

February 2008

Asthma and the School Environment in New York State



**Findings and
Recommendations
from the New York
State Department
of Health
Environmentally-
Based School
Asthma Initiative**

Center for Environmental Health
New York State Department of Health

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Findings and Recommendations from the New York State Department of Health Environmentally-Based School Asthma Initiative

Asthma is the most common chronic illness among school age children nationwide and in New York State (NYS). Asthma can affect the lives of children and their caregivers in many ways, but when properly controlled, children with asthma can lead full and active lives. Children spend a large proportion of their day in schools, where they may be exposed to potential environmental asthma triggers such as mold, dust mites, cockroach allergens, pet allergens, cleaning chemicals, and diesel exhaust. Therefore, school-based asthma management, which includes management of the school environment, becomes an important ingredient in the lives of children with asthma.

The primary purposes of the New York State Department of Health (NYSDOH) Environmentally-Based School Asthma Initiative were to

- Gather information about asthma and asthma management in school-age children
- Collect information about the school environment and policies relating to school indoor air quality (IAQ)
- Inform schools and stakeholders who work with schools about these findings so that they are better able to take the steps necessary to make NYS schools more “asthma friendly”

This report summarizes information obtained from: 1) existing data from a study of asthma hospitalization among school age children by school district, and a survey of school building conditions and 2) new data from surveys of schools nurses, school custodians, and school district facility managers conducted by the NYSDOH. The findings described in this report highlight areas of strength as well as the remaining challenges of managing asthma and associated environmental factors in the school setting.

Asthma and Asthma Management

Asthma Hospitalizations in NYS:

While child asthma hospitalization rates across all socioeconomic and demographic groups declined statewide from 1991 to 2001, possible increasing trends were seen in a few school districts for the last two to three years of this time period, and rates in some school districts were higher than the statewide average of 27 hospitalizations per 10,000 children. Asthma hospitalization rates were higher in urban than in suburban or rural school districts, and in districts with high levels of poverty. They were also higher in younger children than in older children, suggesting that the impact of severe or poorly-managed asthma is greater in elementary schools.

Asthma in NYS elementary schools, excluding New York City (NYC):

Information on asthma prevalence, morbidity, management and education in the school setting was obtained through a survey of school nurses conducted in the spring of 2003. Findings from this survey estimate that 8.5% or 52,605 of the children in surveyed elementary schools have asthma and that this percentage increased with grade level. This represents a substantial number of children whose quality of life at school is potentially impacted by asthma. For instance, among these students, two-thirds visited the health office for asthma symptoms, about a quarter missed at least one day of school due to asthma, and about one out of every five had physical activity limitations because of asthma symptoms.

Environmental Conditions, Programs, Practices and Policies in NYS Schools, excluding NYC

General school building conditions:

Most NYS school buildings are in satisfactory condition overall as reported in the NYS Education Department's Building Condition Survey that was conducted in 2000, but about one-third reported having problems with at least one building system that has the potential to affect students or staff with asthma. Systems potentially related to asthma that were reported as less than satisfactory in more than 10% of schools included windows, floor finishes, roofing, and the ventilation system. Unsatisfactory condition of the first three of these four systems in school districts was associated with higher district asthma hospitalization rates.

Specific environmental conditions, programs, practices and policies relevant to school indoor air quality:

Many NYS elementary schools take actions that help to maintain and improve school IAQ. In a survey of custodians in non-NYC public elementary schools conducted in 2003, most reported that floors and carpets are cleaned frequently, and that schools have a preventative maintenance plan in place, regularly change air filters, air out newly painted areas, have measures to limit dust and fumes from construction, and practice integrated pest management (IPM). These activities are important for controlling dust-borne allergens and air-borne chemical contaminants that could make asthma worse.

Despite these practices, many environmental asthma triggers and the conditions that promote them are common in elementary schools. Almost all (99%) schools reported dust or reservoirs of dust in classrooms, 84% reported mold or moisture problems, 42% reported potential exposure to diesel exhaust, and 40% reported pets in at least one classroom. In addition, some policies and practices designed to improve school IAQ are not being implemented in the majority of schools, including anti-idling policies to limit diesel pollution, and airing out of new carpets and use of green-rated cleaning products to limit pollution from chemical contaminants. Formal IAQ programs were reported in only a quarter of these schools. Additionally, many custodians either didn't answer or were unsure about questions related to anti-idling policies and use of IAQ programs, suggesting a possible disconnect between implementation of policies at the school and district levels.

To further explore this potential disconnect, as well as to find out more about district-level programs, practices and policies relating to IAQ, a separate survey of district facilities managers in NYS public school districts (excluding NYC) was conducted. Comparing this school district information to elementary school information from the custodian survey, in school districts reporting a district-wide IAQ program only about one-third of elementary schools from the custodian survey also reported having such a program. Additionally, in school districts who reported limiting school bus idling, using green-rated cleaning products, or airing out new carpets, less than half of the corresponding elementary schools from the custodian survey reported such practices.

Other findings from the district facilities managers survey indicated that while key IAQ practices, such as IPM and controlling pollution from construction, new carpets, and new paint were followed in over two-thirds of surveyed districts, only 47% reported having a formal IAQ program, and many did not use green-rated cleaning products or have policies to reduce diesel pollution.

Actions and Recommendations

- The NYSDOH has summarized the findings from the Environmentally-Based School Asthma Initiative in this report to provide administrators, maintenance staff, school nurses, and other key players inside and outside of NYS schools with a context for thinking about ways that they can improve school-based asthma management, including management of their indoor air quality.
- The NYSDOH has provided feedback and referrals to school districts with potentially increasing asthma hospitalization rates. The NYSDOH has also provided referrals for indoor air quality issues that are of concern to school districts.
- The NYSDOH will continue to track childhood asthma hospitalizations by school district over time as more recent data become available. Emergency department data are now also available, expanding the opportunity to track trends in asthma outcomes.
- The NYSDOH will continue to track school environmental data over time using the Building Condition Survey, which is conducted every five years. NYSDOH has worked with the NYS State Education Department to add questions about school indoor air quality (IAQ) to the 2005 version of this survey. Future data analysis will incorporate this information. Efforts are also being made to acquire information about NYC schools.
- School nurses should have informational resources to help them manage asthma, including updated clinical practices and trigger reduction information. The NYSDOH will work with interested stakeholders, including the NYS School Nurses Association, to provide resources and support to school nurses.
- School health offices can begin to explore and develop methods to track asthma health endpoints in the school setting to better assess asthma severity in students and to inform asthma management strategies to reduce the number of students significantly impacted by their asthma. The NYSDOH is currently conducting a pilot project in selected school-based health centers to achieve this goal (p. 33 of this report).
- To better manage asthma, school health offices can explore ways to increase the proportion of children with asthma having a written asthma management plan at school. They should also consider using school-based asthma self-management programs such as Open Airways for Schools.
- Schools can take steps to increase awareness among custodians, teachers and other staff about the potential for school environmental conditions to affect the health of students and staff, and can provide training and resources to support custodians in taking action to improve indoor air quality.
- Using the information and resources contained in this report as a guide, schools and school districts can explore the possibility of developing sustainable programs that incorporate low-cost strategies to improve and maintain good IAQ. These programs should ideally include an IAQ coordinator and an IAQ team representing all parties with the potential to impact school IAQ. The NYSDOH is currently developing a pilot project involving 5-10 schools to identify barriers to implementing and sustaining good IAQ practices and to help in addressing these barriers.
- Communication between districts and schools within the districts needs to be ongoing to ensure consistent implementation of good IAQ practices.

What is asthma?

Asthma is a chronic, inflammatory disorder of the tubes (or airways) that carry air in and out of the lungs. For people with asthma, the inside walls of the airways are inflamed or swollen and this can make the airways very sensitive. When people with asthma are exposed to something that they are allergic to or find irritating, the walls of their airways react by becoming inflamed and by producing more mucous. The inflammation and the extra mucous makes the airways narrower. When the airways become narrower, less air passes through to the lungs. This reaction is called an asthma attack and may also be referred to as an asthma episode or asthma exacerbation.

During an asthma episode, a person with asthma may experience wheezing, difficulty breathing, coughing, chest tightness or other symptoms. If severe, these symptoms can lead to low blood oxygen and even, in rare cases, death. The severity of an asthma episode may vary from person to person and from episode to episode. Anything that contributes to or causes an episode is called an asthma trigger. Common asthma triggers include exercise, infections or illnesses (colds, flu, etc.), allergens (pet dander, molds, dust, etc.), irritants (such as certain chemicals), weather (extreme temperatures) and emotions (stress, laughter). Not every person with asthma will have the same triggers.

There is no known cure for asthma. However, many people with asthma are able to control their asthma and lead active and healthy lives. The projects described in this report were conducted to learn about asthma and asthma triggers in the school setting.

Why is it important to learn about asthma in the school setting?

Because of asthma's impact on school-age children and the potential impact of school environmental conditions on students with asthma, it is important to learn about asthma and environmental conditions related to asthma in the school setting. Approximately 291,000 school-age children in New York State (NYS) have asthma, and among them, about 192,000 are of elementary school age.¹ Asthma is the most common chronic illness among children in the United States and is also the leading cause of absenteeism among elementary school children, accounting for 14.7 million days of school missed in 2002.² A recent survey found that 51% of school nurses feel that asthma is more disruptive to school routines than other chronic conditions.³ At the same time, children spend a large part of each day in and around school buildings where they may be exposed to environmental conditions that either cause asthma or make it worse. Many features of school buildings and classrooms can affect students with asthma by increasing exposure to potential environmental asthma triggers, including mold, dust mites, cockroach allergens, cleaning chemicals, and diesel exhaust.⁴⁻⁹ (see Appendix A). According to a national report, 18% of U.S. schools have poor indoor air quality (IAQ) and 26% report poor ventilation.¹⁰

Some Important Asthma Terms

Airways: The tubes that carry air in and out of the lungs.

Asthma: A chronic, inflammatory disorder of the airways in which people may experience wheezing, difficulty breathing, coughing, chest tightness and other symptoms.

Asthma attack (also called an episode or an exacerbation): An asthma attack occurs when a person's asthma symptoms are worse than usual. This is usually in response to an asthma trigger.

Triggers: Asthma triggers are different for every person with asthma and include anything that makes asthma symptoms worse. Common asthma triggers include exercise, infections, allergens, irritants, weather and emotions.

What is the NYSDOH Environmentally-Based School Asthma Initiative?

The NYSDOH Environmentally-Based School Asthma Initiative is based in the Bureau of Environmental and Occupational Epidemiology at the NYSDOH Center for Environmental Health and is part of the CDC-funded National Asthma Control Program Cooperative Agreement. Its purpose is to describe the problem of asthma in the context of the school setting, with a focus on environmental factors. Information from this project is being used to provide feedback to schools, organizations and agencies interested in creating “asthma-friendly” schools and to support the development of targeted environmental interventions.

This report summarizes the findings from the following five components or projects of the Environmentally-Based School Asthma Initiative designed to provide the information listed below:

- **NYS Childhood Asthma Hospitalizations by School District (1991-2001)**
 - District hospitalization trends over time
 - Hospitalization rates by socio-demographic characteristics of school districts
- **The NYS Education Department 2000 Building Condition Survey**
 - The overall condition of NYS school buildings
 - The building systems with the most problems
 - The usefulness of this database to evaluate environmental conditions potentially related to asthma and questions that might be incorporated into future surveys
- **The NYS Department of Health Survey of NYS Elementary School Nurses***
 - Asthma prevalence and morbidity
 - Asthma management and education programs
 - Nurse impressions of the school environment
 - Nurse knowledge about asthma triggers
 - Asthma educational needs and obstacles to asthma management
- **The NYS Department of Health Survey of NYS Public Elementary School Custodians***
 - School environmental conditions and triggers in these schools potentially related to asthma
 - School-based policies, programs, and practices impacting indoor air quality
- **The NYS Department of Health Survey of District Facilities Managers in NYS Public School Districts***
 - District-wide policies, practices and programs relating to school IAQ
 - Differences between implementation at the district level and at the school level as reported from the Survey of Custodians

Projects marked with an asterisk (*) involved collection of new data, unique to the NYSDOH School Asthma Initiative. The other projects used existing datasets.

Who should read and use this report?

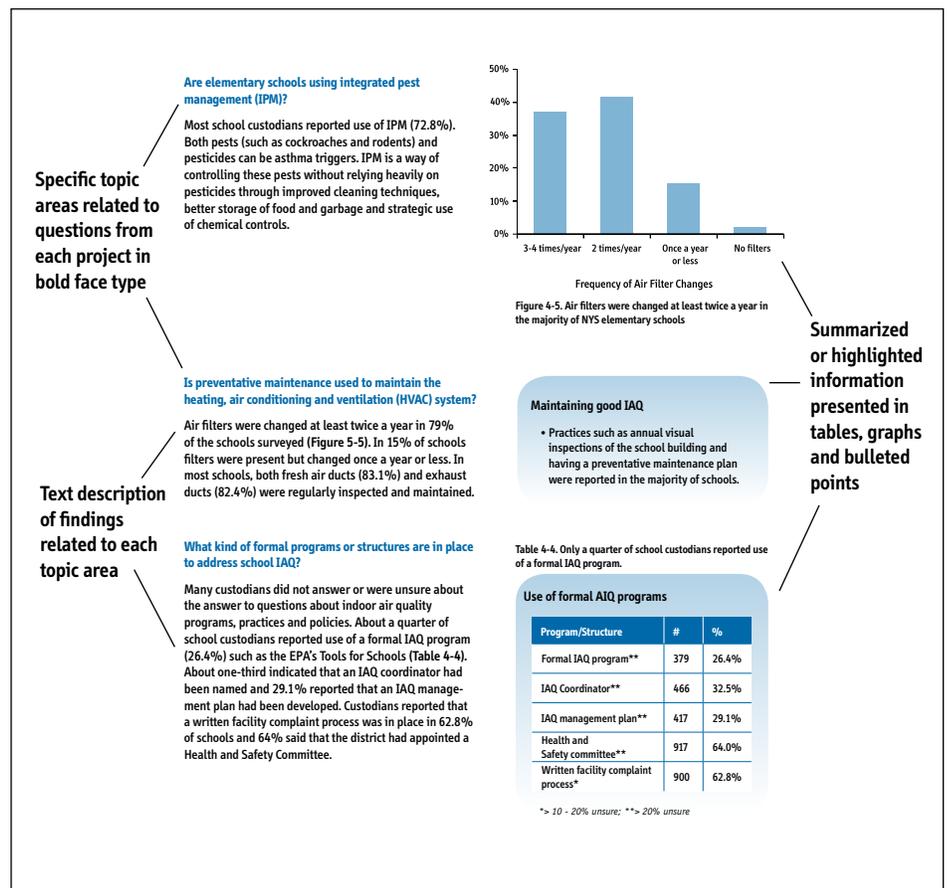
Though designed primarily for use by school or district personnel across NYS, this report contains information that may be useful for many different people or organizations.

School or district employees who may find this report useful:

School Nurses
 School Custodians
 Buildings and Grounds Staff and Administrators
 Classroom Teachers
 P.E. Teachers
 School Principals
 District Superintendents or Other Administrators

Others who may find this report useful:

Parents and guardians
 Members of Local School Boards or BOCES
 Individuals or organizations interested in the management of childhood asthma
 Individuals or organizations interested in school health and school health policies
 Individuals or organizations interested in environmental health



How is this report organized?

A separate section of this report is dedicated to each of the five projects described above. Each section consists of:

- An introduction and general description of the methods used
- Findings
- A summary and bulleted highlights
- Recommendations for future action
- Strengths and limitations of the project
- A list of resources relevant to the findings and recommendations

Detailed descriptions of findings can generally be found in the text along the left hand side of each page, and highlighted or summarized information along the right hand side of each page (see example page shown).

A comprehensive list of resources cited throughout the report together with descriptive summaries of each resource can be found at the end of this report. A glossary of key definitions, concepts, and organizations, a list of references and some sample asthma management materials are also provided.

What are some strengths and weaknesses of the projects described in this report?

The projects described in this report cover a wide range of asthma-related topics and consider asthma in NYS schools from a variety of perspectives. Many of these topics are addressed by more than one project, providing a broader sense of the problem of school asthma. All of this information was gathered from relatively large statewide samples or from existing large datasets.

However, it is important to highlight some of the limitations of the information used in this report and to keep these limitations in mind when interpreting the findings. They are as follows:

- Most of the projects described in this report did not collect information from New York City schools. Therefore, findings are not always representative of the entire state.
- Three of the projects were surveys sent through the mail and participation was voluntary. Therefore the schools and districts that chose to participate in these surveys may be different from schools or districts that chose to not participate in ways that cannot be measured. In the school nurse and school custodian surveys, participating schools appear to be representative of all NYS schools in terms of factors related to asthma such as poverty, race and urbanicity, but it is possible that if the same information had been gathered for every single NYS school and school district, some of the study findings would be different.
- The school nurses, school custodians and district facilities managers who completed these surveys may have interpreted questions in different ways. For example, answers to questions about the number of students with asthma in the nurse survey may not be consistent since it is possible that nurses used different criteria to decide who had asthma. Additionally, the answers given by nurses, custodians and district facilities managers may have been influenced by the amount of knowledge they had about a particular subject and/or the quality of record keeping at each school. For example, in the custodian survey, many custodians did not know whether certain environmental policies or programs existed in their school.
- When comparing results across these projects it is important to note that the data was collected at different points in time and with different scales (schools vs. school districts, for instance), that some of the environmental data is general in nature rather than describing a specific environmental condition that could be making asthma worse, and that the data on asthma hospitalization rates does not represent all children with asthma. Therefore, it is beyond the scope of these studies to draw firm conclusions about relationships between patterns of asthma and the school environment. Additionally, since all of this information was collected at the population level, it should not be used to make conclusions about individuals (either individual students or individual schools).

Despite these limitations, the collective findings from this initiative represent a unique effort to characterize asthma in the context of the school setting and related school environmental conditions. The findings, recommendations and resources contained in this report can serve as a resource for policymakers, schools and school districts to motivate and assist their efforts in creating asthma-friendly learning environments across NYS.

Where can I find additional information?

Additional resources and educational materials related to asthma, asthma management, asthma education, school environmental conditions or school environmental policies are listed at the end of each section of this report. For more information about the specific projects described in this report, contact:

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What was the purpose of the study?

The purpose of the study was to describe patterns of childhood asthma hospitalization in NYS school districts over time, by geographic location, and by demographics.

Who and/or what did the study include?

Researchers looked at NYS hospital admission records from 1991-2001 to identify hospitalizations associated with a principal diagnosis of asthma (ICD-9 code 493). All asthma hospitalizations for NYS children between 5 and 18 years old during the 11-year period were used in this analysis. Hospitalizations were counted as events, meaning that a child who was hospitalized three times during the study period would contribute three hospitalizations to the total count of child hospitalizations.

What does it mean to look at hospitalizations by school district?

Researchers used a technique called geo-coding to match patient addresses obtained from the hospital records to public school districts, based on the physical location of the address and the boundaries of the school district. In other words, children were “assigned” to a public school district based on where they lived at the time of their hospitalization.

