

Improving Asthma Management Through a School-Based Asthma Education Program

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Abstract

Background: Asthma is the leading cause of chronic illness among children in the United States and efforts to improve care and control are of concern. Evidence suggest that children with asthma who participated in an interactive, comprehensive education program can improve their asthma knowledge, self-management skills and overall quality of life.

Purpose: The purpose of this scholarly project was to determine if a school-based asthma educational program, Open Airways for Schools (OAS) increases knowledge of asthma and self-care management skills among elementary school children.

Methods: A convenience sample of 14 school children was recruited to participate in the OAS program. The project entailed six 45-minute educational classes based on the asthma management program called Open Airways For Schools (OAS). Wilcoxon signed-rank test was used to determine if there was a difference in rank of the scores following the intervention and a McNemar test was used to estimate a change in proportion of the students demonstrating correct medication administration following the educational intervention.

Results:

Two of the six questions were statistically significant between pre-and post-test scores and two of the four questions were statistically significant in demonstrating a change in knowledge. All four questions targeted at skills competency were statistically significant in demonstrating an improvement in performance of correct technique following the intervention.

Implications:

The educational intervention results support that children benefit from an asthma educational program and offers an effective way to improve asthma knowledge, self-confidence and self-care practices. The school environment provides an excellent foundation and offers many advantages

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over the traditional clinic-based setting for identifying children with asthma as well as delivering asthma education.

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Acknowledgements

A special thank you to my committee members for all of their support, dedication and guidance through my Doctor of Nursing Practice journey.

Elaine Bundy, DNP, MS, CRNP (Committee Chair)

Lyn Murphy, PhD, MBA, MS, RN (Committee)

Pat McLaine, DrPH, MPH, RN (Committee)

I would like to thank and acknowledge the students of the Harford County Public School where this project took place, who were willing to participate and help me learn if implementing a school-based asthma education program improves their knowledge and self-management skills.

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Background

Asthma is one of the most prevalent chronic disorders in childhood, currently affecting an estimated 6.7 million children in the United States (US) under 18 years of age (Mosnaim, Li, & Damitz, 2011). Asthma accounts for 1.9 million emergency department (ED) visits and 12.7 million office visits, and has an estimated annual burden of \$5.1 million dollars (Diette & Rand, 2007). Among children 5-17 years of age, asthma is the leading cause of missed school days accounting for almost 13 million days of school absences annually, 100 million days of restricted activity and is the third leading cause of childhood preventable hospitalization (Centers for Disease Control, 2012; Davis, Gordon & Burns, 2011).

The burden of asthma, however, is not uniform. Despite effective strategies for asthma management, asthma continues to disproportionately affect minority and low-income groups, especially among African-American and Latino children living in low-income communities (Bryant-Stephens, 2009). African American and Latino children have significantly higher asthma-related morbidity and mortality rates compared to Caucasian children (Bryant-Stephens, 2009). The reasons for these health disparities include: differences in income, education, physical environment, access to preventative care, quality of care, literacy levels and communication and understanding between patients and providers have all contributed to poor asthma outcomes (Bryant-Stephens, 2009; Diette & Rand, 2007; Gold & Wright, 2005).

Asthma is a chronic inflammatory disorder of the airways that requires on-going self-management to avoid recurrent exacerbations. Children with asthma suffer a high number of school absences, and incur substantial health care costs. Children who possess knowledge regarding self-management strategies have been shown to maintain improved asthma control.

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Children with specific knowledge about their asthma are better able to prevent or manage an asthma attack (Velsor-Friedrich, Pigott, & Srof, 2005).

Asthma education has resulted in positive health outcomes, such as increased frequency of symptom-free days, increased asthma knowledge and self-efficacy, reduced school absences and unscheduled healthcare visits (Cicutto, Murphy, & Coutts, 2005; Gerald, Redden, & Wittich, 2006; Mosnaim, Li, & Damitz, 2011; Velsor-Friedrich, Pigott, & Srof, 2005). Ahmad & Grimes (2011) demonstrated that providing asthma self-management strategies to children resulted in an increase in self-control, as well as a reduction in school absences, days of restricted activity and emergency room utilization. A high level of skill is required to administer medication and monitor status. The management of asthma requires a mastering of several tasks including identifying symptoms of impending attack, identifying and avoiding triggers, proper and consistent peak flow technique and correct usage of inhaler (maintenance and rescue) medications. Therefore, asthma education is a vital part of asthma management and important for youth of all ages.

Over the past 20 years, a number of asthma education programs such as The American Lung Association's Open Airways for Schools have been developed to teach children how to prevent asthma episodes and emergencies, promote changes in behavior and improve asthma health and quality of life (Veslor-Friedrich, Pigott, & Srof, 2005). Evaluation studies over the years have shown that children who participated in these school programs had fewer and less severe asthma attacks, improvement in academic performance, fewer absences, improved knowledge about the disease and higher confidence in their ability to manage their asthma (Bowen, 2012; Evans et al., 1987; McGhan et al., 2010; Velsor et al., 2005).

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The National Asthma Education and Prevention Program (NAEPP) (2007) developed guidelines based on current research that supports the use of evidence-based educational strategies to improve pediatric health outcomes for high-risk minority children. The NAEPP (2007) guidelines state that education and self-management are needed to properly control and manage asthma. The large number of children with asthma seen in the ED is an indication that these individuals are not properly controlling their asthma and are in need of quality routine care and proper education (NAEPP, 2007). In effort to meet the NAEPP guideline recommendations to incorporate asthma education in all levels of care, the OAS program was developed to improve self-management skills in elementary aged children. As this age group continues to develop into adulthood, improved asthma knowledge and self-care management skills are needed to promote health and well-being and prevent asthma-related health outcomes (Evans et al., 1987).

Purpose of Project

The purpose of this scholarly project was to evaluate the effectiveness of a school-based asthma education program in eight to eleven year old children with asthma by increasing their asthma knowledge and self-care management skills. The OAS program (2008) was chosen because it had been evaluated and proven to be effective (Bowen, 2012; Evans et al., 1987; Horner, 1998; Velsor et al., 2005). Children who have participated in these programs have had fewer and less severe asthma attacks, improved their academic performance, increased knowledge about the disease and increased confidence in their ability to manage their asthma and exert greater influence on their parents' asthma management decisions (Evans et al., 1987; Horner, 1998).

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Significance and Anticipated Outcomes

Maintaining control with asthma can be complex and challenging for affected children and their families. Evidence suggests that asthma-related morbidity interferes with a child's ability to attend school, obtain adequate sleep and/or fully participate in school-related activities (Hester et al., 2013). Most children aged 5-17 years spend a majority of their waking hours at school. This extended exposure timeframe in the school provides an opportunity to conduct an asthma educational intervention. Asthma interventions conducted in the schools give children exposure to asthma self-management education, asthma-friendly environments and asthma policies (Hester et al., 2013). Numerous approaches have been implemented and appraised in an attempt to determine which method best improves asthma-related outcomes especially in minority children. Asthma education programs are an essential part of asthma management and offer a variety of recommended approaches. Asthma symptoms can be managed through reduction of symptoms and trigger avoidance, but are not entirely preventable. It was anticipated that children who participated in the OAS will have improved asthma knowledge and self-care management skills, which in turn will improve overall patient outcomes.

