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The Effects of an Evidence-based Food Allergy Management Plan to Keep Children with Food Allergies Safe at School

Scarlet R. Spain
Valparaiso University

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THE EFFECTS OF AN EVIDENCE-BASED FOOD ALLERGY MANAGEMENT PLAN TO KEEP CHILDREN WITH FOOD ALLERGIES SAFE AT SCHOOL

by

SCARLET SPAIN

EVIDENCE-BASED PRACTICE PROJECT REPORT

Submitted to the College of Nursing and Health Professions of Valparaiso University, Valparaiso, Indiana in partial fulfillment of the requirements for the degree of

DOCTOR OF NURSING PRACTICE

2015
EFFECTS OF

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SCARLET R. SPAIN

2015

ALL RIGHTS RESERVED
DEDICATION

I dedicate this project to my beautiful, amazing daughter Lilly. Your drive and confidence astound me everyday. I am so proud of you for being a wonderful, sweet, little voice behind food allergy awareness. God gave me the best gift when he gave me my children and remember you are perfectly designed in His eyes. I love you to the moon and back!
ACKNOWLEDGMENTS

First, I would like to thank God who though you all things are possible. I would also like to give a special thanks to my advisor Dr. Suzanne Zentz who motivated me and spent many hours assisting me with my project. To my wonderful husband, Ryan- I cannot express to you how much your support over the past three years has meant to me. Your calm demeanor and strength has meant the world to me as I have completed this life goal. I love you. Also, to both of my wonderful daughters Lilly and Lexi, for letting mommy “multi-task” and type while playing American girl dolls with you. A HUGE thank you to the rest of my family and friends for not only motivating me, but also helping me with the girls while my time was limited. In particular, I’d like to recognize my Aunt Mary Lou, who has been my role model since I was a little girl. You have always been my number one cheerleader and motivated me to accomplish my dreams. Special thanks to my parents Larry and Beatrice and Marty and Cheri, my sister and brother Sean and Christine, my cousins Brett and Stacy, and my best friend Angela- you have all helped me so much; it truly “takes a village”. I thank you so much…
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ABSTRACT

The prevalence of food allergies in children has increased 18% between 1997 and 2007 (CDC, 2013). Furthermore, 84% of food allergic children will experience a reaction at school (Powers, Bergren, & Finnegan, 2007). An exposure in a sensitive child may progress quickly into potentially life threatening symptoms and death if not treated. The purpose of this evidence based practice (EBP) project was to determine if implementation of a food allergy management policy in a school setting reduced overall incidence rates of food allergy reactions in school children and to examine compliance to policy guidelines. The project encompassed implementation of a revised food allergy policy based on best practice guidelines at a local charter school in northwest Indiana. Best practice recommendations include avoidance, a personalized emergency care plan (ECP), and staff education. A 60-minute educational session for staff members and volunteers was provided reviewing the best practice policy and demonstration of two common epinephrine auto-injectors. Independent t tests were conducted to compare numbers of food allergy exposures and incidence of reactions from Spring 2014 (pre policy implementation) to Fall 2014 (post policy implementation). Analyses revealed there were no significant differences between groups. Secondary analyses examined policy compliance via chi-square test of independence and significant interactions were found. An increase in food allergic children having medications consistently traveling with them for use in emergency situations occurred post policy implementation. Statistically, policy implementation did not result in a significant difference in incidence rates of food allergy reactions from the pre policy phase to the post policy phase but did improve compliance with the policy. The findings support the overall need for a policy addressing food allergies within school systems.
CHAPTER 1
INTRODUCTION

Background

Prevalence of food allergies in children has rapidly increased over the past two decades. The reason for this concerning trend remains unknown. The Centers for Disease Control and Prevention (CDC) reported an 18% increased prevalence of food allergies in children from 1997-2007. Food allergies have become the most common cause of anaphylaxis in community health settings (CDC, 2013). Peanuts, tree nuts, milk, eggs, fish, shellfish, soy, and wheat account for 90% of all food allergies (International Food Information Council [IFIC], 2008). Peanut allergies alone doubled between 1997-2002 and often result in severe reactions with exposure. Peanut, tree nut, fish, and shellfish allergies tend to be life-long disorders, while many other allergies will subside as the child ages (Sicherer, Munoz-Furlong, & Sampson, 2004).

Food allergy reactions occur after the predisposed individual’s immune system identifies a non-harmful food substance as foreign or harmful. Food allergies demonstrate a broad spectrum of health morbidities. Minor food allergies may result in self-limiting skin conditions such as pruritus, erythema, eczema, dermatitis or urticaria. Other reactions may quickly develop into potentially life threatening respiratory, cardiovascular, or gastrointestinal symptoms with developing anaphylaxis and possible death if not treated immediately. The complicated cascade of anaphylaxis begins after antibodies are released and cause fluid shifts from the capillaries, reactions in smooth muscle, and reactions in inflammatory cells. Clinical symptoms of food allergy are caused by mediators, such as histamine, that affect body tissue causing muscle spasms, intense swelling, and mucous production (Papageorgio, 2002). If not treated, the reaction can cause a rapid decline in blood pressure and lead to anaphylactic shock and
death. Currently there is no predictor of when a person with a history of a previous minor reaction to a food may result in a severe or life threatening allergy with exposure.

**Statement of the Problem**

Due to the increased prevalence of food allergies in children and the potential for deadly consequences, significant amounts of research have been conducted on topics related to pediatric food allergies. Children spend the majority of their waking hours at school and engaged in school related activities. One major area of concern for the child with food allergies is keeping the child safe while in an environment outside of the home and away from their parents or caregivers.

**Data from the Literature**

One in every 13 kids in the US has a diagnosed food allergy (Food Allergy Research and Education [FARE], 2014, “Keeping Children with Food Allergies”). Not only is the prevalence of pediatric food allergies increasing, anaphylaxis rates related to exposure of foods are increasing (Gupta, 2014). Pediatric food allergies represent a unique problem in that an adult must assist the child in identification and treatment of reactions.

School safety is a topic of concern for all children with a diagnosed food allergy. The younger child may be susceptible to accidental exposures due to the inability to identify if a product contains the offending food or may not be emotionally mature enough to identify the extreme risk with ingestion. This age group also is at a high risk for accidental exposure related to horseplay activities and normal developmental processes of touch between friends and classmates. Eighty-four percent of children with diagnosed food allergies experience allergic reactions from their food allergies while they are attending school (Powers, Bergren, & Finnegan, 2007). Allergens may be found anywhere in the school setting with high-risk locations including not only the cafeteria, but also the classroom. High-risk situations for potential exposure may be art or craft
projects, science projects, fundraisers, and classroom parties or celebrations (Jackson, 2013). Reactions are unpredictable in nature and severity and the rates of severe allergies leading to anaphylaxis remain concerning. Reaction rates reflect a frightening statistic that emphasizes the importance of school personnel and caregivers being knowledgeable about the best way to manage food allergies in the school setting. School staff should have the right to administer epinephrine via auto-injector and should have established parameters for training (Jackson, 2013). With the development of a standard policy for management of food allergies and a general educational in-service, school staff will be provided with basic knowledge and training that will assist school staff in understanding food allergies and management.

Clinical Agency Data

A local charter school serving grades kindergarten through eighth was the site for implementation of this evidence-based practice (EBP) project. The school is located in northwestern Indiana and has approximately 500 students in attendance. School staff includes teachers, food service workers, administrators, custodians, clerical workers, and one full-time nurse. In addition to the staff, the school utilizes many parent volunteers.

The importance of health and safety for the students is reflected in the school’s mission statement. In order to accomplish the goals set forth in the mission statement, the student will attend school in a safe environment. Safety as it relates to food allergies remains an integral concern that is addressed daily at the school. The school principal approved this project and the school nurse served as a facilitator and clinical guide.

Before project implementation, the school had standardized safeguards in place in relation to food allergies. The school handbook outlined and recorded the formal policy and procedure related to food allergy management. The policy developed by a former school nurse was greater than two years old at time of project implementation.
While the previous policy reflected the importance of allergen avoidance and labeled the school as nut free, it did not reflect best practice guidelines. In addition, the previous policy did not mandate use of emergency care plans (ECP) and availability of two epinephrine auto-injectors at all times. The previous policy also did not address all geographical areas where the child may be during the school day.

The school nurse reported that there were 18 known children with food allergies enrolled in the school during the 2013 to 2014 school year. Eight mild reactions where anti-histamines were delivered occurred during the school year. Additionally, one anaphylactic reaction that required the school nurse to inject epinephrine occurred. The child was transported by ambulance to a local emergency room and recovered fully (school nurse, personal communication, June 24, 2014). All staff and volunteers were required to attend EpiPen training yearly. Training did include a return demonstration of proper use of the EpiPen.

**Purpose of the Evidence-Based Practice Project**

New evidence is continuously formulating best practice standards in healthcare to promote patient safety and obtain best outcomes. EBP is the culmination of not only standards of care, but also clinical experience and client/family preferences and values. The focus of this EBP project, keeping children with food allergies safe at school, has become a major concern that involves all school personnel, as well as the affected child and family. Reactions involving food allergies in the school are becoming more common with nearly 20% of at risk children experiencing at least one reaction over 2 years of school admission (Houle, Leo, & Clark, 2010). All staff and volunteers in the school must be properly trained and educated for management of this illness.

The purpose of this EBP project was to examine best practice for management of food allergies in the elementary school setting by developing a policy based on current guidelines and best practice standards. Educating the elementary school staff, revising
the policy based on evidence, and training all staff members on emergency management of food allergies, including administration of medications was integral to the success of the project. The PICOT question examined was, “In the elementary school setting, how does implementation of a revised food allergies management policy affect staff adherence to best practice recommendations and students’ episodes of food allergy reactions over a 4 month period?” The project encompassed revision of a food allergy policy based on best practice guidelines acquired from relevant evidence.

**Significance of the Problem**

Food allergies represent a significant health concern with potentially deadly consequences. Evidence demonstrates that the prevalence of food allergies is rapidly increasing and puts affected children at risk for physical ailments and possibly death from anaphylaxis. This EBP project sought to provide additional knowledge regarding the importance of utilization of best practice guidelines in regards to management of pediatric food allergies in schools by formation and utilization of a policy. Data was collected retrospectively and prospectively and compared to evaluate the effectiveness of the updated policy.

Education of the policy guidelines sought to help staff members increase their knowledge base regarding food allergies, thus, increasing confidence levels in relation to management of food allergies in children. The results provided school administrators and healthcare workers with data indicating the value of utilization of best practice guidelines to implement safety measures for children with food allergies in schools. Results also may be useful in other school systems to adopt best practice policy guidelines based on this intervention.
CHAPTER 2
THEORETICAL FRAMEWORK AND REVIEW OF LITERATURE

Evidence based-practice (EBP) utilizes guidelines developed through evidence gained from multiple research and non-research literature. Differing types of evidence are evaluated to identify concepts related to best practice. For this project an extensive literature review was conducted to establish a multilevel policy to keep the elementary child with food allergies safe at school. Both a theoretical framework and an EBP project model were used in establishment of this project. The framework and EBP model guided the project coordinator in developing the EBP project. This chapter will review theory and the EBP model, as well as describe the best practice literature.

Theoretical Framework

Adult learning theory, or andragogy, was used to guide this project. Malcolm Knowles who developed this theory desired to identify characteristics of adult learners through developed assumptions and principles. Knowles acknowledges that the adult learner has a distinct and different learning style as compared to a child. Adult learning is different due to life knowledge, maturity, and a general self-serving behavior. A basic assumption of the theory is that adults have the desire to acquire new knowledge (Knowles, 1973).

Although Malcolm Knowles developed this theory many decades ago, it remains relevant. This theory can be utilized across many disciplines to formulate goals and examine the overall process of adult learning. Knowles (1973) originally acknowledged four main assumptions of andragogy that differ from pedagogy. Later, fifth and sixth concepts were added that also remain applicable. The six assumptions are (a) changes in self-concept, (b) increasing role of experience, (c) readiness to learn, (d) orientation to
learning, (e) motivation to learn, and (f) need to know (Knowles, Holton, & Swanson, 2012).

Changes in self-concept. As a person matures and grows, the adult learner exhibits increasing self-direction and self-concept. Self-concept will develop from total dependency as experienced in infancy to increasing levels of self-direction through adolescence and into adulthood. Self-direction occurs when students enter a professional school or a job (Knowles, 1973). This change will initiate the adult learner into a differing perception and may provide an innate motivation to increase self-worth.

Increasing role of experience. This concept supports the notion that as an individual matures, the role of experience in life will provide an expanding knowledge base to gather further concepts in learning and thus build knowledge. An adult learner will develop their own interests and goals and will look for ways to accomplish a higher level of processing by applying previous knowledge to formulate new ideas.

Readiness to learn. As a person matures into adulthood, the process related to developmental tasks vital for the attainment of adult social roles are formulated. Adults must learn skills and tools to survive and to provide needs for future generations.

Orientation to learning. Knowles theory states that children are conditioned to have a subject-centered orientation to learning, while adults learn from a problem-centered orientation (Knowles, 1973). Time perspective of the adult is different from that of a child. The adult learner will be inclined to learn topics that may be of use to their current job or present life skills.

Motivation to learn. With age and maturation, the learner will develop an internal motivation to learn (Smith, 2014). This concept is a comprehensive feature of adult learning. Motivation is gained not only through internal conscious but also for external gains.
Need to know. In andragogy, the adult learner will seek to know why they need to learn the presented information before they will invest mentally in learning. The learner will seek out information such as why, what, and how (Knowles, et al., 2012).

Application of Theoretical Framework to EBP Project

Knowles theoretical framework applied to this project, as this project sought to educate adults about how to keep the child with food allergies safe while in school. Knowles theory and assumptions were utilized throughout the project to assist with the education process of the adult learner. For this EBP project if the adult learners have met the six assumptions, then the adult learners will have strong motivation to learn and the desire to keep the children safe.

