

Managing asthma and allergies in schools: An opportunity to coordinate health care

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Children spend a great deal of time in school and can be exposed to situations that increase their risk for an asthma exacerbation or a reaction to food. As such, the clinician can play a significant role in educating children, their families, and school personnel about principles that can be applied not only to manage reactions when they occur but also to prevent them. This theme issue will provide information on indoor allergens commonly present in school and day care settings, as well as information on how to manage children with asthma and food allergies in these settings. (J Allergy Clin Immunol 2009;123:400-405.)

Key words: Allergy, anaphylaxis, asthma, asthma exacerbations, food allergy, school

Children with asthma and allergies spend a good portion of the week in the school setting and are left to the supervision of adults who might or might not be familiar with the management of asthma exacerbations and food allergies. Of greater importance is the application of measures that can prevent such reactions. Because children want to be active and maintain relationships with their peers, children with asthma and allergies might take risks that set them up for loss of asthma control or a reaction to a known allergen.

The clinician can play a significant role in educating children and their families, as well as school personnel, about appropriate steps to take in avoiding situations that place them at risk of harm. This theme issue provides information on methods clinicians can use to help provide a safe environment in the school setting for children with allergies and asthma. For example, the theme issue cover (Fig 1) shows children at school who are playing, perhaps at risk for exercise-induced asthma, and a child eating lunch, who could be at risk for an allergic reaction to food. These situations can be made risk free by applying some simple measures to avoid

such reactions. This editorial will highlight key messages from 6 articles included in this theme issue that address the management of allergies and asthma in schoolchildren.

INDOOR ALLERGENS IN SCHOOL AND DAY CARE ENVIRONMENTS

Salo et al¹ discuss the importance of indoor allergen exposures in school and day care settings, including exposure characteristics and the role of these exposures in relation to allergy and asthma symptoms, and they summarize information available regarding intervention strategies. They point out that in the past most attention has been placed on managing allergens in the home environment. However, recently it has become important to also direct attention to nonresidential indoor environments, such as schools and day care facilities, as sources of allergen exposure. This article is important because it provides current information on allergens in the school setting that contribute to allergic reactions and methods that could be developed to implement interventions to reduce the risk of allergic reactions.

To date, cat (Fel d 1), dog (Can f 1), dust mite (Der f 1 and Der p 1), cockroach (Bla g 1 and Bla g 2), and mouse (Mus m 1 and mouse urinary protein) allergens, as well as molds, have been the most frequently studied allergens. The authors provide a nice summary of the allergen levels and exposure characteristics. They point out that schools and day care centers can be important sites of exposure to cat and dog allergens, particularly for susceptible individuals. Interestingly, the number of pet owners at school or day care centers is one of the strongest predictors of increased cat and dog allergen levels in these settings. Dust mite allergen levels in these settings are associated with climatic, geographic, and building-related factors. Carpeting and upholstered furnishings are important reservoirs and sources of exposure, particularly in humid regions.

Schools can also be important sites for exposure to cockroach and mouse allergens, particularly in locations where roach and rodent infestations are common. However, information on these exposures is limited. The complexity of fungal exposure assessment and the lack of clearly defined threshold levels for fungi and derivatives of fungi that might be allergenic are also limiting. Also of importance is that the relationship of allergic respiratory diseases and indoor allergen exposures in schools and day care settings is not well characterized.

Based on a review of the available literature, Salo et al¹ conclude that multifaceted approaches, such as improvements in ventilation systems, control of excess moisture, reductions in potential dust reservoirs, regular and thorough cleaning and maintenance, pest control, and methods to reduce allergen load on clothing for children with pets, might be needed to decrease indoor allergen levels in schools and day care centers. However, there is

