CHILD CARE PROVIDER KNOWLEDGE AND SELF-REPORTED COMFORT IN CARING FOR YOUNG CHILDREN WITH ASTHMA

By

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(Under the direction of Charlotte Wallinga)

ABSTRACT

The purpose of this study was to examine child care providers' knowledge and self-reported comfort in caring for children with asthma. Participants included 338 child care providers attending three Georgia Early Childhood Institute conferences during 2003-2004. The majority of participants were lead (40.6%) or assistant teachers (33.4%), and held a high school or GED diploma (54.6%). Data was collected using the Asthma Knowledge and Training Needs of Child Care Providers Survey (Bales, Coleman, & Wallinga, 2003). Data analysis consisted of several one-way analysis of variance tests and a correlation test. Analyses revealed that specific knowledge differed according to accreditation status of the work place, while perceived knowledge differed by asthma training, the presence of asthma guidelines, and personal experience with asthma. Self-reported comfort differed only in regard to child care providers' asthma training.

INDEX WORDS: Asthma, Child Care Providers, Knowledge, Comfort

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CHAPTER 1

INTRODUCTION

Asthma is a growing healthcare concern within the United States (American Lung Association (ALA), 2004). Between 1982 and 1994 overall asthma prevalence in Americans escalated by 84%; during which the rate of asthma in children under 18 increased by a dramatic 70% (American Academy of Pediatrics, 2002). Currently, asthma is the most common childhood chronic illness in this country (Welch, 2000) and causes approximately 200 child fatalities a year (Beers, 2003). It is estimated that a total of 5 million children under age 18 are affected by asthma in the United States, including 825,000 children under age 5 years old (American Academy of Allergies, Asthma, and Immunology (AAAAI), 2004). The American Academy of Pediatrics (AAP) estimates that 80 to 90% of children who have childhood asthma had already developed symptoms of the condition by the age of 4 or 5 years old (Welch, 2000). The frequency of asthma in young children suggests a need to address the specific concerns and issues regarding asthma in early childhood.

A prevailing issue pertaining to childhood asthma is the need for trained and competent adult figures to manage the child's special healthcare needs. Within the past few decades, there has been an increase in maternal employment (Bureau of Labor Statistics, 2002). It is estimated that two-thirds of mothers are employed part to full-time, many of whom have children under the age of six (Bureau of Labor Statistics, 2002). If maternal employment is rising, it is plausible to suggest that more young children will be attending child care. In 2002, approximately 12 million children in the United States were receiving care from someone other than their parents (Federal Interagency Forum on Child and Family Statistics, 2004).

It is documented that many child care providers care for children who have asthma. Concern, however, has been expressed by individuals such as, child care providers, parents, and doctors regarding the preparedness and ability of child care providers to give quality care to children who have medical needs (Huss et al., 2002; Ramm, Bauman, Young, & Forero, 1994; Walders, McQuaid, & Dickstein, 2004). Even though many young children with asthma attend child care, only four studies were found that focus specifically on child care providers and asthma (Huss et al., 2002; Juhn, St. Sauver, Shapiro, & McCarthy, 2002; Ramm et al., 1994; Walders et al., 2004). Due to the fact that asthma is becoming increasingly prevalent, young children with asthma need child care, and little research has been conducted on child care providers understanding of asthma, further research is warranted.

Although the topic of child care providers and asthma has been neglected in empirical research, some insight and information may be gained by looking at studies on elementary school teachers and asthma. There is a greater amount of research and literature on elementary teachers, school settings, and children with asthma (Brookes & Jones, 1992; French & Carroll, 1997; Johnson, Boyd, Lubker, & Fowler, 1988; Neuharth-Pritchett & Getch, 2001; Neuharth-Pritchett & Getch, 2003; Rodehorst, 2003). These studies show that teachers report a general lack of knowledge and comfort in caring for children who have asthma (Brookes & Jones, 1992; French & Carroll, 1997; Johnson et al., 1988; Neuharth-Pritchett & Getch, 2001; Rodehorst, 2003). Seeing that there are inadequacies in school teachers' knowledge and comfort in providing optimal care, it is possible that this may also be true of child care providers. This information may be especially salient, due to the fact that child care providers do not have access to school resources and supports for asthma management, such as a school nurse. With the

knowledge that asthma in young children is on the rise and that many children are attending child care settings, it is necessary to learn more about the knowledge and comfort of child care providers who care for these children.

Purpose of Study

The purpose of this study was to examine child care providers' knowledge and self-reported comfort in caring for children who have asthma. More specifically, child care providers' general, specific, and perceived knowledge of asthma, and their self-reported comfort in caring for children with asthma were analyzed to determine possible differences based on child care providers' personal and professional/center demographics, along with their asthma training and experience. By identifying variables that may be important in regard to child care providers' asthma knowledge and self-reported comfort, this study aimed to determine factors that may be useful in increasing child care providers' knowledge and comfort in caring for children with asthma.

CHAPTER 2

LITERATURE REVIEW

The following is a review of literature on asthma and young children, and the child care providers who serve these children. This section will provide an overview of literature and research on a) the medical condition of asthma, b) asthma management, c) negative effects of asthma on children, d) an ecological perspective on children with asthma, and e) child care and children with asthma.

The Medical Condition of Asthma

Childhood asthma is a serious medical condition that causes numerous health problems and may require medical attention. Within a 12 month span of time, it can be expected that over 4 million children will have experienced an asthma attack and may require medical treatment (Welch, 2000). Asthma symptoms and complications are the most commonly cited reason for children's visits to the emergency room and for ensuing hospitalization (Welch, 2000). In 2002, approximately 5 million visits for children ages birth to seventeen were due to asthma related difficulties (Dey, Schiller, & Tai, 2004).

Physiological Process of Asthma

The process of breathing begins at the mouth where air is inhaled into the trachea, or windpipe. From the trachea, air travels into the two bronchial tubes and then into smaller airways, called bronchioles, which disperse oxygen throughout the lungs (Beers, 2003). The bronchi not only bring air into the lungs, but also protect the lungs from harmful substances by restricting and narrowing when these substances are encountered in the air. In an individual with asthma, the bronchi and bronchioles are chronically inflamed, making the air passages

"hypersensitive" or "hyperresponsive" to airborne irritants (Welch, 2000). Although inflammation in the airways caused by asthma is always present, it does not always present noticeable symptoms until an asthma attack is occurring (Welch, 2000).

A reaction causing an increase in asthma severity, known as an exacerbation or asthma attack, occurs when a person comes into contact with various airborne environmental stimuli, called triggers, which stimulate physiological reactions in the respiratory system (Welch, 2000). Exposure to these stimuli irritates the overly-sensitive air passages and causes the ring-like muscular bands surrounding the bronchial airways to tighten and constrict, thereby narrowing the bronchi and making breathing more difficult. Triggers also stimulate the bronchi to produce large amounts of mucus that further crowd the airways, allowing only minor amounts of oxygen to flow into the lungs, causing respiratory complications (Allen, Bryant-Stephens, & Pawloski, 2004; Beers, 2003; Welch, 2000).

Signs and Symptoms of Asthma

Asthma symptoms can present differently in each individual, including the signs, severity, and frequency of attacks. Signs of asthma reactions may include breathing difficulties such as wheezing, labored or fast-paced breathing, and coughing (Beers, 2003; Edelman, 1997; Welch, 2000). Other common signs of asthma can include dark circles under the eyes, anxious or apprehensive behaviors, or restlessness (Beers, 2003). During more severe asthma episodes, there may be signs of lethargy, confusion, or bluing of the skin due to lack of oxygen. Individuals having an asthma reaction may have tightness or pain in their chest or experience headaches (Beers, 2003). Many of these signs and symptoms present visual cues that indicate respiratory problems or an ensuing asthma attack. Therefore, knowledge of the disease, including signs, symptoms, and severity of asthma, along with appropriate skills to assess the child's condition, are crucial to early recognition and treatment of an asthma attack.

Asthma Triggers

Asthma triggers are pervasive throughout indoor and outdoor environments. Though asthma triggers are commonplace, these stimulants can be avoided or exposure can be reduced if caretakers are aware of the individual's triggers. Each individual has unique triggers, although there are certain stimuli which tend to be more prevalent triggers, such as allergens. The most common allergens include, dust, molds, cigarette smoke, animal dander, perfumes, potent chemicals, and foods (Allen et al., 2004; Beers, 2003; Welch, 2000). In fact, 70 to 80% of children diagnosed with asthma also suffer from allergies (Welch, 2000). Not all asthma triggers, however, are allergy related and individuals can still have asthma if they do not have allergies. Typical non-allergenic triggers can include changes in weather conditions, respiratory infections, exercise, or even strong emotional reactions, such as crying or laughing (Allen et al., 2004; Welch, 2000). Avoidance or reduction of exposure to triggers is an important aspect of managing asthma in young children.

Diagnosis in Young Children

Asthma in young children can be difficult to diagnose and treat, because the symptoms are often thought to be pneumonia, bronchitis, or other common respiratory infections (Welch, 2000). Another difficulty with diagnosing asthma in this age group is that young children often have trouble explaining, understanding, or recognizing asthma symptoms (Edelman, 1997; Hamm, 2004). Because the signs of asthma are often ambiguous, it is crucial for individuals who interact with children to be knowledgeable about asthma. Although diagnosing asthma in young children may be complicated, medical professionals stress the importance of making a diagnosis, determining treatment, and beginning management of asthma early in life. Early diagnosis, along with proper treatment and management, can help prevent complications and promote normal lung development in children (Edelman, 1997).

Asthma Management

Although asthma is a chronic medical condition, if properly managed, attacks and flare-ups can usually be prevented and symptoms can be kept under control (AAAAI, 2004; Edelman, 1997). Healthcare professionals state that individuals who engage in appropriate asthma management behaviors will have fewer missed days from child care, school, or work, and will experience fewer symptoms and flare-ups (Beers, 2003; Hamm, 2004; Muth, 2000).

There is no single definition of asthma management; however, there is general consensus in the healthcare field regarding strategies for good asthma management. Generally, asthma management is conceptualized as the use of skills and knowledge to control and reduce asthma symptoms and maintain a healthy and functioning lifestyle. The overall goal of asthma management is for individuals with asthma to be able to function at the same level as their peers without asthma (Page, 2000). Prevention of symptom exacerbations or attacks and minimization of medicinal side effects are also common goals (AAAAI, 2004). Techniques that are often cited by healthcare professionals as key factors to successful asthma management include medication, education, and environmental control of triggers (AAAAI, 2004; Allen et al., 2004; Welch, 2000). These three components of asthma management will be reviewed in greater detail.

Medications

Inappropriate and inconsistent use of asthma medications are common causes of severe and fatal asthma attacks (Welch, 2000). The proper use of medications to treat asthma can allow individuals to function and participate normally in daily activities and can minimize their risk for respiratory complications (Allen et al., 2004).

Asthma medications serve two major functions: 1) they reduce or prevent reactions and sensitivity to environmental triggers, and 2) they aid in quickly opening the airways (Beers, 2003). These medications fall into two broad categories, referred to as anti-inflammatory and

bronchodilator medications. Each medication treats asthma in a unique way; however, these medications should be used congruently in order to effectively reduce symptoms and decrease the likelihood of asthma attacks occurring.

Anti-inflammatory Medications

These medications are commonly called "maintenance" or "controller" medications because their function is to help suppress the constant swelling and irritability within the bronchi and bronchioles. Through consistently controlling the level of inflammation in the airways, these medications help to reduce the hypersensitivity of the bronchi to triggers, thereby lessening the probability of having an asthma attack (Beers, 2003). Furthermore, the use of anti-inflammatory medications helps to prevent lasting respiratory damage and severe asthma reactions (Allen et al., 2004).

Bronchodilators

These medications serve as emergency relief in the event of an asthma attack and can be used to prevent a full flare-up from occurring (Allen et al., 2004; Beers, 2003). The function of bronchodilator medications is to quickly open the bronchi and bronchioles by dilating and relaxing the airways (Beers, 2003). During an asthma attack, the use of bronchodilators will provide prompt alleviation of swelling in the airways, thereby easing breathing problems. Unlike maintenance medications, bronchodilators are only used when needed for immediate relief. Regular use of these quick-relief medications is an indicator that the individual's asthma is not under control (Allen et al., 2004).

