

SCHOOL NURSING AND ASTHMA: THE RELATIONSHIP BETWEEN
EVIDENCE-BASED PRACTICE, BEST PRACTICE
AND INDIVIDUALIZED HEALTHCARE PLANS

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School Nursing and Asthma: The Relationship between
Evidence-Based Practice, Best Practice
and Individualized Healthcare Plans
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Abstract

Anne Wood. SCHOOL NURSING AND ASTHMA: THE RELATIONSHIP BETWEEN EVIDENCE-BASED PRACTICE, BEST PRACTICE AND INDIVIDUALIZED HEALTHCARE PLANS. (Under the direction of Dr. Leonard Parker) School of Education, April, 2009.

The purpose of this study was to evaluate current research on evidence-based practice (EBP) and best practices for school nurses addressing student asthma, as well as how school nurses integrate those practices with the IHP, the IEP, and other factors in daily practice. The objective of this study was to explicate the framework for a qualitative meta-analysis of the existing research and literature addressing EBP and best practices. The method divided a general inquiry of research material, (in this case, best practices for school nurses treating asthma), into three categories: an analysis of theory, and analysis of methodology, and an analysis of findings. Triangulation of these three factors allowed a procedural approach to analyzing the collected data on best practices for school nurses with regard to student asthma. Results of the study offered three recommendations for best practice including proactive communication with other stakeholders, promotion of educational interventions, and teaching and reinforcing the principles of self-care for asthmatic students. The sources containing recommendations for school nurses managing student asthma did not directly address the definition of “best practice.” The definitions and implementation of “best practice” are not consistent in the literature. Also, it may have been unnecessary to discuss the meaning or definition of “best practice” when making recommendations.

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CHAPTER ONE: THE PROBLEM

School nurses are charged with the responsibility to address the individual health problems and concerns of students by using the best health practices available to them. Best practice may require that expert judgment is used when there is a lack of adequate evidence (Adams & McCarthy, 2007). Best practice should be founded upon reliable findings across multiple studies (Adams & McCarthy, 2005). Despite the seemingly universal acceptance of best practice as a desirable standard for quality health care, the exact nature of what constitutes best practice does not share universal definition of application.

Furthermore, existing research suggested that most best practices in nursing are not supported by evidence-based research (Kongstvedt, 2001). The problem to be addressed in this study was that nurses are expected to be competent in the best practices available to them, yet there is a lack of consensus on what those best practices are, and how they should be applied by a nurse in the school setting. Multiple organizations and individuals publish studies suggesting best practices, and school nurses are responsible for discerning the best information, based on evidence, to integrate into their daily practice, including the determination of a course of action for addressing the health needs of students.

In the practice of a school setting, the nursing care required to address a student ailment, such as asthma, requires evaluation of the student's health and educational needs; conversation with the student, parents, administration, medical professionals, and other stakeholders; and the completion of forms that formalize the school's position and

responsibility with regard to the needs of each student. These forms include the individualized healthcare plan (IHP), the individualized education plan (IEP), and insurance forms, including those associated with the 504 Plan. All of the factors noted above affect one another in complex and unique ways for each student.

Asthma is a common and serious problem affecting a significant portion of U.S. students, and it is responsible for more absenteeism from school than any other single medical factor (Koenning et al., 1995). This study intends to address the problem of the lack of consensus in existing research and practice to provide school nurses with standardized, up-to-date, evidence-based, best practices for treating students with asthma. This study also intended to address the problem of expectations of school nurses to integrate those best practices for treatment of asthmatic students into the various factors associated with student treatment by school nurses, including the IHP, the IEP, and the 504 Plan.

Problem Background

School nursing has been regarded as a specialty practice with a unique body of knowledge. The school nurse connects the student to resources inside and outside of the school. They coordinate with staff, families, healthcare providers, and community agencies (Herrmann, 2005a). The practice focuses on caring for students in school with regard to the wider scope of parents, cultures, languages, values, and community expectations and norms. The skill of a health professional is developed with a combined understanding of records and data. In addition, “Evidence-based practice is said to integrate the best evidence from research with clinical expertise, patient preferences, and existing resources into clinical decision making about the health care of individuals

(DiCenso, Cullum, & Ciliska, 1998; Sackett, Rosenberg, MuirGray, Haynes, & Richardson, 1996)” (Romyn et al., 2003, p. 184).

The student body from kindergarten to high school is composed of children with a variety of health issues. Those needs range from students who want to maintain their wellness and excellent health to those who are medically fragile and come to school with chronic health problems. “School nurses often have high to unreasonable student ratios, and in some cases they may be in a particular school only one day a week. School nurses can feel overwhelmed by the volume of students and the health needs of students” (Herrmann, 2005a, p. 2). However, they care about the individual students and strive to provide the best for their needs.

According to Vessey and McGowan (2005), school nurses may practice based on “tradition, intuition, or authority”:

It often seems easier to “go along “a prescribed regimen than to become knowledgeable about students’ health needs, question dubious care, or actively advocate for students and their families. But, in today’s healthcare arena, nurses are being held to a higher standard of care. By adopting evidence based practice (EBP), school nurses can ensure that students receive the best possible care available to them (p. 15).

Schools nurses are expected to integrate evidence-based practice (EBP) and the latest information with their experience and particular care environments to facilitate best practices (National Association School Nurses (NASN), 2005). However, the specific requirements and methods for school nurses to attain such information and integrate it not

only into practice but also into IHPs, IEPs, and additional factors, (such as familial consultation), are not clearly agreed upon.

In particular, there is a lack of research addressing the problem of the best practices to treat student asthma and the best methods for integrating evidence-based research into the practice of treating student asthma, IHPs, IEPs, and other factors.

Nine percent of students in the United States have asthma, and it is the leading medical cause of absenteeism (Koenning et al., 1995). School nurses have unprecedented access to up-to-date information from a wide variety of electronic resources, and with the great deal of research on pediatric asthma, they have a difficult task in discerning the most pertinent and reliable information from those resources (Lewis & Belmonte-Mann, 2002).

Purpose of the Study

The purpose of this study was to evaluate current research on EBP and best practices for school nurses addressing student asthma, as well as how school nurses integrate those practices with the IHP, the IEP, and other factors in daily practice. The professional school nurse keeps up with emerging research findings that influence school health. A school nurse is concerned about the type of care for their students. This is the hallmark of their performance to provide the best practice. School nurses strive to provide the best for each child and plan individually for their best care principally through an IHP. The IHP is one intervention that school nurses use for students with chronic health conditions (Engelke, Guttu, Warren, & Swanson, 2008).

The connection between best practice and the IHP is one of accountability because a primary role of the school nurse is to support student learning. The practice of

professional nursing is based on skills and knowledge of what a nurse should be able to do. During their practice, a nurse shows what they know and are able to do through a variety of actions and procedures. The care they give is documented, developed, and implemented through IHPs. Using a qualitative, meta-analytic framework, this study intends to explore the available EBP resources for school nurses seeking to implement best practices when addressing student asthma. Through a review of these resources and the guidelines for practice available to school nurses, this study served to investigate the consistency of recommendations for best practice in treating student asthmatics. The study intended to form meta-conjectures about the nature and role of EBP resources for school nurses treating student asthma. Last, because asthma is such a prevalent problem for school aged children, the study aimed to form recommendations to support school nurses seeking to integrate the best EBP into their daily activities.

Research Questions

This study is guided by three research questions, which begin with the broadest and conclude with the narrowest.

1. What is an acceptable and consistent definition of best practices, based on an evaluation of the breadth of definition forwarded in recent and relevant literature?
2. What does existing literature present as the best practices with which school nurses can address student asthma?
 - a. Is the existing literature consistent in its findings and presentation of best practices for student asthma?
3. What are the administrative “best practices” through which school nurses should coordinate with parents, school faculty, and health care providers with regard to

treating student asthma? In other words, what does a review of the literature suggest about the best way to connect best practices and EBP with the IHP, the IEP, and other factors, such as family values and school setting?

Definitions

504 Plan – A plan based around the financial considerations involved with the school district paying for FAPE, in the context of Section 504 of the Rehabilitation Act of 1973. According to Sedgwick (2005), “This statute prohibits discrimination against individuals with disabilities, including students, by public school districts receiving federal financial assistance” (p. 69).

Asthma - “An obstructive airway disease characterized by breathlessness and wheezing...[and] one of the most prevalent chronic illnesses among children in the United States” (Wyatt & Hauenstein, 2008, p. 145). “Asthma is a chronic episodic disease that can disrupt children’s lives, limit their activities, and hamper their success in school” (Anderson et al., 2005, p. 236).

Best Practices – “Best practice is a generic or general phase for a process of infusing nursing practice with research-based knowledge” (John A. Hartford Center of Geriatric Nursing Excellence, n.d., ¶ 5).

Evidence-Based Practices - *Evidence based practice* refers to the clear and planned use of the current best evidence in making decisions about the care of individuals (Sackett et al., 2000).

Individualized Education Plan – Similar to an IHP, *individualized education plans* (IEPs) provide a documented framework for educators to plan and implement the best course of action to address the particular educational needs of individual students. They

often include information on current levels of academic performance, short-term instructional objectives and annual goals, documentation of specific special education services, an evaluation plan to determine if needs are being met, and a start date as well as the expected duration of services (Heller & Tumlin, 2004). Zimmerman (2006) indicated that it is an adaptation of the nursing care plan commonly used in health institutions (p. 182).

Individualized Healthcare Plan - An *individualized healthcare plan* (IHP) is a plan of action for the student with special health care needs, actual and potential. “The application and formalization of the nursing process in the school setting. Similar to a nursing care plan in a hospital, this plan should contain information about an individual student's needs, nursing interventions designed to meet those needs, and, ideally, a description of how this care supports the educational process of the student and school” (Adams & McCarthy, 2005, p. 261).

Importance of the Study

This study was important because of the severe problem of missed educational opportunities for asthmatic students. From various legislative requirements, schools are required to provide FAPE to every student. Because asthma is the leading cause of student absenteeism in the country (Wyatt & Hauenstein, 2008), and because nurses are expected to use EBP and guidelines to inform their best practice in their daily activities, this study was important for evaluating the relationship between EBP guidelines and best practice for addressing student asthma.

Buerhaus (2008) would like to see more nursing led research teams develop practical measures of the quality of care associated with nursing. Nurses need a stronger

conceptual, analytical, and empirical research effort to support more meaningful progress (Smith, 2007). The researcher intended for the study to contribute to further research on the role of EBP and best practices used by school nurses to treat students with asthma. In addition, the study also served as a tool for the dissemination of information on best practices in school nursing, particularly in the treatments of asthmatic students, as well as a summative guide to incorporating best practices into students' IHPs and IEPS.

Evidence-based practice is important to school nurses for several reasons. Students deserve the best care that school nurses can provide. Vessey (2006) further related that school nurses need to demonstrate that what they do, and how they do it, helps keep students healthy and ready to learn. Many with a vested interest in the school department, including the school board, parents, taxpayers, and local legislators, are requiring better accountability from school staff (Vessey, 2006). The phrase *best practice in nursing* has become more common over the past several years. At the same time, a clear and consistently used definition of what best practice really constitutes remains unavailable to many practicing nurses.

In many cases, best practice refers to nursing practices that are based on the best evidence available from nursing research, but in the present, the proliferation of different varieties of research considered to be based in EBP makes it difficult for school nurses to know which resources to choose and how to choose them to inform their best practices. This study was significant because it sought to clarify this problem through a qualitative, meta-analytic investigation of existing literature on EBP and best practices, as well as how that literature integrated and informed the day-to-day factors involved with treating

asthmatic students, such as the creation and implementation of the IHP, the IEP, and the 504 plan, among others.

CHAPTER TWO: LITERATURE REVIEW

This section presents a review of the literature with regard to seven areas pertinent to this study. The topics covered are (a) school nursing, discussing the role and expectations of school nurses, (b) evidence-based practice, discussing the role of EBP in school nursing decisions and implementation, (c) best practice, defining and describing the optimal choices for action for school nurses, (d) individualized healthcare plan, providing an overview of the role and format of an IHP and its connection to EBP and best practice, (e) individualized education plan, discussing the role of school nurses in the IEP, (f) other factors in school nursing, presenting an overview of some the other significant factors that affect health-related and learning outcomes and are addressed by the school nurse, and (g) student asthma, a general discussion of the detriment of asthma to student education.

School Nursing

In the United States, the origins of school nursing can be traced back to New York City, 1902 (Wald, 1971). Lillian Wald observed the prevalence of communicable diseases in New York City schools, and with her colleagues, she reported to the New York School Education Administration (NYSEA) on the need for nurses to be placed in schools. Lina Rogers was chosen in a test project to explore the utility of having a nurse in schools, serving four schools for one-month. The project proved extremely successful in disseminating information and treatments and bringing children back into school. Over the following two months after the project, 12 additional nurses were hired by the NYSEA to serve in New York City schools (Wald). Other cities and states observed the

benefits of the New York initiative and began their own school nursing programs (Maughan, 2003). These exciting beginnings laid the groundwork for the system of school nurses in existence throughout the country today. A survey of registered nurses by the Department of Health and Human Services found that there were 57,954 school nurses employed in the United States as of 2002. These school nurses care for more than 52 million students throughout the country (NASN 2003).

Maughan (2003) presented the responsibility of schools in a succinct way: “The goal of the school system is to educate students and help them develop the skills needed in life” (p. 164). Nurses play a critical role in this goal through their responsibility for the health of the students in school. A student who is not as healthy as they can be cannot participate in the educational process as effectively as healthy students can. Absenteeism from school and other time spent out of class (such as office visits) influences students’ ability to learn (Maughan 2003). Existing research has shown that nurses can influence rates of absenteeism (Allen, 2002; Fryer & Igoe, 1995; Kimmel, 1996). Research by Allen (2002) suggested that the presence of a full-time school nurse caused fewer students to be absent from medical dismissals in elementary schools.

Many studies have investigated the relation between school nurses and school performance. Maughan (2003) performed a review of 15 quantitative and qualitative studies that focused on the connection between school nurses and educational outcomes between 1965 and 2003. Maughan (2003) found that school nurses have an influence on school performance, and that they “positively affected the management of chronic disease by identifying and addressing needs” (p. 168). School nurses were also found to have an influence on student performance through health instruction, which is an additional role

of many school nurses beyond the treatment of individual students' needs. However, Maughan (2003) posited that a great limitation to research seeking to investigate the relation between school nurses and student performance is the absence of a direct correlation between the school nurse and the measured outcomes concerning the student. Of the studies reviewed by Maughan (2003), it was difficult to conclude that school nurses were the lone active agents in school change, specifically because the studies did not account for many other influential factors, such as private healthcare.

Not all positive efforts by school nurses manifest themselves in the forms of lower absenteeism or less time spent out of class. For example, a study by Persaud et al. (1996) showed that nursing intervention education for students with asthma did not significantly affect the amount of time spent out of class for asthmatic students. However, the study's qualitative component noted that students who received individualized attention exhibited less anxiety during the attacks, and the nurse's knowledge of the students' asthmatic condition improved and expedited the students' treatment. Therefore, the positive influence of school nurses on student education may include the improvement of student health as a goal that is independent from decreasing absenteeism.

If school nurses are to successfully produce the positive outcomes noted by Allen (2002), Fryer and Igoe (1995), Kimmel (1996), Maughan (2003), and Persaud et al. (1996), they must be competently trained and have access to resources informing them of the most up-to-date best practices in their field. The largest organization dedicated to the research and publication of scholarly work and guidelines for school nurses, the National Association of School Nurses (NASN), periodically publishes standards of practice to guide nurses in their profession. The work is called *School Nursing: Scope and Standards*

of Practice, and the preface noted that the guidelines contained within “serve as a definitive guide for role implementation, interpretation, and evaluation” for school nurses (NASN, p. vii).

The NASN outlined the criteria of education for school nurses in six items, and stated that the school nurse:

1. Participates in ongoing educational activities related to appropriate knowledge bases and professional issues.
2. Demonstrates a commitment to lifelong learning through self-reflection and inquiry to identify learning needs.
3. Seeks experiences that reflect current practice in order to maintain skills and competence in clinical practice or role performance.
4. Acquires knowledge and skills appropriate to the specialty area, practice setting, role, or situation.
5. Maintains professional records that provide evidence of competency and lifelong learning.
6. Seeks experiences and formal and independent learning activities to maintain and develop clinical and professional skills and knowledge. (p. 27)

According to these criteria, there is a heavy emphasis on school nurses’ personal, proactive role in continuing self-education. Several authors have addressed the personal responsibilities of school nurses to obtain not only the latest information concerning their practice, but also to successfully integrate that information with their personal experience and individual environment (i.e., the particular health needs of the students they serve).

Lewis and Belmonte-Mann (2002) described the role of technology in school nurses' decision-making process, and discussed the procedural aspects of school nurse access to information for best practices in treating students. They outlined the decision-making process of school nurses under a framework of "decision support."

Lewis and Belmonte-Mann (2002) defined *decision support* as "resources used by the school nurse to assist with decision-making in nursing practice" (p. 170). They go on to note that those resources can be either paper-based or electronic, although they emphasize the proliferation of electronic information in the twenty-first century. Sackett, Strauss, Richardson, Rosenburg, and Haynes (2000) noted that paper-based resources quickly become out of date and can thus be inaccurate and uninformed of the latest research when describing best practices (cited in Lewis and Belmonte-Mann). Furthermore, Lewis and Belmonte-Mann stated, "The inaccessibility of paper-based practice guidelines can negatively affect the decision-making process" (p. 170). Decision support resources can take the form of recommendations for best practices, although many practices are not based in clinical evidence (Kongstvedt, 2001).

Lewis and Belmonte-Mann (2002) believed that decision making in general involves inductive and deductive reasoning, including "deliberation, judgment, and discrimination," and that for school nurses in particular, "the phases of decision making correlate to the assessment, analysis, and implementation phases of the nursing process" (p. 171). In addition, they stated that school nurses have a prerogative to utilize evidence-based research: "With the advent of evidence-based health care and best practice research, nursing decision making must incorporate the use of the 'best evidence' available. Nurses must produce and describe the evidence on which each client decision

is based” (p. 171). School nurses must integrate their personal knowledge and clinical experiences with evidence-based practice through decision-making support tools.

Ireland (2008) believed that school nurses practice in an increasingly complex environment, which requires nurses and nursing students to have critical thinking abilities “required for the development of searchable, answerable questions, the first step in the evidence-based nursing process” (p. 90). Ireland (2008) identified reflection as a critical element in the decision-making process of school nurses, who must be able to integrate their past practice experiences with their latest information and training. Therefore, school nurses bear the responsibility of using the available decision-support tools, in the form of recent training and access to the latest information, and integrating the best available resources into their previous practice experience. However, how are nurses to know if they are informed of the best practices, or if their decision-support resources are based in evidence?

