

**THE IMPLEMENTATION OF A SCHOOL BASED ASTHMA AND ALLERGY
PROGRAM IN A RURAL SCHOOL DISTRICT**

by

Florence Viveen Dood

LINDA MATHESON, PhD, RN Faculty Mentor and Chair

LYDIA FORSYTHE, PhD, RN Committee Member

LISA SINGLETERRY, PhD, RN Committee Member

Patrick Robinson, PhD, Dean, School of Nursing and Health Sciences

A DNP Project Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Nursing Practice

For submission to the *Journal of Pediatric Nursing*

Capella University

November 2016

Abstract

Asthma and allergies are the chief cause of chronic disease among children. The ability to properly manage asthma and allergies in the school setting requires a high level of coordination between the school district, the family, and the healthcare provider. Due to budget cuts, administrative issues, and legislation, schools often have reduced capability to employ school nurses. Consequently, students with health concerns are often managed by unlicensed assistive personnel who have minimal training. In response to this identified gap in care, the School Based Asthma and Allergy Program was developed. The first aim of the program was to train unlicensed assistive personnel in the management of students with asthma and allergies to increase disease knowledge as well as self-efficacy. The second aim was to provide parents with an educational packet that included a request for a prescriptive asthma or allergy emergency action plan. The third aim was to support sustainability by informing current school health policy. Findings suggest that a coordinated approach promotes improved self-efficacy ($z = -4.8599, p < 0.001$) and disease knowledge ($z = -4.5407, p < 0.001$; significance threshold set at $p < 0.05$) of unlicensed assistive personnel, delivers an effective protocol to guide school personnel in decision making with submitted student action plans on file (increase from 0% to 5%), and informs school health policy. Administrators and health professionals in school districts with adequate or low school nurse-to-student ratios can look to the School Based Asthma and Allergy Program as an effective coordinated approach.

Keywords: schools, asthma, allergies, unlicensed assistive personnel, asthma action plans, allergy action plans, students, school nurses, school health

The Implementation of a School Based Asthma and Allergy Program in a Rural School District

Asthma and allergies are the leading cause of chronic disease among children and present a significant public health concern. The ability to properly manage students with asthma and allergies in the school setting requires a high level of coordination between the school district, the parents, the child, school personnel, and the healthcare provider (Engelke, Swanson, & Guttu, 2014; Kallenbach, Ludwig-Beymer, Welsh, Norris, & Giloth, 2003; National Asthma Education and Prevention Program [NAEPP], 2014). Due to budget cuts, administrative issues, and legislation, schools have reduced capability to employ school nurses (Michigan School Nurse Task Force, 2014). Consequently, students with health concerns are often managed by unlicensed assistive personnel (UAP) with minimal training. In addition, students with asthma and allergies frequently do not have asthma and allergy action plans on file, the healthcare provider's prescriptive guideline for the management of asthma exacerbations and allergic reactions. In response to this identified gap in care, the School Based Asthma and Allergy Program (SBAAP) quality initiative was implemented.

Background and Significance

Since the 1980's, the prevalence of asthma has consistently been increasing and currently 7.1 million children under the age of 18 have asthma (American Lung Association, 2012). Asthma and asthma related illness is the chief cause for school absence and is responsible for the annual loss of 13.8 million school days per year (Centers for Disease Control and Prevention [CDC], 2014). Students with poorly controlled asthma and allergies often miss activities which can progress toward decreased productivity, learning, and poor self-esteem (Kallenbach et al., 2003). Children who suffer from allergies may or may not present with asthma symptoms; however, it is estimated that 60 to 90 percent of asthma attacks are often triggered by allergies

(Kelly & Kaliner, 2014). Of the 230,000 children in Michigan that were diagnosed with asthma in 2011, 41,000 had two or more urgent care or emergency department visits in the 12 months prior and 9,000 were hospitalized with asthma associated complications (Asthma and Allergy Foundation of America [AAFA], 2016). Asthma hospitalization, lost productivity, disability, and missed school days remain high despite recent advances in the scientific development concerning asthma management (National Institutes of Health, National Heart, Lung, and Blood Institute [NHLBI], 2007; NHLBI, 2011).

Asthma is characterized by the inflammation and reversible constriction of the airways, often triggered by allergens such as plants, molds, pets, cockroaches, food allergens and dust mites. An asthma exacerbation can also be triggered by air pollution, smoke, respiratory tract infections, and physical exercise. Individuals with asthma have hypersensitive airways, resulting in excessive constriction and inflammation of the bronchioles (Greener, 2015). Subsequently, the acute asthma exacerbation limits airflow. The associated symptoms include shortness of breath, wheezing, chest tightness, and coughing (CDC, 2012).

Allergic disease, including asthma, is the third most common chronic disease for children under 18 years old (AAFA, 2016). An allergy is defined as a reaction to allergens such as certain foods, insect stings, chemicals in the air, or contact with a product such as latex. The reaction may cause coughing, sneezing, itchy eyes, runny nose or in more severe cases, rashes, asthma exacerbations, or in extreme cases, anaphylaxis (AAFA, 2016). The symptoms of allergy can impact quality of life as well as place the individual at risk for life threatening reactions.

Although asthma and allergies cannot be cured, with appropriate medical treatment and effective management of triggers individuals can successfully control the symptoms of bronchoconstriction, inflammation, and extreme exacerbations (NHLBI, 2011).

