Show Me School Health: Whole Package: Asthma

Sections linked within this document (Exception: Procedure has external link)

Overview of Health Condition

Asthma is a chronic condition of the airway characterized by inflammation, airway obstruction, and bronchial hyperresponsiveness. Children with asthma have recurrent episodes of wheezing, breathlessness, chest tightness, and cough, especially at night and early morning. The inflammation associated with asthma also causes an increase in bronchial hyperresponsiveness to a variety of stimuli (triggers) (Conlon, 2024).

The following are common asthma triggers:

- Respiratory infections (viruses, bacteria)
- Allergen exposure (inhalant, food, and occupational)
- Inhaled respiratory irritants (including tobacco and cannabis [marijuana] smoke and cold, dry air)
- Temperature and weather
- Physical activity
- Hormonal fluctuations
- Medications
- Emotional factors (i.e., anxiety, stress)
- Comorbidities such as:
    - Rhinitis
    - Gastroesophageal reflux
    - Obesity
    - Depression
    - Anxiety

(Miller, 2023)

Asthma is classified into four categories, intermittent, mild persistent, moderate persistent, and severe persistent. The categorization of the asthma symptoms assist health care providers in

developing a treatment plan (Conlon, 2024). Many health care providers follow a stepwise approach for the management of asthma, prescribing a short-acting beta agonist (SABA) for intermittent symptoms and increasing the dose of the medication or introducing an inhaled corticosteroid when the symptoms increase or worsen (American Academy of Allergy, Asthma & Immunology, 2023; Fanta & Barrett, 2023).

Table: Classification of Asthma- 5-11 years of age

	Level of Asthma			
		Persistent		
Symptoms	**Intermittent**	**Mild**	**Moderate**	**Severe**
Daytime symptoms	≤2 days/week	>2 but <7 days/week	Daily symptoms	Symptoms throughout the day
Nocturnal awakenings	≤2 times/month	3 to 4 times/month	>1/week but not daily	Most nights
Short-Acting Beta Agonist (Albuterol)	PRN	PRN	Daily	Several times/day
Interference with activities	None	Minor	Some	Extreme
FEV_1 and FEV_1/FVC (FEV_1 is the amount of air a person can force out of their lungs in 1 second) FEV_1/FVC is the ratio of forced expiratory volume in the first one second to the forced vital capacity of the lungs.	Normal	Normal	FEV_1 60-80% predicted FEV_1/FVC below normal	FEV_1 <60% predicted FEV_1/FVC below normal
Exacerbations treated with oral corticosteroids	≤1/year	≥2/year	≥2/year	≥2/year

Sources: Fanta & Barrett, 2023; National Asthma Education and Prevention Program Coordinating Committee Expert Panel Working Group, 2020

Table: Classification of Asthma- Adolescent and Adult

	Level of Asthma			
		Persistent		
Symptoms	**Intermittent** The presence of all the following symptoms is considered an indicator of intermittent severity	**Mild** The presence of any of the following is considered an indication of mild severity	**Moderate** The presence of any of the following is considered an indication of moderate severity	**Severe** The presence of any of the following is considered an indication of severe severity
Daytime symptoms	≤2 days/week	>2 but <7 days/week	Daily symptoms	Symptoms throughout the day
Nocturnal awakenings	≤2 times/month	3 to 4 times/month	>1/week	Nightly
Short-Acting Beta Agonist (Albuterol)	≤2 days/week	>2 but <7 days/week	Daily	Several times/day
Interference with activities	None	Minor	Some	Extreme
FEV_1 (FEV_1 is the amount of air a person can force out of their lungs in 1 second)	≥80% predicted	≥80% predicted	60-80% predicted	<60% predicted
Exacerbations treated with oral corticosteroids	≤1/year	≥2/year	≥2/year	≥2/year

Source: Fanta & Barrett, 2023

Table: Classification of Asthma Control- 5-11 years of age

Components of control	Classification of asthma control (5-11 years of age)		
	Well controlled	**Not well controlled**	**Very poorly controlled**
Symptoms	≤2 days/week, but not more than once on each day	>2 days/week or multiple times on ≤2 days/week	Throughout the day
Nighttime awakenings	≤1 time/month	≥2 times/month	≥2 times/week
Interference with normal activity	None	Some limitation	Extremely limited
Short-Acting Beta Agonist (Albuterol)	≤2 days/week	>2 days/week	Several times per day
Lung function			
● FEV_1 or peak flow ● FEV_1/FVC	● >80% predicted/person best ● >80%	● 60 to 80% predicted/person best ● 75 to 80%	● 60% predicted/person best ● <75%

(Fanta & Barrett, 2023)

Table: Level of Asthma Symptom Control in Adolescents and Adults

Level of Asthma Symptom Control			
In the past 4 weeks, has the patient had:	**Well controlled**	**Partly controlled**	**Uncontrolled**
Daytime symptoms more than twice/week	None of these	1 to 2 of these	3 to 4 of these
Night awakening due to asthma			
SABA reliever needed more than twice/week			
Activity limitations due to asthma			

(Fanta & Barrett, 2023)

The goal of asthma treatment is to establish good asthma control. Good asthma control means reducing the intensity and frequency of asthma symptoms and maintaining normal or near normal activity levels. Specific goals for asthma control include:

- Freedom from frequent or troublesome symptoms of asthma (cough, chest tightness, wheezing, or shortness of breath)
- Few night-time awakenings (≤2 nights per month) due to asthma
- Minimal need (≤2 days per week) for medication for acute relief of asthma symptoms
- Optimized lung function
- Maintenance of normal daily activities, including work or school attendance and participation in athletics and exercise
- Satisfaction with asthma care on the part of the student and their parents/guardians (Fanta & Barrett, 2023).

Asthma Exacerbation:

When the student's asthma is not well controlled it puts them at higher risk of experiencing an asthma exacerbation which can be life threatening.