Vought-O’Sullivan, Meehan, Havice, and Pruitt (2006) studied continuing education for school nurses in a meta-synthesis of 15 articles. They stated, “Competency-based continuing education is critical to the professional development of school nurses to ensure the application of timely, age-appropriate clinical knowledge and leadership skills in the school setting” (p. 2). They note that there are a variety of continuing education courses for school nurses available at the local, state, and national levels. Through an analysis of the existing literature, Vought-O’Sullivan et al. identified seven methods of continuing education: (a) Seminars, (b) conferences, (c) continuing education coursework, (d) distance learning, (e) e-learning programs, (f) virtual learning, and (g) scenario-based simulation (p. 6). Most of these methods worked on a flexible schedule,

allowing school nurses to enhance their knowledge of best practices in the time that best suited them, although some methods took days (seminars, conferences) or even weeks (continuing education coursework).

However, Vought-O'Sullivan et al. (2006) discovered that significant barriers existed for school nurses to have access to resources of best practices, including lack of financial resources, time limits, family responsibilities, administration hesitancy, and a lack of national school nurse education standards. Describing the influence of financial constraints, they stated, "School nurses are often faced with the barrier of limited financial support or funding to obtain competency-based school nursing continuing education. Locating potential funding sources for continuing education is essential to the attainment of best practices" (p. 5). Because of budget limitations of school districts around the country, school nurses may have a difficult time obtaining the necessary education to be fully informed on best practices and EBP.

Evidence-Based Practice

Nursing and healthcare in general are currently addressed with guidelines based on EBP. According to Adams and McCarthy (2007), "Evidence-based nursing is an approach to healthcare practice that enables nurses to provide the highest quality care based on the best evidence available to meet the needs of their patients" (p. 128). Evidence-based practice represents a significant shift in the way health professionals practice. Emphasis is placed on comprehensive and systemic reviews of relevant findings and other objective evidence rather than on authority, opinion, or tradition (Jennings & Loan, 2001). Embracing EBP helps school nurses demonstrate that their practice is accountable, clinically efficacious, and cost-effective (Denehy, 2003). Since the passing

of the No Child Left Behind Act of 2001, school nurses have worked in a school environment that emphasizes the use of methods based on evidence (Adams & McCarthy, 2005).

According to Vessey and McGowan (2005), “*Evidence-based practice* refers to the conscientious, explicit, and judicious use of the best current evidence in making decisions about the care of individuals” (p. 15). Evidence-based practices have their formal origin in the 1970s, when Archibald Lemon Cochrane, a British physician-epidemiologist, promulgated the collection and use of evidence in treatment decisions. In the United States, the Agency for Healthcare Research and Quality (AHRQ), (originally the Agency for Health Care Policy and Research [AHCPR], founded by the U.S. Congress in 1989), supports the development of guidelines based on evidence-based research as well as the distribution of these guidelines to healthcare providers (Adams & McCarthy, 2005).

Around the same time that the medical field became dominated by EBP, nursing developed research utilization (RU) as a tool to review and evaluate clinical research, and to use those findings to guide best practice (Titler, Mentes, Rakel, Abbott, & Baumler, 1999). Evidence-based medicine and RU have come to be integrated into a singular notion considered as EBP, and school nurses are expected to implement EBP in every aspect of their daily functioning, from assessment to consultation, implementation, and evaluation. DePalma (2000) effectively summarizes EBP:

Evidence-based practice is a total process beginning with knowing what clinical questions to ask, how to find the best practice, and how to critically appraise the evidence for validity and applicability to the particular care situation. The best

evidence then must be applied by a clinician with expertise in considering the patient's unique values and needs. The final aspect of the process is evaluation of the effectiveness of care and the continual improvement of the process. (p. 115)

Evidence-based practice allows the best possible healthcare to be given using the resources available (Colyer & Kamath, 1999). "Everything a nurse does must be grounded in evidence," says Fran Roberts (as cited in Wood, 2008), RN, PhD, vice president of the College of Nursing and Health Sciences at Grand Canyon University in Phoenix; "We must have a proven reason for why we are doing what we are doing" (p. 3). After the knowledge is synthesized, the evidence can then be used in practice. An important part of providing quality care is for the school nurse to ensure that their documents, forms, policies, and procedures that relate to an IHP are current and are based in evidence.

According to Hewitt-Taylor (2003), experimental studies, such as randomized clinical trials, are considered the most valid and appropriate form of research evidence. However, EBP guidelines are not completely consistent across authoritative bodies (Adams & McCarthy, 2005). Moreover, the criteria for acceptable evidence-based research to be included in such guidelines are not standardized either. For example, see Table 1, which presents the different systems of classification of the validity of evidence-based research from the United States and Canada.

Table 1

Hierarchies of Available Evidence Bases on Scientific Merit

U.S. Preventive Services Task Force; Type of Evidence for Individual Studies: Study Design	Registered Nurses Association of Ontario: Strength of Evidence
I: At least one well-conducted RCT.	A: Requires at least one randomized controlled

II-1: Controlled trials without randomization.	trial (RCT) as part of the body of literature.
II-2: Well-designed cohort or case-controlled studies.	B: Well-conducted clinical studies, but no RCT.
II-3: Multiple time-series with or without intervention. Dramatic before or after results.	C: Expert committee reports or opinions and/or clinical experience of respected authorities.
III: Expert opinion, case studies, or reports of expert committees.	
IV: Expert committee reports, expert opinions, consensus statements, expert judgment.	

Note: Adopted from Adams and McCarthy, 2005, p. 260.

As shown by Table 1, different classification systems influence the types of studies that are included in the production of guidelines for EBP. School nurses are responsible for adhering to the most up-to-date guidelines for evidence-based practices and for determining which EBP guidelines they will use in a practice situation.

According to Adams and McCarthy (2005), “Although guidelines were first developed by the AHCPR, professional healthcare organizations in medicine, nursing, and allied health assumed the responsibility for constructing clinical guidelines specific to their practice” (p. 16). In the medical arena, several national organizations publish guidelines based on evidence-based practice in scholarly and clinical studies. The National Guideline Clearinghouse compiles the latest evidence from a variety of international professional health and medical organizations and federal agencies and has some guidelines, such as those on asthma, that are useful for school nursing. Another not-for-profit organization that has updated evidence-based healthcare databases is the Cochrane Library (2008), which supports the systematic review of research in England. These institutions’ systematic reviews are useful for school nurses. Jennings and Loan (2001) state that collectively, this information is systemically used in guiding individualized care decisions.

The Massachusetts School Nurse Research Network (MASRN) was developed to study health concerns common across schools and to validate school nursing practice.

Vessey (2007) indicated that this group seeks to “identify trends in school health, develop questions for future studies, disseminate results of nursing research, and translate them into practice. EBP has yet to become a reality for nurses in all areas of practice” (p. 69).

Nurses are reluctant to ask questions, they have a lack of research preparation, a scarcity of time, and lack easy access to the information (Vought-O’Sullivan et al., 2006, Young, 2003).

MASNRN recognizes that the need and appeal of EBP is obvious. Yet, the acceptance of EBP is not embraced by all in the nursing field. The main disapproval is that an adequate amount of valuable evidence is lacking. This is a legitimate response. The majority of healthcare practices are not evidence-based. For example, it is estimated that no more than 20% of all medical practices are supported by evidence (Kongstvedt, 2001), and considerably less research has been done to identify “best practices” in nursing.

One of the NASN’s (2005) standards is to “enhance the quality and effectiveness of nursing practice” (p. 25). This supports the belief that all school nurses consider it their responsibility to advance evidence-based practice in the way that is most appropriate for their students. School nurses need to seek out and read about topics related to school health. By reading professional journals, they can keep current with the latest treatments and methods for addressing the particular health needs of their students. With the most current research and guidelines, asthma treatment plans and diabetic plans should be reviewed yearly, for example. Immunization requirements would follow changes from

the Communicable Disease Center (CDC) and the student health records monitored in accordance to their recommendation. Receiving emails and reading position statements from the National Association of School Nurses (NASN) and other professional health groups, such as the American Academy of Pediatrics can help school nurses to become knowledgeable about medications for colds and ear infections, and can discredit some of the alternative treatments for conditions, such as fad diets for Attention Deficit Disorder (ADD).

Evidence-based practice requires that studies be examined across a subject area for their clinical use and then combined into a concept with practical application (Long, 2003). Nursing standards based on supporting evidence from EBP serves as a base for the prescribed actions. Use of care plans also provides a framework for providing good quality nursing care and its outcome (Long, 2003). Evidence used in EBP is not limited to findings from randomized clinical trials. Although research findings are a foundation to EBP, quality nursing care cannot be based on scientific findings alone (Stetler et al., 1998). Only when research findings are incorporated with other existing data, clinician expertise, and family values and preferences can students' health needs be fully addressed. The position from which school nurses address student health needs arises from an integration of EBP guidelines, the nurse's particular experiences, and the critical thinking necessary to arrive at the best applications of nursing care, which can be termed *best practice*.

Best Practice

The website of the John A. Hartford Center of Geriatric Nursing Excellence (n.d.) stated that the rapidly expanding knowledge of nursing and related interdisciplinary

research makes the concept of best practice an important one. The Hartford Center posited that the goal of best practices is “to apply the most recent, relevant, and helpful nursing interventions, based in research, in real-life practice.” The Hartford Center pointed out that EBP and best practice are sometimes used interchangeably, yet there are significant differences between the two terms. According to the Hartford Center, “Best practice is a generic or general phase for a process of infusing nursing practice with research-based knowledge” (§ 5). The fundamental distinction between best practice and EBP lies in the systematic research approach that is the foundation of EBP, in which well-designed and reliable research is systematically analyzed for consistency and validity.

Orb, Davis, Wynaden, and Davey (2001) defined best practice as “... the healthcare institutions to offer quality and continuous improvement of the services provided” (p. 11). Adams and McCarthy (2007) evaluated the definition and purpose of evidence-based practice guidelines in school nursing with regard to best practice. They noted, “A lack of sufficient evidence may justify the use of expert opinion; however, when making decisions regarding best practice, consensus statements should be given less weight than practice recommendations based on research” (Adams & McCarthy, p. 129).

The Hirsh Institute for Best Nursing Practices Based on Evidence was established in 1998 by the Frances Payne Bolton School of Nursing (n.d.) in Cleveland, Ohio. The institute’s goal is to “facilitate the integration into practice of the most current available evidence to support nurses in their clinical decision making” (§ 1). The Hirsh Institute advocates for best practices to apply the most relevant and helpful nursing interventions,

based on research, in real-life practice. Although other terms for integrating day-to-day nursing practice with research based interventions have been used in the past (e.g. research utilization, research-based practice), the phrase “best practices in nursing” is the most popular today (John A. Hartford Center of Geriatric Nursing Excellence, n.d.).

From the review of literature, it is clear that school nurses are perpetually seeking to apply best practices in their daily activities; that is, at all times, they attempt to fulfill their role as a school nurse in the treatment of students to the best of their ability. Although organizations publish and disseminate suggestions for best practices based on evidence, school nurses are responsible for integrating EBP into their personal best practices in the context of each unique school and student. The formalization of those best practices results in a student’s IHP.

Individualized Healthcare Plan

Adams and McCarthy (2005) defined the IHP as follows:

The application and formalization of the nursing process in the school setting. Similar to a nursing care plan in a hospital, this plan should contain information about an individual student's needs, nursing interventions designed to meet those needs, and, ideally, a description of how this care supports the educational process of the student and school. (p. 261)

In other words, the IHP is a physical, documented form of the results of the school nurse’s evaluation process to integrate EBP with particular circumstances to arrive at a plan for best practice in addressing the health needs of individual students.

School nurses create IHPs for individual students, which are used to communicate student-specific healthcare information to school staff. The IHP is a tool that identifies

goals and objectives for the student. Vital health care information about a student is condensed into a document easily understandable by school staff members who are responsible for the student. Students with special health care needs whose needs are met through school are provided an opportunity to learn and can experience inclusion with their peers.

The development of an IHP also serves to document that a proper plan and safeguards were put into place. The physical appearance of IHPs varies by school district and state, but the forms documenting the IHP consistently contain similar, if not identical, information. Individualized healthcare plans typically include the basic demographic and contact information for the student, including student name, grade, age, parents' names, physician's name, date of IHP and any other pertinent information. The IHPs also normally include categories of evaluation and implementation of nursing and health-related practices for the student, which are often presented sequentially (i.e., in a horizontal format). Those categories generally include (a) the nursing diagnosis or concern, (b) the educational goal associated with that concern, (c) the plan of action to deal with the health concern, which details the specific steps taken in administering nursing and health-related care, and (d) the individuals at the school who bear the responsibility for those steps, as well as the times they are expected to fulfill those steps.

Individualized healthcare plans are considered best practice or the application of best practice by school nurses. Data from IHPs can also be used to identify the prevalence of students with special health care needs within the school administrative unit. This data can be used for program planning and advocacy. Typically IHPs are used for

management of a student's health care needs; the school nurse should develop (as best practice) an IHP (Kentucky Department of Education, n.d.).

The NASN (2005) provides a list of standard practice guidelines with regard to the formation and implementation of the IHP. The items generally outline the steps involved with an IHP, and while the guidelines mention evidence-based practice, they do not address the specifics of integrating the IHP with sources of evidence-based practice. The lists below represent the steps and considerations involved with the formation and implementation, (respectively), of a student's IHP.

For the formation of the IHP, the school nurse:

1. Develops an individual healthcare plan considering the client characteristics or the situation (e.g., age and culturally appropriate, environmentally sensitive), with appropriate strategies for health promotion and disease prevention.
2. Develops the plan in conjunction with the client, family, school community, and others, as appropriate.
3. Creates individual healthcare plans as a component of the program for clients with special healthcare needs.
4. Provides for the continuity within the plan.
5. Incorporates an implementation pathway or timeline within the plan.
6. Establishes the plan priorities with the client, family, school community, and others, as appropriate.
7. Utilizes the plan to provide direction to the other members of the school team.
8. Defines the plan to reflect current statutes, rules and regulations, and standards.
9. Integrates current trends and research affecting care in the planning process.

10. Considers the economic impact of the plan.
11. Uses standardized language of recognized terminology to document the plan in a retrievable form. (p. 14).

For the implementation of the IHP, the school nurse:

1. Implements the plan in a safe and timely manner.
2. Documents implementation and any modifications, including changes or omissions, of the specified plan.
3. Utilizes evidence-based interventions and treatments specific to the diagnosis or problem.
4. Utilizes community resources and systems to implement the plan.
5. Collaborates with nursing colleagues and others to implement the plan.
6. Provides interventions in compliance with these standards or practice and professional performance.
7. Uses standardized language or recognized terminology to document the implementation of the plan in a retrievable form. (p. 15)

As these lists from the NASN (2005) show, the school nurse has a host of responsibilities when creating a student's IHP. In both the formation and implementation of the IHP, school nurses must remain aware and attentive to the various stakeholders involved with each student, including the student, family, and the school community, among others. At the same time, school nurses must integrate, to the best of their ability, the EBP available to them with the particularities of each unique student.

The result of this critical thinking-heavy process is the formalization of the school nurse's attempt at best practices, formally documented and presented in an IHP with

recognized terminology in an understandable form. The lists also point out the fact that the IHP must be versatile to change as new EBP and best practices are suggested and proliferated by organizations publishing nursing guidelines.

The IHP provides a framework for the nursing process. The nursing process forms the foundation of the scope and standards of professional school nursing practice. It removes the guesswork from providing care, relying on a proven knowledge base to make decisions about the delivery of nursing care (Heller & Tumlin, 2004). There is assessment (summarizing key information); nursing diagnosis (synthesizing a problem statement); developing goals, interventions, and outcomes to meet the health needs of students, and evaluation (Zimmerman, 2006).

Individualized healthcare plan documentation promotes sound planning, coordination, continuation, and evaluation of care. In short, IHPs are a tool that school nurses use to facilitate the wellbeing and academic success of all learners. A student with a special health care need that is relevant to the student's educational progress and/or relevant to the health and safety of that student should have an IHP developed. However, not all states require an IHP for each student, and parents may need to request the formation of an IHP for their child if the school and the school nurse do not take the initiative in providing it.

Individualized Education Plan

When a student suffers from chronic health needs, IHPs can serve as the initial conduit for the school to address that student's needs. According to Heller and Tumlin (2004), "Although school nurses play a key role in the delivery of appropriate health care to students, they also need to assist special education teachers in promoting a safe,

healthy environment for students with complex health care needs” (p. 150). Heller and Tumlin believed that specific situations may require the expansion of the material covered in the IHP, (particularly instruction of a healthcare procedure), to the student’s IEP as educational objectives.

In school, educators are responsible for constructing an IEP for each student with a disability. Individualized education plans often include information on current levels of academic performance, short-term instructional objectives and annual goals, documentation of specific special education services, an evaluation plan to determine if needs are being met, and a start date as well as the expected duration of services (Heller & Tumlin, 2004). The educational goals put forth in the IEP may necessitate the inclusion of school nurses in the creation of the IEP, beyond their input on the IHP only.

Pulcini, Couillard, Harrigan, and Mole (2002) stated that a focus on education is one of the top 20 characteristics of exemplary school nurses. According to Heller and Tumlin (2004),

For students with complex health care needs, nurses need to become not only effective collaborators on the IEP team, but also provide leadership in program planning... [because] the nurse is best equipped to discuss the child’s health care impairment and identify appropriate school interventions. (p. 152)

Therefore, we can see the role of EBP in addressing student needs extends beyond the practices associated with the school nurse and into the general educational plan, (i.e., the IEP), that the school creates for the student. However, Koenning et al. (1995) suggested that school nurses are often uncomfortable with developing health objectives

for the creation of an IEP, and only 49% of school nurses have been found to develop health objectives for the IEP most or some of the time.

In addition, Heller and Tumlin (2004) believed, “Special education teachers are often not prepared to respond to problems that can arise from procedures due to a lack of information, knowledge of parents’ wishes, and standard nursing practice” (p. 154). It is the critical responsibility of the nurse to implement best practices not only in terms of the explicit health care of the student but also with regard to dissemination of health-related information that may influence the educational outcomes of the student. Last, just as an IHP can influence the educational objectives stated on an IEP, so can an IEP affect the considerations of the IHP; both interact with each other and the other stakeholders and plans associated with student’s particular needs. Some of those other factors are described below.

