Evaluation of the Effectiveness of Asthma Action Plans as a Practice Guideline for Elementary School Nurses in a Midwestern Suburban School District

By

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Evaluation of the Effectiveness of Asthma Action Plans

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Abstract

Background: Asthma affects one of every ten children, making it the most common chronic disease in children. Best practices state an individualized Asthma Action Plan (AAP), written by the child's health care provider, should be provided to the school nurse to use as a guide when caring for the child with asthma. There is little data on the effectiveness of the AAP as a guideline for use by the school nurse. Attention to issues unique to the school nurse setting will assist in identifying barriers and facilitators in the implementation of the AAP by the school nurse. **Objective:** The purpose of this project is to evaluate the effectiveness of the AAP as a practice guideline to assist school nurses with asthma management in elementary-age children diagnosed with asthma. **Methods**: The setting is a midwestern suburban school district (MSSD). The sample is MSSD elementary school nurses who volunteered to be interviewed on two of their most challenging asthma cases with an AAP. Responses from the interviews were analyzed for common themes and categorized into the principles within the Framework for 21st Century School Nursing Practice. Quantitative data included statistics on asthma in the MSSD gathered by the school district and nurse demographics collected during the interviews. **Results:** Five school nurses participated in the interviews. Nurse communication, education, and vigilance were the most frequently identified facilitators in the effective use of the AAP. The most significant barriers were gaps in understanding about the AAP. **Conclusions:** Further evaluation would be valuable in understanding the themes, barriers, and facilitators in using the AAP as a guideline for care in the school nurse setting.

Keywords: asthma, asthma resources, asthma action plan, asthma in schools, asthma action plans in schools, school nurses, practice guidelines, nursing guidelines, practice guidelines, community/public health

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Evaluation of the Effectiveness of Asthma Action Plans as a Practice Guideline for Elementary School Nurses in a Midwestern Suburban School District

Asthma is a leading chronic disease in children and is a leading cause of missed school days (Center for Disease Control and Prevention [CDC], 2019), resulting in greater than 10 million missed school days a year (Akinbami, Moorman, & Liu, 2011). When a student misses approximately 18 days in the school year (10%), they are at risk for poor health outcomes, poor school performance, and school dropout (Allison, 2019).

A child will spend approximately 180 days a year in school (Craw, 2018), giving the school nurse considerable time in which to impact the health of a child. The school nurse's goal is to promote wellbeing, allowing the student to be present (versus absent) in the classroom and to facilitate wellness, allowing the student to be in a state of health that optimizes learning (Loschiavo, 2020). Meeting these goals can be challenging when the nurse is managing a chronic disease, such as asthma.

Problem Statement

Children with asthma have inflamed airways that may react to allergens or irritants. There is no exact known cause of asthma, no cure for asthma, and an asthma attack can be fatal. The goal of asthma management is to control symptoms (American Academy of Allergy Asthma and Immunology [AAAAI], 2020). All schools should have a plan based on the best practice for managing asthma (American Lung Association [ALA], 2020). To meet this goal, the school nurse should have an asthma practice guideline with evidence-based recommendations. The Health Director for a Midwestern Suburban School District (MSSD), where this project took

place, stated the practice guideline for asthma management for the school nurse in the district is the individualized Asthma Action Plan (H.D. personal communication, May 20, 2019).

Background

Every child with asthma should have an Asthma Action Plan (AAP), written by their health care provider, which is individualized to that person (Center for Disease Control and Prevention [CDC], 2020). The plans are not in a standardized format across schools, but many have the same components. AAPs are often color-coded into green, yellow, and red zones, as demonstrated in a commonly used template from the American Lung Association (Appendix 1).

- Green zone: Days without symptoms
- Yellow Zone: Days where there are symptoms such as wheezing, chest tightness or shortness of breath
- Red Zone: High-risk days where symptoms are most serious with increasing shortness of breath, fast breathing, and non-stop coughing

Asthma action plans were discussed in the medical literature as early as 1990 (British Thoracic Society, 1990). Recommendations for AAPs in the school setting were published in the 2007 National Heart, Lung, and Blood Institute (NHLBI) National Asthma Education and Prevention Program (NAEPP) Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma. The guidelines state that all children with asthma should have a written asthma action plan, and it should be provided to the child's school each school year (U.S. Department of Health and Human Services National Institutes of Health [NIH], 2007). The recommendation (NIH, 2007) was classified as Category B: recommendations used in the context of risk and benefit and may not be appropriate in all patient-clinician interactions (Kempe et al.,2018).

More recently, in 2020, the Global Initiative for Asthma (GINA) recommended that all patients diagnosed with asthma should have an AAP, individualized for the patients' level of health literacy. GINA's recommendations focus on translation to practice, with a goal of improving symptom control and preventing deaths (Global Initiative for Asthma [GINA], 2020).

Purpose

An AAP is written by the child's primary care provider (PCP), and the school nurse applies the AAP to practice in the school setting. The school nurse is one of many stakeholders using the AAP, and instructions should be followed by whoever is charged with the asthma management of the child: the child themselves, parent, caregiver, nurse, teacher, daycare provider, etc. School nurses often follow evidence-based recommendations, such as interventions written on an AAP, which are supported by evidence-based data. There is, however, limited data on the effectiveness in applying the evidence to the specialty of the school nurse practice to identify the value of the AAP as a practice guideline for the school nurse (Denehy, 2003). Interviewing the nurse as a front-line stakeholder is an initial strategy that will assist in framing problems and identifying gaps in the implementation of the AAP as a practice guideline.

The guideline's effectiveness is not only because it prescribes the correct treatment for different stages of the disease, but effectiveness may require additional supportive conditions that facilitate the applicability of the guidelines to the specialty practice of school nursing (Field & Lohr,1992). Evaluating the effectiveness of the AAP from the perspective of the school nurse will allow a deeper understanding of how to fully facilitate the implementation of an AAP into an environment influenced by the knowledge, attitudes, scope, and standards of the school nurse practice, and by a wide variety of environmental considerations. For example, to use the AAP, the nurse must have access to the recommended interventions, such as a long-term control

medication, or a quick-acting (rescue) medication. There could be many factors that influence the ability to implement this recommendation, including if the family is unable to provide the medication due to finances.

The primary purpose of this project was to evaluate the effectiveness of the AAP as a practice guideline to assist school nurses with asthma management in elementary-age children diagnosed with asthma. The secondary purpose was to identify any barriers and facilitators in the use and effectiveness of AAP as a guideline for school nurses. The findings resulted in recommendations to the school district to support the school nurses in asthma management in elementary-age children.

Definition of Terms

Asthma Action Plan

An asthma action plan is a set of individualized instructions, written by a healthcare provider, that provides instructions on how a person with asthma should manage his or her asthma symptoms (Asthma and Allergy Foundation of America [AAFA], 2015)

Practice Guideline

A practice guideline is a statement to assist clinicians in decisions for the delivery of care to patients with specific conditions (Miller & Kearney, 2004).

School Nursing

School nursing is a specialized practice in which the nurse protects and promotes students' health (National Association of School Nurses [NASN], 2017).

Quality Improvement Process (QI)

The QI process is defined as the Plan-Do-Study-Act cycle, which is used to improve processes and procedures systematically (Agency for Healthcare Research and Quality [AHRQ], 2020).

Literature Review

A literature search included the following keywords: asthma, asthma resources, asthma action plan; asthma in schools, asthma action plans in schools, school nurses, practice guidelines, nursing guidelines, asthma guidelines, and community/public health. Databases searched were Google Scholar, PubMed, Cochrane Database, Cochrane Airways, CINAHL, and the Journal of School Nursing. The reference lists of scholarly articles were also reviewed to determine if additional articles were available that pertained to the school nurse's use of asthma action plans. Exclusions were publications not in English and publications before 2014. The literature search was extended to 2007, to capture studies published soon after the Guidelines for Diagnosis and Management of Asthma recommended every child with asthma should have an individual AAP placed in their school. The literature search for this project is focused on publications that give context to the effectiveness of the AAP when used by the school nurse and may assist in identifying any gaps in the literature that are amenable to further evaluation.