Symptoms Associated with Asthma Exacerbation:

- Hacking, paroxysmal, irritative, nonproductive cough
- Dyspnea
- Wheezing
- Chest tightness
- Chest pain
- Prodromal itching localized at the front of the neck or over the upper part of the back
- Feeling uncomfortable, irritable, or increasingly restless
- Headache
- Feeling tired
- Sitting in tripod position or sitting upright with their shoulders hunched over, hands on a chair, and arms braced to allow them to use their accessory muscles of respiration
- Difficulty speaking, only being able to use short, panting, broken phrases (Colon, 2024).

Assessment Findings Associated with Asthma Exacerbation:

- Hyperresonance on percussion
- Coarse and loud breath sounds
- Sonorous crackles throughout lung field
- Prolonged expiration
- Coarse rhonchi
- Generalized inspiratory and expiratory wheezing
- With severe spasm or obstruction, breath sounds and crackles may be inaudible (Colon, 2024).

Immediate treatment:
Immediate treatment and medical attention are needed for students who are at high risk for a life-threatening or fatal attack based upon history (see Table: Risk factors for a fatal asthma attack) and/or who have severe symptoms (marked breathlessness, inability to speak more than short phrases, use of accessory muscles, and agitation and drowsiness). School staff should be instructed to immediately administer the student's albuterol or emergency stock albuterol and call 911 or emergency medical services (EMS) to have the student transported to the emergency department (Sawicki & Haver, 2023a).

Table: Risk factors for a fatal asthma attack

Indicators of severe disease
Previous life-threatening exacerbation
Asthma attack despite current oral glucocorticoid use
Indicators of poor asthma control
More than 1 hospitalization for asthma in the past year
3 or more emergency department visits for asthma in the past year
Use of more than 1 canister of short-acting beta agonist per month
Serious comorbidities
Cardiovascular or chronic lung disease
Illicit drug use or major psychosocial problems
Food allergy
Poor asthma co-management skills
Not taking inhaled glucocorticoids
History of poor adherence with asthma medications and/or written asthma action plan
Difficulty preventing asthma symptoms or severity of exacerbations

(Sawicki & Haver, 2023).

Asthma and Allergies: "Having an allergy is the strongest epidemiological risk factor for asthma morbidity and mortality" (Conlon, 2024, p. 922) and increased consideration needs to be made when caring for a student who has asthma and allergies, especially anaphylactic allergies. For more on anaphylaxis, see the Anaphylaxis page.

Delegation

Delegation of the administration of albuterol is a common practice in the school setting. The American Thoracic Society, Allergy and Asthma Network, the American Lung Association and the National Association of School Nurses state that Unlicensed Assistive Personnel (UAPs) may be designated to administer albuterol (Volerman et al., 2021) and research has shown that "albuterol sulfate can be safely administered by any school staff who have been trained to do so because modern day formulas are safe with a wide-therapeutic index" (Lowe et al., 2022, p. 1-2). Although it is common practice to delegate albuterol administration to UAPs, the school nurse needs to evaluate each situation individually.

Questions to Ask to Inform Safe Delegation: The delegation questions below are based on the American Nurses Association's Decision Tree for Delegation by Registered Nurses (ANA, 2012) and the National Association of School Nurses' Emergency Medication Administration Delegation Decision Tree (NASN, 2020a).

1. **Has the school nurse performed an initial assessment of the student to determine their needs?** The school nurse should not delegate the procedure to an Unlicensed Assistive Personnel (UAP) until they have completed the initial assessment.

2. **Does school district policy, the school nurse's job description, and the UAP's job description allow the delegation of administering albuterol?** Although the Missouri Nurse Practice Act allows for registered nurses to delegate administration of albuterol to school staff, the school nurse should ensure that the district does not have policies that prohibit or limit the school nurse's ability to delegate. Additionally, the school nurse should review their own and the UAP's job description to confirm that it is appropriate to delegate this procedure.

3. **Is the school nurse competent to perform this procedure or does the school nurse need to acquire some knowledge or skills to be competent in this procedure?** If the school nurse does not have the knowledge or skills or does not feel comfortable performing this procedure, they should not delegate this procedure to a UAP. The school nurse must first acquire the necessary knowledge and skill to perform this procedure competently before they can delegate it to someone else.

4. **Does the student have any other health conditions that make their overall health status unstable?** The student's health condition should be stable so that when the albuterol administration is completed by following a set procedure or protocol the student is not at undue risk.

5. **Are the results of the albuterol administration reasonably predictable?** If the results of the albuterol administration are not predictable then this procedure should not be delegated.

6. **Does the UAP have the appropriate knowledge, skills, abilities, and willingness to perform the procedure?** All these factors need to be considered. Although a UAP may be competent to perform the procedure they may not be willing to do so and in that situation another UAP should be identified and trained. The registered nurse must retain responsibility for the procedure until training is complete.

7. **Is there a procedure and/or protocol in place for this procedure?** A delegated nursing procedure must have an established sequence of steps that the UAP can follow. These steps should have a predictable outcome. The steps should be outlined in a written procedure or protocol. If the written procedure/protocol has not been developed, the school nurse should retain responsibility for the procedure until the procedure/protocol is in place.

8. **Is the school nurse able to provide supervision to the UAP (direct or indirect depending on the situation)?** If the school nurse is not able to provide supervision, then the procedure should not be delegated. The school nurse will need to assess the situation to determine if direct or indirect supervision is required. The school nurse may also need to reassess the situation if the environment changes, for example, if the procedure is going to be performed during a time that the school nurse is not contracted to provide nursing services (i.e., weekend, summer, or if the school nurse is part-time).

9. **Is the student ready to assume some responsibility for the procedure?** The school nurse should resume responsibility for the procedure since the school nurse is the only one who can initiate teaching. The school nurse would also want to observe the student performing the procedure to ensure that the student is competent. Once the school nurse has determined that the student is competent and can safely perform the procedure independently, they can delegate the supervision of the student to a UAP. If at a future date the school nurse is needed to teach the student additional skills, the school nurse would again need to resume responsibility for the procedure until the time in which the school nurse determined the student to be competent.