Administration of Asthma Medications

Asthma medications can be taken orally, intravenously, or can be inhaled. Although administration may occur through any of these methods, the later is the most widely used and will, therefore, be the focus of this section. Inhalation of asthma medications is also thought to

be the most beneficial and effective method of administration, as it delivers medication directly into the airways to alleviate symptoms (Welch, 2000). A common delivery mechanism for asthma medication is an inhaler, which quickly dispenses medication into the bronchi as the individual inhales. Both liquid and powder medications can be used with an inhaler. Metered dose inhalers simplify administration by having pre-measured doses of the medication already within the inhaler and ready for use; this also insures accurate dosages (Welch, 2000). For liquid medications, many individuals may also use a spacer, a tube-like device in which the medication mist is suspended and then inhaled allowing for better inhalation into the bronchi, reducing the likeliness of side effects (Allen et al., 2004). Inhalers with dry powdered medication can also be used to treat asthma. This method ensures that more medication is inhaled into the lungs, as opposed to non-powdered medications, which can settle inside the mouth and back of the throat (Edelman, 1997). Although inhalers are quite common and effective in administering medications, they may be difficult to use for certain individuals, especially young children.

Medication Administration in Young Children

Special considerations must be taken into account when administering medication to young children. Metered dose inhalers require knowledge, coordination, and appropriate sequencing of multiple steps, which could be difficult for young children to understand, follow, and remember (Edelman, 1997). Young children may also have trouble properly breathing dry powder medications, thereby reducing their effectiveness. Based on these concerns most healthcare professionals do not recommend inhalers for children less than 5 years of age (Allen et al., 2004). Instead, nebulizers are suggested for easier and more effective administration of medications in young children (Welch, 2000). A nebulizer is a machine that converts liquid asthma medication into a fine mist that is inhaled through a mouthpiece or mask, which is placed over the child's mouth and nose. Nebulizers are often used for individuals who are not capable

of independent self-administration of medications, such as children. This method of administration allows the child to breathe normally while receiving a continual flow and accurate amount of medicine (Edelman, 1997; Welch, 2000).

Education

Asthma is a serious medical condition, which may require quick decision-making, accurate medicinal administration, and awareness about what is happening and how to manage the situation. Education on the disease and an individual's symptoms, triggers, and medications is critical to the functioning and attainment of management goals in an individual with asthma (AAAAI, 2004; Allen et al., 2004; Edelman, 1997; Welch, 2000). Knowledge of symptoms can prepare individuals to recognize the onset of an attack and knowledge of medications is crucial to properly treating the condition. Education on asthma is not only beneficial in recognizing and treating asthma symptoms and attacks, but it can also provide information on how to reduce the frequency and severity of attacks, along with ways to avoid dangerous complications and possible fatalities (Beers, 2003).

Organizations and professionals that specialize in asthma care and education suggest using an asthma management plan or a care plan to educate caregivers on a child's asthma (AAP, 2002; AAAAI, 2004; Allen et al., 2004; Getch & Neuharth-Pritchett, 1999; Madden, 2000; Welch, 2000). All family members, child care providers, teachers, and other individuals who care for the child should be knowledgeable about an asthma care plan. The care plan serves as an educational tool and provides guidelines for care, which include information about the child's symptoms and triggers, step-by-step instructions for medication administration and use of equipment, emergency contacts, and what to do in the event of an asthma attack (Allen et al., 2004; Welch, 2000).

Environmental Control

A large factor in good management of asthma and prevention of attacks is awareness of triggers and reduction of exposure to these stimuli in the environment (Madden, 2000). Barbara Epstein (2001), an expert of occupational and environmental health, claims that environmental controls and precautions are especially necessary for young children due to the vulnerability of their developing immune and neurological systems. She also points out that young children are more likely to play on floors, increasing their exposure to allergens (Epstein, 2001). Adult caregivers may take simple precautionary measures, however, to reduce the child's exposure to common triggers and irritants, and improve their overall air quality. Children's homes, child care centers, and schools should be vacuumed, dusted, and cleaned on a regular basis. Tile flooring or low carpeting is recommended to decrease allergens on the floor and in the air (Muth, 2000). Furthermore, adults can limit the child's exposure to animals with irritating hair and dander, which can exacerbate asthma symptoms (Muth, 2000). These simple precautionary measures may help reduce the child's exposure to potential asthma triggers, thereby helping decrease the likeliness of an asthma attack.

Asthma Management in Young Children

Asthma management is a complicated process that requires knowledge, the ability to administer medications, decision-making skills, and utilization of prevention strategies. Proper and consistent asthma management requires skills that are beyond the abilities of a young child to handle independently. Although young children may be able to learn basic information about their condition or medications, they lack the cognitive, organizational, and problem-solving abilities that are required to autonomously carry out asthma management tasks and fully manage their asthmatic condition (AAAAI, 2000; Edelman, 1997; Rodehorst, 2003). Based on the

complexities of asthma management and the child's limited abilities in asthma management, parents and caregivers must be responsible for providing this care to young children (Allen et al., 2004; Edelman, 1997).

Negative Effects of Asthma on Children

Early management of asthma can help a child avoid not only some of the physical manifestations of asthma, but may also ameliorate or avert common behavioral and psychosocial reactions that commonly occur in young children with asthma. Children with asthma not only face the normal developmental issues of their peers, but must also cope with the physical, psychological, and social complications that their asthma may present (Madden, 2000; Perrin & Gerrity, 1984). Literature on behavioral and psychosocial reactions of children with asthma will be examined.

Behavioral Reactions

Children with asthma may experience varied changes both behaviorally and in physical activity as a result of their asthma. Because of asthma related issues, such as breathing complications or having to use an inhaler, some children may be less motivated to participate in activities or may avoid activities that require physical exertion (Edelman, 1997), such as tag, basketball, or kickball. These children may also have decreased activity levels due to restrictions imposed by adults who are concerned about physical exercise exacerbating their asthma. Both children and adults may lower their expectations for participation in physical activity for fear that it may cause an asthma attack, whether these fears are realistic or not (Hamm, 2004). With proper monitoring, use of medications, and adaptations for physical needs, however, most children with asthma are able to participate normally along-side their peers in many activities.

Certain behavioral changes in children may also be side effects of asthma medications. Many common asthma medications can affect short-term memory or concentration, possibly affecting the child's ability to focus or participate in activities (Bender, 1995). Children may also experience physiological reactions similar to caffeine, possibly causing the child to feel restless or inattentive (Thies, 1999). Other side effects of medications may include increased heart rate, muscle tremors, or headaches (Allen et al., 2004). It is important for adults, including child care providers, to know that asthma medications may cause these behavioral reactions, in order to be better able to adapt activities, prevent problem behaviors, and provide appropriate support for the child.

Psychosocial Impact

Besides changes in physical activity and behavior, children may also experience negative psychological effects from asthma. Possible negative effects include believing they are "different" and feeling isolated from their peers, or being embarrassed about having asthma and taking medications (Bender, 1995). Furthermore, children can experience anxiety or depression as a result of medicinal side effects (Bender, 1995). These negative psychological reactions may cause children to decrease their socialization with peers, avoid participation in activities, or refrain from taking their medications (AAAAI, 2004). Seeing the possibility that asthma can negatively affect children's psychological, social, and behavioral development, it is important to begin addressing these issues early in life.

Ecological Perspective on Childhood Asthma

To develop an understanding of child care providers caring for children with asthma, it is important to look at contextual factors that may interplay in this relationship. Utilizing an ecological perspective in this study allows for the inclusion of contextual factors from both proximal and distal influences within the ecosystem. The child with asthma is the focus of this

model in order to show how knowledge and self-reported comfort of child care providers, along with other systemic influences, affect the care the child receives.

According to this perspective, an individual's ecological environment consists of multiple systems as "a nested arrangement of concentric structures, each contained within the next" (Bronfenbrenner, 1979, p. 22). It is posited that within this model, there is the microsystem, mesosystem, exosystem, and the macrosystem. These systems contain individuals, contexts and influences of varying proximity to the individual. Beginning with the individual, in this case the child with asthma, in the microsystem and moving outward toward the exosystem, the systems progressively widen in scope to include more and more distal environmental contexts and influences (Bronfenbrenner, 1994). (See Figure 1).

Although these systems contain individuals and contexts of differing proximity to the child, they are not independent of one another, but rather are interrelated and interact. There are links and interactions between each of the ecological systems, which affect one another, and also affect the child (Bretherton, 1993). The mutual interaction between individuals and contexts throughout the systems allows them to influence one another, making this a bidirectional relationship (Bronfenbrenner, 1994). For example, the child is not only independently affected by their parents and child care providers, but is also affected by the interaction between these individuals. To clarify the influence of different ecosystem levels, each system of the model will now be further explored in relation to a child with asthma and the connection of child care providers.

The first system in the ecological model is the microsystem, which includes the child, along with the relationships, roles and activities experienced by the child (Bronfenbrenner, 1994). The relationships in the child's microsystem consist primarily of those individuals who directly interact with the child on a regular basis; mainly the child's family, friends, and child

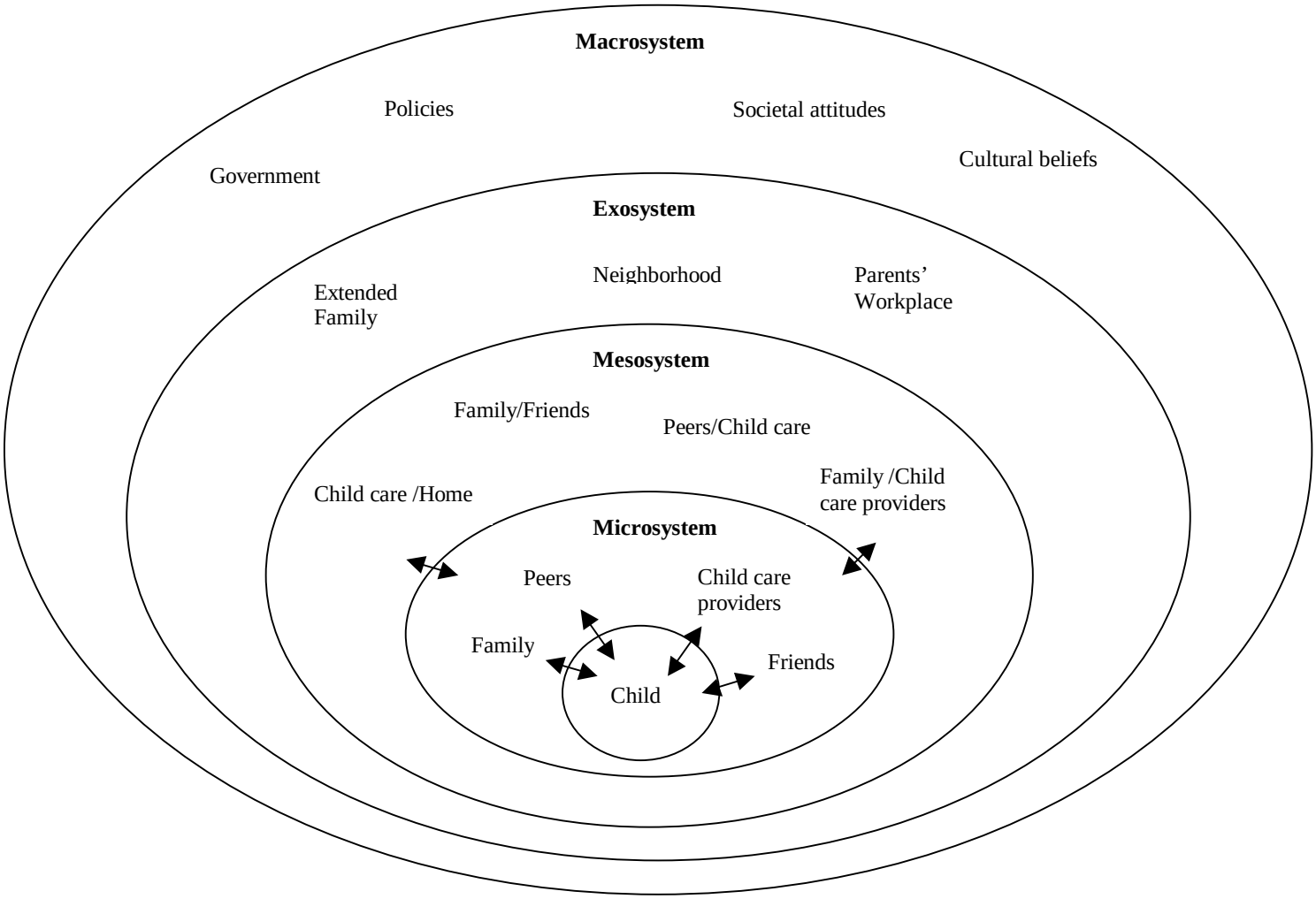

Figure 1.
Bronfenbrenner's ecological model (1994)

care providers (Bronfenbrenner, 1994). For a child, the primary contexts within the microsystem typically include their home, neighborhood, and child care or school settings.