How were asthma hospitalization rates calculated?

Rates were calculated by looking at a specific time period and dividing the number of childhood hospitalizations for asthma by the number of children in the population. For example, yearly rates were calculated by dividing the number of hospitalizations in a year by that year’s population. Rates are expressed as the number of hospitalizations “per 10,000” children in the population. Rates were also calculated for various subgroups (or demographic groups) of children. Information about gender, age and race was obtained for each child from hospitalization records. For other characteristics, like type of location (urban, rural, or suburban) and school district poverty level, each child was assigned the characteristics of the population in his or her location or school district, respectively. NYS population information was obtained from U.S. Census data and the numbers for most years are estimates that are based on 1990 and 2000 census counts.

KEY POINTS: NYS Asthma Hospitalizations by School District Project

- Study included school-age children (aged 5-18 years) living in NYS.
- Looked at hospital admission records over an eleven year period (1991-2001).
- Defined an asthma hospitalization as any hospitalization record with a principal diagnosis of asthma (ICD-9 code 493).
- All records of asthma hospitalization were matched to a school district, using the address associated with the hospital discharge record.
- Rates were calculated by dividing the total number of asthma hospitalizations for children 5-18 years old by the whole 5-18 year old population of the same location over the same time period.

Overall, what is the asthma hospitalization rate for children in NYS?

An overall decreasing trend was seen in the asthma hospitalization rate among children from 1991 to 2001 with a peak in 1993 (34/10,000) and the lowest point (18/10,000) in 2001 (Figure 1-1). The 11-year (1991-2001) average asthma hospitalization rate for children aged 5-18 years in all of NYS was 27 per 10,000 children. In other words, for every 10,000 children living in New York State, 27 children were hospitalized for asthma each year. For a population of 3-4 million children, this is roughly 8,100-10,800 asthma hospitalizations per year.

Rates for subgroups of children followed the same decreasing trend as the overall rate. Rates were higher among blacks and children of other races than among whites over most of this time period. Rates were also higher for boys than for girls.

For a few school districts, rates for the last two or three years of this time period increased.

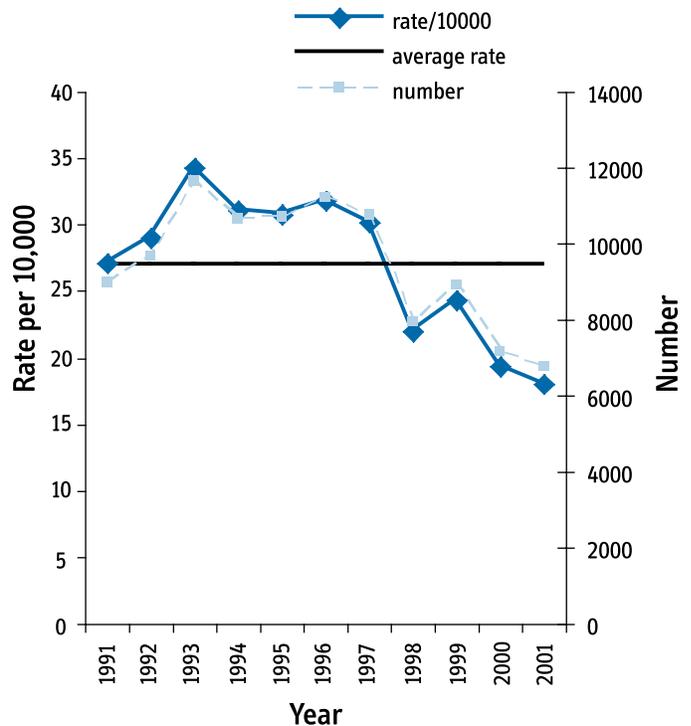


Figure 1-1. Asthma hospitalization rates for NYS children declined between 1991 and 2001.

Are asthma hospitalization rates different for older and younger children in NYS?

Asthma hospitalization rates varied by age among children in NYS. Younger children (aged 5-9 years old) had higher rates than children in the older age groups (Figure 1-2). Average asthma hospitalization rates for the 11-year period were 38 per 10,000 for the 5-9 year old age group, 24 per 10,000 for the 10-14 year old age group and 16 per 10,000 for the 15-18 year old age group.

The average age of a child hospitalized for asthma during the 11-year period was 10 years old. These findings suggest that the impact of asthma hospitalization is greater in elementary schools than in middle schools or high schools.

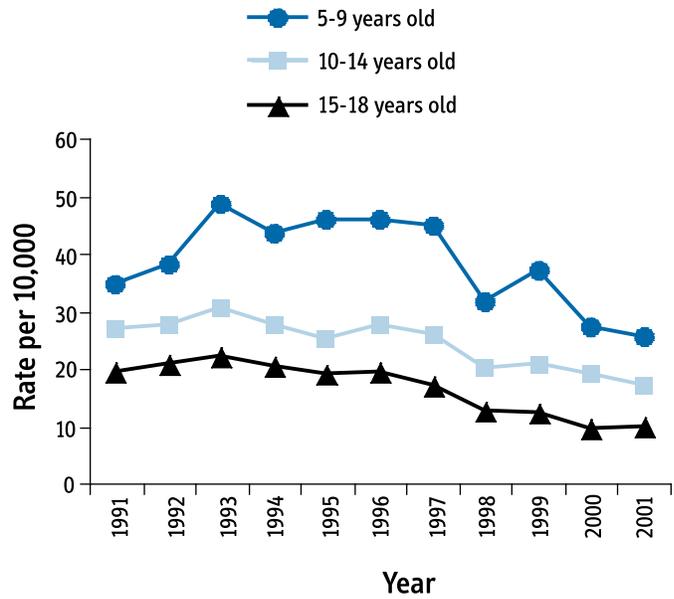


Figure 1-2. Younger children had higher rates of asthma hospitalization than older children.

Do these hospitalization rates vary in school districts across the state?

Asthma hospitalization rates were highest in NYC, followed by large cities such as Syracuse and Buffalo, and other smaller cities. Rates were lowest in suburban and rural communities (Figure 1-3).

Of the 716 school districts in NYS, 48 had average asthma hospitalization rates above the statewide average. NYC school districts had the highest rates in the state before taking race into account. Asthma hospitalization rates vary according to race, so the racial composition of school districts was taken into account to appropriately compare different locations. This adjustment for racial composition didn't change the number of hospitalizations in a given school district, but caused the hospitalization rate to decrease in most NYC school districts and to increase in some of the upstate school districts.

Overall, children in more urban areas seem to experience higher rates of asthma hospitalization. This is partially explained by variation in other characteristics, such as race and poverty (Figure 1-4), that may also be related to asthma prevalence.

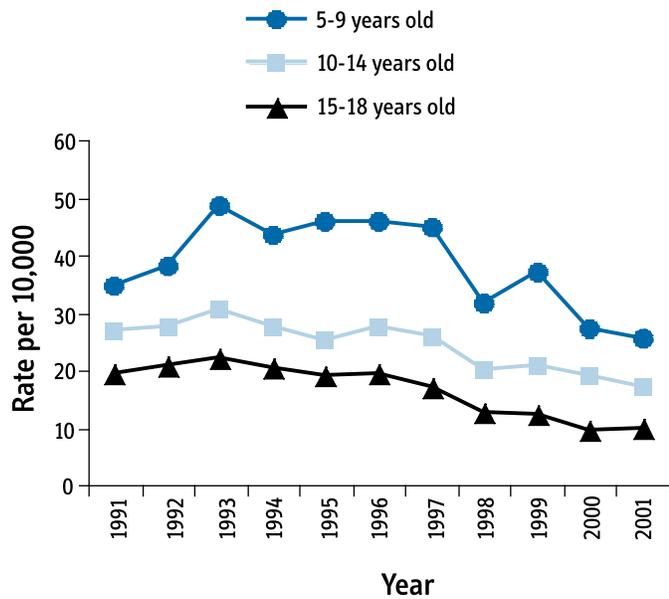


Figure 1-3. Asthma hospitalization rates for children were higher in NYC and other large cities as compared to rural or suburban areas.

How does this rate vary by the economic status of school districts?

Asthma hospitalization rates varied according to economic status. In school districts where more than 75% of students were enrolled in a program to receive free or reduced-price lunches (FRL), a measure of poverty, asthma hospitalization rates were consistently higher than in school districts with fewer students enrolled in this program (Figure 1-4).

In summary, the demographic and economic groups at higher risk for asthma hospitalizations in this study were the youngest children (5-9 years old), boys, children with a lower socio-economic status, non-white races and those living in an urban area or NYC. Some of these findings are hard to interpret since characteristics like race, living in an urban area and poverty may all be related to each other. For example, differences in asthma hospitalization rates between racial groups may be partially explained by differences in their economic status or location which are also related to asthma hospitalization rates.

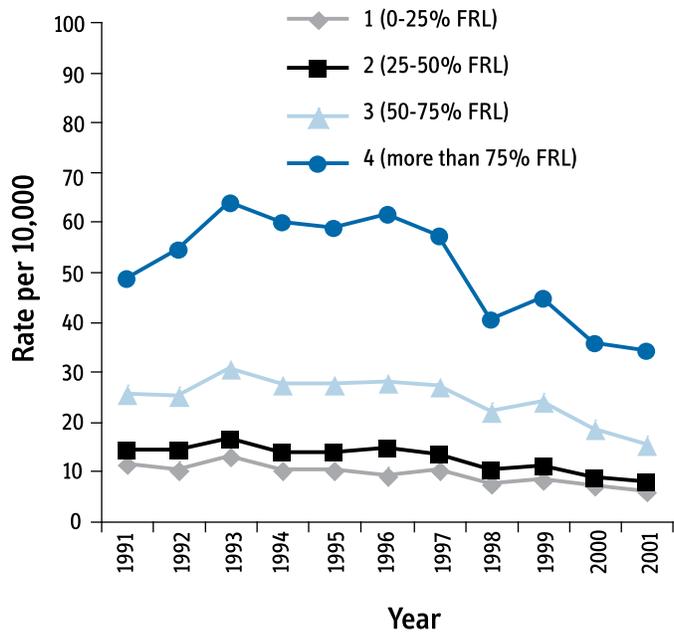


Figure 1-4. Children in school districts with a lower socio-economic status had higher rates of asthma hospitalizations than children in districts of higher socioeconomic status from 1991 to 2001.

What is the average length of stay for a child hospitalized for asthma in NYS?

From 1991-2001, the average length of stay (LOS) for a child hospitalized for asthma in NYS was about 3 days (Table 1-1), but ranged from 1 day to 224 days.

The average LOS was similar across different groups of children (Table 1-1). On average, girls and older children stayed slightly longer in the hospital than did boys and younger children. White children, on average, had slightly shorter LOS than black children or children in other race categories.

Summary

Hospitalizations for asthma among school age children in NYS were examined statewide and also by school district from 1991 to 2001. Statewide asthma hospitalization rates have declined by about 33% since 1991, and this is reflected in each demographic and economic group. Asthma hospitalization rates were higher in young children (5-9 years old), boys, and children of non-white race. These hospitalization rates were also higher in school districts located in an urban area or in NYC, and in districts with higher levels of poverty. Some NYS school districts had asthma hospitalization rates that were higher than the statewide average of 27 per 10,000 children, and a few showed a possible increasing trend over the last few years of the study period despite the decrease in hospitalization rates statewide. For the latter districts, additional years of data are needed to confirm a possible upward trend. The overall length of hospitalization was about three days. Length of hospital stay has implications for school absenteeism.

Note: Asthma hospitalization rates were also analyzed by school district in conjunction with findings from the Building Condition Survey, a general measure of school environmental conditions (see pages 35-42 of this report, or for more information, please refer to the following article: Belanger, E., Kielb, C., Lin, S. Asthma Hospitalization Rates in Children Aged 5-18, by New York State School Districts and School Building Conditions, 1991-2001. Journal of School Health, 2006; 76(8):408-413).

Table 1-1. Average length of hospital stay varied according to age group, gender and race.

Average Length of Hospital Stay

Average Length of Hospital Stay	
Age Group	
5-9 yrs	2.8
10-14 yrs	3.1
15-18 yrs	3.2
Gender	
Male	2.9
Female	3.1
Race	
White	2.9
Black	3.0
Other	3.0

Highlights

- Childhood asthma hospitalization rates have declined statewide from 1991 to 2001.
- Although childhood asthma hospitalization rates varied according to demographic and economic characteristics, the same decreasing trend was seen in all groups.
- Hospitalization rates in some school districts were above the statewide average, and a few have shown possible increasing trends despite a general decrease in rates statewide.
- Asthma hospitalization rates were higher among younger children, blacks, and males.
- Hospitalization rates were higher in more urban school districts and in districts with higher poverty rates.
- The average length of hospital stay for asthma for school-age children was about three days.

Actions and Recommendations

- The NYSDOH will continue to examine childhood asthma hospitalizations by school district over time as more recent data becomes available. This will help verify potential increasing trends in some school districts and identify high risk areas. Emergency department data are available as of 2005, providing additional information for tracking trends in asthma outcomes.
- NYSDOH has identified school districts with potentially increasing rates of child asthma hospitalizations and has provided additional support in the form of referrals to asthma coalitions interested in working with these districts, as well as referrals to the Region 2 Environmental Protection Agency (EPA) for guidance and information in developing or improving school IAQ plans.

Strengths and Limitations of This Study

Hospitalization data are easy to obtain, and are useful for examining trends in hospitalization rates by school district and by school district characteristics. However, since not all children with asthma are hospitalized due to their asthma, hospitalization data do not represent all cases of asthma, but generally only the more severe or poorly managed cases. As mentioned above, the NYSDOH is in the process of adding emergency room visits to this analysis to capture more of the health impacts associated with having asthma.

This study cannot be used to draw conclusions about the relationship between asthma hospitalization rates in a given school district and school-based asthma management or environmental conditions in its schools. Still, schools in districts with higher than average hospitalization rates might want to look more closely at the school environment. In a later section of this report, results from an analysis of school building conditions in relation to district hospitalization data is summarized (see page 39). These results suggest a possible connection between hospitalization rates and the condition of certain school building systems.

Selected Resources*

General Asthma Information

- **Asthma and Allergies website, Centers for Disease Control (CDC)**
Available from: <http://www.cdc.gov/health/asthma.htm>
- **New York State Asthma Information, New York State Department of Health (NYSDOH)**
Available from: <http://www.health.state.ny.us/diseases/asthma>

General School Asthma Programs and Resources

- **Asthma-Friendly Schools Initiative (AFSI) and Toolkit, American Lung Association (ALA)**
Available from: <http://www.lungusa.org/> (follow the links to Asthma > Asthma Management).
Alternatively, call 1 (800) LUNG-USA (1 800 586-4872) for information.
- **Healthy Youth: Asthma in Schools website, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control (CDC)**
Available from: <http://www.cdc.gov/HealthyYouth/asthma/>

School Nurse and Asthma Management Tools

- **Open Airways for Schools (OAS), American Lung Association (ALA)**
Available from: <http://www.lungusa.org/> (follow the links to Asthma > Asthma Management). Alternatively, call 1 (800) LUNG-USA (1 800 586-4872) for information.
- **Allergy and Asthma Tool Kit for School Nurses, National Association of School Nurses (NASN) and American Academy of Allergy, Asthma and Immunology (AAAAI)**
Available from: http://www.aaaai.org/members/allied_health/tool_kit/

Policy and Administrator Resources

- **Asthma in Schools 101, National School Boards Association**
Available from: <http://www.nsba.org> or by email: schoolhealth@nsba.org, phone: (703) 838-6722, fax: (703) 548-5516 or mail: National School Boards Association (NSBA), 1680 Duke Street, Alexandria, VA 22314.

**For additional resources and more detailed information about the above resources, please refer to pages 62-68.*

What was the purpose of this survey?

The primary purposes of this survey were to find out how common asthma and asthma-related problems are in NYS schools and to learn more about asthma management and education in the school setting.

Who was invited to participate in the survey?

This survey was mailed to nurses in elementary schools (grades pre-kindergarten-6) throughout NYS, excluding NYC. To gain support and to encourage participation, the surveys were advertised to school nurses in advance through flyers distributed at meetings and postings on relevant websites. In addition, a cover letter, co-signed by the president of the New York State Association of School Nurses (NYSASN), was mailed with each survey and nurses were given a gift as an incentive to complete and return the survey. Reminder postcards were sent two and four weeks after first mailing of the survey.

When was the survey conducted?

The survey was conducted during the spring of 2003.

What kind of information was collected?

Nurses provided information about the number of students with asthma. They were also asked about the number of children who, due to asthma, visited the health office, had physical limitations, visited the hospital or emergency room and were absent from school over the 2002-2003 school year. Nurses also answered questions about the availability of asthma medications and medication equipment in the school setting, whether students and school staff were educated about asthma, whether there were asthma-related programs at the school, and what their educational needs were with respect to asthma. Finally, the nurses were asked what obstacles existed in managing asthma in the school and their general impression of their school's indoor air quality (IAQ) and potential asthma triggers. The survey was pilot tested and reviewed by school nurses and representatives of the NYS Education Department (NYSED) and NYSASN.

KEY POINTS: Survey of School Nurses in NYS Elementary Schools

- Surveys were mailed to elementary school nurses across NYS, excluding NYC.
- Nurses provided information about the number of students with asthma and the number of students who, due to asthma, visited the health office, experienced physical limitations, went to the hospital or emergency room and/or missed one or more days of school.
- Nurses also provided information about asthma management, education and obstacles they faced in managing students with asthma.
- Nurses were asked to give their general impressions of their school's indoor air quality and potential asthma triggers.
- The survey was conducted during the spring of 2003.

How many school nurses participated in the survey?

Surveys were mailed to elementary school nurses across NYS, excluding NYC. The survey was completed and returned by 1,550 school nurses (66.7% of the nurses who were mailed the survey). The nurses who completed the survey are spread out across NYS public school districts (Figure 2-1). At least one elementary school nurse in 84% of NYS school districts (excluding NYC) participated in this survey. These districts were similar to all non-NYC, NYS districts in terms of poverty, racial composition and urbanicity.

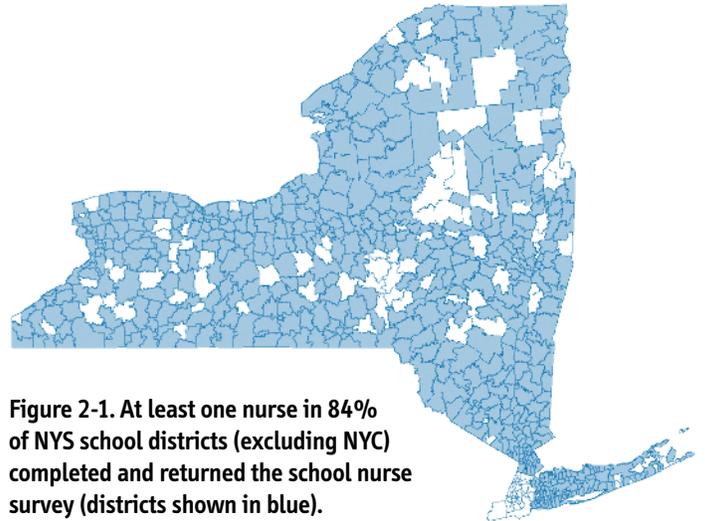


Figure 2-1. At least one nurse in 84% of NYS school districts (excluding NYC) completed and returned the school nurse survey (districts shown in blue).