Other Factors in School Nursing

Legal mandates

Although the IHP and the IEP are the formative portions of a school plan to address the individual needs of particular students, there is a variety of other factors that influence that plan and are themselves influenced by that plan. Those factors include the 504 plan and other financial and legal considerations; parents, physicians, and other stakeholders; and last, the perceptions and beliefs of the student in question. Vought-O’Sullivan et al. (2006) noted that legal mandates have a significant influence on school nursing, and stated, “The Rehabilitation Act of 1973, the Education for All Handicapped Children Act of 1975, and the Individuals with Disabilities Act (IDEA) of 1990 have had a profound impact on the practice of school nursing” (p. 4).

The No Child Left Behind Act

As stated before, the No Child Left Behind Act of 2001 also changed the dynamic of school nursing practice by placing additional emphasis on accountability (Adams & McCarthy, 2005). Amendments to the IDEA Act in 1997 legally mandate schools to provide health care services for disabled student in order to promote academic success (Vought-O'Sullivan et al., 2006). School nurses must constantly take all of these legal considerations into account when attempting the plan and implement best practices when treating student health-related and educational needs.

The Rehabilitation Act

Section 504 of the Rehabilitation Act of 1973 is normally invoked in the realm of employment but also applies to students with health needs. According to Sedgwick (2005), "This statute prohibits discrimination against individuals with disabilities, including students, by public school districts receiving federal financial assistance" (p. 69). All students with disabilities are guaranteed a free appropriate public education (FAPE), regardless of the severity of their disability. Under Section 504 regulations, schools are required to use school district funds, and not additional federal assistance, to address and compensate for the additional health needs of students with disabilities (Sedgwick, 2005).

Section 504 and its accompanying documents form an additional factor to be addressed by school nurses when attempting to implement best practices. The forms associated with a 504 Plan play a critical role in having the school district pay for FAPE, and it is the nurses' responsibility to consult with the relevant stakeholders to address Section 504. Sedgwick stated that there are five distinct steps that must be taken in the

504 FAPE process. These steps include (a) referral, (b) evaluation, (c) eligibility determination, (d) accommodation plan development, and (e) periodic reevaluation.

Qualification for a 504 Plan can be a difficult and confusing process, and it is part of the best practice of school nurses to facilitate the formation of 504 Plans in situations where they are deemed necessary (Sedgwick, 2005).

Case law

A significant number of children have chronic health conditions that interfere with normal activities, including school attendance and active participation in the learning process. Management of students' chronic conditions is complex and requires an intervention from the school medical representative, the school nurse.

Bullock, Libbus, Lewis, and Gayer (2002) write:

One third of the United States population under age 19 has a chronic health disorder or a special health care need that lasts more than 3 months (Liptak & Weitzman, 1995). Historically, many children with complex medical problems or disabilities were excluded from United States public schools (Mawdsley, 1993). With the passage of the Education for All Handicapped Children Act of 1975 (PL 94-142), the Rehabilitation Act of 1973 (Section 504 of PL 93-112), and the Individuals With Disabilities Education Act of 1990 (PL 101-476), children with special health care needs are now attending public schools (Vessey, Jackson, Rabin, & McFadden, 1996). For example, school systems are educating children who may have limited mobility, may be technology dependent, or may have a chronic illness such as asthma or diabetes

(Parette & Parette, 1992). The importance of nurses in the school setting cannot be underestimated. (p. 360)

School nurses play an important role in the school environment. They manage the chronic health conditions of children in the schools. Appropriate education of the student with a chronic health condition or mental impairment takes planning. Planning allows the educational team to better understand the student's health problem.

Furthermore, Bullock et al. (2002) indicate:

The primary goal of health care services in the schools is to promote student wellness, thus enhancing the educational mission of schools (Passarelli, 1994). Healthy children have greater learning potential than children who are not healthy (Novello, Degraw, & Kleinman, 1992). Research suggests that chronic conditions are associated with a greater risk of failure and the necessity to repeat one or more grades. Children with special health care needs often miss school. Multiple absences may affect student grades and ultimately cause these children to fall behind (Liptak, & Weitzman, 1995).

School nurses are integral to providing services that children may require during the school day and to ensuring the good health that underlies the potential for educational success (Parette & Parette, 1992).

The existence of a physical or mental impairment does not mean a student qualifies for section 504 accommodation. It is up to the 504 team to make that determination. Moses, Gilchrest and Schwab (2005) summarize case law which challenges school departments to meet the educational needs of students with chronic health conditions. Their article discusses a case of food allergy, which is often addressed

by 504 teams. In *Land v. Baptist Medical Center* (1999), a parent filed suit against a day care center as it did not accommodate her daughter's peanut allergy. The child had experienced two severe reactions while at the day care with respiratory distress. The parent proposed that the peanut allergy was a disability that significantly impaired her ability to breathe, a major life activity. However, the court decided that the allergy did not limit her ability to eat or breathe. She did not have a severe reaction when she ate other foods. The child had limitations only during the two severe allergic reactions. Therefore, she did not have a disability under 504.

Moses et al. (2005) cite two more decisions which show the process of determining 504 eligibility. In *Student v. Trumbull Board of Education* (March 26, 2004) the decision was made that a kindergarten student with a tree nut and peanut allergy was not eligible for 504. The child's parents commenced a hearing against the school district as the 504 team determined there was no substantial limitation of a major life activity; the child had access to education as other students. The school nurse had set up precautions such as, asking other parents not to send in peanut or peanut products to the classroom and training staff to use the EpiPen. Also, the child had no allergic reaction in school or had not been to the school nurse for allergy or respiratory issues. The parents failed to prove that the major life activity of breathing was substantially limited.

Parents of a student who had attention deficit disorder (ADD), anxiety, and depression asked for her to have more time on tests in an advanced placement class. Unless she had this accommodation, she would not be able to access the advanced placement curriculum due to her disability. Her medications caused her to feel sleepy during part of the day. Although her diagnoses were within 504, and sleeping and

learning were major life activities, she did not have a disability as defined by section 504. Her academic performance and grade point average was consistent with other students in the high school. Teachers had not observed her sleeping in class. There was no evidence to prove that she was limited as a student.

The National Capital Asthma Coalition (2008) has produced a comprehensive guide for managing asthma in schools. It presents legal requirements that affect how schools deal with students and staff who have asthma:

Under the Individuals with Disabilities Education Act (IDEA) of 1997, schools are required to promote the health, development, and achievement of students with asthma. Asthma is classed as a disability under the “Health Impaired” category of IDEA, if it adversely affects a child’s educational performance or interferes with learning. Schools are also required to remove “disability barriers” under Section 504 of the Rehabilitation Act (“504”). This law prohibits discrimination against those with disabilities in education or employment. While having asthma is not considered a disability in itself, school conditions (such as poor indoor air quality (IAQ) may be considered “disability barriers”.

Maurice Watson, an attorney with Blackwell Sanders Peper Martin of Kansas City, MO, and a specialist in education law, notes that in disability cases the courts increasingly look at the severity of the impairment. Thus, if the asthma can be reasonably managed by medication, he continues, that individual might no longer have protection under IDEA and other federal statutes. “The court might say there is no ‘need’ for further accommodation. On the other hand parents might

respond that if there was higher compliance with IAQ, the child could use fewer medications.”

The guide by the National Capital Asthma Coalition (2008) provides two cases of liability involving students and schools. The May 29, 1996 issue of *Education Week* relates the case of a New Orleans school board, principal, and guidance counselor negligent in the death of a student. She died because she had an asthma attack and there was a 34 minute delay in calling 911 as the counselor tried first to call the mother. A court decision found there the school officials had a duty to provide emergency care and they did not. The school was also found to be negligent in providing appropriate training for its staff.

A California judge awarded damages in 2002 to the parent of an 11 year old student who died from an asthma attack at school. The school district had a written policy that all medications must be stored in school. It was not written that he could carry his own inhaler. The school district responded that the student was not prohibited from carrying his inhaler if indicated by a physician. The court decided that the district was negligent as the exception was not written (*Health and Health Care*, 2002).

In addition, the intent of the NCLB mandate requires that barriers affecting each student’s readiness to learn are eliminated or modified. Those obstacles which are related to health can be eliminated or modified by school nurses. The federal NCLB has an emphasis on student achievement, regardless of their disability, racial, ethnic, or socioeconomic status. Schools can best meet the mandated response to the student with a health condition or disability by responding with a team approach. This team can include the student’s family and physician, as well as the principal, school nurse, school

counselor, and classroom teacher. The IHP is the tool which school nurses use to format specific steps, resources, and personnel to address the needs of the student. The school nurse is an important member of the school, especially in analyzing medical information and assisting the rest of the staff to realize the medical issues which affect daily living.

Family considerations

Another factor in school nurses' attempts to implement best practice is family. Parents' awareness of their children's health care needs with regard to their performance in school and their participation in the IHP and IEP process serves an important role in the success of educational and health-related outcomes for their children. Existing studies have suggested that parents' perceptions of their child's illness influence school attendance and deserve proper attention when working with students to address their illness, particularly with regard to asthma (Maughan, 2003; Spurrier et al., 2000).

Concepcion, Murphy, and Canham (2007) forwarded an interpretation of familial involvement in school nursing practice referred to as *family-centered service*. According to Concepcion et al., "Family-centered service is a service delivery model that recognizes the central role of families, builds on their strengths, and seeks to fully involve them in all aspects of their child's health, learning, and development" (p. 315). Their study found that school nurses value family-centered service, and that they regularly involve the parents in the creation of the IHP. In fact, qualitative findings reported that nurses often overcome significant challenges about and beyond the requirements of their position to involve families in their children's health-needs.

Academic success

Thus, there are several factors for schools nurses to consider in conjunction with the IHP and the IEP to address student health needs. Legislation imposes significant requirements and a great deal of accountability on school nurses. School nurses must also work within the particular needs and desires of the family of the student to maximize the academic success of the student while fully addressing their particular health needs.

Student Asthma

As this study intended to investigate school nurses' integration of EBP with best practices and the creation and implementation of IHPs and IEPS in the particular context of asthmatic students, a brief review of the literature on asthma as it relates to this subject matter is necessary. However, because this study uses a meta-analytic methodological approach, and because best practices with regard to asthma is the subject of the meta-analytic review, this section will be kept to a short summary on the topic.

“Asthma is a common health concern for children in school” (Wyatt & Hauenstein, 2008, p. 145). Wyatt and Hauenstein defined asthma as “an obstructive airway disease characterized by breathlessness and wheezing” and they noted that it is “one of the most prevalent chronic illnesses among children in the United States” (p. 145). Anderson et al. (2005) added, “Asthma is a chronic episodic disease that can disrupt children’s lives, limit their activities, and hamper their success in school” (p. 236).

In the United States, 9% of children between 0-17 years of age are currently diagnosed with asthma, and 13% have been diagnosed in their lifetime (Wyatt & Hauenstein, 2008). Wyatt and Hauenstein also noted, “Asthma is the leading cause of

missed school days, despite advances in asthma treatment...and the third leading cause of hospitalizations in children” (p. 145). Therefore, through absenteeism, asthma has a significant effect on the learning opportunities of a sizeable portion of school-aged children in the United States, and is a serious problem requiring diligent attention. Anderson et al. suggested that the problem of student asthma can be exacerbated by the lack of school nurses available to treat the disease, particularly in low-income school districts.

According to Sanzo (2008), the implications of chronic diseases, such as asthma, “affect children and their families on a physical, psychological, social, educational, and financial level—factors that cannot be seen with the naked eye” (p, 191). The consequences of asthma imply that choosing the best practice to address student asthma can be a difficult choice for school nurses. A Minnesota school nurse website summarizes and promotes best practices in schools for care of students with asthma according to the National Heart, Lung, and Blood Institute (NHLBI; Department of Health and Human Services) guidelines. These clarify the case management role of the school nurse and coordinator of the school team approach.

The Minnesota Department of Health (n.d.) defined the best practice protocol for asthma students by the school nurse:

1. Communication among parents, health care providers and school nurses as the key school contact. For example, identify strategies for school nurses to encourage parents and health care providers to submit asthma action plans. This will initiate communication at the beginning of the school year and sustain it

throughout the year to promote basic health and plan for effective care of exacerbations of the disease and any medical emergencies.

2. The asthma action plan should be linked to or incorporated into, as needed, the IEP (Individualized Education Plan), 504 Plan (disabilities accommodations), IHP (Individualized Health Care Plan) including assessment/monitoring of self administration of medications.

The implementation of an IHP along with evaluating its progress requires the school nurse to assure the quality of care by remaining current with best practices. The large volume of recent and current research on asthma poses difficulties to school nurses, who seek to integrate the most recent and valid EBP guidelines into their best practices and unique environments. With so much literature, it is difficult for school nurses to discern what is most relevant to them and the students under their care. This is one of the significant problems motivating this study, which ultimately seeks to provide a systematic review of the variety of EBP guidelines and suggestions for best practice.

CHAPTER THREE: METHODOLOGY

Research Design

The objective of this section is to explicate the framework for a qualitative meta-analysis of the existing research and literature addressing EBP and best practices for school nurses to treat asthma in school-aged children. The approach chosen is known as ecological triangulation. “Triangulation, a concept introduced by Webb, Campbell, Schwartz, & Sechrest (1966) and then applied to qualitative inquiry by Denzin (1978) captures the notion of importance of looking at phenomenon from a variety of vantage points” (Banning, 2006, ¶ 4). This is an unusual methodological approach, and the best approach to evaluate large bodies of information qualitatively is still debated by qualitative meta-analysis researchers in the field. Several different methodologies were considered for this study, including content analysis, grounded theory, and metaphoric translation (Creswell, 2007). However, each of these approaches, upon further research, proved to be too specific to sufficiently meet the methodological needs of this study required to answer the central research questions. Therefore, the methodological approach of ecological triangulation was chosen based on the work of qualitative, integrative theorists, including Banning (2006), Denzin (1978), Patterson, Thorne, Canam, and Jillings (2001), and Zhao (1991).

Banning (2006) further explains this qualitative approach:

Within the “empirically evidenced based” community, however, research questions become more focused on synthesizing the cumulative evidence that a particular intervention produces positive outcomes. In other words, what

intervention works for what kinds of outcomes for what kind of persons under what kinds of conditions? This focus necessitates an ecological framework, i.e., “What are the mutually interdependent relationships among behavior, persons and environments?” (¶ 2)

Selection of Subject Material

The sampling of this material for this study was conducted in an organized and thorough fashion with the assistance of extensive online research databases. The sources of data explored for this study included (a) The Liberty University Library’s major article databases such as EBSCOhost, InfoTrac OneFile, and ProQuest. In addition, special attention was paid to the Cumulative Index to Nursing and Allied Health Literature (CINAHL), Education Resource Information Center (ERIC), MEDLINE, PsycINFO, and other research databases that focus on health-related scholarly material. Specifically, through those research databases, searches were narrowed by an evaluation of key terms relevant to the study, including “asthma,” “best practice(s),” “evidence-based practice(s)” “nursing,” “school nurse,” and others found to be particularly useful during the data collection process.

Once the data were collected, each source was initially categorized by the three factors discussed in the introduction: an analysis of theory, and analysis of methodology, and an analysis of findings. The analysis of theory focused on addressing the type of theoretical framework used in the reviewed literature, noting similarities and differences among them. The theories guiding asthma-related school nursing studies were evaluated, as was the distinct methodologies involved, and the particular types of findings reported by each. Only peer-reviewed, valid and recently published studies were considered

during the data evaluation, and studies that took place more than 5 years before the time of analysis were not included. Both qualitative and quantitative studies were included in the reviewed literature, and the analysis addressed the type of methodological framework used in the reviewed studies as well as any possible effects this may have on the findings of the study.

Assumptions and Limitations

Assumptions. It is assumed in this study that the findings of previous researchers have been valid, and that the EBP they utilize are valid and reliable. Furthermore, the study assumed that major authoritative bodies in school nursing would continue to use the same evaluative criteria for the validity of the results and literature they include through the completion of the study. If criteria were to radically change, the study would have to be redesigned to adjust for that change. Last, it is assumed that data sources cited in the Sampling section would remain available and would provide sufficient access to the necessary literature for the purposes of the study.

Limitations. As Reis (2003) noted, “Although meta-analysis of quantitative research is a well-established technique, the synthesis or aggregation of qualitative studies remains rare and controversial. Questions of feasibility, validity, study selection, mechanism, and interpretation – *and even ethics* - are prevalent.” Because this study was non-experimental in nature, and did not involve any human participants, many of the limitations and delimitations normally associated with nursing research are not applicable here. Instead of human participants, the subject matter of this study consisted of scholarly studies and summative guidelines: literature made up of EBP and best practice recommendations for treating students with asthma. As such, the study was limited to a

manageable number of sources, probably between 15 and 30 major sources, for reasons of time and financial constraints. The study was limited most significantly by the possibility of researcher bias. All qualitative studies suffer from this limitation of subjective interpretation, although the limitation was not so great in this case as it would be in a study with human participants, because the data of this study was static and could not be altered by the researcher in its collection. However, the study was limited by the degree of validity from previous findings, particularly qualitative findings, which could not be proved and were highly subject to research bias during interpretation. Because of this, the study only reviewed literature that was based on established methodological approaches that have produced results deemed worthy for publication in peer-reviewed sources. The approaches used in the evaluated research for this study included quantitative and qualitative techniques that yielded the highest quality of research information on the topics of school nursing and pediatric asthma treatment.

Procedures

The primary procedure to be used in this meta-analytic study was ecological triangulation. Ecological triangulation acknowledges that the findings of studies alone cannot sufficiently account for a full perspective on the various forms of input and processes involved in establishing EBP (Banning, 2006). The method divided a general inquiry of research material, (in this case, best practices for school nurses treating asthma), into three categories: an analysis of theory, and analysis of methodology, and an analysis of findings. Focusing on these three factors allowed the thorough evaluation of the existing relevant material on best practices and evidence-based practices.

Triangulation of the three factors allowed a procedural approach to analyzing the collected data on best practices for school nurses with regard to student asthma.

This qualitative meta-synthesis study operated with a theoretical framework similar to the positivist approach, as described by Banning (2006):

The interpretation of triangulation can “lean” in the positivist direction where the focus is on finding confirming evidence from multiple sources to a “lean” in the constructivists direction where the focus is on the complexity of multiple views. Regardless of the “leaning,” triangulation has become an important ingredient in the establishment of trustworthiness (validity) of qualitative inquiry. (¶ 5)

The chosen methodology utilized triangulation of qualitative data because the study ultimately sought to establish a set of best practices informed by EBP. The analysis would attempt to confirm the most valid and consistent evidence for best practices for school nurses addressing student asthma.

