ED438339 1999-12-00 Supporting Students with Asthma. ERIC/CUE Digest, Number 151.

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ERIC Identifier: ED438339
Publication Date: 1999-12-00
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Source: ERIC Clearinghouse on Urban Education New York NY.

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Five million children in the U.S. are living with asthma and the number is steadily

increasing. Most live in cities, are poor, or are African American or Latino (Noble, 1999). Schools-especially those in urban areas with deteriorating physical plants and limited resources-can find it challenging to promote the good health, positive development, and educational achievement of children with asthma, although they are required to do so under the Individuals with Disabilities Education Act (IDEA) of 1990. Many schools, however, discover that maintaining a healthy physical environment and incorporating information about asthma into the curriculum benefits the entire school community.

This digest briefly describes asthma symptoms and "triggers." It also presents some suggestions for maintaining a school environment conducive to the attendance of children with asthma and for developing a curriculum conducive to their academic achievement.

THE NATURE AND PREVALENCE OF ASTHMA IN CHILDREN

Asthma is a non-contagious chronic lung condition caused by a tightening of the airways of the lungs and production of extra mucus. An asthma attack, which may last a few minutes or several days, results in breathing problems such as coughing, wheezing, chest tightness, and shortness of breath. One or more factors, called "triggers," can provoke an attack. Triggers include: infections, physical over-exertion, and emotional factors; and exposure to allergens (i.e., pollen, mold, animal dander), irritants (i.e., chalk dust, smoke, pesticides), and strong odors (i.e., some personal care products) (Awareness, 1995; Majer & Joy, 1993).
Individuals can control asthma with oral medication taken regularly to prevent attacks and with medication inhaled at the onset of an attack. People with asthma carry a peak flow meter, a hand-held tool for measuring their air flow to determine whether an attack is imminent. With help from medical providers and caregivers, and age-appropriate printed materials (such as those available from the American Lung Association), children can learn to monitor their asthma and self-medicate. Taking such control of their illness not only decreases its symptoms but promotes children's feelings of self-confidence and accomplishment (Asthma, 1991).

Children in poor urban areas (especially those living in shelters) and children of color suffer disproportionally from asthma. There are several reasons why their risk is so high: (1) they get inferior medical care, often limited to emergency room visits, which includes no education about how to control the disease and no follow-up attention; (2) they live in homes and neighborhoods, and attend schools, that are overcrowded and laden with pollutants that irritate their lungs; and (3) they experience the high illness-inducing stress that accompanies poverty (Bernstein, 1999; Noble, 1999).

SCHOOLWIDE INITIATIVES

Schools can take many measures to ensure the health, safety, and emotional comfort of students with asthma. The most effective school asthma management program is a cooperative effort involving health providers, school staff, parents, and students, although coordinated by one staff member (National Heart, Lung, and Blood Institute, NHLBI, 1991). There are several effective interdisciplinary programs for creating a healthy school environment, such as the Healthy Schools Networks in Boston and New York, that can serve as models (Goldberg, 1996). Several Federal programs, including those funded by IDEA, provide aid for cleaning up schools.

ENVIRONMENTAL QUALITY

Most improvements in environmental quality benefit everyone in the school building because pollutants have a universally negative effect. For example, schools should undertake extensive building repairs, painting, cleaning, and extermination during long vacations. They should replace plastic furniture and carpeting, which often emit noxious gases. They should limit use of cleaning supplies and equipment that emit toxic fumes and strong odors and require good ventilation when they are used. They should have the entire building (particularly the heating and ventilation system) cleaned regularly to eliminate dust mites, mold, mildew, animal dander, feathers, cockroaches, and other possible asthma and allergy triggers, and make sure that leaks of water and plaster dust are stopped and quickly cleaned up. They should regularly monitor the air quality of schools, especially those in sealed buildings and try to increase the ventilation so that pollutants can escape (Goldberg, 1997a; NHLBI, 1991).

Schools may not be able to eliminate other pollutants, such as chalk dust. They can, however, find out which of them are triggers for particular students and try to limit the student's exposure to them. Further, sensitive scheduling can keep students with specific sensitivities away from certain art supplies and animals, which may enhance the education of some students but sicken students with asthma.

MEDICAL POLICIES AND SERVICES

1. Overall. Schools with a health clinic provide the best services for students with asthma because clinic staff can monitor the children's condition, adjust their medication, and work with families to provide effective management at home. In poor areas, where health care is inferior and fragmented, school clinics can be vital to children's well-being. However, most urban schools do not have the resources for operating a clinic, and, in fact, even the presence of a full-time school nurse is becoming increasingly rare. It is important, however, for a health care provider to be available regularly to provide guidance on service delivery and to help update school health policies (Goldberg, 1997b; Kronenfeld, 2000).

