.

It is not surprising, therefore, that only ten percent (176) of students with asthma had an asthma-coded absence in 2007-08, compared to 34% (725) in 2006-07. Nevertheless, the APS figure of 2.34 asthma-related absences per student is very similar to national figures.

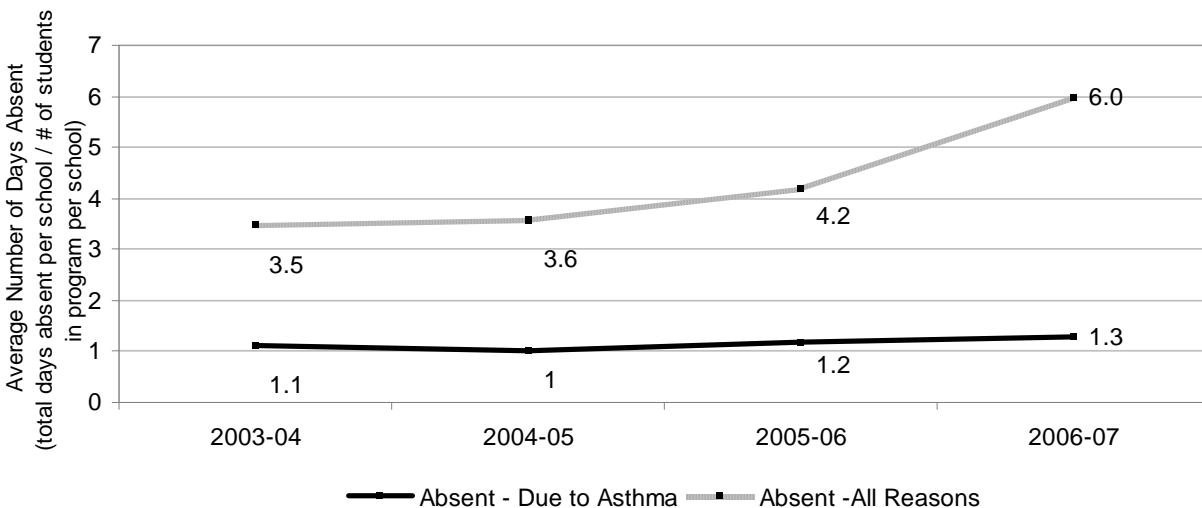
Nurses are split on the question of whether absenteeism changed during the course of the APS asthma program. Over half (54%) of nurses responding to the Survey of Nurses reported that students with asthma at their schools seemed to be absent about the same amount in 2007-08 compared to the previous year. Forty-four percent estimated that students were absent less often. These nurses cited the following possible reasons for attendance improvements:

- Better and more regular use of controller medications;
- Having a nebulizer in the health room;
- Increased availability of inhalers and medications at school and health staff support in using them;
- More knowledgeable students, parents and staff about triggers, medications, preventive actions, symptoms that require absences, and school support systems;
- Parent awareness of and confidence in school staff to help their children with asthma;
- Frequent communications with students, parents and health care providers; and
- Frequent outreach to parents to determine absence reasons.

### School-Level Absenteeism

School-level analyses of absenteeism prior to 2007-08 suggested that *total absences* of students in the asthma program had increased over time and *asthma-related absences* had remained fairly stable (see Figure 8). However, all APS asthma program evaluation reports emphasize the possibility that changes reflect data collection variations rather than actual changes in absenteeism.

**Figure 8: Average Number of Days Absent Over Time for All Reasons and for Asthma: Years 1 – 4**



Data collected in 2007-08 do not permit comparisons with school-level calculations performed for previous reports. However data from the first four years of the asthma program show no discernible pattern of effect.



- *Average school-level absences* among program students vary slightly from year to year, with no consistent upward or downward trend.
- The *range of average days absent attributed to asthma* is similar across program cohorts and years. Within each cohort, there are schools with asthma-related absences at or close to zero. Each cohort also has schools with average asthma-related absence counts close to 3 days per student.
- The *proportion of total absences attributed to asthma* changed over time from a high of 39% in 2003-04 to a low of 22% in 2006-07. However, this is largely explained by the fact that asthma-attributed absences stayed fairly steady while total absences increased each year.