Research designed by Cavanaugh and Strickland (2011) used the adult learning theory to guide the design of the educational portion of an anaphylaxis curriculum for school nurses. The curriculum design utilized teaching strategies to engage the learner in problem-based learning. Problem-based learning is guided by self-directed learning. The design addresses the diversity of the audience, different learning styles, and adult learning motivation. Twycross (2002) examined the importance of utilizing andragogy when educating nurses about pain management. Knowles concepts were used as well as considering current student knowledge, the need to communicate clearly, and the importance of stimulating students to develop an eagerness to learn.

Staff members at the school of implementation have developed an increasing self-concept and self-direction to keep children with food allergies safe. In theory, self-direction made the staff open to education and policy changes to increase the safety and welfare of the student body due to their formal role as staff members at an elementary school. Staff members had some previous education or exposure to the issue of food allergies as it relates to their students. Even if the staff had only a minimal education base on food allergies, they had an initial knowledge base on which to build increasing
comprehension of the new policy. For this EBP project, it was assumed that school staff had identified their social role as an important figure in keeping the children in their school system safe in relation to all outside triggers, including food allergies. This enhanced the staff’s readiness and internal motivation to learn. Increasing prevalence of food allergies and possible deadly consequences were included in the education thus demonstrating the importance of learning about the management of food allergies.

By taking assumptions into consideration and utilizing concepts, the adult learning theory was fundamental in teaching staff about food allergies. All six concepts were relative to this specific population and provided insight into this project. Knowledge gained in understanding adult motivation to learn guided the project coordinator with designing the teaching portion of the policy related to food allergies. A PowerPoint presentation was used to facilitate learning. The presentation elicited assumptions from this theory by guiding the participants to identify the importance of the topic.

**Strengths and weaknesses of theoretical framework.** Although this theory was developed decades ago, its process is still applicable to teaching adults today. The assumptions identified in adult learning theory are universal and can be applied to multiple disciplines, which is the major strength of the theory. The core principles of andragogy provide a foundation for planning effective adult learning experiences (Knowles et al., 2012).

A weakness of this theory is that specific guidelines regarding teaching the adult learner were not identified. The broad base of the theory provided ideas, but not actual examples for use of the theory. The theory was examined and specific guidelines were planned related to the teaching of adults to assist with project development and implementation.
Evidence-Based Practice Theory

In addition to the adult learning theory, the Academic Center for evidence-based practice (ACE) star model was used to guide the implementation and evaluation of this EBP project. Dr. Kathleen R. Stevens developed the ACE star model of transformation in January 2000 at the University of Texas. The ACE star model is dedicated to bridging research into practice with the intent of improving care, patient outcomes, and patient safety (ACE, 2012). The goal of the ACE star model is to examine and link the relationships among all stages of knowledge transformation.

The ACE star model is a cyclic model that examines the nature and characteristics of knowledge utilization in EBP learning. A five-point star illustrates the five states of knowledge transformation and provides an inclusive framework with which to organize EBP processes and approaches (Fineout-Overholt, Stillwell, Williamson, Cox, & Robbins, 2011). In working towards the goal, old and new concepts of care are utilized to provide a framework to organize the process and approach of EBP (ACE, 2012). Five levels of knowledge transformation are identified in the ACE star model relating to knowledge acquisition. These stages are (a) knowledge discovery, (b) evidence summary, (c) translation into practice recommendations, (d) implementation into practice, and (e) evaluation (Fineout-Overholt et al., 2011).

Knowledge discovery. This is the initial stage of knowledge generation where a topic is identified and researched to obtain new knowledge. Research may incorporate many different avenues for finding relevant items. In relation to topics that have previously had extensive research performed there may be an abundance of information. Other topics may result very few studies or none at all.

Evidence summary. This is point two on the ACE star model and commences with all evidence obtained being fused into a generalized summary on the topic. Stage two includes synthesis of all types of evidence. The main advantage of the evidence
summary is that it reduces the quantity of information making a more manageable form (Abbott, Dremsa, Stewart, Mark, & Swift, 2006). Also, the evidence summary establishes generalizability across all aspects of the study design. Generalizability is established while assessing consistency, increasing power in the cause and effect relationship, reducing bias, integrating all information for future decision making, increasing time efficiency, and providing a basis for obtaining new EBP updates (Abbott et al., 2006).

Translation into practice recommendations. This stage consists of two separate defining steps that result in the dissemination of information. The overall goal of the translation phase is to summarize evidence to provide information that is both useful and relevant to both clinicians and clients in a way that is time and cost effective (Abbott et al., 2006). Translation of practice into recommendations is the beginning phase of stage three. The second phase is integration into practice. With initiation of both steps, the new knowledge will reflect best practice.

Implementation into practice. During this stage guidelines are activated and implemented into practice. Implementation may be started by multiple disciplines at the project location, but there must be an effective change agent and staff who are willing to participate in the evidence-based guideline changes.

Evaluation. In the evaluation stage, data are analyzed after evidence-based practice guideline implementation. Evaluation includes the outcome data and statistics for comparison. This crucial stage is used to verify the success of EBP application and interventions (Fineout-Overholt et al., 2011).

Application of Evidence-Based Practice Model to Project

The ACE star model facilitated the identification and staging of essential factors for integration of best practice into a preexisting system. All five stages of the model were essential and relevant to all stages of this EBP project. Initially the knowledge discovery step was implemented to obtain an overview of published evidence
demonstrating the importance of best practice management of food allergies. Application of the ACE star model to this EBP project resulted in identifying best practice evidence regarding safety of the elementary school aged child with food allergies.

Other resources that utilized the ACE star model for concept development were examined. The ACE star model was used to guide an EBP project aimed at decreasing ventilator-associated pneumonia incidence rates and total days that required use of a ventilator in the intensive care unit. The stages of knowledge discovery, evidence summary, translation into practice recommendations, practice implementation, and evaluation were used to implement the clinical practice guidelines. Length of stay in the intensive care unit was decreased with a cost savings to the patient and healthcare in general. The study showed that utilizing best practice guidelines decreased ventilator associated pneumonia rates, which in turn reduced intensive care length of stay thus, demonstrating a successful application of the ACE star model (Abbott, et al., 2006).

For the purpose of this EBP project, multiple databases were examined and best practice evidence on keeping the elementary school child with food allergies safe while at school was obtained. There is no published experimental data available on the topic of management of food allergies in schools. Multiple other study designs were found and it became evident that there were best practice recommendations on the topic available. The evidence also demonstrated that many schools and school type environments do not have the proper safeguards in place to keep the food allergic child safe.

This EBP project was directed by the ACE star model to implement best practice evidence. Knowledge discovery involved multiple searches to obtain evidence. This project utilized relevant best practice guidelines to implement a multilevel policy and procedure regarding food allergies. Information from the Centers of Disease Control (CDC), Food Allergy Research and Education (FARE), clinical guidelines, and multiple other evidence sources were assessed for quality data and recommendations. All
EFFECTS OF evidence was critiqued and synthesized to construct the evidence summary, which was categorized into defining areas with best practice recommendations and translated into practice recommendations. The implementation stage of the ACE star model transforms evidence into best practice guidelines to influence clinical decision-making. A best practice policy regarding keeping the elementary age child with food allergies safe was established and implemented into practice. Evaluation took place after implementation of the new policy and staff and volunteer education. Statistical analysis assessed adherence to the revised policy. Additionally, food allergy reaction rates prior to implementation of the new policy were compared to food allergy reaction rates post implementation of the new policy.

**Strengths and weaknesses of the ACE star model.** Strengths of this model include overall provision of evidence demonstrating best practice guidelines. The model has a general applicability for utilization across multiple education levels and settings. The ACE star model was utilized in an intensive care setting that examined the adoption of EBP guidelines to decrease length of stay in the intensive care unit. This model was also utilized effectively for a project with education strategies to improve NCLEX scores in post-baccalaureate nursing students. This model guided the process of implementation and the NCLEX pass rates increased after implementation (Bonis, Taft, & Wendler, 2007). The ACE star model has facilitated meeting healthcare goals and improving patient satisfaction.

Weaknesses identified in utilization of the model may include lack of awareness of the importance of food allergy education and guidelines or lack of effective change agents in reference to the setting of implementation. Limitations in research related directly to food allergy management policies provide a weakness for utilization of this model related to inadequate amounts of retrievable evidence. Data from sources were synthesized together to provide a through management plan.
Literature Search

A thorough search for literature was initiated to obtain best practice evidence related to safety of the elementary school child with food allergies. Databases searched included (a) Joanna Briggs Institute (JBI), (b) The Cochrane Library, (c) Education Resources Information Center (ERIC), (d) Cumulative Index to Nursing and Allied Health Literature (CINAHL), (e) Health Source Nursing Academic Edition, (f) Medline via EBSCO, (g) Medline via Pub-Med, (h) ProQuest, and (i) National Guideline Clearinghouse. The medical subject heading terms (MeSH) of food hypersensitivities was explored in JBI and Cochrane to ensure consistency. The keyword search for best practice articles included food allergy, food hypersensitivity, peanut allergy, education, school, class, teacher, school nurse, and school health nursing. Search terms were formatted consistently across databases until the search was exhaustive. Articles were also reviewed from citation chasing of relevant sources.

Search results. Search results from all databases are depicted in Table 2.1. JBI and Cochrane Library had no evidence available. Initial results for ERIC provided nine articles for abstract review, CINAHL resulted 10 articles, Health Source Nursing Academic Edition resulted 6 articles, MEDLINE resulted 41 articles, ProQuest resulted 180 articles, and National Guideline Clearinghouse resulted 4 articles for review.

Inclusion and exclusion criteria. Inclusion criteria included articles published in the English language, publication date of less than 10 years from the search date, and peer reviewed. Multiple abstracts were obtained and articles were hand picked that included generalized themes of managing food allergies in elementary schools. Articles were included for review if they examined other age groups, however, the focus
Table 2.1

*Studies Obtained from Database*

<table>
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<th>Initial Articles for Review</th>
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population of elementary age students must have also been included. Articles were also utilized that described deficiencies in recommended best practice for management of food allergies in elementary schools. Some themes of reviewed articles included - the education of school nurses regarding current policy and outcome goals, and research regarding education of school nurses. Research that examined the components of emergency care plans (ECP) and medication administration were also included. Search terms were reviewed with the abstracts.

Exclusion criteria included any articles that did not examine school management of food allergies and also articles that did not examine safety in the early childhood population (elementary schools). Articles older than 10 years and articles that examined international statistical data were also excluded.

Levels of evidence. Articles chosen for inclusion after review of abstracts and application of inclusion and exclusion criteria were evaluated and appraised utilizing the John Hopkins Nursing Evidence-Based Practice Research Evidence Appraisal and Non-Research Evidence Appraisal tools (John Hopkins Nursing Evidence Based Practice, n.d.). The appraisal tools are used to rate the strength of evidence based on the type of study from Level 1 to Level 5, with Level 1 being the highest quality of research. Each article was appraised with the appropriate, corresponding tool. The research appraisal tool designated Level 1 evidence as experimental studies and meta-analysis. Level 2 evidence is quasi-experimental studies. Level 3 includes non-experimental studies, qualitative studies, and metasynthesis studies. The appraisal tool critiquing non-research type studies includes systematic reviews and clinical practice guidelines as Level 4 evidence. Level 5 is organizational, expert opinion, case study, and literature reviews. The same tool also provides a quality of rating for each article. Quality scores are categorized as A for high quality research, B for good quality research, or C for low quality or major flaws (John Hopkins Nursing Evidence Based Practice, n.d.).
After abstract review of all included articles, 14 articles were selected for inclusion to design this EBP project (see Table 2.2). No Level 1 evidence was found on the subject matter. One quasi-experimental study was identified as Level 2 evidence. Nine articles were nonexperimental in nature and therefore evaluated as Level 3 evidence. Eight pieces of evidence in Level 3 were descriptive studies. No Level 4 evidence was included. Four articles were classified as Level 5 evidence. In the Level 5 evidence reviewed, one article was a literature review, one was organizational experience, and two were expert opinions.

**Appraisal of Relevant Evidence**

After review of abstracts, appraisal of the 14 articles that met the inclusion and exclusion criteria was completed. Appraisal was conducted using a standard tool with a systematic process to assess practicality of the evidence in relation to the project topic and goals, and validity of results. Strengths and weaknesses of the evidence were also identified through use of the tool (see Table 2.3).

**Level 2 evidence.** Shah, Parker, and Davis (2013) utilized a quasi-experimental design in a large, diverse urban school district to examine three objectives in relation to an educational intervention for schoolteachers. The objectives of the research were to measure knowledge of food allergies after an educational intervention for teachers, to measure the difference in baseline knowledge of teachers regarding food allergies between schools with students of different socioeconomic levels, and to identify the effect of the educational intervention on teachers among the schools with various student socioeconomic levels.