Delegation Decision Tree and Delegation

The Decision to Delegate:
There may be times when the school nurse and school administrator have conflicting opinions on the delegation of a procedure to a UAP. The school nurse may feel that delegation is not appropriate or the administrator may want the school nurse to delegate a procedure to an UAP that the school nurse feels is not competent. In these situations, the school nurse may need to educate the administrator that the school nurse has a professional and legal responsibility to determine if delegation of a nursing procedure is appropriate and safe (ANA, 2012). See **Fact Sheet for School Administrators, Families, and School Personnel: Nursing Delegation Requires the School Nurse** **and** **Navigating Delegation in the School Setting (pdf)** to assist school nurses communication with the school administration.

School Environment

Proper management of the school environment plays a critical role in the management of asthma and the mitigation and prevention of asthmatic exacerbation. The school environment includes the people within the school (i.e., students, staff, and visitors), the physical environment (i.e., classroom, cafeteria, and playground) and the resources available within the school (i.e., access to stock albuterol, school staff who are educated and trained to respond to asthma exacerbation).

Physical Environment:

Asthma Friendly Schools:The school environment can impact a student's asthma. Triggers found in the school environment can exacerbate a student's asthma, such as animal dander, dust, perfume, and car/bus exhaust . The American Lung Association has developed an Asthma Friendly Schools Initiative Toolkit which includes resources on providing a healthy school environment. The Environmental Protection Agency has also developed an Indoor Air Quality Tools for Schools Action Kit.

The Wisconsin Asthma Coalition has developed an asthma walk-through program that includes a school walkthrough checklist.

Access to Albuterol: A prompt and coordinated response to an asthma exacerbation is critical. School staff who have regular interactions with a student with asthma should know where the student's albuterol is located. If the student self-possesses their albuterol, the student should communicate the location of their albuterol with school staff and the school nurse.

Stock Albuterol: Missouri Statute 167.635 allows schools to maintain a supply of asthma-related rescue medications. When planning for stock albuterol the school nurse should consider the following:

- Acquisition of an order for stock albuterol from the school's medical advisor.
- Funding source to cover the cost of initial supply of albuterol and other needed supplies (i.e., individual student spacers or valved holding chambers).
- Acquisition of albuterol to maintain adequate stock at each of the school buildings within the district.
- Identification of where the stock albuterol will be stored
    - It is recommended that stock albuterol be stored in a temperate, dry, and unlocked place that is easily accessible to trained individuals for medication administration (Volerman et al., 2021)
- Development of a process to systematically check the expiration date(s) of the stock albuterol.
- Development of an albuterol policy, procedure, and protocol.
- Training of all school staff on asthma, risk reduction, and response to asthma exacerbation.

- Training of designated staff who will be responsible for administering albuterol in response to asthma exacerbation.
- Determination if stock albuterol will be available for before and after school events.

An important component of a stock albuterol program is to ensure that there are one-way valved holding chambers or spacers, which can be plastic or cardboard, if necessary for economic reasons. Studies have shown that paperboard spacers can safely last the entire school year without microbial growth (Volerman et al., 2021, p. 519-20).

It is recommended that a stock albuterol administration protocol include the following:

- Signs and symptoms of mild, moderate, and severe respiratory distress
- The course of action based on the initial presentation of the student
- Specific indications for when to summon emergency medical services
- The dose of albuterol to give (i.e., the number of inhaler puffs for initial use and subsequent use for same episode of respiratory distress)
- Post incident instructions
- Information on the duration that a student's documentation log shall remain on file with the school (Volerman et al., 2021).

An important treatment consideration for the school nurse to understand is that students who have an Asthma Action Plan but require the administration of stock albuterol (for example, if they do not have their own inhaler at school) is that

> Treatment for any child who requires stock albuterol should follow the standardized protocol and prescription instructions specified on the standing medical order, regardless of whether they have an asthma action plan on file at school. An asthma action plan provides school personnel with instructions on how to use a child's personal medicine, not stock albuterol (Volerman et al., 2021, p. 520).

Ensuring Access to Albuterol in Schools: From Policy to Implementation provides resources and guidance on developing a stock albuterol program and the American Academy of Allergy, Asthma, and Immunology have developed a Stock Albuterol Toolkit. The St. Louis Chapter of the Asthma and Allergy Foundation has the RESCUE Missouri Schools program which offers resources for stock albuterol.

Education and Training:

The American Thoracic Society, Allergy and Asthma Network, the American Lung Association and the National Association of School Nurses recommend that school staff be trained to recognize and respond to a student experiencing asthma symptoms. They state, "at each school, a minimum of two individuals should be trained per building, with consideration given to additional individuals on the basis of asthma prevalence and other school indicators" (Volerman et al, 2021, p. 514) but they recommend to train as many school staff as possible so at least one trained individual is present in the school each day. They recommend that the training include:

- Basic asthma pathophysiology and common triggers.

- How quick-relief medications work to treat respiratory distress.
- Recognizing mild, moderate, and severe respiratory distress.
- Demonstration of correct technique to administer treatment by using a metered-dose inhaler with a valved holding chamber.
- Determining the course of action for managing respiratory distress events.
- Maintenance of stock albuterol devices.
- Post incident instructions, including timely documentation and parent/guardian/caregiver contact instructions (Volerman et al., 2021, p. 518).
- It is also recommended that all school staff are educated to never send a student, who is experiencing asthma symptoms, to obtain their albuterol on their own (Allergy and Asthma Network, 2023).

Since proper use of the inhaler and administration of the albuterol is key to symptom relief, they state that "opportunities to teach back are particularly important to ensuring proper technique" (Volerman et al., 2021, p. 514).

The American Academy of Allergy, Asthma, and Immunology's SA³MPRO™ has developed additional education and training resources.