Expanding outward within the model, the next level is the mesosystem, which is comprised of interlinked groups of microsystems (Bubolz & Sontag, 1993). This system includes not only the individuals and environmental contexts of the child's microsystems, but places emphasis on the relations and interaction between these groups of microsystems (Bronfenbrenner, 1979). For a child with asthma, the mesosystem could include the relationship between the parents and child care providers and how their interaction affects the child. More specifically, if the parents of a child with asthma were to educate and communicate with the child care providers concerning their child's asthma, the child's care would likely be improved.

The next tier is the exosystem, which includes connections and interactions between two or more elements of the ecological environment, one of which does not include the child (Bronfenbrenner, 1979). Though more distal to the child, these people and contexts affect individuals within the child's microsystem, thereby indirectly affecting and influencing the child (Bronfenbrenner, 1994). An example could be the stance a child care director takes on asthma education for employees. A director who provides education about asthma would increase the employees' knowledge of the condition, which would indirectly affect the quality of care that is provided to children with asthma by the child care employees.

The outermost level of a child's ecosystem that this study examined is the macrosystem. This system is conceived as being a "societal blueprint" for social and cultural beliefs and life options (Bronfenbrenner, 1979, 1994). Although any influences on the child through the macrosystem may seem far removed, they are in fact, inherent in the child's everyday life. The macrosystem, for example, would include policies regarding educational programs on chronic

medical conditions, such as asthma. Therefore, the popularity of asthma education policies will play a role in determining the level of training on asthma that is required for child care providers. These policies then indirectly affect the asthma care a child receives based on the required training for child care providers.

It is through an ecological lens that this study examines child care providers and their knowledge and self-reported comfort in caring for children who have asthma. By having utilized this theoretical perspective, one can see more clearly how child care providers are included as salient influences on the child and the importance of understanding their knowledge and self-reported comfort regarding asthma care.

Childhood Asthma in Multiple Contexts

It is important to realize that the child's family is the primary source of information and socialization; however, the child interacts within multiple contexts regularly. Therefore, successful symptom management for a child with asthma must take place in a variety of settings and with numerous individuals (Brown, Avery, Mobley, Boccuti, & Golbach, 1996; Rand, 2002). Collaboration and communication should occur between individuals, such as the child's parents, doctors, and child care providers, or teachers (AAAAI, 2004; Allen et al., 2004; Wigal, Creer, Kotses, & Lewis, 1990). By using the ecological perspective in this study, one is able to see how influences in various systems affect the child's asthma management and care. Through the use of this perspective research examining childhood asthma and familial, school, and child care will be discussed.

Asthma and the Family

When a child has asthma, it is not only the child who is affected by this medical condition, but also all individuals within its family (Brown et al., 1996). Common circumstances that affect family members include psychological stressors, concern regarding ability to manage

the illness, interruption of routines, and financial constraints (Mailick, Holden, & Walther, 1994; Rand, 2002). Alternatively, as the family is affected by the child's medical needs, so can the child be affected by the family members' outlook and responses to their asthmatic condition and treatment adherence.

The family is a primary context of influence on young children's behaviors and beliefs in general, and towards their asthmatic condition (Brown et al., 1996). Young children spend much of their time within the family context and are dependent upon their parents to make decisions and provide care, such as asthma management (Brown et al., 1996). Research has shown that parents' perceptions of the child's asthmatic condition and their beliefs concerning medications may determine the level and quality of asthma care that is provided to the child (Mansour, Lanphear, & DeWitt, 2000; Rand, 2002).

Parental knowledge of asthma and ability or desire to actively manage the child's condition also determines the level of care the child receives. Research has shown conflicting reports on parents' knowledge of their child's asthmatic condition (Brown et al., 1996; Cabana et al., 2004; Mansour et al., 2000; Rand, 2002). In their study on parents (N = 40) of children ages 5-12 with asthma, Mansour et al. (2000), determined that barriers to asthma management were often unknowingly presented by parents and family members. Common familial induced barriers included parental attitudes toward asthma and lack of knowledge concerning medications and their use. Cabana et al. (2004), determined that most parents of children with asthma (N = 896) could identify some of their child's triggers; however, over half of the interventions they provided to help control asthma were not beneficial. Alternatively, in a study of 61 parents of preschool children with asthma, Brown et al. (1996), found that the primary caretakers demonstrated accurate knowledge of their child's triggers, medications, and administration. They also reported engaging in self-directed knowledge seeking on asthma,

along with educating their child's caretakers on the condition. Although the results obtained by Brown et al. (1996), are promising, other research shows that parents need further instruction and education.

Another common theme throughout the literature is parents' feelings of comfort regarding their child's condition and use of management techniques. Trollvick and Severinson (2003), found that although parents may be able to manage their child's asthma, feelings of discomfort and worry regarding the medical condition still existed. Parents expressed feelings of uncertainty, helplessness, and fear that their child would have a serious attack at any time. Mansour et al. (2000), reported, however, that even though parents may have fears about the child's asthma, some still reported high levels of confidence in their ability to manage the child's condition. Parents in their study reported feeling fearful at times, but felt confident and efficacious in their asthma management abilities.

These studies stress the importance of the parent's knowledge, beliefs, and comfort on the direct care they provide to the child. Research has shown that the primary source of information for child care providers regarding a child's medical condition and proper management techniques is usually the child's parents (Brookes & Jones, 1992). Therefore, if a parent has limited knowledge and comfort, this individual will not be able to act as a good source of information and support to child care providers. Through this interaction, parents indirectly influence the asthma care their child receives through the information and support they are able to provide to child care providers.

Asthma and School

According to the ecological model, a child interacts with various environments outside of his/her family. As mentioned earlier, there is scant research on child care providers' asthma knowledge and comfort; however, much information may be gained by looking at these topics

with teachers. Various studies have researched school teachers and their knowledge and comfort in providing care for children with asthma. Seeing as how children spend a great deal of time at school and that asthma management continues throughout the day, it can be seen that the school setting and teachers play an important role in children's asthma management (French & Carroll, 1997; Rodehorst, 2003).

A study on school teachers' experiences with chronic illness (N = 480) shows that over 98% of the participants in elementary and middle schools reported working with a child with a chronic illness, the most common being asthma (Clay, Cortina, Harper, & Cocco, 2004). This study reveals a general dearth of on-the-job and academic training concerning childhood chronic illnesses among teachers. Participants in this study disclosed feelings of responsibility and unpreparedness to take on the role of managing a child's medical condition (Clay et al., 2004). In regard to childhood chronic illness, it was determined that teachers' understanding and awareness of the medical condition was a major factor in whether or not they provided appropriate care and support to the child (Mukerjee, Lightfoot, & Sloper, 2000).

Other studies that focus on asthma and elementary teachers, show similar findings (Brookes & Jones, 1992; Neuharth-Pritchett & Getch, 2001; Rodehorst, 2003). Rodehorst (2003) revealed that elementary teachers reported overall positive attitudes and good intentions to manage a child's asthma, although they had limited knowledge of the medical condition. Of the 212 participants in the study, the majority scored between 50-59% on their knowledge of asthma, with lower knowledge on prevention techniques and medications. A study by Brookes and Jones (1992), determined that some elementary teachers believed they had limited knowledge of asthma and expressed concern regarding their lack of information and

preparedness. Along with general reports of lacking asthma knowledge, teachers also reported little to no training on asthma or management techniques (Brookes & Jones, 1992; Neuharth-Pritchett & Getch, 2001; Rodehorst, 2003).

Research has also explored elementary teachers' feelings of competence and comfort in caring for children with asthma. Teachers' confidence in their ability to manage a child's asthma will be reflected both in their actual ability to provide care and in their attitude toward the child and his/her medical condition (Bowen, 1999). Numerous studies have shown that teachers report discomfort in regard to asthma management and do not feel adequately prepared to provide this type of care to a child with asthma (Bowen, 1999; Brookes & Jones, 1992; Neuharth-Pritchett & Getch, 2001). In a study by Rodehorst (2003), however, teachers reported being relatively confident in their ability to provide care to children with asthma, especially those teachers who personally had asthma. Although reports of comfort in caring for children with asthma vary, the fact remains that many early childhood teachers are uncomfortable and feel unprepared to care for these children (Bowen, 1999; Brookes & Jones, 1992; Neuharth-Pritchett & Getch, 2001).

Child Care and Children with Asthma

With the increase in child care attendance and asthma incidence, it could be expected that child care arrangements for children with special medical needs would be more readily available. Research, however, has shown that parents of children with medical conditions and special healthcare needs have difficulty finding child care for their child, as few child care settings offer care for children with medical conditions (Crowley, 1990; Krajicek & Moore, 1993).

Progress has been made toward inclusion of children with medical needs in elementary school settings, but advances in child care have been slow (Crowley, 1990; Krajicek & Moore, 1993). Although some studies show that child care directors and providers are open to including children with special medical needs, these children are still often not admitted (Juhn et al., 2002).

Child care directors and providers often cite lack of information, time, resources, nursing staff, and no licensure for administering medications as common reasons why children with medical needs are not admitted into their child care settings (Crowley, 1990; Juhn et al., 2002; Krajicek & Moore, 1993; Presler & Routt, 1997).

Care Considerations for Children with Asthma

Children with asthma have many special care considerations that require all care givers including parents, child care providers, and teachers, to administer medications, monitor the child's condition, enact environmental precautions, and make decisions regarding asthma management (AAAAI, 2004; Allen et al., 2004; Bagnato et al., 2004; Edelman, 1997; Getch & Neuharth-Pritchett, 1999; Muth, 2000; Hamm, 2004). Consistent and proper care of asthma in all settings is necessary to maintain the child's health and keep asthma under control (Allen et al., 2004; Edelman, 1997; Huss et al., 2002). Therefore, child care providers must fulfill the role of asthma manager while the child is at child care.

Beside physiological affects, asthma may also cause immediate or long-term ramifications on other areas of the child's development, including social and emotional development (Bender, 1995; Hamm, 2004; Krajicek & Moore, 1993; Madden, 2000). The child care provider's ability and attitude in managing the child's condition may help to shape the child's perceptions of asthma management and their asthmatic condition (Krajicek & Moore, 1993). Furthermore, adults that care for children with asthma may also be important in peer acceptance of the child's asthma through answering questions and providing information about asthma (Simeonsson & Lorimer, 1995).

Asthma Knowledge in Child Care Providers

Only three empirical studies were found that focused on child care providers and their asthma knowledge. This research shows that child care providers have overall low or minimal

levels of knowledge regarding asthma, medications, and management techniques (Juhn et al., 2002; Ramm et al., 1994; Walders et al., 2004). A study by Walders et al. (2004), on Head Start and Early Head Start staff (N = 61) revealed that participants were typically aware of some of the most common asthma symptoms and triggers, but most participants were unable to identify colds, infections, animal dander, or molds as other common triggers. Although some participants were able to identify numerous triggers and symptoms, the majority of participants displayed minimal knowledge of the condition. Another study by Ramm et al. (1994), found that child care providers (N = 247) were unable to correctly determine the severity level of an attack according to symptom presentation. Juhn et al. (2002), found that child care directors (N = 100) had a mean score of only 75% on a measure of asthma knowledge. These results reveal the need for greater knowledge of asthma for all individuals who provide child care.

Training and Education of Child Care Providers on Asthma

Training, both formal and informal, is a key factor in the quality of care provided to children by child care providers, with higher levels of training leading to higher quality and more specialized care (Arnett, 1989; Burchinal, Cryer, & Clifford, 2002; National Institute of Child Health and Human Development (NICHD), 2000; Whitebook, Howes, Phillips, & Pemberton, 1989). The link between quality of care provided and training has also been shown to exist for children with chronic medical illnesses (Crowley, 1990; Krajicek & Moore, 1993). Furthermore, the American Academy of Pediatrics (2002), recommends that child care providers receive training specific to the child's medical condition, as the care they give can directly affect the child's health (AAP, 2002).

It was found that only two studies asked child care providers specifically about their training in regard to asthma. These two studies reveal that child care providers and directors have minimal training on asthma and asthma management techniques (Huss et al., 2002; Walders

et al., 2004). In fact, many child care providers in these studies reported having received little training on healthcare related issues and practically no training specifically related to asthma. Of the 61 Head Start and Early Head Start staff interviewed by Walders et al. (2004), only 44% had received training on asthma, even though 65% were responsible for administering medications and 41% were responsible for attending to asthma attacks. Another study on Head Start staff and directors (N = 280) determined that although 83% of staff were responsible for giving medications, over half of the directors indicated that no curriculum existed to teach these staff about asthma management, such as medicinal administration (Huss et al., 2002). Furthermore, only about 45% of these program directors had attended training on asthma and management techniques.