Four schools were enrolled in the study by random selection. Each intervention school was matched with a control school with similar socioeconomic diversities of students. The four schools were then randomly assigned to either control or invention groups. Interventions included a 1-hour teaching session with content addressing food
Table 2.2

*Levels of Evidence*

<table>
<thead>
<tr>
<th>Evidence Level</th>
<th>Articles</th>
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<tbody>
<tr>
<td>Level 1</td>
<td>0</td>
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<td>Level 2</td>
<td>1</td>
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<tr>
<td>Level 3</td>
<td>9</td>
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<td>Level 4</td>
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<td>Level 5</td>
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</table>

Note. Adapted from John Hopkins Nursing Evidence Based Practice. (n.d).
Table 2.3  

**Appraisal of Evidence**

<table>
<thead>
<tr>
<th>Citation</th>
<th>Design/ Level</th>
<th>Sample/Setting</th>
<th>Major Variables/ Measurement</th>
<th>Recommendations</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carlisle, Vargas, Noone, Steele, Sicherer, Burks, &amp; Jones, 2010, Food allergy education for school nurses: A needs assessment survey by the consortium of food allergy research</td>
<td>Descriptive/ Level 3</td>
<td>199 school nurses attending regional professional meetings in Arkansas and North Carolina</td>
<td>A self-administered questionnaire was completed that examined demographics/school characteristics, self-reported proficiency of food allergy management, how knowledge and skills were learned, resources used to update knowledge, food allergy educational needs, and preferred methods for education</td>
<td>Avoidance, emergency plan development and education ranked highest in areas school nurses desired more education</td>
<td>A</td>
</tr>
<tr>
<td>Cavanaugh &amp; Strickland, 2011, Research to practice: Developing an integrated anaphylaxis education curriculum for school nurses</td>
<td>Organizational/ Level 5</td>
<td>No sample size stated, Washington state school nurses</td>
<td>Education program that provides school nurses with curriculum including, lesson plans, teaching-learning activities, and resources to provide education on anaphylaxis to staff was implemented</td>
<td>Curriculum for training school nurses’ on anaphylaxis education should include awareness, avoidance, recognition of symptoms, administration of epinephrine and implementation of the emergency care plan</td>
<td>C</td>
</tr>
<tr>
<td>Source</td>
<td>Type</td>
<td>Methodology</td>
<td>Participants</td>
<td>Findings</td>
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<tr>
<td>Gupta, 2014, Anaphylaxis in the young adult population</td>
<td>Expert Opinion/ Level 5</td>
<td>Author reviewed &amp; educated on several aspects of anaphylaxis</td>
<td>First line medication for anaphylaxis is epinephrine; patient should have 2 epinephrine auto-injectors with them at all times, Training of school personnel and developing management protocols is of extreme importance</td>
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<tr>
<td>IFIC Foundation, 2008, IFIC-SNA 2008 school food allergy survey: Having a food allergy plan is key to prevention</td>
<td>Descriptive Survey/ Level 3</td>
<td>Web based survey used to measure prevalence of food allergies in schools, assess proportion of schools with a formal ECP, identify food allergy topics of interest, and best practice for management of food allergies in schools</td>
<td>Prevalence of food allergies remains high, ECPs for all students with food allergies are recommended</td>
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<tr>
<td>McIntyre, Sheetz, Carroll, &amp; Young, 2005, Administration of epinephrine for life-threatening allergic reactions in school settings</td>
<td>Descriptive Survey/ Level 3</td>
<td>Survey measured incidence of anaphylaxis in schools, circumstances of anaphylaxis, practices for management of anaphylaxis, and recommendations for improvement</td>
<td>The majority of food allergy reactions happen outside of the home, making school a concern for food allergic children, even outside of the cafeteria; Anaphylactic reactions in schools are not uncommon events; The student’s individualized ECP must be assessable at all times, including on the playground, on field trips, and during school transport</td>
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<tr>
<td>Reference</td>
<td>Study Design/ Level</td>
<td>Key Findings</td>
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<tr>
<td>Munoz- Furlong, 2004, Food allergy in schools: Concerns for allergists, pediatricians, parents, and school staff</td>
<td>Expert Opinion/ Level 5</td>
<td>Examined the most effective way to manage food allergy reactions in schools, Information for article taken from Food Allergy Research and Education (FARE) website and federal laws</td>
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<tr>
<td>Nielson &amp; Lindsey, 2010, When there is no school nurse are teachers prepared for students with peanut allergy</td>
<td>Descriptive Survey/ Level 3</td>
<td>Objective of survey was to assess the teachers’ knowledge of signs and symptoms of an allergic reaction, knowledge of how to administer an EpiPen and knowledge of when to deliver the auto-injector</td>
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<tr>
<td>Powers, Bergren, &amp; Finnegan, 2007, Comparison of school food allergy emergency plans to the food allergy and anaphylaxis network’s standard plan</td>
<td>Descriptive Survey/ Level 3</td>
<td>Survey results compared ECPs to currently recommended ECP developed by the FARE Plan</td>
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A team effort approach including individualized ECPs and necessary medications on hand and complete avoidance of allergens is essential for management of food allergies in the school setting.

Staff must be educated on food allergy management since there may be times when the school nurse is not available, Many schools have insufficient educational resources for teaching staff how to recognize an allergic reaction.

ECP guidelines should follow the criteria from developed by FARE ECP; Staff must all be educated on food allergy management since there may be times when the school nurse is not available; Current food allergy emergency plans should be reviewed to determine that they are consistent with the most recent FARE plan; 60 participants included blank ECPs, 98% of respondents reported having
<table>
<thead>
<tr>
<th>Study</th>
<th>Study Design</th>
<th>Level</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulcini, Marshall, &amp; Naveed, 2011, Presence of food allergy action plans in Mississippi</td>
<td>Descriptive Survey/ Level 3</td>
<td></td>
<td>Survey investigated school nurse’ perceptions of food allergies and the presence of ECPs for students with food allergies. Eliminate the use of food allergens in the educational setting, such as arts and crafts projects; Prompt administration of rescue epinephrine is essential.</td>
</tr>
<tr>
<td>Pulcini, Sease, &amp; Marshall, 2010, Disparity between the presence and absence of food allergy action plans in one school district</td>
<td>Descriptive Survey/ Level 3</td>
<td></td>
<td>Survey examined prevalence of food allergies, type of food allergies, reactions in past year, information on rescue medication administration and storage. Inconsistent use of ECPs noted and not all staff were trained to deliver epinephrine; Also, complete avoidance must include avoidance during school projects or crafts.</td>
</tr>
<tr>
<td>Shah, Parker, &amp; Davis, 2013, Improvement of teacher food allergy knowledge in socioeconomically diverse schools after education intervention</td>
<td>Quasi-Experimental/ Level 2</td>
<td></td>
<td>Research indicates that there is a desire among school staff to increase knowledge related to management of food allergies in children; Educational intervention sessions on food allergies have improved attendees understanding of causal foods, signs and symptoms of anaphylaxis, and proper treatment of both local and systemic reactions.</td>
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<tr>
<td>Study Authors</td>
<td>Study Title</td>
<td>Study Type</td>
<td>Study Details</td>
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<tr>
<td>Wahl, Stephens, Ruffo, &amp; Jones, 2014</td>
<td>The evaluation of a food allergy and epinephrine auto-injector training program for personnel who care for children in schools and community settings</td>
<td>Non-experimental/ Level 3</td>
<td>4,818 individuals (teachers, camp counselors, childcare providers, administrators, school aides) at 247 schools and community sites</td>
</tr>
<tr>
<td>Weiss, Munoz-Furlong, Furlong, &amp; Arbit, 2004</td>
<td>Impact of food allergies on school nursing practice</td>
<td>Descriptive/ Level 3</td>
<td>400 elementary school nurses nationwide</td>
</tr>
<tr>
<td>Young, Munoz-Furlong, &amp; Sicherer, 2009</td>
<td>Management of food allergies in</td>
<td>Literature Review/ Level 5</td>
<td>Authors do not state how studies in review were selected</td>
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</table>
related to management of food allergies in schools
to appropriately treat reactions;
The child must carry two epinephrine injectors at all times or staff must have easy availability to two epinephrine injectors at all times; Quick administration of epinephrine is of significant importance; Evidence shows the importance of staff education regarding food allergies in school systems
allergy reactions, prevalence, causal foods, signs of reactions, prevention, and treatment strategies. A questionnaire was developed that consisted of two items on a Likert-type scale to reflect knowledge and comfort of food allergies as it relates to reaction prevention. A scale of eight items was included to assess knowledge. Teachers at all schools completed the questionnaire twice. Regardless of the students' socioeconomic status, intervention schools demonstrated a significant increase in understanding of food allergy causes, signs of anaphylaxis, and treatment of reactions as compare to the control schools. This study used a small sample size, but is still well developed research as evidenced by definitive conclusions thus warranting an A quality rating. The validity and usefulness of the results demonstrate significant strides in educating teaching staff regarding food allergies. This research provides an important view in the development of effective educational programs for school staff.

**Level 3 evidence.** Carlisle et al. (2010) performed a descriptive study with goals of determining self proficiency of school nurses related to food allergies, identifying educational needs for school nurses in relation to food allergies, and assessing the educational needs of school nurses related to food allergies. Researchers used a six-section questionnaire that was developed by an education program committee comprised of experts in food allergies. School nurses attending a professional meeting completed a total of 199 surveys. All results were self-reported. Survey results showed that more than 85% of respondents reported a moderate to high understanding of definitions of food allergy/food intolerance, recognition of signs of an allergic reaction, and importance of hand washing for students. In regards to ECP development, fewer nurses rated a moderate to high self-proficiency regarding education of staff on ECP and delegation of responsibilities to school staff. Related to food allergy education needs, nurses ranked education regarding cross contact of food allergens, ECP development, and education of school staff as the highest need for further development. Carlisle, et al.
(2010) found that school nurses’ ranked education regarding cross contact of food allergens, emergency care plan development and education of school staff highest among a personal needs assessment. This research not only speaks to the needs of the school nurses, but also addresses the school nurses’ desire to gain knowledge and tools to teach staff. The major weakness of this study is the use of self-assessment, thus no direct measurement of the nurses proficiency was conducted. Also, the convenience sample of respondents may limit generalizability of evidence. However, the overall quality of this article is rated as an A due to the strong validity of the assessment tool resulting in conclusions that remain consistent with recommendations.

International Food Information Council (2008) distributed a survey. Objectives of the survey included obtaining a current prevalence measurement of food allergies and examining the change in prevalence over the last several years. Assessing the proportion of schools who have implemented formal ECPs, identifying topics of interest and educational materials, and identifying best practice in schools to keep children safe were additional study objectives. Researchers conducted a web-based survey with an initial sample size of 844 school nutrition professionals and district directors. The survey results showed a high prevalence of food allergies with 84% of respondents verifying that there were children with food allergies present in their school systems. Only 64% identified having an ECP in place for food allergic students. A very concerning 21% of survey participants reported not having an ECP in place and 13% admitted to being unaware of what to do in a food allergy related emergency situation. Results also indicated that school nutrition professionals desire education related to this topic. This study reflected that food allergy prevalence remains high while implementation of ECPs remains low. The quality of the study was rated at B due to the lack of detailed analysis.

McIntyre, Sheets, Carroll, and Young (2005) performed a descriptive study to examine incidence of anaphylaxis in schools. Specifically, researchers examined
reasoning surrounding event occurrence, ways to better manage these events, and improvement of food allergy management. School nurse leaders from 109 school districts completed an Epinephrine Administration Form. There were 115 administrations of epinephrine over this period; however, 24% of these cases were in students who did not have diagnoses of a life-threatening allergy. Additionally, 19% of the food allergy reactions occurred outside of the school building.

The most significant limitation of utilizing findings of this study is the age of the data. Study data may not be consistent with current prevalence rates. However, the presented information is valid and examines a new point of reference. This is high quality research rated at A due to overall quality of the presented research demonstrating consistent results and recommendations.

Nielsen and Lindsey (2010) presented a model program about food allergy management in schools designed to educate teachers. The authors recognize the importance of staff being trained for emergency type situations when the school nurse is not available. Researchers of this small-scale study evaluated 26 questionnaires from teachers. Results revealed that respondents were neutral regarding the need for further food allergy education. Of interest was that the teachers with more years of experience had a stronger need for the program. Although this article provided consistent recommendations and useful results, the sample size was small and there was no in depth literature review presented. This article is useful in validating the need for an individualized ECP for the child with food allergies. The quality level of this research is rated as C level related to the missing literature review and sample size.

Powers, et al., (2007) examined 94 surveys from school nurses over a 2-month period. Results indicated that although 98% of respondents did care for children with food allergies in the school, only 15% of the ECPs were identical to the current recommended plan. Results demonstrated that 21% of the ECPs were older versions,
and 50% of the ECPs were not based on the recommended plan. Further findings demonstrated the lack of food allergy ECPs; 60 of the 94 participants included blank food allergy plans. Individualized plans were examined and 15% were identical to the current recommended ECP plan, 35% were outdated versions of the ECP plan, and 50% were not based on the plan. The literature review conducted demonstrated that many schools do not have an ECP in place, despite the evidence that children do experience anaphylaxis at school. According to Powers et al. (2007), a significant percentage of ECPs did not indicate that throat, lung, and heart symptoms are life threatening food allergy reactions. This lack of differentiation could result in a fatal error if anaphylaxis is not recognized and treated properly. The research also emphasizes the importance of having an ECP developed by FARE. This study is rated A for quality of evidence related to a sufficient sample size and an extensive literature review of research.

Use of ECPs for school-aged children in Mississippi schools were also examined in a descriptive study by Pulcini, Marshall, and Naveed (2011). Researchers investigated school nurses knowledge of food allergies and the overall presence of ECPs. The results showed an increase in the number of ECPs for the food allergic child over the two-year period spanning from 2008 to 2009. Students were also more likely to have an ECP if the child was enrolled in an urban area school. By 2009, information received from a physician increased the likelihood of the child having an ECP in place as compared to information received from the parents. Results again reflect the lack of ECPs in school systems. A weakness of this research is related to the older age of the data, which may interfere with relevance. However, the article did provide useful data that was appropriately obtained. The quality rating for this study is A related to strong data collection.

Pulcini, Sease, and Marshall (2010) examined food allergy perceptions and use of ECPs via electronic and paper surveys administered to all elementary and middle
school nurses in Greenville County, SC. Results confirmed prevalence of food allergies remains high with all respondents reporting at least one student diagnosed with food allergies enrolled in the school. Forty-four percent of schools had an ECP for all students with known allergies. In 42% of schools, one-half or less of students with known food allergies had an ECP. Twenty-three percent of schools made multiple accommodations for the child with food allergies and 70% made at least one accommodation. In relation to EpiPen training, 86% of schools had at least three additional school personnel trained in EpiPen administration, and 5% of schools had no additional adults trained to give epinephrine. This study is rated as A quality evidence related to the thoroughness of data collection.