Physical Education and Recess:

Some student's asthma symptoms may be exacerbated by physical activity and exercise and/or by triggers in the outside environment. Physical education teachers should be educated on the signs and symptoms of asthma along with how to respond if a student were exhibiting symptoms. Additionally, physical education teachers should be encouraged to receive education and training on how to administer or assist a student in administering their albuterol (National Heart, Lung, and Blood Institute, 2014). The physical education teacher and any of the student's coaches should have a copy of the student's Asthma Action Plan and know what actions the student should take prior to engaging in physical activity. Additionally, the physical education teachers and coaches should ensure that the student has access to their albuterol during physical education class, practice, and/or any sporting events (Allergy and Asthma Network, 2023; Barrett & Moore, 2019). Considering some student's Asthma Action Plans instruct them to administer their albuterol prior to physical education class or when engaging in exercise, the school nurse should collaborate with the student and their educational team to develop a plan to ensure they receive their medication prior to exercise.

Students

An important first step when caring for a student who is diagnosed with asthma would be to complete a health history and physical assessment, preferably with the student and their parents present.

Health History Questions:

- Medical conditions
- Does the student have a diagnosis of anaphylaxis?
- Medications

- Allergies
- What triggers the student's asthma?
- Has the student been seen in the emergency department due to asthma exacerbation?
- Does the student's asthma interfere with any activities, such as running or singing?
    - How often?
- Does the student cough at night?
    - If yes, how many nights per week?
- During the last month, on average, how many days did the student have asthma symptoms (i.e., coughing, wheezing, shortness of breath, or waking up at night)?
- Does the student use a spacer with their inhaler?
    - If yes, does the student have a spacer for school and one for home?
- Previous hospitalizations
- Insurance coverage
- Health care provider(s) name and contact information
- Preferred hospital, if applicable

(Missouri Department of Health and Senior Services, 2021)

The Missouri Department of Health and Senior Services has developed the School Nurse Chronic Health Assessment Tool and the Colorado Department of Education has developed a Parent Asthma Intake Form and SA³MPRO™ has developed a School Nurse Asthma Care Checklist.

Assessment Questions: The school nurse may want to consider asking the student and their parents/guardians the following additional questions:

1. Does the student have an Asthma Action Plan (EAP)?
2. Has the student been educated and trained to administer their own albuterol?
3. Does the student self-carry their albuterol?
4. How does this health condition impact the student's daily life?
5. Does the student know their asthma triggers?
6. Does the student have strategies to avoid their triggers?
7. Does the student wear a medical alert bracelet, necklace, watchband?
8. Has the student shared information about their asthma diagnosis with their peers?
9. Does the student or parents have any concerns about the student's health condition?
10. What challenges does the student face in managing their health condition?
11. Do you feel the student has been sufficiently supported by school staff in managing their health condition?
12. Does the student have a 504 Plan or Individualized Education Program (IEP)?
13. Would the student benefit from evaluations or assessments in any of the following areas: physical therapy, occupational therapy, speech and language therapy, assistive technology, adapted physical education, functional behavior, psychology, hearing and vision?
14. Would the student benefit from additional academic support and/or modified education (i.e., copies of notes, extra time, reduced workload, simplified instructions, alternative formats for presentation of material, 504/IEP)?

15. Does the student have an Individualized Health Care Plan (IHCP)?
16. Is there a need for a specific plan for this student's individual needs if there is a crisis in the building?
17. How is the student transported to and from school?
18. Does the student attend before or after school care?
19. Does the student participate in school-sponsored clubs or athletics?

(Missouri Department of Health and Senior Services Bureau of Community Health and Wellness, 2021).

Transition Planning:

The school nurse should assess the student's current and desired level of independence to determine what goals should be established for the student. Additionally, the school nurse should discuss with the student and family what steps have been initiated related to transition planning. The school nurse should consider including goals related to self-management and decision-making skills in the student's Individualized Health Care Plan (IHCP) (NASN, 2019b) and consider how those goals can be expanded upon each year to support independence, if appropriate.

The Missouri Department of Health and Senior Services has the resource, Asthma in a Minute: School Nurse Toolkit for Asthma Self-Management Education. The American Lung Association has also developed 4 Steps for Transitioning from Pediatric to Adult Asthma Care.

Transportation:

It is important for the school nurse to determine how the student is transported to and from school. If the student is transported on the school bus the school nurse may be required to educate school bus drivers on asthma and train them on how to administer albuterol. The school nurse should confer with the school administrator to determine who is responsible to provide the training as school bus drivers who are employed by an outside agency may receive their training through their employer.

Communication

Asthma management including exacerbation risk reduction and response requires effective communication with and between multiple stakeholders. At the center are the student and their family. School personnel, such as the school nurse, need to communicate with the family to ensure all the necessary information and documents are available at school, including health care providers order(s), Asthma Action Plan, and contact information. Since a student's Asthma Action Plan may be frequently updated, the school nurse will want to ensure that they have received the most up to date plan.

The school nurse also needs to ensure that they are communicating with school staff to provide the necessary education and training. School leaders also need to establish effective methods of communicating during an emergency, paying special attention to times when staff are outside

of the school building (i.e., during recess) and when students are in transport (i.e., on the bus coming to and from school).

Some families of students with asthma struggle to be able to provide an extra albuterol inhaler to store at school and may rely on the school's stock albuterol program. It is recommended that the school nurse contact the student's family and their health care team if the student requires the use of stock albuterol more than once in a school year (Volerman et al., 2021, p. 520).

The school nurse needs to discuss with the student and their family the best way(s) to communicate with them. Does the parents/guardian have a preference (i.e., email, text, telephone call)? Do the parents prefer to have the communications sent to both parents or is there a parent who manages the communication with the school nurse?