Theoretical Framework

The Social Cognitive Theory (SCT) provided the theoretical framework for this project. The SCT explains how people acquire and maintain certain behavioral patterns, while also providing the basis for intervention strategies (Bandura, 2004). Evaluating behavioral change depends on the factors of environment, people and behavior which are constantly influencing each other. The main concepts of the SCT are observational learning, self-efficacy, behavioral capability, and reinforcement. Observational learning occurs when a person watches the actions

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and outcomes of others. A person's behavioral capability is the knowledge and skill gained to master a certain task through skills training; a person's positive attitude about asthma medicines, self-confidence and reinforcement have been significantly associated with better adherence to the medical regime (Bandura, 2004).

When asthma self-management education is provided to children in school that incorporates these concepts, each child can bring their own individual personality, beliefs and past experiences to build on knowledge and skill to perform a given behavior (Ahmad & Grimes, 2011). This should increase compliance with asthma treatment plans, thereby, improving health outcomes and quality of life. Researchers studying the key concepts of this theory, concluded that children are quite competent to participate in programs that teach decision-making skills, self-efficacy, self-management (SM) and problem-solving skills (Bandura, 2004). However, providing information about asthma alone may not be effective in improving asthma outcomes. Programs that incorporate tools such as goal-setting, role-playing and social reinforcement have proven more successful in promoting learning and behavioral change compared to those that involve passive learning.

Literature Review

A literature review was conducted using the search terms "asthma education", "school-based asthma programs", "childhood asthma", "inner city asthma", "asthma self-management education" as well as "asthma interventions". Searches were conducted in PubMed, Clinical Cumulative Index to Nursing And Allied Health Literature (CINAHL) and Cochrane databases, limiting search articles to publication dates from 2005 to present. Studies that were included were those that assessed interventions focused on self-management skills, self-efficacy, asthma

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knowledge, and improved overall quality of life. This search resulted in six relevant articles (See Appendix A).

Asthma is one of the most common chronic diseases in children and efforts to improve care and control the high rates of morbidity are a priority (Bartholomew et al., 2006). The National Asthma Education and Prevention Program (NAEPP, 2007) developed an evidence-based consensus set of guidelines for diagnosis and management of asthma for health care professionals and people who suffer from asthma. Education directed toward asthma management has been shown to improve asthma symptoms and control. The NAEPP recommends that asthma self-management education be integrated into all aspects of asthma care. The implementation of school-based asthma education programs such as the Open Airways for Schools program is a crucial part of ‘best practice’ and has proven to be successful in the field of health-promoting interventions for youth. Improving children’s abilities to self-manage their asthma, through increasing their knowledge and in turn, their confidence is a critical component to improving health outcomes (Nabors, Kockritz, Ludke & Bernstein, 2012).

The review of the literature revealed asthma education is an essential part of asthma management. Many studies have suggested that asthma education has resulted in positive health outcomes, such as increased frequency of symptom-free days, improved symptom recognition, increased asthma knowledge and self-efficacy, reduced school absences and unscheduled healthcare visits (Cicutto et al., 2005; Gerald et al., 2006; Mosnaim et al., 2011; Velsor-Friedrich et al., 2005). One randomized control trial (RCT) conducted by Gerald et al. (2006) evaluated the effect of a comprehensive school-based asthma management program in an inner-city, mainly African American school system. Schools (N=54) were randomly assigned to cohorts, 736 students were then assigned to immediate and delayed intervention programs based on

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randomization of their school. Children with asthma enrolled in the delayed intervention groups were referred to their private physician or public health department for further evaluation. There was a significant increase in asthma knowledge among children in the immediate intervention group compared to children in the delayed intervention group. But, there were no significant differences in school absences, school performance, ED visits or hospitalizations between the two groups (Gerald et al., 2006). This study is consistent with several other studies Cicutto et al. (2005) and Velsor-Friedrich et al. (2005) of school-based educational interventions, which have shown increases in asthma knowledge, self-management skills and self-efficacy but not longer term outcomes such as quality of life, school absences and health care utilization.

A quasi-experimental study conducted by Velsor-Friedrich et al. (2005) examined the effect of a school-based asthma intervention program (Open Airways) plus five monthly follow-up visits with a nurse practitioner on selected psychosocial and health outcomes of inner-city minority school children (N=52). At the end of this intervention period, students in the intervention group scored significantly higher than the control group (no intervention) on asthma knowledge, asthma self-efficacy and basic self-care practices. No significant difference was found between the two groups on health outcomes. Schools provide an excellent foundation and offer many advantages over the traditional clinic-based setting for identifying children with asthma and for delivering asthma education. The school setting offers an opportunity to reach children with asthma who have not been diagnosed or have poor control and limited access to medical care. Schools also facilitate collaboration and communication with the families and the child's health care provider through parent-teacher conferences, a school nurse being onsite, the presence of the school social worker and close links between the school nurse and the primary care provider. Mosnaim et al. (2011) evaluated the impact of an educational program, "Fight

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Asthma Now” (FAN) between two populations of predominately low-income minority students: youth (third to sixth graders) and young teens (seventh and eighth graders). Pre- and post-test asthma knowledge questionnaires and observation for spacer technique competency indicated that the FAN intervention significantly increased both knowledge and spacer competency. Although the FAN educational program did show improvements in knowledge and spacer technique, the study did not measure whether these improvements translated into changes in other outcomes such as missed school days and emergency room visits (Mosniam et al., 2011).

Children with asthma experience an unnecessary burden of illness but this can be minimized through the benefits of asthma education programs. The overall goal of educational programs is to assist children in becoming successful in managing their asthma through improvements in knowledge, skills, and confidence (Cicutto et al., 2005). Two experimental studies in the same geographic region conducted by McGhan et al. (2010) and Cicutto et al. (2005) found that children with asthma do benefit from a comprehensive asthma education program offered by certified asthma educators in the school setting. Children in both experimental groups received the “Roaring Adventures of Puff” (RAP) educational instruction and the control group received their usual care. Those who attended the RAP reported higher quality of life and increases in self-efficacy. Parents of children in the RAP program also reported reductions in health care utilization, school absences and days of interrupted activity compared to children who did not attend the program. In these two studies RAP incorporates a variety of childhood educational approaches, including puppetry, games, role- playing, model building and discussions. Parental involvement was encouraged through the use of asthma – related homework activities and an invitation to attend the last RAP session. Interventions that influenced the children’s psychosocial and cognitive processes and support by parents, clinicians

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and friends may motivate them to engage in behaviors that enhance health, thereby, improving overall quality of life (McGhan et al., 2010).