Asthma

Asthma places significant health and economic burden on families. Globally, trends in overall asthma prevalence increased from 2001 to 2010, then prevalence plateaued. However, asthma does remain among the top 10 causes of chronic conditions in children 5-14 years of age (Asher & Pearce, 2014).

The trend of U.S. prevalence is similar to the pattern of global prevalence, as U.S. childhood asthma increased from 2001 to 2009, followed by a plateau and then a decline in 2013.

An estimated 7.5% of U.S. children had asthma in 2018 (Center for Disease Control and Prevention [CDC], 2020). Although the overall rates of asthma plateaued, when the socioeconomic level was separated from other factors, U.S. trends showed an increased prevalence in children living in poverty, regardless of race and ethnicity (Akinbami, Simon, & Rossen, 2016).

One serious concern in pediatric populations is asthma attacks. An asthma attack is an asthma exacerbation and can be very serious due to restricted airways (National Heart Lung and Blood Institute [NHLBI], 2020). In 2017, 51.6% of children with asthma had at least one asthma attack during the previous 12 months. Asthma attack prevalence did not differ in subgroups defined by race or ethnicity, poverty level, or census region (Center for Disease Control and Prevention [CDC], 2018). Mortality from asthma did have racial disparities. African American children have a death rate from asthma ten times that of non-Hispanic white children (Asthma and Allergy Foundation of America [AAFA], 2019).

Pediatric asthma has an economic impact on families. The overall average annual healthcare cost of asthma ranges from $3,076.00 to $13,612.00 per child. The range of costs includes children with and without insurance (Perry, Braileanu, Palmer, & Steven, 2019). An estimated 4.7% of children with asthma attacks required hospitalization (CDC, 2018). On average, every asthma-related trip to the Emergency Department (ED) costs $1,502.30 (Wang, Srebotnjak, Brownell, & Hsia, 2014).

There is a high utilization of healthcare resources when a child has asthma, and the disparities indicate significant differences in access to care. One intervention that could best meet this need in healthcare delivery is individualized guidelines for asthma management, which are tailored to local resources (Sebrisky & Wiznia, 2019). This project evaluated the effectiveness of

one application of this recommendation: the individualized AAP, implemented by a school nurse.

Asthma Action Plan Effectiveness in Schools

Not all studies report positive outcomes related to the use of an AAP. A systematic review of randomized controlled trials examining written action plans in children stated there was not enough evidence to conclude that an action plan is superior to no asthma action plan (Zemek, Bhogal, & Ducharme, 2008). In a literature review of publications examining AAPs and outcomes, Kelso (2016), concluded that asthma action plans do not independently lead to outcomes relating to fewer symptoms, no limits on activity, few exacerbations, and normal lung function.

Other experts state AAP result in positive outcomes. When comparing a ten-year difference in data between the years 2003 and 2013, the CDC reported a decrease from 10% to 5% prevalence of asthma-related hospitalizations. The data also reported that the use of AAPs increased during the years 2010 and 2016, with a correlation between lower adverse health outcomes and higher use of AAPs to manage asthma (Zahran, Bailey, Damon, Garbe, & Breysse, 2018). One conclusion was to positively impact the health of children with asthma by promoting asthma control strategies. Even with an increase in the use of AAPs, however, less than half the children in the U.S. have an AAP at the present time (Zahran et al., 2018).

Asthma Action Plans in School Settings

There have been studies researching interventions to increase the number of AAPs in school settings, which emphasized the importance of communication and collaboration between the school nurse and primary care providers (Pulcini, DeSisto, & McIntyre, 2007). Other publications have emphasized the communication to include the patient and the caregiver. A

systematic review of 19 studies stated AAPs are hindered when they are not developed through a partnership and incorporate the person with asthma and the caregiver (Ring et al., 2011). Although the Ring study was not specific to a school setting, it supported a collaborative approach to the implementation of the AAP, which would include the school nurse as part of the health care team.

The school nurse's attitudes and sense of self-efficacy concerning asthma management have been researched. Findings reported as the nurse's confidence and self-efficacy increased, asthma management behaviors increased (Quaranta & Spencer, 2015). Borgmeyer et al. (2005) surveyed school nurses on the use of AAPs. The 2005 publication was included for review, even though it was beyond the year limit for the literature search, because of the specific focus on asthma action plans and school nurses. The data demonstrated AAPs increase the confidence for nurses when managing asthma in the school setting but did not include the effectiveness of the components of the AAP. The results may imply that nurses lack confidence in asthma management. However, a more recent systematic review of nurse-led asthma care reported nurse-led care is not inferior to physician-led care (Kuethe, Vassen-Verberne, Elbers, & Van Aalderen, 2013). This review included only five studies, and generalization would require more studies in various settings, including schools.

Although the studies cited above gave context to the nurses using AAPs, there remains a gap in knowledge on the effectiveness of AAPs by school nurses in an elementary school setting.

Aim

This project aimed to evaluate the effectiveness of the Asthma Action Plan (AAP) as a practice guideline for elementary school nurses in a midwestern suburban school district

(MSSD), based on the perceptions of the school nurses using the AAP in the practice setting. The project questions were as follows:

- Is an AAP used by the MSSD an effective practice guideline for school nurses in an elementary setting?
- What are the barriers and facilitators of the AAP when used by the MSSD as a guideline?

Findings resulted in recommendations to the school district support the school nurse in asthma management in elementary-aged children.

Theoretical Framework

The framework for this project was the Framework for 21st Century School Nursing Practice (Appendix 2). This framework was developed by The National Association of School Nurses (NASN), (Maughan, E. D., Bobo, N., Butler, S., & Schantz, S., 2016). Components of The Whole School, Whole Community, Whole Child Model (WSCC), (Appendix 3), were included in the framework by NASN. The inclusion of WSCC components allowed language and concepts of the model used by all school staff and employees to be embedded within a model created specifically for school nurses (Association for Supervision and Curriculum Development & Center for Disease Control [ASCD & CDC], 2014).

WSCC Component of the Framework

The importance of including the WSCC model within the Framework for 21st Century School Nursing Practice was that all education stakeholders, not just nurses, use this model, and this is the model in place at the MSSD for coordinated school services. When school nurses are advocating for policies to promote the management of asthma, they can articulate their practice

within the WSCC framework. The Framework for the 21st Century is specifically for school nurses and can be used to communicate on a national level to the school nurse community.

The WSCC model was created as a holistic approach to student wellbeing in the school setting. The student is in the center as the focus surrounded by policies and practices supported by resources to promote health. All services and professions that interact with the student can coordinate within the WSCC model. The Framework for 21st Century School Nursing Practice was created to align with and operationalize the health services component (the blue circle) of the WSCC model, such as family engagement, health education, health services, physical activity, and emotional climate.

Principles of the Framework for 21st Century School Nursing Practice

The framework was created to guide nurses to interact within an educational environment and will be used to show how managing asthma fits into the school nurse role. There are five principles applied by school nurses for managing asthma in the school. The principles shown are like the steps in the nursing process, with each principle having practice components. The graphic presentation of each principle in columns may give the impression the process is linear, but the processes are overlapping and nonhierarchical, much like the nursing process. Each principle is shown with the correlating practice components. Below is a description of how each principle, with the correlating practice component, will be used specifically for this project.

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Standards of practice. The State Nurse Practice Act defines the standard of practice for the state in which the nurse practices. The standard of practice principle also includes evidence-based practice and critical thinking. The use of an AAP is operationalized within the boundaries of the Nurse Practice Act, using critical thinking to apply the evidence-based plan to the school nurse setting.

Care coordination. It is essential to translate the individual care of a student with asthma to the network of stakeholders, which include a broad community of health care professionals, educators, and caregivers. The school nurse coordinates care with others to enhance the control of asthma symptoms, facilitating optimal health to allow the ability to engage in learning.

Leadership. The school nurse is the health advocate for the student with asthma. For example, when educating on eliminating triggers, this would include teaching the child and the physical education teacher how to manage asthma with exercise.

Quality improvement. When school nurses document planning, implementation, and evaluation of care, the documentation not only provides information for individual asthma care but creates data to build evidence. The evidence can be used to improve processes or promote policy change.