Wahl, Stephens, Ruffo, and Jones (2014) conducted a large study that examined 4,818 individuals at 247 schools and community sites. Objectives included assessment of the effectiveness of in-person training regarding food allergy management and improvement of self-confidence in prevention, recognition, and treatment of food allergy reactions. The objectives also sought to collect information about prior education regarding food allergies. A 45-minute presentation was delivered to participants. Educational portions included facts about food allergies, how to avoid reactions, signs of a reaction, and the importance of immediate treatment. EpiPen training was also included. Three evaluation tools were utilized that included a primary survey, a secondary online survey, and a phone interview. The results obtained indicated that a presentation and hands-on demonstration are effective strategies to increase confidence in adults working with food allergic children. The evaluation tools showed that the positive results were sustained for up to 12 months after educational intervention. Researchers also demonstrated that training related to prevention, recognition, and treatment of severe allergic reactions from a nurse educator is an effective strategy for
increasing confidence in staff that work with food allergic children. The evidence has a quality rating of A related to a sufficient sample size and definitive conclusions.

Weiss, Munoz-Furlong, Furlong, and Arbit (2004) utilized a descriptive study to assess the number of anaphylaxis events that occurred in schools. A nationwide telephone survey to 440 elementary school nurses found that 44% of respondents reported an increase in prevalence of food allergies over the last 5 years. In regards to ECP and epinephrine access, 78% of respondents performed staff training. Ninety percent of epinephrine was stored in the school nurse office. Weiss et al. (2004) recommended that all school personnel must be trained to form risk-reduction strategies, recognize the signs of a reaction, and be able to quickly administer medication during an anaphylactic emergency due to the potential life-threatening nature of food allergies. Weiss et al. (2004) found that in food allergy reactions, delays in epinephrine administration or lack of epinephrine administration is associated with fatalities. Although data are older, this study reflects the inconsistent use of ECPs and has an A quality rating related to a sufficient sample size and consistent results.

**Level 5.** Cavanaugh and Strickland (2011) described a *train-the-trainer* education program designed to train caregivers about anaphylaxis. This program currently provides school nurses in Washington State with essentials for management of children with food allergies. Curriculum was implemented with the educational goals of awareness, avoidance, recognition, and response to anaphylaxis. Curriculum objectives were also written and school nurses learned of the recently adapted program during a teleconference. The 55-minute training sessions were made available on-line to school nurses. Although the program was based on current recommendations, there was no program evaluation. This study was included for review as it did match inclusion criteria, but has a quality rating of C due to the limited analysis of outcomes.
Gupta (2014) provided expert opinion on the general topic of food allergy. Gupta discusses the importance of counseling and education that includes complete allergen avoidance, early recognition of signs and symptoms of an allergic reaction, and the presence of an ECP and epinephrine auto-injector with an adult available to deliver the medication at all times. Gupta also adds that the child affected by food allergies should always wear medical identification jewelry or have an anaphylaxis wallet card on them at all times. Although, this is a low level of evidence, the author provides a great general overview of food allergy management. The quality rating of this article is A related to the evidence reflecting the author’s expertise in the field.

Munoz-Furlong (2004) also published a generalized review of food allergies based on the author’s expert opinion. Specifically, management of food allergies in schools was examined. A literature review was performed and recommendations are based on the information. Successful management of food allergies in schools is directly linked to awareness, cooperation, and education among the child’s physician, the child’s family, school staff, and other students and their parents. This author also addresses the need for all school staff to be aware of children with food allergies and emphasizes the importance of students having an individualized ECP plan present with ease of access to epinephrine. This is an A quality review due to the author’s expertise in the field.

Young, Munoz-Furlong, and Sicherer (2009) also conducted a literature review to examine issues to assist the allergist with teaching the patient on school-specific concerns. Authors examined administration of epinephrine and location of epinephrine auto injectors in relation to location of the child. Data also indicate that the food allergic child should have two doses of epinephrine available at all times for quick administration if needed. The authors recommend the use of Individualized Healthcare Plans (IHPs), which are written, child specific plans for the management of reactions in the food
EFFECTS OF allergic child. The IHP includes the ECP. The quality rating of this study is A related to the depth of evidence and the authors’ expertise.

Construct EBP

Synthesis of literature. The best practice model for keeping elementary school children with food allergies safe at school is a multilevel model that must include an individualized plan with discussions and planning that include the child, parents, and staff members. After careful appraisal of the evidence, recommendations across the literature include (a) avoidance, (b) personalized ECP plan, and (c) staff education to increase knowledge base on management of food allergies related to recognition and treatment of reactions.

Avoidance. After review of data, a common theme reflecting best practice for management of food allergies in the school setting remains complete avoidance of trigger foods for the affected child (Carlisle et al., 2010; Cavanaugh & Strickland, 2011; Gupta, 2014; Weiss et al., 2014). Statistically, it has been shown that the majority of food allergy and anaphylactic reactions happen outside of the home setting (Gupta, 2014; McIntyre et al., 2005). The school setting as a whole becomes a concern for food allergic children, even outside of the cafeteria (Carlisle et al., 2010; McIntyre et. al., 2005). As food allergies become more prevalent (IFIC, 2008), it is essential that schools make continued efforts to avoid reactions.

Even with these safeguards in place, many times allergic reactions develop after accidental ingestion. Complete avoidance must include avoidance during school projects or crafts as well (Pulcini et al., 2010). No medications are available to cure or control food allergies; the only way to prevent a reaction is with strict avoidance.

Personalized emergency care plan. Implementation of a personalized ECP written by the child’s personal provider is of extreme importance for the school aged child with food allergies. Standards currently are that ECP guidelines should follow the
criteria from FARE (Gupta, 2014; Munoz-Furlong, 2004; Powers et al., 2007). The student’s individualized ECP must be accessible at all times, including on the playground, on field trips, and during school transport (Carlisle et al., 2010; McIntyre et al., 2005).

Studies have shown that often times the child with food allergies will not have a formal ECP or will not have the ECP with them (IFIC, 2008). The plans must be detailed and accurate. Since food allergies and anaphylaxis demonstrate a wide variability in symptoms and triggers, each student should have their own plan (Carlisle et al., 2010; Cavanaugh & Strickland, 2011). This plan includes key information that designates when to inject epinephrine and important historical data regarding asthma status as well as a picture of the affected child (Powers et al., 2007). Written ECPs will delineate medical treatment for allergic reactions and will also designate general or individualized plans for prevention (Young et al., 2009).

Two medications are used in response to allergic reactions, epinephrine for severe reactions and antihistamines for minor reactions (Carlisle et al., 2010; Gupta, 2014). Epinephrine and antihistamine dosing should be outlined on the ECP. The child must carry two epinephrine injectors at all times or staff must have easy availability to two epinephrine injectors at all times (Carlisle et al., 2010; Young et al., 2009). The quick administration of epinephrine is of significant importance (Gupta, 2014; Weiss et al., 2004; Young et al., 2009). Instruction regarding how and where epinephrine should be administered must be given to all staff members, parent volunteers, and any other adult who may be responsible for care of the child with food allergies (Cavanaugh & Strickland 2011; Gupta, 2014; IFIC, 2008).

Reviews of ECPs should be done at least annually before school initiation and possibly more often with any changes in history or after an exposure (IFIC, 2008). Collaboration with all school disciplines, parents, and the child should be completed
before the start of the school year to help reduce the risk of accidental exposure (Carlisle et al., 2010).

**Staff training.** Research indicates that there is a desire among school staff to increase knowledge related to management of food allergies in children (Carlisle et al., 2010; Shah et al., 2010). Staff training of all individuals that may come into contact with the food allergic child is of extreme importance (Carlisle et al., 2010; Gupta, 2014; Munoz-Furlong, 2004). Evidence supports staff education regarding food allergies in school systems (Weiss et al., 2004; Young et al., 2004). Staff must all be educated on food allergy management since there may be times when the school nurse is not available (Nielson & Lindsey, 2010; Powers et al., 2007). All staff should be aware of children who have documented food allergies and should be able to quickly identify signs and symptoms of a reaction and know basic assessment skills regarding when epinephrine should be delivered (IFIC, 2008; Munoz-Furlong, 2004). Educational intervention sessions on food allergies have improved attendees understanding of causal foods, signs and symptoms of anaphylaxis, and proper treatment of both local and systemic reactions (Shah et al., 2013).

Education should include an overview of symptomatology of food allergies, a complete review of each child’s individualized ECP, and hands on experience with use of an epinephrine trainer pen (Carlisle et al., 2010; Cavanaugh & Strickland, 2011). Training for the specific product used is of extreme importance to reflect use of different devices (Gupta, 2014).

**Clinical Question**

The aim of the EBP project was the development, implementation, and evaluation of a food allergy policy to keep elementary school children safe at school. Development consisted of integrating the best practice evidence into a policy. Implementation included putting the policy into place at the school and educating staff
members and volunteers. The effect of the practice change was evaluated by comparing data from the previous school year to data after the practice change. The policy guidelines assisted in answering the clinical question by establishing a measurable outcome in relation to policy implementation. The PICOT question of, “In the elementary school setting, how does implementation of a revised food allergy management policy affect staff adherence to best practice recommendations and students’ episodes of food allergy reactions over a 4 month period?” was addressed.

Research shows that even with careful management, accidental exposures happen and caregivers must be ready and knowledgeable to deal with potential anaphylaxis. Data must be provided that is relevant and individualized to guide schools in developing meaningful plans to keep students with food allergy safe without isolating or excluding them (Young et al., 2009). To manage food allergy in children, schools should strive for complete avoidance of food allergens. All children with a diagnosed food allergy must have an individualized ECP and all required medications with them at all times.

Staff training for all persons in the school system is of extreme importance. Staff must adopt these best practice guidelines for the safety of the student with food allergies. Training should include recognition of food allergy reactions and education regarding medication use. Emphasis should also be placed on demonstration with use of epinephrine device.
CHAPTER 3

IMPLEMENTATION OF PRACTICE CHANGE

Implementation for this evidence-based practice (EBP) project was performed over several months and encompassed the utilization of the ACE star model to guide evidence-based practice. Overall goals for the implementation period included successful transfer of the best practice policy for management of food allergies into the school setting. Goals were met and resources were utilized effectively and efficiently.

Setting and Participants

The setting for implementation of this EBP project was a local charter school that educates children from grades kindergarten through eight. The school is located in northwest Indiana and educates approximately 500 students. School staff includes teachers, food service workers, administrators, custodians, clerical workers, one full time nurse, and numerous volunteers. Permission for project implementation was obtained from the school director and the school nurse. After discussions with the school nurse explaining evidence findings and the project plan, it was decided that the school would benefit from implementation of the project. The project encompassed policy development based on best practice evidence (see Appendix A for policy). This EBP project included two distinct parts. The initial component comprised policy development regarding management of food allergies in the school setting. An audit of school clinic records was performed to examine the effects of policy implementation (see Appendix B for data collection sheet). The pre intervention group was comprised of records of children with food allergies during the previous school term (Spring 2014). These data were compared to the post intervention group that consisted of records of children with food allergies during the term following implementation (Fall 2014).
The second part of the EBP project included educational training to review policy guidelines, procedure, and epinephrine administration. A total of 115 school staff and volunteers participated in the educational in-services.

**Outcomes**

The primary outcome measure for this EBP project was incidence of food allergy reactions. Pre intervention data regarding the incidence of food allergy reactions from the previous school term were compared to post intervention data to assess the impact of the revised policy on food allergy reactions. Additionally, policy adherence was examined by monitoring the number of food allergic children with ECPs and epinephrine auto-injectors available at the school post policy implementation compared to the pre intervention data and also examined rates of children who had easy availability of medications at all times (*traveling* epinephrine). Data were also collected from surveys completed by staff immediately following the educational intervention. In the surveys, respondents were asked to evaluate the educational program.

**Intervention**

A systematic search of databases was conducted to obtain evidence supporting the intervention. All literature was appraised and synthesized to obtain best practice recommendations for the intervention. The project involved the revision of an existing school policy. The school had a policy in place (pre intervention) for management of food allergies while at school but the policy was dated and did not reflect current best practice guidelines. The changes to the policy included the addition of multiple best practice guidelines, including consistent ECPs for all children with food allergies. ECPs should be based on the most up to date guidelines presented by FARE. This easy to read, standard form is detailed for each child by their healthcare provider, but presents the same flow sheet in helping to determine what actions need to be taken in regards to a food allergy reaction. The revised policy mandates that all food allergic children must
have required medications with them while attending school and school related activities. The policy also addresses safety in all geographic areas of the school, including fieldtrips, and outlines steps to follow during and after a food allergy exposure.

Additionally, a 60-minute educational presentation addressed background information on food allergies, prevalence of food allergies, signs and symptoms of reactions, management of the child during a reaction, and reviewed policy development and guidelines. The participants, school staff and volunteers, were presented a PowerPoint presentation (see Appendix C) and given handouts that included the school food allergy management policy, a copy of the recommended ECP (see Appendix D), the consent form (see Appendix E), and evaluation form (see Appendix F). The consent and evaluation forms were returned to the project coordinator immediately following the program. The educational session included a demonstration and return demonstration for participants of both the EpiPen auto-injector and the Auvi-Q auto-injector. Safe, brand specific training devices were utilized to provide attendees with hands on practice with both devices.

The educational sessions began in August 2014, one week before the beginning of the 2014-2015 school year. Four sessions were held to accommodate multiple staff and volunteers with the final session running in mid September 2014. The project coordinator reviewed the evaluation forms after the first educational session and changed the PowerPoint slightly related to the qualitative comments that were viewed. The intervention phase ran from August 2014 until January of 2015. The staff and volunteers were kept up to date with the policy intervention by the project coordinator attending a parent meeting that was open to all staff and volunteers in January of 2015. The project coordinator reminded attendees about the importance of quick epinephrine injection and was available for questions. Initial results were also reviewed with the
attendees. The school nurse was also available to field questions or concerns during the implementation phase.