What kind of nurses participated in the survey?

Nurses in non-NYC, NYS elementary public and private schools were invited to participate in the survey. Most of the school nurses who completed the survey held a Registered Professional Nurse (RN) license or a higher nursing license (93%). Most of the nurses also reported that a Licensed Practical Nurse (LPN) or RN was present and worked full-time, five days per week in their school (92%). Among the nurses surveyed, the average length of employment at their current school was 8.5 years, but ranged from 6 weeks to 44 years.

Education and employment characteristics of participating school nurses

- 93% held a RN license or a higher nursing license.
- A school nurse was present and worked full-time, five days per week in 92% of NYS schools surveyed.
- Nurses who responded to this survey had an average of 8.5 years of experience in their current positions.

How do school nurses learn about which students have asthma?

Nurses were given a list of possible sources of information and asked to rank them according to how often each source was used to identify students with asthma. Nurses were instructed to rank five choices by giving the most common method a “1,” the next most common method a “2” and so on (Table 2-1). By adding up the number of nurses who ranked each source of information with either a 1 (most common) or a 2 (next most common), we found that information from parents was the most common method among schools of identifying students with asthma, followed by school records and medication forms or doctor’s orders. However, in some schools, students with asthma were most commonly identified when they visited the health office for asthma symptoms or through other sources of information.

How many students have asthma in NYS elementary schools (excluding NYC)?

About 8.5% of students in non-NYC, NYS elementary schools have asthma. This estimate was based on a question that asked nurses for the total number of enrolled students and the number of students with asthma. Nurses were also asked to report enrollment and number of students with asthma for each grade level. The percentage of students with asthma increased with grade level from 6.9% of pre-Kindergarten students to 9.8% of students in grade 6. Other estimates of childhood asthma prevalence (the percentage who currently have asthma) in NYS are similar: 9.4% among children aged 5-9 and 8.8% among those aged 10-14¹¹.

Table 2-1. Nurses commonly learn if a student has asthma from the parents, school records or doctor’s order for quick relief medication (in terms of sources ranked as 1 or 2 on survey).

Average Length of Hospital Stay

Sources of student asthma status/medical information	Number (%) of nurses who report source is common (of 1550 schools)
Parents	1310 (84.5%)
School records	1072 (69.2%)
Medication form/ MD order	728 (47.0%)
Student visits health office with asthma symptoms	241 (15.5%)
Other*	41 (2.6%)

*Includes other staff, emergency cards, another nurse, confidential lists, students who carry asthma medications.

Students with asthma in NYS elementary schools (excluding NYC)

- Nurses reported that 8.5% of students in NYS elementary schools have asthma (excluding NYC).
- The percentage of children with asthma increased with grade level from 6.9% for pre-Kindergarten students to 9.8% among students in grade 6.
- These findings are consistent with previous estimates from surveys and studies done in the Northeastern U.S., in which the percentage of children with asthma ranges from 8 to 11%.

How are students with asthma affected by their asthma while at school?

Nurses were asked to estimate the total number of students with asthma who, during the 2002-2003 school year, visited the health office for asthma symptoms, limited physical activity due to asthma symptoms, were hospitalized or visited an emergency room for asthma symptoms or missed school due to asthma symptoms. These numbers were then divided by the total number of students with asthma to estimate the percentage of students with asthma who experienced each of these circumstances. Nearly two-thirds of students with asthma visited the health office for asthma symptoms (64.1%), about a quarter missed school due to asthma (26%), about one-fifth of students with asthma had to limit physical activity (19.5%) and 7% of students with asthma visited a hospital or emergency room due to asthma (Figure 2-2).

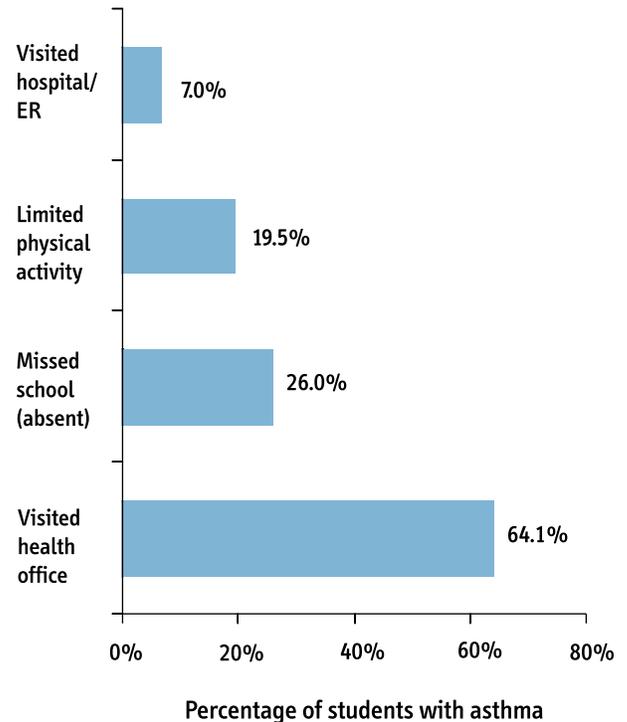


Figure 2-2. Among students with asthma, asthma-related visits to the health office were most common, followed by school absences, physical or activity limitations, and emergency room or hospital visits due to asthma.

How is the asthma of individual students managed in the school setting?

Nurses were also asked about the number of students with asthma who had an individual Asthma Action Plan or other written management plan on file, who had a physician order on file for permission to administer quick relief/rescue medication and who used a peak flow meter. About half of students with asthma in participating schools have a medication order on file (49.5%), while less than one third of students had a written asthma management plan on file (28%) and only 8% were known to use a peak flow meter.

What asthma medications and supplies are available to students in NYS elementary schools?

About 36% of nurses reported that at least some students with asthma carry inhalers on their persons, and almost all reported that students' inhalers were available somewhere at school (98%), primarily in the health office (95%). Over 45% of nurses indicated that spacers for delivering inhaler medication were available, and about 60% said that they had at least one nebulizer for delivering inhaler medication.

Asthma management in school settings

- Less than one third of students in NYS elementary schools have an individualized written asthma management plan and only about half have a doctor's order on file with the school nurse for administration of quick relief medication (see page 75 for sample asthma management plan).

Availability of asthma medications and supplies

- Slightly more than one-third of nurses said that at least some students in their elementary school carry inhalers on their person.
- About 60% of schools reported having nebulizers and about 45% reported having spacers for delivering inhaler medication.
- About one-third of the nurses reported use of a school-based asthma management program such as the American Lung Association's *Open Airways for Schools*.

What school-wide plans or programs are in place to manage asthma?

Almost 60% of nurses reported that their school had a school-wide, written Asthma Emergency Plan. About one third of nurses said that their school used a school-based asthma management program, such as the American Lung Association’s program Open Airways for Schools, which teaches elementary age children to manage their asthma.

Are students and staff educated about asthma?

School nurses were asked if students and staff in their school were taught about asthma (Figure 2-3). Sixty-nine percent answered that students in the school were taught about asthma. Among school staff, 65% of the nurses reported that physical education teachers were taught about asthma, 53% reported that classroom teachers were taught about asthma and 43% reported that other staff was taught about asthma.

Do school nurses in NYS elementary schools feel that their nursing training adequately prepared them to manage asthma in the school setting?

The majority of those surveyed (81%) felt that their nursing training had adequately prepared them to manage asthma in the school setting. However, many nurses commented that post-degree training in the form of workshops and seminars helped more than their nursing training.

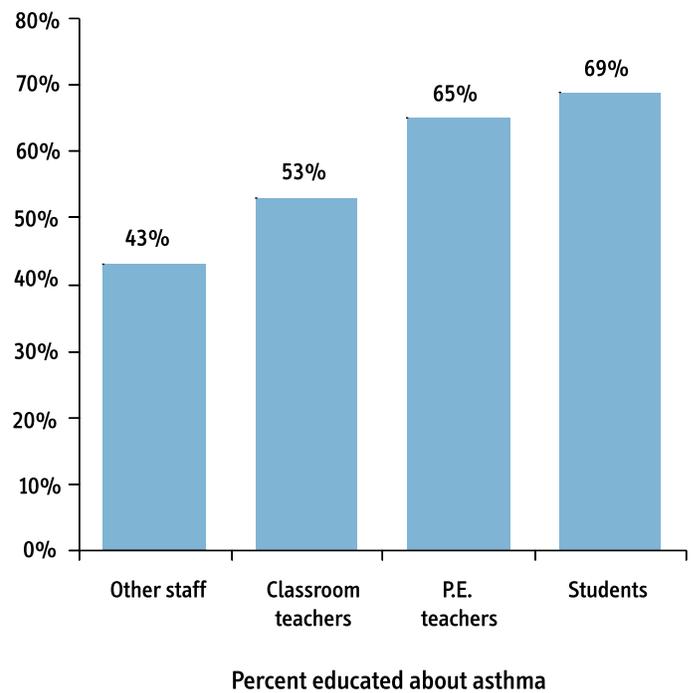


Figure 2-3. Nurses in at least half of the schools reported that students, P.E. teachers and classroom teachers are educated about asthma.

Content of Materials

Content of Materials	#	%
Current best practices/guidelines	1164	75.1%
Update on asthma medications	1134	73.2%
Teaching tools for staff/families	1057	68.2%
Indoor environment and asthma	949	61.2%
Asthma triggers	899	58.0%
General asthma facts	771	49.7%
Ozone/other air pollutants	439	28.3%
Smoking/second hand smoke	370	23.9%

Table 2-2. Over half of the nurses reported that the most helpful information would include current asthma guidelines, updates on asthma medications, teaching tools for staff and families and information about asthma triggers.

What kinds of additional information/training would school nurses find most helpful?

When asked about the content of asthma educational materials, at least half of the school nurses reported that the following topics would be most helpful: current information on asthma guidelines, updated asthma medication information, asthma management teaching tools for staff and families, information about the indoor environment, information about asthma triggers and general asthma facts (Table 2-2).

About 60% said they needed training and/or information on triggers in the school setting.

What type or format of educational materials or asthma resources are most useful to school nurses?

School nurses reported that fact sheets, one-on-one sessions with students and brochures are the most useful formats for sharing asthma information (Table 2-3).

Table 2-3. School nurses favored fact sheets, one-on-one sessions with students and brochures over other educational formats.

Type of Materials

Type of Materials	#	%
Fact sheets	1083	70%
One-on-one sessions with students	1067	69%
Brochures	776	50%
Videos	379	24%
Group classes	327	21%
Parent classes	142	9%
Other*	145	9%
CD ROM	55	4%

*Other included teaching parents/teachers, regional and local programs (Open Airways for Schools, American Lung Association, St. John's), books/magazines/ newsletters, and posters

What obstacles or problems do nurses encounter in managing asthma in the school setting?

The most frequently reported obstacle to managing asthma in the school setting was a lack of time (55.2%) (Figure 2-4). School nurses also reported a lack of funding for supplies (26%), a lack of parental support (18%), a lack of staffing (14%) and a lack of administrative support (8%). Other reported obstacles included a lack of support from doctors, lack of training or knowledge, lack of medicine or equipment, lack of teacher support, and a lack of student support.

How do nurses rate the IAQ in their schools?

Though subjective, we thought it would be interesting to learn the impressions school nurses have about the school environment. When nurses were asked to rate the IAQ in their schools, 62% said it was good and 7% rated it as excellent (Figure 2-5). Nurses who responded that IAQ was either fair (26%) or poor (5%) were asked to describe the indoor air quality. The most frequently reported concerns were with the heating or ventilation (HVAC) systems, mold, climate control, age of the building, construction projects and dust.

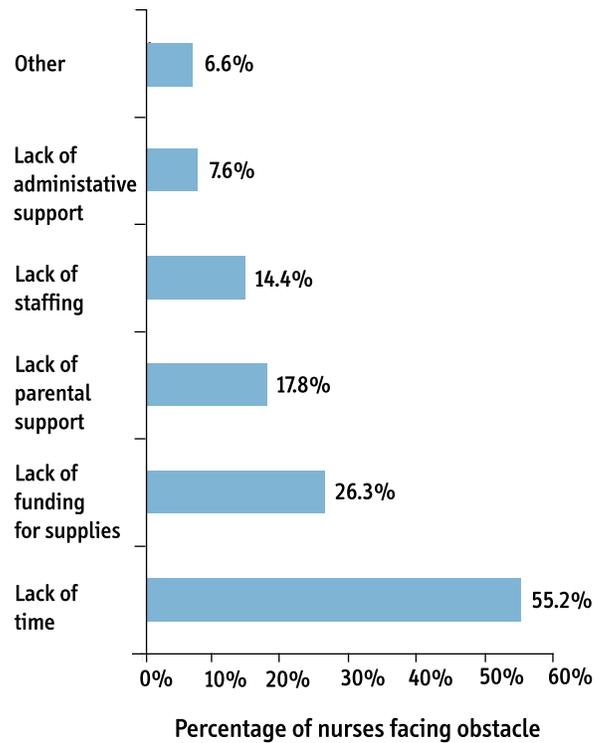


Figure 2-4. Nurses may face a variety of obstacles in managing asthma, but the most commonly reported obstacle was a lack of time.

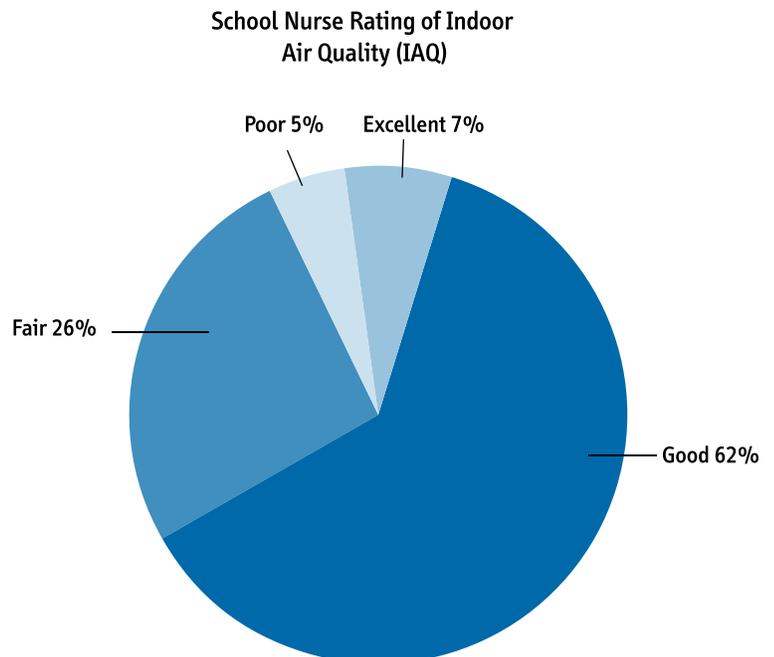


Figure 2-5. The majority of school nurses rated school IAQ as good or excellent, but slightly less than a third reported that IAQ was only fair or poor.

Which environmental asthma triggers are nurses most concerned about in the school setting?

Nurses were given a list of common environmental asthma triggers and asked to select the triggers in their school that they felt affected students with asthma (Figure 2-6). The most frequently selected triggers were dust (78%), mold (61%), cleaners (34%), school supplies (28%), bus fumes (26%), and construction (24%) (Figure 2-6). Although less common, pets, paint, environmental tobacco smoke (ETS, or secondhand smoke), latex and drinking water were also reported. Other triggers that nurses mentioned included outdoor allergens, perfumes, temperature, chemicals, fumes/odors and illness.

Do school nurses play a role in school environmental issues?

About 76% of the school nurses indicated that the school had a Health and Safety Committee, and of these, 80.5% reported that a nurse was on this committee. This means that about 61% of nurses reported that a nurse served on such a committee. About 57% of the nurses surveyed indicated that they needed information or training about environmental asthma triggers.

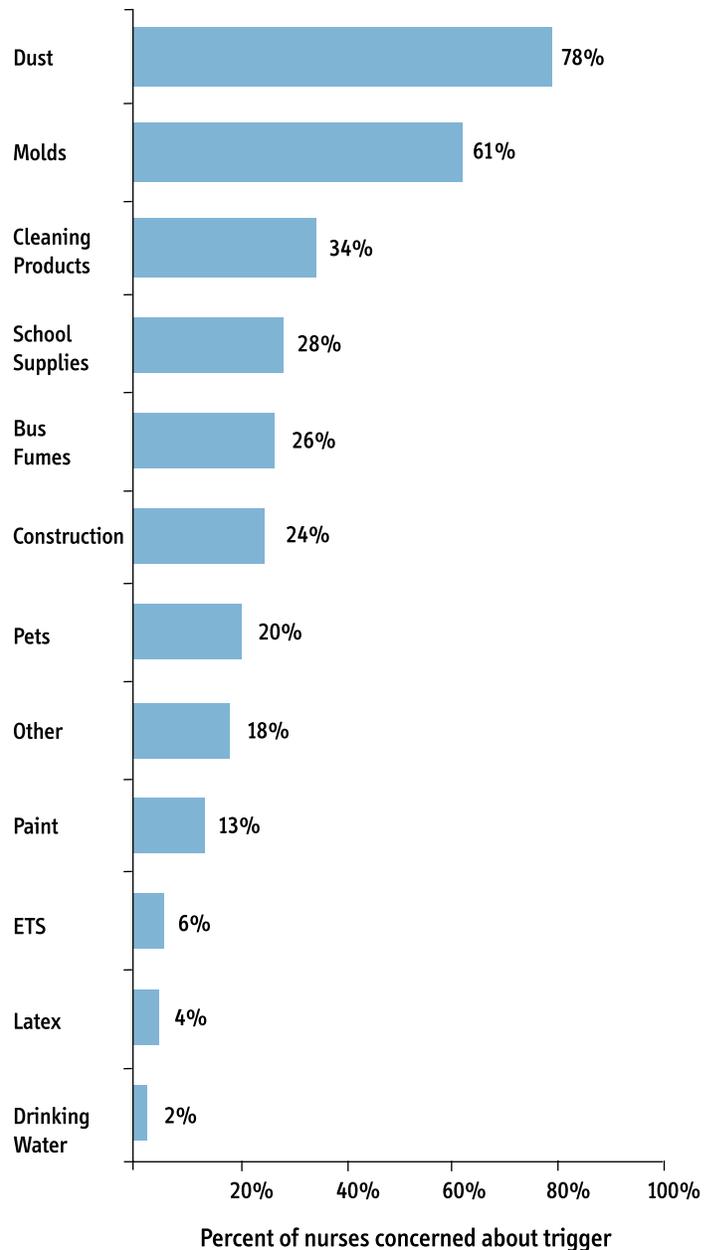


Figure 2-6. Dust and mold topped the list of environmental asthma triggers at school that concerned school nurses.