In a systematic review of 24 randomized controlled trials (RCT's), Coffman, Cabana, and Yelin (2009) evaluated the effectiveness of providing asthma education in schools. They hypothesized that asthma education would improve three intermediate outcomes (knowledge, self-efficacy and self-management behaviors) and that improvements in these outcomes would lead to improvement in health outcomes, quality of life, days/nights with symptoms, and reduced school absences. Coffman et al. (2009) reported that school-based asthma education improved knowledge of asthma, self-efficacy and self-management behavior but had less clear-cut effects on health outcomes.

Synthesis of Evidence

Most school-based intervention programs attempt to provide education to increase asthma knowledge in children in efforts to improve self-management skills, confidence in managing their asthma, recognition of asthma symptoms, and quality of life (QOL) and to reduce school absences and hospitalizations/ED visits (Ahmad et al., 2011; Mosnaim et al., 2011). Although many studies were limited to mostly low-income children, asthma education may have greater effects on acute care utilization for low-income children (Mosnaim et al., 2011). Several studies (Cicutto et al., 2005; Gerald et al., 2006) relied primarily on school and health records for them to collect data. Therefore, results may have been less accurate related to conducting repeat training classes for newly hired personnel due to the schools high turnover rate of teachers and staff and time constraints may have undermined components of the asthma educational program. A literature review conveyed that asthma education programs may contribute to preventing and

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managing asthma exacerbations, reducing health care cost and increasing the child's responsibility for self-management practices (Ahmad & Grimes, 2011).

Short term, stand-alone asthma education interventions may be insufficient for improving health among children who do not have regular access to medical care or have high levels of exposure to environmental triggers or irritants (Coffman et al., 2009).

While national guidelines call for and emphasize the need for collaboration between the family, school and health care team, schools continue to face challenges that hinder the implementation of asthma education programs (Bartholomew et al., 2006). Some of the barriers to adding these programs to the existing school curriculum include the lack of administrative support for coordinated efforts by the school principal, educators and staff, the lack of resources for educational programs in schools, and the competing demands of academic accountability and assessment. While many schools are eager to participate in these educational programs, time constraints and limited staff have hindered the ability to successfully implement school asthma programs. As more responsibility for asthma management and education is shifted to school nurses and teachers, school asthma educational guidelines need to be established in order to improve the likelihood of more successful outcomes. This literature review reveals evidence that asthma education programs contribute to improved knowledge and increased asthma management in school-aged children.

[See attached appendix A for a more detailed review and summary of findings]

Methodology

Over the past decade several educational programs have been developed in an effort to improve self-management skills for children with asthma so they can achieve and maintain

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asthma control. Implementing school-based asthma programs nationwide is an important step in helping schools and school systems to establish effective and sustainable asthma interventions. Sharing the knowledge gained will help to make adjustments and improvements in the program and best practice-based evidence.

The aim of this project was to implement a school-based asthma education program, Open Airways for Schools (OAS) to 1) increase knowledge of asthma and 2) increase self-care management skills. The OAS program was also chosen because the nurses in the Harford County Public Schools (HCPS) had previously been trained and had the materials/toolkits to implement these educational classes but were not running the programs due to time, staffing and workload constraints. In addition, the project leader was certified and experienced OAS educator who had been teaching classes since 2000. Because of poor asthma outcomes among children with asthma in the HCPS, school health was interested in implementing the program and the Accountability Department wanted to see demonstration of success with this approach.

Design

A single group pre and posttest comparison design was used to determine if an established school-based asthma education program, (OAS), would improve asthma knowledge and self-management skills in school-aged children. After obtaining consent and assent, a convenience sample of elementary school children diagnosed with asthma and attending a single elementary school was recruited to participate in the program. The project was conducted over a six week period during the fall 2014.

Setting and Sampling Approach

Following IRB approval, a data collection tool was used by the school nurse to identify potential student participants who met the study inclusion criteria (students aged eight to eleven

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years old, who have and/or use an asthma inhaler, and are English-speaking) using the school's electronic health records (Appendix B). This list was next provided to the project team and reviewed with the school nurse. After each child was verified to meet the inclusion criteria, a total of 32 participants were eligible to participate in the study. The identified children received a non-descript envelope to be delivered to their parent(s) or legal guardian containing the following items: an explanatory letter detailing the purpose intent of the project and asking for parental permission (Appendix C); the parent or legal guardian's consent form (Appendix D); the child's assent form (Appendix E); and a return nondescript envelope. Each child was asked to deliver the envelope to their parent or legal guardian, a common practice in the elementary school. Contact information for the project leader was provided in the explanatory letter for questions or concerns. The child's parent(s) or legal guardian were asked to review the enclosed information and if they wished for their child to participate in the project, were directed to sign the consent form, have their child sign the assent form and return both forms in the enclosed envelope to the school nurse. Once an envelope with a signed consent form and signed assent form were received, the project leader called the parent or legal guardian at their contact number to verify the signature on the consent form, to clarify any questions and/or concerns, and to seek understanding of the project. After one week, the project leader placed a call to the parent or guardian of any potential participant who had not returned the envelope to follow up and a second envelope with 'Talking Points' (Appendix F) was provided to the child to take home.

After the second week, if the child did not return the envelope, no additional contact was made to the child, the parent(s) or legal guardian. Following the recruitment phase, a total number of 15 students were enrolled in the study, 10 females and 5 males. The students were then contacted directly with an invitation (Appendix G) providing them the start date and time of

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the classes. The classes were offered one day per week for 45 minutes over a six week period of time beginning in October 2014. One student dropped out halfway through the program due to transferring to another school.

Intervention

The project entailed providing educational classes to the students using the American Lung Association (ALA)'s asthma management program Open Airways For Schools (OAS). The OAS program is a culturally relevant, interactive group program designed to be delivered to school-age children between ages 8–11 years old during school hours. The success of OAS is achieved through a fun and interactive educational program that empowers children in asthma self-management. The program teaches how to detect the warning signs of asthma, the correct technique to use the inhaler device, spacer and peak flow and how to avoid asthma triggers; and make decisions about their health. An outline of the program was provided to the students for review (Appendix H). The classes consisted of six 45-minute educational sessions offered one day per week for six weeks at the school where the child attends. The classes were conducted by the project leader (a pediatric nurse practitioner) during the most suitable time for child during the school day, during their lunch period and/or recess. In its original form, the program is limited to six to eight children per class. For this project, the program consisted of two classes each with seven to eight students, offered on two different days of the week.

At the first class, the participants were provided with a full verbal explanation of the purpose and intent of the program. Each child was given an attendance card (Appendix I) for the Open Airways program. After completion of each session, the child was given a sticker to place on the card that was kept in the child's folder by the OAS educator. The purpose of the card was to track the number of classes each child attends as well as to create a sense of positive

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reinforcement for coming to class. At the beginning of the program, each child was given a paper and pencil asthma knowledge pre-test (Appendix J) used in the OAS program. The pre-test included four demographic questions and 10 questions regarding general knowledge about asthma, asthma triggers, awareness and management of asthma symptoms, deciding when to seek help, relaxation techniques and appropriate use of medications. Instructions, survey items and answers were read aloud according to program protocol due to variable reading levels. The participants were given 25 minutes to complete the pre-test. The completed data collection forms were kept in a locked file in the project leader's locked office.