To ensure rapid treatment for an asthma attack, schools need a plan for such a medical emergency with components that range from delivery of medication on site to phoning for an ambulance. Despite the attractiveness of zero-tolerance policies for drug use, physicians usually recommend that students carry asthma medication, thus providing them with a quick and easy way to prevent or stop an attack, and enabling their

participation in sports and field trips (Larkin, 1999).

2. Child Specific. The school nurse or another designated staff member should develop an individual asthma action plan with the family of each child with the condition and distribute it to the child's teachers. The plan should include all the information the family believes is important to provide, and, especially, information on medication and other strategies for stopping an attack, normal peak flow meter levels, known asthma triggers, and the names of several caregivers and a health care provider to contact in an emergency. The staff member and the family should also communicate throughout the school year to report attacks and update information in the plan. Parents should be assured that medical records will be kept confidential and that their children will be protected from teasing about their illness (Frieman & Settel, 1994). Most important, the school should maintain a supply of medicine for each child with asthma, located in a secure place that the designated staff member can easily access in an emergency (NHLBI, 1995).

Some families may not recognize their children's asthma, may maintain a home environment that inadvertently exacerbates it, may be unable to secure appropriate asthma treatment, or may be unable to manage the treatment. School personnel, particularly the nurse, can help these parents understand the problem and secure medical services. Considering families' attitudes, beliefs, reading skills, and extent of English comprehension when approaching them improves communication (Asthma, 1998; NHLBI, 1991).

3. Staff Training. The school nurse, a local hospital, or an organization (i.e., Mothers of Asthmatics) can provide staff members with inservice training and printed materials on asthma. Trainers can teach staff how to: (1) recognize the signs of an asthma attack (wheezing, shortness of breath, excessive coughing, a pale sweaty face, low peak flow readings); (2) help a child stop an attack by encouraging relaxation and deep breathing (possibly by modeling the technique), and providing warm water to drink; and (3) determine whether professional medical help is needed and get it rapidly. Training can also cover how asthma medication may affect a student's performance, and suggest ways to support students with asthma by helping them deal with their feelings of being different, their fatigue, their anxieties over medication, and their embarrassment at having an attack. Finally, trainers can help staff understand the pressures on families of students with asthma and communicate effectively with them (Frieman & Settel, 1994; NHLBI, 1991).

STUDENT EDUCATION AND ACTIVITIES

1. Curriculum. Asthma as a topic across the curriculum draws on knowledge in several subject areas and has a practical use. All the students can use the peak flow meter of a child with asthma to learn about the respiratory system (and, by extension, about anatomy in general),and about basic mathematical concepts as they record and analyze

data collected through periodic measuring of lung activity. Use of the many available stories, poems, and audiovisuals with asthma as a theme can help develop students' reading and critical thinking skills. Asthma can also be a topic for students' personal writing, script writing, and role playing. Learning about the illness itself helps develop all students' empathy for those living with chronic illnesses and increases the self-esteem of children with asthma who may feel stigmatized (Asthma, 1998).
2. Sports. Students whose asthma is under control can play most sports, and, indeed, exercise helps develop muscles around the lung and increases stamina. Because some physical exertion may provoke an attack, however, teachers need to remind students to take preventive medication and to carry their inhaler, and to know how to help stop an attack. Schools and families together can develop an exercise program appropriate for their children (Asthma, 1991; NHLBI, 1991).

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This Digest was developed by the ERIC Clearinghouse on Urban Education, with funding from the Office of Educational Research and Improvement, U.S. Department of Education, under contract no. ED-99-CO-0035. The opinions in this Digest do not necesarily reflect the position or policies of OERI or the Department of Education.

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Title: Supporting Students with Asthma. ERIC/CUE Digest, Number 151.
Document Type: Information Analyses---ERIC Information Analysis Products (IAPs) (071); Information Analyses---ERIC Digests (Selected) in Full Text (073);
Available From: ERIC Clearinghouse on Urban Education, Institute for Urban and Minority Education, Teachers College, Box 40, Columbia University, New York, NY 10027. For full text: http://eric-web.tc.columbia.edu.
Descriptors: Asthma, Disadvantaged Youth, Elementary Secondary Education, Minority Groups, Physical Health, School Health Services, Special Health Problems, Urban Youth
Identifiers: ERIC Digests
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