**Planning**

Communication was initiated with school faculty in the spring of 2014. An email was sent to the school director and school nurse expressing interest in policy revision and implementation of best practice for management of food allergies. Both the principal and school nurse agreed that the project would be beneficial to the school and expressed interest in the project implementation.

Policy revision was planned after critique of evidence and review of the school policy related to food allergy management. The previous school policy did not reflect current best practice guidelines related to food allergy management. Policy revision was completed for the school and a consent letter and evaluation form were drafted. The revised policy, consent letter with attached evaluation form, ECP, and a copy of the educational PowerPoint presentation were thoroughly analyzed for accuracy. All information was then forwarded to the school nurse for final approval. The project coordinator implemented the food allergy educational sessions on scheduled days that also included first aid training and asthma education performed by the school nurse.

**Recruiting Participants**

Current policy at the school stated that all staff and volunteers were required to undergo training related to food allergies. All staff was recruited to participate on the scheduled staff orientation day that included the initial food allergy educational session. Further participants were recruited via the school email system recommending that school volunteers attend the educational session. The final session included volunteers that assisted in teaching and organizing the after-school clubs. Food allergy training was mandatory for staff members and highly recommended for volunteers. Staff and
volunteers were notified before the educational session that alternative teaching with the school nurse was available if that was the preferred route of education.

Data

**Measures and their reliability and validity.** Data for the project were collected by the project coordinator and the school nurse using a self-developed data collection sheet obtained from clinic records. Additional data were obtained by direct interview from the school nurse. Internal validity may be a concern due to the utilization of direct interview technique. Program evaluation data from the educational sessions was obtained from all participants. Persons that attended the educational portion were asked to perform a post in-service evaluation. Evaluations for all sessions were consistent and anonymous.

**Collection.** Data from children with food allergies were obtained for the previous school term, January 2014 to June 2014 and the post implementation term, August 2014 to January 2015. Data included, age, grade level, gender, food allergies, exposure type, and treatment related to the previous exposures. Data were documented on the data collection tool and kept secure by ensuring that no identifiable information about the child was included on the tool. Additionally, evaluations completed by participants attending the educational in-services were collected. The evaluations examined participants’ perceptions of the project coordinator’s presenting skills and participants’ knowledge of the revised policy. The evaluation forms included ten 5-point Likert-scale items and three short answer items. Participants’ consents and evaluation forms were coded with matching numbers. Evaluation data were separated from the participants’ consent forms to maintain participant confidentiality. All data were kept secured in a locked cabinet in the project coordinator’s private office.

**Management and Analysis.** The project coordinator managed all data for this project. The primary outcome measure focused on comparing the pre intervention
incidence of food allergy reactions to the post intervention incidence. Data were compared using independent \( t \) tests. Policy compliance was examined by comparing the numbers of food allergic students in the pre and post intervention groups who had ECPs on file and recommended medications brought to school. Policy compliance was examined using chi-square test of independence to determine differences between groups. SPSS version 22.0 statistical software was utilized to analyze data.

Descriptive statistics were used to analyze in-service evaluation data. To determine participants’ perception of in service effectiveness, means of Likert-scale items were calculated. Short answer items were examined and consistent themes were identified.

**Protection of Human Subjects**

Approval for this EBP project was obtained from the Valparaiso University Institutional Review Board (IRB) prior to implementation. Contact information for the project coordinator was provided to all participants. Confidentiality was upheld by instituting careful security measures in regards to data. Data collected did not contain any identifiers. Additionally, findings were disseminated as group data and individual data was not distinguishable.
CHAPTER 4

FINDINGS

This EBP project was developed to provide an evidence-based approach to policy formation and implementation of a food allergy management plan in a charter school in northwest Indiana. The project was designed to assess a multi level policy’s impact on incidence levels of food allergy reactions in the school. The following data analysis details the project outcomes and compares the pre policy and post policy phase. The pre policy implementation group (Spring 2014 students) and the post policy implementation group (Fall 2014 students) were statistically analyzed with independent t tests to assess incidence of food allergy reactions. Chi-square testing was also used to assess compliance to policy. Participants of the educational in-services were asked to complete a post education Likert-type evaluation assessing the knowledge gained.

Participant Characteristics

Size. In the Spring 2014 semester, 18 students with documented food allergies were enrolled in the school. The Fall 2014 semester had 22 students with documented food allergies in the school. The project also yielded 115 participants in the educational in-services provided at the school for staff and volunteers.

Demographics. Demographics were examined for both the pre and post policy intervention groups. The pre intervention group reflected a higher prevalence of males with food allergies (66.7%, \( n=12 \)), when compared with females (33.3%, \( n=6 \)). This trend remained the same for the post intervention group with prevalence of males with food allergies at 59.1%, \( (n=13) \) and females at 40.9%, \( (n=9) \). The mean age of participants in the pre intervention group was 8.16 and the mean age in the post intervention group was 8.22. Both the pre intervention and the post intervention group demographics showed a higher incidence of food allergic children in the lower grade levels. For the Spring 2014
group, 82% of the children with diagnosed food allergies were in grades kindergarten to 4th, with the remaining 18% being in grades 5th to 8th. Similarly for the Fall 2014 group, 83% of the students with diagnosed food allergies were in grades kindergarten through 4th and 17% were in grades 5th to 8th. Peanut and tree nut allergies remained the most common food allergies for both groups in the school. For the Spring 2014 group 61.1% of the 18 students with food allergies enrolled in the school had a peanut allergy \( (n=11) \) and 61.1% had a tree nut allergy \( (n=11) \). Of the 22 students enrolled in the school for Fall 2014, 68.2% of these students had a peanut allergy \( (n=15) \) and 72.7% had a tree nut allergy \( (n=16) \). There were no significant differences between the groups on the demographic variables (See Table 4.1).

Chi-square tests of independence were calculated comparing the frequency of gender \( (X^2(1)= .606, p>.05) \), age \( (X^2(1)= 8.923, p>.05) \), and grade \( (X^2(1)= 1.905, p>.05) \) of the children with food allergies between pre and post groups. No significant differences were identified between the groups on these demographic variables.

A total of 115 participants attended the educational in-service. On the in-service evaluation form, participants were asked to identify their role within the school. Missing data regarding this item occurred with 50.4% \( (n=58) \) of the returned forms (See table 4.2).

**Changes in Outcomes**

**Statistical testing.** Detailed statistical analysis was performed using the commercially available IBM SPSS Statistics software, version 22.0. An analysis was conducted to answer the proposed PICOT question using an independent samples \( t \) test comparing pre and post intervention statistical data. Secondary analysis compared policy compliance with chi-square testing.
Table 4.1  
*Characteristics of Children with Food Allergies*

<table>
<thead>
<tr>
<th></th>
<th>Pre Policy Demographics</th>
<th>Post Policy Demographics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Spring 2014 (n) %</td>
<td>Fall 2014 (n) %</td>
</tr>
<tr>
<td>Total # of Children</td>
<td>18</td>
<td>22</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>(6) 33.3%</td>
<td>(9) 40.9%</td>
</tr>
<tr>
<td>Male</td>
<td>(12) 66.7%</td>
<td>(13) 59%</td>
</tr>
<tr>
<td>Age M (SD)</td>
<td>8.16 (2.06512)</td>
<td>8.22 (2.89974)</td>
</tr>
<tr>
<td>Grade M (SD)</td>
<td>4 (2.7774)</td>
<td>4 (2.1365)</td>
</tr>
<tr>
<td>K</td>
<td>(3) 16.7%</td>
<td>(3) 13.6%</td>
</tr>
<tr>
<td>1</td>
<td>(4) 22.2%</td>
<td>(4) 18.2%</td>
</tr>
<tr>
<td>2</td>
<td>(4) 22.2%</td>
<td>(4) 18.2%</td>
</tr>
<tr>
<td>3</td>
<td>(2) 11.1%</td>
<td>(5) 22.7%</td>
</tr>
<tr>
<td>4</td>
<td>(2) 11.1%</td>
<td>(2) .09%</td>
</tr>
<tr>
<td>5</td>
<td>(1) .05%</td>
<td>(1) .05%</td>
</tr>
<tr>
<td>6</td>
<td>(1) .05%</td>
<td>(1) .05%</td>
</tr>
<tr>
<td>7</td>
<td>(1) .05%</td>
<td>(1) .05%</td>
</tr>
<tr>
<td>8</td>
<td>0</td>
<td>(1) .05%</td>
</tr>
<tr>
<td>Allergy (frequency/</td>
<td></td>
<td></td>
</tr>
<tr>
<td>cumulative percent)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peanut</td>
<td>(12) 66.7%</td>
<td>(15) 68.2%</td>
</tr>
<tr>
<td>Tree Nut</td>
<td>(11) 61.1%</td>
<td>(16) 72.7%</td>
</tr>
<tr>
<td>Milk</td>
<td>(1) 5.6%</td>
<td>(1) 4.5%</td>
</tr>
<tr>
<td>Egg</td>
<td>(2) 11.1%</td>
<td>(6) 27.3%</td>
</tr>
<tr>
<td>Food</td>
<td>Percentage</td>
<td>Note</td>
</tr>
<tr>
<td>-------------</td>
<td>------------</td>
<td>------</td>
</tr>
<tr>
<td>Soy</td>
<td>5.6%</td>
<td>(1)</td>
</tr>
<tr>
<td>Wheat</td>
<td>5.6%</td>
<td>(1)</td>
</tr>
<tr>
<td>Fish</td>
<td>16.7%</td>
<td>(3)</td>
</tr>
<tr>
<td>Shellfish</td>
<td>33.3%</td>
<td>(6)</td>
</tr>
<tr>
<td>Palm</td>
<td>5.6%</td>
<td>(1)</td>
</tr>
<tr>
<td>Sunflower</td>
<td>5.6%</td>
<td>(1)</td>
</tr>
<tr>
<td>Coconut</td>
<td>5.6%</td>
<td>(1)</td>
</tr>
<tr>
<td>Sesame</td>
<td>5.6%</td>
<td>(1)</td>
</tr>
<tr>
<td>Strawberry</td>
<td>5.6%</td>
<td>(1)</td>
</tr>
<tr>
<td>Banana</td>
<td>5.6%</td>
<td>(1)</td>
</tr>
<tr>
<td>Watermelon</td>
<td>5.6%</td>
<td>(1)</td>
</tr>
<tr>
<td>Kiwi</td>
<td>5.6%</td>
<td>(1)</td>
</tr>
<tr>
<td>Chocolate</td>
<td>5.6%</td>
<td>(1)</td>
</tr>
</tbody>
</table>
Table 4.2

*Role of In-Service Participants*

<table>
<thead>
<tr>
<th>Type of Position</th>
<th>( n )</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching staff</td>
<td>19</td>
<td>16.5%</td>
</tr>
<tr>
<td>Administration</td>
<td>1</td>
<td>0.9%</td>
</tr>
<tr>
<td>Clerical staff</td>
<td>1</td>
<td>0.9%</td>
</tr>
<tr>
<td>Volunteers</td>
<td>36</td>
<td>31.3%</td>
</tr>
<tr>
<td>No response</td>
<td>58</td>
<td>50.4%</td>
</tr>
<tr>
<td>Total # of Participants</td>
<td>115</td>
<td></td>
</tr>
</tbody>
</table>
Significance. Results demonstrated that the pre intervention group had 4 episodes of food allergy reactions as compared to the post intervention group that experienced 5 episodes of food allergy reactions. An independent-samples t test was calculated comparing the mean number of children who experienced a food allergy reaction pre policy implementation to the mean number of children who experienced a food allergy reaction post policy implementation. No significant difference between the two groups was found. The mean number of reactions of the pre policy group ($M = .22, SD = .55$) was not significantly different from the mean of the post policy implementation group ($M = .27, SD = .77$). Of significance is that the pre intervention group did have one exposure that resulted in anaphylaxis and required use of epinephrine. All other reactions in both groups only required use of antihistamine (See table 4.3).

Although the number of food allergy reactions from pre and post policy data did not show a significant change, policy compliance was improved post policy implementation. Chi-square tests of independence were calculated comparing pre and post groups on the frequency of food allergic children having an ECP on file, having the recommended ECP on file, and having the recommended medications available. Significant interactions were not found. The last form of policy compliance measured sought to identify a difference from the pre intervention group to the post intervention group regarding percentage of medications that traveled with the student for ease of access. A significant interaction was found. See Table 4.4 for chi-square results.