Data Processing and Analysis

After initial categorization of the collected data, it was evaluated using a Computer Assisted Qualitative Data Analysis Software (CAQDAS), specifically, NVivo, by QSR International. A CAQDAS program was necessary in this study because of the large volume that the researcher investigated. NVivo allowed the categorization and organization of large bodies of diverse information such as those that made up the basis of this study. The literature evaluated by this study was organized according to the relevant factors needed to answer the research questions, including definitions of best practices in relation to student asthma, the particular best practices currently recommended to school nurses, and the ways that school nurses’ best practices integrate

and interact with the other factors involved in student health and wellbeing, such as the IHP, IEP, and 504 Plan. Data was grouped and clustered into categories of similarity, and then reevaluated after data collection is complete to assure validity.

“The ecological triangulation approach focuses on theory, method, interventions, persons, settings/environments and outcomes and the transactional relationship among these variables” (Banning, 2006, ¶ 8). The heart of the analysis came with the qualitative triangulation of the data, in which relationships were drawn from the established categories of the data and conclusions were drawn based on the significance of those relationships. Patterns of efficacy of school nurses’ best practices for addressing student asthma were evaluated. Through the relationships of the data that was established in chapter four, there was sufficient information to answer the research questions posed in this study.

CHAPTER FOUR: RESULTS

Introduction

This chapter presents the results of the qualitative data analysis on best practices for school nurses addressing student asthma. The purpose of this data analysis was to evaluate existing literature on best practices for school nurses addressing student asthma, including the administrative “best practices” of school nurses to integrate student treatment into the Individualized Healthcare Plan (IHP), Individualized Education Plan (IEP), and other pertinent considerations. The chapter begins with a description of the analytic method involved in the ecological triangulation research design discussed in chapter 3.

The next section of this chapter reviews some basic demographic information on the data collected. The following section presents the results of the data analysis, and it is separated into the three primary categories required by the research design: theory, methods, and findings. A fourth conceptual category was added to accommodate data for research question 1: What is an acceptable and consistent definition of best practices, based on an evaluation of the breadth of definition forwarded in recent and relevant literature? Each conceptual category is presented along with the invariant constituents that make up that category. The chapter concludes with a brief summary of the results.

Data Analysis

This qualitative meta-analysis study utilized the methodological approach of ecological triangulation (Banning, 2006). Ecological triangulation allows the structured analysis of a large body of information, in this case, information on EBP and best

practices for school nurses to address student asthma. In order to carry out the data analysis for such a large body of information, it is of critical importance that the data be organized in a consistent and coherent fashion. Bogdan and Biklen (2007) describe the basic approach to sort data. What they write is applicable to a computer program or manual analysis. Important to this study was to develop a limited number of codes for analysis. Specifically for ecological triangulation, it is necessary to distinguish the sources informing the data analysis to engage in the triangulation of the data. This involves attending to specific categories.

Ary, Jacobs, Razavieh, and Sorensen (2006) indicate that “convergence of a major theme or pattern in the data from these various sources lends credibility to the findings” (p. 505). To accomplish this organization, and to generate meaningful connections among the data, it was necessary to employ a Computer Assisted Qualitative Data Analysis Software (CAQDAS) program, which is NVivo.

The researcher chose to use NVivo8, by Qualitative Solutions for Research (QSR) International. Data were collected from a variety of sources for use in the analysis. Only articles published in peer-reviewed, scholarly journals were considered for analysis. In addition, all data used in the analysis was from 2003 or later. These conditions were imposed in order to ensure that only valid data were included in the analysis.

Once the data were collected for the study, the literature to be analyzed was uploaded into NVivo8 for analysis. All literature was review in detail, and it was evaluated to confirm that it was all relevant to the study and provided the necessary data to answer the research questions. Next, the analysis of the data began. The relevant information of the primary sources was coded with appropriate labels. Relevant

information included that which fell under the three categories of ecological triangulation (theory, methods, and findings); information on the definition of *best practice*; and information on asthma management with regard to the IHP, the IEP, and other factors concerning administrative “best practices.”

Once the information was coded, it was organized and clustered into four primary conceptual categories. These four conceptual categories included (1) Theory, (2) Methods, (3) Findings, and (4) Definition of Best Practice. Once the data was coded and grouped into these categories, it was further dissected into constituent subcategories. The creation of these constituent subcategories allowed for the comparison of specific information among the literature being analyzed.

Once the data was fully organized and coded, frequency tables were generated for each of the conceptual categories to visually express the data. Data on the theory of the analyzed literature were triangulated with the data on methods and findings to contextualize the results of the analysis.

The data informing the remaining categories were also analyzed in the context of the results of this triangulation. This process allowed the detailed and organized analysis of the existing literature on best practices of school nurses addressing student asthma to answer the research questions of this study.

Demographic Information

The literature analyzed in this study came from a wide variety of sources, from studies of single schools to national studies. It also included quantitative and qualitative approaches. Table 2 presents demographic information of the literature sources used in the data analysis.

Table 2

Demographic Information

Source Number	Title of Study	Authors	Year
1	The school nurse role in asthma management: Can the action plan help?	Borgmeyer, Jamerson, Gyr, Westthus, & Glynn	(2005)
2	Providing asthma care in elementary schools: understanding barriers to determine best practices.	Major et al.	(2006)
3	The efficacy of asthma case management in an urban school district in reducing school absences and hospitalizations for asthma.	Levy, Heffner, Stewart, & Beeman	(2006)
4	A practitioner-based asthma intervention program with African American inner-city school children.	Velsor-Friedrich, Pigott, & Srof	(2005)
5	Childhood asthma in a rural environment: Implications for clinical nurse specialist practice.	Horner	(2008)
6	Feasibility and impact of a school-based intervention for families of urban adolescents with asthma: Results from a randomized pilot trial.	Bruzzese, Unikel, Gallagher, Evans, & Colland	(2008)
7	Talking with teens about asthma management.	Velsor-Friedrich, Vlasses, Moberley, & Coover	(2004)
8	Schools' capacity to help low-income, minority children to manage asthma.	Anderson et al.	(2005)
9	Evaluation of an educational program for adolescents with asthma.	Berg, Tichacek, & Theodorakis	(2004)
10	Healthy Learner Model for student chronic condition management -- part II: the asthma initiative.	Erickson, Splett, Mullett, Jensen, & Belseth	(2006)
11	Assessing the capability of school-age children with asthma to safely self-carry an inhaler.	Flower & Saewyc	(2005)
12	Kickin' Asthma: School-Based Asthma Education in an Urban	Magzamen, Patel, Davis, Edelstein, & Tager	(2008)

	Community.		
13	Barriers to Care of Inner-City Children With Asthma: School Nurse Perspective.	Forbis, Rammel, Huffman, & Taylor	(2006)
14	Asthma in middle schools: What students have to say about their asthma.	Ayala et al.	(2006)
15	Using school staff to establish a preventive network of care to improve elementary school students' control of asthma.	Bruzzese et al.	(2006)
16	Partners in school asthma management: Evaluation of a self-management program for children with asthma.	Bartholomew et al.	(2006)

As shown in Table 2, 16 evidence-based studies constituted the raw data for this study. Most sources ($n = 11$, 61%) were published within the last two years (2006-2008). Many variations of search terms were applied to find studies that directly addressed best practices and EBP for school nurses addressing student asthma. Although all of the included studies are relevant and sufficient for data analysis by ecological triangulation, not all of the studies provided information to answer all three of the research questions. The consequence of this finding will be discussed in greater detail in the Results section.

The majority of studies (12) came from the *Journal of School Nursing* and the *Journal of School Health*. This is not surprising as the research questions address a specialty of importance to school nurses and their environment. If the 16 evidence based studies are considered participants then Gay's (2003) data collection strategy provides a valid view of selection:

Qualitative research generally relies on purposive selection of participants; they are selected because they can provide pertinent information about the intended research topic and setting.

The key to “sampling” in qualitative research is to choose good participants who can provide the insights and articulateness needed to attain the desired richness of qualitative data (p. 195).

Results of Categories

This section presents the results of the data analysis described above and in chapter 3. Each of the four conceptual categories (Theory, Method, Findings, and Definition of Best Practice) is addressed in sequence. The basis of the category is reviewed and the subcategories that constitute the primary conceptual categories are explained in greater detail. Meaningful patterns and insight within the categories are noted. The triangulation of the data is covered in the conclusions section.

Although not every study directly addressed all three research questions, there are a sufficient number of sources to provide the data necessary to address these questions. However, as the following analysis will reveal, there are some significant gaps in the literature on best practices for school nurses treating student asthma, apparently caused by an overabundance of literature focused on a few particular trends and topics.

Analysis of Theory

The conceptual category of Theory refers to both the formal theoretical framework of the study (if any) and the more general construction and orientation of the study. Nine of the sources analyzed in this study did not include information on a formal theoretical framework (i.e., one based on a specific set of established theories built on the

work of seminal authors within the nursing practice). However, all of the studies did present a general construction and orientation, and these frameworks were grouped into the subcategories represented in Table 3.

The study by Bruzzese et al. (2008) was to test the practicality and effect of a program titled Asthma: It's a Family Affair. This program presented a school- based family- focused intervention in public middle schools in New York City. It offered asthma education as well as parent training. Four theories form the foundation of this study. These theories are the social cognition theory, cognitive behavioral theory, and two forms of family systems theory, parenting styles, and Behavioral Family Systems Theory.

Bruzzese et al. (2008) affirm the purpose:

This study is significant because it is among the first to evaluate asthma education for preadolescents and early adolescents and it is the first to combine asthma education with parent training as a means of improving asthma management and health outcomes. An evidence-based intervention for adolescents and their caregivers focusing on asthma management and improving family relations represents a substantial contribution to the care of youth with asthma (p. 108).

Although the use of multiple theories was an effective strategy to reach across the various individuals and families, the framework of these theories is not specific to the practice of nursing or school nursing. The theories were a foundation for the teaching learning connection (an intervention) and as such are a factor in best practice for the school nurse.

Marrs and Lowry (2006) examine this connection between theory, practice, and research:

It is the hypothesis of the authors that the picture is about to be completed, but the pattern of dots has been somewhat divergent and scattered among nurse theorists, researchers, and practitioners, as they have each taken different approaches in completing the holistic picture of nursing knowledge (p. 2).

The study combines an expanded conceptual-theoretical-empirical structure of knowledge development. “Many have expressed concern about the continued existence and advancement of the discipline of nursing, unless the theorists, researchers, and practitioners integrate their thinking” (Cody, 2003; Fawcett, 2000).

Mitchell (2007) proposes that “nurses in the future will embrace nursing theories because the discipline will mature and nurses in practice will progressively seek nursing theory to provide the structure and knowledge essential to meet the needs and expectations of society” (p. 336).

Theories are less abstract than conceptual models; they help organize thinking about nursing, and can be directly tested in research, and practice. Models are helpful in organizing thinking about nursing situations, but due to their level of abstraction, they cannot be directly tested in research or practice (Barry & Gordan, 2006, p. 26).

The Health Learner Model (Erickson et al., 2006) for students with asthma has seven elements and two requisites. The elements are (a) leadership, (b) evidence based practice, (c) capacity building, (d) chronic disease resource nurse, (e) healthy learner, (f) partnership with families, and (g) partnership with healthcare providers. The two

requisites are school nursing and evaluation. Although this study provided information about a beneficial asthma management program for school children and the model was comprehensive, it offered no mention of a theoretical basis to its model.

It was found that there was insufficient information on specific theoretical foundations represented in the literature of the 16 studies. Therefore, only the theoretical constructions of the evaluated literature sources were noted. The analysis of this information led to the development of 12 subcategories for the conceptual category of Theory.

Table 3

Conceptual Category of Theory

Subcategories of sources	n	%
Targeting Population with High Rates of Student Asthma	9	56
Based on intervention	8	50
Not based on intervention	8	50
Context of Self-Care	5	31
Developmental Theory	4	25
The Role of School Nurses & Asthma Action Plans	3	19
The Barriers of School Nurses	3	19
Social/Behavioral Orientation	3	19
Cognitive Learning Theory	2	13
Evaluation of an Assessment Tool	2	13
The Role of Environmental Factors	1	6
Education Theory	1	6

The 12 categories represented in Table 3 were created from an evaluation of the theoretical orientation of the literature reviewed. This information contextualizes an evaluation of the conclusions of the analyzed literature. Multiple theoretical foundations were common; all but one study contributed to two or more constituent subcategories under the primary conceptual category of Theory.

As Table 3 shows, the literature reviewed was divided equally to 8 studies being based on an intervention and 8 studies not based on an intervention in a school. Sources evaluated different implications of school interventions and asthma management. More than half (56%) of the studies were specifically oriented towards populations with high rates of student asthma. This is a significant discovery, as most of the literature sources studied niche populations that are not indicative of the asthma levels and conditions of most schools. Almost one-third (31%) of the studies reviewed were based in a theoretical context of self-management, with a focus on the student's agency to manage their asthma.

Developmental theory, focusing on the developmental stage of students and their ability to cope with asthma, was only slightly less prevalent at 25%. Three studies (19%) were theoretically organized towards an evaluation of the role of school nurses and Asthma Action Plans (AAP). An AAP is a tool created by the parents and primary care providers for students, and it details the severity of the asthma condition, treatment plans and procedures, and emergency information; it is similar to an IHP, but is distinct because it is normally developed independently of the school.

Three studies (19%) were theoretically focused on the barriers experienced by school nurses in the assessment and management of student asthma. Each of these studies

carried a qualitative component. Three other studies (19%) were based in a social/behavioral orientation, focusing on the social implications of student asthma and asthma management. These studies were explicitly clear about the need to take the age, maturity, and behavior of students into account when analyzing results and presenting evidence-based recommendations for best practice.

Two studies (13%) were based on an evaluation of an asthma assessment tool, which was applied to students and other stakeholders to determine levels of asthma knowledge and how they related to the implementation of best practices for school nurses. Cognitive learning theory informed two studies (14%), and education theory informed one study. Last, one study (6%) was theoretically organized around the role of environmental factors and student asthma management.

Theoretical organization was found to be varied and wide, focusing on student asthma management by school nurses with focuses on the age, development, and maturity of the student; the knowledge levels of students, teachers, administration, and parents; and the particular social and behavioral contexts of students. It is significant to note that there were no sources based on clinical practitioner framework. Instead, the literature theoretically positions the school nurse as an entity distinct from nurses in other occupational circumstances.

There is no “best” model/theory for establishing and evaluating a school nursing program or for guiding individual school nursing practice. It is up to school nurses to determine which of the available models/theories are most consistent with their beliefs, values, and practice (Barry & Gordan, 2006, p. 40).

This implies that research involving EBP to determine best practices considers those best practices to be specifically applicable to the school nursing context. The wide variety of theoretical orientations in the analyzed literature represents a diversity of perspectives, which may be necessary to address the complexity and nuances of student asthma management. The even split between studies that were based on a school intervention and research that was not based on an intervention represents a further diversity of orientation in this literature, as best practices were evaluated in both static and changing circumstances, thus providing a more thorough and detailed perspective on the best practice for the management of student asthma.

Analysis of Method

This section presents and describes the primary conceptual category of Method and its subcategories. Methods were found to have a great deal of variance, with researchers choosing many different populations, approaches, and tools in their study of student asthma management. The subcategories that informed the conceptual category of Method are presented in Table 4.

Table 4

Conceptual Category of Method

Subcategories of sources	n	%
Quantitative	8	50
Mixed	5	31
Qualitative	3	19
Sample size 1-25	3	19
Sample size 26-75	4	25
Sample size 75-200	2	13

Subcategories of sources	n	%
Sample size 200-500	2	13
Sample size 500+	4	25
Sample by grade= K-5	5	31
Sample by grade= 6-8	3	19
Sample by grade= 9-12	2	13
Sample by grade= K-12	4	25
Sample = School Nurses	6	38
Sample = Urban Minority	9	56
Intervention with Curriculum	7	44
Intervention Involving Family Education	3	19
Intervention with Individual Attention	2	13
Quasi-experimental pre- and posttest design	6	38
Randomized Control Trial	3	19
Survey-Based	8	50
Focus Groups	6	38
Interviews	1	6

The literature reviewed was primarily based in quantitative techniques; with 13 of the sources (81%) using quantitative analysis and 8 sources (50%) using only quantitative analysis. Eight studies (50%) used some form of qualitative analysis, and only 3 studies (19%) were based solely on qualitative techniques. This suggests a great degree of diversity among the sources, another indication of a variety of perspective informing a rounded recommendation of best practice.

A similar degree of diversity was found among the sample sizes used in the literature sources. Unsurprisingly, qualitative studies tended to use smaller sample sizes

than quantitative studies. Just as many studies used sample sizes of 26-75 participants as studies that used more than 500 participants (4 studies, 25%, respectively). Studies that used 75 to 200 participants were just as common as studies that used 200-500 participants (3 studies, 19%, respectively).

A great degree of variety in the grade-levels of the populations studied in the reviewed literature is once again indicative of a rounded perspective informing best practices for school nurses to address student asthma. The most popular grade-levels studied in the 16 sources analyzed in this study were kindergarten through fifth-grade: elementary school. Five studies (31%) were focused exclusively on the elementary school students, and four studies (25%) were focused on students from kindergarten through high school.

Notably, six of the reviewed sources (38%) used school nurses as part of their sample population, evaluating them both quantitatively and qualitatively in a variety of contexts. This focus on school nurses is appreciable, as they are indeed important stakeholders in the process of evidence-based research to inform best practices. However, it is also important to recognize that the school nurses were not evaluated under a clinical framework, and the studies using them as part --- or all --- of their sample were generally concerned with their qualitative input. (Only 1 of the 6 studies using nurses as the sample involved just quantitative techniques).

Qualitative design is chosen because of the nature of the research problem.

Broussard (2006) writes:

Certain disciplines (e.g., anthropology, nursing), and philosophical orientations (e.g., phenomenology) study phenomena that are better understood with

interpretive methods. For example, a nurse researcher may be interested in quality of life. Because there are many influences on this complex concept, a qualitative approach that allows the participants to tell their stories in their own words may be more appropriate. The qualitative researcher engages in prolonged contact with the participant via interviews and observation in order to gain a true understanding of his or her experience related to quality of life. Using qualitative methods, the researcher can explore areas in which little is known or can gain a new perspective in an area in which much is known (Shreiber & Stern, 2001). Qualitative research designs allow one to understand the intricate details about feelings, thought processes, and emotions that are often difficult to explore using more conventional research (p. 212).