Although lack of training on asthma has been reported, programs designed to teach information about asthma and management skills to child care providers do exist. The Asthma and Allergy Foundation of America (AAFA) sponsors two programs aimed at training child care providers and early childhood educators about asthma. Both "Asthma and Allergy Essentials for Child Care Providers" and "Asthma Basics for Children" focus on teaching asthma disease information, management techniques, and prevention strategies through interactive programs taught by trained health professionals (AAFA, 2005). Community education programs, such as the National Asthma Education and Prevention Program, designed to provide applicable information on asthma and management techniques, may also serve as sources of training and information for child care providers (National Heart, Lung and Blood Institute (NHLBI), 2005).

Beside training initiatives, credentialing and accreditation programs exist to provide child care providers with education, training, and standards for various issues related to caring for young children. Child care providers may obtain credentials as a Child Development Associate (CDA) or become accredited by an association, such as the National Association for the

Education of Young Children (NAEYC) (Council for Professional Recognition, 2005; NAEYC, 2005). These credentialing and accrediting programs provide competency standards in areas such as, child development, health and safety, professionalism, and communicating with families. Trainings on child care and health related topics may include information on childhood medical conditions or specific diagnoses; however, training providers determine the topics and are not required to present on childhood medical conditions. Although training and credentialing programs exist, child care providers may not utilize these resources as many requite training or certification fees and are, furthermore, not required to be a child care provider.

Child Care Providers and Self-Reported Comfort

There is little existent research on child care providers and their self-reported comfort in caring for young children with asthma. In fact, only one study by Walders et al. (2004) assesses child care providers comfort in caring for children with asthma. It must be noted, however, that the questioning regarding comfort and asthma was only a subsection of the study. In their research Walders et al. (2004) surveyed 61 Head Start and Early Head Start staff on two aspects of comfort, medication administration and responding to asthma attacks. In regard to administering medications, 37% of participants reported feeling "somewhat comfortable"; however, more than 27% classified themselves as "very uncomfortable" performing this task, while, 15% reported that they were "very comfortable" in this domain. The same group of participants were asked to rate their comfort in responding to a child's asthma attack. Results reveal that 52% of participants felt "somewhat comfortable", but 40% reported feeling "somewhat uncomfortable" to "very uncomfortable" with managing an asthma attack. None of the participants reported feeling "very comfortable." These mixed findings, along with the dearth of information in this area suggest the need to further explore the comfort of child care providers in caring for children with asthma.

Summary

Asthma is increasing among young children; therefore, child care providers can expect to care for greater numbers of children with this medical condition. Research has shown the importance of consistent asthma management in reducing medical complications and other negative effects on children. Adult caregivers, including child care providers, have been shown to play an integral role in asthma management. According to the limited research available, child care providers have limited knowledge of asthma and report being generally unprepared and unsure of their ability to care for a child who has asthma. This study aimed to further clarify what child care providers know about asthma and how comfortable they are caring for children who have asthma. Through determining variables that may affect these aspects of child care providers this study aimed to identify ways to better prepare these individuals to provide optimal care for children with asthma.

Hypotheses

The purpose of this study was to examine variables of child care providers that may make a difference on their knowledge and self-reported comfort in caring for young children with asthma. Based on previous research that has been reviewed, the following hypotheses were proposed:

1. Child care providers' general knowledge of asthma will differ based on personal and professional/center demographics, asthma training and experience with asthma.

2. Child care providers' specific knowledge of asthma will differ based on personal and professional/center demographics, asthma training, and experience with asthma.

3. Child care providers' perceived knowledge of asthma will differ based on personal and professional/center demographics, asthma training and experience with asthma.

4. Child care providers' self-reported comfort in caring for children with asthma will differ based on personal and professional/center demographics, asthma training and experience with asthma.

CHAPTER 3

METHODS

The following chapter contains descriptive information of participants and measures used to assess child care providers' personal and professional/center demographics, and asthma training and experience variables. Measures on asthma knowledge and self-reported comfort of child care providers are also presented. Child care providers' knowledge of asthma is comprised of three subscales measuring general knowledge, specific knowledge, and perceived knowledge of asthma (see Appendix A). Procedures implemented for collection and analysis of data are described.

Participants

Participants were child care providers recruited from three Early Childhood Institute (ECI) conferences held throughout the state of Georgia during 2003 and 2004. The ECI conference locations included Waycross, Warner Robins, and Columbus, Georgia. Conference attendees included child care directors, lead teachers, assistant teachers, and inclusion specialists. All conference attendees were invited to participate; however, participation was voluntary and anonymous. Three-hundred and thirty eight participants returned surveys, 61 from the Waycross site, 77 from the Warner Robins site, and 200 from the Columbus site. The Waycross and Warner Robins locations had an overall response rate of 61% and the Columbus site had a 57% response rate.

Measures

The Asthma Knowledge and Training Needs of Child Care Providers Survey (Bales, Coleman, & Wallinga, 2003) (see Appendix A) was utilized in this study. All participants

completed four topic areas on the survey regarding a) personal and professional/center demographics, b) asthma knowledge, c) self-reported comfort, and d) asthma training and experience variables. These four topic areas, along with the response format and scoring procedures on the survey, follow below.

Demographic Questions

Participants were asked 12 questions concerning their personal and professional/center demographics. The two personal demographic questions used concerned participants' age and education level. Five questions focusing on professional/center demographics were asked regarding their years of experience in child care and their current position, community size, center accreditation status, and availability of asthma guidelines.

Asthma Knowledge

Child care providers' asthma knowledge was measured using three instruments for this study. The three instruments assess participants' general knowledge of asthma, specific knowledge of asthma, and perceived knowledge of asthma.

General Knowledge of Asthma

The measure used to evaluate participants' general knowledge of asthma was modified from a survey called "Check Your Asthma I.Q." created by the National Heart, Lung, and Blood Institute (U.S. Department of Health and Human Services (U.S. DHHS), 1996). This scale measures participants' general knowledge of asthma, including questions on prevalence, etiology, and condition severity. The original scale included statements on asthma, such as "People with asthma should not exercise" and participants were asked to reply on a true/false basis. For this study, all 12 statements regarding general knowledge of asthma were maintained; however, the response format was changed to a 5-point Likert-type format. Participants were asked to respond to each item on a scale ranging from 1 indicating "strongly disagree" to 5

indicating “strongly agree.” There were five items in this scale that were reverse scored, such as “Asthma is an emotional or psychological illness”, which is an inaccurate statement. Knowledge scores on this scale ranged in possibility from 12-60, with higher scores indicating a higher level of general knowledge of asthma. Analyses on scale reliability report a low level of internal consistency at $\propto$=.55. Previous reports of reliability for this measure have not been found.

Specific Knowledge of Asthma

The scale used to assess specific knowledge of asthma was adapted from the Juhn et al. (2002) Questionnaire for Asthma Knowledge. The integrity of the original questionnaire was maintained, except for minor revisions to the response format phrasing. The original response format was a 5-point Likert scale response, with the response options 1(disagree completely), 2(disagree somewhat), 3(unsure) 4(agree somewhat), and 5(agree completely). A 5-point Likert-type scale was still used, however, response statements were changed to 1 (strongly disagree), 2 (disagree), 3 (not sure), 4 (agree), and 5 (strongly agree).

The measure consists of three subscales that assess the participant’s specific knowledge including, asthma symptoms, triggers, and treatments. Symptom knowledge was determined through six items, three of these being reverse scored. Knowledge of triggers was assessed by eight items, three being reverse scored items. Knowledge concerning common treatments of asthma was determined through four items, of which two were reverse scored. Participants answered items based on the five point scale previously mentioned. Total scores for all three subscales on specific knowledge of asthma could range from 18-90, with higher scores indicating greater specific knowledge of asthma. Survey items that were reverse scored were not accurate responses of asthma knowledge on any of the subscales. Examples of reverse scored items include “diarrhea” as a symptom, “kissing another child with asthma” as a trigger, and “physical therapy” as a treatment.

Reliability measures of this instrument have been reported on a sample of child care program directors to have an alpha coefficient between .88 - .92 (Juhn et al., 2002). Cronbach's alpha measures for this study were slightly lower than in previous studies, but were still acceptable at $\propto = .71$ for the scale on specific knowledge of asthma.

Perceived Knowledge of Asthma

Participants' perceived knowledge was determined through self-report on a six item scale with phrases regarding asthma symptoms, causes, medications, emergencies, and social ramifications (Bales, Coleman, & Wallinga, 2003). Items included statements on perceived knowledge about, "Emergency procedures for asthma," "Things that cause asthma," and "Helping other children relate to a child with asthma." The participants answered the phrases regarding their perceived level of asthma knowledge on a 4-point Likert-type scale. The response scale ranged on a continuum from 1 indicating "definitely do not know" to 4 indicating "definitely know". The scale indicates that to "know" about the phrases indicated the participant understands or is aware of the topic. Possible scores on this scale range from 6-24, with higher scores indicating greater amounts of perceived knowledge of asthma. Reliability measures for this scale of perceived knowledge of asthma had a Cronbach's alpha of .91.

Self-Reported Comfort

Scores of child care providers' self-reported comfort in caring for children with asthma were assessed through a scale adapted from the Teacher Capability and School Resource Scale for Asthma Management (Neuharth-Pritchett & Getch, 2004). The original scale was composed of two subscales, Teacher Capability in School and Emotional Aspects of Asthma Management and School Resources/Institutional Capability for Asthma Management. Three of the five questions in the current survey were drawn from the first scale and one other from the second scale. These four questions assessed child care providers' self-reported comfort on medication

administration, time constraints, and availability of resources. Minimal phrasing changes were made to adapt the scale for child care providers: for instance, "school" was changed to "center." Bales, Coleman, and Wallinga (2003) created an additional question to determine the participants' level of self-reported comfort in communicating with parents regarding their child's asthma. All five questions were answered on a 5-point Likert-type scale, ranging from 1 indicating "very uncomfortable" to 5 indicating "very comfortable." Scores on this measure range from 5-25, with higher scores indicating a higher level of self-reported comfort in caring for children with asthma.

Reports of internal consistency from the original scale had alpha coefficients from 0.83-0.86 for the two subscales (Neuharth-Pritchett & Getch, 2004). Reliability measures for the adapted scale utilized in this study reported a Cronbach's alpha of .87.

Asthma Training and Experience

Asthma training was determined by several questions. First, asthma training was assessed by asking "Have you had professional training related to asthma?" in a yes or no format. A follow-up question was provided for participants who responded positively to having had asthma training. This question asked participants to indicate what type of training they had attended, with the choices being: college course, workshop, or other training.

Asthma experience was separated into personal and professional experience with asthma. Personal asthma experience was measured by asking participants "Do you or a close family member have asthma?" If the participants answered positively, they were asked to indicate a specific family member from the following choices: self, spouse, child, parent, siblings, or other family member. Professional asthma experience was assessed by asking the question, "Have you had a child in your classroom in the last year with asthma?" with a yes or no answer format.

Procedures

Surveys were distributed at the Early Childhood Institute (ECI) conferences in Waycross, GA, Warner Robins, GA, and Columbus, GA. At the Waycross and Warner Robins locations, surveys were included in the conference packets for all attendees. By the request of the ECI in Columbus, a table with a survey proctor was set up in a common area of the conference next to registration and was accessible to all participants in attendance. Interested participants were briefly informed about the survey; those interested received a survey complete with instructions and implied consent forms. Completed surveys were placed in a collection box in the common area. After completing the survey, participants were eligible to enter into a drawing for two gift baskets, priced at approximately $50.00 each. Drawings were held at the end of each conference for those eligible individuals.

Data Analysis

Data analyses were conducted in two parts, using SPSS 12.0 software. Descriptive statistics were run for all demographic variables, along with asthma training and experience variables of participants. Variables to be studied were organized into groups labeled as personal demographic characteristics, professional/center demographics, and asthma training and experience variables. One-way analysis of variance (ANOVA) tests were run in order to determine whether any of the personal, professional/center, or asthma training and experience variables had any significant variance on the dependent variables: general knowledge of asthma, specific knowledge of asthma, perceived knowledge of asthma, and self-reported comfort. Separate one-way ANOVA tests were performed for each of the four dependent variables on personal and professional/center demographic categories, asthma training and experience. Correlation analyses were also run to determine the strength of the relationships between the dependent variables.

CHAPTER 4

RESULTS

The purpose of this study was to examine child care providers' knowledge and self-reported comfort in caring for children who have asthma. The results of this research are presented in two sections. In the first section, descriptive information, demographic variables and scale statistics are reported. In the second section, statistical results for each of the four hypotheses will be presented.