Severe, life-threatening allergies due to food allergies and insect stings in children is on the rise. Schools are often confronted with the task of maintaining the safety of students while also preparing for a possible anaphylactic emergency, regardless of onsite school nurse coverage (National Institute of Allergy and Infectious Disease, 2007). Children with food allergies are at significant risk at school due to the prevalence of food in the classroom, playground, and other activities that revolve around food. Approximately 84% of children with food allergies have a reaction at school and 25% of the reactions are first time exacerbations (Morris, Baker, Belot, & Edwards, 2011). Between 1997 and 2007, the prevalence of food allergies had increased in children by 18%. In Michigan, 88% of schools reported students with food allergies (Michigan Department of Education [MDE], 2016). Severe allergic reactions to foods is the most common cause of anaphylaxis in the public setting (MDE, 2016). Compared to the United States, Michigan has a greater percentage of adults and children who have been diagnosed with asthma as well as higher rates of hospitalization (Asthma Initiative of Michigan [AIM], 2016).

The ability to properly manage students with asthma and allergies in the school setting requires a high level of coordination between the school district, the parents, the child, school personnel, and the healthcare provider (Engelke et al., 2014; Kallenbach, et al., 2003; NAEPP, 2014). Yet in Michigan, there is an identified gap in care concerning student health care management in the schools. Due to budget cuts, administrative issues, and legislation, schools have reduced capability to employ school nurses. Per national statistics, Michigan ranks last among states in the ratio of school nurses to students (Michigan School Nurse Task Force, 2014). Consequently, students with health concerns are often managed by UAP with minimal training and without the oversight of a school nurse. Asthma care and self- management goals are not being met in K-12 schools in Michigan (AIM, 2014). The number of individuals who received an

asthma action plan (AAP) or education about asthma and asthma medications is low in comparison to national benchmarks (AIM, 2014).

The need for a more intentional approach concerning the management of asthma and allergies within the local school district was generated by two events that recently took place. The first was the enactment of the new Michigan law effective in 2014 that mandates that every school statewide have two epinephrine auto injectors in each school building and that two staff members receive training in the use of the devices as well as the overall management of students with asthma and allergies (MDE, 2013). The second was the recent death of a student who suffered an anaphylactic reaction while traveling on the bus in a nearby school district (Tunison, 2015). A lack of proper oversight of the students with asthma and allergies was verified by the absence of asthma action plans (AAP) or personalized allergy emergency action plans (AEAP) on file, students without inhalers or epinephrine auto injectors on site, undocumented asthma and allergy office visits, under reported identification of students with asthma and allergies, and the lack of training of UAP. In view of these requirements and events, the local school administrative team determined the need for an initiative that addressed these issues. The multicomponent SBAAP initiative includes UAP training, action plans, adequate medication, and a sustainable health policy (AIM, 2014).

Literature Review

Community Partnerships and Collaboration

A collaborative approach that includes community partnerships is an effective means for creating a sustainable program. In Long Beach, New York, a critical factor in the success of the public schools' initiative in response to an asthma related student death was the formation of community partnerships (Guglielmo & Little, 2006). The tragedy caused the community to

organize and create a coordinated school based asthma management program. The development of a local asthma coalition provided the necessary partnerships to implement the program (Guglielmo & Little, 2006). Hester et al. (2013) recognized that after reviewing three successful state asthma school- based programs, the facilitation of networks between schools, school systems, and community stakeholders contributed to the success of the multi-component asthma interventions.

Another example of utilizing community partnerships was evident in the evaluation of a multi -component school based asthma and allergy management program within the Kennett Public School (KPS) district located in southeast Missouri (Cheung et al., 2015). The KPS district started an asthma and allergy initiative after obtaining a state health grant. In partnership with the University of Missouri School of Medicine, KPS coordinated trainings for school personnel, school nurses, healthcare providers and their staff (Cheung et al., 2015). The lack of community partnerships can also impact the sustainability of a program. This was noted by Gerald et al. (2006) in a study concerning a comprehensive asthma program in a large urban school district. Over time, the fidelity of the program was compromised due to the excessive demands placed on school staff, time constraints, and the overall cost of training newly hired staff and annual trainings.

Community collaboration is an effective means for addressing the issue of asthma and allergy burden within a community and schools are a key access point (Gerald et al., 2006). Partnerships with local community agencies and universities provide opportunities for healthcare initiatives that impact school populations. Innovative approaches include partnerships between schools of nursing and school districts to address possible gaps in care (Rossman, Dood, &

Squires, 2012). The school nurse, often the main source of healthcare in the school setting, is a key player in the growth of these partnerships (Rice, Biordi, & Zeller, 2005).

Role of the School Nurse

The school nurse, identified as critical in the safeguarding of students and staff, is responsible for the identification of students with asthma or life threatening allergies, the collection of demographics via health concern lists and logs, the training and education of school staff, communication with parents, and continued follow up (Guglielmo & Little, 2006; Hanson, Aleman, Hart, & Yawn, 2013; Moonie, Sterling, Figgs, & Castro, 2008; Morris et al., 2011). Students with asthma and allergies are more likely to be absent due to medical care and illness (Rodriguez et al., 2013). Rodriguez et al. (2013) evaluated the outcomes of adding full- time nurses to five schools within the San Jose Unified School District. In the schools with additional nursing support, mean absenteeism related to asthma and allergies decreased while the comparison schools' absenteeism increased over a two- year period. Parent surveys reported less emergency room visits and less time off from work (Rodriguez et al., 2013).

In many school districts, access to a full- time school nurse is not likely due to a lack of funding and other administrative barriers; thus, the burden of care is placed on the UAP or teacher (Gerald et al., 2006). This creates an additional load on staff who are also responsible for the academic achievement of students. These limitations affect asthma and allergy management in the school setting. However, a comprehensive program that includes UAP training, access to action plans, and sustainable health policies improves student health outcomes (Bruzzezes et al., 2006).