Following completion of the pre-test, each child was asked to perform specific asthma self-management skills (Appendix K). The skills were assessed as correct or incorrect by the project leader. Both forms were identified with the child's first name only. If two children had the same first name, the first initial of the child's last name was used. After collecting this data, the first session started with an ice-breaker. The children introduced themselves and were asked to draw something about themselves that will show how they feel when they have asthma symptoms. This led to discussion of the definition of asthma, sharing feelings about asthma and deep-breathing exercises. The six week program followed the OAS outline (Appendix H). Other sessions included topics on problem-solving, steps to asthma management, asthma triggers at home and at school, types of medications, proper use of inhalers and peak flow meters and ways to stay active.

After the last class, each child was asked to complete the post-test questionnaire (Appendix L). The post-test asked for the child's first name only and the same 10 questions administered prior to the implementation of the program except for the demographic questions. Additionally, each child was asked to demonstrate specific asthma self-management skills that

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were recorded by the project leader on an asthma student skills post-checklist as "correct" or "incorrect" (Appendix M). After the completion of the Open Airways program, the students and their parents and legal guardian, principal, school nurse and teachers received an invitation (Appendix N) to attend a graduation ceremony where refreshments were served and each child had the opportunity to present what they learned from the OAS program. Each parent and legal guardian received a copy of their child's attendance card, the pre-test and post-test as well as a copy of the pre-skills list and post-skills list in a nondescript envelope marked with the child's name.

Data Collection

Data were collected using the Asthma Knowledge Questionnaire, as part of the OAS 2008 program edition. Although the OAS has been evaluated, published studies did not report on use of the OAS program tools. The first questions addressed basic demographic information: grade, age, gender and whether students had previously participated in OAS classes. Questions 1-6 examined the student's ability to handle their asthma symptoms. Each question was ranked on a scale from 1 to 3 (1 = no; 2 = sometimes; 3 = all the time). A higher score indicated a better handling of their asthma symptoms. Questions 7- 10 assessed the student's ability to identify signs that would require calling a provider or going to the emergency room. Answers were recoded to reflect whether the response was correct (1) or incorrect (0). The final section asked participants to identify asthma triggers for themselves and others. This question (question 11) was not scored since there was not a 'right' or 'wrong' answer.

Students were individually observed on seven skills that demonstrated their ability to administer medication correctly prior to and following the educational intervention. Of the

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seven skills observed, only four (questions 1, 4, 5, and 7) were applicable to the students who participated; items 2, 3, and 6 were deleted from the analysis.

Data Analysis and Results

Data from the student's pre and post asthma questionnaire were entered by the project leader using Microsoft Excel and merged into SPSS version 21 for statistical analysis at completion of the project. Of the 14 students who completed the program 64.3% (n=9) were females and 35.7% (n=5) were males. Students ranged in age from 8-10 years with a mean age of 8.9 years (SD=0.83). All students were enrolled in third, fourth and fifth grades with the majority of students in third grade. None of the students had ever taken an OAS education class.

On the six-question assessment of student's ability to manage asthma symptoms (see Table One), students reported improved handling of symptoms on the first five questions from before the start of the program to program completion, with the change in mean scores of the group being significantly different for questions one – taking medication when symptoms are present and three – using belly breathing to relax when symptoms are present (Wilcoxon signed rank test, $P < 0.05$). For question six, telling an adult when you are having symptoms, the mean post test score was lower than the mean pre-test score, although the difference was not significant.

Questions in Section B were examined as the proportion of students who would seek help appropriately given a particular scenario and demonstrated changes from before (pre-test) to after the classes (post-test) (see Table Two). McNemar's test was used to estimate a change in proportion of the students answering the questions correctly following the intervention compared to pre-test. Differences in two of the four questions were statistically significant in demonstrating a change in proportion among the students, 'You have mild wheezing and can

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play' ($p = 0.02$) and 'You are having a hard time walking, talking or playing' ($p = 0.002$). For the other two questions, although the proportion correctly identifying when to seek help improved over time, the differences were not statistically significant.

All four asthma medication administration skills improved significantly from the start of the program to program completion (see Table Three), with large and statistically significant increases in the proportion of children correctly demonstrating these skills (McNemar's test, $P < 0.05$). By the end of the program, more than 90% of students correctly demonstrated three of the four skills (using a MDI, using a spacer with a MDI, properly recording peak flow readings and tracking symptoms using an asthma diary). More than 75% correctly demonstrated use of a peak flow meter.

The experience of the students during the implementation of the OAS program seemed to be positive. Attendance in class was 100%. Students also had the opportunity to make up any classes missed since there were two classes per week on different days. During each class, students were actively engaged, asked appropriate questions and shared their feelings related to the topic discussed. The students seemed to learn from the hands-on activities and enjoy the role-playing, as they all participated in the interactive games and scenarios. As the findings indicated, the children not only showed a boost in knowledge and medication administration skills but gained the ability of acquiring the fundamental principles to communicate and make decisions in managing their disease.

Upon completion of the classes, the students celebrated their new knowledge gained with a graduation party and certificates were given for being declared 'asthma experts'. Parents had the opportunity to come to all the classes as well as the graduation ceremony. None of the

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parents attended any of the educational sessions but 8 of the 14 students had their parents or loved ones attend the graduation festivities.

Discussion

The results of this project suggest that participation in the OAS program, a child-oriented, structured asthma education program, will result in improvements in asthma knowledge, decision-making and asthma medication administration skills among elementary school children consistent with published literature (Cicutto et al., 2005; Coffman et al., 2009; Mosnaim et al., 2011; Velsor-Friedrich et al., 2005). The results provide evidence that children who complete the OAS understand the first steps of self-management skills including knowing when to avoid asthma triggers, how to identify early warning symptoms and when to seek help. Consistent with previous studies, the results of the project suggest that asthma education programs can produce positive changes in health behavior where children are free to control their own actions and increase responsibility for their care. Four medication administration skills improved significantly, with more than 90% of children competent in 3 of 4 skills, suggesting education in this area was very effective. This confirms previous findings that educational programs are effective in improving self-care management practices (Coffman et al., 2009; Mosnaim et al., 2011; Velsor-Friedrich et al., 2005). Improvement in knowledge, critical thinking and skills are significant because as children start to become more independent, their ability to communicate and make decisions is crucial. The results further demonstrate that a school-based asthma education program is a feasible way to deliver asthma education to children and to develop skills to improve their self-management practices.