Community/Public Health. The school nurse cares for both the individual student with asthma as well as the population of students with asthma. Connecting to resources is often valuable for families in need of assistance, such as finances for medications or interventions to

minimize hazards in the home environment. The school nurse is the health advocate for the student with asthma. For example, when educating on eliminating triggers, this would include teaching the child and the physical education teacher how to manage asthma with exercise.

Methods

This project was an evaluation to determine the effectiveness of AAPs in an MSSD, based on interviews using a guided interview tool titled, "Is the Asthma Action Plan Working?" (NHLBI, 2008). The answers to questions were analyzed for common themes and mapped to the principal components of the Framework for 21st Century School Nursing Practice. Facilitators and barriers were summarized with the contextual data of nurse demographics, MSSD asthma rates, and absenteeism within the population of students diagnosed with asthma. The MSSD Health Director approved interviewing five school nurses for the purpose of the project. The school nurse coordinator identified five nurses who volunteered for the project.

Setting and Sample

The sample population was a convenience sample of five MSSD elementary school nurses using an AAP for elementary-aged children. Face to face individual interviews took place in five out of 34 total MSSD elementary schools. There was a BSN or higher degreed school nurse for every primary school in the district. The sample size of five nurses represented 14.7 percent of the nurses in the elementary schools in MSSD. The district race and ethnicity are 63.95% White, 8.93% Black, 18.74% Hispanic, and 8.72% other. There is a district average of 47.65% of the students receiving free and reduced lunches, indicating the socioeconomic status of families in the MSSD (Midwestern Suburban School District, [MSSD], 2019).

Qualitative Data Collection

Qualitative data was collected through face to face, one-hour interviews with five nurses. The interview occurred at the school nurse's office. To facilitate consistent data collection, the assessment tool, “Is the Asthma Action Plan Working?” (Appendix 4), was mailed to the nurses ahead of time to prepare for the interview questions. The nurse discussed two of the most challenging asthma cases under her care with an AAP. Students' personal data was not shared with the interviewer. The focus of the dialogue was the nurses’ experience when using the AAP. This process resulted in 10 interviews (two for each of five nurses).

Interview tool. The interview tool “Is the Asthma Action Plan Working?” is in the public domain. The tool was developed by the Environmental Protection Agency’s (EPA) National Asthma Education and Prevention Program (NAEPP) School Asthma Education Subcommittee (EPA, 2009). “Is the Asthma Action Plan Working?” was developed for the school nurse to assess the effectiveness of a student's asthma plan. There is a lack of evidence for interrater reliability. Still, the construct validity is solid because the tool was developed in collaboration with the NASN experts in the field of school nursing as part of the EPA 402-K-10-004 (A. Garcia, personal communication, August 21st, 2019). The project amended the form to eliminate the need for student identification and added lines for notetaking during the interview.

Assumptions. The assumptions when collecting data were:

- All stakeholders have the child's wellbeing as their primary intention.
- The school nurse is using the AAP as a guideline as written.
- The AAP written by the provider is the correct intervention.

Quantitative data was collected through different sources. The school district provided data collected for students with asthma in elementary schools and the absentee rate for all

students, including those diagnosed with asthma. Nurse demographics were collected as part of the interviews.

Human Subjects Submission

Approval for the project was obtained from the University of Kansas Institutional Review Board as a Quality Improvement project. The project is compliant with the Health Insurance Portability Act (HIPAA) and The Family Educational Rights and Privacy Act (FERPA). The project is focused on the use of the AAP by the nurses. Student names were not on the form, and the interviewer did not review the student chart. Participation by the nurses was voluntary, and they could withdraw at any time.

Quantitative MSSD Data

Nurse Demographics

Quantitative data was gathered to give context to the project interviews and identified themes, barriers, and facilitators. Demographic data were collected on the school nurses who volunteered to be interviewed (Appendix 5). A BSN degree was the highest degree held by four of the nurses. One nurse had a DNP degree. The years practicing as a nurse averaged 22.2 years, with a range of 7 to 41 years of practice. The years practicing as a school nurse averaged 6.2 years, with a range of 2-14 years. None of the nurses interviewed were certified in school nursing.

Asthma Report Card

MSSD has an ongoing project whereby data is collected by the nurses in each building and collated into an Asthma Report Card for the district. Information was made available regarding the 2018-2019 school year for the five schools represented by the five nurses interviewed for the project. The report included the number of students diagnosed, number of

inhalers/nebulizer supplies at school, number of times a rescue inhaler was used, number of times an inhaler was used before exercise, number of office visits for asthma, number of 911 calls for asthma, number of students with asthma action plans, number of students who use daily control meds, and the number of students with a consistent PCP, (Appendix 6). This information was made available after the interviews, and after the themes, barriers, and facilitators were identified to avoid bias.

AAPs and students with diagnosed asthma. The five schools had an average of 42.8 students diagnosed with asthma in the school. The number ranged from 23 to 51. It is important to note that there may also be students with asthma in the school that are not yet diagnosed. The lower number of asthma diagnoses may reflect fewer asthma cases but may also indicate lower access to care. This data is worth noting for context but would fall outside the scope of this project, which focused on those students diagnosed with asthma and have an AAP in place at the school. The percentages of students diagnosed with asthma that also had AAPs were reported as 40%, 34%, 31%, 13%, and 10%, averaging 25.6%.

Consistent PCP. The percentage of students diagnosed with asthma that have a consistent PCP is reported at an average of 42%. Considering the ratio of PCP:AAP, the school data states: 23:20, 9:5, 6:5, 10:8, and 44:16. Except for one school, the number of students with AAPs closely correlates to the number of students with a consistent PCP.

Office visits for asthma. Other numbers that closely correlate are the number of office visits for asthma and the number of times a rescue inhaler was used (the number of inhalers/nebulizers at the school is in parenthesis): 126:124 (24), 307:308(20), 104:99 (16), 584: 528(30), and 82:77 (18). Twice, a school nurse, (at different schools), called 911 to assist with asthma management. Clearly, acute care or urgent asthma care occurs within the school nurse

role. If used daily, controller medications are prescribed to reduce inflammation and prevent asthma symptoms over the long term (Institute for Quality and Efficiency in Health Care [IQWiG], 2017).

The ratio of controller medications to be used at home compared to the inhalers or nebulizers at school were 8:24, 6:20, 4:16, 17: 30, with one school unable to report controller medications used at home. The significance of this data may indicate more need for preventative medication, either prescribed or used as prescribed at home.

Attendance Reports

The goal of school nurses is to promote wellness and prevent absenteeism, which allows students to learn in the classroom. Attendance records for the 2018-2019 MSSD school year reported that for all 2,261 students with asthma (kindergarten-12th grade), 94% had regular attendance, compared to 95% with students without asthma (27,359), (Appendix 7).

Chronic absenteeism for students with asthma was reported at 16%, compared to 12% in students without asthma. Chronic absenteeism is defined as students who are absent for more than 10% of their day of membership in school. A 10% absenteeism rate reflects a student missing 15 out of 150 days of school. The rate of chronic absenteeism in students 7th to 12th grade with asthma increased to 23%, compared to 18% of the students without asthma. This project focused only on elementary school children; school nurses educate elementary-aged children with asthma on self-care to promote wellness as an adolescent. As the child becomes older, they will self-carry their inhaler and are often responsible for their asthma management.

Qualitative Data Findings from Interviews

The interview notes were reviewed several times by reading both silently and out loud to become familiar with interview statements. Each statement was written on a separate sticky note,

color-coded for barriers or facilitators. The barriers and facilitator statements were then categorized under one of the principles in the Framework for 21st Century School Nursing: Standards of Practice, Care Coordination, Leadership, Quality Improvement, Community/Public Health. The categorizations were reviewed several times and recategorized if another principle was a better reflection of the barrier or facilitator statement. Each statement was further examined to identify terms that represented the statement. Terms were then grouped into themes that represented and connected commonalities or intent. Six themes were identified: obtaining a complete AAP, AAP implementation, asthma education to parents and students, systems-level leadership-advocacy, QI process embedded in daily practice, and issues impacting the school population with asthma. Barriers and facilitators were identified within the themes and are summarized in Table 1 (Appendix 8). The table was sent to the nurses interviewed, as well as the Health Director of MSSD for review and comment.