Multi-Component Approach to Care

Addressing asthma in the school setting requires a multi-component approach as knowledge alone may not reduce asthma and allergy exacerbations (Cheung et al., 2015; Rastogi, Madhok, & Kipperman, 2013; Toole, 2013). Toole (2013) “coined the term *perfect asthma care*” (p. 117). Perfect school based asthma care includes the identification of students with asthma, the training of staff, safeguarding that students have access to appropriate controller and rescue medications, and that staff have access to the student’s individualized AAP (Cheung et al., 2015; Rastogi et al., 2013; Toole, 2013).

Action plans. The management of asthma and allergies in the schools requires that each student have an individualized AAP or AEAP on file. The use of standardized guidelines is essential regarding the proper response to an asthma or anaphylactic episode. An AAP or AEAP provides the necessary prescriptive guidelines for school personnel to determine the appropriate use of an epinephrine auto injector or asthma medications (Burns et al., 2008; Dunbar & Luyt, 2011; Garwick et al., 2010). When available, the action plan guides the care of students as well as acute asthma or allergy episodes (Borgmeyer, Jamerson, Gyr, Westhus, & Glynn, 2005; Carrillo Zuniga et al., 2012; Egginton et al., 2013; McLaughlin et al., 2006; Pulcini, DeSisto, & McIntyre, 2015). The use of an emergency action plan has shown an “eight-fold reduction in the frequencies of anaphylactic events and a 60-fold reduction in severe reactions” (Dunbar & Luyt, 2011, p.33). An important component to the effective coordination of care among schools, parents, and physicians is ensuring that an AAP or AEAP is on file (Burns, Gray, & Richard, 2008; Garwick, Seppelt, & Riesgraf, 2010).

Training. Expert asthma and allergy training for school personnel can produce an increase in knowledge and empower personnel across the spectrum of experience and

responsibility levels (Getch & Neutharth-Pritchett, 2009; Keysser, Splett, Ross, & Fishman, 2006). In one study, a statewide asthma training program for school personnel demonstrated significant gains in asthma knowledge (Keysser et al., 2006). The need for asthma education and training was evident in a cross-sectional prevalence survey of school teachers in a Georgia public school district. The study, comprised of 593 elementary and middle school teachers, indicated that teacher knowledge of asthma and asthma management was low regardless of education, individual health status, or whether teachers taught at the elementary or middle school level (Getch & Neutharth-Pritchett, 2009).

Policy and protocol. A program that is effective requires a cooperative effort from the parents, teachers, UAP, administrators, and school staff. Protocols that include training for staff and stock epinephrine provide a safer solution toward the management and care of students with possible life threatening allergies and asthma (Morris et al., 2011; Fitzsimons, Kane, & Fox, 2011). Administrators are responsible for the oversight and implementation of health policies in the absence of a school nurse. A policy ensures the safe management of students with proper protocol that includes trainings, safe medication administration, action plans, and the integration of state regulations (NAEPP, 2014). A school based asthma and allergy program requires an intentional approach that incorporates a continuous surveillance that targets the needs that exist, policies that back asthma and allergy protocol, collaboration with partners in the community, the effective training of UAP, and the need for an AAP or AEAP on file to guide care (Carpenter, LaChance, Wilkin, & Clark, 2013).

Purpose

The goal of the SBAAP was to improve the management of students with asthma and allergies, ages 5 to 17, in a rural Michigan school district with the implementation of a six -week

quality initiative project. The quality improvement project was designed to address three aims. The first aim was to train 100% of the UAP concerning the management of students with asthma and allergies. The second aim was to inform and educate parents regarding the management of students with asthma and allergies in the school setting and increase the percentage of personal student AAP or AEAP on file by 80%. The third aim was to support the sustainability of the SBAAP by informing the current school asthma and allergy health policy.

Methods

Prior to the start of school in the fall, school office staff in each school building (two elementary, one middle school and one high school) identified students ($n=90$) with asthma and allergies and mailed informative educational packets to the parents. Blank AAP (see Appendix C) and AEAP (see Appendix D) forms were included with a request to return a physician signed prescriptive plan. The plans were obtained from the NHLBI website, content that is in the public domain and can be used without restriction (NAEPP, 2014; NHLBI, 2011). If students had seen their provider within the last 12 months, the signed forms could be faxed or mailed to the school without a provider visit. Information regarding access to Medicaid and the local free health clinic was provided for those who may have had difficulty accessing or paying a health care provider. The packet included a checklist that outlined the prescriptive care required for the individual student in the school setting: a provider visit, an updated AAP or AEAP, a quick relief inhaler for use at school, an epinephrine auto injector if needed, and all required individualized healthcare plan forms (IHP) (Cicutto, Gleason, & Szeffler, 2014; Cicutto, To, & Murphy, 2013; NAEPP, 2014). The time frame for the collection of submitted action plans was over a period of six weeks. Staff were responsible for the mailing of the packets and the collection of the action

plans. There were no reminders or follow up calls made to parents. At the end of the sixth week, the school staff conducted an audit of the number of returned plans.