The school nurse may want to consider having the parents/guardians complete a Health Insurance Portability and Accountability Act (HIPAA) compliant medical release form to facilitate communication with the student's health care team. Although HIPAA does not require parental consent to allow the school nurse to discuss the student's treatment plan, such as medications and nursing procedures, with the student's health care provider, having a signed consent form would undoubtedly make the process go smoother for all involved parties (U.S. Department of Health and Human Services & U.S. Department of Education, 2008).
FERPA HIPAA Consent Sample (NASN)

Medications

Short-Acting Beta Agonists (SABAs):
SABAs such as albuterol (salbutamol) and levalbuterol (levosalbutamol) remain front line treatment for childhood asthma. SABAs relax airway smooth muscle, reducing constriction, which leads to a prompt increase in airflow. SABAs generally provide rapid relief of acute asthma symptoms (i.e., coughing, wheezing, chest tightness, and shortness of breath), with a time to onset of action of approximately 5 to 10 minutes, peak effect beginning within approximately 50 minutes, and duration of action of approximately three to six hours (Sawicki & Haver, 2023b).

Spacers and Valved Holding Chambers: Spacers and Valved Holding Chambers (VHCs) are medical devices approved by the Food and Drug Administration for use with inhaled medications. Both devices are used to improve inhaled medication delivery to the lower airways and decrease potential side effects such as candidiasis (thrush) and dysphonia (hoarseness). Although the word spacer is sometimes used to describe both items, they are different. A spacer is any open tube placed on the mouthpiece of a metered dose inhaler (MDI) used to extend its distance from the mouth (American Academy of Allergy, Asthma & Immunology (AAAI), 2022c). The spacer creates space between the medication and the student's mouth. The space helps the medicine break into smaller droplets which allows the medication to get further down into the lungs (American Lung Association, 2023). A VHC is also a spacer but it is manufactured with a one-way valve to regulate inspiratory flow and prevent exhalation into the device. The VHC

traps and holds the medication in the chamber and allows the student to inhale the medication over several breaths. Many times, the VHC also has a whistle that informs the user when they are inhaling too quickly or forcefully (Schoessler & Winders, 2016). Due to the one-way valve and the whistle feature, VHCs are recommended over spacers by the AAAI (2022c).

Student Possession and Self-Administration of Albuterol: Missouri State Statute 167.627 allows students to possess and self-administer their albuterol. When determining if it is appropriate for a student to possess and self-administer their albuterol the school nurse would want to assess the following:

- That the student has an Asthma Action Plan on file
- That the student knows:
    - What symptoms indicate the need to use their inhaler
    - How often to use their inhaler
    - When to prime the inhaler
    - What to do if their symptoms do not improve
    - The difference in their asthma medications (i.e. SABAs and inhaled corticosteroids (ICS))
    - How to identify when their inhaler is empty
- That the student can demonstrate:
    - Proper inhaler use technique (Kimel, 2022)
    - Proper use of spacer or valved holding chamber, if applicable
- Where the student will store their inhaler
- What the student will do if they are in need of their inhaler and do not have access to it (i.e., lost it or cannot find it)
- That the student's health care provider agrees with the plan to allow the student to possess and self-administer their medication
- That the student's parents/guardian have completed a written authorization form that indicates they permit their child to possess and self-administer their albuterol (NASN, 2020b; NASN, 2021).

The National Association of School Nurses has developed a **Contract for Student Self-Carry and Self-Administration of Medication** that could be used to document the school nurse's assessment and planning with the student. The Colorado Department of Education has developed an Asthma/Allergy Self-Carry Medication Contract.

Controller Medications:

In addition to SABAs many students are also prescribed controller medications. Controller medications are taken every day to help minimize the likelihood of an asthma exacerbation. The most common controller medications for children under the age of 12 are inhaled glucocorticoids (ICS), plus inhaled long-acting beta agonists (LABAs) or oral leukotriene receptor antagonists (LTRAs) in combination with ICS. Long-acting anticholinergic agents (or long-acting muscarinic antagonists (LAMAs) for children ≥6 years of age) and biologic agents (monoclonal antibodies against immunoglobulin E [IgE] and interleukin [IL] 5, for children ≥6 years of age are used as a stepwise approach (see tables below) in children whose asthma is

not well controlled on other medications (Nanda, Russell, & Bingemann, 2021; Sawicki & Haver, 2022).

Inhaled Cocorticoids (ICS): Are anti-inflammatory agents. They reduce bronchial hyperresponsiveness, prevent late asthmatic response, & enhance lung function. ICS are available as MDIs, nebulized medication, & dry powder inhalers (DPI) (Sawicki & Haver, 2022).

Inhaled Long-Acting Beta Agonists (LABAs): LABAs are used in conjunction with ICS and should not be used as monotherapy. LABAs provide long-term control of asthma symptoms with a duration of at least 12 hours. They prevent nocturnal symptoms and exercise-induced bronchoconstriction (Sawicki & Haver, 2022).

Oral Leukotriene Receptor Antagonist (LTRAs): Cysteinyl leukotrienes are potent bronchoconstrictors that also promote the production of mucus and proinflammatory cytokines. LTRAs are medications that block leukotriene receptors. Montelukast is Food and Drug Association (FDA) approved for control of asthma in children ≥12 months of age, and zafirlukast is approved for children ≥5 years (Sawicki & Haver, 2022).

Long-Acting Muscarinic Antagonists (LAMAs): Tiotropium is an anticholinergic bronchodilator approved by US FDA for long-term maintenance in children ≥6 years of age with severe symptomatic asthma not well controlled on ICS and other maintenance therapies.

Biologic Agents: There are three biologic agents for children ≥6 years of age who have severe asthma and who have not responded to usual therapy. They include Omalizumab, dupilumab, and mepolizumab (Sawicki & Haver, 2022).

Combination Medications:
Some inhaled asthma medication combinations contain both a corticosteroid and a bronchodilator. For more information see American Academy of Allergy, Asthma, and Immunology.

