

## Self-Administration at School of Prescribed Medications for Asthma and Anaphylaxis

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In 2002 it was estimated that 9.2 million children in the U.S. have asthma.<sup>1</sup> A recent national survey of school nurses indicated that asthma was more disruptive of school routines than any other chronic condition.<sup>2</sup> In day care facilities and schools, children experience increased symptoms or frank attacks of asthma in association with exercise or after exposure to allergens in the classroom. Also, those with viral respiratory tract infections may develop asthma symptoms at school or leave home with minor asthma symptoms (e.g., cough) that become worse as the day progresses.

A short-acting inhaled  $\beta$ 2-selective agonist such as albuterol is the most effective initial treatment for increased asthma symptoms.<sup>3</sup> Also, pre-treatment with a  $\beta$ 2-agonist can prevent acute asthma symptoms that results from vigorous activity such as that which occurs during recess, physical education class, or after school sports. The  $\beta$ 2-agonist is administered through an age-appropriate device. In older children, a press-and-breath or breath-actuated metered-dose inhaler (MDI) is adequate for drug delivery and can be conveniently carried by the student. In younger children who are unable to coordinate actuation of the device and inhalation, a valved holding chamber with mouthpiece (e.g., Aerochamber Plus, OptiChamber-Advantage, or Vortex) may be required, and infants and toddlers need a valved holding chamber with at-

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tached mask. While children requiring an assist device are usually too young to self-administer medication, these devices can eliminate the need to have an air compressor/nebulizer set-up at school. Numerous studies in children of all age groups, including those <2 years, indicate that a nebulized  $\beta$ 2-agonist offers no advantage over the same drug delivered by an MDI attached to a chamber. Additionally, delivery in this manner causes fewer side effects, is more convenient, and is less expensive.<sup>4-6</sup>

Delays in administering an inhaled  $\beta$ 2-agonist can result in a more severe exacerbation that might require treatment in a hospital emergency department, and on rare occasion, such a delay may result in a fatal outcome. In about 60% of children who died from asthma, the final episode was sudden in onset (not preceded by milder symptoms) and fatal within one hour<sup>7</sup> (i.e., asphyxic asthma).

Anaphylaxis is a medical emergency. In the susceptible child, it can result from exposure to a food (e.g., peanuts), an insect sting, a medication, or allergen immunotherapy. Anaphylaxis is an IgE-mediated reaction that results in mast cell release of mediators such as histamine and leukotrienes. The reaction is explosive and is manifested by one or more of the following signs and symptoms: cutaneous (hives, angioedema), respiratory (bronchospasm, laryngeal edema), cardiovascular (hypotension), and gastrointestinal symptoms (vomiting, diarrhea). The immediate administration of intramuscular epinephrine through an auto-injector syringe (e.g., EpiPen) is life saving. Death from anaphylaxis can occur within minutes, and the longer the delay in administering epinephrine, the greater

the risk of a fatality.<sup>8</sup>

Common to both asthma and anaphylaxis is the need to rapidly administer medication. Accordingly, we recommend that any child who is capable and responsible be allowed to carry and self-administer in school a short acting  $\beta_2$ -agonist MDI for asthma or auto-injector epinephrine syringe for anaphylaxis. The child must be given adequate instruction on when and how to administer the medication, and parents and clinicians must provide the school with a written action plan. For children who are not able to self-administer medication reliably, we recommend that the medication be kept with the child's teacher. The teacher also must be taught when and how to administer it.

Currently, many schools require that the child go to an office or nurse for medication. The delay in medication administration caused by such a policy is dangerous, especially for children with asphyxic asthma or anaphylaxis. Unfortunately, many schools do not have a full-time nurse. For example, in Florida, the nurse to student ratio is only 1:2663.<sup>9</sup> Often administration of medication is relegated to an untrained office worker. Thus, it would be far more effective and safer for the child to self-administer the medication when the child is capable of doing this and for the child's teacher to administer the medication when the child is not capable than to risk the consequences of delayed treatment by sending the child to the school office or nurse.

Surprisingly, few states have laws or regulations allowing students to carry and self-administer prescribed medications for asthma and anaphylaxis<sup>10</sup> (see figure on inside back cover). In Florida, for example, a statute allows a student to carry an MDI with written approval from physician and parent, but there is no provision for carrying epinephrine for anaphylaxis.<sup>11</sup> In a recent survey of physician members of the Florida Asthma, Allergy and Immunology Society, 21% reported difficulty obtaining permission for a student to carry epinephrine in school.

If carrying medication is not allowed for your patients, we urge you to be proactive, and, along with parents, lobby state public health officers and legislative representatives to implement a regulation or law that allows it. Such actions will reduce morbidity and prevent deaths from asthma and anaphylaxis in children.