The UAP ($n=40$) attended a 3-hour asthma and allergy educational in-service. The training was done by a RN with experience in school health. The effectiveness of the training was evaluated with a pre- and-post training 18 question disease knowledge true or false quiz (see Appendix A) and a 7-point Likert self- efficacy scale survey. The training materials and surveys were adapted from content located within the NAEPP content guidelines, *Managing Asthma: A Guide for Schools* (NAEPP, 2014). Information on the NHLBI website is in the public domain and can be used without restriction (NAEPP, 2014; NHLBI, 2011). The format for the Likert scale was *not confident at all* to *extremely confident* in response to 7 statements (see Appendix B). Included on the scale was the option to respond to 99, which indicated a *don't know* response. The surveys were anonymous without any identifying information. Participants had the option to not participate in the pre-and-post tests, however the school required that all UAP attend the trainings.

The final intended outcome was to promote the sustainability of the SBAAP by informing the current school asthma and allergy health policy. The policy and protocol review required several hours of meetings with the assistant superintendent. The review included the current Michigan auto epinephrine legislation, asthma and allergy policies, and established protocol.

Results

Eighty- five of the 90 identified students' parents received the educational packet. Five of the packets were returned because the students had left the district. The number of returned action plans increased from zero at baseline to five over the six -week period. Thirty- seven of

the 40 participants completed the pre- and-post knowledge quiz yielding a 92.5% response rate. The Wilcoxon signed rank test indicated significant positive differences in UAP disease knowledge post training ($z = -4.5407, p < 0.001$). The significance threshold was set at $p < 0.05$). The group mean between the pre- and -post test showed improvement by one point, the lowest pre-test score was 13, the highest post-test score was 18.

Thirty-three of the forty participants completed the pre-and-post self- efficacy Likert scale yielding an 82.5% response rate. The Wilcoxon signed rank test indicated significant positive differences in self -efficacy in the management of students with asthma and allergies post training ($z = -4.8599, p < 0.001$). The significance threshold was set at $p < 0.05$). The group mean of the total Likert score between pre-and -post training showed a gain of 8.5 points, indicating improved self -efficacy. The lowest total score pre-training was 13, the highest was 46. Pre- training the average score was 32.8 and post- training, 41.2.

The asthma and allergy policies were revised to incorporate the Michigan auto epinephrine legislation, UAP training, action plans, and established protocol. The updated policies will be considered for adoption by the administrative team after review.

Discussion

The SBAAP demonstrated that a coordinated approach can enhance the overall management of students with asthma and allergies. Reflecting on the first aim, the increase in disease knowledge and self- efficacy is a vital outcome regarding the management of potentially life threatening diseases. Studies support that a formal training program improves the self- efficacy of participants which can improve student outcomes (Soo, Saini, & Moles, 2013). Increased self- efficacy and disease knowledge enhances the UAP's ability to communicate with parents, utilize the action plans, monitor student symptoms, and manage asthma and allergy

exacerbations (Keyser et al., 2006). Future trainings could also incorporate a performance measurement, demonstrating the correct use of an auto-epinephrine injector and inhaler, as well as the use of simulation techniques in the management of acute exacerbations (Soo et al., 2013).

The second aim was to provide parents with an educational packet that included a request for a prescriptive AAP or AEAP. The number of submitted action plans increased by 5%. However, this response rate is well below the intended target goal of 80%. The gain is only noteworthy because the baseline was zero. A change in protocol without past precedence presented the following barriers identified by staff: the abbreviated time frame of the project initiative, a lack of administrative support for school personnel to follow up with parents, and the absence of a school nurse. An ongoing concern is the significant percentage of identified students with asthma and severe allergies who remain without an action plan on file. As discussed in the literature, the AAP and AEAP is an essential tool that communicates health information and protocol between the healthcare provider and the school (Egginton et al., 2013; Litarowsky, Murphy, & Canham, 2004). Nevertheless, the low number of submitted action plans is an issue for many school districts throughout the United States (Egginton et al., 2013). In one study, a large school system in Minnesota reported that only ten percent of the students had action plans on file at school (Hanson et al., 2013). Other studies indicate that the AAP or AEAP was not available for a large percentage of the students or data was missing from the form (Egginton et al., 2013; Guglielmo & Little, 2006; Hanson et al., 2013; Pulcini et al., 2015).

The outcome of this aim highlights the role of the school nurse as critical in safeguarding students. The presence of a school nurse in the role of case manager can have a positive effect on students' asthma management outcomes (Engelke et al., 2014). Schools are more likely to provide proper treatment, have emergency action plans on file, and utilize the action plan when a

school nurse is employed (Morris et al., 2011). Future suggestions include the ongoing partnership with the local nursing school, possible part time employment of a school nurse, a designated *champion* point person in each building who is responsible for the collection of the action plans, and the continuing education of parents.

The third aim was to support the sustainability of the SBAAP by informing the current school health policy. Key stakeholders were provided with a presentation of the program initiative and an overview of the outcomes. The program has been integrated as a required protocol within the school district. This institutionalizes the following: the identification of students with asthma and allergies, increased parent education and communication, the training of UAP, and access to prescriptive AAP and AEAP forms. Although the policy and protocol have recently been adopted, it is possible that the policy will not be properly integrated into daily practice. Nevertheless, policy and practice changes in general increase the sustainability of programs (Carpenter et al., 2013).

Ethical Considerations

The Capella University Institutional Review Board (IRB) determined that the project initiative did not meet the federal regulations definition of human subjects' research. Therefore, IRB oversight was not needed. The local school district administration offered full support and permission for the quality improvement project initiative. Consent was obtained from the unlicensed assistive personnel prior to the administration of the pre-and-post disease knowledge and self-efficacy surveys. The surveys and the submitted action plan audits did not contain any identifying information. This quality improvement initiative did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Limitations

The project initiative has several limitations. The number of students with reported asthma and allergies does not include unreported cases within the district, perhaps missing students in need. Issues that may have impacted the outcomes include the time constraints of the project initiative, a lack of administrative support, poor parental involvement affecting the return of the AAP or AEAP, and the absence of a school nurse.