Standard of Practice (SOP): Themes, Barriers, and Facilitators.

There were two main themes under SOP, "Obtaining a Complete AAP" and "AAP Implementation: Asthma Assessment and Treatment." The SOP principle was the category in which the most significant number of nurse comments were placed. For the AAP to be an effective guideline, the nurse must first obtain the AAP and then proceed to implement the plan.

The AAP is initially developed between the PCP, the student, and the parent. The interviews demonstrated that much effort is required to obtain an AAP for a school setting. A typical process includes emails, phone calls, notes placed in students' backpacks, and a meeting during parent's night. Additional barriers were noted when the AAP was obtained but was incomplete and needed to be returned for completion. For example, the AAP may be blank with a signature at the end, or there may not be medications prescribed, but medications were written

in the AAP as a treatment for symptoms. The nurse may not have consent from the parent to speak directly to the provider, so the form is sent back for completion via the parent.

Parent understanding of the components of the AAP was included under the “Obtaining a Complete AAP” because a complete AAP implies parent and student education occurred during the PCP visit when the AAP was developed. Although the nurse uses the AAP in the school setting, the parents' understanding of the components of the AAP impacts the collaboration between the parent, student, and nurse. Parent and student collaboration is foundational in establishing communication for the nurse to treat the students, as stated in the AAP. If the parent does not understand the instructions or understand the importance of the AAP, there is an impact on the school nurse's treatment of asthma in the school setting.

For example, one parent believed the AAP was an order to be followed precisely, not a guideline, and expected the nurse to give the student an inhaler every four hours, regardless of symptoms. Another example was when the parent perceived the AAP as a school form, not a plan to be used in all areas of the student's’ life. The asthma treatment at home impacts asthma care at school. Parent perception appeared to be tied to provider perception. If the provider had a lack of understanding of the importance of the AAP, the parent also had a knowledge gap, which could impact the nurse's effectiveness in collaboration with parents and students.

Facilitators for obtaining an AAP included the vigilance and effort of the school nurse. At the beginning of the year, there was a potentially labor-intensive process for obtaining an AAP, assuring it was complete, and confirming the parent understanding. The ideal facilitator was when the PCP understood the importance of the AAP and included the parent and child in the discussion when developing the plan, and then confirms understanding of the plan. The PCP appointment begins to build the initial foundation for collaboration. When there is an emphasis

on the use of the AAP in all settings, including the school setting, the need for the school nurse to receive the AAP is reinforced.

Another theme under the SOP Principle is "AAP Implementation: Assessment and Treatment." The AAP cannot be detailed enough to include all situations in the child's life. For the school nurse, the AAP is a guideline that requires interpretation to apply to the school nurse setting.

One barrier in the implementation of the AAP is the school nurse workload. For example, one nurse reported an average of 86 visits per day, 60 students diagnosed with asthma, 30 inhalers prescribed, and 20 AAPs. Asthma care for a student requires additional forms, equipment, and medications. The school nurse needs not only a complete AAP but also a completed Asthma Intake Form and Health History Form filled out by parents, a spacer for use with an inhaler, prescriptions, and medications that are not expired (often families cannot afford to have current prescriptions filled).

A facilitator for implementation of the AAP is the nurse's commitment to professional practice to promote wellness, allowing student learning in the classroom. For example, if an AAP does not have the medication listed, but the nurse has a prescription written on the medication box, the nurse can give the medication. Clinical judgment is used to determine when medication administration is indicated and the effectiveness of the treatment. The nurse assesses the student before and after an inhaler to decide if not only the signs and symptoms are relieved but to determine if the breath sounds have also improved.

A trusting relationship between student and nurse is also a facilitator in the implementation of the AAP, creating an atmosphere where the nurse's office is a safe space, both

emotionally and physically. The trusting relationship may be a result of the nurse's commitment to professional practice, but for this project, it was delineated into a separate theme.

When the student enters the nurse's office, there is a verbal report from the student describing signs and symptoms, which allows the nurse to reinforce the identification of the symptoms indicating a need for an inhaler, promoting self-care. The nurse will guide the student's' use of the inhaler, including the technique. A trusting interaction with even the youngest student encourages the use of the instructions outlined in the AAP. The student will begin to feel comfortable informing the nurse about factors that impact asthma, such as a parent forgetting to give medication at home or increased stress in the home setting.

Care Coordination: Themes, Barriers, and Facilitators

When the nurses spoke about care coordination, the comments focused on coordination with parents and children with asthma. The theme that emerged was "Asthma Education to Parents and Students." When the parent does not fully understand the components of the AAP or fully understand the diagnosis of asthma, the school nurse is often in a position to educate parents and students in short segments over a period of time, either throughout the school year or over several years as the child attends elementary school. School nurses do coordinate care with other health care providers, but the comments from the interviews related to educating parents and the child with asthma. When discussing the use of the AAP, one nurse stated that "Ninety percent of the problems are education gaps."

Barriers were the severity of asthma, the general health of the child, parent support, and parent understanding of asthma and asthma management. Asthma has the potential to be a life-threatening illness, and it can be difficult if either the child or the parent lacks engagement. In addition, stressful home lives can trigger asthma symptoms. For example, when the child's care

takes place in two separate homes as a result of divorce, each parent may view asthma differently, complicating care coordination between home and school, and increasing the stress on a child.

An example of different viewpoints of parents is when one parent, who also had a mild form of asthma that was easily controlled, did not understand the emphasis on the importance of the child's treatment stating, "I have it too. He will get better on his own." The mother followed the AAP, and the child was aware of the need to report the symptoms of difficulty breathing. The difference between the two homes and the school setting was confusing and stressful for the child. The nurse continued education to coordinate care between home and school. If the child's asthma is not well controlled at home, then they often come to school needing more frequent visits to the nurses' office, removing them from the learning environment of the classroom. With a broad variability in the severity of asthma, education is needed to coordinate care in all areas of the child's life. If a child is old enough to self-carry (carry the inhaler and administer the treatment themselves), then there is less opportunity for the nurse to identify gaps in education since there are fewer trips to the nurse's office.

Comorbidities can also be a barrier. If the child has other co-morbidities, the medical regimen can be complicated, and parents may set priorities on urgent conditions versus chronic care of asthma. When congestion or shortness of breath occurs, it can be dismissed as "It's just a cold," because the other illnesses appear to be the priority. If there are frequent hospitalizations due to co-morbidities, the AAP provides a guideline. Still, the nurse needs to apply her knowledge of the other illness' diagnoses and the current state of health of the child, synthesize that knowledge, and determine the impact on the AAP for the child's asthma. Every discharge diagnosis would prompt a review of the AAP. Her education to the parents and child would

include how the other comorbidities and recent discharge diagnosis impact care: mental illness, learning disabilities, chronic disease, acute illness, and numerous allergies (including food allergies).

One key facilitator to care coordination is supportive parents. Education gaps and discussions about the instructions in the AAP are facilitated when parents support the role of the nurse in the care of the child's asthma. When a student attends school regularly and remains at the same school year after year, there is a depth of understanding about individualized asthma care that develops when educating the student and the parent year after year. Coordinated care, (when the AAP is followed both at home and school), gives the student a framework to develop the skills for self-care and the ability to responsibly self-carry. For example, when the parent understands that cold weather is a trigger for the child's asthma, then instead of the child walking to school, the parent may drive them to school.

Another example is when the AAP states a long-term controller medication is prescribed to be given at home to control asthma and prevent asthma attacks. If the child has an asthma attack at school, the nurse might assume the controller medication has been given and has not been effective at preventing an asthma attack. The reality may be that the medication is not given consistently, or the prescription has not been filled due to cost. When parents are supportive of the importance of following the AAP at home as a form of coordination of care, it benefits the child's wellbeing.