Again, as noted in Table 3, Table 4 shows that most of the studies (56%) used an urban minority population as their sample. The high prevalence of asthma in these communities makes them ideal for study about asthma management, as they can usually provide greater numbers of eligible participants suffering from asthma from a smaller total school pool. However, repeatedly focusing on such communities does not provide results that are able to be generalized to the greater population. Only one study (6%) was focused explicitly on a rural student population. This does not represent a great deal of diversity in the analyzed literature.

Almost half of the studies (44%) used a methodology that specifically focused on the effects of an asthma intervention in the school curriculum, generally in the form of educational seminars that taught students about asthma. Some of these studies focused on interventions that involved family education (19%) or interventions that gave additional

individual attention to students with asthma (13%). It is important to note that contemporary literature (since 2003) has begun to address the need to study the asthma management by school nurses involving interventions not only in the school, but also in the family and community. As a community stakeholder among many in the management of a student's asthma, a school nurse uses best practices that have effects beyond the school grounds, and it is important to investigate these effects.

Only three of the studies (19%) used a randomized control trial in their analyses, which is considered the premier type of methodology in producing valid and reliable results. The remaining sources relied on methodological approaches that are less reliable, including quasi-experimental pre- and posttest designs (38%) and focus groups (38%), usually aided by content analysis. Only one qualitative study (6%) used personal interviews.

Analysis of Findings

The third conceptual category required by ecological triangulation is an analysis of the Findings. In coding the 16 reviewed sources there were an excessive number of specific recommendations for school nurses to manage asthma to be practical for representation. During the clustering and grouping phase of the coding process, the many constituent examples of the findings of the studies were summarized into 16 subcategories of recommendations for best practice for school nurses. Those subcategories are presented in descending frequency in Table 5.

Table 5

Conceptual Category of Findings

Subcategories of sources	n	%
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Subcategories of sources	n	%
Nurses Need to Take a Proactive Role in Communication with other Stakeholders	12	75
Promotes Educational Intervention	10	63
Promotes Teaching and Reinforcement of Principles of Self-Care	10	63
Promotes Continuing Education of Nurse	7	44
Promotes AAP	6	38
Should Educate School Staff and Administration about Asthma	6	38
Promotes Active Role in Assessment	6	38
Promotes Additional Individualized Attention for Students	5	31
Promotes Educational Intervention (including Parents)	4	25
Foster Communication between Parents and Student	3	19
Adjust Best Practices for Age	3	19
Promotes Active Role in Environmental Evaluation	3	19
Promotes IHP	2	13
School Nurses Should Supervise Elementary School Children Using Inhalers	2	13
Promotes Preventative Medications	2	13

It should be noted that the findings of these studies and literature sources did not often discuss their particular recommendations and conclusions as “best practices.” However, for the purpose of this meta-analysis, the evidence-based recommendations of the reviewed literature sources were considered to be recommendations of best practice. The fourth conceptual category, which comprises the definition of “best practices” forwarded in the literature, will address this issue further.

The reviewed sources were in a majority of agreement to three recommendations for best practice for school nurses to manage student asthma. Twelve sources (75%) recommended that school nurses need to take a proactive role in communication with

other stakeholders, most notably school faculty, parents, and primary care providers. Communication was found to be of the most fundamental importance in the implementation of best practices by school nurses in managing student asthma. Communication allowed all stakeholders to be clear about the severity of the disease and the conditions and needs of the student. The subcategory of communication is reflected in other subcategories, as it is a critical tool that facilitates a variety of different best practices.

Ten of the studies (63%) recommended educational interventions to help teach students about asthma, and ten studies (63%) recommended that school nurses should devote time to the teaching and reinforcement of the principles of self-care to the asthmatic students for which they are responsible. All but one of the studies found that educational interventions had a resoundingly positive effect on student asthma management. It is interesting to note that there were more studies that recommended teaching self-care methods to students than there were studies that utilized a self-care theoretical framework, which suggests that researchers from a variety of perspectives are coming to similar conclusions on what the best practices are for schools nurses addressing student asthma.

Beyond these three recommendations for best practice, the remaining 13 recommendations were supported by less than half of the reviewed sources. After the three recommendations discussed above, the next most common subcategory of best practice was the continuing education of the nurse. This recommendation was largely informed by qualitative studies of school nurses, who noted that they required both

educational initiatives from the administration as well as a continued effort on self-education.

Each of the three recommendations was endorsed by six of the studies (38%). The first of those recommendations is the promotion of the AAP by the school nurse. Although the school nurse is often not formally involved in the AAP, both quantitative and qualitative studies endorsed the active efforts of the school nurse to be included in the formation or modification of the AAP as a best practice. The second recommendation posited by 38% of the reviewed sources was for school nurses to educate other teachers, staff, and faculty about asthma management and procedures for treatment. However, only one study included non-academic staff in this recommendation. That study forwarded that it is best practice for a school nurse to contact all school staff, including janitors and other maintenance workers, as they can have an important affect on the environmental conditions experienced by students with asthma.

The third best practice recommended by 38% of the reviewed sources was for the school nurse to play an active role in the assessment of students' asthma conditions. These studies recommended that the school nurse conduct assessment procedures, such as peak flow monitoring (which indicates the level of lung functioning of the student), in conjunction with and in addition to the information they receive from the students' caregivers.

The fourth recommendation for best practice was for school nurses to devote additional individual time to each student with asthma, which was forwarded by five studies (31%). Each of these studies grounded this recommendation in the context of an educational intervention in the school. Four studies (25%) recommended that educational

interventions at the school should include efforts to educate parents about asthma management and their role in their child's asthma management while at school.

Three recommendations for best practice were expressed in three studies (19%) each: fostering communication between parents and students, adjusting best practices for the appropriate age of the student, and promoting an active role in environmental evaluation of the school for asthma management. The studies that recommended adjusting best practices for students of different ages focuses primarily on adolescents, who were found (under a social/behavioral framework) to need more complex asthma management that addressed their unique social position as a student with asthma.

The remaining three recommendations for best practice were forwarded by only 2 of the 16 reviewed sources. These recommendations included the promotion of the integration of the AAP into IHP, the supervision of elementary school students by school nurses when they are using inhalers, and the promotion of preventative medication. None of the reviewed studies mentioned the best practices of the school nurse managing student asthma as relating to the IEP, the 504 Plan, or other financial concerns. When initially collecting data, the researcher was unable to find any studies that addressed the role of the school nurse with regard to the IEP and the management of student asthma. Both the IHP and the IEP are standard components developed by the school to ensure that all students' educational and health needs are met. Sedgwick (2005) writes:

The rationale for the school nurse to be involved in this process lies within the very definition of eligibility for consideration for 504: the student must have a physical or mental impairment that substantially limits a major life activity. The school nurse's assessment skills are an essential part of that evaluation to help

determine the impact of the student's disability on his or her education (substantial limitation) (p. 70).

Asthma is one of the most common chronic illnesses in children. The Asthma IHP (Appendix A) is an important document to safeguard children with asthma in school and promote their ability to learn (New Mexico School Health Manual, n. d.). According to Lowe (2005):

The school nurse plays a critical role in the special education process, especially when the health and/or physical needs of the student, if left unattended, would prevent or restrict the student from full participation in his or her educational program.

An individualized healthcare plan (IHP) is a valuable tool that can assist school nurses to accomplish their role in the special education process. IHPs can be integrated into the individualized education program (IEP), ensuring that the health needs of the student are addressed and saving the school nurse time. (p. 45).

Analysis of the Definition of “Best Practice”

The final conceptual category developed in this meta-analysis addressed the Definition of “Best Practice.” Unfortunately, most evaluated sources (69%) did not contain reference to the words “best practice,” and were thus unable to contribute to this category. The five subcategories that constitute the conceptual category of the Definition of “Best Practice” are presented in Table 6.

Table 6

Conceptual Category of the Definition of “Best Practice”

Subcategories of sources	n	%
No Mention	11	69
Notes Inconsistent Implementation/Definition of Best Practices	2	13
Requires Collaboration with Parents, Administration, and Healthcare Providers (Team Approach)	3	19
A Review of Research and Expert Recommendations	1	6
Pre-testing of procedures and tools by potential users	1	6

Eleven (69%) of the reviewed sources made no mention of the phrase “best practice.” Two additional studies (13%) discussed the definition of “best practice” in the context of stated lack of consistency in the definition and implementation of best practices. It is probable that most of the studies reviewed did not bother to mention that their recommendations for practice are considered “best practice,” as they seem to consider it to be implied.

However, four studies (25%) did contribute to a definition of “best practice.” Three studies (19%) noted that “best practice” requires the school nurse to communicate and collaborate with other stakeholders, including parents, administration, and healthcare providers. Of the three studies each employed this definition, one aptly referred to it as the “team approach.” Another study noted that a definition of “best practice” includes a review of research and expert recommendation, and also commented that it involved the pre-testing of procedures and tools by potential users.

Summary

The four primary conceptual categories yielded a great deal of useful information for this meta-analytical study. Ecological analysis of the 16 reviewed sources revealed a wide variety of theoretical foundations, both formal and informal, indicating many perspectives for evaluating best practices for school nurses to use to manage student asthma. There were an equal number of studies oriented around an asthma intervention in the school, as there were studies focused on a static population. Self-care and developmental theory were also found to be popular theoretical foundations.

Most surprising was the fact that the majority of the reviewed sources (56%) were oriented around populations with above-average rates of student asthma. In addition, it was noted that the studies lacked a focus on clinical theoretical foundations. It was surmised that this was because the literature addressing the best practices of school nurses managing student asthma considers the school nurse to be distinct from nurses operating in other professions and conditions. The distinctions between school nursing and other realms of nursing reflected in the lack of clinical nursing foundations in the reviewed literature are indicative of the unique position held by the school nurse, which will be discussed in greater detail in chapter 5.

Reed (2006) indicates that even across the various disciplines of nursing there is a range of theories that are used in practice:

The nursing discipline retains a rich repertoire of strategies for theory development. These strategies include, for example, deduction from nursing conceptual models, reformulation of nonnursing concepts and theories, reflection in or on nurse-patient encounters, inductive construction across empirical

generalizations, and abductive reasoning from existing nursing knowledge. No one description fully represents a strategy. Nursing theory development is a complex, non linear process - something best experienced and coached rather than defined, categorized and explicated (p. 328).

This article addresses “cocreating from Parse’s theory, partnering from Newman’s theory, and transpersonal caring from Watson’s theory. A theme across these theories is a practice methodology that shows nursing knowledge created out of a dialogue between nurse and patient” (p. 328).

Barry and Gordan (2006) build upon the dialogue and relationship of nurse and patient as learning about others within their cultural beliefs and values using Leininger’s Theory of Culture Care Diversity and Universality (Appendix B):

This theory provides a useful framework for school nurses grounded in the values of respect and care within the context of culture. Worldwide migration has changed the faces of students at schools and has created a challenge to understand diverse and universal healthcare beliefs and practices (p. 34).

Although not developed for school nursing practice, Leininger’s theory offers a useful model for caring for students from various multicultural backgrounds who attend school. Appendix B provides the theoretical framework for a nursing situation managed by a school nurse. The scenario is not described but a list of considerations by the school nurse is given.

Hoxie (2005) offers this thought to the school nurse role:

When assessing immigrant and refugee students in order to develop individualized healthcare plans (IHPs), the school nurse takes into consideration

cultural issues as well as legal and health issues in order to provide quality, comprehensive, and culturally competent care (p. 133).

The methodological approaches providing the evidence for the recommendations for best practice in the reviewed literature were varied in sample size, grade-level of sample, inclusion of school nurses in the sample, and many other factors. Half of the studies were based on an evaluation of the effects of a school intervention on student asthma. Quantitative techniques prevailed as more popular than qualitative techniques, although most quantitatively based studies relied on a quasi-experimental pre- and posttest design rather than the stronger randomized control trial. Focus groups and surveys were the most common techniques.

An analysis of the findings of the reviewed literature and their recommendations for best practice of student asthma revealed 16 relevant subcategories. Three major recommendations were found to be expressed by more than 50% of the literature. These three recommendations for best practice included proactive communication with other stakeholders, promotion of educational interventions, and teaching and reinforcing the principles of self-care for asthmatic students.

The idea of proactive communication was reflected in several other common recommendations from the reviewed literature. An unexpected finding was the recommendation by six sources (38%) that the school nurse should take a proactive role in being involved in the creation of asthmatic students' AAP. Education was also recommended by many sources as a best practice for school nurses in a variety of roles, including the education of parents, administration, and teachers, as well as the continuing education of the nurse. The majority of the studies did not mention the best practices

involved with the management of student asthma and the creation and use of the IHP or the IEP, despite the best efforts of the researcher to include relevant material addressing these topics. This appears to represent a significant gap in the literature.

Last, the analysis of the 16 sources found that the sources containing recommendations for school nurses managing student asthma did not directly address the definition of “best practice.” This was an unexpected finding that may be explained by two of the sources, which noted that definitions and implementation of “best practice” are not consistent. It is also possible that the authors of the reviewed literature assumed that it was unnecessary to discuss the meaning or definition of “best practice” when making recommendations.

Of the studies that referred to the definition of “best practice,” three found that it must be based in collaboration with all stakeholders, which was called the “team approach.” Other studies indicated that “best practice” was defined by the incorporation of a review of the research and expert recommendations and the pre-testing of procedures and tools by potential users. The next chapter will discuss these results according to the three motivating research questions of this study.

CHAPTER FIVE: CONCLUSIONS

Introduction

This study sought to investigate the relationship between EBP, best practices, and other relevant factors, including the IHP of the student, for school nurses managing student asthma. Unfortunately, there appears to be a dearth in contemporary literature (published since 2003) on how the IHP should be integrated into the other best practices for school nurses managing student asthma. However, the results of the meta-analysis of chapter 4 were sufficient to address this issue in the conclusions of the study. To further support the conclusions and contextualize the findings of the analysis, several sections from the NASN's guideline textbook on best practices will be reviewed.

This chapter begins with a presentation and discussion of the three motivating research questions of this study, which will be addressed sequentially. The discussion about the research questions is followed by a general conclusions section that integrates all of the relevant results and helps create a broader picture of the relationship between EBP and recommendations for best practices for school nurses. Next, the implications of the conclusions and the limitations of the methodology are presented. Recommendations for research and practice are offered, and the chapter concludes with a summary.

Several school health forms are included in the appendices as there is a need for complete documentation. It is appropriate as these instruments may not be well known across the medical or educational community. They are specialized documents which are developed for school nursing.

The appendices consist of the tools and instruments which put into practice the recommendations from an analysis of the articles. Three main recommendations for best practice involve communication with other stakeholders, promotion of educational interventions, and teaching self-care for asthmatic students.

The Student Asthma Management Skill Competency Assessment Form (Appendix D) specifies instruction which the student learns. The Components of Asthma Management in the Health Office (Appendix E) and the Quick Report Card: Asthma and Allergy Assessment (Appendix F) address the collaboration and involvement of school staff which are required for the recommendations of best practice.

These three tools are not particular to the reviewed articles but they are the means to meet the best practices mentioned in the articles. They illustrate how best care is provided.

Bonaiuto (2007) refers to a National Association of School Nurses position statement and describes school nurses who manage children with chronic health conditions “as the professionals who can identify, plan for, manage, monitor, and document outcomes in this growing special population” (p. 203).

Documents are important as a framework to share information with appropriate school staff, parents, and healthcare providers. School nursing documents reflect the evidence of their best care.

Research Questions

The following research questions guided this study.

1. What is an acceptable and consistent definition of best practices, based on an evaluation of the breadth of definition forwarded in recent and relevant literature?

2. What does existing literature present as the best practices with which school nurses can address student asthma?

- a. Is the existing literature consistent in its findings and presentation of best practices for student asthma?

3. What are the administrative “best practices” through which school nurses should coordinate with parents, school faculty, and health care providers with regard to treating student asthma? In other words, what does a review of the literature suggest about the best way to connect best practices and EBP with the IHP, the IEP, and other factors, such as family values and school setting?

Each research question will be addressed individually, integrating the relevant data from the meta-analysis. Following the third research question, the next section will discuss what the conclusions of this section mean in relation to each other.

Research Question 1

The fourth conceptual category of the meta-analysis was intended to address the issue of defining best practices, based on an evaluation of the breadth of definition forwarded in recent and relevant literature?

However, because the majority of the reviewed studies were found to be lacking a definition of “best practice,” the researcher concluded that there is not a consistent definition of “best practice” in the evidence-based literature reviewed. This conclusion was reinforced by the discovery during the analysis that two of the sources directly mentioned that best practice is not consistent in its definition or implementation in school nursing.

However, it is also possible that the reviewed literature presumes that their recommendations are considered to fall under a more general concept of “best practice.” Unfortunately, there was no way to confirm or deny this presumption through the meta-analysis. Of the studies that referred to the definition of “best practice,” three noted that it must involve collaboration with all stakeholders, including parents, faculty, and healthcare providers. The other definitions forwarded in the reviewed literature, sources noted that “best practice” was defined by inclusion of a review of recent literature and expert recommendations as well as the previous evaluation of tools and procedures used in the management of student asthma. Overall, it was found that these definitions are consistent with those cited in the literature of preceding chapters, but there was not enough relevant data in the analysis to confirm a consistent definition within the evidence-based source reviewed.

Research Question 2

For the purposes of this research question, it was assumed that the recommendations for practice put forth in the reviewed literature were intended to be best practice recommendations, even if they were not explicitly stated as such. The meta-analysis revealed that the most common and consistent best practice recommended in the sources was proactive communication with all stakeholders, which aligns with the definitions of “best practice” given above.

Education was also a commonly recommended best practice, and was found to have a great deal of crossover with recommendations for proactive communication. Many studies used their results as justification for recommendations of improved communication between the school nurse, the school staff, the parents of the student,

other healthcare providers, and, when appropriate, the student. Part of the justification for this recommendation for improved communication was the necessary education of all stakeholders on the management of student asthma while at school. Several studies stressed the need to have consistency in asthma management practices at school and at home. The NASN's best practice guidelines align closely with this idea of education:

The role of the school nurse includes education of students, parents, faculty, and staff. Teachers [and coaches] need to understand the disease process, the signs and symptoms of the disease, triggers for the individual student, and management of an asthma attack in order to be able to identify when a student is having difficulty (Ficca & Moore, 2006, p. 700).

To foster this recommended communication and education, the reviewed sources suggested that asthma interventions be performed by the school nurse or in conjunction with the school nurse. Half of the reviewed sources evaluated the effects of an asthma intervention, and more than half of the studies recommended that interventions be conducted. There was also a significant emphasis on self-care of asthma by students, both in the theoretical foundations of the studies and in their recommendations for practice.