Conclusion

Students spend a significant portion of the day in school and without proper healthcare supervision, asthma and allergy outcomes may be negatively affected. Schools can have a positive influential outcome by becoming more asthma friendly as well as adopting school based asthma and allergy policies and protocol (AIM, 2014). School administrators and health professionals in school districts with adequate and low nurse-to-student ratios can look to the SBAAP as an effective protocol to promote disease knowledge and the self- efficacy of UAP. Promoting access to action plans provides the necessary prescriptive protocol for students. The project initiative highlights the need for school administrators and health professionals to coordinate student asthma and allergy care that includes professional training of UAP by a registered nurse, supportive asthma and allergy health policies, and encourages proactive education and communication with parents. The SBAAP is a coordinated plan that may promote the management of students with asthma and allergies as well as provide an effective protocol to guide school personnel.

References

- American Lung Association. (2012). *Trend in mortality and morbidity*. Retrieved from <http://www.lung.org/finding-cures/our-research/trend-reports/asthma-trend-report.pdf>
- Asthma and Allergy Foundation of America. (2015). *Asthma month Michigan data*. Retrieved from http://www.aafamich.org/ESW/Files/asthma_facts_sheet_michigan.pdf
- Asthma and Allergy Foundation of America. (2016). *Allergy facts and figures*. Retrieved from <http://www.aafa.org/page/allergy-facts.aspx>
- Asthma Initiative of Michigan. (AIM) (2014). *For healthy lungs*. Retrieved from <http://getastmahelp.org/Default.aspx>
- Asthma Initiative of Michigan. (AIM) (2016). *Michigan asthma statistics*. Retrieved from <http://getastmahelp.org/documents/Michigan-Asthma-Statistics-FINAL.pdf>
- Borgmeyer, A., Jamerson, P., Gyr, P., Westhus, N., & Glynn, E. (2005). The school nurse role in asthma management: Can the action plan help?. *Journal of School Nursing, 21*(1), 23-30. doi:10.1177/10598405050210010601
- Burns, C., Gray, M., & Richard, H. (2008). The development, dissemination and evaluation of written information as a component of asthma management for parents of children with asthma. *Neonatal, Paediatric, and Child Health Nursing, 11*(3). 9-11.
- Bruzzese, J., Evans, D., Wiesemann, S., Pinkett-Heller, M., Levison, M., Du, Y., & ... Mellins, R. (2006). Using school staff to establish a preventive network of care to improve elementary school students' control of asthma. *Journal of School Health, 76*(6), 307-312. doi:10.1111/j.1746-1561.2006.00118.x

- Carpenter, L. M., Lachance, L., Wilkin, M., & Clark, N. M. (2013). Sustaining school based asthma interventions through policy and practice change. *Journal of School Health*, 83(12), 859-866. doi: 10.1111/josh.12104
- Carrillo Zuniga, G., Kirk, S., Mier, N., Garza, N., Lucio, R., & Zuniga, M. (2012). The impact of asthma health education for parents of children attending head start centers. *Journal of Community Health*, 37(6), 1296-1300. doi:10.1007/s10900-012-9571-y
- Centers for Disease Control and Prevention. (2012). *Common asthma triggers*. Retrieved from <http://www.cdc.gov/asthma/triggers.html>
- Centers for Disease Control and Prevention. (2014). *Asthma reported missed school days among children age 5-17 years*. Retrieved from http://www.cdc.gov/asthma/asthma_stats/default.htm
- Cheung, K., Rasberry, C. N., Dunville, R. L., Buckley, R., Cook, D., & Daniels, B. (2015). A multicomponent school-based asthma management program: Enhancing connections to clinical care. *Journal of School Health*, 85(2), 135-140. doi: 10.1111/josh.12226
- Cicutto, L., To, T., & Murphy, S. (2013). A randomized controlled trial of a public health nurse-delivered asthma program to elementary schools. *Journal of School Health*, 83(12), 876-884. doi:10.1111/josh.12106
- Cicutto, L., Gleason, M., & Szeffler, J. (2014). Establishing school centered asthma programs. *Clinical Reviews in Allergy and Immunology*, 134(6), 1223-1230. doi:10.1016/j.jaci.2014.10.004

Dunbar, H., & Luyt, D. (2011). Triggers, clinical features and management of anaphylaxis in children. *Nursing Children & Young People*, 23(5), 29-35.

doi:10.7748/ncyp2011.06.23.5.29.c8542

Egginton, J. S., Textor, L., Knoebel, E., McWilliams, D., Aleman, M., & Yawn, B. (2013).

Enhancing school asthma action plans: Qualitative results from southeast Minnesota Beacon Stakeholder Groups. *Journal of School Health*, 83(12), 885-895.

doi:10.1111/josh.12107

Engelke, M. K., Swanson, M., & Guttu, M. (2014). Process and outcomes of school nurse case management for students with asthma. *The Journal of School Nursing*, 30(3), 196-205.

doi: 10.1177/1059840513507084

Fitzsimons, R., Kane, P., & Fox, A. (2012). Anaphylaxis in school settings. *Independent Nurse*,

28-33. doi: 10.12968/indn.2012.19.3.90531

Garwick, A., Seppelt, A., & Riesgraf, M. (2010). Addressing asthma management challenges in a multisite, urban head start program. *Public Health Nursing*, 27(4), 329-336.

doi:10.1111/j.1525-1446.2010.00862.x

Getch, Y. Q., & Neutharth-Pritchett, S. (2009). Teacher characteristics and knowledge of asthma.