Summary

School nurses in NYS elementary schools (exclusive of NYC) were surveyed about asthma, problems related to asthma, and asthma management and education. About two-thirds of surveyed nurses responded to the survey. Based on these responses, 8.5% of elementary students have asthma, and due to asthma, two-thirds visit the health office, one-quarter were absent from school, about one-fifth had physical activity limitations, and 7% visited the ER or were hospitalized. Asthma is clearly an important problem in this age group in NYS and students with asthma are impacted by this disease in many ways. Visits to the health office, school absences, and visits to urgent care facilities take time away from learning. Physical limitations affect students at recess, during physical education classes and in other situations where physical activities take place.

Results with respect to asthma management present a mixed picture. Medications appear to be accessible to students in the school setting, and many schools reported that students and staff are educated about asthma. On the other hand, less than one-third of nurses reported that their schools had a school-based asthma program and less than one-third of students have a written asthma management plan at school. Lack of time, funding, and parental support were the most frequently reported obstacles that nurses faced in managing asthma in the school setting. Additionally, more than half of the nurses surveyed felt that educational materials regarding the most recent clinical practices, about teaching tools, and about environmental asthma triggers in the school setting would be helpful.

With respect to the school environment, nearly a third of the nurses rated their school indoor air quality as less than good, and over half were concerned about dust and mold, both potential asthma triggers. Over 60% of nurses reported that a nurse was on the school or district Health & Safety Committee, where they are in a position to raise concerns about how the school environment may be impacting the health of students and staff.

Highlights

- Two-thirds of surveyed nurses participated in the survey.
- According to this survey, 8.5% of students in NYS elementary schools (excluding NYC) have asthma.
- Among students with asthma, the majority visited the health office for asthma symptoms, and substantial numbers missed at least one day of school due to asthma and had to limit their physical activity because of asthma symptoms.
- Only about one-third of students with asthma have an individual asthma action plan on file and only one third of nurses reported use of a school-based asthma self-management program.
- More than half of the school nurses felt that additional training or information about environmental asthma triggers would be useful.
- Many school nurses were concerned about specific environmental asthma triggers in the school setting and a majority reported that a nurse served on the school or district Health & Safety committee.

Actions and Recommendations

- Schools can identify and begin to develop methods to track asthma health endpoints in the school setting, including urgent visits and hospitalizations for asthma as well as physical limitations due to asthma. This would make it easier for schools to assess asthma severity in their students and could inform asthma management strategies to reduce the number of students significantly impacted by their asthma.
- The NYSDOH is currently conducting an Asthma Learning Collaborative with five School Based Health Centers (SBHCs) in NYC. Its primary goal is to assist these health centers in improving the quality of asthma care in its students with asthma. One of the objectives to achieve this goal is for the SBHCs to develop asthma registries to track asthma-related events and assess severity. This Learning Collaborative has the potential for spread to school health offices throughout NYS.
- To better manage asthma at school, schools and health offices can develop strategies to increase the proportion of children with asthma having a written asthma management plan at school.
- To better enable them to manage asthma, school nurses can be provided with relevant educational materials, including updated clinical practices and trigger reduction information. The NYSDOH will work with interested stakeholders, including the NYS School Nurses Association, to coordinate outreach to school nurses.
- School and district staff should consider using or developing school-based asthma self- management programs such as the American Lung Association's Open Airways for Schools. Information about this program appears in the Resource section at the end of this section.
- To facilitate communication regarding indoor air quality and other environmental health issues, schools should encourage all school nurses to serve on Health and Safety Committees.

Strengths and Limitations of this Survey

This survey collected specific information about asthma prevalence, severity, management and education from nurses in NYS schools, and these nurses are in a good position to provide information about asthma prevalence, management and education. Although not all school nurses who were asked to participate in this survey did so, school districts where at least one nurse participated were similar to districts as a whole in terms of factors related to asthma, including poverty level, racial composition and degree of urbanicity.

However, since the survey was not sent to school nurses in NYC, the results are applicable only to the rest of NYS. In addition, the school nurses who completed these surveys may have interpreted questions in different ways. For instance, in counting the number of students with asthma, some school nurses may have counted only those students with a confirmed doctor's diagnosis, and other school nurses may have included any student with asthma-like symptoms, regardless of whether they had diagnosed asthma. Also, the accuracy of answers to questions about the number of students affected in different ways by their asthma depended upon the quality of record keeping at each school. Finally, the answers given by nurses regarding school IAQ were subjective, though we believe it is nonetheless valuable to learn the perceptions of school nurses regarding aspects of the school environment important to asthma.

Selected Resources*

General Asthma Information

- **Asthma and Allergies website, Centers for Disease Control (CDC)**
Available from: <http://www.cdc.gov/health/asthma.htm>
- **New York State Asthma Information, New York State Department of Health (NYSDOH)**
Available from: <http://www.health.state.ny.us/diseases/asthma>
- **Asthma and Children, American Lung Association (ALA)**
Available from: <http://www.lungusa.org/> (follow the links to Asthma > Asthma and Children).
Alternatively, call 1 (800) LUNG-USA (1 800 586-4872) for information.

School Nurse and Asthma Management Tools

- **Open Airways for Schools (OAS), American Lung Association (ALA)**
Available from: <http://www.lungusa.org/> (follow the links to Asthma > Asthma Management).
Alternatively, call 1 (800) LUNG-USA (1 800 586-4872) for information.
- **Allergy and Asthma Tool Kit for School Nurses, National Association of School Nurses (NASN) and American Academy of Allergy, Asthma and Immunology (AAAAI)**
Available from: http://www.aaaai.org/members/allied_health/tool_kit/
- **Is the Asthma Action Plan Working?: A Tool for School Nurse Assessment, National Institutes of Health, National Asthma Education and Prevention Program**
Available from: http://www.nhlbi.nih.gov/health/prof/lung/asthma/asth_act_plan_frm.htm
- **Asthma Action Plan and Clinical Guidelines from the New York State Asthma Information website, New York State Department of Health (NYSDOH)**
Available from: <http://www.health.state.ny.us/diseases/asthma>

Resources for Classroom Teachers, P.E. Teachers and Coaches

- **Asthma and Physical Activity in the School, National Institutes of Health, National Heart, Lung and Blood Institute**
Available from: http://www.nhlbi.nih.gov/health/public/lung/asthma/phy_asth.htm or by mail from NHLBI Health Information Center, P.O. Box 30105, Bethesda, MD 20824-0105 (NIH Publication No. 95-3651, include order form and check or credit card number). Alternatively call (301) 592-8573 (or 240 629-3255 for TTY) or fax (240) 629-3246.

Trigger Reduction and School Environmental Management Resources

- **Indoor Air website, Environmental Protection Agency (EPA)**
Available from: <http://www.epa.gov/iaq/index.html>. For general information on Indoor Air Quality, you can call EPA's IAQ INFO Hotline at (800) 438-4318.

*For additional resources and more detailed information about the above resources please refer to pages 62-68.

What was the purpose of this study?

The NYSDOH analyzed data from the 2000 BCS to assess how NYS public schools (excluding NYC) are doing with respect to their physical infrastructure and to identify building systems with the most problems in schools. This information was also summarized by school district, and then linked to asthma hospitalization rates.

What is the Building Condition Survey (BCS)?

The BCS is a physical inspection of NYS public school buildings that takes place every five years. It is conducted by a team that must include a licensed architect or engineer. The inspection is mandated by regulations issued in 1999 by the Commissioner of Education. Since the BCS is collected every five years, it can be used to track environmental conditions in NYS public schools. Because information from the BCS for NYC was not available at the time of analysis, NYC school buildings were not included in this analysis.

What is included in the BCS?

The BCS report includes ratings of 53 individual building systems (roof, plumbing, windows, etc), and an overall building condition rating.

What do the ratings mean?

Each **individual building system** was rated as follows:

Excellent – no remediation is required

Satisfactory – system is functioning reliably, routine maintenance required

Unsatisfactory – system is unreliable or has exceeded useful life but repairs or replacement are scheduled

Failed – system is non-functioning or unreliable; endangers occupant health and/or safety

The overall building condition was rated as “excellent,” “good,” “satisfactory” or “unsatisfactory.” An overall rating of “unsatisfactory” indicates that at least one individual building system related to health and safety or to building structure was rated as “failed.”

What information from the BCS did NYSDOH look at?

NYSDOH looked at overall building rating and individual system ratings. At the time of analysis, ratings for 3,017 school buildings (including 2,195 elementary school buildings) were available.

KEY POINTS:

Findings from the NYSED Building Condition Survey

- The BCS is a physical inspection of NYS school buildings that is conducted every five years. NYC school buildings are not included in this analysis since BCS information for them was not available at the time of analysis.
- During the inspection, each building is given an overall rating and 53 individual building systems are also evaluated and rated.
- NYSDOH analyzed information from the 2000 BCS.
- NYSDOH looked at overall building ratings and individual system ratings, focusing on ratings of 19 building systems with the potential to affect students or staff with asthma.

What is the overall condition of NYS public school buildings?

Most of the school buildings in NYS (excluding NYC) were given an overall building rating of satisfactory or better (Table 3-1). However, 4.4% of school buildings were given an overall rating of unsatisfactory, indicating that at least one building system related to Health and Safety or building structure was rated as failed in these schools. Ratings were similar for the subset of elementary schools, where 4% of buildings were rated unsatisfactory.

How many public schools have individual building systems rated as unsatisfactory or failed?

At least one building system was rated unsatisfactory or failed in 44.1% of all NYS public schools. Similarly, among elementary schools, 45.4% had at least one building system rated unsatisfactory or failed.

Which building systems have the potential to affect students and staff with asthma?

Based on consultations with environmental health staff, 19 of the 53 building systems included in the BCS were classified as “asthma-related.” In other words, when these systems are not functioning properly, they have the most potential to affect students and staff with asthma. This can happen by either increasing the presence of environmental triggers (for example, flooding or leaks that cause mold problems) or by interfering with the processes that maintain indoor air quality (for example, the exhaust systems).

Table 3-1. The overall condition of most NYS school buildings is satisfactory or better.

Overall condition of NYS public school buildings

Rating	#	%
Excellent	225	7.5%
Good	894	29.6%
Satisfactory	1764	58.5%
Unsatisfactory	134	4.4%

Unsatisfactory building systems

- 44.1% of NYS public school buildings had at least one building system that was rated unsatisfactory or failed.

- Asthma-related building systems:

- | | |
|------------------------|-----------------------|
| Roofing | Ductwork |
| Chimneys | Unit ventilators* |
| Ceilings | Air handling systems* |
| Windows | Terminal units* |
| Plumbing drainage* | Exhaust systems* |
| Plumbing fixtures | Control systems* |
| Heating systems piping | Heating fuel systems* |
| Floor finishes | Air conditioning |
| Boiler/furnace* | Swimming pool |
| Ventilation systems* | |

*Classified as related to health and safety by the Building Condition Survey.

How many public school buildings have asthma-related building systems rated unsatisfactory or failed?

In 33.5% of all NYS public school buildings, at least one of the 19 asthma-related systems was rated unsatisfactory or failed. Similarly, in 34.6% of elementary school buildings, at least one asthma-related system was rated unsatisfactory or failed.

Among schools with at least one building system rated as unsatisfactory or failed, how many building systems are poorly rated?

Of the 1,011 schools that had at least one asthma-related building system rated unsatisfactory or failed, 66.5% had 1-3 such systems, 19.2% had 4-6, 11.6% had 7-10 such systems and 2.8% had 11-19 (Figure 3-1).

Among the 759 elementary schools with at least one asthma-related building system rated unsatisfactory or failed, 66.8% had 1-3 such systems, 19.5% had 4-6, 10.7% had 7-10 such systems and 3% had 11-19.

Unsatisfactory Building systems (continued)

– In one-third of NYS public school buildings, at least one asthma-related building system was rated unsatisfactory or failed.

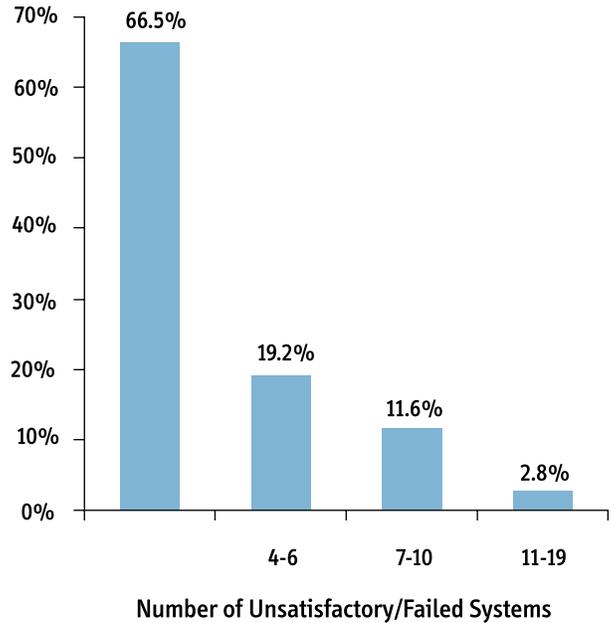


Figure 3-1. In two-thirds of NYS public schools with at least one unsatisfactory/failed asthma-related building system, 1-3 of the systems were rated unsatisfactory or failed.

Which asthma-related building systems were most often rated as unsatisfactory or failed?

Twelve of the 19 asthma-related systems were rated unsatisfactory or failed in at least 5% of NYS school buildings (Figure 3-2). Eleven of these systems were rated unsatisfactory or failed in at least 5% of elementary school buildings. The five asthma-related systems most frequently rated as unsatisfactory or failed were windows, floor finishes, roofing, ventilation systems and plumbing fixtures.

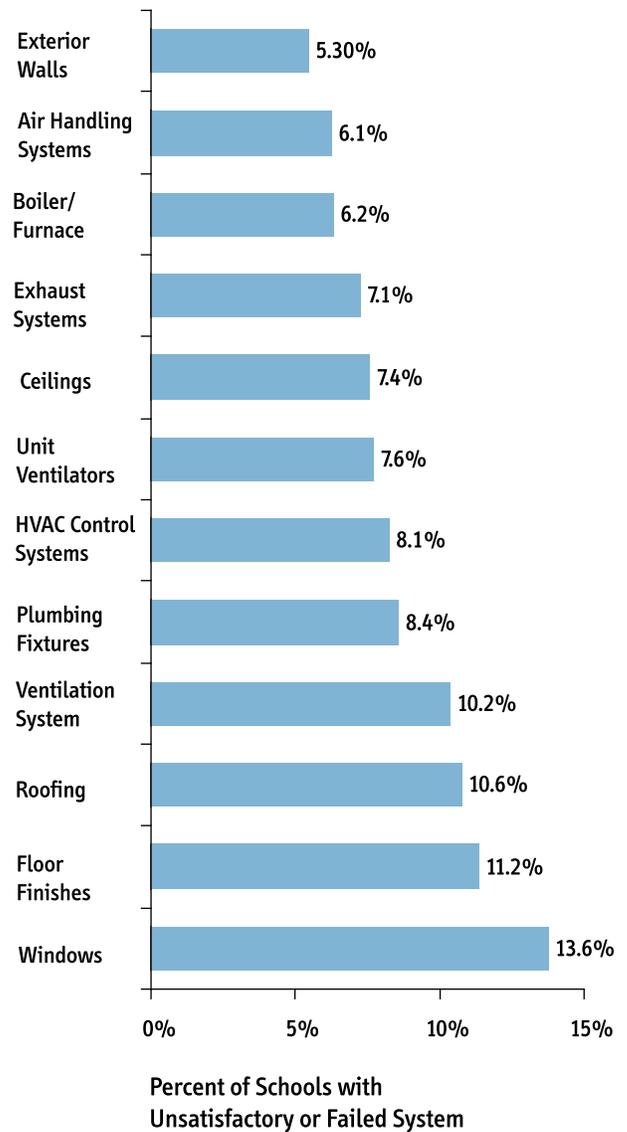


Figure 3.2. Twelve of the 19 asthma-related building systems were rated unsatisfactory or failed in 5% or more of all NYS public school buildings (excluding NYC).

What kind of comments or observations were made about failed asthma-related systems?

Comments and observations were summarized for asthma-related systems that were failed in at least 2% of the schools. Inspectors generally cited, age, disrepair or mentioned that the system was out of date. Failed ventilation systems were frequently described as non-functioning or obsolete. Many failed roofing systems needed replacement and a few were noted as having leaks. Failed window systems were often described as obsolete. Many failed floor finishes rated needed replacement. Exhaust systems were described as old and in need of replacement. Failed swimming pools were described as obsolete or abandoned.

Are the ratings of asthma-related building systems related to district-wide asthma hospitalization rates?

The asthma-related building systems were also analyzed in a project that looked at asthma hospitalizations of children within NYS public school districts (see pages 15-22). This project compared the ratings of asthma-related building systems in school districts with asthma hospitalization rates above the statewide average to school districts with rates at or below the statewide average. The project found that higher asthma hospitalization rates were associated with having worse ratings for the following asthma-related building systems: roofing, windows, exterior walls, floor finishes, and the boiler/furnace. For more information, refer to:
Belanger et al. Asthma Hospitalization Rates in Children Aged 5-18, by New York State School Districts and School Building Conditions, 1991-2001. Journal of School Health, 2006; 76(8):408-413.

Failed asthma-related systems

- Many failed asthma-related building systems were described as “obsolete,” “non-functioning” and “in need of replacement.”

Ratings of asthma-related building systems

- A relationship was found between higher asthma hospitalization rates in school districts and a poorer rating for several building systems thought to be potentially related to asthma: roofing, windows, exterior walls, floor finishes, and the boiler or furnace.

Summary

Information on school building ratings was summarized for non-NYC public school buildings using the 2000 BCS. The majority of these buildings were given an overall rating of “satisfactory” or better. However, 4.4% of school buildings were given an overall rating of “unsatisfactory”, indicating that at least one building system related to Health and Safety or building structure was rated as “failed” in these schools. NYSDOH identified 19 building systems with the potential to impact students and staff with asthma and found that in a third of school buildings, at least one such system was rated “unsatisfactory” or “failed.” Twelve of these 19 systems were rated “unsatisfactory” or “failed” in more than 5% of NYS school buildings. In a separate analysis, poorer ratings for school building roofing, windows, exterior walls, floor finishes, and the boiler/furnace were significantly associated with higher school district asthma hospitalization rates. This association does not necessarily indicate a causal link between a particular system and an asthma hospitalization because the information available for these systems from the BCS is very general and doesn't provide information about asthma triggers or individual exposure to environmental asthma triggers. For more information about this part of the analysis, please refer to the following article: Belanger, E., Kielb, C., Lin, S. Asthma Hospitalization Rates in Children Aged 5-18, by New York State School Districts and School Building Conditions, 1991-2001. *Journal of School Health*, 2006; 76(8):408-413.