The nurse's commitment to the education component of care coordination requires knowledge, competence, time, and effort. The underlying tone of the facilitator statements is the school nurse's willingness to embrace the professional responsibility of educating and caring for students with asthma. Students spend eight hours a day at school, giving the nurse a great deal of

access to students needing asthma education. The AAP is individualized, so the education needs to be individualized. The goal is for the student to learn how to independently identify triggers, symptoms indicating the need for an INH, and use the correct technique (with a spacer) when giving themselves treatment. The education aspects of coordination of care would not take place if there were an interest in doing the minimal work required in the AAP. For the school nurse to use the AAP as a guideline, she often takes the time to understand the educational component needed for the child to become the sole user of the AAP as they age into adulthood.

Leadership: Themes, Barriers, and Facilitators

The predominant theme under the Framework's Principle of Leadership was "Systems Level Leadership: Advocacy." Using the AAP as a guideline, the school nurse often advocated extending asthma care beyond the school nurse's office. For example, environmental triggers would require changes in the child's schedule, such as staying in the building for PE or recess on cold days if cold weather was a trigger. Students allergic to grass may have indoor recess on mowing days. The AAP is available to the school nurse and can be made available to the school staff. Faculty and staff can be educated to care for the student for events outside of school, such as field trips.

Barriers included the many needs and demands on a teacher's time and attention in the classroom. When a teacher has several students with many educational or behavioral needs, asthma may not always be top of mind when managing a classroom. A young student may not have yet developed the ability to advocate for themselves. The AAP may be complicated, with one student having up to 30 triggers. Asthma care is also complicated when there is a substitute nurse who would have to familiarize themselves with each AAP for each child that visits her

office. The presence of a consistent school nurse remains the “quarterback” for asthma care in the school setting.

Facilitators for leadership were an online communication system that allowed the school nurse to send a message to faculty regarding a student. If the nurse had concerns about a students’ wellbeing that day, she would alert the faculty on observations that would be a cause for concern. Nurses also provided individualized education to health aides, teaching assistants, and staff on field trips. One nurse gave a poster to the physical education teacher about the signs and symptoms of asthma for both the students and the faculty to view and remember breathing difficulties during exercise may be asthma related. Also, education to the child about their AAP regimen allowed the student to advocate for themselves to faculty and staff as they became older.

In many situations, nurses searched for funding to provide spacers for use with inhalers. The use of spacers is rarely included in the AAP, and they are not covered by insurance. Spacers allow more time for the child to breathe in the medicine, reducing the coordination between pressing the inhaler and breathing in, which can be difficult for a young child. Since some families cannot afford to purchase spacers, one nurse successfully obtained a grant from the Parent Teachers Association to provide each student with a spacer to use with their inhaler.

When system-level leadership issues were elevated to policy changes or administrative decisions, all the nurses interviewed felt fortunate they had a health director that was supportive, knowledgeable, and approachable. The school nurses in the MSSD also would email or text each other for consultations if they needed professional opinions from a colleague about the AAP implementation or treatments. Nurses spoke of advocacy actions as an accepted part of the school nurse role. Supportive colleagues and administration were spoken of with a tone of gratitude.

Quality Improvement: Themes, Barriers, and Facilitators

The theme identified under the Framework Principle, Quality Improvement (QI), was "QI Process Embedded in Daily Practice." When interpreting the AAP, the nurses interviewed often came up with ideas that would make the situation better. The barriers listed in this section are not barriers to quality improvement, but obstacles to using the AAP as a guideline. The underlying facilitator of the QI process was nursing innovation in creating solutions. The school nurse often collaborated with other nurses in the MSSD or the health director when improving processes or procedures. Some situations were complicated, and the QI process was ongoing, embedded in the daily workload.

Often, QI was involved with educating the student using the AAP as a guideline. When the AAP indicated what medication to give the student in response to signs and symptoms, the nurse changed the descriptions to the color zones on the AAP and the colors of the inhaler (which is not standardized). She might state, "When you are in the yellow zone, you need the white inhaler." The nurse will also ask the student to use their own words to describe the symptoms and note those words on the AAP to continue to use the student's own descriptors to educate on asthma management. If the family finances allow, additional control medications were kept at school because the nurse can establish a routine to give the medication.

Some QI measures require data, and there are times when subjective data is difficult to collect for an AAP evaluation. One nurse used a peak flow meter to document changes or lack of improvement after treatment to report to parents and physicians. Peak flow meters were not ordered on any of the AAP's for this project, but the nurse used available equipment to improve care.

There were also continued barriers to convenient access to the AAP. Some parents take a picture of the form, so it is on their phone. One nurse stated the ideal situation would be if it were on the inhaler itself or the box with the prescription. The 8x10 AAP can be cumbersome to carry, and there is continued QI on how to make the AAP easy to access for all caregivers.

Summarizing the theme of using the QI process, the barriers were individual challenges that occur during daily practice, and the facilitator was the nurse's continual QI process embedded into everyday practice, resulting in innovative problem-solving. As a note, the asthma report card data reported in the quantitative data section were collected by the school nurses. Collecting data is also part of QI but was not specifically mentioned in the answers to the interview questions.

Community and Public Health Themes, Barriers, Facilitators

The theme identified under the Framework Principle of Community and Public Health was "Issues Impacting the School Population of Students with Asthma." Although the project's focus was on the AAP as a guideline, interview questions brought forth comments that indicated individualized care for a child with asthma were often broadened to impact the population of children with asthma in the school setting. For example, educational resources benefited all students with asthma, such as a video titled "Iggy and the Inhalers," which was made available for students as young as kindergarten age to learn about inhalers.

Population based barriers included poor access to care for low-income families, the need for incentives to comply with completing health forms, higher risk students in Title 1 schools (schools with a large number of low-income students), and low health literacy concerning asthma. Facilitators were interventions applied to the larger school population of children diagnosed with asthma.

When the school nurse identified a family with poor access to care, she accessed a broader system for help. For example, refugee families or families of undocumented immigrant parents are often unaware of how to seek health care. Discussions with the families can identify needs, and the nurse can assist with referrals for care. The school nurse may also engage administrators to address families who cannot afford medications or those who do not have insurance to find resources for assistance. For example, Title 1 schools have higher rates of Emergency Department admissions because parents cannot afford medications or insurance. The nurse will work "upstream" on prevention interventions to thwart emergency asthma attacks while discussing with leadership how to develop a sustainable referral source. As the school nurse addresses concerns on a case to case basis, more extensive population-based interventions are created as well for students with similar issues.

Limitations

The limitations of this study were the small sample size of 5 nurses resulting in 10 interviews. Results may not be able to be generalized without further research. Also, the nurses volunteered to be interviewed, indicating the nurses had an interest in asthma and felt confident enough in their skills to be interviewed about their practice habits. The nurses interviewed also embraced the responsibility for the care of students with asthma. They did not speak negatively about the workload or state. There was a need for additional need for support from the school administration. Further research should allow anonymous participation and include several school systems.

Implications

School nurses have a significant impact on a student's health, safety, and readiness to learn, which is at the center of the Framework of 21st Century School Nursing Practice

(Appendix 2). The identified barriers provide insight into the support needed for school nurses to achieve optimal outcomes in students diagnosed with asthma. Exploring the current perspectives of parents and providers may assist in streamlining processes to alleviate the labor-intensive efforts now required to obtain an AAP in the school setting. Parents and primary care providers need to be aware of the importance of the AAP and the school nurse's role in asthma management and education. A proactive approach to increased collaboration between parents, providers, and the school nurse could streamline the process of obtaining a complete AAP. A robust supportive structure to reduce the time involved to obtain an AAP would leverage a nurses' time to focus on strategies to address additional barriers and strengthen facilitators.

Conclusions

The project aims were to evaluate the effectiveness of the Asthma Action Plan (AAP) as a practice guideline for elementary school nurses in a midwestern suburban school district (MSSD), based on the perceptions of the school nurses using the AAP in the practice setting. The themes, barriers, and facilitators brought to light the importance of communication at all levels of the AAP, from development, to implementation, to improvement.

The themes with the largest number of barriers in the use of the AAP was "Obtaining a Complete AAP." Use of an AAP as a guideline requires there should first be an AAP available to the school nurse. The interviews indicated the beginning of the school year started with processes to obtain the AAP. The ideal process would be where the PCP and parents were proactive in giving the AAP to the school compared to the nurses sending reminders to parents to send a copy to the school nurse office. Data from MSSD support the difficulty of obtaining an AAP. In the five schools represented, only 54 out of 214 students had an AAP. A significant

amount of effort was put forth by school nurses to obtain AAPs, resulting in approximately a 25% success rate.