Public Health Nursing, 26(2). 124-133. doi: 10.1111/j.1525-1446.2009.00763.x

Gerald, L., Redden, D., Wittich, A., Hains, C., Turner-Henson, A., Hemstreet, M., & ... Bailey,

W. (2006). Outcomes for a comprehensive school-based asthma management

program. *Journal of School Health*, 76(6), 291-296. doi:10.1111/j.1746-

1561.2006.00114.x

Greener, M. (2015). Managing acute asthma in school age children. *British Journal of School*

Nursing, 10(1), 12-17. doi: 10.12968/bjsn.2015.10.1.12

- Guglielmo, C., & Little, C. (2006). Tragedy in a beachfront community: A proactive school district responds to asthma. *Journal of School Health, 76*(6). 297-299.
doi: 10.1111/j.1746- 1561.2006.00115.x
- Hanson, T., Aleman, M., Hart, L., & Yawn, B. (2013). Increasing availability to and ascertaining value of asthma action plans in schools through use of technology and community collaboration. *Journal of School Health, 83*, 915-20. doi:: 10.1111/josh.12110
- Hester, L. L., Wilce, M. A., Gill, S. A., Disler, S. L., Collins, P., & Crawford, G. (2013). Roles of the state asthma program in implementing multicomponent, school-based asthma interventions. *Journal of School Health, 83*, 833-841. doi: 10.1111/josh.12101
- Institute for Healthcare Improvement. (2016). *Plan, do, study, act*. Retrieved from <http://www.ihl.org/resources/Pages/Tools/PlanDoStudyActWorksheet.aspx>
- Kallenbach, A., Ludwig-Beymer, P., Welsh, C., Norris, J., & Giloth, B. (2003). Process improvement for asthma: An integrated approach. *Journal of Nursing Care Quality, 18*(4), 245-256. doi:10.1097/00001786-200310000-00002
- Kelly, W. F., & Kaliner, M. A. (2014). *Allergic and environmental asthma overview of asthma*. Retrieved from <http://emedicine.medscape.com/article/137501-overview#a1>
- Keysser, J., Splett, P. L., Ross, S., & Fishman, E. (2006). Statewide asthma training for Minnesota school personnel. *Journal of School Health, 76*(6). 264- 268.
doi:10.1111/j.1746-1561.2006.00109.x
- Litarowsky, J. A., Murphy, S. O., & Canham, D. L. (2004). Evaluation of an anaphylaxis training program for unlicensed assistive personnel. *Journal of School Nursing, 20*(5), 279-284.

McLaughlin, T., Maljanian, R., Kornblum, R., Clark, P., Simpson, J., & McCormack, K. (2006).

Evaluation the availability and use of asthma action plans for school-based asthma care.

A case study in Hartford, Connecticut. *Journal of School Health*, 75(6), 325-328. doi:

10.1111/j.1746-1561.2006.00121.x

Michigan Department of Education. (2013). *FAQ: Epinephrine auto-injector public act 186 &*

187. Retrieved from [http://michigan.gov/documents/mde/Epinephrine_Auto-](http://michigan.gov/documents/mde/Epinephrine_Auto-Injector_Public_Act_186__187__FAQ_462334_7.pdf)

[Injector_Public_Act_186__187__FAQ_462334_7.pdf](http://michigan.gov/documents/mde/Epinephrine_Auto-Injector_Public_Act_186__187__FAQ_462334_7.pdf)

Michigan Department of Education. (2016). *Food allergy guidelines for schools*.

http://www.foodallergymiaassociation.com/uploads/2/6/5/2/26524383/mde_2016_food_allergy_guidelines.pdf

Michigan School Nurse Task Force. (2014). *Ratio of students to school nurses by county, 2014*.

Retrieved from <http://mischoolnursetaskforce.org/>

Moonie, S., Sterling, D., Figgs, L., & Castro, M. (2008). The relationship between school

absence, academic performance, and asthma status. *Journal of School Health*, 78(3),

140-148. doi:10.1111/j.1746-1561.2007.00276.x

Morris, P., Baker, D., Belot, C., & Edwards, A. (2011). Preparedness for students and staff with

anaphylaxis. *Journal of School Health*, 81(8), 471-476. doi:10.1111/j.1746-

1561.2011.00616.x

National Asthma Education and Prevention Program. (NAEPP) (2014). *Managing asthma: A*

guide for schools. Retrieved from [http://www.nhlbinh.gov/health-](http://www.nhlbinh.gov/health-pro/resources/lung/managing-asthma-guide-schools-2014-edition-html)

[pro/resources/lung/managing asthma-guide-schools-2014-edition-html](http://www.nhlbinh.gov/health-pro/resources/lung/managing-asthma-guide-schools-2014-edition-html)

National Institute of Allergy and Infectious Disease. (2007). *Report of the expert panel on food*

allergy research. Retrieved from www.niaid.nih.gov/dait/pdf/11-20-03FAreport1.pdf

National Institutes of Health, National Heart, Lung, and Blood Institute. (NHLBI) (2007).

National asthma education and prevention program. Retrieved from

<http://www.nhlbi.nih.gov/health-pro/resources/lung/naci/audiences/healthcare-professionals.htm>

National Institutes of Health, National Heart, Lung, and Blood Institute. (NHLBI) (2011).