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The need for improved asthma management requires a coordinated multicomponent, multilevel public health-focused approach. The first step was gaining principal's support by stressing the connection between asthma-friendly approach by schools, school improvement and student achievement, was key (Langenfeld, Bonaiuto, & Edmonds, 2006). Having peak flow meters to distribute to the children, perhaps at the end of the 6 week program, would improve their ability to effectively manage asthma exacerbations at home as well as school. Linkages to and collaboration with other community organizations and resources are critical to success. Support for asthma management must include collaboration with the child's health care provider, school nurse and parents so that education can be tailored to the individual child. Identifying meaningful, specific, measurable and realistic improvement goals and evaluating the intervention's effectiveness in a collaborative and patient-centered manner is also important for gaining support of the intervention in the schools (Hester et al., 2013; Wheeler et al., 2006).

Project Limitations

A major limitation of this project was the small convenience sample from only one school in a low-income area of this school district. Although the OAS was originally tested in white, middle class populations (Cicutto et al., 2005; McGhan et al., 2010), the results of the program cannot be generalized to all students attending the Harford County Public Schools. To determine the program's efficacy with these students, the intervention should be tested with a larger sample of children with asthma in more schools in a variety of income areas. A period of six weeks is inadequate to see a real change and longer follow-up would be preferable. This evaluation did not include measures of asthma symptoms or use medication and would be strengthened by adding a reliable measure of symptom control and medication administration

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such as the ACT, which could easily be administered by school nurses in a school setting. The program also did not identify or address asthma triggers in the home or child's school environment. It may be possible to address the home environment using other partnerships and to consider implementation of the Environmental Protection Agency (EPA's) Asthma Friendly Schools Program, as has been done in other school systems.

Translation Plan

The changing demands of our nation's complex health environment require the highest level of scientific knowledge and practice expertise to assure quality patient outcomes. Implementing practice change in the real-world setting requires partnerships. There is a need to engage with the community, with other professionals, with the public school system and with other health care resources such as asthma foundations, community organizations, and state and local health departments (Waldrop, Caruso, Fuchs, & Hypes, 2014). The Doctor of Nursing Practice (DNP) prepared nurse practitioner must demonstrate the ability to lead in front-line positions, facilitate shared decision-making, collaborate interorganizationally and have the knowledge and skills to successfully implement their project in the practice setting (Waldrop et al., 2014). The American Association of Colleges of Nursing (AACN) developed a set of essentials that reflect core competencies that a DNP-prepared nurse must have in order to bridge the gap between new knowledge and integration of this knowledge into practice (AACN, 2006). The most relevant essentials that guided the implementation of this project were (a) *Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice* (b) *Essential V: Health Policy for Advocacy in Health Care* and (c) *Essential VI: Interprofessional Collaboration for Improving Patient and Population Health Outcomes*.

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The DNP is an expert in evidence-based practice and will lead the innovation process by educating, motivating, analyzing and providing feedback to stakeholders and members of the interprofessional team. The DNP leader reports outcomes about the importance of asthma education programs to stakeholders and disseminates findings through publications. The DNP establishes partnerships to influence policy and practice change with key stakeholders including: public school systems, school-based health centers, Boards of Education, state and local government agencies, local health departments, pediatric primary care offices and hospitals. This can be done by influencing policymakers to mandate the use of the NAEPP guidelines, which recommend that schools develop, implement and evaluate pilot programs to explore innovative approaches to teaching wellness and self-management skills to children with asthma.

Further, the DNP can be instrumental in supporting children's health in schools by testing evidence-based programs, providing training sessions to school personnel to enhance skills for administering the program to administration, evaluating change using evidence-based tools and longer term outcomes and making a clear connection between asthma programs, school improvement, and student achievement. The dissemination of the results will include sharing the findings and lessons learned from this project. Results will be presented in oral and poster presentations with the school nurses employed by the Harford County Public School (HCPS), National Assembly on School-Based Health Care conference, the National Doctor of Nursing Practice Conference and the National Association of Pediatric Nurse Practitioner conference. These discussions will encourage further implementation of this program and increase attention to the need to address childhood asthma throughout our public schools. Finally, the DNP can be instrumental in persuading Boards of Education to support children's health by funding implementation of evidence-based programs like the OAS.

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Implications for Future Practice

Health care providers who care for children with asthma are challenged to find effective, evidence-based approaches to do this. Asthma education at school is an effective means of helping children improve their symptoms management. With the responsibility of asthma management and education shifting to school nurses and school-based health centers, additional programs need to be implemented in order to ensure more successful outcomes. Early recognition of symptoms and appropriate use of medications can decrease the burden of asthma in this population.

Although, OAS is a good program, this stand-alone, short-term program alone may not be sufficient to improve risk factors associated with poor asthma control. Classes may need to be repeated annually and over longer periods to achieve improvements in health outcomes. Starting the program in the fall would enable changes to be monitored throughout the school year. Improving asthma outcomes will require a coordinated effort among health professionals, caregivers, school personnel, and the community. Expansion should be started by developing programs in 2 more schools continuing to evaluate the success of the programs including improved measures of individual management and impact on school attendance.

Conclusion

Asthma education is an effective means of helping patients better manage their symptoms. This project demonstrated that the OAS asthma educational program improved asthma knowledge, decision-making and self-care skills in 3rd -5th grade children. While the OAS is a good program for asthma education, this program alone may not be sufficient to improve risk factors associated with more severe asthma or poor control. Individuals working in a school

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setting including school nurses, teachers, administrators, and health educators, can take initiative to improve the asthma management, education and policies in this school environment.

Partnerships between schools, state and local legislators and community organizations are needed to focus on strategies to sustain effective asthma educational programs, particularly when resources are limited.

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Table One: Assessment of ability to handle asthma symptoms

Think about when you have asthma symptoms	PreTest Mean (SD)	PostTest Mean (SD)	z, p
1. Do you take medicine to stop your asthma symptoms?	2.21 (0.57)	2.71 (0.46)	-2.33, p = 0.02*
2. Do you try to relax and stay calm?	2.14 (0.53)	2.28 (0.46)	-0.82, p = 0.41
3. Do you do belly breathing to relax?	1.71 (0.61)	2.42 (0.64)	-2.23, p = 0.02*
4. Do you try to get away from your asthma triggers?	2.42 (0.64)	2.64 (0.63)	-1.0, p = 0.31
5. Do you watch to see if you symptoms get better or worse?	2.21 (0.69)	2.28 (0.61)	-0.33, p = 0.31
6. Do you tell an adult when you are having symptoms?	2.85 (0.36)	2.71 (0.46)	-1.0, p = 0.31

*Statistically significant at 0.05

Table Two: Assessment of when to appropriately seek help

What signs mean you should call the doctor or go to the emergency room?	Percentage Pre-test	Percentage Post-test	p-value
7. Your wheezing or coughing gets worse after you take your medicine.	78%	78.6%	p > 0.05
8. You rested and your asthma symptoms are gone.	28.6%	21.4%	p > 0.05
9. You have mild wheezing and you can play.	42.9%	78.6%	p = 0.02*
10. You are having a hard time walking, talking, or playing.	14.3%	85.7%	p= 0.002*