Highlights

- Overall, most surveyed NYS school buildings (excluding NYC) are in satisfactory or better condition.
- Many individual building systems have the potential to impact students and staff with asthma. Of 19 building systems identified as asthma-related, 12 were rated as unsatisfactory or failed in more than 5% of NYS public schools.
- One-third of NYS public school buildings have at least one poorly rated asthma-related building system.
- The five asthma-related building systems most frequently rated as unsatisfactory or failed were windows, floor finishes, roofing, ventilation and plumbing fixtures.
- School building systems associated with increased school district asthma hospitalization rates include: roofing, windows, exterior walls, floor finishes, and the boiler/furnace.

Actions and Recommendations

- The NYSDOH will continue to track school environmental data over time using the BCS, which is conducted every five years by the NYS Education Department (NYSED). NYSDOH recently worked with NYSED's Office of Facilities Planning to add questions specifically relating to school Indoor Air Quality (IAQ) to the 2005 Building Condition Survey. NYSDOH is in the process of analyzing the results of this most recent survey and comparing them to those of the 2000 BCS. NYSDOH will continue to work with the NYSED to refine the BCS for use as a tool for monitoring school IAQ over time. NYSDOH is also in the process of acquiring school building condition data for NYC schools, so that information on the condition of school buildings throughout the whole of NYS can be summarized.
- In addition to the mandatory BCS inspection every five years, schools are required by NYSED to conduct an annual visual inspection. This kind of non-technical review of the school environment can help to identify problems early on when the cost of repair or replacement is likely to be less. Schools could be encouraged to complete this annual review and be given resources to take action to improve environmental conditions for all students and staff when unsatisfactory conditions are present.

Strengths and Limitations of this Survey

This building condition data is collected every five years from NYS schools, and thus represents a sustainable, low-cost source of information about their physical condition. However, since this analysis does not include information about NYC schools, these results cannot be applied to the entire state of New York. Efforts are underway to locate similar information about NYC school buildings. Another limitation of this data is that the ratings obtained from the 2000 Building Condition Survey are general in nature, and so are not informative about specific problems that might be impacting school indoor air quality (IAQ). However, the most recent Building Condition Survey, revised for 2005, contains specific questions that address school IAQ issues potentially related to asthma, and this newer data will be used to identify aspects of school building conditions with the potential to impact asthma.

Selected Resources*

General Asthma Information

- **New York State Asthma Information, New York State Department of Health (NYSDOH)**
Available from: <http://www.health.state.ny.us/diseases/asthma>

Building Condition Survey Information

- **New York State Education Department (NYSED), Office of Facilities Planning website**
Available from: <http://emsc32.nysed.gov/facplan/>

Trigger Reduction and School Environmental Management Resources

- **Indoor Air website, Environmental Protection Agency (EPA)**
Available from: <http://www.epa.gov/iaq/index.html>. For general information on Indoor Air Quality, you can call EPA's IAQ INFO Hotline at (800) 438-4318.
- **Indoor Air Quality Tools for Schools (IAQ TFS) Kit, Environmental Protection Agency (EPA)**
Available from: <http://www.epa.gov/iaq/schools/toolkit.html>. Alternatively, for general information about indoor air quality, call the EPA's IAQ info hotline at (800) 438-4318. Additional contact information is listed at the end of this report.
- **Mold Remediation in Schools and Commercial Buildings, Environmental Protection Agency (EPA)**
Available from: <http://www.epa.gov/mold/moldresources.html>. Also available by sending a request to the following address (be sure to reference EPA document number EPA 402-K-01-001 when ordering): National Center for Environmental Publications (NSCEP), P.O. Box 42419, Cincinnati, OH 42419; or by phone at 1 (800) 490-9198; or by fax at (513) 489-8695.

- **Healthy SEAT, Environmental Protection Agency (EPA)**
Available from: <http://www.epa.gov/schools/healthyseat>
- **Healthy School Environment Resources, Environmental Protection Agency (EPA)**
Available from: <http://cfpub.epa.gov/schools>
- **What's That Smell?: Simple Steps to Tackle School Air Problems, Asthma Regional Council (ARC)**
Available from: www.asthmaregionalcouncil.org (follow the link to publications) or by mail from: Asthma Regional Council, The Medical Foundation, 622 Washington Street, 2nd floor, Dorchester, MA 02124. Alternatively call (617) 451-0049 Ext. 504, for information.
- **Reducing Asthma Triggers in Schools: Recommendations for Effective Policies, Regulations and Legislation, Asthma Regional Council (ARC)**
Available from: www.asthmaregionalcouncil.org (follow the link to publications) or by mail from Asthma Regional Council, The Medical Foundation, 622 Washington Street, 2nd floor, Dorchester, MA 02124. Alternatively call (617) 451-0049 Ext. 504, for information.

**For additional resources and more detailed information about the above resources, please refer to pages 62-68.*

What was the purpose of this survey?

Children spend a large part of their day in school, where they may be exposed to environmental conditions that either cause asthma or make it worse. The purpose of this survey was to learn about the environmental conditions, policies, programs, and practices in NYS public elementary schools that may affect school indoor air quality.

Who was invited to participate in the survey?

Head custodians in elementary schools across NYS, excluding NYC were invited to participate in the survey.

The survey was conducted with support from district facilities managers, the New York State Education Department and the New York State Asthma Coalitions. It was mailed to district facilities managers for distribution to custodians in elementary schools (pre-Kindergarten through Grade 6).

When was the survey conducted?

This survey was conducted during the spring of 2003.

What kind of information was collected?

Custodians were asked questions about the school building, including its age; the type and condition of the heating, ventilation, and air conditioning systems; the type and frequency of various cleaning practices; the presence of allergens and the conditions that promote them; and the presence of irritants and fumes, including diesel exhaust. Questions about specific practices, programs and policies relating to indoor air quality (IAQ) were also asked.

KEY POINTS: Survey of head custodians in NYS public elementary schools

- Surveys were distributed to school custodians in public elementary schools across NYS, excluding NYC.
- Custodians answered questions about the school building, environmental conditions inside the school, practices relating to school indoor air quality and environmental policies and programs.
- The survey was conducted during the spring of 2003.

How many school custodians participated in the survey?

Surveys were mailed to district facilities managers for distribution to 2,277 public elementary school head custodians across NYS, excluding NYC. About 63%, or 1,434, of these school custodians, completed and returned the survey. The custodians who completed the survey were spread out across NYS public school districts (Figure 4-1). At least one public elementary school custodian in 71% of NYS public school districts participated in this survey. These districts were similar to all NYS districts in terms of socioeconomic measures such as poverty, race and urbanicity.

How old are NYS public elementary school buildings?

The median age of the NYS public elementary school buildings included in this survey was 47 years, ranging from 6 months to 196 years.

How many elementary schools are using portable classroom units?

Custodians in 8.7% of elementary schools reported the presence of at least one portable unit classroom. This type of classroom is prone to inadequate ventilation and water damage that could result in mold problems.

How common are construction and renovation projects?

Some construction or renovation had taken place over the previous 12 months in 39.1% of NYS public elementary schools.

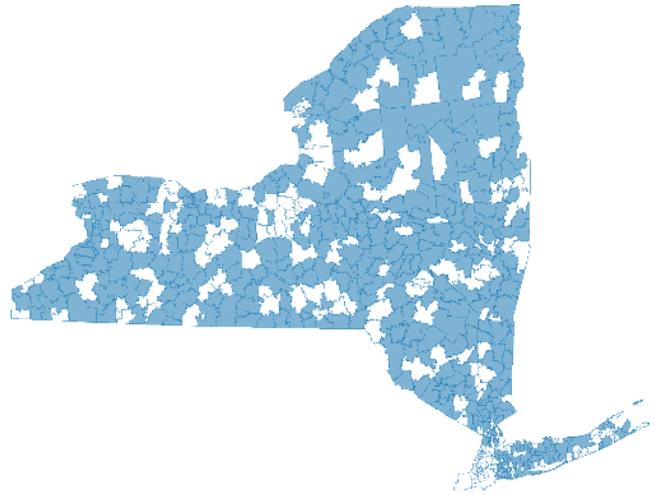


Figure 4-1. At least one custodian in 71% of NYS public school districts (excluding NYC) completed and returned the custodian survey (participating districts shown in blue).

Elementary schools

- The median age of NYS public elementary school buildings in this survey was 47 years.
- In the 12 months leading up to the survey, 39.1% of the elementary schools had undergone some construction or renovation.
- Portable classroom units were reported by custodians at 8.7% of the responding schools.

What kinds of heating and ventilation systems are found in NYS public elementary schools?

For heating, most schools relied on steam and/or hot water systems (93.9%), while forced air heating systems were less common (18.3%). The majority of schools surveyed used unit ventilation systems (88.2%), where each classroom controls its own ventilation, while about a third used central ventilation systems (34.3%) and about a quarter used a mixed system (26.4%). In general, ventilation systems were working well in 88.3 % of public elementary schools, but custodians in 46.6% of schools reported that unit ventilators were blocked by books or other items in some or most classrooms.

What potential sources of environmental asthma triggers exist in public elementary school classrooms?

A variety of classroom conditions or contents have the potential to affect students with asthma. Custodians were asked whether certain conditions or items were present in either most, some or none of the classrooms in their schools (Figure 4-2). Commonly reported in either most or some classrooms were dust (75.8%), dust reservoirs other than carpets (pillows, upholstered furniture and stuffed animals where dust can accumulate) (95.3%), carpets (96.3%), chalkboards (94.1%) and white boards that use chemical markers (92.7%). Pets with fur or feathers (that children with asthma may be allergic to) were present in at least some classrooms in 40.2% of schools.

Heating and ventilation in NYS public elementary schools

- Ventilation systems were reported to be working well in 88.3% of schools.
- Almost half of school custodians reported that at least some classroom air ventilation systems were obstructed by classroom items.

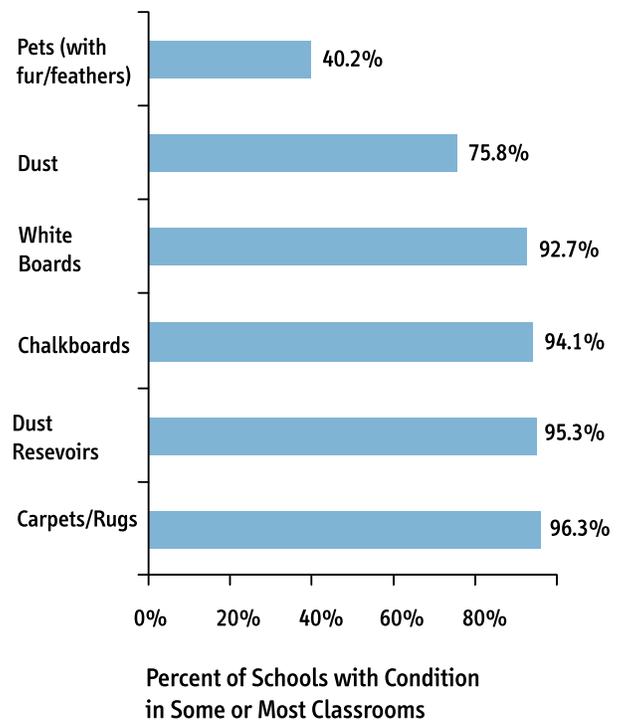


Figure 4-2. Dust, carpets/rugs, chalkboards and white boards that use chemical markers are present in at least some classrooms in over three-quarters of NYS elementary schools. Pets that are a potential source of allergens (i.e. with fur or feathers) are present in 40.2% of schools.

What kinds of odors related to asthma triggers are noticeable in NYS public elementary schools?

Odors can indicate the presence of asthma triggers. Diesel exhaust was the most commonly reported odor in the elementary schools surveyed (21%), followed by odors from mold/mildew (12%), cleaners (10%), roads/facilities (9%), paint (8%) and air fresheners (8%) (Figure 4-3). Other sources of odor in schools included arts and crafts supplies, labs or vocational-tech shops, photocopying or other office equipment, perfumes or colognes and environmental tobacco smoke (ETS). Less than 2% of custodians reported noticeable odors from ETS.

What controls are in place to limit exposure to diesel exhaust in NYS public elementary schools?

The location of fresh air intakes near school bus loading areas (32.6% of schools) or near garbage dumpsters (5.7% of schools) increases the potential for diesel exhaust to enter the school from either school buses or garbage trucks that idle. Noticeable diesel odors were reported in 20.7% of schools, and the potential for diesel exposure (from schools that reported either noticeable odors or fresh air intakes located near bus loading areas or garbage dumpsters) existed in 42.1% of schools. Fewer than half of the schools had a policy to limit school bus idling (42.5%) and even fewer said that there was a policy that was enforced (37.2%). However, many custodians either left these questions blank or said that they were unsure about the existence or enforcement of anti-idling policies.

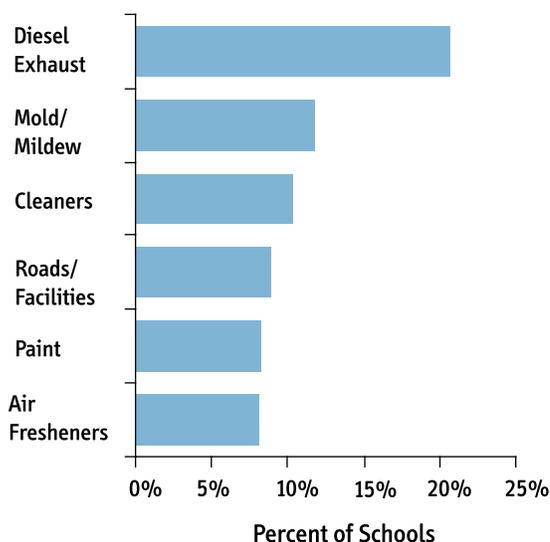


Figure 4-3. Diesel exhaust was the most commonly reported noticeable odor in NYS public elementary schools, followed by mold/mildew odors and odors from cleaning supplies.

Table 4-1. Potential exposures to diesel exhaust exist in many NYS elementary schools, and many schools lack policies to limit exposure to diesel exhaust.

Potential exposures to diesel exhaust

	#	%
Fresh air intakes near school bus loading area	468	32.6%
Fresh air intakes near garbage dumpsters	82	5.7%
Diesel odors in school	297	20.7%
Any of the above	604	42.1%
Policy to limit school bus idling*	610	42.5%
Policy enforced*	533	37.2%

*unsure > 20%

How common are mold or moisture problems in NYS public elementary schools?

While noticeable mold/mildew odors were reported in only 12% of schools, many schools reported other problems associated with mold or moisture (84.4%) (Table 4-2). Visible water damage or stains were indicated by custodians in 73.1% of schools and about half of the schools surveyed had experienced some kind of leak in the previous 3 years (47.2%). Roof leaks were most common (34.9%), followed by plumbing leaks (18.7%), heating, ventilation and air conditioning (HVAC) leaks (15.3%) and foundation leaks (7.2%). Condensation (26.4%), mold or moldy odors (18.3%) and flooding (5.0%) were also reported. Wet/flooded materials were routinely removed or dried within 48 hours in 82.1% of schools.

What other environmental asthma triggers are present in NYS elementary schools?

Waste products from pests such as rodents and cockroaches are considered to be asthma triggers. Although these pests were not a problem in the majority of schools surveyed, 28% of schools indicated problems with rodents and 8% with cockroaches (Figure 4-4).

Despite construction or renovation projects in 39.1% of schools during the previous 12 months, less than a quarter of custodians (22%) indicated that construction dust, a potential asthma trigger, was present.

Table 4-2. Mold and moisture problems are fairly common in NYS Public Elementary Schools.

Mold and moisture problems

	#	%
Water damage or stains	1048	73.1%
Any leaks	677	47.2%
Roof leak*	501	34.9%
Plumbing leak*	268	18.7%
HVAC leak*	219	15.3%
Foundation leak*	104	7.2%
Condensation	379	26.4%
Mold or moldy odors	263	18.3%
Flooding	71	5.0%
Any of the above	1210	84.4%

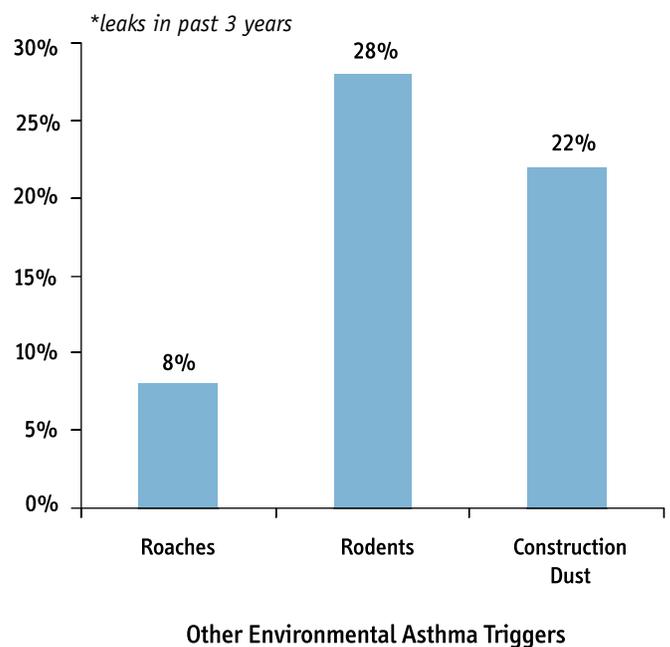


Figure 4-4. Other environmental triggers present in some NYS elementary schools included construction dust, rodents and cockroaches.

How are NYS public elementary schools cleaned and maintained?

Most custodians reported that floors and carpets were cleaned often, with 91.9% indicating that classroom carpets were dry vacuumed at least 3 times each week (Table 4-3). Dry vacuuming without a HEPA filter to control dust and allergens was more common (63.4%) than dry vacuuming with a HEPA filter (41.1%), while wet vacuuming occurred in about 40.3% of schools. Dry mopping 4-5 times/week was also commonly reported (88%), while wet mopping 4-5 times each week occurred in fewer than half of schools (45.6%). Garbage was removed daily in nearly all of the schools (95.7%) and was typically placed in secure dumpsters (86.8%).

Only one-third of custodians reported use of green-rated cleaning products (33.2%). Green-rated cleaning products are products that can be used safely and that do not harm, or that minimize the harm, to people and to the environment from chemical pollutants. This survey was conducted during the 2004-2005 school year, prior to state legislation that took effect in September 2006 which requires all NYS schools to purchase or use environmentally sensitive cleaning products.

Table 4-3. In most schools, floors and carpets are regularly cleaned and garbage is removed daily.

How NYS public elementary schools are cleaned

	#	%
Vacuuming Classroom Floors*		
Dry vacuuming at least 3 times/week		
Dry vacuuming without HEPA		
Dry vacuuming with HEPA		
Wet vacuuming		
Mopping Classroom Floors		
Dry mopping 4-5 times/week	1262	88.0%
Wet mopping 4-5 times/week	654	45.6%
Garbage removal		
Removed daily from school	1372	
Placed into secure dumpsters	1244	

*out of 1381 schools who reported classroom carpets

Green-rated cleaning products were used in only about one-third of schools. However, use has likely increased substantially since the enactment of a law requiring all NYS schools to use these types of products.

Are elementary schools using integrated pest management (IPM)?