National asthma control initiative. Retrieved from <http://www.nhlbi.nih.gov/health-pro/resources/lung/naci/audiences/healthcare-professionals.htm>

Pulcini, J., DeSisto, M. C., & McIntyre, L. (2015). An intervention to increase the use of asthma action plans in schools: A MASNRN study. *The Journal of School Nursing, 23*(3). 170-176. doi: 10.1177/10598405070230030801

Rastogi, D., Madhok, N., & Kipperman, S. (2013). Caregiver asthma knowledge, aptitude, and practice in high healthcare utilizing children: Effect of an educational intervention. *Pediatric Allergy, Immunology, and Pulmonology, 26*(3). 128-139. doi: 10.1089/ped.2013.02266

Rice, S.K., Biordi, D.L., & Zeller, R.A. (2005). The relevance of standards of professional school nurse practice. *Journal of School Nursing, 21*(5), 293-298. doi:10.1177/10598405050210050801

Rodriguez, E., Rivera, D. A., Perlroth, D., Becker, E., Wang, N. E., & Landau, M. (2013). School nurses' role in asthma management, school absenteeism, and cost savings: A demonstration project. *Journal of School Health, 83*(12), 842-850. doi:10.1111/josh.12102

Rossman, C.L., Dood, F.V., & Squires, D.A. (2012). Student nurses as school nurse extenders. *Journal of Pediatric Nursing, 27*(6), 734-741. doi:10.1016/j.pedn.2012.02.005

Soo, Y. Y., Saini, B., & Moles, R. J. (2013). Can asthma education improve the treatment of acute asthma exacerbation in young children?. *Journal of Paediatrics & Child Health*, 49(5), 353-360. doi:10.1111/j.1440-1754.2012.02551.x

Toole, K. P. (2013). Helping children gain asthma control: Bundled school-based interventions. *Pediatric Nursing*, 39(3), 115-124.

Tunison, J. (2015, November 14). *Allergic reaction, possibly to peanuts, suspected in teen's death*. Retrieved from http://www.mlive.com/news/grand-rapids/index.ssf/2015/11/allergic_reaction_possibly_to.html

Appendix A

Asthma and Allergy Knowledge Quiz

Please respond with True (T) or False (F) to the following statements:

- _____ Asthma is a common disease among children in the United States
- _____ An initial symptom of an allergic reaction may be complaints of an itchy throat
- _____ The way that parents raise their children can cause asthma
- _____ Asthma episodes may cause breathing problems, but these episodes are rarely dangerous
- _____ Asthma episodes usually occur without warning
- _____ Peanut allergies are usually not a serious concern
- _____ Asthma cannot be cured, but it can be controlled
- _____ There are different types of medicine to control asthma
- _____ People with asthma have no way to monitor how well their lungs are functioning
- _____ Severity of symptoms can change quickly in an anaphylactic reaction
- _____ Insect sting allergies are a significant cause of anaphylactic reactions
- _____ Tobacco smoke can make an asthma episode worse
- _____ People with asthma should not exercise
- _____ The three main symptoms of asthma are coughing, wheezing, and shortness of breath.
- _____ It is not necessary to call 911 after an epinephrine auto injector is administered
- _____ Children with asthma have abnormally sensitive air passages in their lung.
- _____ During an attack of asthma, wheezes may be due to swelling in the lining of the air passage in the lung.
- _____ Asthma attacks can be prevented if medications are taken even when there are no symptoms between attacks.

From NAEPP (2014). *Managing asthma: A guide for schools*. Retrieved from <http://www.nhlbinh.gov/health-pro/resources/lung/managing-asthma-guide-schools-2014-edition-html>. Adapted from NAEPP. Information on the NHLBI website is in the public domain and can be used without restriction.

Appendix B

Asthma and Allergy Self -Efficacy Scale

Please respond by indicating on the Likert Scale your confidence regarding the stated issue.

I can recognize when a student is experiencing asthma symptoms

Not Confident at All _____ Extremely Confident _____ Don't Know
 1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____ 99

I understand how to help students correctly use their inhaler or medications

Not Confident at All _____ Extremely Confident _____ Don't Know
 1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____ 99

I understand the general symptoms associated with asthma and allergies

Not Confident at All _____ Extremely Confident _____ Don't Know
 1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____ 99

I can accurately estimate the severity of respiratory distress

Not Confident at All _____ Extremely Confident _____ Don't Know
 1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____ 99

I can interpret the directives within an individualized Asthma Action Plan

Not Confident at All _____ Extremely Confident _____ Don't Know
 1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____ 99

I can recognize the symptoms of an anaphylactic reaction

Not Confident at All _____ Extremely Confident _____ Don't Know
 1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____ 99

I understand how and when to use an epi-pen

Not Confident at All _____ Extremely Confident _____ Don't Know
 1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____ 99

From NAEPP (2014). *Managing asthma: A guide for schools*. Retrieved from <http://www.nhlbinh.gov/health-pro/resources/lung/managing-asthma-guide-schools-2014-edition-html>. Adapted from NAEPP. Information on the NHLBI website is in the public domain and can be used without restriction.

Appendix C

Asthma Action Plan

My Asthma Plan ENGLISH Patient Name: _____

Medical Record #: _____

Provider's Name: _____ DOB: _____

Provider's Phone #: _____ Completed by: _____ Date: _____

Controller Medicines	How Much to Take	How Often	Other Instructions
		_____ times per day EVERY DAY!	<input type="checkbox"/> Gargle or rinse mouth after use
		_____ times per day EVERY DAY!	
		_____ times per day EVERY DAY!	
		_____ times per day EVERY DAY!	
Quick-Relief Medicines	How Much to Take	How Often	Other Instructions
<input type="checkbox"/> Albuterol (ProAir, Ventolin, Proventil) <input type="checkbox"/> Levalbuterol (Xopenex)	<input type="checkbox"/> 2 puffs <input type="checkbox"/> 4 puffs <input type="checkbox"/> 1 nebulizer treatment	Take ONLY as needed (see below — starting in Yellow Zone or before exercise)	NOTE: If you need this medicine more than two days a week, call physician to consider increasing controller medications and discuss your treatment plan.