*Statistically significant at 0.05

Table Three: Assessment of student skills

Asthma medication administration	Percentage Pre-test	Percentage Post-test	p-value
Demonstrate correct technique using a metered dose inhaler (MDI)?	28.6%	92.9%	p = 0.004*
Demonstrate correct technique using a spacer/holding chamber with MDI?	38.5%	92.9%	p = 0.008*
Demonstrate correct technique when using a peak flow meter	21.4%	78.6%	p = 0.008*
Demonstrate correct technique in properly recording peak flow reading and track symptoms in asthma diary	7.1%	92.9%	p = 0.000*

*Statistically significant at 0.05

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Appendix A

Johns Hopkins Nursing Evidence Based Practice Individual Evidence Summary

#	Author	Date	Evidence Type	Sample & Sample Size	Results / Recommendations	Limitations	Strength & Quality
1	Cicutto, Murphy, & Coutts	2005	RCT of elementary schools	Children 6-11 yrs in grades 2-5 treatment-132 & control-124	Children who experienced the asthma education program- 'Roaring Adventures of Puff' (RAP) delivered in their schools by certified asthma educators demonstrated better outcomes than those who did not experience the intervention (RAP). Outcomes measured- self-efficacy in ability to manage asthma, missed school days, urgent care visits and higher quality of life. The program may have demonstrated greater benefits if an asthma-friendly and supportive school environment existed that facilitated the ability of	Quality of life and self-efficacy were only assessed at baseline and at two months not at the one year point. Therefore, no conclusions can be drawn related to sustainability of improvements. Relied on parent recall since access to student school records and health records were not permitted. Suburban setting limits generalizability	1 A

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					students to manage asthma.		
2	Coffman, Cabana, & Yelin	2009	Systemic Review	This review demonstrated that school-based asthma education programs enhanced knowledge of asthma, self-efficacy and self-management behaviors but had fewer effects on health outcomes. Partnerships between schools and health professionals may be beneficial in improving overall health outcomes.	This review demonstrated that school-based asthma education programs enhanced knowledge of asthma, self-efficacy and self-management behaviors but had fewer effects on health outcomes. Partnerships between schools and health professionals may be beneficial in improving overall health outcomes.	High degrees of heterogeneity in interventions, target populations & outcomes assessed. Numbers of sessions, contact hrs and duration of interventions varied widely as well as the people who provided the education.	1 B
3	Gerald, Redden & Wittich	2006	RCT-schools randomized to immediate and delayed intervention –consisted of 3 separate educational programs and medical management over a 5 yr period	736 students Grades 1- 4 urban minority school system	A significant increase in asthma knowledge among the immediate intervention group was observed but morbidity measures did not change (school absences, grades, health care utilization) these outcome	Difficulty maintaining fidelity of the asthma program. For example- students changed schools often, and school records were often not accurate. High turnover of school faculty and staff, which impacted continuity of the project. Threats to external validity	1 B

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					variables were not as reliable as anticipated.		
4	McGhan & Wong	2010	RCT	262 children grades 2-5 predominately Caucasian living in small cities in Canada	The 'Rap' group showed an overall improvement in outcome measures at 6 & 12 months. Improved child's perception of the Quality of Life (QOL), symptoms, coping, asthma control. Establish partnerships with schools to develop school asthma guidelines linked with ongoing health care support.	Size difference between groups, differences in dropouts and participants lost to follow up for various reasons, randomized to school not student, higher exposure to smoke in the intervention group.	1 B

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5	Mosnaim, Li, & Damitz	2011	RCT-stratified 2-arm study	25 youth classes (19 experimental & 6 control) 16 teen classes (11 experimental & 5 control)	The program Fight Asthma Now (FAN) significantly increased asthma knowledge and spacer technique competency test scores. School-based asthma program is a feasible way to deliver effective education to children who may not have access to these services.	Some schools were not always accommodating to educators so they can provide FAN. Imbalance of gender and ethnicity in both youth and teen group.	1 B
6	Velsor-Friedrich, Pigott & Srof	2005	Quasi-experimental study: pre and post test design	52	School-based asthma programs with follow-up NP visits improves asthma knowledge and self-care management practices	Small sample size, limited generalizability; intervention failed to demonstrate improvements in asthma symptoms, school absences, rescue medication use, peak flow readings and health care utilization	2 B

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Appendix C



Barbara P. Canavan, Interim Superintendent of Schools
 102 S. Hickory Avenue, Bel Air, Maryland 21014
 Office: 410-838-7300 • www.hcps.org • fax: 410-893-2478

Date: _____

Student's Name: _____

School: _____

Street _____ City _____ State _____ Zip Code _____

Dear Parents,

Magnolia Elementary School has a great asthma learning program called Open Airways For Schools (OAS). This program helps children learn about asthma and ways to control asthma and how to use their inhaler and spacer and ways to stay active with asthma.

There will be six classes about asthma offered one day each week during the school day at the best time for the child. The nurse practitioner will teach the asthma classes. Parents will receive written materials each week of what their child is learning in the OAS program. During classes, there will be group discussion, stories, games, and role-play activities.

We would like to have permission for children with asthma to join in this learning program. If your doctor has told you that your child has asthma, this program can help your child by teaching them how to better control their asthma and be able to attend school and live more active, healthy lives. Please complete the bottom portion of this page and return this letter to **(school nurse)** if your child has asthma and you give permission for him or her to join in the class. If you have any questions about the program, please feel free to call **(school nurse)** at 410-612-1553.

Sincerely,

Blanche Brown, MSN, CRNP

I give my permission for my child _____ to participate in the

(Printed Name of child)

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Continuation of Appendix C...

Open Airways for Schools, the American Lung Association's asthma program for children with asthma in elementary school.

Parent/Guardian's printed name:

Signed: _____ Date: _____

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Appendix D

RESEARCH CONSENT FORM

Protocol Title: Improving Asthma Management

Study No.: HP-00058489

Principal Investigator: Elaine Bundy, DNP, MS, CRNP, 410-706-3684

This is an educational program that will take place during the school day. Participation is voluntary and the child could withdraw from the program at anytime. You can ask questions at anytime during the course of the program.

PURPOSE OF STUDY

The purpose of this project is to examine the effect of a school-based asthma education program in improving knowledge about asthma and self-care management skills.

The school nurse reviewed the health records of 3rd, 4th and 5th grade students and identified your child as having asthma. The school nurse also identified those students that have/use a rescue asthma inhaler at school and felt your child would qualify to participate in the asthma program.