Figure I.c: Stepwise Approach for Management of Asthma in Individuals Ages 5–11 Years

	Intermittent Asthma	Management of Persistent Asthma in Individuals Ages 5–11 Years				
Treatment	**STEP 1**	**STEP 2**	**STEP 3**	**STEP 4**	**STEP 5**	**STEP 6**
Preferred	PRN SABA	Daily low-dose ICS and PRN SABA	Daily and PRN combination low-dose ICS-formoterol▲	Daily and PRN combination medium-dose ICS-formoterol▲	Daily high-dose ICS-LABA and PRN SABA	Daily high-dose ICS-LABA + oral systemic corticosteroid and PRN SABA
Alternative		Daily LTRA,* or Cromolyn,* or Nedocromil,* or Theophylline,* and PRN SABA	Daily medium-dose ICS and PRN SABA or Daily low-dose ICS-LABA, or daily low-dose ICS + LTRA,* or daily low-dose ICS +Theophylline,* and PRN SABA	Daily medium-dose ICS-LABA and PRN SABA or Daily medium-dose ICS + LTRA* or daily medium-dose ICS + Theophylline,* and PRN SABA	Daily high-dose ICS + LTRA* or daily high-dose ICS + Theophylline,* and PRN SABA	Daily high-dose ICS + LTRA* + oral systemic corticosteroid or daily high-dose ICS + Theophylline* + oral systemic corticosteroid, and PRN SABA
		Steps 2–4: Conditionally recommend the use of subcutaneous immunotherapy as an adjunct treatment to standard pharmacotherapy in individuals ≥ 5 years of age whose asthma is controlled at the initiation, build up, and maintenance phases of immunotherapy▲			Consider Omalizumab**▲	

Assess Control

- First check adherence, inhaler technique, environmental factors,▲ and comorbid conditions.
- **Step up** if needed; reassess in 2–6 weeks
- **Step down** if possible (if asthma is well controlled for at least 3 consecutive months)

Consult with asthma specialist if Step 4 or higher is required. Consider consultation at Step 3.

Control assessment is a key element of asthma care. This involves both impairment and risk. Use of objective measures, self-reported control, and health care utilization are complementary and should be employed on an ongoing basis, depending on the individual's clinical situation.

Abbreviations: ICS, inhaled corticosteroid; LABA, long-acting beta$_2$-agonist; LTRA, leukotriene receptor antagonist; SABA, inhaled short-acting beta$_2$-agonist

▲ Updated based on the 2020 guidelines.

* Cromolyn, Nedocromil, LTRAs including montelukast, and Theophylline were not considered in this update and/or have limited availability for use in the United States, and/or have an increased risk of adverse consequences and need for monitoring that make their use less desirable. The FDA issued a Boxed Warning for montelukast in March 2020.

** Omalizumab is the only asthma biologic currently FDA-approved for this age range.

(National Asthma Education and Prevention Program Coordinating Committee Expert Panel Working Group, 2020, p. 26).

Figure I.d: Stepwise Approach for Management of Asthma in Individuals Ages 12 Years and Older

Treatment	Intermittent Asthma: STEP 1	Management of Persistent Asthma in Individuals Ages 12+ Years: STEP 2	STEP 3	STEP 4	STEP 5	STEP 6■
Preferred	PRN SABA	Daily low-dose ICS and PRN SABA or PRN concomitant ICS and SABA▲	Daily and PRN combination low-dose ICS-formoterol▲	Daily and PRN combination medium-dose ICS-formoterol▲	Daily medium-high dose ICS-LABA + LAMA and PRN SABA▲	Daily high-dose ICS-LABA + oral systemic corticosteroids + PRN SABA
Alternative		Daily LTRA* and PRN SABA or Cromolyn,* or Nedocromil,* or Zileuton,* or Theophylline,* and PRN SABA	Daily medium-dose ICS and PRN SABA or Daily low-dose ICS-LABA, or daily low-dose ICS + LAMA,▲ or daily low-dose ICS + LTRA,* and PRN SABA or Daily low-dose ICS + Theophylline* or Zileuton,* and PRN SABA	Daily medium-dose ICS-LABA or daily medium-dose ICS + LAMA, and PRN SABA▲ or Daily medium-dose ICS + LTRA,* or daily medium-dose ICS + Theophylline,* or daily medium-dose ICS + Zileuton,* and PRN SABA	Daily medium-high dose ICS-LABA or daily high-dose ICS + LTRA,* and PRN SABA	
		Steps 2–4: Conditionally recommend the use of subcutaneous immunotherapy as an adjunct treatment to standard pharmacotherapy in individuals ≥ 5 years of age whose asthma is controlled at the initiation, build up, and maintenance phases of immunotherapy▲			Consider adding Asthma Biologics (e.g., anti-IgE, anti-IL5, anti-IL5R, anti-IL4/IL13)**	

Assess Control

- First check adherence, inhaler technique, environmental factors,▲ and comorbid conditions.
- **Step up** if needed; reassess in 2–6 weeks
- **Step down** if possible (if asthma is well controlled for at least 3 consecutive months)

Consult with asthma specialist if Step 4 or higher is required. Consider consultation at Step 3.

Control assessment is a key element of asthma care. This involves both impairment and risk. Use of objective measures, self-reported control, and health care utilization are complementary and should be employed on an ongoing basis, depending on the individual's clinical situation.

Abbreviations: ICS, inhaled corticosteroid; LABA, long-acting beta$_2$-agonist; LAMA, long-acting muscarinic antagonist; LTRA, leukotriene receptor antagonist; SABA, inhaled short-acting beta$_2$-agonist

▲ Updated based on the 2020 guidelines.
* Cromolyn, Nedocromil, LTRAs including Zileuton and montelukast, and Theophylline were not considered for this update, and/or have limited availability for use in the United States, and/or have an increased risk of adverse consequences and need for monitoring that make their use less desirable. The FDA issued a Boxed Warning for montelukast in March 2020.
** The AHRQ systematic reviews that informed this report did not include studies that examined the role of asthma biologics (e.g. anti-IgE, anti-IL5, anti-IL5R, anti-IL4/IL13). Thus, this report does not contain specific recommendations for the use of biologics in asthma in Steps 5 and 6.
■ Data on the use of LAMA therapy in individuals with severe persistent asthma (Step 6) were not included in the AHRQ systematic review and thus no recommendation is made.