Special instructions when I am *doing well,* *getting worse,* *having a medical alert.*

Doing well.

GREEN ZONE

- No cough, wheeze, chest tightness, or shortness of breath during the day or night.
- Can do usual activities.

Peak Flow (for ages 5 and up): is _____ or more. (80% or more of personal best)

Personal Best Peak Flow (for ages 5 and up): _____

PREVENT asthma symptoms every day:

- Take my controller medicines (above) every day.
- Before exercise, take _____ puff(s) of _____
- Avoid things that make my asthma worse. (See back of form.)

Getting worse.

YELLOW ZONE

- Cough, wheeze, chest tightness, shortness of breath, or
- Waking at night due to asthma symptoms, or
- Can do some, but not all, usual activities.

Peak Flow (for ages 5 and up): _____ to _____ (50 to 79% of personal best)

CAUTION. Continue taking every day controller medicines, AND:

- Take _____ puffs or _____ one nebulizer treatment of quick relief medicine. If I am not back in the **Green Zone** within 20-30 minutes take _____ more puffs or nebulizer treatments. If I am not back in the **Green Zone** within one hour, then I should:
- Increase _____
- Add _____
- Call _____
- Continue using quick relief medicine every 4 hours as needed. Call provider if not improving in _____ days.

Medical Alert

RED ZONE

- Very short of breath, or
- Quick-relief medicines have not helped, or
- Cannot do usual activities, or
- Symptoms are same or get worse after 24 hours in Yellow Zone.

Peak Flow (for ages 5 and up): less than _____ (50% of personal best)

MEDICAL ALERT! Get help!

- Take quick relief medicine: _____ puffs every _____ minutes and get help immediately.
- Take _____
- Call _____

Danger! Get help immediately! Call 911 if trouble walking or talking due to shortness of breath or if lips or fingernails are gray or blue. For child, call 911 if skin is sucked in around neck and ribs during breaths or child doesn't respond normally.

Health Care Provider: My signature provides authorization for the above written orders. I understand that all procedures will be implemented in accordance with state laws and regulations. Student may self carry asthma medications: Yes No self administer asthma medications: Yes No (This authorization is for a maximum of one year from signature date.)

Healthcare Provider Signature _____ Date _____

ORIGINAL (Patient) / CANARY (School/Child Care/Work/Other Support Systems) / PINK (Chart)

©2008, Public Health Institute (PHI)

From NAEPP (2014). *Managing asthma: A guide for schools*. Retrieved from <http://www.nhlbinh.gov/health-pro/resources/lung/managing-asthma-guide-schools-2014-edition-html>. Information on the NHLBI website is in the public domain and can be used without restriction.

Appendix D

Anaphylaxis Emergency Action Plan

Patient Name: _____ Age: _____

Allergies: _____

Asthma Yes (*high risk for severe reaction*) No

Additional health problems besides anaphylaxis:

Concurrent medications:

Symptoms of Anaphylaxis

MOUTH itching, swelling of lips and/or tongue

THROAT* itching, tightness/closure, hoarseness

SKIN itching, hives, redness, swelling

GUT vomiting, diarrhea, cramps

LUNG* shortness of breath, cough, wheeze

HEART* weak pulse, dizziness, passing out

Only a few symptoms may be present. Severity of symptoms can change quickly.

**Some symptoms can be life-threatening. ACT FAST!*

Emergency Action Steps - DO NOT HESITATE TO GIVE EPINEPHRINE!

***Inject epinephrine in thigh using (circle or highlight one):**

Adrenaclick (0.15 mg)

Adrenaclick (0.3 mg)

Auvi-Q (0.15 mg) Auvi-Q (0.3 mg)

EpiPen Jr (0.15 mg) EpiPen (0.3 mg)

Epinephrine Injection, USP Auto-injector- authorized generic
(0.15 mg) (0.3 mg)

Other (0.15 mg) Other (0.3 mg)

Specify others:

IMPORTANT: ASTHMA INHALERS AND/OR ANTIHISTAMINES CAN'T BE DEPENDED ON IN ANAPHYLAXIS. Call 911 or rescue squad (before calling contact)

Emergency contact #1: Home _____ Work _____ Cell _____

Emergency contact #2: Home _____ Work _____ Cell _____

Comments:

Doctor's Signature/Date/Phone Number

Parent's Signature (for individuals under age 18 yrs)/Date/Phone number

From NAEPP (2014). *Managing asthma: A guide for schools*. Retrieved from <http://www.nhlbinh.gov/health-pro/resources/lung/managing-asthma-guide-schools-2014-edition-html>. Information on the NHLBI website is in the public domain and can be used without restriction.

Statement of Original Work and Signature

I have read, understood, and abided by Capella University's Academic Honesty Policy ([3.01.01](#)) and Research Misconduct Policy ([3.03.06](#)), including the Policy Statements, Rationale, and Definitions.

I attest that this dissertation or capstone project is my own work. Where I have used the ideas or words of others, I have paraphrased, summarized, or used direct quotes following the guidelines set forth in the *APA Publication Manual*.

Learner name
and date

Florence Viveen Dood 10/26/2016

Mentor name
and school

Linda Matheson, PhD, RN Capella University 11/28/16