Descriptive and Scale Statistics

Data on a variety of demographic variables were collected from participants in the study. The majority of participants were female (98.2%), between the ages of 31 to 50 years of age (54.2%), and identified their ethnicity as either black (59.6%) or white (32.4%). The sample was comprised of mostly lead or assistant teachers and floaters (74%), with over half (54.6%) of the participants reporting a high school or a GED degree as their highest level of education completed. Nearly half of these individuals reported being employed at privately owned child care centers (45.6%). Information on the size of the community where participants worked revealed a wide range of settings, with approximately 33% living in large cities or suburbs, 31% in small cities, and the rest working in large towns (19%) or small towns and rural settings (15%). Complete descriptive statistics of demographic characteristics of participants are presented in Tables 1-7.

Information was gathered on participants' training related to asthma, along with their experience with asthma. Data reveal that around 23% of participants had received some type of training related to asthma. The majority of participants had attended workshop trainings

(18.8%), with the rest attending college (3%) or some other type of asthma training (4.3%). Approximately, 55% of child care providers reported professional experience with asthma, indicating that they had a child with asthma in their care within the past year. Additionally, around 58% of participants cited having a close family member with asthma. Complete statistics of child care providers' asthma training and experience can be found in Tables 5-7.

Data was also collected on the participants' general, specific, and perceived knowledge of asthma, as well as their self-reported comfort in caring for children with asthma. The mean score for general asthma knowledge of participants was 44.43 out of a possible total score of 60, with a standard deviation of 6.36. For specific knowledge of asthma, the mean score of participants was 59.05 out of a possible total score of 90, with a standard deviation of 16.02. Mean scores of participants for perceived knowledge of asthma was 17 out of a possible total score of 24, with a standard deviation of 3.79. The average score for self-reported comfort in caring for children with asthma was 19.4 out of a possible total score of 25, with a standard deviation of 4.01. See Table 8.

Correlational analyses were run on the four dependent variables of general knowledge, specific knowledge, perceived knowledge, and self-reported comfort, to determine the reliability of the scales in assessing the three measures of asthma knowledge, along with child care providers' self-reported comfort in caring for children with asthma. See Table 8. The scales for general and specific knowledge of asthma were correlated ($r = 0.40$; $p \leq .01$), showing the compatibility in using these scales together to measure asthma knowledge of individuals. The general knowledge scale also had a small correlation with the self-reported comfort scale ($r = 0.17$, $p \leq .01$), and with the perceived knowledge scale ($r = .14$, $p \leq .05$). The perceived knowledge scale and the self-reported comfort scale were determined to be moderately correlated

($r = .36$, $p \leq .05$), showing a relation between these two scale measures. The specific knowledge scale, however, was not significantly correlated with either the perceived knowledge or self-reported comfort scales.

Testing of Hypotheses

One-way analyses of variance (ANOVAs) were conducted for each of the hypotheses. Separate one-way ANOVA tests were run for each of the four dependent variables of (a) general knowledge of asthma, (b) specific knowledge of asthma, (c) perceived knowledge of asthma, and (d) self-reported comfort in caring for children with asthma. Each analysis tested whether there were significant differences in the dependent variables in regard to the independent variables (personal and professional/center demographic variables and asthma training and experience). Results from data analyses are presented in Tables 9-11. Following are the results of the data analysis based on the proposed hypotheses.

Hypothesis One: General Knowledge of Asthma

General knowledge of asthma was hypothesized to differ based on child care providers' personal and professional/center demographics, asthma training and experience. Results from the one-way ANOVA test showed that none of the personal, professional/center, or asthma training and experience variables differed significantly on individuals' general knowledge of asthma.

Data analysis results show that these variables were able to account for only very small amounts of the variance in general knowledge of asthma. Personal characteristics of participants explained 6 percent of the variance in general knowledge of asthma ($R^2 = .061$). Professional/center characteristics of the participants accounted for approximately 4 percent of the variance in general knowledge ($R^2 = .037$). Asthma training and experience variables explained approximately 5 percent of the variance in this type of knowledge ($R^2 = .053$).

Hypothesis Two: Specific Knowledge of Asthma

It was hypothesized that differences would exist in child care providers' specific knowledge of asthma based on personal and professional/center demographics, along with asthma training and experience. Only one variable, working in an NAEYC accredited setting, was found to be significant in regard to specific knowledge of asthma. Individuals having worked in NAEYC accredited settings had significantly lower scores on specific knowledge of asthma, including signs and symptoms, triggers, and treatments $F_{(1, 225)} = 5.35$, $p \leq .05$. See Table 9. Mean specific knowledge scores for individuals working in NAEYC accredited settings was 54.73, while those without accreditation scored a mean of 61.52 on specific knowledge of asthma.

Again, all variables studied were able to explain only a small amount of variance in child care providers' scores of specific knowledge of asthma. Personal demographics of participants accounted for approximately 11 percent of the variance in specific knowledge of asthma ($R^2 = .114$). Professional/center demographics explained slightly more than 8 percent of the variance in specific knowledge ($R^2 = .084$). Those characteristics pertaining to the individuals' training and experience with asthma accounted for approximately 4 percent of the variance ($R^2 = .043$).

Hypothesis Three: Perceived Knowledge of Asthma

Child care providers' perceived knowledge of asthma was hypothesized to differ based on personal and professional/center demographics, along with asthma training and experience with asthma. Child care providers' perceived knowledge of asthma significantly differed according to whether or not the individual had received professional training on asthma $F_{(1,261)} = 12.50$, $p \leq .001$. See Table 10. Individuals who had received training reported higher levels of perceived knowledge of asthma ($M = 19.76$) as opposed to those who had not attended an asthma training ($M = 16.13$). There were also significant differences in child care providers' perceived

knowledge of asthma based on the presence or absence of asthma guidelines $F_{(2,191)} = 3.51$, $p \leq .05$. Child care providers who responded that asthma guidelines were present in their workplace reported higher perceived knowledge ($M = 17.36$) than those who worked in settings without asthma guidelines ($M = 16.90$). Child care providers' perceived knowledge of asthma also differed according to their personal experience with asthma $F_{(1,261)} = 8.60$, $p \leq .01$. Those individuals who reported having a family member with asthma reported higher levels of perceived knowledge ($M = 18.17$) than those who did not have a family member with asthma ($M = 15.40$). More specifically, those who specified that their spouse had asthma had significantly different scores than those who did not have a spouse with asthma $F_{(1,261)} = 5.01$, $p \leq .05$. Participants who reported having a spouse with asthma scored significantly higher on levels of perceived knowledge ($M = 20.50$) than those with another family member with asthma ($M = 16.90$)

Variables studied were able to explain some of the variance on child care providers' perceived asthma knowledge. Personal characteristics accounted for around 9 percent of the variance of perceived knowledge of asthma ($R^2 = .094$). Professional/center characteristics explained 11 percent of the variation for this variable ($R^2 = .113$). Asthma training and experience variables accounted for approximately 32 percent of the variance in perceived knowledge of asthma ($R^2 = .316$).

Hypothesis Four: Self-Reported Comfort in Caring for Children with Asthma

It was hypothesized that child care providers' self-reported comfort in caring for children with asthma would differ based on personal and professional/center demographics, along with asthma training and experience. Professional training related to asthma made a significant difference on child care providers' self-reported comfort $F_{(1,292)} = 6.03$, $p \leq .05$. Those

individuals who reported having had training related to asthma scored significantly higher on measures of self-reported comfort (M = 20.58), as opposed to those without training (M = 19.01). See Table 11.

The variables examined were able to explain minimal amounts of the variance for self-reported comfort of child care providers in caring for children with asthma. Personal characteristics accounted for 9 percent of the variance in self-reported comfort (R^2 = .093), whereas, professional/center characteristics explained around 5 percent (R^2 = .054). Training and experience with asthma were also only able to explain around 7 percent of the total variance for self-reported comfort of participants (R^2 = .077).

Table 1

Frequencies and Percentages of Personal Demographic Characteristics: Gender, Age, and Ethnicity

Variable	*n*	%
Gender (*N* = 329)		
Female	323	98.2
Male	6	1.8
Age (in years) (*N* = 332)		
> 20	17	5.1
20-30	78	23.5
31-40	88	26.5
41-50	92	27.7
51 +	57	17.2
Ethnicity (*N* = 327)		
Black	195	59.6
White	106	32.4
Hispanic/Latino	14	4.3
American Indian or Alaskan Native	1	.3
Asian or Pacific Islander	4	1.2
Multi-racial	6	1.8
Other/ Non-reported	1	.3

Table 2

Frequencies and Percentages of Personal Demographic Characteristics: Education Level

Variable	*n*	%
Education Level (*N* = 324)		
High school/ GED	177	54.6
CDA, CCP, TCC, NAC	47	14.5
Associate/ Tech Diploma	58	17.9
Bachelors Degree	20	6.2
Masters Degree	9	2.8
Other	13	4.0

Table 3

Frequencies and Percentages of Professional Demographic Characteristics of Child Care Providers

Variables	*n*	%
Job Title (*N* = 323)		
Administrator	40	12.4
Lead Teacher	131	40.6
Assistant Teacher/ Floater	108	33.4
Inclusion Specialist	1	.3
Other	43	13.3
Year Experience in Child Care (*N* = 311)		
0-2 years	87	28.0
3-5 years	79	25.4
6-8 years	46	14.8
9+ years	99	31.8

Table 4

Frequencies and Percentages of Center Demographic Characteristics of Child Care Providers

Variables	*n*	%
Type of Center (*N* = 331)		
Privately Owned	151	45.6
Chain or Franchise	20	6.0
College or Technical School Sponsored	4	1.2
Church Sponsored	56	16.9
Community or Organization Sponsored	27	8.2
Other	73	22.1
Community Size (*N* = 318)		
Rural/ Small Town	50	15.7
Large Town	62	19.5
Small City	99	31.1
Large City/ Suburb	107	33.6
Centers that Receive State Funding (*N* = 320)		
Yes	192	60.0
No	53	16.6
Do Not Know	75	23.4
Centers With Asthma Guidelines (*N* = 330)		
Yes	176	53.3
No	71	21.5
Do Not Know	83	25.2

Frequencies and Percentages of Center Demographic Characteristics of Child Care Providers Cont.

Variable	*n*	%
NAEYC Accreditation (*N* = 328)		
Yes	120	36.6
No	208	63.4
Montessori Accreditation (*N* = 328)		
Yes	4	1.2
No	324	98.8
Other Accreditation (*N* = 328)		
Yes	27	8.2
No	301	91.8
Do Not Know Of Accreditation (*N* = 329)		
Yes	126	38.3
No	203	61.7

Table 5

Frequencies and Percentages of Asthma Training of Child Care Providers

Variable	*n*	%
Training on Asthma (*N* = 328)		
Yes	75	22.9
No	253	77.1
College Training (*N* = 329)		
Yes	10	3.0
No	319	97.0
Workshop Training (*N* = 329)		
Yes	62	18.8
No	267	81.2
Other Training (*N* = 328)		
Yes	14	4.3
No	314	95.7

Table 6

Frequencies and Percentages of Personal and Professional Asthma Experience of Child Care Providers

Variable	*n*	%
Child With Asthma in the Classroom Last Year (*N* = 327)		
Yes	180	55.0
No	147	45.0
Close Family Member with Asthma (*N* = 332)		
Yes	192	57.8
No	140	42.2

Table 7

Frequencies and Percentages of Specific Family Members with Asthma

Variable	*n*	%
Self		
Yes	34	10.2
No	300	89.8
Spouse		
Yes	9	2.7
No	325	97.3
Child		
Yes	74	22.2
No	260	77.8
Parent		
Yes	24	7.2
No	310	92.8
Sibling		
Yes	41	12.3
No	293	87.7
Other		
Yes	66	19.8
No	268	80.2

Table 8

Intercorrelations, Means, and Standard Deviations for General Knowledge, Specific Knowledge, Perceived Knowledge, and Self-Reported Comfort

Measure	1	2	3	4	*M*	*SD*
1 General Knowledge	---	.39**	.14*	.16**	44.43	6.36
2 Specific Knowledge		---	.09	.05	59.05	16.02
3 Perceived Knowledge			---	.36**	17.00	3.79
4 Self-Reported Comfort				---	19.40	4.01

* $p \leq .05$, ** $p \leq .01$

Table 9

One-Way Analysis of Variance, Means, and Standard Deviations for Differences in Child Care Providers' Specific Knowledge of Asthma Based on NAEYC Accreditation Status