The total number of participants at this site is 20-25

PROCEDURES

Once enrollment in the study is complete, the first of six 45-minute educational sessions will begin. The classes will be offered one day per week for six weeks at the school where the child attends. The Nurse researcher will conduct the classes during the most suitable time for the child during the school day. At the beginning of the educational program, the participants will be provided with a full verbal explanation of the purpose and intent of the program. The participants will then be given an 11-item paper and pencil asthma knowledge pre-test. The first session will be a discussion on the definition of asthma, sharing feelings about asthma and deep-breathing exercises. Other classes will include topics on problem-solving, steps to asthma management, asthma triggers at home and at school, types of medications, proper use of inhalers and peak flow meters and ways to stay active. At the end of the last class, students will take a test to see how much they learned from the program.

POTENTIAL RISKS/DISCOMFORTS:

IMPROVING ASTHMA MANAGEMENT

Continuation of Appendix D...

There is minimal risk associated with this study. Participants will be assured prior to the beginning of the educational program that all information discussed during the classes will not be shared and all data collected will be minimized by storing data in a secure location such as a locked office and locked cabinet or “Electronic data will be password-protected.”

POTENTIAL BENEFITS

Studies over the years have shown that children who participated in this program had fewer and less severe asthma attacks, improvement in academic performance, confidence in their ability to manage their asthma, decrease in school absences and increased participation in physical activity.

You need to decide if your child’s participation in this research study is in your child’s best interest.

ALTERNATIVES TO PARTICIPATION

This is not a treatment study. Your alternative is to not take part. If you choose not to take part, your healthcare will not be affected in any way.

COSTS TO PARTICIPANTS

It will not cost you anything to take part in this study.

PAYMENT TO PARTICIPANTS

Participants will not be paid.

CONFIDENTIALITY AND ACCESS TO RECORDS

The data from the study may be published. However, you will not be identified by name. Everyone using study information will work to keep your personal information confidential. Being that no identifying information will be collected, there are no potential confidentiality issues related to this study.

RIGHT TO WITHDRAW

Your participation in this study is voluntary. You do not have to take part in this research. You are free to withdraw your consent at anytime. Refusal to take part or to stop taking part in the study will involve no penalty or loss of benefits to which you are otherwise entitled. If you decide to stop taking part, or if you have questions, concerns, or complaints, or if you need to

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Continuation of Appendix D...

report a medical injury related to the research, please contact the investigator, Elaine Bundy at 410-706-3684

CAN I BE REMOVED FROM THE RESEARCH?

The person in charge of the research study or the sponsor can remove you from the research study without your approval. Possible reasons for removal include [**misconduct, failure to follow instructions, missing classes**] The sponsor can also end the research study early. The study doctor will tell you about this and you will have the chance to ask questions if this were to happen.

UNIVERSITY STATEMENT CONCERNING RESEARCH RISKS

The University is committed to providing participants in its research all rights due them under State and federal law. You give up none of your legal rights by signing this consent form or by participating in the research project. **This research has been reviewed and approved by the Institutional Review Board (IRB).** Please call the Institutional Review Board (IRB) if you have questions about your rights as a research participant.

The research described in this consent form has been classified as minimal risk by the IRB of the University of Maryland, Baltimore (UMB). The IRB is a group of scientists, physicians, experts, and other persons. The IRB's membership includes persons who are not affiliated with UMB and persons who do not conduct research projects. The IRB's decision that the research is minimal risk does not mean that the research is risk-free. You are assuming risks of injury as a result of research participation, as discussed in the consent form.

If you are harmed as a result of the negligence of a researcher, you can make a claim for compensation. If you have questions, concerns, complaints, or believe you have been harmed through participation in this research study as a result of researcher negligence, you can contact members of the IRB or the staff of the Human Research Protections Office (HRPO) to ask questions, discuss problems or concerns, obtain information, or offer input about your rights as a research participant. The contact information for the IRB and the HRPO is:

University of Maryland School of Medicine
Human Research Protections Office
BioPark I
800 W. Baltimore Street, Suite 100
Baltimore, MD 21201
410-706-5037

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Continuation of Appendix D...

Signing this consent form indicates that you have read this consent form (or have had it read to you), that your questions have been answered to your satisfaction, and that you voluntarily agree to participate in this research study. You will receive a copy of this signed consent form.

If you agree to participate in this study, please sign your name below.

_____ Participant's Signature	_____ Signature of Parent/Guardian <i>(When applicable)</i>
Date: _____	Relationship: _____ Date: _____
_____ Investigator or Designee Obtaining Consent Signature	_____ Signature of Parent/Guardian #2 <i>(When applicable, as required by CFRs- requirements for permission by parents' assent)</i>
Date: _____	Relationship: _____ Date: _____
	_____ Witness*
	Date: _____

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Appendix E

RESEARCH ASSENT FORM

Protocol Title: Improving Asthma Management

Study No.: HP-00058489

Principal Investigator: Elaine Bundy, DNP, MS, CRNP, 410-706-3684

We want to tell you about a research study we are doing. A research study is a way to learn facts about something. We would like to find out if an asthma learning program will help you know more about asthma and what you can do to make your asthma better. You are being asked to join the study because you have asthma.

If you agree to join this study, you will be asked to come to six classes about asthma. The classes will be one day during each week for six weeks at your school. At the first class, you will take a short test to see how much you know about asthma. We will then talk about what it means to have asthma, share your feelings about asthma and do some breathing exercises. Other classes will help you understand how to tell if your asthma is getting worse, what might be things to trigger your asthma at home and at school, learn about asthma medications, how to use your inhaler, peak flow meter and spacer and ways you can stay active with asthma. At the end of the last class, you will answer questions again to see how much you learned from your classes about asthma.

You do not have to join this study. It is up to you. You can say okay now, and you can change your mind later. All you have to do is tell us. No one will be mad at you if you change your mind.

Anything we learn about you from this study will be kept as secret as possible.

Before you say yes to be in this study, we will answer any questions you have.

If you want to be in this study, please sign your name. You will get a copy of this form to keep for yourself.

(Sign your name here)

(Date)

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Talking Points regarding Open Airways Program

- ☑ What is the Open Airways for Schools Program (OAS)
- ☑ The benefits of OAS for the child
 - Increase asthma knowledge, self-care management skills and self-confidence
 - Increased participation in physical activity
 - Reduced days missed from school
 - Improved classroom performance
 - Fewer asthma emergencies
 -
- ☑ The benefits of OAS for the parents
 - Improved communication about asthma with child and with school
 - Less days missed from work
 - Classes built into the school day
 - Fewer emergency room visits



You are invited to participate in the
Open Airways for Schools Program

Why:

- Learn how to take care of your asthma at home and at school.
- Learn how to take your medicine.
- Learn to stay healthy and active.
- Control asthma symptoms so you don't miss school in order to do well in school.



When: During your lunch time

Where: Conference room

THANK YOU to everyone who returned the Asthma Program consent forms! Lets Learn-Play-Breathe and have fun!