Most school custodians reported use of IPM (72.8%). Both pests (such as cockroaches and rodents) and pesticides can be asthma triggers. IPM is a way of controlling these pests without relying heavily on pesticides through improved cleaning techniques, better storage of food and garbage and strategic use of chemical controls.

Is preventative maintenance used to maintain the heating, air conditioning and ventilation (HVAC) system?

Air filters were changed at least twice a year in 79% of the schools surveyed (Figure 5-5). In 15% of schools filters were present but changed once a year or less. In most schools, both fresh air ducts (83.1%) and exhaust ducts (82.4%) were regularly inspected and maintained.

What kind of formal programs or structures are in place to address school IAQ?

Many custodians did not answer or were unsure about the answer to questions about indoor air quality programs, practices and policies. About a quarter of school custodians reported use of a formal IAQ program (26.4%) such as the EPA's Tools for Schools (Table 4-4). About one-third indicated that an IAQ coordinator had been named and 29.1% reported that an IAQ management plan had been developed. Custodians reported that a written facility complaint process was in place in 62.8% of schools and 64% said that the district had appointed a Health and Safety Committee.

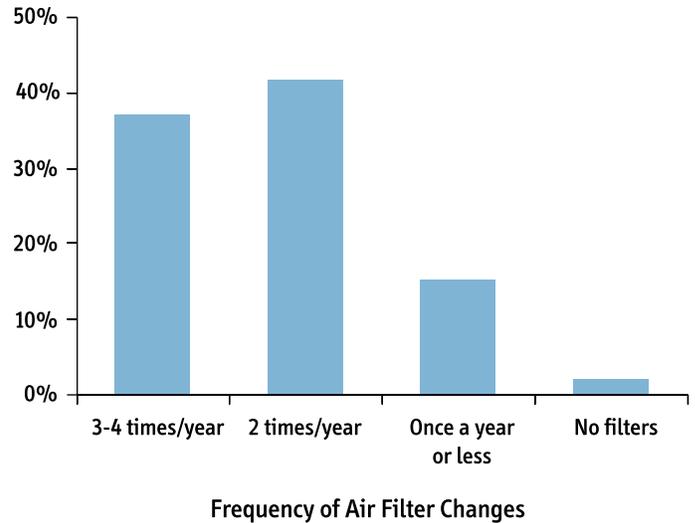


Figure 4-5. Air filters were changed at least twice a year in the majority of NYS elementary schools

Table 4-4. Only a quarter of school custodians reported use of a formal IAQ program.

Use of formal IAQ programs

Program/Structure	#	%
Formal IAQ program**	379	26.4%
IAQ Coordinator**	466	32.5%
IAQ management plan**	417	29.1%
Health and Safety committee**	917	64.0%
Written facility complaint process*	900	62.8%

* > 10 - 20% unsure; ** > 20% unsure

What other structures or procedures are in place in schools to improve and maintain good IAQ?

In general, specific components of IAQ management plans were more commonly reported than comprehensive programs. For instance, 84.1% reported that an annual visual inspection of the school was conducted (per State Education Department Regulations) and 74% reported that their school has a preventative maintenance plan.

Nearly three quarters (71.6%) of custodians indicated that dust and fumes from renovation were controlled and custodians in about two-thirds of schools reported that such projects were avoided during school hours (65.1%). Newly painted areas were aired out in 85% of schools surveyed, reducing exposure to chemicals that can irritate the lungs. However, new carpets, which also can emit chemicals that irritate the lungs, were aired out prior to installation in only 35.4% of schools.

Summary

Head custodians in NYS elementary schools (excluding NYC) were asked about environmental conditions, practices, and policies in their schools. Custodians in 63% of surveyed schools responded. Asthma triggers or conditions related to the presence of triggers that were most commonly reported included classroom dust or reservoirs of dust (99% of schools), mold or moisture problems (84% of schools), potential exposure to diesel exhaust (42% of schools), the classroom pets in at least some classrooms (40% of schools), and rodent droppings (28% of schools).

While NYS elementary schools appear to be taking many actions to maintain healthy learning environments, some practices and policies could be more widely implemented. This survey found that floors and carpets in most schools were cleaned frequently and that preventative maintenance, such as changing air filters, took place frequently. It also found that many schools proactively control pollution from newly painted areas and from construction and renovations, and that integrated pest management (IPM) is widely used. However, many custodians reported blocked ventilation systems in classrooms, only about one-third reported airing out new carpets or using green-rated cleaning products, and just over one third reported that school bus idling policies both existed and were enforced. Only one fourth reported that a formal IAQ program existed, which is lower than a national estimate of 42% for schools with a formal IAQ program or policy.¹²

Since many custodians could not provide answers to questions about programs and policies, a similar survey of district facilities directors was conducted to obtain this information at the district level (see pages 56-65 for more information).

Maintaining good IAQ

- Practices such as annual visual inspections of the school building and having a preventative maintenance plan were reported in the majority of schools.
- Most schools reported controlling dust and fumes during construction or renovation projects, including avoiding such projects during school hours.
- The majority of schools surveyed reported airing out newly painted areas before allowing students and staff to occupy the area, but only about one-third regularly air out new carpets prior to installation.

Highlights

- Custodians in 63% of surveyed non-NYC schools participated in this survey.
- The most commonly reported asthma triggers included dust, mold, diesel, and pets.
- In most NYS public elementary schools, floors and carpets were cleaned frequently, air filters were changed frequently, integrated pest management (IPM) was used, and proactive steps were taken to protect occupants from pollution caused by fresh paint applications and areas where construction or renovations are taking place.
- Key components of indoor air quality management that have not been implemented or are not being enforced in the majority of elementary schools include airing out new carpets, controlling diesel pollution from idling school buses, use of green-rated cleaning products, and implementation of a formal IAQ program.

Actions and Recommendations

- Schools and school districts can think about using these results and the resources listed in this report to develop sustainable programs that incorporate low-cost strategies to improve and maintain good IAQ. These programs should ideally include an IAQ coordinator and an IAQ team representing parties in the schools that have the potential to impact school IAQ. The NYSDOH is currently developing a pilot project involving 5-10 schools to identify barriers to implementing and sustaining good IAQ practices and to help in addressing these barriers. This support will be customized to meet the unique needs of the individual schools.
- School or district facility managers can take steps to increase awareness among custodians of district programs and policies pertaining to school IAQ, so that these policies may better be carried out in the schools.
- The SED and NYSDOH should partner to encourage school or district facility managers to take steps to increase awareness among custodians about the potential for school environmental conditions to affect the health of students and staff. Training and resources should be provided to support custodians in taking action to improve indoor air quality using low-cost or no-cost techniques to improve indoor air quality. Airing out new carpets prior to installation or avoiding construction and renovation work during the school day are just two examples of how to manage indoor air quality without a lot of additional resources.
- Schools can increase awareness among other school staff about their roles in maintaining good indoor air quality. For example, teachers can be encouraged to keep ventilation units free of clutter and to remove unnecessary items that harbor dust from their classrooms. Likewise, principals and superintendents can be encouraged to actively support enforcement of anti-idling and other environmental policies.

Strengths and Limitations

This survey collected information from school custodians in non-NYC elementary schools about factors relating to the school environment that can impact asthma. The content of this survey was based on an extensive review of the literature on school environmental conditions relevant to asthma. Although not all custodians who were asked to participate in this survey did so, school districts where at least one custodian participated were similar to districts as a whole in terms of factors related to asthma, including poverty level, racial composition and degree of urbanicity. However, since the survey was not sent to schools in NYC, the results are applicable only to schools in the rest of NYS. Many custodians were unsure of or did not answer questions pertaining to key IAQ policies and programs, underscoring the need for a survey of district level facilities managers who are more knowledgeable about these issues. The latter survey was carried out one year after the completion of the custodian survey (see pages 56-64 for more information).

Selected Resources*

General Asthma Information

- **Asthma and Allergies website, Centers for Disease Control (CDC)**
Available from: <http://www.cdc.gov/health/asthma.htm>
- **New York State Asthma Information, New York State Department of Health (NYSDOH)**
Available from: <http://www.health.state.ny.us/diseases/asthma>

Trigger Reduction and School Environmental Management Resources

- **Indoor Air website, Environmental Protection Agency (EPA)**
Available from: <http://www.epa.gov/iaq/index.html>. For general information on Indoor Air Quality, you can call EPA's IAQ INFO Hotline at (800) 438-4318.
- **Indoor Air Quality Tools for Schools (IAQ Tfs) Kit, Environmental Protection Agency (EPA)**
Available from: <http://www.epa.gov/iaq/schools/toolkit.html>. Alternatively, for general information about indoor air quality, call the EPA's IAQ info hotline at (800) 438-4318. Additional contact information is listed at the end of this report.
- **Mold Remediation in Schools and Commercial Buildings, Environmental Protection Agency (EPA)**
Available from: <http://www.epa.gov/mold/moldresources.html>. Also available by sending a request to the following address (be sure to reference EPA document number EPA 402-K-01-001 when ordering): National Center for Environmental Publications (NSCEP), P.O. Box 42419, Cincinnati, OH 42419; or by phone at 1 (800) 490-9198; or by fax at (513) 489-8695.
- **Healthy SEAT, Environmental Protection Agency (EPA)**
Available from: <http://www.epa.gov/schools/healthyseat>
- **Healthy School Environment Resources, Environmental Protection Agency (EPA)**
Available from: <http://cfpub.epa.gov/schools>
- **What's That Smell?: Simple Steps to Tackle School Air Problems, Asthma Regional Council (ARC)**
Available from: www.asthmaregionalcouncil.org (follow the link to publications) or by mail from: Asthma Regional Council, The Medical Foundation, 622 Washington Street, 2nd floor, Dorchester, MA 02124. Alternatively call (617) 451-0049 Ext. 504, for information.
- **Reducing Asthma Triggers in Schools: Recommendations for Effective Policies, Regulations and Legislation, Asthma Regional Council (ARC)**
Available from: www.asthmaregionalcouncil.org (follow the link to publications) or by mail from Asthma Regional Council, The Medical Foundation, 622 Washington Street, 2nd floor, Dorchester, MA 02124. Alternatively call (617) 451-0049 Ext. 504, for information.

*For additional resources and more detailed information about the above resources please refer to pages 62-68.

What was the purpose of this survey?

Many schools are adopting policies to better manage asthma in the school setting. These plans often include a component aimed at reducing exposure to environmental triggers by improving indoor air quality (IAQ) and other environmental controls. However, little is known about the presence of IAQ policies that are instituted at the school district level. To find out how common school IAQ and environmental control policies are in NYS, the NYSDOH conducted a survey of district facilities managers in NYS public school districts, excluding NYC.

Who was invited to participate in the survey?

This survey was first distributed at the 2004 annual meeting of the NYS Association for Superintendents of School Buildings and Grounds. To obtain a more representative sample, the survey was also mailed to district facilities managers in public school districts throughout NYS, excluding NYC. A copy of the survey was also made available on the New York State Education Department (NYSED) Office of Facilities Planning website.

When was the survey conducted?

The survey was conducted during the 2004-2005 school year.

What information was collected?

The survey asked district facilities managers about district-wide environmental policies and actions, with an emphasis on management of IAQ. The survey contained some questions related to broad IAQ policies and programs (e.g., EPA's Tools for Schools or other IAQ management programs) and some questions related to specific IAQ management practices or actions (e.g., airing out new carpets prior to installation, use of green-rated cleaning products). District facilities managers provided information about existing policies as well as plans for future implementation of environmental policies. They were also asked about their experiences and opinions regarding effective management of IAQ in the school setting

KEY POINTS: Survey of District Facilities Managers in NYS Public School Districts

- The surveys were distributed to district facilities managers in public school districts across NYS, excluding NYC.
- District facilities managers answered questions about broad-based district-wide environmental policies such as the use of an IAQ management program as well as specific policies affecting IAQ.
- The survey was conducted during the 2004-2005 school year.

How many school districts participated in the survey?

District personnel from 326 public school districts (or about 44% of all NYS public school districts, excluding NYC) completed and returned the survey (Figure 5-1). Nearly three quarters of the respondents identified themselves as a District Facilities Director or Superintendent of Buildings and Grounds. Other job descriptions included Head Custodian, Plant and Facilities Administrator and District Superintendent.

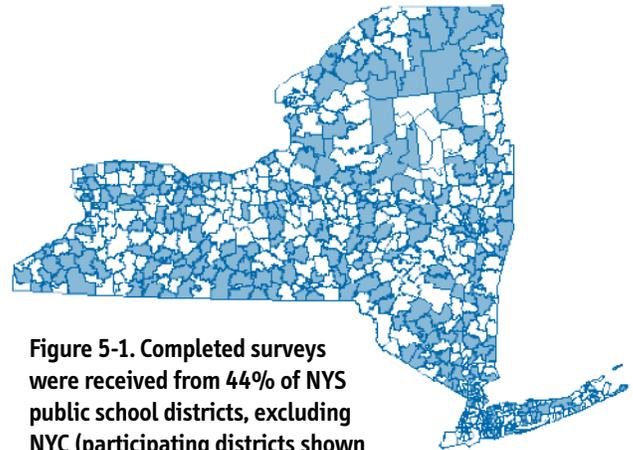


Figure 5-1. Completed surveys were received from 44% of NYS public school districts, excluding NYC (participating districts shown in blue).

What district level policies are in place to minimize exposure of staff and students to construction?

District facilities managers reported that major construction/ renovation was typically conducted during the summer recess (97%) or after school hours (59%), but 14% reported that major work also occurred during the school day (Figure 5-2). Minor construction/ renovations were often conducted during the school day (62%), after hours (61%) and during the summer recess (49%). Overall, 64% of districts reported that some type of work (major or minor) typically occurred during the school day. Nearly all districts (99%) indicated that precautions were taken during school construction/renovation when students and staff were in the building.

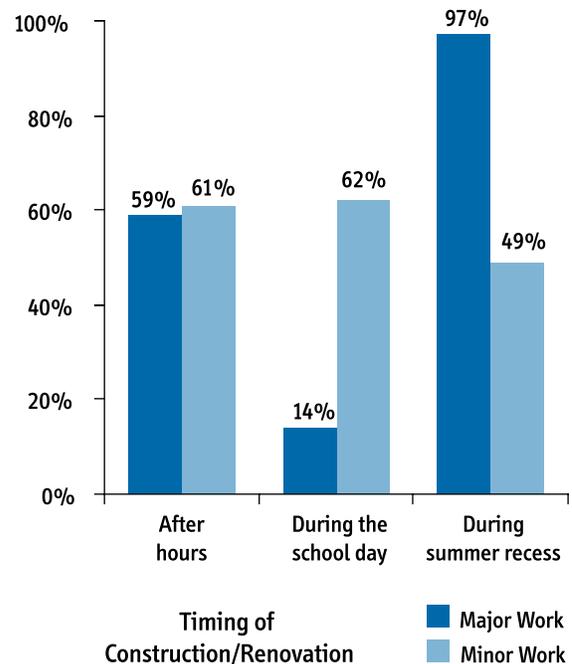


Figure 5-2. Major construction or renovation work was typically conducted during the summer recess or after school hours.

How common are policies to limit the idling of vehicles on school grounds?

Anti-idling policies were reported to exist in 60% of responding districts. An additional 9% of districts reported plans to implement an anti-idling policy.

- Sixty percent of school districts currently had an anti-idling policy in place.

Are school districts practicing Integrated Pest Management (IPM)?

Among the districts included in our survey, 82% were practicing IPM. Both pests (such as cockroaches and rodents) and pesticides can be asthma triggers. IPM is a way of controlling pests without relying heavily on pesticides, through improved cleaning, better storage of food and garbage, and strategic use of chemicals.

How do districts handle IAQ complaints from parents, faculty and students?

89% of districts reported some formal procedure or structure for handling indoor air quality complaints, including a district Health and Safety Committee (75%) and/or other formal structure or procedure (58%). Health and Safety Committees were present in 92% of participating non-NYC public school districts. These committees were slightly more common in districts that used an IAQ program (94%) than in districts that did not have one in place (88%).

Are NYS public school districts using formal IAQ management programs?

Over half of the responding districts (58%) reported that at least one school in the district was following a formal IAQ program. Forty-eight percent were using EPA's Tools for Schools (TfS) and 14% were using another IAQ management program, either independently or in conjunction with EPA's TfS (Table 5-1). An additional 13% of districts indicated future plans to implement such a program in at least one school, while district-wide IAQ programs were already in place in 47% of districts surveyed.

- Most public school districts reported use of integrated pest management, a way of controlling pests without relying heavily on pesticides.

- In 89% of districts, a formal structure or procedure for handling complaints about indoor air quality was reported to exist. This was most commonly a Health and Safety Committee.
- Health and Safety Committees were present in 92% of participating districts, and were slightly more common in districts using a formal IAQ program.

Table 5-1. At least one school in over half of the districts surveyed was using the EPA's TfS or other formal IAQ management program.

NYS public school districts using formal IAQ management programs

At least one school in the district	#	%
Uses EPA's Tools for Schools	156	48%
Uses another formal IAQ program	45	14%
Either of the above	188	58%
Plans to implement an IAQ program	41	13%
District-wide programs Any formal IAQ program	154	47%

What are NYS public school districts doing to assess the IAQ in school buildings?

Overall, 60% of all districts indicated completion of an annual school walkthrough to assess school building and environmental conditions, 37% had appointed an IAQ coordinator and 30% had developed an IAQ management plan. Steps taken to assess IAQ were more common in districts where at least one school used a broad IAQ management program than in districts where no IAQ program existed. Less than a quarter of districts without any IAQ program reported development of an IAQ plan, naming of an IAQ coordinator or completion of a school walkthrough. On the other hand, at least half of the districts with some IAQ program had taken these steps (Figure 5-3).

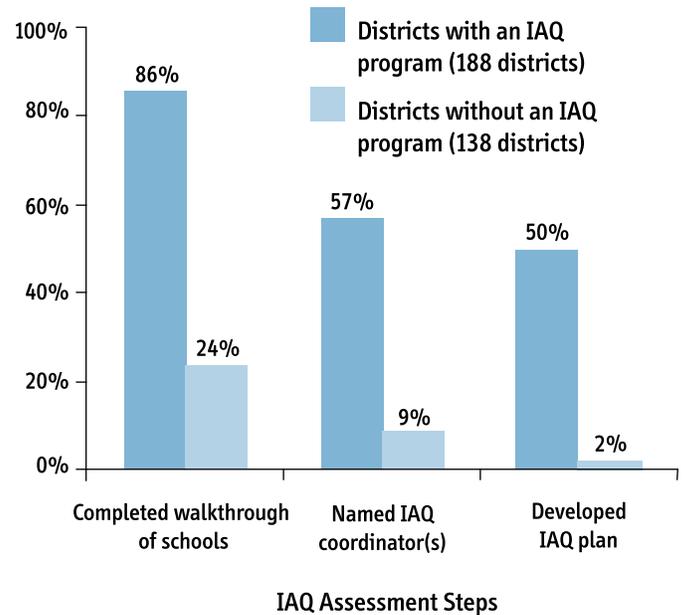


Figure 5-3. Many districts had completed a walkthrough assessment of school buildings, but fewer had named an IAQ coordinator or developed an IAQ plan.