Variable	*M*	*SD*	*df*	*F*
		Specific Knowledge		
Accreditation			225	5.35*
NAEYC Accreditation	54.73	19.05		
No NAEYC Accreditation	61.52	13.75		

* $p \leq .05$

Table 10

One-Way Analysis of Variance, Means, and Standard Deviations for Differences in Child Care Providers' Perceived Knowledge of Asthma Based on Asthma Training, Personal Asthma Experience, and Asthma Guidelines

Variable	*M*	*SD*	*df*	*F*
		Perceived Knowledge		
Asthma Training (*N* = 328)			261	12.50***
Training	19.76	3.08		
No Training	16.13	3.59		
Asthma Guidelines (*N* = 330)			191	3.51*
Yes	17.36	3.66		
No	16.90	3.60		
Family Member With Asthma (*N* = 332)			261	8.60**
Yes	18.18	3.53		
No	15.40	3.58		
Specific Family Member With Asthma				
Self	19.59	3.27	261	3.31
Spouse	20.50	4.07	261	5.01*
Child	19.13	3.15	261	2.44
Parent	18.40	3.07	261	0.04
Sibling	17.50	3.09	261	0.89
Other	17.52	3.82	261	0.01

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$

Table 11

One-Way Analysis of Variance, Means, and Standard Deviations for Differences in Child Care Providers' Self-Reported Comfort in Caring for Children with Asthma Based on Asthma Training

Variable	*M*	*SD*	*df*	*F*
		Self-Reported Comfort		
Asthma Training			292	6.03*
Yes	20.58	4.08		
No	19.01	3.97		

* $p \leq .05$

CHAPTER 5

DISCUSSION

The purpose of this study was to examine variables that may make a difference in child care providers' knowledge of asthma and self-reported comfort in caring for children with asthma. Variables studied included personal and professional/center demographics and asthma training and experience of participants. Personal demographics included age and education level of participants and professional/center demographics included participants' years of experience in their current position and in the child care field, the presence of asthma guidelines, community size, and NAEYC accreditation status of their workplace. Asthma training measured whether or not participants had received some type of training on asthma, while asthma experience was assessed by personal and professional experience with asthma. Personal experience included whether or not the participant had a close family member with asthma and identification of the specific family member. Professional asthma experience was assessed by whether or not the child care provider had cared for a child with asthma in his/her classroom in the past year. A discussion of the results, along with limitations, implications, and recommendations for future research, will be presented.

Knowledge of Asthma

It was hypothesized that differences would exist in child care providers' general and specific asthma knowledge based on their personal and professional/center demographics, along with asthma training and experience. Only NAEYC accreditation status resulted in significant differences in participants' specific knowledge of asthma. No other variables were significant in regard to differences in asthma knowledge of child care providers.

Although general and specific knowledge were presented as separate measures of asthma knowledge in this study, they will be jointly reviewed in the discussion section. The two measures of asthma knowledge (general and specific) were found to have a significant moderate correlation (.398) suggesting that these two constructs measure relatively related information. Therefore, these constructs of asthma knowledge will be discussed simultaneously.

Personal Demographics

In the current study, significant results were not found for either of the two personal demographic variables (age and education) in regard to child care providers' knowledge of asthma. The insignificant findings on the variable of age are similar to results found by Baskin, Saylor, Furey, Finch, and Carek (1983), who determined that elementary school teachers' knowledge of childhood cancer was not predicted by their age. Although the two studies focus on knowledge of different childhood chronic illnesses, the results agree that age does not affect participants' knowledge of medical conditions.

Education level of participants was the second personal demographic variable that failed to report significant results in regard to knowledge of asthma. There is little literature to draw upon to explain this finding, as research on asthma and child care providers does not address education level. Information may be gained by examining education level of child care providers, and their knowledge of child development topics. Snider and Fu (1990) determined that child care providers with greater levels of education scored higher on measures of knowledge concerning developmentally appropriate practice. Other researchers also suggest that level of education increases child care providers' knowledge of child development topics (Howes, Galinsky, & Kontos, 1998; Mueller & Orimoto, 1995). These findings from other studies contradict the current insignificant findings on education level and knowledge.

A possible reason for the insignificant results of this study and conflicting results with other studies could be due to the small variation in education level of this sample. The majority of participants (54.6%) were high school graduates or held a GED diploma. Subcategories of post high school educational attainment had varying amounts of participants, with few reporting higher education levels (baccalaureate or graduate). This uneven distribution of education levels may have affected the analysis results.

Professional/Center Demographics

Analyses from the current study revealed that the only significant professional/center demographic variable on participants' knowledge of asthma was NAEYC accreditation status. Results show that child care providers' specific knowledge of asthma differed according to NAEYC accreditation status of their workplace. No other professional/center demographic variables were found to prove significant differences for child care providers' general or specific knowledge of asthma.

Although specific knowledge of asthma was shown to differ according to NAEYC accreditation status, a negative difference was found. Individuals working in NAEYC accredited child care settings were shown to have significantly lower scores of specific knowledge of asthma than child care providers who worked in centers that did not hold this accreditation or were unaware of the accreditation status. Similar to the current finding, Juhn et al. (2002) reported that child care directors working within NAEYC accredited settings scored lower on measures of asthma knowledge. A possible explanation for these results may be that center accreditation by NAEYC does not require training or education specifically related to asthma. Accreditation standards include topics specific to childhood health including, promotion of healthy practices and prevention of injury and illness, however, these topics focus on general childhood health, as opposed to asthma (NAEYC, 2005). Therefore, it can plausibly be

suggested that NAEYC accreditation standards may not affect child care providers' knowledge of asthma, as this is not an area of specific focus in their standards.

Since 58% of participants in this study working in NAEYC accredited settings had cared for a child who had asthma within the previous year, asthma may be an important topic to consider when writing accreditation standards. Results on NAEYC accreditation status, however, should be considered carefully. Although many child care providers in NAEYC accredited settings cared for children with asthma, only a third of the total sample (36%) reported working in settings that were accredited by NAEYC. Thus, the small sample of individuals working in accredited settings may have influenced the results.

The other professional/center demographic variables including years of experience in childcare and in their current position, community size, and the presence of asthma guidelines were not shown to make significant differences in child care providers' knowledge of asthma. Insignificant findings were reported for child care providers' total years of experience and their knowledge of asthma. Results obtained by Snider and Fu (1990) are contradictory to the current study, suggesting that child development was related to child care providers' years of experience, but only when the individual had also received training. The current study, however, did not address connections between experience and training.

In regard to child care providers' experience in their current position and their knowledge of asthma, literature was not found that supports the current insignificant findings. Juhn et al. (2002) found results contrary to findings from the current study. It was determined that directors with fewer years of experience in their current position had higher levels of asthma knowledge (Juhn et al., 2002). A possible reason for these conflicting findings could be that the Juhn et al. (2002), study focuses specifically on child care directors, as opposed to the sample of various child care providers (directors, lead and assistant teachers) included in this study. Furthermore,

participants in the Juhn et al. (2002) study averaged 8.7 years in their current position, whereas 50% of the participants in this study had been in their current position for five years or less. Differences in the samples studied and the participants' years of experience in their current position may have accounted for discrepancies in the results.

Significant differences in knowledge of asthma were also not found in regard to the community size in which child care providers worked. Literature was not found on which to compare the current insignificant findings on community size. Other studies have examined child care providers' knowledge, but did not address community size (Juhn et al., 2002; Ramm et al., 1994; Walders et al., 2004.

Insignificant results were also found for the presence of asthma guidelines in regard to child care providers' knowledge of asthma. Results from this study are similar to Juhn et al. (2002) who reported that having asthma guidelines did not significantly impact child care directors' asthma knowledge scores. Lack of significant findings for this variable may have been affected by the small number of individuals reporting that these guidelines existed in their workplace. Only half of the respondents (52%) reported having asthma guidelines in their child care settings, while a quarter (25%) did not know whether or not guidelines existed. Based on the amount of individuals who were unsure of the presence of asthma guidelines in their workplace, it is possible that these guidelines are not well reviewed.

Asthma Training

The body of empirical research on asthma knowledge in child care providers is small and has not directly addressed the impact of training on child care providers' knowledge of asthma. The current study found that child care providers' knowledge scores were not significantly different based on asthma training. This result may be due to the low number of participants in

this sample who had received training related to asthma (22.2%). Differences could possibly be found to exist in samples with greater numbers of participants having attended training on asthma.

Analyses on training and experience with asthma were only able to explain 5% of the variation in general asthma knowledge and 4% in specific asthma knowledge, suggesting that other variables are more influential in determining these types of knowledge. It should also be mentioned that only basic questions were asked about asthma training on the survey, such as whether the participant had received training and what type of training it was (college, workshop, other). No questions were presented as to the topics, content, depth, or length of these asthma trainings or audience the trainings were created to reach.

Although the current study failed to find significant differences in asthma knowledge based on training, other research contradicts this finding. Mesters, Meertens, Crebolder, and Pradel (1993) determined that training increased parents' post-education knowledge of asthma in an asthma education training program. The training program consisted of parents using an educational training guide that contained information on asthma, management behaviors, prevention techniques, and emergency procedures. Results from Mesters et al. (1993) suggest that educational training may be useful to increase asthma knowledge in individuals who care for children with asthma.

Other research on training and child care providers suggests that training is an important variable in the care provided to children. Kontos (1992) determined that child care providers were able to benefit from training, through moderate increases in their knowledge after training sessions. Other studies have found that training on early childhood education increases the quality of care provided by early childhood caregivers (Burchinal et al., 2002; Whitebrook et al.,

1997). Even though these studies do not specifically address asthma they provide additional research on the benefits of training to prepare child care providers to provide optimal care to children.

Personal and Professional Asthma Experience

Experience with asthma, both personally and professionally, was not shown to make a difference in child care providers' knowledge of asthma. These results are consistent with findings from a study on elementary school teachers, which revealed that neither personal asthma experience, nor professional asthma experience were related to teachers' knowledge of asthma (Rodehorst, 2003). In addition, current analyses show that asthma training and experience were only able to account for 4% of the variation in asthma knowledge. This information, along with the insignificant ANOVA findings, suggests that other variables, not examined in the current study, may play a greater role in explaining differences in child care providers' asthma knowledge.

It is worth noting, that specific asthma knowledge scores of the child care providers in this study were lower than the sample studied by Juhn et al. (2002). The mean score on specific knowledge for the current sample was 59.06 (*SD* = 16.02), whereas the sample from Juhn et al. (2002) had a mean score of 75.5 (*SD* = 5.7). One must keep in mind that although both studies focused on asthma knowledge and child care, the sample populations differed. The Juhn et al. (2002) study focused specifically on child care directors, whereas the current study was comprised of mostly lead and assistant child care providers, with only a few child care directors. Therefore, differences in mean scores of asthma knowledge may have been affected by the target population studied.

Perceived Knowledge of Asthma

It was hypothesized that differences would exist in child care providers' perceived knowledge of asthma based on their personal and professional/center demographics and asthma training and experience. Data analyses revealed that several variables contributed to significant differences in child care providers' perceived knowledge of asthma, including asthma training, personal experience with asthma, and the presence of asthma guidelines.

It should be mentioned, that perceived knowledge of asthma was conceptualized as the child care providers' understanding or awareness of asthma topics. Therefore, the results obtained on perceived knowledge indicate the knowledge that child care providers believe they have, as opposed to the actual knowledge they possess. Although a few studies address child care providers and their asthma knowledge (Juhn et al., 2002; Ramm et al., 1994; Walders et al., 2004), no research has addressed perception of knowledge in these individuals. Information gained from the current study may, therefore, be able to lend some insight on variables that affect child care providers' perception of their asthma knowledge.

Personal Demographics

Analyses of personal demographics and perceived knowledge revealed that neither age nor education level made a significant difference in child care providers' perceived knowledge of asthma. As mentioned earlier, previous research on child care providers' perception of their asthma knowledge has not been conducted. Therefore, literature on perceived knowledge in regard to age and education of child care providers cannot be utilized to explain the results.

Professional/Center Demographics

Perceived knowledge scores of child care providers, overall, did not differ according to professional/center demographic variables. The only variable that was shown to make a significant difference in perceived knowledge scores of these individuals was the presence of

asthma guidelines in their work setting. Results revealed that those individuals who worked in child care settings with asthma guidelines (53.3%) scored higher on measures of perceived knowledge of asthma than those who worked in settings without asthma guidelines. No literature is available to support or refute this finding, since research has not examined measures of perceived knowledge. It could be suggested that child care providers who are aware of and review asthma guidelines may perceive they have more knowledge regarding asthma and how to manage the condition. The content of asthma guidelines and child care providers' familiarity with this information, however, was not specifically addressed in this study.