In addition to the major recommendations discussed above, each of which were supported by more than half of the reviewed sources, the meta-analysis revealed 13 additional recommendations for best practice for school nurses to manage student asthma. The continuing education of the school nurses themselves was a common recommendation. This is understandable, for it is only with constant education that nurses will be able to remain up-to-date on the recognized best practices for addressing student asthma. There is a great deal of research in this field, and sources recommended that

nurses should either self-educate or provoke the administration to aid them in additional, ongoing education so that they are aware of the latest evidence-based research informing best practices.

An inconsistency found in the recommendations of best practices in the reviewed literature was the suggestion (by 38% of the sources) that school nurses proactively seek to involve themselves and their input in the creation, maintenance, or alteration of AAPs. Interestingly, although most studies did not make this recommendation, the NASN's guidelines include this concept as a best practice, stating that it is perfect to "meet with the parents at the time the Asthma Action Plan is developed" (Ficca & Moore, 2006, p. 702). An Asthma Action Plan can be separate or part of an IHP. It is the strategy for regaining control when symptoms are worse. Asthma can be managed and controlled, there is no cure. The severity of an acute asthma attack with chest tightness and choking is a feared emergency. An Asthma Plan is developed with involvement of the health care provider, the student, and family. It helps the student with asthma recognize exacerbations and know how to respond. The Maine School Asthma Plan (Appendix C) is an example of these specific steps (Maine Department of Education, 2009). In the school setting, the need to know by staff about a student's asthma is weighed with privacy of information and confidentiality of records. It is a key issue which school nurses consider as part of best practice with AAPs and IHPs. None of the 16 studied articles mentioned FERPA or HIPPA. Safeguarding student health information is examined by Bergren (2005).

Whereas care should be taken to avoid sharing information inappropriately, every effort should be made to identify all pertinent school district personnel relative to the child's education, health, and safety (p. 39).

Care plans or documents guiding the staff will be found in classrooms, on busses, in the gym, on the playground, and in individual office (p. 40).

Other best practices for school nurses to use to manage student asthma included fostering communications between the parent and the student, evaluating the school environment and working to reduce irritant and allergen levels, and adjusting best practice for age. This recommendation was found to frequently be connected to recommendations for self-care, and studies found that individual assessment of each child is critical to determine the boundaries of their self-care. The Student Asthma Management Skill Competency Assessment Form (Appendix D) is a good indicator of a student's growth toward their objective (Maine Department of Education, 2009). Lundquist (2005) addresses self-care of children with chronic health problems, "All children go through stages of development as they grow. Students with a chronic disability or illness face challenges in meeting their developmental goals" (p. 119). "Learning becomes more difficult and frustrating with the student losing interest in school. Since successful employment depends upon skill mastery and the ability to have positive social interactions, these students' futures are at risk" (p. 120). Self-care is the ultimate goal of the stakeholders involved in student asthma as they progress through school, so that they can be fully functioning adults thoroughly educated in how to manage their condition.

Although 13 of the 16 recommendations were not endorsed by more than half of the reviewed sources, the researcher did not conclude that this was an indication of gross inconsistency in the literature. Rather, the topic of school nurse treatment of student asthma is so broad and diverse that it cannot be expected that each source would be based in the evidence to support the many recommendations for best practice. Aside from the inconsistency noted above, the recommendations for best practice in the reviewed literature were valid and consistent with the NASN's guidelines on student asthma management (Ficca & Moore, 2006).

Ficca and Moore (2006) wrote the section on best practices for asthma management in the NASN's guidelines textbook, which was the result of years of accumulation and evaluation of evidence-based research. According to Ficca and Moore (2006), the significant categories of best practice for the management of student asthma include diagnosis, management, emergency management, education, responsibility for the IHP, and assessment of the environmental conditions. Communication is intrinsic throughout all of these categories.

The reviewed sources forwarded limited suggestions on best practice with diagnosis, responsibility for the IHP, and assessment of environmental conditions. Nonetheless, the studies that addressed these recommendations did so in way that was generally consistent with the guidelines, particularly concerning the assessment of environmental conditions. However, there was some inconsistency in recommended diagnoses.

According to the NASN guidelines on asthma put forth by Ficca and Moore (2006):

The gold standard for the diagnosis of asthma is spirometry (Kelly, 2003).

Spirometry utilizes a machine that measures lung function, as recorded by the FEV1 (forced expiratory volume in 1 second)... Peak flow measurements are not recommended as a diagnostic measure, as they are not a sensitive measure to airflow obstruction; their results are more variable and less replicable than those of the FEV1.

However, of the studies that discussed best practices for school nurses diagnosing asthma, all relied on peak flow measurements and recommended their continuous usage as a preventative and assessment tool.

Overall, it was found that the reviewed literature suggested that best practices for nurses are complex, but at least include communication with all stakeholders about the student's asthma, education of all relevant stakeholders about asthma management, and education in school that focuses on self-care for the student. Conversely, the reviewed sources did not present a total list of recommendations for best practice, but instead tended to focus on more limited facets of student asthma treatment by school nurses.

Research Question 3

The meta-analysis of the literature found that there is a significant gap in the evidence-based literature on best practices for school nurses to manage student asthma and the integration of those practices with the IHP, the IEP, and the 504 Plan. In addition, family values were not included as part of any consideration in the reviewed literature. It is significant to note that the reviewed literature provided a wealth of suggestions on the

best practice involved with the communication and collaboration of the relevant stakeholders involved in a student's asthma condition. The Components of Asthma Management in the Health Office (Appendix E) is a comprehensive review of the roles the healthcare staff- provides with asthma care of students. They are stakeholders as the caregiver to the students with asthma (Minnesota Department of Health, n. d.). Only one study (Erickson et al., 2006) discussed delegation in terms of job classification, "School nurses focused on asthma severity, care for students with complex needs, student self-management, and care coordination. LPNs and health assistants were responsible for routine asthma care and delegated nursing care based on license, training, and job descriptions" (p. 321).

Herrmann (2005b) maintains the school nurse holds the accountability with scope of practice:

As delegator, the school nurse has the responsibility to make a proper act of delegation by giving clear, specific directions to a person who can perform safely and competently. The burden of competency of the person who will perform the tasks and ongoing evaluation rests with the nurse. The delegator is accountable for the act delegated and may incur liability if found to be negligent in the process of delegating and supervising (p. 13).

The nurse coordinates school staff in the care of the students with asthma and works with all school personnel to maintain a healthy setting for them. The school environment involving classroom teachers, custodians, secretarial personnel, bus drivers, and administration are stakeholders in ensuring a clean air setting. The Quick Report Card: Asthma and Allergy Assessment (Appendix F) requires teaching staff and support

staff to take responsibility for improving indoor air quality (Asthma and Allergy Foundation of America, n. d.). It is the nurse who would be expected to initiate this clean air check, “School nurses play a pivotal role in the provision of the school health services for children with chronic illness” (Lenz, 2005, p. 125).

The results of the meta-analysis confirmed that although there is a great deal of data supporting increased and sustained communication from the school nurse with all stakeholders, there is limited data on how to achieve these goals. Some sources recommended educational asthma intervention programs that include a parental component. Other sources recommended the direct contact through phone or mail of the parents by the nurse. Only two studies recommended that the best practices should be solidified in and replicated from the IHP created for individual students through the collaboration of the school nurse, parents, healthcare providers, and the IEP was completely lacking from the reviewed literature.

It is probable that the lack of discussion about the use of the IHP and the IEP in the reviewed literature of best practice management of student asthma is due to the perception of contemporary authors on the subject that the IHP and IEP are standard parts of the best practice. Consequently, the IHP is required for students with asthma, and it is important for school nurses to know how to integrate it with the other best practices involved in managing student asthma. Although there was discussion in the reviewed literature of financial concerns for low-income families with children with asthma, there were no recommendations on how school nurses could account for that and integrate it into their practice.

In addition, this study did not address the staffing of schools by a school nurse; it is difficult to examine the benefits of best practice when schools do not employ adequate nursing staff. Improved school attendance with the student ready to learn is an important indicator of best practice effectiveness.

Borgmeyer (2005) concurs as:

School nurses need to become leaders in the development and implementation of policies that will improve the health of children with asthma; reduce absenteeism and time out of classroom; as well as increase the confidence of the child, family, and staff that symptoms will be dealt with effectively and in a timely manner (p. 29).

Six studies discussed better attendance of students with asthma due to intervention; four made a difference in improving attendance and two showed no difference. The Partners in School Asthma Management Program (Bartholomew et al., 2006), Kickin' Asthma Program (Magzamen et al., 2008), Healthy Learner Model for Student Chronic Condition Management (Erickson et al., 2006), and Case Management approach with the Open Airways Curriculum (Levy et al., 2006) helped students gain knowledge and confidence with managing their asthma. The educational component, better collaboration with family and physician along with the implied caring are some of the factors leading to reduced absenteeism. The two studies which showed no difference in school attendance cited reasons such as, "challenges related to case detection, training, implementing preventive care activities, which may have hindered our success (Bruzese et al., 2006) and a "ceiling effect, seasonal variation, and interpretation of school absence records "(Velsor-Friedrich et al., 2005). The failure to show significance was related to

issues other than intervention. There was limited information as to how the school nurse could impact these factors.

School nursing practice, guided by evidence-based principles and informed by ongoing evaluation, results in high quality care for children and promotes educational success, including improved attendance and active participation in learning” (Erickson et al., 2006, p. 329).

Since interventions are successful with better attendance, the importance of providing a nurse to manage children with asthma is vital to meeting their school health needs.

General Conclusions

This meta-analytic study found that there is a great deal of consistency in the evidence-based literature supporting best practices for school nurses to use to manage student asthma. The reviewed literature came from a wide variety of contexts, and an analysis of the methodology revealed a great deal of variety in the methodological approaches used to establish evidence to inform best practice recommendations. The theoretical foundations and orientations of the reviewed literature were also found to be varied. This variety in the theory and methodology informing the suggestions for best practice represent a rounded, throughout approach towards evaluating EBP for student asthma management.

Triangulation of the data expressed a high degree of consistency among the recommendations for best practice, and only minor inconsistencies. It was found that evidence-based literature informing best practices can often only do so in an incomplete fashion. That is, the management of student asthma is a complex task requiring the

coordination and involvement of a large number of stakeholders and particular issues, and because of this, the literature supported best practices in a limited number of areas, as opposed to a comprehensive overview of all best practices involved.

The meta-analysis of the literature also led to the conclusion that despite the wide variety of theoretical and methodological focuses of the reviewed literature, as well as the 16 subcategories of recommendations for best practice found in the sources, the data of the study was unable to meaningfully evaluate recommendations on how best practice can be integrated into the IHP or IEP. In retrospect, it is probable that the IEP was not mentioned in the literature because it is not often necessary for the management of student asthma. Although asthma is a debilitating condition, it appears that it is rarely severe enough to merit the creation of an altered educational plan for students who suffer from the disease.

Because the essential best practices of the school nurse managing student asthma involve proactive communication and education of all relevant stakeholders, as well as a focus on teaching and reinforcing the concepts of self-care to students, the role of the IHP is important, as it can serve as a center point from which these other practices can be formulated and enacted. Although, as discussed above, it is possible that the lack of literature on IHP is due to the assumption of its use because it is required for all students with asthma, it is for this very reason that it needs to have evidence-based recommendations for best practice.

Implications

There are several implications that can be drawn from the conclusions of this meta-analytic study. First, because of the lack of data found to address the inclusion of

the IHP and the IEP in the best practices of school nurses managing student asthma, there is an implication that there is gap in the literature on these topics. A lack of evidence-based research supporting recommendations on how to integrate the best practices for the management of student asthma with the use of the IHP creates a void that must be filled by either expert opinion, personal experience, or conjecture. In order to maintain the highest standards of practice, such voids should not be left to be filled by recommendations for best practice that are not EBP.

In addition, the conclusions of this analysis imply that researchers and authors contributing to the field of EBP and best practice for students with asthma are not operating on a consistent definition of “best practice.” This presents a serious issue, as recommendations for best practices become meaningless if there is not standardization or unity of belief in the meaning of the term itself. However, the fact that there were no contradictions in the few definitions of “best practice” found in the reviewed literature, (and checked against the NASN’s guidelines on asthma management), implies that there is no egregious confusion of the meaning of the term, although this cannot be confirmed, as several studies noted that there are inconsistent definitions of “best practice.”

Last, the conclusions of this study imply that evidence-based literature of a primary source nature may not be the best source of information for school nurses to use to stay up-to-date on asthma management for students. Because research in this field is so extensive, and because student asthma is a complex issue, evidence-based studies are often focused on particular aspects of best practice, as opposed to the complete best practices to used by school nurses. This implies that the use of guidelines, although not as current, may be necessary.

Limitations

This study has several limitations. First, it was unanticipated that evidence-based research from the last 5 years would be so limited in addressing the definition of “best practice” and the way best practices should be integrated into the students’ IHPs. Therefore, the study was limited in its ability to fully answer the research questions in as comprehensive a manner as was hoped. However, this limitation did have the unexpected benefit of establishing and highlighting this gap in the research.

The study was also limited by the focus of the research questions which sought studies of school nursing and asthma as well as best practices and evidence based research. The vast selection of literature with aspects of these criteria required that the meta-analysis be kept at a relatively manageable size of 16 studies. This means that the results of the study may be limited in generalization to all literature on best practices for treating student asthma.

Recommendations for Research

The conclusions of this study have led to several recommendations for further research. Primarily, there is a great need for research on the way that the school nurse managing student asthma should implement best practice with students’ IHPs. Because the IHP is a central part of the asthma management of every American student who suffers from the disease, its use must be based on more than expert recommendations in the future. The researcher recommends that a longitudinal study be conducted to investigate the utility of the IHPs and methods to most effectively utilize the information of the IHP.

Further recommendations for future research include expanding this study to include a wider review of the evidence-based literature relevant to this topic. There is a great deal of ongoing literature in the field of asthma management, and school nurses need to be informed about the latest best practices and EBPs. Another recommendation for future research is for a study to be created to evaluate the consistency of the term “best practices” throughout medically-related fields. Without a consistent definition of what best practice is, researchers, school nurses, and other stakeholders will be unable to investigate, recommend, or implement best practices coherently. Last, it is recommended that this study be conducted with a quantitative component to investigate if there are any statistically significant correlations between the conceptual categories or subcategories.

Recommendations for Practice

This study focused on an evaluation of selected literature to determine the best practices for school nurses to address asthma. Therefore, it is important to provide several recommendations based on the research results. First, the primary goal of school nurses is to effectively assess asthmatic students’ conditions. School nurses must communicate with the parents and other healthcare officials to determine the severity of the disease, and must also assess the student at school in addition to the environment of the school. The secondary goal of the school nurse should be to establish strong, open lines of communication with all stakeholders, including parents, administration, faculty, and healthcare providers. Knowledge about the specifics of a student’s condition must pass through these channels, and all stakeholders should be kept up-to-date on the latest information.

Second, it is recommended that school nurses evaluate their sources of information on best practices to ensure that they are based in evidence-based research whenever possible, as opposed to expert opinion or conjecture. Third, school nurses should work to proactively educate the faculty of the school to treat asthma in their absence. Nurse-to-student ratios are demanding, and districts often have to share school nurses among several schools. Therefore, it is critical that the school nurse develop the IHP and distribute it to those who are immediately responsible for the health of the child at school, such as the student's particular teachers and the administration. Last, it is recommended that policymakers devote greater efforts to the funding of school nurses in schools, as more hired nurses would allow greater individual time to be spent on each student, which has been shown in the meta-analysis to be an effective method for managing student asthma and reducing absenteeism.

Summary

This chapter presented the conclusions of this study on the best practice of school nurses managing student asthma. The results of chapter four were analyzed and dissected to address each of the three research question that motivated this study, and the general conclusions from the integration of all of the data of the study arose from that discussion. The implications of the conclusions were discussed and were found to be significant for the school nursing profession with regard to asthma treatment. Next, the chapter reviewed the limitations of the study, which would have benefitted from an expansion of materials analyzed over a longer timeline. The conclusions that were formed in this chapter from the analysis of the results in chapter 4 inspired several recommendations for research and practice, including a call for more EBP of the IHP and students with asthma.

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		<p>significantly improve in _____ minutes: Repeat medications as ordered by health care provider. If symptoms still do not improve after _____ minutes: Contact parent/guardian for instructions; CALL 911 EMERGENCY RESCUE SERVICES;</p>	
2. Potential for alteration breathing pattern/gas exchange.	2. Attain & maintain near normal pulmonary function. Prevent asthma Symptoms.	<p>1. Student will come to Nurse's office daily at _____ to monitor lung capacity with peak flow meter. Normal volume: _____ Low volume: _____ 2. Student will record volume on individual student log. A copy of student log will be sent home with student: weekly monthly If peak flow volume is below _____: Student will administer medication as ordered by physician; Parent/guardian will be contacted for instructions.</p>	<p>Student as ordered by physician</p> <p>Student</p> <p>School nurse-as specified</p> <p>Student-as needed</p> <p>School nurse</p>
3. Potential need for medication for management of asthma; Potential for noncompliance with prescribed	3. Maintain near normal pulmonary function; prevention of asthma symptoms;	1. Student will come to the Nurse's office for supervised administration of the following medication (s) according to written physician's	Student/school nurse-as ordered by doctor

<p>medications related to:</p> <ul style="list-style-type: none"> • knowledge deficit • improper administration of medication • perceived ineffectiveness of medication • denial of need for medication • inability to access medication 	<p>prevention of recurrent asthma episodes.</p> <p>Student will learn the importance of compliance medication regimen to maintain optimum health</p>	<p>orders: (Medication Authorization Policy)</p> <p>Medication(s) Dose Time</p> <p>All school procedures/policies will be followed for administration of medication.</p> <p>2. Student will be reminded to come to nurse's office for medication if the student does not report within _____ minutes of scheduled time.</p> <p>Parent will maintain an adequate supply of medication at school. Parent will be notified when supply of medication needs replacement.</p> <p>3. Student will be monitored for adverse side effects or decreased therapeutic benefit of medication such as:</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>4. Student will receive medication by nebulizer. School procedure for administration of nebulizers will be followed. (see manual)</p>	<p>Teacher/health office personnel - as specified</p> <p>Parent/Nurse's office personnel - ongoing</p>
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		<p>Student is on the following medications being taken at home:</p> <p>Medication(s) Dose</p> <p>Time</p> <p>5. Parent will be notified if there are any concerns regarding the medications which might require medical follow up.</p>	School nurse - as needed
4. Potential for respiratory distress secondary to physical activity/ exercise-induced asthma	Student will be able to participate in school activities while maintaining optimum respiratory status.	<p>Student will carry and self-administer asthma inhaler as ordered by physician as indicated on medication authorization form.</p> <p>4. Student and school personnel will note any signs of increased respiratory effort. Staff will allow rest periods as needed during physical activity. Student will go to nurse's office for asthma inhaler _____ minutes prior to physical activity, as ordered by physician.</p> <p>2. Student has the following restrictions for physical activity: When a student is unable to participate in physical activity, an alternate education activity will be substituted.</p>	<p>Student-as ordered by M.D.</p> <p>Student/staff/school RN</p> <p>Classroom instructor-as appropriate</p>
5. Knowledge deficit related to asthma and its management	5. Student will increase knowledge related to asthma to	5. Student will be provided with ongoing health education and counseling related to asthma and its	School nurse-continuously as needed.

	allow improved self-monitoring and management of the disease.	management appropriate to age and level of learning. The school nurse/health educator will provide information on asthma and management to the classroom teacher in the form of written materials and consultation to support the student's needs. The student's knowledge/understanding of his illness will be discussed with him/her to assess level of awareness and need for review/or update. A classroom presentation on asthma will be given to student's classmates as needed.	School nurse when felt to be of benefit to the student
6. Potential for change in medical status	Student/family will collaborate with members of the health team to facilitate optimum health and safety necessary for learning.	6. Parents will provide school nurse with a copy of current medical report or doctor's statement annually or when a change in status occurs. The school nurse will call the physician to obtain current information verbally when necessary to enable management of the student's condition at school Physician: Phone:	Parent/guardian annually or prn School nurse prn
The Individual Health Plan (IHP) will be reviewed annually with the parent/guardian as well as appropriate staff members. This plan may be	The IHP will be updated/ revised annually to meet the health needs of the student	Review Date: RN Initials: Parent Initials:	School nurse annually or as needed.