Are districts using the IAQ checklists that are available as part of the EPA's TFS program?

A series of IAQ management checklists are available as part of the EPA TFS program. About half of the districts reported completion of the ventilation checklists (52%). Fewer districts reported that maintenance checklists (45%), renovations and repairs checklists (40%) and teacher's checklists (15%) had been distributed. Though more common among districts with some broad IAQ program, use of EPA TFS checklists was not limited to these districts (Figure 5-4).

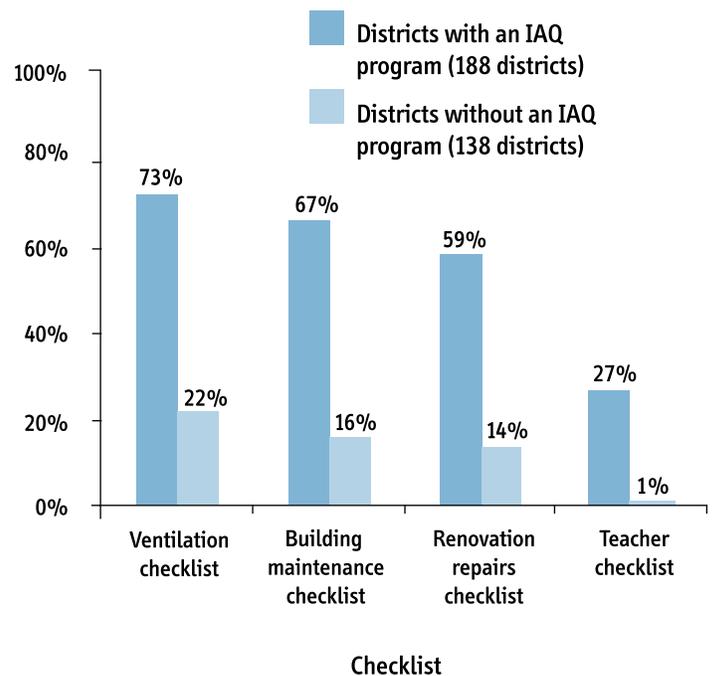


Figure 5-4. Ventilation, building maintenance and renovation/repairs checklists were completed more often than teacher's checklists.

What steps have school districts taken to minimize student and staff exposure to chemicals and odors?

Many districts had a chemical hygiene program in place (77%). A chemical hygiene program minimizes exposure to hazardous chemicals. Chemical hygiene programs were more common in districts with formal IAQ programs (86%) than in districts without programs (64%). Newly painted areas were aired out before being reoccupied in 92% of the districts and new carpets were aired out before installation in 68% of the districts. Both of these steps were more common among districts with a broad IAQ program or policy (Figure 5-5).

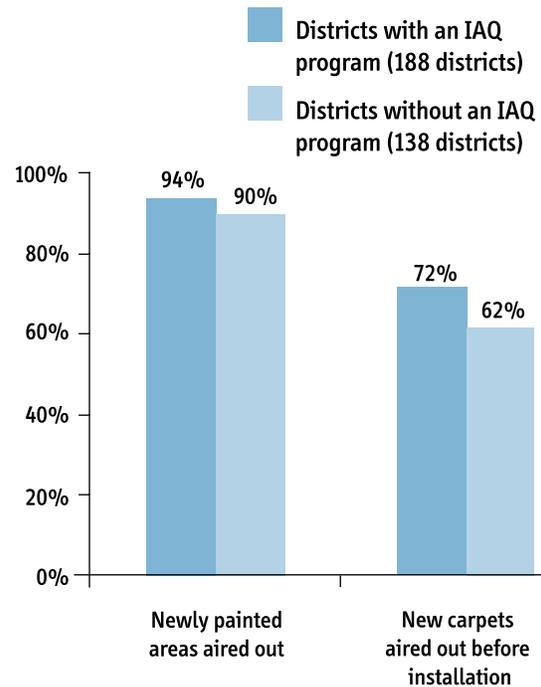


Figure 5-5. In most districts, newly painted areas were aired out before being occupied and new carpets were aired out before installation.

What district level policies exist to promote environmentally friendly cleaning practices in NYS schools?

Green-rated cleaning products are products that can be used safely and that do not harm, or that minimize the harm, to people and to the environment. Green-rated cleaning products were used in 54% of all responding districts and HEPA filters were used in cleaning in 52% of districts. These practices were more common in districts with broad IAQ programs (Figure 5-6). This survey was conducted during the 2004-2005 school year, prior to state legislation that took effect in September 2006 and which requires all NYS schools to purchase or use environmentally sensitive cleaning products.

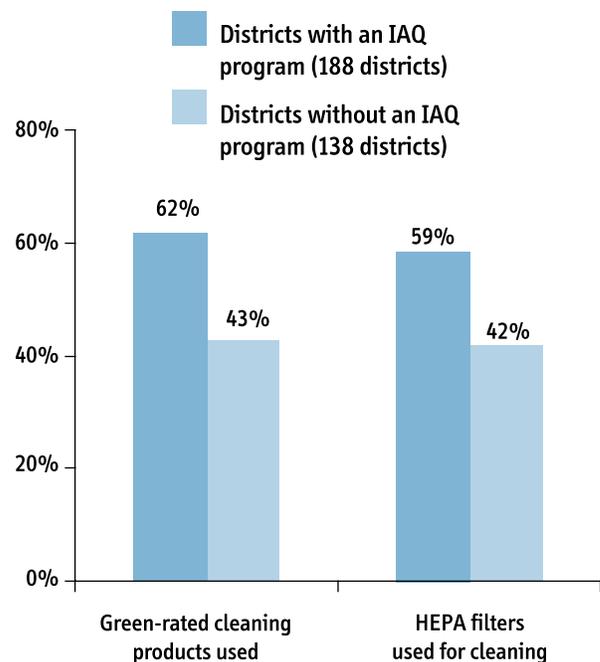


Figure 5-6. More than half of school districts with an IAQ program use green-rated cleaning products and HEPA filters in cleaning.

How common are district level policies regarding animals or pets in the classroom?

Less than a third (29%) of the districts surveyed had a policy regarding animals, a potential source of allergens, in the classroom. This was true of districts with broad IAQ management programs (only 30% had such a policy) and of districts without an IAQ program (27%).

Do districts generally keep a log or other record of maintenance activities (e.g., filter changes)?

Keeping maintenance logs was reported in 85% of districts. In districts with broad IAQ programs, 90% kept maintenance logs compared to 77% in districts without broad IAQ programs.

What strategies do district-level administrators believe are most effective or important for addressing IAQ problems?

When asked about the most effective or important strategies for addressing IAQ problems, the most common responses included preventative maintenance, prompt and honest communication and timely action to correct problems.

Is there a disconnect between IAQ practices and policies at the district level and at the school level?

To assess the consistency of policies and practices instituted at the district level with those individual schools making up the district, comparisons were made between the information obtained from this school district survey and that obtained from the custodian survey of elementary schools (see pages 45-55).

In school districts that reported limiting bus idling, using green-rated cleaning products, or airing out new carpets, less than half of the corresponding elementary schools participating in the custodian survey reported these practices. Only about one-third of elementary schools in school districts reporting a district-wide IAQ program also reported having such a program.

- Less than one-third of the districts surveyed have a policy governing animals in the classroom. Such policies were slightly more common in districts with formal IAQ programs.

- Most districts keep a log or other record of maintenance activities. Maintenance logs were more common in districts with formal IAQ programs.

- Many district facilities managers highlighted the role of preventative maintenance in preventing IAQ problems.
- Some district facilities managers emphasized the need for open and timely communication when responding to IAQ complaints or concerns.
- Timely, reasonable action was also mentioned by several district facilities managers.

- In districts reporting certain practices designed to improve school indoor air quality, less than half of participating elementary schools from the survey of custodians reported the same, and in districts reporting IAQ programs, only one-third of these elementary schools reported such programs.

Summary

To supplement information obtained from the survey of custodians (see pp. 45-55), this survey asked district facilities managers questions about programs, practices and policies related to school IAQ. Forty-four percent of non-NYC school districts participated in this survey. District-wide IAQ programs were reported to exist in 47% of responding NYS public school districts and 58% reported that at least one school in the district is following an IAQ program. However, having an IAQ program or policy does not guarantee that steps have been taken to improve school IAQ. Likewise, some districts that lack a formal IAQ policy or program may be taking steps to improve specific areas of school IAQ (e.g., through use of IPM, anti-idling policies, etc.). Some specific IAQ policies seem to be widely implemented in schools with and without formal IAQ programs, but there is significant room for improvement. More than 80% of district facilities managers reported having the following policies or taking the following steps: precautions during construction (99%), airing out newly painted areas (92%), IAQ complaint procedures/mechanisms (89%), using maintenance logs (85%), airing out new carpets prior to installation (81%) and use of integrated pest management (81%). However, 40% of districts lacked an anti-idling policy for buses, 71% had no classroom pet policy (or were unsure if such a policy existed) and 35% lacked a policy to use green-rated cleaning products. Furthermore, a comparison of results from this survey with those of the survey of school custodians indicates that policies and programs instituted by districts are not always put into practice at the school level.

Highlights

- 44% of non-NYC school districts participated in this survey.
- 47% of participating school districts reported having district-wide IAQ programs or policies in place. In over half of school districts, at least one school uses a formal IAQ program.
- Some steps to assess and improve school IAQ were fairly common in NYS school districts, including taking precautions during construction, airing out newly painted areas, airing out new carpets and use IPM.
- Many districts still lack key IAQ policies. For example, less than 30% of the districts surveyed have a policy concerning animals in the classroom, and about 40% of school districts did not have a bus anti-idling policy in place at the time of the survey.
- Environmental policies instituted at the district level may not always be translated into everyday practice at the school level.

Actions and Recommendations

- School districts can use this information and the resources at the end of this section to think about how they might develop sustainable programs that incorporate low-cost strategies to improve and maintain good IAQ.
- The NYSDOH should consider collaboration with NYSED to encourage districts to use their annual visual inspections as a framework for using EPA's Healthy SEAT program, a computer-based product that helps schools track environmental conditions and identify areas for improvement. Information about this program is listed under the resource listing at the end of this section.
- Examination of district level versus school level IAQ policies on the part of school districts may highlight opportunities to close gaps between policy and implementation.

Strengths and Limitations of This Survey

This survey asked district facilities managers questions about programs, practices and policies related to school IAQ because the facilities manager has more knowledge and expertise in these areas than many custodians do. Therefore, information from this survey is an important supplement to that obtained from the survey of school custodians. However, less than half of the districts surveyed responded, limiting the ability to apply these findings to NYS school districts as a whole, and to compare information from this survey to information obtained from the survey of school custodians. Comparison between these two surveys is also limited by the fact that the information is coming from two different levels: schools and districts. Nevertheless, some useful comparisons were made in districts where at least one school participated in the custodian survey, enabling disconnects to be identified between policies and programs on the school and district levels.

Selected Resources*

General Asthma Information

- **Asthma and Allergies website, Centers for Disease Control (CDC)**
Available from: <http://www.cdc.gov/health/asthma.htm>

Policy and Administrator Resources

- **School Health Index, Centers for Disease Control (CDC)**
Available from: <http://apps.nccd.cdc.gov/SHI/Default.aspx> or by mail (Healthy Youth, P.O. Box 8817, Silver Spring, MD 20907), email (CDC-INFO@cdc.gov) or phone 1 (800) CDC-INFO (1 800 232-4636), TTY: 1 (888) 232-6348
- **Schoolhouse in the Red: An Administrator's Guide to Improving America's School Facilities and Environment, American Association of School Administrators (AASA)**
Available from: Copies are available for \$12 by contacting Toni Moore at (703) 875-0762 or amoores@aasa.org or by mail from American Association of School Administrators, 801 N. Quincy Street, Suite 700, Arlington, VA 22203.
- **Fit, Healthy and Ready to Learn: A School Health Policy Guide, National Association of State Boards of Education (NASBE)**
Available from: <http://www.nasbe.org/HealthySchools/fithealthy.html>
- **Asthma in Schools 101, National School Boards Association**
Available from: <http://www.nsba.org> or by email: schoolhealth@nsba.org, phone: (703) 838-6722, fax: (703) 548-5516 or mail: National School Boards Association (NSBA), 1680 Duke Street, Alexandria, VA 22314.

Trigger Reduction and School Environmental Management Resources

- **Indoor Air website, Environmental Protection Agency (EPA)**
Available from: <http://www.epa.gov/iaq/index.html>. For general information on Indoor Air Quality, you can call EPA's IAQ INFO Hotline at (800) 438-4318.
- **Indoor Air Quality Tools for Schools (IAQ Tfs) Kit, Environmental Protection Agency (EPA)**
Available from: <http://www.epa.gov/iaq/schools/toolkit.html>. Additional contact information is listed at the end of this report.
- **Healthy SEAT, Environmental Protection Agency (EPA)**
Available from: <http://www.epa.gov/schools/healthyseat>
- **Healthy School Environment Resources, Environmental Protection Agency (EPA)**
Available from: <http://cfpub.epa.gov/schools>

**For additional resources and more detailed information about the above resources, please refer to pages 62-68.*

General Asthma Information

- **Asthma and Allergies website, Centers for Disease Control (CDC)**
Available from: <http://www.cdc.gov/health/asthma.htm>
 - Links to information about asthma, the impact of asthma on children and adolescents, data and statistics about the prevalence of asthma nationwide and information about asthma management interventions, legislation and policies. This page also has a link to another CDC webpage, *Healthy Youth: Asthma in Schools* that focuses specifically on asthma in schools.
- **New York State Asthma Information, New York State Department of Health (NYSDOH)**
Available from: <http://www.health.state.ny.us/diseases/asthma>
 - This web site is designed to provide accurate, current and useful information for people with asthma and for the people who care for them. The website includes a general overview of asthma, information on asthma in New York State, a description of New York State asthma initiatives, updated clinical guidelines, sample asthma management materials and much more.
- **Asthma and Children, American Lung Association (ALA)**
Available from: <http://www.lungusa.org> (follow the links to Asthma > Asthma and Children).
Alternatively, call 1 (800) LUNG-USA (1 800 586-4872) for information.
 - This section of the American Lung Association website is devoted to information on childhood asthma. Topics include an overview of childhood asthma, a childhood asthma fact sheet, information about controlling asthma in children, asthma medications, special camps and clubs for kids with asthma and a section on teens with asthma. This page also contains links to school-based programs such as *Open Airways for Schools* and the *Asthma Friendly Schools Initiative* (follow the links to Asthma > Asthma Management).

School Asthma Tools, Kits and Resources

- **Asthma-Friendly Schools Initiative (AFSI) and Toolkit, American Lung Association (ALA)**
Available from: <http://www.lungusa.org/> (follow the links to Asthma > Asthma Management).
Alternatively, call 1 (800) LUNG-USA (1 800 586-4872) for information.
 - The Asthma-Friendly Schools Toolkit is a comprehensive toolkit designed to help communities and organizations successfully implement asthma management programs within local school structures. The toolkit has six major sections, including: community asthma planning, maximizing school health services, building asthma education awareness, healthy school environments, physical activity and asthma resources. Recognizing that every community is unique, the toolkit is designed to allow schools, organizations and communities to focus on their individual needs.
- **Healthy Youth: Asthma in Schools website, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control (CDC)**
Available from: <http://www.cdc.gov/HealthyYouth/asthma/>
 - This section of the CDC website is dedicated to information and resources related to school asthma. Data and statistics about asthma and school asthma policies are presented alongside information about evidence-based strategies for addressing asthma in the school setting and about national, state and local school asthma programs. References, publications and related links are also listed.

- **Managing Asthma: A Guide for Schools, National Institutes of Health, National Asthma Education and Prevention Program**

Available from: http://www.nhlbi.nih.gov/health/prof/lung/asthma/asth_sch.htm or by mail from: U.S. Department of Health and Human Services, National Institutes of Health, National Heart, Lung and Blood Institute, (request NIH Publication No. 02-2650)

- This guide is a useful resource for schools interested in planning a new asthma management program or in building upon an existing program. Though detailed information on environmental conditions/remediation may be lacking, the guide includes many helpful checklists, sample letters and sample asthma action plans that schools can use or adapt as part of their own asthma management program.

- **How Asthma-Friendly Is Your School?; Su escuela tiene en cuenta a los niños con asma? National Institutes of Health, National Asthma Education and Prevention Program**

Available from: <http://www.nhlbi.nih.gov/health/public/lung/asthma/friendhi.htm>

- Available in English or Spanish, this evaluation tool contains seven questions to help parents and school staff identify potential problems for children with asthma in the school setting. A list of organizations and resources is also provided to assist parents and staff in taking action to promote an asthma-friendly school environment.

School Nurse and Asthma Management Tools

- **Open Airways for Schools (OAS), American Lung Association (ALA)**

Available from: <http://www.lungusa.org/> (follow the links to Asthma > Asthma Management).
Alternatively, call 1-800-LUNG-USA (1-800-586-4872) for information.

- This program is designed to improve self-management skills among students with asthma, decrease asthma emergencies, raise asthma awareness and promote coordination of asthma management among doctors, parents and school staff. Through group discussion, stories, games and role-play, students with asthma are encouraged to learn about asthma and asthma medication, how to recognize and manage asthma symptoms, how to avoid asthma triggers, how to get enough exercise and how to do well at school.

- **Allergy and Asthma Tool Kit for School Nurses, National Association of School Nurses (NASN) and American Academy of Allergy, Asthma and Immunology (AAAAI)**

Available from: http://www.aaaai.org/members/allied_health/tool_kit/

- Background information, PowerPoint presentations, handouts, sample letters, sample action plans and other assessment and planning tools to evaluate and improve asthma management in the school setting. Some materials are also available in Spanish.

- **Is the Asthma Action Plan Working?: A Tool for School Nurse Assessment, National Institutes of Health, National Asthma Education and Prevention Program**

– Available from: http://www.nhlbi.nih.gov/health/prof/lung/asthma/asth_act_plan_frm.htm

This tool will help school nurses to evaluate how well an asthma action plan is working for an individual student and may also be a useful tool for asthma educators, primary care providers and asthma specialists.

- **When Should Students With Asthma or Allergies Carry and Self-Administer Emergency Medications at School?**, **National Institutes of Health (NIH), National Heart, Lung and Blood Institute**
Available from: http://www.nhlbi.nih.gov/health/prof/lung/asthma/emer_medi.htm
 - This resource provides guidance in assessing when it may be appropriate for individual students to carry and self-administer prescribed asthma medications at school. Student, parent/guardian and school factors and perspectives are all considered in the context of the individual student’s personal asthma management plan.
- **Asthma Action Plan and Clinical Guidelines from the New York State Asthma Information website, New York State Department of Health (NYSDOH)**
Available from: <http://www.health.state.ny.us/diseases/asthma>
 - In addition to general asthma information and information about asthma in New York State, this website contains sample asthma management materials (such as an Asthma Action Plan available in English and Spanish) and updated clinical guidelines.
- **Quest for the Code: An Adventure Game about Managing Asthma for Children, Starbright Children’s Foundation**
Available from: Order the CD-ROM free of charge from <http://www.starlight.org> (follow links to Programs).
 - Quest for the Code is an interactive adventure game designed to teach asthma management skills children aged 7-15 years. The game is available in English and Spanish. An implementation guide is also available that contains helpful strategies on using the game to educate students one-on-one about their own asthma, teach asthma management skills to a group of students or a class, integrate the game into existing classes, and educate parents about their child’s asthma.