Other professional/center demographic variables, including the years of experience in child care, years in current position, and community size did not make significant differences in measures of child care providers' perceived knowledge of asthma. In regard to the lack of results, no literature exists to aid in explaining these insignificant results.

No differences were found in perceived knowledge based on whether or not child care providers worked in an NAEYC accredited setting. As only 35.5% of participants reported working in NAEYC accredited centers, the sample may have been too small to accurately assess differences in relation to accreditation. Additionally, because accreditation standards for NAEYC focus on general child development topics and do not specifically provide education on asthma it is not surprising that no differences were found.

Asthma Training

Significant differences in perceived knowledge of asthma were found, according to whether or not the participant had received training on asthma. Those child care providers who reported having had asthma training scored significantly higher on measures of perceived knowledge of asthma. In fact, asthma training and experience variables were found to account for 32% of the variance in perceived knowledge of asthma, suggesting that these variables may

play an important role in influencing perceived knowledge. A possible explanation for these results could be that participation in asthma training may provide familiarity with asthma topics, thereby increasing the individual's perception of knowledge.

The significant results for asthma training on perceived knowledge is interesting considering that earlier analyses revealed that training did not significantly increase child care providers' general or specific knowledge of asthma. The discrepancies in these findings could be due to possible increases in perceived knowledge of asthma after training, regardless of whether or not the individuals' actual knowledge increased. Additionally, perceived knowledge of asthma was found to have a low correlation with general knowledge (.16) and was not significantly correlated with specific knowledge of asthma. These results suggest that perceived knowledge measures a unique aspect of asthma knowledge, which may not be related to general or specific knowledge, possibly helping to explain the differences in results.

Personal and Professional Asthma Experience

Significant differences were found on child care providers' perceived knowledge of asthma based on their personal asthma experience. Of the total sample of child care providers, 192 participants (57.8%) reported having a family member with asthma. Results show that participants who reported having a family member with asthma had higher scores of perceived knowledge than individuals who did not have a close family member with asthma. Although research has examined personal asthma experience in child care providers, studies have not attempted to determine how this variable may affect their perceived knowledge. A possible explanation for significant findings could be based on the proximity of the individual with asthma. If a close family member has asthma, then it may be more likely that child care providers may perceive they know more about the condition, due to possibly helping to care for and manage the family member's asthma.

Upon further analysis, it was found that those individuals having a spouse with asthma (2.7%) perceived higher levels of asthma knowledge than individuals with any other family member with asthma. This result must be considered carefully, as the sample of participants who had a spouse with asthma included only nine individuals. An explanation for this difference, however, could be that spouses may discuss healthcare needs and jointly participate in management techniques (e.g. environmental control), thereby increasing the likeliness that child care providers with spouses who have asthma may perceive that they have greater knowledge of asthma.

Although having a family member with asthma was significant, caring for a child with asthma in the classroom within the past year did not make a significant difference on reports of perceived asthma knowledge. There could be many reasons for the discrepancy in perceived knowledge between personal and professional asthma experience. First, depending on the severity of the child's asthma in their care, the child care provider may not have had to actively manage the child's condition and, therefore, may not perceive a gain in asthma knowledge. Second, if the child care provider did have to manage the child's asthma it may not have been viewed as a learning experience, especially if the child care provider had no training or education on the condition. Third, family members are present throughout an individual's life, whereas children may only be present in child care for a short amount of time. Therefore, due to the longevity of relationships with family members, personal experience could be significant because individuals may be more willing to learn about and participate in asthma management.

Self-Reported Comfort

It was hypothesized that differences would exist in child care providers' self-reported comfort based on their personal and professional/center demographics, along with asthma training and experience. The only variable that made a significant difference in child care

providers' self-reported comfort was training on asthma. Scores of self-reported comfort did not significantly differ according to any of the other variables examined.

Personal Demographics

As found in analyses of the other independent variables, no significant differences were found for the personal demographic characteristics of age and education on child care providers' self-reported comfort in caring for children with asthma. No research was found that studies child care providers' age and comfort in asthma care. It is possible, however, that child care providers' chronological age may not necessarily be associated with either their experience in child care or their experience with asthma. Therefore, the variable of age may not prove to be a useful variable to study in regard to comfort in caring for children with asthma.

A possible explanation for the insignificant differences based on education level could be that often educational programs do not specifically teach about asthma. Furthermore, if education was provided regarding asthma, simply learning about asthma may not necessarily increase an individual's self-reported comfort in providing asthma care. Previous research cannot help to explain the current findings, as no studies have addressed education level and child care providers' comfort in providing asthma.

Professional/Center Demographics

Analyses on professional/center demographics and child care providers' self-reported comfort revealed that none of these variables examined were influential in determining differences in self-reported comfort. Insignificant results were found for years of experience in child care, years of experience in their current position, the presence of asthma guidelines, community size, and NAEYC accreditation status.

Literature has addressed child care providers' years of experience in child care and years of experience in their current position in relation to asthma knowledge and self-efficacy (Rodehorst, 2003), but has not examined these variables in relation to comfort in caring for children with asthma. Possible explanations for insignificant results may be similar to those mentioned in previous sections. For example, greater experience in child care does not necessarily infer more experience working with children who have asthma in child care, or greater amounts of comfort in providing care.

Findings also revealed that asthma guidelines made no significant difference on child care providers' self-reported comfort in caring for children with asthma. As no research is available on comfort and asthma guidelines, it can possibly be surmised that asthma guidelines may not be accessible or contain sufficient information or instructions regarding asthma care to make a significant difference in child care providers' self-reported comfort. As mentioned previously, content and familiarity with asthma guidelines were not addressed in the current study. Furthermore, half of the participants reported that either no asthma guidelines existed or that they were unsure of their presence. Limited sample size and uncertainty regarding the presence of asthma guidelines may have affected the results obtained.

Consistent with the other analyses in this study, community size was found to be insignificant in regard to child care providers' self-reported comfort in caring for children with asthma. Literature cannot be drawn upon to help explain the lack of significant findings, as previous research has not addressed community size and self-reported comfort of child care providers in caring for children with asthma.

Working in NAEYC accredited settings was another variable that did not result in significant differences in child care providers' self-reported comfort. These insignificant findings may be caused by reasons similar to those specified for this variable in regard to general

and perceived asthma knowledge. Sample size issues and lack of requirements on asthma education for NAEYC accreditation are likely causes for insignificant results. No literature exists to support or refute the current lack of findings on NAEYC accreditation status and child care providers' self-reported comfort with asthma.

Asthma Training

Asthma training was the only variable examined that was shown to make a significant difference in child care providers' self-reported comfort in caring for children with asthma. Those individuals who had asthma training scored higher on measures of self-reported comfort than those who had not received training. A possible explanation for this finding could be that child care providers with asthma training may believe they know more and may feel more prepared to manage a child's asthma. It is possible then, that if individuals believe they know more, meaning they have high perceived knowledge, then they may be more comfortable caring for children with asthma. It should be mentioned that perceived knowledge of asthma and self-reported comfort were found to be moderately correlated (.36), suggesting that a relation may exist between these two constructs. Although this is a possible explanation, this study did not specifically examine links between self-reported comfort and perceived knowledge of asthma.

Findings supporting a connection between training and comfort have been reported in numerous studies. Sapien, Fullerton-Gleason, and Allen (2004) found that elementary teachers report higher levels of comfort in various aspects of asthma care, such as recognizing symptoms and administering medication following training on asthma. In another study on an asthma education program for parents, Mesters et al. (1993) found that training improved both attitudes and efficacy of parents in caring for their child's asthma. Findings from Arnett (1989) further support this connection, reporting that training may be related to positive attitudes and positive interaction styles in child care providers. These studies all provide support for the benefits that

training may have for child care providers. Results from the current study, along with previous research suggest that training may play an influential role in increasing child care providers' comfort in caring for children with asthma.

Only one study was found to contradict the findings on asthma training from the current research. In their study on Head Start and Early Head Start child care providers, Walders et al. (2004) reported that asthma training did not influence their comfort in caring for and managing a child's asthma. A possible explanation for the contradiction in findings between Walders et al. and the current study may be based on the number of participants that had received training. For the current study, 75 participants reported having received asthma training, whereas only 27 had received training in the previous study. Additionally, neither study examined the content of training possibly contributing to the difference in results between the two studies.

Personal and Professional Asthma Experience

Child care providers' self-reported comfort in caring for children with asthma was not found to differ according to either personal or professional asthma experience. A possible explanation for these results could be that although a child care provider may have experience with a close family member or child in their care who has asthma, experience does not necessarily infer comfort. No previous research has examined asthma experience and child care providers' comfort in caring for children with asthma.

Although research does not address child care providers' comfort and asthma experience, insight may be gained by looking at parents of children with asthma. Trollvik and Severinsson (2003) reported that, although parents may care for their child's asthma on a daily basis, many still reported feeling uncomfortable providing care for their child's asthma and feared the onset of a spontaneous asthma attack. These results may suggest that no matter how often an individual provides care or interacts with a child who has asthma, these experiences may not

necessarily increase their self-reported comfort in providing this care. An additional explanation could be that individuals who have experience with asthma may understand more fully the severity of asthma and likelihood of ensuing complications, possibly causing discomfort surrounding asthma care.

Limitations

Although this study is able to contribute to literature on child care providers' asthma knowledge and self-reported comfort, certain limitations existed. In utilizing convenience sampling for this study, a few considerations should be taken into account. First, information was gathered only at Early Childhood Institute conferences, restricting the sample to attendees at this function. It is possible that individuals attending ECI conferences may be more proactive in regard to education than their peers who did not attend. Second, individuals who chose to participate in the study may have greater knowledge or interest in asthma related topics than those who did not participate. Third, the response rate for participation was 61% at the first two ECI locations and 57% for the final location. Higher response rates may have been able to provide further information regarding variables that may affect child care providers' knowledge and self-reported comfort in caring for children with asthma. Finally, the sample gathered was relatively homogenous and had small samplings of certain subgroups (e.g. variation in education level), though this is typical of child care providers. Although the information gathered from this sample is useful, the ability to utilize various statistics to analyze possible differences these variables might have on child care providers' asthma knowledge and self-reported comfort was limited.

A limitation also existed in the survey format utilized to assess items on participant's knowledge and comfort. Likert-type response scales were used to assess participants' knowledge of asthma and their self-reported comfort in caring for children with asthma.

Although useful, this type of response format limits answers to the response options offered and prohibits participants from providing additional information regarding their knowledge and self-reported comfort. Additionally, participants may have different interpretations of what a score of 4 versus a score of 5 may mean, possibly affecting the results obtained.

Questions posed in a yes/no format used to report professional/center demographics and asthma training and experience also limited the amount and depth of information that could be obtained from participants. In regard to professional/center demographics, participants were only asked about the presence of asthma guidelines in their workplace. Further questions were not posed regarding the content of these guidelines or participants' familiarity with the guidelines. Additionally, information regarding training focused on whether the participant had training and what type of training was received. Supplementary questions concerning the content and other details of the asthma training child care providers' had received were not addressed.

Items addressing child care providers' asthma experience also asked only basic information on this topic. Questions concerning personal experience (e.g. do you have a close family member with asthma, which family member is it) and professional experience (e.g. have you had a child with asthma in your care within the past year) were asked. Personal experience items did not address whether the child care providers were active in their family member's asthma management or what type of care they may have provided. Professional experience did not assess whether the child care providers were actually responsible for providing asthma care in their child care setting. Additional questioning was not posed about whether any instructions or a care plan was provided to child care providers to aid in caring for children with asthma.

The inclusion of an open-ended response format, in addition to the current survey items, may have proved useful in providing further information on child care providers' knowledge of

asthma, self-reported comfort, asthma guidelines, asthma training, and experience with asthma. Information gained from utilizing various types of response formats, including open-ended questions and Likert-type response ratings would provide qualitative information to supplement the quantitative data provided by participants.

Furthermore, there were limitations in reliability scores for one of the scale measures. The cronbach's alpha for the scale of general knowledge was moderately low $\propto = .55$, indicating low internal reliability for this scale. It may be, however, that this low alpha suggests that the items are not redundant and measure unique aspects of general knowledge.

Implications

Findings from this study provide empirically based research that specific asthma knowledge may differ according to accreditation status; perceived knowledge of asthma may be higher in those who have personal asthma experience and work in settings that have asthma guidelines; and both perceived knowledge and self-reported comfort may be higher in child care providers who have received training on asthma. Findings from this study suggest that asthma training, personal asthma experience, and the presence of asthma guidelines may be beneficial to child care providers. The information gained through this study will be valuable for individuals working with children who have asthma, educators, and legislators. Specific implications from the current study will be discussed including, the usefulness of this study for research, benefits for child care providers, suggestions for training and education, and establishment of policy.