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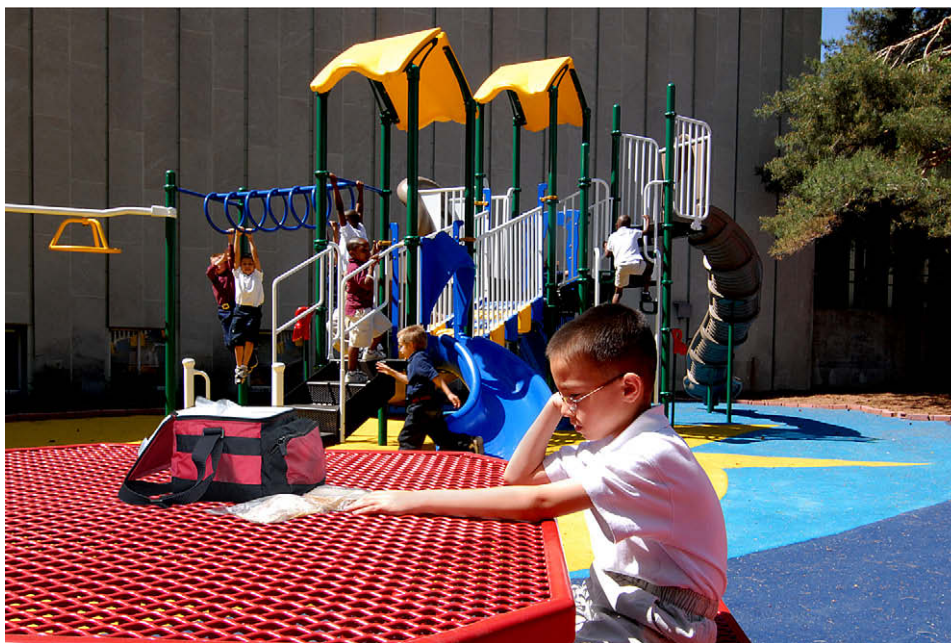


FIG 1. This picture was taken at the Kunsberg School at National Jewish Health. Over the years, this school has focused attention on managing the symptoms of children with severe asthma and allergies and chronic diseases that impair school attendance and performance. It is a major resource of information for the Denver community in creating an asthma- and allergy-friendly environment. The picture shows children at play, who might be at risk for exercise-induced asthma; however, they benefit from a well-designed treatment plan to ensure control, pretreatment for exercise, and an action plan available for managing exacerbations. Another child is eating lunch. This child brings his own lunch to school, prepared by his mother, and thus reduces the risk of contact with foods that might induce an allergic reaction.

limited information on how to choose and implement the most cost-effective intervention. They indicate that from a public health perspective, it would be important to examine the extent to which various interventions are able to influence exposure levels and building occupants', children's, and staff members' allergy- and asthma-related morbidity. From personal observations, school nurses can play an important role in educating the school staff about risky behaviors; however, they can benefit from guidance from the child's physician on what specific measures are clinically relevant to an individual child's safety in the school setting.

MANAGEMENT OF FOOD ALLERGIES IN SCHOOLS

Young et al² discuss the challenges of food allergy and other triggers of anaphylaxis in the school setting. There is an increasing population of children with food allergy, resulting in increased potential for anaphylaxis occurring in schools. They make the point that deficiencies in school management of food allergies have primarily been attributable to a lack of implementation of management plans and delayed recognition and management of anaphylaxis. They believe that implementation of simple methods to reduce the likelihood of ingestion of an avoided allergen, education about recognizing and treating anaphylaxis, and establishment and review of school procedures for allergy management should improve the health and safety of children with food allergies.

They also indicate that the allergist can play a key role in school management of food allergy through individualized diagnosis, management, and education, as well as serving as a resource to the school staff. It is crucial that policies be developed not only for the treatment of acute medical emergencies but for proactive and

preventive management as well. These policies should be based on the principles of food allergen avoidance and preparedness with epinephrine. Routine hand washing and cleaning are highly effective in the removal of food allergens. With school-wide policies and individualized health care plans in place, the student with food allergy and children at risk for anaphylaxis should have an optimal opportunity to attain the full benefits of a safe and healthy learning environment. They provide an excellent list of things that the allergist can do to assist in managing food allergy in schoolchildren. In my own experience, a personal call to the school nurse from a physician will help reinforce the need for special precautions, and a written plan will help to focus the necessary steps to avoid reactions and to train staff to identify and manage reactions, if they occur.

Although the safety measures addressed in this review can be directed to elementary through high school years, one should not forget that reactions also occur in college students. Greenhawt et al³ provide data from an online survey conducted with University of Michigan undergraduates. This survey revealed that only 40% of students with food allergy avoided a self-identified food allergen, and more than three quarters did not maintain self-injectable epinephrine. These behaviors obviously place the students at risk for serious reactions in a less supervised setting. Perhaps better management at an earlier age will reinforce principles of better self-management.

SCHOOL-BASED ASTHMA PROGRAMS

Bruzzese et al⁴ direct their attention to information available on identifying children with asthma and the available literature on

school-based interventions. They point out that although studies indicate that school-based programs have the potential to improve outcomes, competing priorities in the educational system present challenges to their implementation, and therefore practical, targeted, and cost-effective strategies are needed to ensure measurable success.