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## POSITION STATEMENT

**Self-Administration of Asthma Medications for School-Aged Children**

Asthma is the most common chronic childhood respiratory disease, with severity varying from mild to very severe. It has reached epidemic proportions in children, increasing significantly in both prevalence and severity over the past two decades.<sup>1</sup> In 2001, asthma affected approximately 6.3 million children <18 years of age in the U.S. alone; of that, nearly 4 million children had experienced an acute asthma episode within the previous 12 months. In 2000, childhood asthma was a leading cause for hospitalizations resulting in over 200,000 admissions. Furthermore, it has been reported that mortality among children with asthma has increased three-fold since 1976. In 2000, among children <18, there were more than 4.5 million physician office visits, over 700,000 emergency room visits, and 14 million missed school days.<sup>2-4</sup>

Childhood asthma has significant societal costs. In 1994, the direct cost of providing care to asthmatic patients was over \$6 billion, about 50% of which was attributed to hospital stays, outpatient visits, and emergency room visits.<sup>5</sup> Though harder to translate into monetary terms, indirect costs associated with asthma management are also significant. Lost work days, additional day care, travel, and waiting times also contribute to societal costs of asthma management. An additional \$4.6 billion in indirect expenditures was associated with asthma management in 1994.<sup>5</sup>

Asthma is a chronic lung disease characterized primarily by inflammation and bronchoconstriction. Narrowing of the airways results in coughing, wheezing, shortness of breath, and chest tightness. Although there is no cure for asthma, national guidelines have been published to aid in the proper diagnosis, treatment, and prevention to make asthma more controllable. Based on the National Heart Lung and Blood Institute (NHLBI) Expert Panel Report 2, successful management of persistent asthma is dependent on the concurrent use of a daily inhaled corticosteroid and a fast-acting bronchodilator to be used as needed. This combination is recommended for most patients while a bron-

chodilator may be used alone for mild intermittent asthma and exercise-induced bronchospasm.<sup>1</sup>

Bronchodilators (e.g., albuterol, pirbuterol) relax smooth muscles in the airways through  $\beta_2$ -stimulation to make breathing easier and to allow for air to pass more readily through the bronchioles.  $\beta$ -agonists are used for the quick relief or "rescue" of bronchoconstriction while corticosteroids are used to prevent or "control" disease progression by working against inflammatory processes. Acute asthma episodes are often unpredictable. Failure to use a "rescue" medication for immediate relief at the onset of symptoms may result in a life-threatening event.

The National Institutes of Health (NIH) emphasizes the importance of reliable and prompt access to medication in order to prevent the precipitation of an emergent event.<sup>1</sup> Furthermore, mortality rates continue to rise significantly among children, especially school-aged children.<sup>2-4</sup> A student's right to carry and self-administer emergency asthma medications is essential to reduce associated complications and potential deaths. Due to the individualized nature of warning signs and symptoms preceding an asthma exacerbation, school-aged children need to be given the responsibility for control of their asthma.

When rescue inhalers are kept with only one designated individual or at one location within the school, a child is unable to access his or her inhaler immediately and thereby loses valuable time in arresting an acute asthmatic event. In addition, the child may not have appropriate access when the designee or location is unavailable. As a result, the Allergy and Asthma Network Mothers of Asthmatics (AANMA) has advocated for national legislation and local standards to allow children to carry and self-administer emergency medications at school. On May 7, 2003, a bill entitled "Asthmatic Schoolchildren's Treatment and Health Management Act of 2003" was introduced into the U.S. Congress.<sup>6</sup> This bill, officially named HR2023, provides incentives to states that require schools

to allow students to self-administer prescribed lifesaving asthma or anaphylaxis medications. To date, there are only 23 states with laws protecting students' rights for self-administering medications for asthma and/or allergy-related emergencies.<sup>7</sup>

Creating a supportive school environment has also been identified as a strategy for improving asthma management by the Centers for Disease Control and Prevention (CDC).<sup>8</sup> Proper awareness and education of students, staff, and administrators about their role in the management of asthma through organized programs may improve outcomes among school-aged children. Educational initiatives focusing on overall disease management, the importance of prompt medical management and need for appropriate monitoring may prove beneficial for students, staff, and administrators of school systems. Students with asthma should also provide the school with an individual action plan prepared by their primary care provider or pulmonologist. This plan should include specific steps to arrest an acute event based upon the child's current respiratory status. Therefore, it is important for schools to implement a management plan for the self-administration of asthma medications to allow for adequate and timely treatment of acute asthmatic episodes.

The Pediatric Pharmacy Advocacy Group (PPAG) understands the need for students to have control over the management of acute asthmatic events. Therefore, PPAG advocates that students with an adequate understanding of their disease and treatment regimen be permitted to carry and self-administer rescue inhalers as needed and/or as described by their asthma action plan. In addition, PPAG also encourages all states to create legislation that would mandate a child's right to carry these medications. In addition, PPAG strongly encourages schools to create an asthma management plan that includes measures ensuring all staff members understand and demonstrate prompt and accurate medical management of asthmatic episodes. More importantly, students and staff members must also be able to recognize the need for emergency care from licensed practitioners in a timely manner when conservative measures are ineffective. The combination of these efforts may prevent further increases in mortality trends among school-aged children with asthma.

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