As concluded by CDC-DASH officials, improving attendance is very difficult to do and hard to evaluate (Wheeler, L., Merkle, S., personal communication, September 10, 2007). Future efforts should consider the following recommendations:

- Calculate *excess days absent due to asthma* (the number of days absent due to asthma) by comparing percent total attendance of students with asthma to percent total attendance of students without asthma.
- Refine and reinforce procedures for establishing whether students have *current* asthma so that analyses are not confounded by the lower absence rates of non-asthmatic students.
- Study absence trends among asthmatic students with historically high absence rates.

## Conclusions

Evaluation results spanning five years suggest that the APS Coordinated School Health Program for Asthma is meeting its goal of “improving health outcomes and reducing absenteeism by raising awareness of asthma and ensuring that students have asthma care plans and access to primary care providers.”

In 2007-08 the proportion of students with a **primary care provider increased** for the third year in a row, to an all-time high of 95%. **Insurance coverage increased** progressively each year also, from 76% in Year 2 to 94% in Year 5. With access to health care and medications, students are better able to manage their asthma, prevent asthma episodes and emergencies, minimize absences, and enjoy good health.

One source of improved asthma management and control is **student and parent education** about asthma. Over five years, 1,370 students at all 85 elementary schools have received asthma education classes, and materials to share with parents. Each year, students have shown statistically significant improvements in knowledge about asthma, self-management skills, ability to talk to adults about asthma, understanding of asthma triggers, and attitudes about having asthma. Nurses report that parents also are better informed and are more likely to send medications to school.

Another source of improved asthma management and control is **improved nursing practice**. Overwhelmingly, elementary school nurses report that the asthma program has increased their knowledge, self-confidence and level of activity related to helping students manage asthma. Survey results also suggest that most school nurses have come to accept, and even embrace, their role as asthma advocates and change agents at their schools.

**Teachers, too, are more knowledgeable about asthma** and are taking action to create asthma-friendly schools. Nurses report that teachers are removing asthma triggers, modifying P.E. activities, carrying inhalers on field trips, assessing and addressing warning signs, and reminding students to take medications before P.E. or recess.

**Conclusions about the program’s impact on absenteeism are harder to draw.** The average number of absences per student with asthma fluctuated in no consistent direction between 2004-05 and 2007-08, between a low of 5.1 and a high of 6.6 absences. The proportion of absences attributed to illness was fairly stable across years (around 80%), which might suggest that the program had little effect if any on absenteeism. However, changes in the way absence data were collected from one year to the next may obscure real improvements. Forty-four percent of nurses surveyed in the spring of 2008 estimate that students were absent less often in 2007-08 than in the previous year. They cite improvements in students’ use of medications; parent awareness and trust in schools’ asthma supports; and communications among parents, students and providers; among other improvements.

The marked drop in the number of absences with asthma reason codes in 2007-08, compared to all previous years, suggests at least two things. First, data accuracy likely declined in 2007-08. Second, nurses played a vital role in ensuring data accuracy and completeness. Any future efforts

to evaluate the program's impact on absenteeism may depend on finding ways to fill the role nurses played prior to 2007-08.

Student enrollment in APS' asthma program fluctuated significantly from year to year. The overall proportion of students enrolled in the program each year held fairly steady at four percent. However, school-level asthma identification rates varied widely from year to year. In addition, there appears to be significant mobility in and out of the program from one year to the next. Fewer than half of 3<sup>rd</sup> through 5<sup>th</sup> grade students enrolled in 2007-08 were also enrolled in 2006-07. As documented nationally, parent under-reporting coupled with variations in nurses' case identification and reporting practices may be responsible.

APS' new five-year grant from the Centers for Disease and Control and Prevention provides a perfect opportunity to expand upon successes and address challenges identified in the first five-year grant period. Lessons have been learned that will facilitate the development of more consistent data collection procedures. Reliability and validity weaknesses have been identified and will be addressed as possible by program managers and evaluators. Those that cannot be addressed directly will be factored into the evaluation design. One option given the large size of the APS district may be to conduct case studies. This could permit a deeper study of project implementation and outcomes, as well as greater control over data reliability and validity. Case studies also could permit pilot testing and refinement of new data collection procedures before expanding to all schools.

One key lesson is that data collection procedures need to facilitate better analyses at the student level, so that the outcomes of students with moderate to severe asthma can be compared to those of students without asthma, to students with less severe asthma, and/or to students' own previous experience. Another lesson is that data should be collected more reliably to measure changes from the start to the end of the school year. For example, how many students started the school year without a PCP or health insurance but had them by the middle or end of the school year? An ongoing collaboration between the Health and Wellness department and Research, Development and Accountability department should enable answers to some or all of these questions.

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