Available studies summarized in this review indicate that the high prevalence of asthma in school-aged children and the economic effect of asthma draw attention to the importance of asthma as a public health problem, particularly in inner cities. Many investigators have targeted schools as the setting for asthma interventions because schools provide reliable access to large numbers of children. In addition, schools are often the only setting of affordable health care for low-income and ethnic minority youth because of limited access to medical care. Therefore the school staff, through a school-based asthma program, can play an important role in identifying students with asthma, supervising medication administration, managing cases, and educating and teaching appropriate management skills to students, parents, and school personnel and in special settings might have the opportunity to deliver asthma care through a school-based health clinic.

Each type of strategy to improve asthma management in the school setting has certain benefits and limitations that are reviewed by the authors. They conclude that the success of school-based programs for asthma depends on a partnership with families and the health care system. The capabilities of individual school settings are highly variable, and a successful strategy that works in a school setting will be dependent on the resources that each component of the partnership can contribute.

In my own experience with developing a school-based asthma program in the Denver Public School system, I have found it important to develop a team approach that addresses the specific needs of the individual schools and to involve the school administration, school nurse, principal, teachers, secretarial staff, parents, and students in addressing the special needs of their student population. This is particularly important in the elementary and middle schools, where there is usually very limited availability of school nurses and high incidence of asthma exacerbations. Kruzick et al⁵ report on an evaluation of asthma control conducted in our Denver Public School system that indicates students might indeed have access to care but that such access does not ensure asthma control. There is a need for supplementary programs, potentially school-based asthma programs that can reinforce principles of self-care. The allergist can provide an important community service by developing asthma programs with school staff that foster an asthma-friendly environment.

SUPPORTING SUCCESSFUL ASTHMA MANAGEMENT IN SCHOOLS

Cicutto⁶ points out that schools represent a very important setting for managing asthma, which can be supportive or pose several barriers to successful asthma control. Students with asthma are at risk for greater school absence and for poorer school performance than those who do not have asthma.

Cicutto⁶ provides a useful checklist for asthma care providers to support successful asthma management in schools. Steps can be taken to create asthma-friendly and supportive schools, including identification and tracking of all students with asthma;

ensuring immediate access to medications as prescribed; using an individualized asthma action plan for all students with asthma; encouraging full participation in school-related activities, including physical activity; using standard emergency protocols for worsening asthma; educating all school personnel and students; identifying and reducing common asthma triggers; and ensuring communication and collaboration among school personnel, families, and health professions.

Asthma care providers play an important role in ensuring that these goals are attained. In some circumstances a family might need assistance from the student's physician or health care provider in advocating for the student to gain the right to self-carry an asthma inhaler. Physicians or other asthma health care providers might need to contact the principal if there is resistance to permit self-carrying of inhalers at school. An individualized school-based asthma plan is necessary to support successful asthma management and to serve as a communication and coordination tool among the student, parents/guardians, health care provider, and school personnel, including the school nurse. Schools can pose challenges for students with asthma, but effective partnerships and communication can overcome these challenges.

In our experience with an asthma program in the Denver Public School system, we have observed that there is a low availability of rescue inhalers and asthma action plans for students with asthma. We have instituted programs that help nurses track individual students for school absence, availability of asthma medications, and an action plan. With the advanced computer systems now available, lines of communication that were not previously feasible are rapidly being implemented. Such communication systems should help reduce school absence and improve school performance and thus minimize the effect of chronic disease.

OPPORTUNITIES

Great care has been applied to developing asthma guidelines that provide principles of asthma management to achieve optimal control.^{7,8} We can expect the introduction of guidelines to help manage and prevent food allergy. The success of these guidelines will only be achieved if health care providers support and implement these guidelines. Another important feature is to reduce the effect of asthma and allergy on school attendance and performance, as well as the risk for catastrophic events. This editorial has focused attention on highlighting the information presented in 4 theme issue reviews that clinicians can use to improve the quality of life of children with asthma and food allergies in the school and day care setting. A previous issue of the *Journal* described factors that affect the prevalence and severity of asthma exacerbations, including children in the school setting (ie, the September epidemic).^{9,10} Therefore this issue did not specifically address asthma exacerbations in relation to viral infections. There is a need to find effective ways to minimize the effect of viral infections on asthma exacerbations in schoolchildren.

These 2 theme issues combined provide ample resources for health care providers to reflect on their current experience and identify ways that they could work closer in the community setting with school personnel to not only manage and avoid emergency events but also to improve school attendance and performance along with the child's comfort in the school environment. We thank the contributors to the reviews in this theme issue for taking

the time to share their experience in helping to provide safe school environments for children with asthma and allergies.

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