The educational in-service was evaluated using 10 Likert-scale type items and three open-ended qualitative type questions. One hundred and fifteen participants completed the educational session and 102 completed the evaluation.
Table 4.3

Comparison of Reactions

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pre</th>
<th>Post</th>
<th>$t$</th>
<th>$Df$</th>
<th>$p$ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Reactions</td>
<td>.2222 (.54832)</td>
<td>.2727 (.76730)</td>
<td>-.234</td>
<td>38</td>
<td>.816</td>
</tr>
</tbody>
</table>
Table 4.4

Comparison of Policy Compliance

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Pre</th>
<th>Post</th>
<th>$X^2$</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECP on file</td>
<td>(15)</td>
<td>(20)</td>
<td>.519</td>
<td>.471</td>
</tr>
<tr>
<td>(83.3%)</td>
<td>91.0%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recommended ECP on file</td>
<td>(15)</td>
<td>(19)</td>
<td>.071</td>
<td>.789</td>
</tr>
<tr>
<td>(83.3%)</td>
<td>86.4%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recommended medications readily</td>
<td>(8)</td>
<td>(12)</td>
<td>.404</td>
<td>.525</td>
</tr>
<tr>
<td>available</td>
<td>44.4%</td>
<td>54.5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medications traveled with student</td>
<td>(1)</td>
<td>(12)</td>
<td>10.831</td>
<td>.001*</td>
</tr>
<tr>
<td>(.05%)</td>
<td>54.5%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p < .05
The Likert-scale type items assessed the instructor, presentation, policy, and participants’ knowledge of Auvi-Q and EpiPen auto-injectors, and confidence regarding recognition and management of food allergies in the school population (See table 4.5). The three open-ended questions asked participants about usefulness of the presentation, how the presentation could have been improved, and how the presentation would change the participants’ way of dealing with children with food allergies. A significant portion of respondents \((n=34, 29.6\%)\) found the hands on demonstration with the Auvi-Q and EpiPen as the most useful part of the presentation. Respondents \((n=15, 13\%)\) also reported finding the statistics about incidence rates of food allergies and signs and symptoms of a reaction useful. Case studies that represented unique scenarios were also presented to the group and five participants \((.04\%)\) found them most useful. Question three examined how participants would use the knowledge gained to change practice when dealing with children with food allergies. These responses varied. The most common responses reflected participants’ perception of an \textit{increase in knowledge} regarding food allergy management. Participants also reported \textit{increased confidence} and being \textit{more alert} by watching for a child in distress related to a possible allergic reaction (See table 4.6).
Table 4.5

*Evaluation of Educational In-Service*

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>Responses (n) %</th>
<th>M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructor was knowledgeable about topic.</td>
<td>(1) .9% 0 0 (8) 7% (93) 88.7%</td>
<td>4.8824 (.47291)</td>
</tr>
<tr>
<td>Presentation was well developed and easy to understand.</td>
<td>(1) .9% 0 (2) 1.7% (9) 7.8% (90) 78.3%</td>
<td>4.8333 (.54632)</td>
</tr>
<tr>
<td>Instructor communicated well and provided useful feedback.</td>
<td>(1) .9% 0 (2) 1.7% (5) 4.4% (94) 81.7%</td>
<td>4.8725 (.52031)</td>
</tr>
<tr>
<td>Policy was clearly explained.</td>
<td>(1) .9% 0 (3) 2.6% (13) 11.3% (85) 73.9%</td>
<td>4.7745 (.59548)</td>
</tr>
<tr>
<td>I can identify the signs of an allergic reaction.</td>
<td>(1) .9% 0 (1) .9% (24) 20.9% (76) 66.1%</td>
<td>4.7059 (.59015)</td>
</tr>
<tr>
<td>I understand how to administer the Auvi-Q auto-injector.</td>
<td>(1) .9% 0 (2) 1.7% (11) 9.6% (86) 74.8%</td>
<td>4.8100 (.56309)</td>
</tr>
<tr>
<td>I understand how to administer EpiPen auto-injector.</td>
<td>(1) .9% 0 0 (12) 10.4% (89) 77.4%</td>
<td>4.8431 (.50237)</td>
</tr>
<tr>
<td>Policy guidelines are manageable in the school setting.</td>
<td>(1) .9% (1) .9% (2) 1.7% (21) 18.3% (77) 67%</td>
<td>4.6863 (.65974)</td>
</tr>
</tbody>
</table>
Presentation increased my knowledge regarding the management of food allergies in the school setting.

<table>
<thead>
<tr>
<th></th>
<th>(1) .9%</th>
<th>(1) .9%</th>
<th>(2) 1.7%</th>
<th>(17) 14.8%</th>
<th>(80) 69.6%</th>
<th>4.7228</th>
<th>(.64990)</th>
</tr>
</thead>
</table>

I have an increased level of confidence in my ability to manage food allergies in the school setting.

|          | (1) .9% | (1) .9% | (2) 1.7% | (26) 22.6% | (72) 62.6% | 4.6373 | (.67177) |
Table 4.6

*Responses to Open-ended Evaluation Items*

<table>
<thead>
<tr>
<th>Question #’s</th>
<th>Most Common Answer</th>
<th>Number of Total Questionnaires with Response ($n$) %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What did you find most useful about the presentation?</td>
<td>Hands on demonstration of epinephrine auto injectors</td>
<td>(34) 29.6%</td>
</tr>
<tr>
<td>2. How might the presentation be improved?</td>
<td>NA/ No response/ No recommendations</td>
<td>(83) 72.3%</td>
</tr>
<tr>
<td>3. How will participation in this presentation change how you deal with the child with food allergies?</td>
<td>Increased confidence/ better awareness</td>
<td>(45) 39.1%</td>
</tr>
</tbody>
</table>
CHAPTER 5

DISCUSSION

The purpose of this EBP project was to determine if implementation of a best practice policy for management of food allergies in the elementary school setting would decrease the incidence of food allergy reactions in the school. Secondary outcomes also examined overall policy compliance from pre policy to post policy implementation.

Explanation of Findings

Primary outcome. The pre intervention group had 4 episodes of food allergy reactions as compared to the post intervention group that experienced 5 episodes of food allergy reactions. An independent-samples t test comparing the mean number of children who experienced a food allergy reaction pre policy implementation to the mean number of children who experienced a food allergy reaction post policy implementation demonstrated no significant difference between the two groups. The implementation of a food allergy management policy did not result in a change in the number of reactions experienced by children with food allergies.

The lack of overall change between groups may be due to the small sample size and the short implementation period. A larger sample size and monitoring the sample over a longer period of time may promote a more recognizable statistical change. Available evidence on the topic was lower level. Many studies were descriptive studies that examined a small portion of the recommended policy that was developed. No studies were identified that examined incidence rates of food allergy reactions post policy implementation. Thus, comparison to other studies that examined incidence rates after implementation of a policy is not possible.

Statistically policy implementation did not reduce the number of food allergy reactions, however, two important findings were documented that were not reflected on
statistical analysis. In Spring 2014, the pre implementation group did have one exposure that resulted in anaphylaxis and required use of epinephrine after a child ingested a food containing peanuts while at school. No anaphylactic episodes were documented for Fall 2014 after policy implementation. Also, no instances of accidental exposures to offending foods occurred after policy implementation. Policy implementation may have increased awareness of food allergies affecting the decrease in accidental exposures and reactions.

Another important factor that may have potentially skewed the numbers reflecting the incidence rates for the post intervention group is that one child was subsequently diagnosed with additional food allergies after collection of the Fall 2014 data. Of the 5 episodes for the Fall 2014 group this child represented 3 of the 5 food allergy cases. These reactions occurred due to exposure to an unknown allergen at the time of data collection. Taking this into account, essentially the overall incidence rate may have been lower if project outcomes were measured after the child’s diagnoses due to complete avoidance of the food.

**Secondary outcomes.** Results demonstrated that policy compliance improved post policy implementation. Multiple chi-square tests of independence were calculated comparing pre and post intervention groups on policy compliance.

No significant interactions were demonstrated when measuring the frequency of food allergic children having an ECP on file from pre intervention to post intervention. The pre policy compliance rate of children that had an ECP on file was 83% and increased to 90% after policy implementation. Although not significant, an upward trend is still reflected. Pulcini, et al. (2011) examined 194 school nurses regarding this same topic. In 2009, 37% of the nurses reported that students with known food allergies had an ECP on file and 26% of nurses reported that 0 - 10% of the students with known food allergies had an ECP on file. Lack of knowledge regarding food allergy management in
the study may have influenced the compliance rates obtained by Pulcini, et al. The ECP remains a critical part of emergency management for the child with food allergies (Carlisle, 2010; Cavanaugh & Strickland, 2011; IFIC 2008) and all children with diagnosed food allergies should have a provider signed ECP before admittance into school.

The recommended ECP is the current version prepared by FARE. The ECP includes the child’s name, a picture for identification, a list of allergens, and if the child is asthmatic. The form is also generalized with signs and symptoms of food allergy reactions and when to treat the reaction with either an oral antihistamine or epinephrine. Powers, et al. (2007) examined survey results to see how many students had the recommended ECP on file. Results were lower than the EBP project findings showing that only 15% of the surveyed 94 students had the recommended ECP on file during data analysis. An upward trend was found with compliance in reference to this EBP project. Compliance increased from 83.3% pre policy to 86.4% post policy. Although not a great increase in percentage, the policy implementation may have impacted this finding.

A chi-square test of independence was used to examine children with food allergies who had the recommended medications available and again no significant interaction was found in the post policy intervention group. Although findings were not significant, an increase was noted from the pre policy percentage of 44.4% to 54.4% post policy. Literature demonstrates the importance of quick delivery of epinephrine in anaphylaxis (Gupta, 2014; Pulcini, et al. 2011; Weiss, 2004; Young, 2009).

A significant increase in the number of students that had medications that traveled with them for ease of access from the pre intervention phase to the post intervention phase was found. Prior to policy implementation, .05% of food allergic children had medications that traveled with them for ease of access. The number of
student’s who had medications that traveled with them increased to 54.5% after policy implementation. All though no other studies examined this factor, it remains an essential factor for food allergic children for safety reasons. With literature analysis and review, recommendations regarding the necessity of epinephrine were found. Having medications readily available facilitates quick delivery, which is essential for proper treatment of food allergies (Young, et al. 2009).

The PICOT question for this EBP project, “In the elementary school setting, how does implementation of a revised food allergies management policy affect staff adherence to best practice recommendations and students’ episodes of food allergy reactions over a 4 month period?” was answered by evidence showing an increase in adherence to policy recommendation. Although episodes of food allergy reactions did not significantly decrease during the post implementation period, no child experienced an anaphylactic episode post policy implementation and one child’s undiagnosed allergies might have skewed the data. Additionally, one outcome measuring policy compliance reflected a significant increase in adherence to policy recommendations.

**Evaluation of the Project: Adult Learning Theory**

Adult learning theory, or andragogy was used to guide the educational portion of this project. The theory identifies characteristics of adult learners through developed assumptions and principles. The theory hypothesizes that adults have a differing learning style compared to children. Adult learning is different due to life knowledge, maturity, and a general self-serving behavior. The six assumptions are (a) changes in self-concept, (b) increasing role of experience, (c) readiness to learn, (d) orientation to learning, (e) motivation to learn, and (f) need to know (Knowles, Holton, & Swanson, 2012).

All six assumptions guided the EBP project as the coordinator developed the education portion to meet the learning goals for the adult staff members and volunteers.
Assumptions were used to develop objectives for the adult learners. Major content included education on the possible severe effects of food allergies and risk associated with not following policy guidelines. Risks would include severe risk to the student and implications for the school. The theory facilitated the development of the PowerPoint presentation and teaching strategies used with participants. Strengths of the theory in relation to the EBP project include its overall applicability of use and the self-directed nature of the theory. Participants in the education sessions were able to guide their own learning experience per the theory. Identified weaknesses included individual’s barriers to learning. The project coordinator noted that some participants seemed very fearful of the topic. Other barriers to learning included the adult’s cognitive abilities, previous life experiences dealing with the topic, or general stress. Since teaching was developed for the participants as a group, individual assessment of learning could not be completed. The theory was very useful in guidance and the planning process regarding the education in-services.

**Evaluation of the Project: ACE Star Model**

The purpose of the ACE star model is to examine and link the relationships between all stages of knowledge transformation to bridge research into practice. The intent of the model is to improve care, patient outcomes, and patient safety (ACE, 2012). The model consists of a five-point star model that examines the nature and characteristics of knowledge utilization in EBP learning. The five stages are (a) *knowledge discovery*, (b) *evidence summary*, (c) *translation*, (d) *integration into practice*, and (e) *evaluation*.

The EBP project was founded on the project coordinators personal interest and passion related to food allergy safety and management. Knowledge discovery was initiated through a cyclic process that included review of multiple pieces of evidence related to food allergies in children. Knowledge discovery assisted the project
coordinator in development of the overall project concept. All appropriate evidence was synthesized and utilized for policy development. The policy was thorough and encompassed multiple best practice recommendations.

The third point on the star is translation into practice recommendations. This was done initially by contacting the school to seek out interest in project development. Stakeholders were identified and notified of the project and how it would benefit the school. Change was sought through interaction with key stakeholders. Implementation into practice followed with the project coordinator presenting the policy guidelines to the school faculty and volunteer staff during the education sessions. This closely followed the goals of integration into practice (fourth point) by working closely with the school staff and developing a trusting relationship centered on the project goals.

Evaluation, the last step of the ACE model for development of EBP, was sought on multiple levels by the project coordinator. Project outcomes measured were overall incidence of food allergy reactions pre and post policy implementation and also policy compliance. Evaluations of all participants who participated in the educational in-services were performed

The ACE star model was useful for this EBP project in guiding practice. ACE clearly outlines steps and designs to follow. The model facilitated gathering and critiquing evidence to identify best practice guidelines that provided the foundation for policy development. ACE was also useful in identifying key stakeholders and planning strategies to organize change in the preexisting school policy. One weakness of the model was the translation and implementation phase of the model could have benefited from clarification of steps to utilize for practice.

The ACE star model facilitated revision after the first session of participants in the educational in-service. The project coordinator assessed the returned evaluation forms and read through the ratings and added more photographs for visual learners to better
understand signs and symptoms of food allergy reactions in working with the translation into practice stage. In reference to applicability of the ACE star model, if the project were repeated, the evaluation phase would be extended and possibly more definitive tests performed to evaluate learning skill retention. This could be accomplished through administration of a pre test followed immediately by a post test after the educational in-service and repeated 3 months after the in-service to assess for retention of knowledge.

**Strengths of the EBP Project**

Implementation of the EBP project demonstrated an overall increase in effectiveness of policy compliance. This will result in increased safety for the student population with food allergies. The EBP project also facilitated communication and education regarding food allergies to staff members and volunteers. All who attended the educational in-services were given information on signs and symptoms of food allergies and use of auto-injectors. Two common epinephrine auto-injectors were demonstrated to all participants by the project coordinator and all participants gave a return demonstration of both auto-injectors. The implementation phase of the project was of no direct cost to the school. However, participants committed their personal time and the school facility was utilized.