The findings in our theme, “Obtaining a Complete AAP,” also highlighted the importance of the initial communication between the PCP and the parent when developing the AAP. MSSD data identified a higher ratio of AAPs in students with a consistent PCP. The nurse’s interviews also identified the PCP as conducive to the nurse receiving the AAP. More research is needed to determine what aspects of a PCP relationship are necessary to promote placing AAPs in the school setting as well as promoting parent understanding of the AAP. Until the AAP is considered vital to asthma management in the school setting, the use of the AAP as a guideline will be undervalued and underutilized by PCP and parents, thwarting the obtainment of the AAP by the school nurse.

Communication between the nurse and parent and child frequently was in the form of education. Often the parent and child lacked knowledge about asthma or the components of the AAP. Our findings suggest that school nurses spend a significant amount of time educating parents and children on the severity of asthma, recognizing signs and symptoms of asthma, or when to give treatments and medications. It can be hypothesized that the nature of an AAP, as an individualized plan, requires listening to parents and children as they explain individual experiences and reactions to triggers and medications. As the school nurse listens to the parent and child, a trusting relationship develops. Trust facilitates education as a school nurse provides individualized education on asthma management, improving knowledge and adherence to the AAP in all areas of the child’s life. More research is required to test this hypothesis.

The commonality of the facilitators for all themes was the nurses’ willingness to commit time, effort, and energy toward the care of a student with asthma. The character trait of

embracing responsibility appears to be embedded in the professional identity of the school nurse. The nurses interviewed spoke of the actions to promote wellness in the asthma population as part of their daily routine. The nurses who volunteered appeared confident with asthma management, and there was not an indication of a need for additional training on the use of an AAP as a guideline.

A great deal of effort is expended on addressing gaps in education and the understanding of AAPs by parents or PCPs. These gaps could be minimized during the development of the AAP at the PCP office. Nurse vigilance for maintaining a standard of care was a common thread connecting the identified facilitators; however, there are factors outside of the school nurse scope of practice that impact asthma management in school settings, such as the development of the AAP in the PCP office. More evaluation is needed to identify specific measures to support the school nurse in the use of the AAP as a guideline, including areas outside of the school setting that impact the nurse role.

School nurses have demonstrated a high capacity to provide care across all principles within the Framework of 21st Century School Nursing Practice (Appendix 2). Supportive strategies will enhance the nurse's ability to provide care to students diagnosed with asthma and ultimately improve student outcomes in health, safety, and readiness to learn.

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Appendix 1

Asthma Action Plan

AMERICAN LUNG ASSOCIATION.

Name _____ DOB ____/____/_____

Severity Classification ☐ Intermittent ☐ Mild Persistent ☐ Moderate Persistent ☐ Severe Persistent

Asthma Triggers (list) _____

Peak Flow Meter Personal Best _____

Green Zone: Doing Well

Symptoms: Breathing is good – No cough or wheeze – Can work and play – Sleeps well at night
Peak Flow Meter _____ (more than 80% of personal best)

Control Medicine(s)	Medicine	How much to take	When and how often to take it
	_____	_____	_____
	_____	_____	_____

Physical Activity ☐ Use albuterol/levalbuterol ____ puffs, 15 minutes before activity
☐ with all activity ☐ when you feel you need it

Yellow Zone: Caution

Symptoms: Some problems breathing – Cough, wheeze, or chest tight – Problems working or playing – Wake at night
Peak Flow Meter _____ to _____ (between 50% and 79% of personal best)

Quick-relief Medicine(s) ☐ Albuterol/levalbuterol ____ puffs, every 4 hours as needed

Control Medicine(s) ☐ Continue Green Zone medicines
☐ Add _____ ☐ Change to _____

You should feel better within 20–60 minutes of the quick-relief treatment. If you are getting worse or are in the Yellow Zone for more than 24 hours, THEN follow the instructions in the RED ZONE and call the doctor right away!

Red Zone: Get Help Now!

Symptoms: Lots of problems breathing – Cannot work or play – Getting worse instead of better – Medicine is not helping
Peak Flow Meter _____ (less than 50% of personal best)

Take Quick-relief Medicine NOW! ☐ Albuterol/levalbuterol ____ puffs, _____ (how frequently)

Call 911 immediately if the following danger signs are present
- Trouble walking/talking due to shortness of breath
- Lips or fingernails are blue
- Still in the red zone after 15 minutes

Emergency Contact Name _____ Phone (_____) _____-_____

Healthcare Provider Name _____ Phone (_____) _____-_____

1-800-LUNGUSA | LUNG.org

Date ____/____/_____

Appendix 2

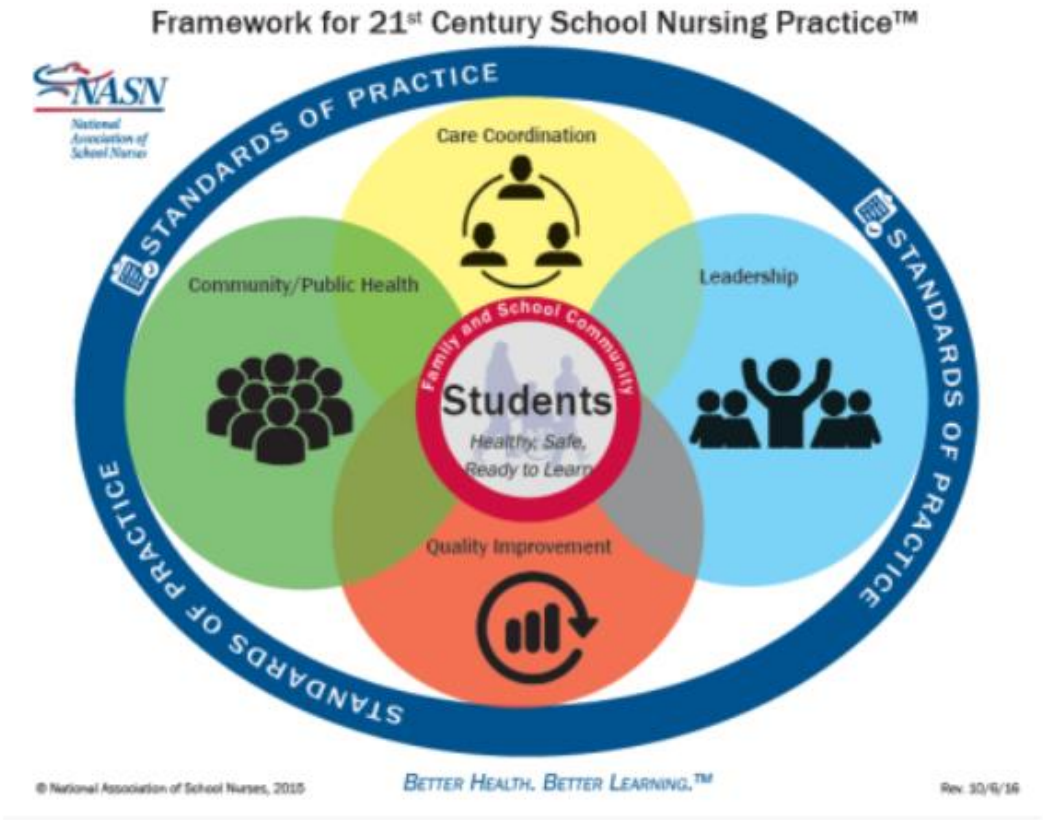

Figure 2. Components of the Framework's Principles

Standards of Practice

- Clinical Competence
- Clinical Guidelines
- Code of Ethics
- Critical Thinking
- Evidence-based Practice
- NASN Position Statements
- Nurse Practice Acts
- Scope and Standards of Practice

Care Coordination

- Case Management
- Chronic Disease Management
- Collaborative Communication
- Direct Care
- Education
- Interdisciplinary Teams
- Motivational Interviewing/ Counseling
- Nursing Delegation
- Student Care Plans
- Student-centered Care
- Student Self-empowerment
- Transition Planning