<p>revised/updated as appropriate to ensure the most current treatment modalities for the student. The school nurse (in collaboration with parent/guardian will train (or arrange for training) and supervise all non-medically licensed school personnel who are delegated responsibility for implementing any portion of this plan as appropriate.</p>			
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http://www.nmschoolhealthmanual.org/forms/sectionV/39_asthma.pdf

Appendix B

Theory of Culture Care Diversity and Universality

Values/Assumptions - Care is essential for human growth, survival, curing, and healing.

Beliefs, values, and expressions of human care may vary or may be the same among cultures. Culturally congruent care, based on the values and beliefs of an individual or group, is essential for the health and well-being of persons.

Focus - Culture Care

Goal - Learning from persons about their culture care values, beliefs, and lifeways is necessary to understand their world, their needs, and the way to provide culturally competent, congruent, and responsible care practices (Leininger & McFarland, 2003).

The school nurse brought a language facilitator with her to Magdalena's home. She asked to be invited in and then listened respectfully to Rosa's story about caring for herself and her daughter.

Person - Magdalena is a unique individual with values and beliefs about health, illness, and death that have been learned within the context of culture with sources such as the family, school, church, and profession. Rosa was concerned about her daughter's urinary problem and understood the link between taking in liquids and excreting them. She thought she was doing the right thing to restrict Magdalena's liquids.

Nursing - The nurse is the bridge between folk practices and professional health care services. The school nurse assessed the situation, provided care and support for Magdalena and Rosa, and connected them to primary care at the health department.

Factors Influencing Culture Values, Beliefs, and Lifeways: Technological,

Religious/Philosophical, Kinship & Social, Political & Legal, Economic, Educational -

The Guatemalans in Florida live a subsistence life as agricultural workers. They are easily recognized by their short stature and distinctive dress. The men wear long-sleeved shirts, jeans, and baseball hats. The women dress in long skirts and wear their hair unadorned in long ponytails. Beliefs are embedded in Mayan traditions that foster family life, care of children, respect for elders, and self-respect. Education is promoted for the children, and many women attend literacy classes with their young children. Health care beliefs are broad, with use of home remedies, consultation with native curanderos, and visits to professional providers. Causes of illness are seen as a humoral imbalance or may have a spiritual connection. The political situation for Guatemalans should also be understood; the United States has not recognized the civil war in Guatemala, and many refugees are undocumented. This contributes to a reluctance to seek professional health care (Barry & Kronk, 1993; Barry et al., 1998).

Culture Care Preservation - The school nurse listened respectfully to Rosa's explanation of how she was caring for her daughter. On hearing this, the school nurse began to understand the concern this mother had for her daughter's health. The nurse supported the mother's efforts while carefully explaining, through the language facilitator, what she believed the health issue was. She suggested further assessment and offered assistance with booking the appointment and arranging for transportation. Rosa said she wanted to seek her husband's advice before making any decision. The nurse supported this and asked permission to make a home visit after Rosa consulted with her husband. The school nurse supported Rosa's core values of caring for herself and her family seeking her husband's advice on matters of importance.

Culture Care Accommodation - Keeping her language general and nonmedical, the school nurse explained the doctor's finding, instructions for antibiotic use, and need for liquids. Understanding that, in their culture, humoral imbalance expressed as too much "hot" or "cold" is associated with physical or mental illness and that ingesting hot or cold liquids assists in bringing the body back in balance (Zapata & Shippee-Rice, 1999), she explored what Magdalena liked to drink and what would be healthy in this situation. The school nurse respected the family's beliefs about the cause and cures of this health condition and negotiated the balance between professional practice and folk practice.

Culture Care Repatterning - The school nurse, with thoughtful presence, established a relationship with this family that allowed her to get to know them and their health beliefs. She became the bridge between folk and professional health practices and helped navigate the system. Magdalena recovered and returned to school feeling good about herself. Rosa continued with prenatal care and delivered a healthy baby boy. She shared that she had told her friends about how important fluids were in helping with urinary problems. One of the most important outcomes in this situation was a new cultural understanding for the school nurse and the school community. Rosa and Magdalena experienced a new understanding of professional nursing care in particular the fullness of school nursing.

Barry, C. D. & Gordan, S. C. (2006). P. 35. Table 2.3

Appendix C

Maine School Asthma Plan

I AUTHORIZE THE EXCHANGE OF MEDICAL INFORMATION ABOUT MY CHILD'S ASTHMA BETWEEN THE PHYSICIAN'S OFFICE AND SCHOOL NURSE.

Parent or Guardian signature: _____ Date: _____

Parent or Guardian tel.# home: _____ work: _____ cell phone: _____

Physician/Healthcare Provider Name: _____ Parent concerns: _____

My child may carry and use his/her: inhaled asthma medicine Yes No Epi-Pen Yes No N/A

Provider name: _____ Tel.#: _____

Fax# _____

NO changes from previous plan

PEAK FLOW:

Child's predicted, or personal best peak flow: _____ Date: _____

Child's Green Zone: _____ Yellow Zone: _____ Red Zone: below _____

MEDICATIONS:**Preventive (Controller) Medications:**

Quick Relief Medications: (check the appropriate quick relief med, circle device, list dose/frequency):

Albuterol (Proventil, Ventolin) Pirbuterol (Maxair)

Other: _____

▶ Inhaler with spacer OR nebulizer ▶ Dose/Frequency: _____

Allergies /Triggers for asthma: None known

Avoid animals

Other triggers to avoid: _____

Exercise Pretreatment Instructions (check all that apply)

Give 2 puffs of quick relief inhaler 15 minutes prior to recess/ physical education and/ or _____

May repeat 2 puffs of quick relief inhaler if symptoms recur with exercise, or _____

Measure Peak Flow prior to recess / physical education; restrict aerobic activity when child's peak flow is below _____

Asthma Exacerbation Treatment Instructions:

➤ **YELLOW ZONE:** If child is coughing, wheezing or short of breath, and/or peak flow is in Yellow Zone:

Give 2 puffs of child's quick relief inhaler with spacer (or nebulizer treatment). May be repeated in 10 minutes if doesn't recover to Green Zone. Notify parents of exacerbation.

Other: _____

➤ **RED ZONE:** If child is in respiratory distress, and/or peak flow is in Red Zone:

- Give 4 puffs quick relief inhaler (or nebulizer treatment), and call parent and Healthcare Provider.
Call 911 if child does not improve quickly or parents/Healthcare Provider cannot be reached.
- Other:

SPECIAL INSTRUCTIONS:

Maine law now permits students to carry and use inhaled medications and Epi-pen after demonstrating appropriate use of

Inhalers and or Epi-Pen to School nurse. Please check appropriate boxes below:

- This student has the knowledge and skill to carry and use: **Inhaled medication** **Epi-pen**
- This student is not able to carry and use by himself/herself: **Inhaled medication** **Epi-pen**
- Please contact Healthcare Provider and parent if student is using quick relief medicines more than 2 times a week (i.e. in excess of pre-exercise treatment)

OTHER:

Healthcare Provider signature	Date
This student demonstrates	
knowledge and skill to carry and use:	
Inhaler medications <input type="checkbox"/> YES <input type="checkbox"/> NO	
Epi-Pen <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A	School Nurse Signature
Date	

USE OF QUICK RELIEF MEDICATIONS MORE THAN TWICE WEEKLY:

This indicates poor control of asthma, and providers should be notified by the school nurse or designated staff. .

PEAK FLOW ZONES (based on student’s personal or predicted best:

Green zone: Peak flow 80-100% Symptoms and/or use of quick relief medication ≤ 2 times a week

Use daily controller medication at home

Full participation in physical education and sports

Yellow zone: Peak flow 50-80% Has symptoms or needs quick relief medication >2 times a week

Needs quick relief medication and further observation by school nurse; notify parents

Attend physical education but restrict strenuous aerobic activity

Red zone: Peak flow <50% Symptoms may include shortness of breath, retractions, difficulty talking or walking;

quick relief medication not effective

Requires immediate action, close monitoring and notification of parent and healthcare provider.

Appendix D

Student Asthma Management Skills Competency Assessment Form

Student _____ Date _____

School _____ Inhaler Type _____

Metered Dose Inhalers (MDI)**1. SPRAY INHALER WITH A SPACER OR A HOLDING CHAMBER:****If using a tube type spacer/holding chamber:**

1. Remove cap, inspect, and clean if necessary.
2. Put inhaler in spacer opening. Hold spacer and inhaler together and shake 8-10 times.
3. Breathe out gently, emptying lungs. Hold breath. Place spacer in mouth with lips closed tightly around the mouthpiece.
4. Spray one puff of medicine into the spacer, and begin to take in a slow deep breath. If you hear a whistle, breathe slower, but keep taking a deep breath.
5. Take the spacer out of mouth, and hold breath. Count to 10 slowly, then breathe out slowly.
6. Repeat for each puff of medicine the doctor orders. Wait one minute between each puff.

If you use a spacer with a facemask:

1. Remove cap, inspect, clean if necessary.
2. Put inhaler in spacer opening. Hold spacer and inhaler together and shake 8-10 times.
3. Put mask over the nose AND mouth and press against the face gently so no air or medicine escapes.
4. Spray one puff of medicine and hold the mask in place while breathing in and out 6 times.
5. Repeat for each puff of medicine the doctor orders. Wait one minute between each puff.

2. INSPIREASE DEVICE:

Inspirease: Type of spacer or holding chamber, does not have a one-way valve. Most useful for those who can't inhale deeply or hold breath for more than a few seconds.

1. Connect the mouthpiece to the bag and untwist the bag to its full size.
2. Shake the medication canister 8-10 times and put in the upright part of the mouthpiece. Exhale completely.
3. Put mouthpiece in mouth and close lips tightly around it.
4. Spray only one puff of the inhaler. Breathe in slowly to a count of 5 until the bag collapses. If you hear a whistle, breathe slower until there is no sound.
5. Hold breath while counting slowly to 5, then breathe out slowly into the bag.

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INSPIREASE DEVICE –CONTINUED-

1. Breathe in again and count to 5, but DO NOT spray the medicine again. Hold breath for a count of 5, then breathe out.
2. Repeat for each puff of medicine the doctor orders. Wait one minute between each puff.
3. How to clean: Do not clean collapsible bag; Take mouthpiece off and clean in warm soapy water, rinse and air dry on clean towel.
4. Replace collapsible bag every 3-4 weeks or sooner if needed.

Key Points for all Above:

1. Breathe in slowly (as age allows)
2. Wait at least 1 minute between each new puff of medicine.
3. If MDI has not been used in **4 weeks**, you need to prime it (spray) **4 times**.
4. Keep a diary to determine when the MDI is empty: Record each time MDI is used. DO NOT float the MDI in water, this WILL NOT tell if it is empty.
5. A spacer or holding chamber is recommended for all ages when using an MDI, especially with inhaled corticosteroids (should have a one-way valve to be effective).
6. Never put two puffs of medicine in the chamber at the same time.
7. **Spacer with mask** – ages 1-5 or anyone who cannot hold breath or breathe deeply.
8. **Spacer with mouthpiece** - for approximately 7-8 years of age and above. The student must be able to take a deep breath and hold 10 seconds.
9. Spacer or holding chamber:
 - Increases the amount of medicine reaching the lungs,
 - Reduces throat irritation and sore mouth,
 - If unable to breathe through mouth or follow directions, use a mask with the holding chamber.
10. How to clean: Wash with soapy water and rinse before first use; Clean once a week following the manufacturer's recommendations (see package insert).

**Cleaning too frequently will cause static electricity, which will cause medication to adhere to the walls of the device.*

NOTE: It is NOT recommended to use inhaler without spacer (exception: autohaler), but if this is done it should be with open mouth technique (which may not work well with the round shape of some HFA inhalers) to avoid spraying medicine directly on tongue or roof of mouth.

Asthma Reviewed 3-21-08 2

3.SPRAY INHALER - OPEN MOUTH:

1. Remove cap, inspect and clean if necessary. Shake the inhaler 8-10 times.
2. Stand up if possible.
3. Breathe out.
4. Open mouth and hold the inhaler two finger widths away. As start to breathe in, push down on the top of the inhaler and keep breathing in slowly.
5. Hold breath for 10 seconds.
6. Breathe out gently through pursed lips if possible.
7. If more than one puff prescribed, wait one minute before each puff.

Metered Dose Inhaler (MDI)

AUTOHALER (MAXAIR):

1. Hold canister upright and remove the cap.
2. Raise the lever so that it stays up. It will “snap” in place. Keep upright.
3. Hold autohaler around the middle and shake gently several times. Do NOT block air vents at bottom.
4. Continue to hold upright. Exhale fully. Seal lips tightly around mouthpiece.
5. Inhale deeply through mouthpiece with steady, moderate force. A “click” will be heard and a soft puff felt when the inhalation triggers the release of medicine. Do not stop when click is heard or the puff felt. Continue to take a full, deep breath.
6. Take Autohaler away from mouth and hold breath for 10 seconds, then exhale slowly.
7. Continue to hold autohaler upright while lowering the lever. Lower lever after each puff. Wait one minute for each additional puff prescribed and repeat above steps.
8. If not used for 48 hrs, follow steps **1-3** and click lever at bottom to release 1 puff; repeat.

This clears the inhaler before use. Then follow **1-7** as above

Keypoint If Maxair has not been used in 48 hours (2 days) you **must prime (spray) it twice.**

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Dry Powder Inhalers (DPI)

- All are controller medications.
- Currently come as a diskus, turbuhaler and aerolizer. The DPI does not use propellants and is not shaken.

- Breath activated, not pressurized. A forceful inhalation is necessary to activate the pre-measured dose.

- Do not expose to moisture, store in a cool, dry place; do not shake before use. The DPI must be held level or the dose will dump out.

A. DISKUS

1. **Open:** With Diskus level in one hand, place thumb of other hand on grip and push away to expose lever underneath.
2. **Click:** Push lever away until you hear and/or feel a “click”. (Hold the diskus level and don’t tip or you will lose the dose.)
3. Turn face away and breathe out. Do not blow into the device.
4. **Inhale:** Place the mouthpiece between lips and inhale deeply and forcefully. Then close the diskus.
5. Rinse mouth with water, gargle, and spit. Do not swallow.
6. The exact number of doses left is indicated on the side of the diskus.
7. Delivers 60 doses of Serevent, or Advair (fluticasone/salmeterol) (one month supply), or 28 doses of samples (2 weeks supply). Use only one inhalation per dose: The counter indicates how many doses are left.

B. TURBUHALER

1. To Prime (**the first time only**): Hold upright, twist off white cap and twist brown base to the right, then to the left until hear the click. Repeat.
2. To use: Hold upright, twist off white cap and twist brown base to the right, then to the left until hear the click.
3. Turn face away and breathe out. Do not blow into the device
4. Place the mouthpiece between lips and inhale deeply and forcefully. (The turbuhaler must be held upright or horizontal or you will lose the dose.)
5. If more than one dose is prescribed, repeat **steps 2 through 4**.
6. Replace cover. Turbuhaler must be kept clean and dry.
7. Rinse your mouth with water, gargle and spit. Do not swallow.
8. When red line shows on side of Turbuhaler, there are 20 doses left.

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TURBUHALER – CONTINUED-

9. Delivers 200 doses of Pulmicort (budesonide)
10. When using it for the first time, it must be primed.
11. When 20 doses are left, red mark appears on side of turbuhaler and will remain.

C.AEROLIZER INHALER

Delivers Foradil in a capsule. Capsule is NOT to be swallowed.

1. Pull cover off.
2. Hold base of Aerolizer inhaler and twist mouthpiece in the direction of the arrow to open.
3. Push buttons in to make sure that the 4 pins are visible in the capsule well on each side.
4. Peel paper backing from one blister capsule and push capsule through the remaining foil. Remove capsule just before use.
5. Place capsule in the capsule-chamber (not in the mouthpiece).
6. Twist mouthpiece back to closed position.
7. Hold inhaler/mouthpiece upright; at the same time press both buttons once. A click should be heard as the capsule is being pierced.
8. Release the buttons (don't press again).
9. Tilt head back slightly and place mouthpiece in mouth, close lips around it. (Make sure inhaler is horizontal, with the blue buttons to the left and right...NOT up and down).
10. Inhale deeply and steadily. A whirring noise will be heard and a sweet taste experienced.
11. Open the Aerolizer inhaler and remove the empty capsule.

Nebulizer:

1. Choose a comfortable position that allows you to inhale medicine.
2. Place the nebulizer compressor on a stable surface and plug machine in.
3. Unscrew top of nebulizer.
4. Put premeasured unit or prescribed dose of medicine in nebulizer cup.
5. Replace top of nebulizer and turn until secure.
6. Attach mouthpiece onto nebulizer with valve facing down, or attach mask if mouthpiece can't be used correctly. Blowby (Blowing the medicine into the face) is not very effective and not recommended unless other delivery methods are not possible.
7. Attach the tubing to bottom of nebulizer by pressing on firmly.