**Weaknesses of the EBP Project**

The first major weakness of the EBP project was the overall lack of evidence in regards to directly managing food allergies in the school setting. There is much evidence available that reflects portions of school management, but no evidence was found that examined policy implementation. Due to the lack of relevant articles, a wide variety of articles were examined and critiqued. The project itself is a broad topic so the variability of the critiqued articles was an essential factor to incorporate.
Another weakness was the small sample size of children with food allergies. Because of this small sample size, the statistical power of the results will be limited. During the Spring 2014 pre intervention term, 18 students with diagnosed food allergies were present in the school. The Fall 2014 post intervention term reflected 22 students enrolled in the school with food allergies. The child who had an undiagnosed additional food allergy at the time of data collection for the fall term was a confounding variable that may have impacted the overall validity of findings. Another weakness of the project was the short timeframe to gather and evaluate data post policy implementation. Ideally, a longer pre and post management timeframe would help to strengthen the overall statistical findings.

**Implications for the Future**

**Practice.** Based upon the outcomes evidenced by the EBP project, it is recommended that the school continues use of the updated policy and continues to provide educational in-services to all staff and volunteers annually. The policy should be updated yearly by the school nurse and presented to administration for change approval to incorporate best practice evidence. The policy can be sustained at the school in the future since it is consistent with the school’s overall mission related to safety of the children, school administrators and staff are invested, and there is a consistent school nurse.

Evidence regarding implementation of a food allergy management policy, based on best practice recommendations in the school setting is lacking. This project implementing a policy could easily be generalized beyond a single school to a school system and could be utilized other places where children are present. An evidenced-based food allergy plan is an effective tool for use in the public domain for nurses, teachers, and administrators to keep children with food allergies safe.
Theory. Both the ACE star model to guide EBP and the adult learning theory were valuable provisions for this EBP project. The assumptions set by Knowles in the adult learning theory proved to be true and provided the project coordinator with knowledge and guidance before initiating the educational in-service on what to expect and how to teach the learners. The ACE model was a convenient tool for a step-by-step guide to utilize best practice theory in research utilization and the knowledge transformation process. The utilization and consideration of these theories in the future with development of food allergy management policies in schools may lead to easier implementation of food allergy management programs. Future theory formed interventions can provide best practice approaches and educational strategies for future policy.

Research. Due to the nature of the research available on a variety of topics regarding food allergies, the need for research focusing specifically on management in elementary schools would be beneficial. Future nursing research may explore short and long term effects of a best practice food allergy management policy in the elementary school setting. Higher-level evidence on children with food allergies would be beneficial for future research. The advanced practice nurse (APN) is well equipped to design research or evidence-based practice projects regarding food allergy management in the elementary school setting.

Education. Knowledge exchange and synthesis of the information found in this EBP project report will have an impact on nurses and APNs, particularly pediatric and school nurses. As food allergies become more prevalent, proper diagnosis and management is essential. Nurses and APN’s must be responsible educators to parents, school administrators, and staff regarding school management of food allergies. Nurse educators are also responsible for parent and patient education for newly diagnosed children with food allergy and continuing education with children and their parents as
new information and studies are published. Nurse educators hold responsibility for teaching nursing students the pathophysiology of food allergies, pharmacological, and nursing management of food allergies. As the prevalence of food allergies increase, all nurses working with children need to be able to quickly identify signs of anaphylaxis or allergic reactions and properly manage them. Additionally nurses must be able to properly educate others about these vital skills.

Conclusion

Overall, this EBP project has provided evidence supporting the use of an evidence-based policy for food allergy management in the school setting. Implementation of a best practice policy for management of food allergies was integrated into a local charter school that educates children grades kindergarten through eighth grade. The intervention was evaluated for effectiveness and although no significant difference between the two groups was found in regards to incidence of reactions, secondary outcomes were measured that reflected an increase in compliance with food allergy management recommendations.

Initiation of this EBP project provided a policy change that increased safety for the student population and also provided staff and volunteers with education regarding the policy. Prior to this project, no specific evidence that directly examined the effects of a multi level food allergy management policy was available, however, results of this project reinforce evidence that recommend the importance of personalized ECPs, medication availability, and staff education. This project demonstrates that initiation of a food allergy management policy is effective at increasing compliance to policy guidelines that will provide a safer environment for the child with food allergies.
REFERENCES


Academic Center for Evidence Based Practice (ACE). (2012). University of Texas Health Science Center. Retrieved from www.acestar.uthscsa.edu


from www.foodallergy.org/resources/kids


Ms. Spain graduated with her ASN from Purdue University in 2004. She began her career as an RN working on an intermediate care cardiac unit at a regional hospital. Ms. Spain continued her education and obtained her BSN from Valparaiso University in 2006 and graduated from Valparaiso University in 2008 with a MSN degree. She completed the Family Nurse Practitioner program in May of 2009 and has been practicing as a board certified family nurse practitioner since. Her experiences as a nurse practitioner have included working in internal medicine and her current employment as an occupational health nurse practitioner in a large industrial setting.

Ms. Spain is currently enrolled at Valparaiso University obtaining her Doctorate in Nursing Practice degree with an anticipated graduation of May 2015. Ms. Spain developed an interest in the management and treatment of food allergies after her daughter was diagnosed with severe allergies to peanuts, shellfish, fish, and egg after many sleepless nights and a storm of diagnostic tests. Ms. Spain’s passion to keep her daughter safe has spilled over into her professional life as her DNP project focuses on keeping the child with food allergies safe in school. Her goal is to increase awareness to keep all children affected by food allergies safe. Ms. Spain had the privilege of performing a podium presentation at the FARE Teen Summit on her research in November 2014 in Washington DC. Ms. Spain is an active member of the American Association of Nurse Practitioners, Sigma Theta Tau- Zeta Epsilon Chapter, and the Coalition of Advanced Practice Nurses of Indiana. She also remains involved in FARE with her daughter with the goal of supporting awareness of food allergies.
ACRONYM LIST

ACE: Academic Center for Evidence Based Practice
APN: Advanced Practice Nurse
JBI: Joanna Briggs Institute
CDC: Centers for Disease Control
CINAHL: Cumulative Index to Nursing and Allied Health Literature
EBP: Evidence Based Practice
ECP: Emergency Care Plan
ERIC: Education Resource Information Center
FAAN: Food Allergy and Anaphylaxis Network
FARE: Food Allergy Research and Education
IFIC: International Food Information Council
NCLEX: National Council Licensure Exam
Appendix A

Severe Food Allergy Policy and Plan

Discovery Charter School has a Severe Food Allergy (including nuts) policy and plan in place. The plan is described below. The parent or guardian of students with food allergy should notify the school nurse to discuss and develop an individual health care plan that will include safety procedures for all school activities. The purpose of this plan is to keep the child with food allergies safe while attending school and school related activities.

I. Nurse-Family Communication

A. All new students with allergies and their parents or guardians must meet with the school nurse before school begins. The nurse will meet with returning students within the first week of school unless there have been any changes to their health history. If changes have occurred, the responsible adult (parent or guardian) should discuss changes with the school nurse before school begins at either orientation or by setting up an appointment.

B. The nurse will assess the students’ understanding of their allergies, symptoms, and reactions either during an individual appointment or shortly after the school year begins. The nurse and student will discuss how to avoid allergens and what actions to take if they believe they are having an allergic reaction. The nurse will periodically review this information with the student either quarterly or after an exposure.

II. Care of the Child While Attending School

A. Emergency Action Plan

1. All students with diagnosed food allergies MUST have an emergency action plan (EAP) signed by their physician before they can enter school. Best practice demonstrates that the EAP developed by Food Allergy Research and Education (FARE) is the plan of choice, therefore, all students must use this standardized form. An English version print out can be obtained from [http://www.foodallergy.org/document.doc?id=234](http://www.foodallergy.org/document.doc?id=234)

2. Regular classroom teachers will include a copy of EAPs for all students with food allergies in the substitute teacher plans. The EAP must be clearly labeled so it is easily identifiable.
B. Medications

1. Students must have anti-histamine for mild reactions and two valid epinephrine auto-injectors readily available at all times (medications will be in the same geographic location with the food allergic child at all times). The epinephrine in the classroom will be out of reach from the students. This is mandatory for school admittance. Research shows that quick administration of epinephrine is a lifesaving tool in anaphylaxis.

2. Communication with the teachers, school nurse, and staff is essential to develop an individualized plan for each student with food allergies to ensure that medications are always available. This plan is different from the EAP and will include discussion regarding transferring of medications and keeping the child safe at all times while at school or attending school related activities. The location(s) of medications should be listed on each child’s EAP. The teacher will clearly identify the location of the epinephrine in the substitute teacher plans.

3. Extra epinephrine will be stored in the nurse’s office secured in an upper cabinet, but will also be accessible to other staff in an emergency situation.

4. Documentation of a food allergy reaction should take place immediately by the staff member who responds to the emergency. Documentation should include date/time, signs of reaction, food allergy trigger if known, and medications given. EMS and parent notification should be initiated immediately.

C. Lunchtime

1. All school lunches are prepared and served nut free. There will be a nut free table clearly labeled in the cafeteria. Signs will be posted near and on the table. There will be separate sponges and buckets used to clean the peanut free table.

2. The nurse will have a meeting with food service personnel, lunchroom monitors, and custodians to educate them about food allergies. Since students’ EAPs and medications must accompany them to the cafeteria, lunch aides must know signs and symptoms of food allergies and how to effectively administer epinephrine.

3. All students will be educated about the no sharing policy, the importance of keeping their hands to themselves, and to wash their hands after lunch before returning to the classroom.

4. Students must wash their hands after lunch before returning to the classroom.

5. There will be a designated food storage area for food brought from home.

6. Teachers of children with food allergies must bring two epinephrine auto-injectors per child to the cafeteria and give them to the cafeteria monitors during lunch. After lunch, both
epinephrine injectors must be returned back to teacher to assure that student always has medications available.

III. School Wide Plan

A. Classrooms

1. Each classroom with a nut allergic student will be nut-free. There will be a sign posted on the outside of the classroom. All students who attend the designated nut free room will wash their hands before class starts, when returning from lunch, or entering the room at any time. All other students and staff will wash their hands before entering the classroom. The importance of washing hands well with soap and water to ensure removal of any nut oil will be clearly explained to all.
2. All specials classrooms and the school office will be nut-free. Signs will be posted outside of these rooms.
3. The teacher will be aware of all food brought into the classroom and will ensure that no nut products are introduced. Also, any project that may involve food needs to be closely monitored, like using birdseed, which may contain nuts.
4. The nurse will explain the reason for the plan to the students in the class at the beginning of the school year while ensuring respect for the food allergic child. Age appropriate teaching will be used to ensure understanding of students.
5. Letters will go home to all students and their families the week school starts concerning the nut-free classroom.
6. Special events with food and classroom parties must be carefully planned with the teacher so that there is minimal chance of exposure.

B. Recess/ Outdoor Activities

1. It remains essential that the child have their EAP available with all necessary medications while outside of the classroom as well. Teachers should hand off items to trained recess aids to provide continuance of safety.
2. Eating of any kind while at recess is prohibited. This prevents a choking hazard and a possible hazard for the food allergic child.
3. Communication devices will be available at all times in case of an emergency (e.g. walkie-talkies, cell phones, intercom system, etc.)

IV. Training and Education of all Staff

A. Prior to school starting all staff will be informed about how to maintain a safe environment for the students. The nurse will demonstrate how
to use an EpiPen auto-injector and AUVI-Q auto-injector. All staff must complete a return demonstration with both items and show competency.

B. The nurse will be responsible for making sure the student is given the appropriate treatment at school. In the nurse’s absence, it will be the responsibility of other staff who are present with the child at the time of exposure to make sure that the epinephrine is administered in a timely fashion and that 911 is immediately called.

C. Whenever epinephrine is administered, 911 must be called and the student must be transported by ambulance to the hospital. Parents or guardians of the student must be notified after the emergency call is complete.

D. Periodic updates, reminders, and training will occur throughout the year, at least at each quarter or possibly more often. Also, any new staff will need to have food allergy training before any student encounter.

E. Education and training of Food Allergy Policy will be mandatory for all substitute teachers, volunteers in the lunchroom, recess aids, car line volunteers, and volunteers.

F. The school nurse will be responsible for making sure that epinephrine injectors are not expired.

V. Out of School Learning Experiences/Field Trips

A. The nurse will investigate where the class is going and the exposure risk involved. The nurse and/or teacher must assure the child has their EAP with them as well as medications.

B. No eating will be allowed on the bus during learning experiences. The bus company will be notified that the seats will need to be cleaned before students can enter the bus.

C. The parent/guardian of a child with a food allergy should be allowed to attend learning experiences if possible. If the parent/guardian cannot attend, the adult responsible for the child must be trained in food allergy management.

D. The responsible adult will take required medications and the student’s EAP on the learning experience. The child with food allergies should ideally be grouped with their teacher who they have developed a relationship with if their own parent or guardian is not available to attend the learning experience.

E. All children should be reminded to pack nut free lunches when attending out of school learning experiences.
References


allergies in schools: A perspective for allergists. *American Academy of Allergy, Asthma & Immunology, 124*, 175-182.
THE EFFECTS OF AN EVIDENCE-BASED FOOD ALLERGY MANAGEMENT PLAN
TO KEEP CHILDREN WITH FOOD ALLERGIES SAFE AT SCHOOL

Scarlet Spain MSN, CNS, FNP-BC, Doctorate Student

*Please complete for each student with known food allergies from January 2014 to June 2014.

A. DEMOGRAPHIC DATA

Gender: ____________________________

Age in years: ______________________

Grade: ______________________________

Known Food allergies: ______________________________________________________

__________________________________________________________________________

2. EXPOSURE DATA (IF CHLD DID NOT HAVE EXPOSURE, SKIP TO #3. Please include all exposures for child. [Numerically label exposures for each child throughout columns.])