(National Asthma Education and Prevention Program Coordinating Committee Expert Panel Working Group, 2020, p. 28).

Asthma and Allergies: Some students diagnosed with asthma may also have a diagnosis of anaphylactic allergies and may be prescribed an epinephrine auto-injector. For more information on epinephrine auto-injectors see the **Anaphylaxis** page.

Health Care Provider Order:
Many times the health care provider's order for albuterol may be written as an Asthma Action Plan. See the **Documentation** and **Emergency Preparedness** sections for more discussion on Emergency Action Plans. If the student does not have an Asthma Action Plan, the health care provider's order should, at a minimum, contain the following information:

- Name of the student
- Date of birth
- Name of medication
- Dose
- Route
- Time of administration
- Reason for administration
    - The reasons for administration are typically listed as the symptoms of asthma.

Field Trips

The school nurse and school personnel should consider the following when planning for a student with asthma to go on a field trip:

1. Confirm that students on the field trip who have an asthma diagnosis have all the necessary items for the field trip including:
    a. Health care provider order/Asthma Action Plan
    b. Albuterol
    c. Spacer, if available
    d. Emergency Contact Information
2. Ensure that the Asthma Action Plan is up-to-date and reviewed to determine if any revisions are needed due to the field trip.
3. Plan to have emergency plans stored with the medication during the field trip. Consider what steps will need to be taken to ensure health plans remain confidential.
4. Determine where emergency medication will be stored keeping in mind temperature stability, accessibility, and safety.
    a. Emergency medication should not be left unattended on the school bus or with a school staff/volunteer who is not with the student.
5. Identify which students will be allowed to self-carry their emergency medication. Ensure that proper education, training, competency, and documentation has been completed.
6. Determine how medications administered on the field trip will be documented.
7. Develop a plan to obtain additional emergency medication, if needed.
8. Determine locations of emergency departments and hospitals along the route for the field trip and in the vicinity of the final field trip destination.
9. Determine if any additional staff are needed on the field trip to meet the health care needs of the students.
10. Identify whether school staff who will be accompanying students on the field trip have the necessary training, education, and competence to perform any emergency procedures such as albuterol administration.

11. If a field trip will be outdoors or in locations with potential exposure to asthma triggers, plan ahead to reduce potential exposure.
12. Consider that there may be areas where cellphone reception is limited or not available and plan accordingly.
13. If the field trip will be occurring out of the state:
    a. Review the states' Nurse Practice Acts to confirm that the administration of albuterol can be delegated to an UAP in that state.
    b. Determine if the states traveled through or visited are a part of the Nurse Licensure Compact.
14. If the field trip will be occurring out of the country the school nurse should discuss with school administration any applicable laws to determine what additional steps may be needed. In addition, the U.S. Embassy can provide information on points of contact for destination countries.

(Erwin, Clark, & Mercer, 2014; NASN, 2019a; NASN, 2020b; NASN, 2021; Wisconsin Department of Public Instruction, 2019).

It is important to note that the Section 504 of the Rehabilitation Act does not allow for a student with a disability to be excluded from a field trip due to their disability.

Resources for field trip planning: **NASN Resource: Field Trip Preparation Checklist**

Documentation

The medical management of student's asthma in the school setting will require the school nurse to acquire and complete numerous forms of documentation.

Health Care Provider Order: Frequently the health care provider's order for asthma medications are written as an Asthma Action Plan. If the student does not have an Asthma Action Plan then the school nurse will need a health care provider's order for the medication administration. See the **Medication** section for more information.

Asthma Action Plan: Many times a student with asthma will have an Asthma Action Plan written (or the template completed) by their health care provider. Several organizations have developed Asthma Action Plan templates including the American Academy of Allergy, Asthma, and Immunology, American Lung Association, Asthma and Allergy Foundation of America, Centers for Disease Control and Prevention, Missouri Department of Health and Senior Services and the National Heart, Lung, and Blood Institute.

SA³MPRO™ recommends the Asthma Action Plan contain the following:

- Student name
- Date of birth
- The student's level of asthma severity (Intermittent, Mild Persistent, Moderate Persistent, Severe Persistent)
- An indication if the student has had many or severe asthma attacks

- Stop Light Zones: Provide treatment plan for chronic, acute, and emergency situations
- Asthma Triggers
- An indication if the student should receive their SABA prior to exercise
- Which students should be allowed to possess and self-administer their medication
- Provider contact information
- Parent authorization for the student to communicate with the health care provider
- Parent, school nurse, and Health care provider signature

(American Academy of Allergy, Asthma, and Immunology, 2022a, 2022b).

Parent/Guardian Authorization: In addition to the health care provider's order, the school nurse will also need written authorization from the parents/guardians to administer the albuterol and other asthma medications, as needed (except for when administering stock albuterol for a student exhibiting asthma symptoms). The school nurse should review the Asthma Action Plan template to determine if it has a section for parent/guardian authorization. If the parent authorization is not included or the health care provider just provides an order for the albuterol then the school nurse will want to document the parent/guardian authorization on a separate document.

Self-Possession and Administration: When determining if a student is capable of carrying and self-administering their albuterol the school nurse will want to meet with the student and assess their knowledge, ability, and skills to ensure that it is appropriate for them to self-possess and self-administer their albuterol. Upon completing this assessment the school nurse will want to document their assessment in the student's health record. The school nurse should also document that the student's parent/guardian and health care provider agree with the plan of care for the student to self-carry and self-administer their medication. The school nurse should review their school district's policies, procedures, and/or protocols to determine if the student's self-administration of medication needs to be documented in the student's health care record.

The National Association of School Nurses has developed a **Contract for Student Self-Carry and Self-Administration of Medication** that could be used to document the school nurse's assessment and planning with the student.