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Nebulizer – continued-

8. Attach opposite end of tubing to machine's outlet port.
 9. Turn compressor machine on. Check for a steady mist.
 10. Place mouthpiece between teeth and top of tongue and inhale through the mouth.
 11. If using a mask, hold mask to face or secure with a strap.
 12. If using a nebulizer mask with holes, place mask over nose and mouth and take the cap off of neb, otherwise it will take much longer to dispense.
- If using Pulmicort respules, be sure to use a mask without holes and use the accompanying one-way valve attachment, to allow medicine to reach lungs effectively. Wash face and rinse mouth after.
- If side effects are experienced such as dizziness, nausea, chest pain, uncontrollable coughing, heart racing extremely fast, or irregular heartbeat, or any other side effects that may occur with any medication, **STOP** the treatment and call your primary health care provider.
13. Continue treatment until medicine is gone.
 14. Turn compressor off.
 15. Rinse mouth with water if using Budesonide respules.
 16. **DO NOT** throw the machine adaptor away.
 17. Rinse nebulizer parts as appropriate and wash at recommended intervals.

Key Points- Nebulizer

1. A liquid medicine suspended in a saline solution is poured into nebulizer.
 2. Air compressors or jet nebulizers produce a fine mist of the solution.
 3. The mist with the medicine can penetrate deep into the lungs.
 4. Effective for those who cannot use inhalers.
 5. Both quick relief and inhaled corticosteroids are available in liquid form for the nebulizer.
 6. There are different types of nebulizers: jet and ultrasonic. Pulmicort (budesonide) respules should not be used with ultrasonic Nebulizer.
 7. Some deliver greater volumes and take less time for the aerosol therapy.
 8. Average treatment time is 8-10 minutes.
 9. Explain how to clean every other day to prevent infection from bacteria (hot, soapy water to wash nebulizer, rinse with vinegar or sterile water per instructions. May be cleaned in dishwasher, if dishwasher safe. Do not wash tubing.)
 10. Explain how to check and replace the filter when it turns gray/dirty looking.
- (From: Open Airways – American Lung Association of Maine/ Ah! Asthma Health Program, revised 7/04)

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<http://www.maine.gov/education/sh/asthma/studassessform.pdf>

Appendix E

Components of Asthma Management in the Health Office

Health Service Assistant (HSA)	Licensed Practical Nurse (LPN)	Licensed School Nurse (LSN)
CASE FINDING	CASE FINDING	CASE FINDING
<ol style="list-style-type: none"> 1. Identify students with asthma by reviewing the following: <ol style="list-style-type: none"> a. <i>Emergency Referral Cards, Annual Health Information form, Medication forms, Health Problem List, Early Childhood Screening forms, Physical Exams, new Pupil Health Record</i>, and. b. Asthma identified by parent, staff or student report c. ED/hospital admissions due to asthma. 2. Document students seen in the Health Office with symptoms of asthma (frequent cough, wheezing, difficulty breathing) on the <i>Daily Log</i>. 3. Notify LSN of students with asthma or symptoms of asthma following established communication procedure. 	See activities under Health Service Assistant	<ol style="list-style-type: none"> 1. Conduct case finding for asthma by reviewing data from a variety of sources including the student/ family, health/medical records, information and/or referrals from Health Office staff, school staff, medical and other health providers. 2. Review health data provided by Health Office staff on students with asthma. 3. Record health data in the <i>Pupil Health Record</i> and on the <i>Health Problem List</i> as indicated. 4. Obtain additional history as needed.
DELEGATED NURSING CARE/PROCEDURES	Delegated Nursing Care/Procedures	Nursing Care/Procedures
<ol style="list-style-type: none"> 1. Distribute <i>Parent Guardian Questionnaire (PQ)</i> to: <ul style="list-style-type: none"> • newly diagnosed or newly discovered students with asthma in Pre-K through 5th grade. • any student indicated by the LSN. 2. The <i>PQ</i> may be sent home with the student, mailed or given to the parent/guardian. 3. Document that the <i>PQ</i> was given or sent to parent/guardian on the <i>Daily Log</i>. 	See activities under Health Service Assistant	<ol style="list-style-type: none"> 1. The <i>Parent Guardian Questionnaire (PQ)</i> is a tool used to help the LSN: <ol style="list-style-type: none"> a. determine if the student's asthma is under control (in grades Pre-K through 5); b. determine severity level, and c. to develop an appropriate plan of care (IHP). 2. The <i>PQ</i> is given to: <ul style="list-style-type: none"> • newly identified or newly discovered students with • asthma in Pre-K through 5th grade. • students with asthma where more information is needed. 3. Information from the <i>PQ</i> is summarized in the narrative notes of the pupil health record. 4. The <i>PQ</i> may be sent home with the student, mailed or given to the parent/guardian. 5. Document that the <i>PQ</i> was given or sent to parent/guardian on the <i>Daily Log</i>.
<ol style="list-style-type: none"> 1. Administer Student Breathing Questionnaire (SBQ) to any student in Grades 6 – 12 with asthma: <ul style="list-style-type: none"> • on initial visit with asthma symptoms to the Health Office during the school year, • who takes medications on a routine basis, • per request of LSN, • who is reported to the Health Office staff as absent due to asthma \geq1-day. 2. Assist student with SBQ if student 	See activities under Health Service Assistant	<ol style="list-style-type: none"> 1. The LSN uses the Student Breathing Questionnaire (SBQ) to: <ol style="list-style-type: none"> a. help determine if student's asthma is under control (for students in grades 6 - 12); b. help determine the student's severity level, and c. develop a plan of care. 2. Administer SBQ to any student in Grades 6 – 12 with asthma: <ul style="list-style-type: none"> • on initial visit with asthma symptoms to the Health Office during the school

<p>cannot read at 3rd grade level or needs interpreter services.</p> <p>3. Document that SBQ was given to student on the Daily Log.</p>		<p>year.</p> <ul style="list-style-type: none"> • who takes medications on a routine basis. • who is reported to the Health Office staff as absent due to asthma ≥1-day. <p>3. If the student's asthma status appears to be changing, the LSN can repeat the SBQ if indicated (persistent asthma, moderate to severe asthma, out-of-control asthma).</p> <p>4. Assist student with SBQ if student cannot read at 3rd grade level or needs interpreter services.</p> <p>5. Summarize findings in narrative notes of the Pupil Health Record.</p> <p>6. Document that the SBQ was given to the student on the Daily Log.</p>
<p>Provide episodic care to students with symptoms of asthma.</p>	<p>Provide episodic care to students with symptoms of asthma, which includes physical assessment in the following areas: visual inspection, auscultation of breath sounds (anterior/posterior, skin to skin.), respiratory rate, peak flow.</p>	<p>1. Perform assessments on students with symptoms of asthma, which include:</p> <ul style="list-style-type: none"> • Physical Assessment: visual inspection, auscultation of breath sounds (anterior/posterior, skin to skin), respiratory rate, peak flow. • School: school performance, ability to function in physical education, sports, socially, and attendance. • Resources: insurance status, transportation, finances, access to Health Care Provider (HCP). <p>2. Assessment can also include the following areas:</p> <ul style="list-style-type: none"> • Emotional/social status: student's reaction to illness, abuse, neglect. • Environmental: home and school environment • Family support:
<p>1. Document asthma visit on Daily Log and/or Pupil Health Record.</p> <p>2. Complete Asthma Visit Notification form (AVN) when student is seen in the Health Office with asthma symptoms and/or distress and send home with student. Retain one copy for LSN to review and file.</p> <p>3. Document that Asthma Visit Notification Form (AVN) was sent to parent/guardian on Daily Log (communication section).</p>	<p>See activities under Health Service Assistant</p>	<p>1. Document asthma visit on Daily Log and/or Pupil Health Record.</p> <p>2. Complete Asthma Visit Notification form (AVN) when student is seen in the Health Office with asthma symptoms and/or distress and send home with student.</p> <p>3. Review and file AVNs completed by Health Office staff.</p> <p>4. Using the MPS Pathway For School Asthma Care, provide appropriate level of intervention for students with exacerbation of asthma.</p> <p>5. Phone parent/guardian if student is seen in the Health Office ≥2 times a week with asthma symptoms.</p> <p>6. Document that AVN Form was sent to parent/guardian on the Daily Log (communication section).</p> <p>7. Review AVNs weekly and file in the Pupil Health Record.</p> <p>8. Determine if additional medical information is needed; request Consent to Release Information from parent/guardian. If AAP includes "consent to release information", use AAP as "release or Medication Authorization form."</p>
<p>1. Complete or initiate the School Health Office Asthma Record (SHOAR) on all students with asthma medication and/or students who need documentation of Peak Flow or Education. (See instructions under peak flow and SHOAR instructions).</p> <p>2. The SHOAR is used to:</p> <ul style="list-style-type: none"> • Record asthma medication 	<p>See activities under Health Service Assistant.</p>	<p>3. Complete or initiate the School Health Office Asthma Record (SHOAR) on all students with asthma medication and/or students who need documentation of Peak Flow or Education. (See instructions under peak flow and SHOAR instructions).</p> <p>4. The SHOAR is used to:</p> <ul style="list-style-type: none"> • Record asthma medication • Record peak flow readings • Document asthma symptoms

<ul style="list-style-type: none"> Record peak flow readings Document asthma symptoms Document education. 		<ul style="list-style-type: none"> Document education.
		<ol style="list-style-type: none"> The Asthma Medical Request form (AMR) is used for communication between the Health Care Provider (HCP) and the LSN. Complete the AMR or contact the HCP when there are asthma control or management concerns. Attach SHOAR if HCP requests. The AMR should be sent to the HCP only after parent/guardian consent is obtained, except in the event of an emergency. When a student is transported by ambulance to the ED, the AMR form should be sent along with the student. Fax copy to HCP (if known). When a student needs immediate care (based on the MPS Pathway for Acute Asthma Care) and he/she is going to their primary clinic or urgent care, the LSN should call the HCP to inform them of the referral. The AMR should be sent with the student and faxed to the HCP. For situations not requiring immediate attention, the LSN should fax the AMR to the clinic without calling the clinic. The LSN should call the parent/guardian or send the AVN form home informing parent/guardian of AMR faxed to clinic. The LSN will send the AMR when: <ul style="list-style-type: none"> Student is seen in the Health Office 2 or more times a week with asthma symptoms. Medication/peak flow meter/spacer are needed at school. There are other questions about medications. Student experiences an acute asthma episode requiring immediate care. Student has missed 5 or more days of school due to asthma within the current school year. Document on the Daily Log and narrative notes of Pupil Health Record that the AMR was sent to the clinic or HCP. File original/copy in the Pupil Health Record.
		<ol style="list-style-type: none"> Summarize Health Office asthma visits (intervention and response) at least annually in the narrative notes of the Pupil Health Record. Develop Individual Health Plan IHP for students with moderate to severe asthma who require nursing care (see IHP instructions). Review and modify IHP as needed.
<ul style="list-style-type: none"> Request Asthma Action Plan (AAP) and/or Release of Medical Information or Medication Authorization form per LSN request (see form letter in Asthma Manual). Send AAP form and explanatory cover letter home with request. The AAP form serves as a medication consent and release of information consent when signed by Health Care Provider and parent. AAPs will be faxed to HRS who will fax them directly to the student's school. HSA and LPN will notify LSN of new AAPs. Place AAPs in medication book behind SHOAR form. File copy in chart. 	See activities under Health Service Assistant.	<ol style="list-style-type: none"> Send request for AAP on students: <ul style="list-style-type: none"> whose asthma is out of control, with mild, moderate and severe persistent asthma, who take asthma medications at school on a daily basis, with ED or hospital visits within the last year. Review new AAPs on a weekly basis. Place AAPs in medication book behind SHOAR form. File copy in chart.

		<ol style="list-style-type: none"> 1. Review PQ, SBQ, AVN Form, and AAP to determine student's current level of control and/or severity. 2. Determine control and/or severity level on any student who comes into the health office with problems related to asthma. 3. Document in Pupil Health Record and on Health Problem List. Update severity level on Health Problem List.
<p>Check peak flow:</p> <ul style="list-style-type: none"> • on students with asthma symptoms, to determine if medication is needed per AAP • on students designated by the LSN • Document peak flow readings, signs, symptoms and medications given on SHOAR form: "o" = peak flow reading before medication, "x" = peak flow after prn medication. Record actual PF number above "o" or "x" on graph section of SHOAR. • If student returns with symptoms a second time on that same date and requires repeat peak flow monitoring, the following adjacent vertical column is used to document the peak flow (If AAP is not available, calculate the values based upon the student's personal best or calculate student's predicted peak flow using the table: "Average Peak Flow Rate For Healthy Children.") 	See activities under Health Service Assistant	<p>Check peak flow on students:</p> <ul style="list-style-type: none"> • with persistent asthma • with asthma symptoms • to determine if medication is needed per AAP. • Document peak flow readings, signs, symptoms and medications given on SHOAR form: "o" = peak flow reading before medication, "x" = peak flow after prn medication. Record actual PF number above "o" or "x" on graph section of SHOAR. • If student returns with symptoms a second time on that same date and requires repeat peak flow monitoring, the following adjacent vertical column is used to document the peak flow (If AAP is not available, calculate the values based upon the student's personal best or calculate student's predicted peak flow using the table: "Average Peak Flow Rate For Healthy Children.")
<ol style="list-style-type: none"> 1. Administer medications per AAP or Health Care Provider (HCP) order. <ul style="list-style-type: none"> • Document medication in the same vertical column, that peak flow is recorded on the SHOAR form, in the first available box corresponding to the medication given. • If student returns with symptoms a second time on that same date and receives PRN medication and/or requires peak flow monitoring, the following adjacent vertical column is used to document the peak flow and medication given (use one line only for PRN medication). • Use one line for each medication unless a medication is routinely given twice during the each school day. In this case, use a separate line for each administration time. 	See activities under Health Service Assistant	<ol style="list-style-type: none"> 1. Assess, monitor, and/or administer medications. <ul style="list-style-type: none"> • Document medication in the same vertical column, that peak flow is recorded on the SHOAR form, in the first available box corresponding to the medication given. • If student returns with symptoms a second time on that same date and receives PRN medication and/or requires peak flow monitoring, the following adjacent vertical column is used to document the peak flow and medication given (use one line only for PRN medication). • Use one line for each medication unless a medication is routinely given twice during the each school day. In this case, use a separate line for each administration time.
		<ul style="list-style-type: none"> • Summarize triggers, significant history, education and progress toward goals in the IHP and on narrative notes of Pupil Health Record at the end of the year or on withdrawal. • Provide ongoing support and monitoring to Health Office staff regarding asthma care. • Train Health Office staff on all delegated tasks and supervise performance.
Care Coordination (HSA)	Care Coordination (LPN)	Care Coordination (LSN)
Request AAP on students per LSN delegation.	Request AAP on students per LSN delegation.	<ol style="list-style-type: none"> 1. Request AAP on students: <ul style="list-style-type: none"> • whose asthma is out of control,

		<ul style="list-style-type: none"> • with persistent mild, moderate or severe asthma. • seen daily for administration of asthma medications. <ol style="list-style-type: none"> 2. Document request in narrative notes of Pupil Health Record.
		<ol style="list-style-type: none"> 1. Review IHP and AAP 2. Develop or modify plan for case coordination as needed.
Refer students who have no insurance to the New Family Center using the Health Insurance Information Questionnaire.	Refer students who have no insurance to the New Family Center using the Health Insurance Information Questionnaire	<ol style="list-style-type: none"> 1. Determine if students have insurance. 2. Assess family's understanding of health care system and ability to access preventive and emergency care. 3. For students who have no insurance, refer to the New Family Center using the Health Insurance Information Questionnaire and Resource Directory.
<ol style="list-style-type: none"> 1. Arrange transportation per LSN request. 2. Arrange interpreters for parents or students as needed. 	<ol style="list-style-type: none"> 1. Arrange transportation per LSN request. 2. Arrange interpreters for parents or students as needed. 	Arrange transportation and interpreters for students as needed.
Communicate with parent/guardian regarding asthma care, asthma episodes, Release of Information Consents and need for medication or supplies.	Communicate with parent/guardian regarding asthma care, asthma episodes, Release of Information Consents and need for medication or supplies.	<ol style="list-style-type: none"> 1. Consistent communication with parents/guardians and providers regarding asthma care, need for medication, supplies, Release of Information Consents, asthma episodes. 2. Refer students to Health Care Provider to ensure consistent asthma care and follow-up according to NIH guidelines.
		Initiate referrals to: <ul style="list-style-type: none"> ▪ community based asthma programs, ▪ asthma case management services @ health plan, hospital or clinic, ▪ home visiting services for f/u coordination, education or home environment assessment. ▪ other services as needed.

E2 - Components of Asthma Care in the School Health Office (Minneapolis Public Schools).

Appendix F

Quick Report Card: Asthma and Allergy Assessment

Evaluate your school's health and create a safer learning environment.

YES NO

Are feathered or furry animals kept out of classrooms?

If animals must stay, are they away from ventilation systems?

If there are signs of cockroaches or rodents, is Integrated Pest Management (www.epa.gov/pesticides/ipm) used?

Is food stored in sealed containers?

Are dumpsters parked away from buildings?

Are leaks and mold areas fixed promptly?

Is indoor humidity between 30-50%?

Is ventilation adequate around art supplies and lab experiments?

Are no-smoking policies enforced in and around the school?

Are stuffed toys washed weekly to prevent the growth of dust mites?

Are nap pads covered with mite-proof covers?

Are plastic/wood chairs used instead of upholstered furniture?

Are hard surfaces regularly damp-dusted?

Is a high-efficiency particulate air (HEPA) vacuum cleaner used?

Are no/low VOC (volatile organic compounds) paints, adhesives and cleaning products used?

Are repairs, painting, new carpet installation and spraying done

when school is out? If not, are parents notified in advance?

If portable classrooms are used, are dampers open, ventilation systems used correctly and washable entry mats used?

Are classrooms away from dusty parking lots, sprinklers and where cars and school buses idle?

If you answered 'No' to one or more of the above questions, refer to the resources listed below for more tips on creating a healthy school environment and discuss them with the appropriate professionals.

More Information (ask for Spanish resources):

Asthma and Allergy Foundation of America – 1.800.7ASTHMA – www.aafa.org

Environmental Protection Agency – 1.800.438.4318 – www.epa.gov/iaq/schools

www.schoolasthmaallergy.com

http://aafa-md.org/media/quick_report_card_schools.pdf