Date(s) of Reaction(s):________________________________________________________

Known exposure/ Unknown exposure nominal

If known; please describe circumstance of exposure: _____________________________

__________________________________________________________________________

__________________________________________________________________________

Treatment: antihistamine/ epinephrine

If epinephrine was used, please indicate # of injections: _________________________

3. POLICY ADHERANCE

EAP on file: YES/ NO

Does EAP follow FAAN recommended guidelines: YES/ NO

Does child have antihistamine and two epinephrine auto-injectors at school: YES/ NO

Does medications travel with student: YES/ NO
Appendix C

Food Allergy Management in School and School Activities
Scarlet Span MSN, CNP, FNP-BC, DNP Student

Background
- Prevalence of food allergies has increased dramatically in recent years.
- Prevalence in children has increased 18% from 1997 to 2007.
- There are documented 30,000 visits to the emergency room each year related to food allergies.
- More than 100 deaths will occur in the United States this year from food allergies.


Food allergies is the primary allergy in approximately 6% of allergy sufferers.
- Pediatric food allergy is more common than adult food allergy.
- 8 foods cause 90% of all food allergy reactions:
  - milk, soy, eggs, wheat, peanuts, tree nuts, fish, and shellfish.
- Peanut allergy alone is estimated to affect approximately 400,000 school-aged children in the United States.


What is a food allergy?
What causes food allergies?
Children with no known food allergies may experience their first “reaction” while in school.
- Food allergies are caused by an abnormal response to food triggered by the immune system.
  - Identifies a food as “harmful.”
  - The cause of food allergies remains unknown.
  - Although some children may “outgrow” their food allergies, there is no current treatment or cure.
  - Adults also may develop an allergy to a substance at any time.

Minor Reactions
- Pruritis (Itchiness)
- Mild erythema (Pink color changes to skin)
- Eczema (chronic skin condition)
- Dermatitis
- Mild urticaria (Hives)

Major Reactions
- Respiratory symptoms
- Cardiovascular symptoms
- Gastrointestinal symptoms
- Developing anaphylaxis and possible death if not treated immediately.
EFFECTS OF

Food Allergy Symptoms in Children

- Children with food allergies might communicate their symptoms in the following ways:
  - It feels like something is poking my tongue.
  - My tongue (or mouth) is tingling (or burning).
  - My tongue or mouth feels itchy.
  - My tongue feels like there is hair on it.
  - My mouth feels tingly.
  - There’s a lump in my throat; there’s something stuck in my throat.
  - My tongue feels taut (or heavy).
  - My face feels tight.
  - It feels like there are bugs in there (to describe itchy ears).
  - It (my throat) feels thick.
  - It feels like a bump is on the back of my tongue (throat).

Source: (From: Allergy & Anaphylaxis) 2012

What is Anaphylaxis?

- A complicated cascade of events that occur after the predisposed individual’s immune system identifies a substance (food) as foreign.
- Antibodies are released and cause fluid shifts from the capillaries, reactions in smooth muscle, and reactions in inflammatory cells.
- Clinical symptoms of food allergy are caused by mediators such as histamine, that affect body tissues causing muscle spasms, intense swelling and mucous production (Source: Powers, 2003, p. 167).
- If not treated, the reaction can cause a rapid decline in blood pressure and lead to anaphylactic shock and death.

school Management

- Complete Avoidance of Trigger Food
  - Policy outlines measures for avoidance
  - Food Allergic Child must ALWAYS have emergency action plan (EAP), antihistamine, and 2 doses of epinephrine easily accessible
  - All staff must be trained to recognize signs and symptoms of food allergy reaction and must be trained to administer epinephrine

How will we know when to treat the student?
EFFECTS OF

You will treat at the guidance on the student's Emergency Care Plan or Emergency Action Plan (EAP).

"The risk of death from untreated anaphylaxis outweighs the risk of adverse side effects from using epinephrine in these cases."

Source: Centers for Disease Control and Prevention (CDC, 2015, p. 12).

Epinephrine Auto-injectors—Used for Emergency Treatment of Anaphylaxis for those At Risk for Anaphylaxis

EpiPen
- Simple, hand-held, self-injecting device
- Instructions on side of device
- Usually connected together as a "two-pack"

Auvi-Q
- Newer device
- Simple, hand-held, self-injecting device
- Takes the administrator through step by step process
- Can be held in a pocket

Delivering Auto-injectors


https://www.auvi-q.com/how-to- deliver

Psychosocial Concerns

It is imperative to show the child with food allergies respect and confidentiality. By federal law all children with food allergies must be accommodated in all school activities and inclusion in activities is a must.

Legislation

- Section 554 of the Rehabilitation Act of 1973. Title III of the Americans with Disabilities Act of 1990 (ADA), and the Individuals with Disabilities Education Act
- Parents of students with life-threatening food allergies may request that the school ensure the safety of their child, National Education Association Health Information Network (NEA HIN), 2012, p. 16.
- School staff must have information on potential allergens, for the safety of all students. The principal must be informed of all students with food allergies, the family educational rights and privacy act (FERPA) and Health Insurance Portability and Accountability Act (HIPAA) when collecting, storing, and sharing personal student information. (NEA HIN, 2012, p. 14).
EFFECTS OF

Bullying
• Research indicates that a diagnosis of food allergy may put the child at risk for bullying.
• 1 out of 3 kids with food allergies report that they have been bullied specifically because of their allergies.
• All staff must be mindful to watch for this.
• Peers need to be educated on food allergies and ways to assist their classmates in living a healthy life.
• Programs are available that are dedicated to teach classmates about food allergies.

Case Study
• You are in the cafeteria monitoring lunch activities, you notice Benjamin (who does not have a food allergy) eating a Snickers bar with his friends at the designated "peanut free" table. What do you do?

Case Study
• You are on a field trip and see Sarah, age 7 (known allergy to peanuts), ingest candy that contains peanuts. Sarah does not look in any distress. She denies any problems. You are aware that her allergy is severe. What do you do?

Case Study
• (Sabe, age 5 (known allergy to milk and wheat) is in the classroom and complains of his chin itching. It is not a snack time, nor has anyone been eating in the classroom. You notice just a few small hives around his mouth. He has no other complaints of his tongue or throat feeling funny. His stomach doesn’t hurt and he otherwise looks okay. What do you do?

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• Thank you to ALL of you!!!

Questions???
Appendix D

**Food Allergy & Anaphylaxis Emergency Care Plan**

Name: ___________________________ D.O.B.: ___________________________

Allergy to: ___________________________

Weight: __________ lbs. Asthma: [ ] Yes (higher risk for a severe reaction) [ ] No

NOTE: Do not depend on antihistamines or inhalers (bronchodilators) to treat a severe reaction. USE EPINEPHRINE.

Extremely reactive to the following foods: ___________________________

**THEREFORE:**

[ ] If checked, give epinephrine immediately for ANY symptoms if the allergen was likely eaten.

[ ] If checked, give epinephrine immediately if the allergen was definitely eaten, even if no symptoms are noted.

FOR ANY OF THE FOLLOWING:

**SEVERE SYMPTOMS**

**LUNG**
Short of breath, wheezing, repetitive cough

**HEART**
Paie, blue, faint, weak pulse, dizzy

**THROAT**
Tight, hoarse, trouble breathing/swallowing

**MOUTH**
Significant swelling of the tongue and/or lips

**SKIN**
Many hives over body, widespread redness

**GUT**
Repetitive vomiting, severe diarrhea

**OTHER**
Feeling something bad is about to happen, anxiety, confusion

**OR A COMBINATION OF SYMPTOMS FROM DIFFERENT BODY AREAS.**

1. **INJECT EPINEPHRINE IMMEDIATELY.**
2. **Call 911.** Tell them the child is having anaphylaxis and may need epinephrine when they arrive.
   - Consider giving additional medications following epinephrine:
     - Antihistamine
     - Inhaler (bronchodilator) if wheezing
     - Lay the person flat, raise legs and keep warm. If breathing is difficult or they are vomiting, let them sit up or lie on their side.
     - If symptoms do not improve, or symptoms return, more doses of epinephrine can be given about 5 minutes or more after the last dose.
     - Alert emergency contacts.
     - Transport them to ER even if symptoms resolve. Person should remain in ER for at least 4 hours because symptoms may return.

**MILD SYMPTOMS**

**NOSE**
Itchy/runny nose, sneezing

**MOUTH**
Itchy mouth, mild itch

**SKIN**
A few hives, mild itch

**GUT**
Mild nausea/discomfort

**FOR MILD SYMPTOMS FROM MORE THAN ONE SYSTEM AREA, GIVE EPINEPHRINE.**

**FOR MILD SYMPTOMS FROM A SINGLE SYSTEM AREA, FOLLOW THE DIRECTIONS BELOW:**

1. Antihistamines may be given, if ordered by a healthcare provider.
2. Stay with the person; alert emergency contacts.
3. Watch closely for changes. If symptoms worsen, give epinephrine.

**MEDICATIONS/DOSES**

Epinephrine Brand: ___________________________

Epinephrine Dose: [ ] 0.15 mg IM [ ] 0.3 mg IM

Antihistamine Brand or Generic: ___________________________

Antihistamine Dose: ___________________________

Other (e.g., inhaler-bronchodilator if wheezing): ___________________________

Parent/Guardian Authorization Signature: ___________________________

Date: ___________________________

Physician/Provider Authorization Signature: ___________________________

Date: ___________________________

Form provided courtesy of Food Allergy Research & Education (FARE) (www.foodallergy.org) 4/2014
EFFECTS OF

FARE
Food Allergy & Anaphylaxis Emergency Care Plan

EPI-PEN® (EPINEPHRINE) AUTO-INJECTOR DIRECTIONS
1. Remove the EpiPen Auto-Injector from the plastic carrying case.
2. Pull off the blue safety release cap.
3. Swing and firmly push orange tip against mid outer thigh.
4. Hold for approximately 10 seconds.
5. Remove and massage the area for 10 seconds.

AUVI-Q™ (EPINEPHRINE INJECTION, USP) DIRECTIONS
1. Remove the outer case of Auvi-Q. This will automatically activate the voice instructions.
2. Pull off red safety guard.
3. Place black end against mid outer thigh.
4. Press firmly and hold for 5 seconds.
5. Remove from thigh.

ADRENACLICK®/ADRENACLICK® GENERIC DIRECTIONS
1. Remove the outer case.
2. Remove grey caps labeled “1” and “2”.
3. Place red rounded tip against mid outer thigh.
4. Press down hard until needle penetrates.
5. Hold for 10 seconds. Remove from thigh.

OTHER DIRECTIONS/INFORMATION (may self-carry epinephrine, may self-administer epinephrine, etc.):

Treat someone before calling Emergency Contacts. The first signs of a reaction can be mild, but symptoms can get worse quickly.

EMERGENCY CONTACTS — CALL 911

RESCUE SQUAD: ____________________________
DOCTOR: ____________________________ PHONE: ____________________________
PARENT/GUARDIAN: ____________________________ PHONE: ____________________________

OTHER EMERGENCY CONTACTS

NAME/RELATIONSHIP: ____________________________ PHONE: ____________________________
NAME/RELATIONSHIP: ____________________________ PHONE: ____________________________
NAME/RELATIONSHIP: ____________________________ PHONE: ____________________________

PARENT/GUARDIAN AUTHORIZATION SIGNATURE ____________________________
DATE ____________________________

FORM PROVIDED COURTESY OF FOOD ALLERGY RESEARCH & EDUCATION (FARE) (WWW.FOODALLERGY.ORG) 4/2014
Appendix E

Food Allergy Education Program
CONSENT FORM

Study Title: The Effects of an Evidence-based Food Allergy Management Plan in the Elementary School Setting

Project director: Scarlet R. Spain MSN, CNS, FNP-BC

Purpose: I, ____________________________, understand that I am being asked to take part in an evidence-based practice project, regarding policy development for management of food allergies for the elementary student population.

Procedure: The project will include education regarding the management of food allergies in the child attending school and off site school activities. The project will consist of a group educational session with the project director, and the completion of an evaluation of the educational session.

Risks: There are no physical or other known risks to participating in the study.

Benefits: The information provided will demonstrate the current best practice evidence related to the management of food allergies in schools to keep the food allergic child safe.

Voluntary participation/withdrawal: I understand that participating in this session is my choice, and I am free to stop at any time.

Compensation: I understand that there is no compensation being offered for my time or travel.

Questions: If I have any questions about participating now or in the future, Scarlet Spain may be contacted at (219) 741-2585.

Confidentiality/anonymity: Although the information and answers I give will be used and reported by the project director, my name and other facts that would identify me will be kept strictly confidential.

Consent to participate in the research study: I have read or had read to me all of the above information about this evidence-based practice project, the procedure, possible risks, and potential benefits to me, and I understand them. All of my questions have been answered. I give my consent freely, and offer to participate in this study.

Participant Signature ___________________________ Date

Project Director Signature ___________________________ Date
Appendix F

**Food Allergy Education Program**  
**Evaluation Form**

Please circle your role at Discovery Charter School:

- Teaching  
- Food Services  
- Administration  
- Clerical  
- Custodial  
- Volunteer (car line, parent, etc)

Rate each statement using the scale:

- 1= strongly disagree  
- 2= disagree  
- 3= neutral  
- 4= agree  
- 5= strongly agree

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.Instructor was knowledgeable about topic.</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>2.Presentation was well developed and easy to understand.</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>3.Instructor communicated well and provided useful feedback.</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>4.Policy was clearly explained.</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>5.I can identify the signs of an allergic reaction.</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>6.I understand how to administer the Auvi-Q auto-injector.</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>7.I understand how to administer EpiPen auto-injector.</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>8.Policy guidelines are manageable in the school setting.</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>9.Presentation increased my knowledge regarding the management of food allergies in the school setting.</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>10.I have an increased level of confidence in my ability to manage food allergies in the school setting.</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

What did you find most useful about the presentation?

How might the presentation be improved?

How will participation in this presentation change how you deal with the child with food allergies?