Leadership

- Advocacy
- Change Agents
- Education Reform
- Funding and Reimbursement
- Healthcare Reform
- Lifelong Learner
- Models of Practice
- Technology
- Policy Development and Implementation
- Professionalism
- Systems-level Leadership

Quality Improvement

- Continuous Quality Improvement
- Documentation/Data Collection
- Evaluation
- Meaningful Health/ Academic Outcomes
- Performance Appraisal
- Research
- Uniform Data Set

Community/ Public Health

- Access to Care
- Cultural Competency
- Disease Prevention
- Environmental Health
- Health Education
- Health Equity
- Healthy People 2020
- Health Promotion
- Outreach
- Population-based Care
- Risk Reduction
- Screenings/Referral/ Follow-up
- Social Determinants of Health
- Surveillance

Appendix 3


WHOLE SCHOOL, WHOLE COMMUNITY, WHOLE CHILD
A collaborative approach to learning and health
COMMUNITY
COMMUNITY
Health Education
Physical Education & Physical Activity
Nutrition Environment & Services
Health Services
Counseling, Psychological, & Social Services
Social & Emotional Climate
Physical Environment
Employee Wellness
Family Engagement
Community Involvement
COORDINATING POLICY, PROCESS, & PRACTICE
HEALTHY
SAFE
ENGAGED
SUPPORTED
CHALLENGED
IMPROVING LEARNING AND IMPROVING HEALTH

Appendix 4

National Asthma Education and Prevention Program

Appendix 6

IS THE ASTHMA ACTION PLAN WORKING?

A Tool for School Nurse

Assessment

Nurse:_____Date: _____

This tool assists the school nurse in assessing if students are achieving good control of their asthma. Its use is particularly indicated for students receiving intensive case management services at school.

Probes: After each question, the nurse will be asked about the barriers and facilitators concerning the focus of the question.	**Responsible Person/site**	**Yes**	**No**	**N/A**
Medications: • Are appropriate forms completed and on file for permitting medication administration at school?	**By school staff**	❑	❑	❑
	Self-carry	❑	❑	❑
Barriers: Facilitators:				
• Has a daily **long-term-control** medication(s) (controller*) been prescribed?		❑	❑	❑
Barriers: Facilitators:				
• Is **controller** medication available to use as ordered?	**Home**	❑	❑	❑
	School	❑	❑	❑
Barriers: Facilitators:				
• Is the student taking the **controller** medication(s) as ordered?	**Home**	❑	❑	❑
	School	❑	❑	❑
Barriers: Facilitators:				
• Has a **quick-relief** (short-acting B_2-agonist) medication been prescribed?		❑	❑	❑

Barriers: Facilitators:				
• Is **quick-relief** medication easily accessible?	**Home**	❑	❑	
	Personal inhaler (s) at school health office	❑	❑	
	Self-carry	❑	❑	
Barriers: Facilitators:				
• Is the student using **quick-relief** medication(s) as ordered…? o Before exercise?	**Home**	❑	❑	❑
	School	❑	❑	❑
Barriers: Facilitators:				
o Immediately when symptoms occur?	**Home**	❑	❑	❑
	School	❑	❑	❑
Barriers: Facilitators:				
Medication Administration: • Does the student use correct technique when taking medication?		❑	❑	❑
Barriers: Facilitators:				
• Does the person administering the medication use correct technique?		❑	❑	❑
Barriers: Facilitators:				

Monitoring: • Can the student identify his/her **early** warning signs and symptoms that indicate onset of an asthma episode and need for quick-relief medicine?		❑	❑	❑
Barriers: Facilitators:				

• Can the student identify his/her asthma signs and symptoms that indicate the need for help or medical attention?		❑	❑	❑
Barriers: Facilitators:				
• Can the student correctly use a peak flow meter or asthma diary for tracking symptoms?		❑	❑	❑
Barriers: Facilitators:				
• Are the students' asthma signs and symptoms monitored using a Peak Flow, verbal report or diary? o Daily?	**Home**	❑	❑	❑
	School	❑	❑	❑
Barriers: Facilitators:				
For response to quick-relief medication?	**Home**	❑	❑	❑
	School	❑	❑	❑
Barriers: Facilitators:				
o During physical activity?	**Home**	❑	❑	❑
	School	❑	❑	❑
Barriers: Facilitators:				
Trigger Awareness: • Have triggers been identified?		❑	❑	
Barriers: Facilitators:				
• Can student name his/her asthma triggers?		❑	❑	❑

Barriers: Facilitators:				
• Can parent/caregivers list their child's asthma triggers?		❑	❑	
Barriers: Facilitators:				
• Are teachers, including physical educators, aware of this student's asthma triggers?		❑	❑	
Barriers: Facilitators:				
Trigger Avoidance: • Are triggers removed or adequately avoided or managed?	**Home** _____ _____ **School**	❑ ❑	❑ ❑	❑ ❑
Barriers: Facilitators:				

* Long-term-control medications (controllers) include inhaled corticosteroids (ICS), leukotriene receptor antagonists (LTRA), or combination medicine (long-acting B2-agonists and ICS), cromolyn, or theophylline.

Appendix 5

Nurse	Highest RN Degree	Years Practicing as a Nurse	Years Practicing as a School Nurse	Certified in School Nursing?
1	**DNP, ND**	**28**	**2**	**No**
2	**BSN**	**11**	**5**	**No**
3	**BSN**	**41**	**14**	**No**
4	**BSN**	**24**	**8**	**No**
5	**BSN**	**7**	**2**	**No**

Appendix 6

School	Number Diagnosed	Number of inhalers/ nebulizer supplies at school	Number of times Rescue Inhaler used	Number of times Inhaler used before exercise	Number of office visits for asthma	Number of 911 calls for asthma	Number of students with asthma action plan	Number of students who use daily control med	Number of students with consistent PCP
1	50	24	124	2	126	0	20	8	23
2	40	20	308	0	307	0	5	6	9
3	50	16	99	0	104	1	5	4	6
4	51	30	528	51	584	1	16	17	44
5	23	18	77	5	82	0	8		10

Appendix 7

Asthma and Student Attendance — 2018-2019 School Year

Attendance Rates by Students with or without Asthma – ALL STUDENTS

	Count of Students	Sum of Membership Days	Sum of Days Attended	Attendance Rate
Students with Asthma	2,261	379,837	356,442.7	94%
Students without Asthma	27,359	4,396,891	4,175,134.9	95%
Total**	**29,620**	**4,776,728**	**4,531,577.6**	95%

Percent Chronic Absenteeism* by Students with or without Asthma – ALL STUDENTS

	Count of Students	Percent Chronically Absent
Students with Asthma	2,261	16%
Students without Asthma	27,359	12%
Total**	**29,620**	**13%**

Percent Chronic Absenteeism* by Students with or without Asthma – GRADES 7 - 12

	Count of Students	Percent Chronically Absent
Students with Asthma	944	23%
Students without Asthma	11,915	18%
Total**	**12,859**	**19%**

*Chronic Absenteeism is defined as students who are absent for more than 10% of their days of membership in school. For example, if a student is enrolled for 150 days, then the student would be considered chronically absent if he/she misses at least 15 days of school.

Appendix 8

Standards of Practice: clinical competence, clinical guidelines, code of ethics, critical thinking evidence-based practice, NASN position statement, nurse practice acts, scope and standard of practice				
Framework Principles	**Themes Identified**	**Barriers**	**Facilitators**	**Examples**
Standards of Practice (SOP): Obtaining and Implementing an AAP	**Obtaining a Complete AAP.**		Provider takes time complete AAP and communicate and includes patient/parent	"This student has a great doctor." PCP attentive to asthma and AAP are foundational.
		AAP given to parent for use at school, but not at home. AAP considered a school form.	RN copy and reminder to use at home	PCP does not always understand the importance of an AAP for all settings.
		Instructions given to parents, or the understanding of those instructions, via PCP is different from AAP	RN education on interpretation of AAP	Parent would give INH Q 4 hrs. as Rx'd, not follow AAP.
		No allergy testing done to determine all triggers	Allergy testing performed to identify triggers; or AAP states triggers	Lack of understanding that all triggers may not have yet been identified.
		Parent states child has asthma, but no dx	RN referral for dx	INH can be ordered, but no dx for asthma, need clarification.
			Additional evaluations.	Ped allergy specialists further define severity of asthma, triggers and treatments.
		No Rx for medication	RN request for all Rx needed for implementation of AAP. Rx on box or written order	AAP states use nebulizer, but no nebulizer ordered.