Resources for Classroom Teachers, P.E. Teachers and Coaches

- **Tips for Teachers, Promoting Healthy Schools, Asthma Regional Council (ARC)**
Available from: www.asthmaregionalcouncil.org (follow the link to publications) or by mail from Asthma Regional Council, The Medical Foundation, 622 Washington Street, 2nd floor, Dorchester, MA 02124. Alternatively call (617) 451-0049 Ext. 504, for information
 - This is a one page summary of actions teachers can take to improve the indoor air quality of their classrooms.
- **Asthma and Physical Activity in the School, National Institutes of Health, National Heart, Lung and Blood Institute**
Available from: http://www.nhlbi.nih.gov/health/public/lung/asthma/phy_asth.htm or by mail from NHLBI Health Information Center, P.O. Box 30105, Bethesda, MD 20824-0105 (NIH Publication No. 95-3651, include order form and check or credit card number). Alternatively call (301) 592-8573 (or 240 629-3255 for TTY) or fax (240) 629-3246.
 - Provides guidance and information for teachers and coaches who want to help students with asthma safely participate in sports and other physical activities throughout the school day. In addition to a reproducible asthma action card, this resource contains information about the causes and symptoms of asthma, how to avoid and control asthma triggers, how to help students who take medications and how to make activities more asthma-friendly.

- **Asthma Awareness: Curriculum for the Elementary Classroom, National Institutes of Health, National Heart, Lung and Blood Institute**
Available from: <http://www.nhlbi.nih.gov/health/prof/lung/asthma/school/index.htm> or by mail from NHLBI Health Information Center, P.O. Box 30105, Bethesda, MD 20824-0105 (NIH Publication No. 93-2894, include order form and check or credit card number). Alternatively call (301) 592-8573 (or 240 629-3255 for TTY) or fax (240) 629-3246.
 - This curriculum is appropriate for use with elementary school children and includes separate objectives and lesson plans targeted for younger and older elementary school students. These lessons may function as part of a comprehensive health education curriculum or may be integrated into lessons across a variety of subject areas, including science, social sciences, math, art and language arts. The lessons are intended to help students develop a basic understanding of asthma, to inform students about appropriate actions to help people with asthma and to provide resources for students to share with parents and other family members.
- **Breathing Difficulties Related to Physical Activity for Students With Asthma: Exercise-Induced Asthma, Information for Physical Educators, Coaches and Trainers, National Institutes of Health, National Heart, Lung and Blood Institute**
Available from: http://www.nhlbi.nih.gov/health/prof/lung/asthma/exer_induced.htm
 - This tip sheet provides a summary of guidance and actions for preventing and responding to breathing difficulties associated with exercise-induced asthma. This tool can be a useful, quick reference for teachers, coaches or any other school staff that are involved with physical activity and/or sports programs for students.

Trigger Reduction and School Environmental Management Resources

- **Indoor Air website, Environmental Protection Agency (EPA)**
Available from: <http://www.epa.gov/iaq/index.html>. For general information on Indoor Air Quality, you can call EPA's IAQ INFO Hotline at (800) 438-4318.
 - This website contains links to many EPA resources related to indoor air quality, including asthma, molds, radon, green buildings and much more. Information related to the EPA's Tools for Schools (TfS) program (a program to help schools identify practical, low-cost ways to prevent and fix indoor air quality problems) is also available on this website.
- **Indoor Air Quality Tools for Schools (IAQ TfS) Kit, Environmental Protection Agency (EPA)**
Available from: <http://www.epa.gov/iaq/schools/toolkit.html> or from the IAQ Info Clearinghouse by mail, phone or fax (see below). Alternatively, for general information about indoor air quality, call the EPA's IAQ info hotline at (800) 438-4318.
 - IAQ INFO Clearinghouse
 - P.O. Box 37133
 - Washington, DC 20013-7133
 - Telephone: 1 (800) 438-4318 or (703) 356-4020
 - Fax: (703) 356-5386
 - Email: iaqinfo@aol.com

To obtain a hard copy of the toolkit, request EPA document number 402-K-05-001.

To obtain a copy of the toolkit on CD-ROM, request EPA document number 402-C-05-001.

To obtain a copy of the walkthrough video, request EPA document number 402-V-01-004.

To obtain a copy of ventilation basics video, request EPA document number 402-V-98-001.

- **The Indoor Air Quality Tools for Schools (IAQ TFS) Kit** is a comprehensive indoor air quality (IAQ) management tool that focuses on no-cost and low-cost actions to prevent and resolve common IAQ problems in the school setting. The kit contains information; sample policies, sample management plans and a series of checklists geared towards a variety of school personnel and can be customized to meet the needs of individual schools.
- **The IAQ Tools for Schools Walkthrough Video:** Four Schools Making a Difference demonstrates the school walkthrough assessment component of the TFS process (available as a videocassette).
- **The Indoor Air Quality Tools for School Taking Action Video & Ventilation Basics Video** videos are available to support the implementation of the TFS program. The **Taking Action video** features the story of one school's success in implementing the toolkit while **Ventilation Basics** video focuses on demonstration of basic techniques that will help schools prevent or solve common indoor air quality problems (available as a videocassette).
- An asthma companion piece for the **IAQ TFS** toolkit, entitled **Managing Asthma in the School Environment**, may be found at <http://www.epa.gov/iaq/schools/asthma>.
- **Mold Remediation in Schools and Commercial Buildings, Environmental Protection Agency (EPA)**
Available from: <http://www.epa.gov/mold/moldresources.html>. Also available by sending a request to the following address (be sure to reference EPA document number EPA 402-K-01-001 when ordering): National Center for Environmental Publications (NSCEP), P.O. Box 42419, Cincinnati, OH 42419; or by phone at 1 (800) 490-9198; or by fax at (513) 489-8695.
 - This booklet describes how to prevent, investigate, evaluate and remediate moisture and mold problems in schools and commercial buildings. Additional resources include a mold remediation checklist (removable and laminated), a glossary of mold terms, and an introduction to molds and associated health effects.
- **Healthy SEAT, Environmental Protection Agency (EPA)**
Available from: <http://www.epa.gov/schools/healthyseat>
 - This software tool combines key components from various EPA programs for schools to help schools and school districts customize the evaluation and management of school environmental conditions. District-level staff can use the software to conduct assessments and to track and manage environmental conditions by individual school. A variety of resources and web links to more detailed information are also provided.

- **Healthy School Environment Resources, Environmental Protection Agency (EPA)**

Available from: <http://cfpub.epa.gov/schools>

- On-line resources to help facility managers, school administrators, architects, design engineers, school nurses, parents, teachers and staff address environmental health issues in schools (including: chemical use and management, design, construction and renovation, energy efficiency, environmental education, facility operations and maintenance, indoor environmental quality, legislation and regulation, outdoor air pollution, portable classrooms, safety and preparedness, school facility assessment tools, waste, waste reduction and water).

- **What's That Smell?: Simple Steps to Tackle School Air Problems, Asthma Regional Council (ARC)**

Available from: www.asthmaregionalcouncil.org (follow the link to publications) or by mail from:

Asthma Regional Council, The Medical Foundation, 622 Washington Street, 2nd floor, Dorchester, MA 02124. Alternatively call (617) 451-0049 Ext. 504, for information.

- This pamphlet is a step-by-step guide for schools interested in learning more about indoor air quality problems and in identifying simple strategies for assessing and resolving problems. This resource also addresses the question of hiring outside, professional help and offers advice to schools about how to evaluate the need for additional help and about what types of help may be available.

- **Reducing Asthma Triggers in Schools: Recommendations for Effective Policies, Regulations and Legislation, Asthma Regional Council (ARC)**

Available from: www.asthmaregionalcouncil.org (follow the link to publications) or by mail from

Asthma Regional Council, The Medical Foundation, 622 Washington Street, 2nd floor, Dorchester, MA 02124. Alternatively call (617) 451-0049 Ext. 504, for information.

- This document lists policies/actions for ventilation, maintenance, chemicals and construction/renovation. Legislation, assessment and funding of environmental remediation are also discussed.

Policy and Administrator Resources

- **School Health Index, Centers for Disease Control (CDC)**

Available from: <http://apps.nccd.cdc.gov/SHI/Default.aspx> or by mail (Healthy Youth, P.O. Box 8817, Silver Spring, MD 20907), email (CDC-INFO@cdc.gov) or phone 1 (800) CDC-INFO, (1 800 232-4636), TTY: 1 (888) 232-6348)

- The SHI is an easy to use, voluntary and completely confidential, assessment and planning tool that schools can use to evaluate and improve their health and safety policies and programs. Schools can choose to either comprehensively evaluate their schools health policies and programs or may opt to evaluate only those policies/programs related to asthma. The tool is available online and may be used interactively online, downloaded, or used as a paper version ordered from the website.

- **Schoolhouse in the Red: An Administrator's Guide to Improving America's School Facilities and Environment, [American Association of School Administrators \(AASA\)](#)**

Available from: Copies are available for \$12 by contacting Toni Moore at (703) 875-0762 or amoore@aasa.org or by mail from American Association of School Administrators, 801 N. Quincy Street, Suite 700, Arlington, VA 22203.

- This booklet offers practical guidance for school administrators by discussing the financial and legal issues related to school environmental conditions and improvement efforts. Topics addressed include the impact of poor environmental conditions on teaching, learning and health, an overview of the age, condition and cost of repairing America's school buildings, the importance of maintenance, energy efficiency, financial issues and opportunities, legal issues and resources and strategic alliances.

- **Fit, Healthy and Ready to Learn: A School Health Policy Guide, [National Association of State Boards of Education \(NASBE\)](#)**

Available from: <http://www.nasbe.org/HealthySchools/fithealthy.html>

- Fit, Healthy, and Ready to Learn contains publications, articles, policy briefs, sample policies, resources and links that reflect best practice strategies for various school health issues, including asthma. Policies and policy issues may be considered and adapted to fit local needs.

- **Asthma in Schools 101, [National School Boards Association](#)**

Available from: <http://www.nsba.org> or by email: schoolhealth@nsba.org, phone: (703) 838-6722, fax: (703) 548-5516 or mail: National School Boards Association (NSBA), 1680 Duke Street, Alexandria, VA 22314.

- This information packet contains information about asthma management within the school system, including articles about best practices, sample policies and general asthma information. Copies can be requested using the online form or by contacting the NSBA.

- **Asthma: A Growing Epidemic, [National Conference of State Legislatures](#)**

Available from: <http://www.ncsl.org/programs/environ/envHealth/ehasthma.htm>

- This publication of the National Conference of State Legislatures discusses the growing asthma epidemic in the United States and what is being done at the federal and state levels to address the issue.

airways	The tubes that carry air in and out of the lungs.
asthma	A chronic disorder of the tubes that carry air in and out of a person's lungs. During an asthma attack, a person with asthma may experience symptoms such as wheezing, coughing, chest tightness or difficulty breathing. Asthma attacks may be triggered by a variety of factors including stress, illness, exercise and environmental conditions.
asthma triggers	Asthma triggers are different for every individual with asthma and may be anything that makes asthma symptoms worse. Common asthma triggers include exercise, infections, allergens, irritants, weather and emotions.
asthma hospitalization	A hospitalization for which asthma is listed as the principal diagnosis.
asthma management/ asthma education	Any strategies or materials used to educate people about asthma and/or to otherwise control or manage asthma symptoms. For example, providing training for teachers about asthma symptoms, allowing students to carry and self-administer inhalers and having an individual Asthma Action Plan for each student with asthma are all examples of different asthma management techniques in the school setting.
District Facilities Manager (DFM)	Used in this project to describe district-level personnel who are responsible for the environmental conditions and/or policies of school facilities within the district. Related job descriptions include: Superintendent of Buildings and Grounds, Director of Operations, Plant and Facilities Administrator, etc.
Environmental Protection Agency (EPA)	The mission of the Environmental Protection Agency is to protect human health and the environment. The EPA leads the nation's environmental science, research, education and assessment efforts by developing and enforcing environmental regulations, offering financial assistance and advice (through grants, fellowships, educational programs, etc), performing environmental research, sponsoring voluntary partnerships and programs, furthering environmental education and publishing information about human health and the environment.
episode (or attack or exacerbation)	An asthma episode (or attack or exacerbation) occurs when a person's asthma symptoms are worse than usual. This is usually in response to an asthma trigger. During an episode in which asthma symptoms worsen an individual student might seek relief by taking additional medication, going to the nurse's office or limiting physical activity.
geocoding	The process of assigning geographic identifiers to data records such as addresses.
HVAC system	The heating, ventilation and air conditioning system.

indoor air quality (IAQ)	The quality of the air inside a building that reflects conditions related to the health, comfort and performance of people inside the building. This may include factors such as temperature, humidity, concentrations of pollutants, allergens or irritants, etc.
indoor air quality program (IAQ program)	A formal set of practical and specific strategies to prevent and resolve indoor air quality problems.
integrated pest management (IPM)	IPM is a way of controlling pests without relying heavily on pesticides. For instance, improved cleaning and storage practices may reduce pest populations and pesticides may be applied on an “as needed” basis, rather than on a regular schedule to avoid unnecessary exposure to pesticide chemicals.
median	The middle value in an ordered distribution, or in cases where no single middle value exists, the mean (average) of the two middle values. For example, in the sequence 1,3,3,4,5 the median value is 3. In the sequence 1,3,3,4,5,6, the median value is 3.5 (or the average of 3 and 4).
morbidity	Morbidity can refer to the rate of sickness (due to particular disease within a specific population) or to a diseased state or symptom. For example, the proportion of students with asthma who limit their physical activity due to asthma.
NYS	New York State
NYSDOH	New York State Department of Health
NYSED	New York State Education Department
rate	The frequency of something relative to time, often measured per unit of something else. For example, the asthma hospitalization rate is really the number of asthma hospitalizations per 10,000 people per year. A person’s heart rate is the number of heartbeats per minute, etc.
socio-demographic	Social characteristics or traits of a population; for example average gender, age, income, level of education, race, ethnicity, etc.
SPARCS	The Statewide Planning and Research Cooperative System (SPARCS) database records admissions from all NYS hospitals by gathering inpatient information. The SPARCS is a legislatively mandated discharge database and contains discharge data abstracts for at least 95% of all NYS acute care hospitalizations, excluding psychiatric and federal hospitals. The discharge information from SPARCS includes the patient’s address, age, sex, race/ethnicity, and principal diagnosis. Because of the lack of reliable personal identifiers, this computerized dataset represents all admission events rather than individual patients.
Tools for Schools (TfS)	Tools for Schools is a toolkit, developed by EPA, to assist schools in developing and implementing an indoor air quality management program.
urbanicity	The degree to which a location is urban.

English

Asthma Action Plan

Directions to the Provider:

The purpose of this Asthma Action Plan is to help families become proactive and anticipatory with respect to asthma exacerbations and their control. The Asthma Action Plan should be used as an education and communication tool between the provider and the patient and his or her family. The patient/family should be able to demonstrate an understanding of the plan and the appropriate use of medicines.

This form has been designed for the primary care provider to use with families who need a relatively simple asthma management regimen. Once a family has become more informed about asthma, a plan can be developed with additional flexibility in treatment.

Families should be given additional educational materials about asthma, peak flow monitoring, and environmental control. A spacer should be prescribed for all patients using an MDI.

Give the top two copies of the form to the family, with instructions to give one copy to the child's school or day care. Keep one copy for your records.

Children over the age of six may be given peak flow meters to monitor their asthma. Parents of children under the age of six should use symptoms to determine the child's zone.

Zone Instructions:

The "Personal Best" peak flow should be determined when the child is symptom-free. A diary can be used to determine personal best, and usually are part of the peak flow meter package. A peak flow reading should be taken at all asthma visits and personal best should be redetermined regularly. Because peak flow meters vary in recording peak flow, instruct your patients to bring their peak flow meter to every visit.

Green: List all daily medicines. Fill in actual numbers, not percentages, for peak flow readings. Green zone is 100%—80% of personal best, or when no symptoms are present.

Yellow: Add medicines to be taken in the yellow zone and instruct the patient to continue with green zone medicines. Yellow zone is 80%—50% of personal best, or when the listed symptoms are present. Include **how long** to continue taking these medicines and when to contact the provider.

Red: List any medicines to be taken while waiting to speak to the provider or preparing to go to the emergency room. Red zone is 50% or below personal best, or when the listed symptoms are present.

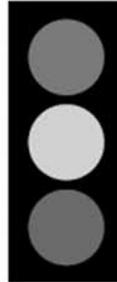
Peak Flow Chart:

Personal Best—100%	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320
Yellow—80%	80	90	95	105	110	120	130	135	145	150	160	170	175	185	190	200	210	215	225	230	240	250	255
Red—50%	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160

Personal Best—100%	330	340	350	360	370	380	390	400	420	440	460	480	500	520	540	560	580	600	620	640	660	680	700
Yellow—80%	265	270	280	290	295	305	310	325	335	350	370	385	400	415	430	450	465	480	495	510	535	545	560
Red—50%	165	170	175	180	185	190	195	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350

Asthma Action Plan

Name	Date
Doctor	Medical Record #
Doctor's Office Phone #: Day	Night/Weekend
Emergency Contact	
Doctor's Signature	



The Colors of a traffic light will help you use your asthma medicines.

Green means Go Zone!
Use preventive medicine.

Yellow Means Caution Zone!
Add quick-relief medicine.

Red means Danger Zone!
Get help from a doctor.

Personal Best Peak Flow _____

GO

You have all of these:

- Breathing is good
- No cough or wheeze
- Sleep through the night
- Can work and play

Peak flow from _____ to _____

CAUTION

You have any of these:

- First signs of a cold
- Exposure to known trigger
- Cough
 - Mild wheeze
- Tight chest
 - Coughing at night

Peak flow from _____ to _____

DANGER

Your asthma is getting worse fast:

- Medicine is not helping
- Breathing is hard and fast
- Nose opens wide
- Ribs show
- Can't talk well

Peak flow reading below _____

Use these daily preventive anti-inflammatory medicines:

MEDICINE	HOW MUCH	HOW OFTEN/WHEN

For asthma with exercise, take:

--	--	--

Continue with green zone medicine and add:

MEDICINE	HOW MUCH	HOW OFTEN/WHEN

CALL YOUR PRIMARY CARE PROVIDER.

Take these medicines and call your doctor now.

MEDICINE	HOW MUCH	HOW OFTEN/WHEN

GET HELP FROM A DOCTOR NOW! Do not be afraid of causing a fuss. Your doctor will want to see you right away. It's important! If you cannot contact your doctor, go directly to the emergency room. **DO NOT WAIT.**

Make an appointment with your primary care provider within two days of an ER visit or hospitalization.

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