Procedures and Medication Administration: Administration of asthma medications will need to be documented, whether they are performed by the school nurse or a UAP. Many times the medication administration is documented in the student's health record. The school nurse will want to ensure that the documentation is completed for the administration of asthma medications during field trips, before or after school, and/or during any school-sponsored activities.

Staff Competency Validation: If the medication administration is delegated to a UAP the school nurse should document that the UAPs knowledge, abilities, and skills have been assessed. Many times these factors are documented on a skills competency checklist **(see Skill Competency Checklists**). There should be a place on the skills competency checklist for the

school nurse and UAP to sign to indicate that they feel competent and are willing to perform the procedure. Once the procedure has been delegated the school nurse is responsible for periodic evaluation of the UAP and their competency. The school nurse must determine how often the supervision is needed. After the school nurse has re-evaluated the UAP's competency, they should document the date of the evaluation (Shannon & Kubelka, 2013; Selekman & Ness, 2019). The school nurse should organize the competency documentation in a way that easily allows them to determine when subsequent evaluation and documentation of competency is needed. For more information on delegation see the **Delegation** section.

Individualized Health Care Plan (IHCP): Another document that the school nurse may develop for a student with asthma is an Individualized Health Care Plan (IHCP). The IHCP outlines the plan of care for the student, including but not limited to:

- Actions taken by the school nurse to support the student's educational attainment.
- The education and training that will be provided to school personnel.
- The education and training the school nurse will provide to the student to assist them in being able to self-possess and self-administer their albuterol.
- The education the school nurse will provide to the student to assist them in being able to reduce their risk of an asthma exacerbation.
- The development of Asthma Action Plans, including steps to be taken in case of an evacuation.
- And the accompanying expected outcomes for each of the nursing interventions (NASN, 2020d).

Prior to completing the IHCP, the school nurse should complete a health history and physical assessment of the student. For more information on health history see the **Student** section.

The Texas School Nurse Association has developed a sample Asthma IHP.

Section 504 Plan: Students with asthma may qualify for a Section 504 Plan since their health condition may impact a major life activity (breathing). If the student has been identified as qualifying for a 504 Plan, the school nurse may be involved in identifying appropriate accommodations and writing the plan. Once developed, the school nurse will want to frequently review, update, and document in the 504 Plan (NASN, 2020d). For more information on Section 504 Plans see **Legal Issues That May Impact This Health Condition** section.

Procedure

See Show Me School Health > Resources> Respiratory (Just in Time Procedures)

Emergency Preparedness

Shelter-in-Place and Other Emergency Events:
In addition to ensuring that all students with asthma have an Asthma Action Plan (see **Documentation**) and that all school staff have been educated on the signs and symptoms of asthma and how to respond to an emergency (see **School Environment**); the school nurse should also collaborate with school administration and the student's education team to plan for other potential emergencies such as shelter-in-place, lockdowns, and emergency evacuations. The emergency planning should include discussion and planning on where the student's medication will be stored. The emergency plan should also address access to medication during a school evacuation considering exposure to outdoor elements could trigger asthma symptoms. For more information on emergency planning see Missouri School Boards' Association's Emergency Planning Guide for Students and Staff with Special and Functional Needs within Schools.

Legal Issues That May Impact This Health Condition

There are currently two Missouri State Statutes that relate to asthma management in the school setting. They are:

- 167.627 RSMo. Possession and self-administration of medication in school — requirements
- 167.635. Asthma-related rescue medications, school nurse may be authorized by school board to maintain, procedure

Section 504 Plan:
Students with asthma may qualify for a Section 504 Plan. Section 504 of the Rehabilitation Act of 1973 as amended through the Americans with Disabilities Amendment Act (ADAA) in 2008 ensures that students who have disabilities have access to a free and appropriate public education (FAPE) (U.S. Department of Education, 2023). FAPE provides a student with a physical or mental impairment that impacts one or more major life activities (including breathing) with related services and accommodations in the general education classroom (U.S. Department of Education, 2023; NASN, 2023). If the student does not have a 504 Plan the school nurse should determine if an evaluation is indicated (see **Student** section for questions to ask student and family to determine if 504 evaluation is indicated). If it is determined that the student qualifies for a Section 504 Plan, the school nurse may want to consider the appropriateness of the following accommodations (this list is not all inclusive):

- Allowing the student to carry their quick-relief asthma medication at all times during school hours and school-sponsored activities.
- Allowing the student to self-administer their quick-relief asthma medication with or without assistance, as appropriate.
- Developing physical education class modifications as needed.
- Allowing the student to self-monitor their activity level with rest periods as needed, including during physical education class.

- Allowing the student to have unlimited access to the restroom and access to water for hydration as needed.
- Not allowing fur/feather bearing animals in the student's classroom.
- Planning for weather related triggers (i.e., accommodations related to outdoor recess/physical education class during hot/cold weather, windows opened in the classroom).
- Development of an Asthma Action Plan.
- Education to school staff regarding how to respond to student who is experiencing an asthma exacerbation.
- The student will have access to trained transportation staff who know how to respond to an asthma exacerbation.
- The types and methods of cleaning that are appropriate to prevent triggering asthma symptoms.
- Steps that the school needs to implement to ensure a healthy indoor air quality in the student's classroom.
- The student will not be excluded from field trips or the ability to participate in extracurricular activities.

(Asthma and Allergy Foundation of America, 2023; Chicago Asthma Consortium's School Working Group, n.d.)

Resources

Allergy and Asthma Network Back to School Checklist for School Nurses
American Lung Association: Asthma Resources
Asthma and Allergy Foundation of American: Asthma Resources
Asthma Ready
CDC: Asthma Resources
Environmental Protection Agency: Asthma Resources
Missouri Department of Health and Senior Services: Asthma Prevention and Control
Show-Me ECHO's Asthma ECHO
NASN: Asthma Resources
NASN: Allergy & Anaphylaxis: Clinical Practice Guidelines and Toolkit for School Nurses

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