Framework Principles	Themes Identified	Barriers	Facilitators	Examples
SOP(continued)	Obtaining a Complete AAP (continued)	No consent given to talk to providers	Consents signed allowing RN to speak to providers.	Parents believed they should only speak to provider. No consent given
		RN is the driver to obtain AAP from provider via parents.	RN prompts to obtain AAP	Parents informed: only option without an AAP is to call an ambulance.
		Instructions unclear or incomplete	RN vigilance. Will return until AAP complete.	AAP blank with a signature at the bottom
		Sometimes several attempts to obtain AAP. Labor intensive.	RN prompts parents of need for school nurse to have an AAP.	Process: phone call x 3, email, backpack mail, meet at parent's night to get form
		Use of spacers not ordered or emphasized with student	RN educate on need for spacers to implement APP	AAP filled out, but no directions were given to explain AAP.
	AAP Implementation: Assessment and Treatment	Complete preparation takes several steps per student	RN takes several steps to ensure everything in place for AAP implementation. Keep focus on objective-student to be healthy enough to learn in classroom	Process: Asthma intake form and health history in place. Check expiration dates of INH given to school ,spacers available for each student, AAP complete.
		Everything is not included on AAP; it could not be that detailed.	If it is not on the AAP, but is on the order, nurse can treat.	AAP did not state to treat before exercise, but Rx stated to tx before exercise.
		AAP is not nurse specific, but for all who care for child.	Embed professional RN practice in AAP, interpretation is required before implementation.	Always assess after treatment. Students verbally described s/s before and after tx.

Framework Principles	Themes Identified	Barriers	Facilitators	Examples
SOP (continued)	**AAP implementation (continued)**	Daily Workload of RN	One RN has asthma, asthmatic- understands living with condition	86 visits/day. 60 asthma dx, 30 INH, 20 AAPs.
			All RN's watched techniques—at least once in self-carry to confirm correct technique All Rn's assess after INH each time except self-carry	Meds in drawer. If prevention - student comes into office, reports in with nurse, go to drawer and self-administer.
			RN initiative to keep student healthy	RN will assess before after school care to assure asthma controlled.
			Trusting relationship between student and RN is important to care	Student will report problems and s/s if good relationship with RN. Example: Will report if parent forgot to give controller med at home. (Most controller meds given at home)

Care Coordination: case management, chronic disease management, collaborative communication, direct care, education, interdisciplinary teams, motivational interviewing/counseling, nursing delegation, student care plans, student centered care, student self-empowerment, transition planning				
Framework Principle	**Themes Identified**	**Barrier**	**Facilitators**	**Examples**
Care Coordination	**Asthma Education to Parents/Students**	Students at risk; higher burden of care with potential life threatening dx.	RN embraces responsibility with goal of promoting wellness.	"90% of problems are education gaps" Assume good intent by all involved.
		Co-morbidities complicate medical regimen home and school. frequent hospitalizations due to co-morbidities;	RN communicate s/s and tx observations at school-educating parents on successful methods at school or need for follow up.	Continued education on comorbidities impact on asthma: mental or learning disability, illness, chronic disease, numerous allergies.
		If student not at same school, education can be disjointed.	If student stays at the same school RN has years to educate.	Education year after year can progress to goal of self-care.
		Triggers cannot be eliminated	Triggers can be managed	Educate about triggers over time.
		If student old enough to self-carry-less opportunity to teach as RN not as central to care.	Young students required to come to nurse office for tx and educate each visit. Observe self-carry at least once.	Observe for correct technique and give guidance on use of spacer with INH.
		Home life not conducive to education due to stress. High stress at home increases asthma s/s	Trust in RN allows education, questions and counseling, finding root cause of suboptimal management.	Divorced parents may view asthma differently-require separate education. E.g. Cold days-drop off vs walking
		Lack of family support or engagement. "It's just a cold" "It's not that bad".	Family/ parent support is key.	Example: Home management of asthma impacts asthma at school.

Leadership: advocacy, change agents, education reform, funding and reimbursement, healthcare reform, lifelong learner, models of practice, technology, policy development, professionalism, systems-level leadership				
Framework Principle	**Themes Identified**	**Barrier**	**Facilitators**	**Examples**
Leadership	**Systems Level Leadership: Advocacy**	Many environmental factors are hard to address	Staff will amend environment when able.	Student will have inside recess on lawn mowing days or cold day.
		Not all faculty have capacity to focus on asthma management	Educate staff and advocate care when circumstances indicate specific training.	Educate assistant of SPED student, health aids, field trip staff.
		Students cannot afford spacers	RN finds innovative ways to provide spacers.	PTA grant funded spacers.
		Sometimes large amount of information on student	Computer program allows online communication to teachers from RN.	RN can alert teacher or staff of a child with increasing s/s.
		Young student cannot always advocate for selves	If less than 5th grade-no self-carry, so nurse is central to care and advocacy	All nurses felt supported by administrative leader.
		Asthma is one of many issues in classroom and s/s may not be top of mind.	RN provides resources to prompt awareness. RN Often confers with RN colleagues	RN has poster for PE —visually remind students and teacher that if too SOB—consider asthma.
		Sub nurses will not know details of cases	RN teaches and reinforces routine so student will know routine and advocate for self.	RN set routine for tx- so student can become familiar and do with sub. nurse or staff.

Quality Improvement: continuous quality improvement, documentation/data collection, evaluation, meaningful health/academic outcomes, performance appraisal, research, uniform data set.				
Framework Principle	**Themes Identified**	**Barrier**	**Facilitators**	**Examples**
Quality Improvement (QI)	**QI Process Embedded in Daily Practice**	Inhaler colors not standardized; meds difficult for student to name	Talk about the color of the inhaler and the color of the zone.	" If you are in the yellow zone, you need the white inhaler"
		AAP in language some may not understand	Use common language to improve health literacy	Ask the student to talk about s/s and tx and use student descriptors-to continue to educate.
		AAP on 8x10 paper, not always accessible or convenient to care givers	Some parents will take a picture phone.	Ideal would be an AAP that fits on box or INH
		Difficult to get subjective data for change	RN documents visits and reports problems to parent.	RN will use PFM before and after tx to document to parents or Dr. if there is a need for change
		Not all parents remember to give controller at home	Student or parent reports if meds not given at home	RN will ask for additional controller med at school to give to student.
		Some situations are difficult;	Continual problem solving, QI, is performed with communication between nurses and director.	Nurse will ask peers at school or health director opinion on health issue.
		Emergencies require quick action and sometimes minutes count	RN creates process to quick access.	When nurse in office, emergency meds in unlocked drawer for quick access

Community Public Health: access to care, cultural competency, disease prevention, environmental health, health education, health equity, health people 2020, health promotion, outreach, population-based care, risk reception, screenings/referral/ follow up, SDOH, surveillance				
Framework Principle	**Themes Identified**	**Barrier**	**Facilitators**	**Examples**
Community and Public Health	**Issues impacting the school population with asthma**	Access to care	RN identify need and discuss with parents or leadership, or referrals to assist	Parents cannot afford medication or spacer. Does not visit PCP due to no insurance.
		Not all parents fill out forms	Incentives available for filling out forms	Health history must be completed for student to receive an I-pad for use at school.
		Increased number of Title 1 ER visits for asthma	RN promote wellness for prevention of exacerbations. RN will counsel and interview higher risk children and families to determine needs.	Refugee parents needed information on how to obtain care for child if family did not have insurance.
		All students with asthma need general education	Collect resources for asthma education for all ages	"Iggy and the Inhalers" is a video for young ages.

AAP=Asthma Action Plan

IHN=Inhaler

PFM=Peak Flow Meter