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Open Airways Curriculum Outline

- I. **Lesson 1**
 - A. “Ice Breaker”
 - B. Basic information and feelings about asthma
- II. **Lesson 2**
 - A. Recognizing early warning signs of asthma and managing symptoms
 - B. Role-play activity- “Moving through management steps”
- III. **Lesson 3**
 - A. Solving problems with medicines and symptoms
 - B. Role-play activity- “Deciding how bad symptoms are”
- IV. **Lesson 4**
 - A. Demonstrate and role-play activity- “Finding and controlling asthma triggers”
- V. **Lesson 5**
 - A. Keeping your battery charged
 - B. Demonstrate and role-play activity- “Ways to stay active”
- VI. **Lesson 6**
 - A. Doing well at school
 - B. Role-play activity- “Deciding when to go to school...”

Progress Report

My name is _____

When I finish my lessons, I will be an expert in Asthma Management. This is what I've learned so far:

Lesson 1: Basic Information and Feelings About Asthma

- I know how asthma affects my lungs.
- I can do belly breathing for relaxation.

Lesson 2: Recognizing and Managing Asthma Symptoms

- I know my asthma warning signs.
- I can take my asthma medication at the right time and in the right way.
- I know when to ask an adult for help.

Lesson 3: Solving Problems with Medicines and Assessing Symptoms

- I know how to solve problems with my medicines.
- I know when I need to get medical help.

Lesson 4: Finding and Controlling Asthma Triggers

- I know what my asthma triggers are.
- I can avoid things that trigger my asthma symptoms.
- I know how to talk to parents, teachers, coaches, and friends about my asthma.

Lesson 5: Keeping Your Battery Charged and Getting Enough Exercise

- I know how to keep calm and relaxed.
- I know how to stay active.

Lesson 6: Doing Well at School

- I know when I'm OK to go to school and when I need to stay home.
- I know how to make up missed schoolwork.

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Progress Report



IMPROVING ASTHMA MANAGEMENT

Open Airways for Schools: Pre-Program Questionnaire

Name: _____ School: _____ Date: _____

Below are questions about yourself. Please check the box that best describes you.What grade are you in? ___ 3rd ___ 4th ___ 5th

How old are you? ___ 8 ___ 9 ___ 10 ___ 11

Are you a boy or a girl? ___ Boy ___ Girl

Have you ever been in an Open Airways For Schools class before? ___ No ___ Yes

Think about when you have asthma symptoms

1. Do you take medicine to stop your asthma symptoms?
___ No ___ Sometimes ___ All the time
2. Do you try to relax and stay calm?
___ No ___ Sometimes ___ All the time
3. Do you do belly breathing to relax?
___ No ___ Sometimes ___ All the time
4. Do you try to get away from your asthma triggers?
___ No ___ Sometimes ___ All the time
5. Do you watch to see if your symptoms get better or worse?
___ No ___ Sometimes ___ All the time
6. Do you tell an adult when you are having symptoms?
___ No ___ Sometimes ___ All the time

What signs mean you should call the doctor or go to the emergency room?

7. Your wheezing or coughing gets worse after you take your medicine
___ No, don't go to the doctor. ___ Yes, go to the doctor.
8. You rested and your asthma symptoms are gone.
___ No, don't go to the doctor. ___ Yes, go to the doctor.

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9. You have mild wheezing and you can play.

No, don't go to the doctor.

Yes, go to the doctor.

10. You are having a hard time walking, talking, or playing.

No, don't go to the doctor.

Yes, go to the doctor.

From the list below, circle the things that bring on your asthma. Also circle the thing that can bring on asthma in other people with asthma.

Pets like dogs, cats, rabbits

Mold

Trees

Smoke

Changes in weather

Cuts

Strong smells like perfume, hairspray,
Cleaning products

Having a cold

Cockroaches

Very cold air

Physical activity like running, swimming,
or playing

Strong feelings like laughing or crying

Plywood

Being around dusty things

IMPROVING ASTHMA MANAGEMENT

Asthma Student Skills Pre-Checklist

Medication Administration	Correct	Incorrect	N/A
1. Does the student demonstrate correct technique when using the metered dose inhaler (MDI)?			
2. Does the student demonstrate correct technique when using the dry powder inhaler (DPI)?			
3. Does the student demonstrate correct technique when using the nebulizer?			
4. Does the student demonstrate correct technique when using the spacer/holding chamber with MDI?			
5. Does the student demonstrate correct technique when using the peak flow meter?			
6. Does student use peak flow meter before taking asthma medication?			
7. Is the student able to properly record peak flow reading and track symptoms in asthma diary?			

IMPROVING ASTHMA MANAGEMENT

Open Airways for Schools: Post-Program Questionnaire

Name: _____ School: _____ Date: _____

Think about when you have asthma symptoms

1. Do you take medicine to stop your asthma symptoms?
 No Sometimes All the time
2. Do you try to relax and stay calm?
 No Sometimes All the time
3. Do you do belly breathing to relax?
 No Sometimes All the time
4. Do you try to get away from your asthma triggers?
 No Sometimes All the time
5. Do you watch to see if your symptoms get better or worse?
 No Sometimes All the time
6. Do you tell an adult when you are having symptoms?
 No Sometimes All the time

What signs mean you should call the doctor or go to the emergency room?

7. Your wheezing or coughing gets worse after you take your medicine
 No, do not go to the doctor. Yes, go to the doctor.
8. You rested and your asthma symptoms are gone.
 No, do not go to the doctor. Yes, go to the doctor.
9. You have mild wheezing and you can play.
 No, do not go to the doctor. Yes, go to the doctor.
10. You are having a hard time walking, talking, or playing.
 No, do not go to the doctor. Yes, go to the doctor.

IMPROVING ASTHMA MANAGEMENT

Part 2

From the list below, circle the things that bring on your asthma. Also, circle the thing that can bring on asthma in other people with asthma.

Pets like dogs, cats, rabbits

Mold

Trees

Smoke

Changes in weather

Cuts

Strong smells like perfume, hairspray,
Cleaning products

Having a cold

Cockroaches

Very cold air

Physical activity like running, swimming,
or playing

Strong feelings like laughing or crying

Plywood

Being around dusty things

Appendix M

Asthma Student Skills Post-Checklist

IMPROVING ASTHMA MANAGEMENT

Medication Administration	Correct	Incorrect	N/A
1. Does the student demonstrate correct technique when using the metered dose inhaler (MDI)?			
2. Does the student demonstrate correct technique when using the dry powder inhaler (DPI)?			
3. Does the student demonstrate correct technique when using the nebulizer?			
4. Does the student demonstrate correct technique when using the spacer/holding chamber with MDI?			
5. Does the student demonstrate correct technique when using the peak flow meter?			
6. Does student use peak flow meter before taking asthma medication?			
7. Is the student able to properly record peak flow reading and track symptoms in asthma diary?			

Lesson 5: Invitation

Dear Parents, Family Members, and Teachers

You are invited to a
Graduation Celebration for

who has successfully completed the
American Lung Association
Open Airways For Schools program.

Date: _____

Time: _____

Place: _____

Sincerely,

Instructor, the American Lung Association
Open Airways For Schools program