Research

It has been discussed that there is limited research on child care providers and various aspects of childhood asthma, including child care providers' knowledge and comfort in providing care. Results of this study may be beneficial for furthering research on child care providers, child care settings, and caring for children with asthma. This study presents findings

that aid in informing researchers about variables that may determine differences in asthma knowledge and comfort of this population. Information gained from this study may be able to guide future research in examining asthma knowledge and comfort of child care providers. Furthermore, implications for research on training programs and their effectiveness with child care providers may be made. Additional and more in-depth suggestions for research will be provided in the section on recommendations for future research.

Child Care Providers

The current findings may prove useful to a variety of individuals who work in child care settings and who care for young children who have asthma. This study determined that variables such as training and asthma guidelines may be beneficial to child care providers' perception of asthma knowledge and comfort in providing asthma care to children. It was also revealed that asthma knowledge was low among child care providers in the study, even though many of these individuals were still responsible for providing care for children with asthma. These findings reveal the great need of asthma training concerning the condition and care of children with asthma for child care providers. Furthermore, findings from this study suggest a need for the use of asthma guidelines and instructions for asthma care in child care settings.

Besides having implications for variables that may aid child care providers in providing care to children with asthma, findings from this study have additional uses for child care center directors. Information on asthma knowledge and comfort of child care providers may be useful in aiding directors to establish regulations concerning asthma care and training. Child care directors are often in charge of decisions regarding child care staff training and may even be responsible for conducting training programs. Therefore, findings from this study may inform directors that training is beneficial to child care providers and that, in general, these individuals are in need of training and education regarding asthma. Additionally, directors are often

responsible for deciding whether or not children with asthma will be admitted into their child care program. The current findings give some indication of the information needed to prepare staff to care for children with asthma, including the use of training on asthma and having asthma guidelines to follow.

Training and Education

Results may also prove useful in developing and promoting training and education on asthma care and considerations for individuals in child care settings. Information gathered from this study may serve as a guide to assist individuals who develop and provide trainings on asthma for child care providers. One finding was that asthma training may make a difference on child care providers' perceived knowledge and comfort in caring for children with asthma. Training was shown to be beneficial to child care providers; however, many had not received instruction on asthma. This suggests a strong need for training and education on asthma for child care providers. Furthermore, trainings should be made conducive to directors, who can then utilize the information to provide a safe and nurturing environment for children with asthma and disseminate information concerning asthma knowledge and care to their staff.

Additionally, implications can be made for the development of asthma training programs and educational courses for child care providers. Trainings on asthma may be provided through workshops, in-service presentations, college or vocational classes, credentialing program, such as the Child Development Associate program, and national organizations, such as the National Association for the Education of Young Children. Content for trainings could include information on asthma signs, symptoms, triggers, treatments, asthma management techniques, and medication administration.

Policy

This study also has implications for larger scale initiatives concerning how legislative policies on asthma effect child care providers and asthma care by using the ecological perspective. This perspective, as discussed earlier, allows connections to be made which show how distal factors in the macrosystem may affect individuals within the microsystem. Based on these interconnections, it can be postulated that legislative policies affect child care providers' knowledge of asthma through requirements on asthma training, thereby affecting the care that children with asthma receive in child care settings. The current findings on child care providers' deficits in asthma knowledge and training may prove to be beneficial in advocating for the establishment of legislative policies on asthma and child care providers. These government regulations could include requirements on training and education for child care providers on the condition of asthma and medication administration. Furthermore, policy implications could require the use of specific care instructions and procedures in caring for children with asthma such as, asthma guidelines and care plans. Overall, the use of findings from this study could be a step in beginning positive policy initiatives to prepare child care providers to optimally care for children with asthma.

Recommendations for Future Research

Although information gained from the current study adds to the literature on child care providers and asthma, much research is still needed. Further research on child care providers and children with asthma is necessary to promote optimal care for young children who have asthma.

It is recommended that alternative sampling techniques be used for future research. Other sampling options could include mailing surveys to various child care settings or interviewing participants by phone. Through utilizing an alternative sampling technique,

researchers may be able to increase the diversity of their sample, while also reaching a larger number of people throughout the state.

Another recommendation is for future studies to obtain larger and more diverse samples of child care providers. By using a larger sample, the power of analyses should increase, thereby allowing a wider range of analyses to be utilized. Additionally, a larger sample size and more diverse group would likely allow researchers to determine more differences within the variable categories. For example, participants' level of education was analyzed in this study; however, due to the small sample size of certain subgroups (e.g. bachelor, masters degrees), post hoc analyses could not be utilized. Through increasing and diversifying the sample, future researchers may be able to determine if, for example, child care providers' knowledge and self-reported comfort with asthma differs if an individual has a high school or bachelor level education.

In order to gather more in-depth information on child care providers and childhood asthma, focus groups could be established. By using focus groups, researchers may be able to obtain more specific information on constructs of asthma knowledge, self-reported comfort, training, and experience with asthma. For example, questions could be asked regarding the specifications of asthma trainings, including the topics covered, management techniques taught, and resources that were provided during the training. Also, focus groups permit researchers to ask open-ended questions allowing the participants to provide their own responses to questions, as opposed to rating their responses on a point-based scale. This type of questioning may be especially beneficial in studying subjective constructs (e.g. perceived knowledge, self-reported comfort) and identifying new variables to examine.

Since the current study found that asthma training made a significant difference in child care providers' perceived knowledge and self-reported comfort, future research may wish to

study training in greater depth. It would be beneficial to know more about the type of training these individuals received and how this may relate to asthma knowledge and comfort of child care providers. Future research may want to assess more specific aspects of training such as content, length, and focus of the training, along with the information on who provided the training (e.g. child care center director, registered nurse, American Lung Association).

Further exploration of the concept of child care providers' perceived knowledge of asthma is recommended, as literature on this topic is scant. One area researchers may wish to examine could include possible connections between perceived knowledge of asthma and individuals' general and specific knowledge of asthma. Additionally, findings from the current study indicate that perceived knowledge and self-reported comfort may be related, suggesting that these subjective constructs may be areas for future research to examine more thoroughly.

As with perceived knowledge, little literature can be found on child care providers' self-reported comfort in caring for children with asthma, making it a good topic for future research. The addition of qualitative questions on measures of comfort could increase the amount and detail of information that could be gained, while also allowing participants to provide subjective responses. Along with studying comfort more closely, the concept of efficacy could be included in future studies. The inclusion of this construct in research would allow for assessment of child care providers' confidence in their ability to provide asthma care, as opposed to just examining their self-reported comfort. Additionally, research could explore possible connections between self-reported comfort and efficacy with other variables, such as knowledge and perceived knowledge of asthma, training, and experience with asthma. While the present study provided new insights on child care providers and childhood asthma, future research on this crucially relevant topic is warranted.

Conclusions

The aim of this study was to determine variables that may affect child care providers' knowledge and self-reported comfort in providing care for children with asthma; however, the results may have a wide range of implications for child care providers and policies concerning asthma. Asthma in young children has increased and child care options for children with asthma are needed. By identifying variables that may affect child care providers' knowledge and comfort in caring for children with asthma, this information can be utilized to better prepare and educate individuals in child care settings. Child care providers are salient influences on young children and may positively or adversely affect the child's asthma care and ensuing health status. If child care providers are trained to be more knowledgeable about asthma, children with this medical condition are likely to receive more optimal care. Furthermore, research and policies concerning childhood asthma and care in child care settings will allow more children to receive appropriate asthma care and ultimately provide children with a safe environment in which to grow, play, and learn.

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APPENDICES

APPENDIX A

SURVEY ITEMS

Items from the Asthma Knowledge and Training Needs of Child Care Providers Survey (Bales, Coleman, & Wallinga, 2003)

Personal Demographic Items

1) How old are you?

o 20 years or less
o 20-30 years old
o 31-40 years old
o 41-50 years old
o 51+ years old

2) What is the highest education level you have completed? (Check one)

o High School Diploma/GED
o CDA, CCP, TCC, or NAC credential
o Associate Degree of Technical Diploma
o Bachelor's Degree in _____
o Master's Degree or more in _____
o Other. Please specify _____

Professional/Center Demographic Items

3) Please check the number of years of experience you have in each of the following areas:

Child Care	Your Current Position
o 0-2 years	o 0-2 years
o 3-5 years	o 3-5 years
o 6-8 years	o 6-8 years
o 9+ years	o 9+ years

4) I work in a: (Select ONE only)

o Rural area or small town (under 2,500)

o Large town (2,501-9,999)

o Small city (10,000-49,999)

o Large city (50,000 and over)

5) Does your center have written health guidelines for asthma?

o Yes o No o Do not know

6) Is your center accredited? (Check all that apply)

o NAEYC

o Montessori

o Do not know

o Other. Please specify _____

Asthma Training and Experience Items

1) Have you had professional training related to asthma?

o Yes o No

If so, what kind of training?

o College course

o Workshop

o Other. Please specify _____

2) Have you had a child in your classroom in the last year with asthma?

o Yes o No

3) Do you or a close family member have asthma?

o Yes o No

If so, who has asthma?

o Self o Parent

o Spouse o Siblings

o Child o Other. Please specify _____

Scale Items

General Knowledge of Asthma

Using the following scale, please indicate the degree to which you agree or disagree with each of the following statements (Circle one response for each item)

1 = Strongly Disagree 2 = Disagree 3 = Do not know 4 = Agree 5 = Strongly Agree

1 2 3 4 5 Asthma is a common disease among children and adults in the U.S.

1 2 3 4 5 Asthma is an emotional or psychological illness.

1 2 3 4 5 The way that parents raise their children can cause asthma.

1 2 3 4 5 Asthma episodes may cause breathing problems, but these episodes are not really dangerous.

1 2 3 4 5 Asthma episodes usually occur without warning.

1 2 3 4 5 Many different things can bring on an asthma attack.

1 2 3 4 5 Asthma cannot be cured, but it can be controlled.

1 2 3 4 5 There are different types of medicine to control asthma.

1 2 3 4 5 Both children and adults can have asthma.

1 2 3 4 5 People can outgrow asthma.

1 2 3 4 5 Tobacco smoke can make an asthma episode worse.

1 2 3 4 5 People with asthma should not smoke.

(U.S. Department of Health and Human Services (1996). Check Your Asthma IQ)

Specific Knowledge of Asthma

Please tell us about your knowledge of asthma.

Please circle the number that corresponds with your answer.

Common asthma symptoms or signs include:

	Strongly Disagree	Disagree	Not sure	Agree	Strongly Agree
Shortness of breath	1	2	3	4	5
Diarrhea	1	2	3	4	5
Coughing	1	2	3	4	5
Wheezing	1	2	3	4	5
Fever	1	2	3	4	5
Sore throat	1	2	3	4	5

Common asthma triggers include:

	Strongly Disagree	Disagree	Not sure	Agree	Strongly Agree
Exercise	1	2	3	4	5
Aspirin	1	2	3	4	5
Emotional upset	1	2	3	4	5
Cool air	1	2	3	4	5
Upper respiratory/ viral infection	1	2	3	4	5
Laughing	1	2	3	4	5
Pets (e.g. dog, cat)	1	2	3	4	5
Kissing another child with asthma	1	2	3	4	5

Common asthma treatments include:

	Strongly Disagree	Disagree	Not sure	Agree	Strongly Agree
Tylenol	1	2	3	4	5
Breathing treatment	1	2	3	4	5
Physical therapy	1	2	3	4	5
Oxygen	1	2	3	4	5

(Juhn, St. Sauver, Shapiro, & McCarthy (2002). Questionnaire for Asthma Knowledge)

Perceived Knowledge of Asthma

Use the scale given to indicate how much you **know** about each asthma-related training topic.

Definitely Do Not Know	Do Not Know	Know	Definitely Know	
1	2	3	4	Asthma medications
1	2	3	4	Things that cause asthma
1	2	3	4	Signs and symptoms of asthma
1	2	3	4	Working with parents of children with asthma
1	2	3	4	Emergency procedures for asthma
1	2	3	4	Helping other children relate to a child with asthma

Se*lf-reported Comfort*

Please use the scale below to rate your comfort level regarding the following questions:

	Very Uncomfortable	Uncomfortable	Not sure	Comfortable	Very Comfortable
How comfortable are you having a child with asthma in your care?	1	2	3	4	5
How comfortable are you giving medications to a child with asthma?	1	2	3	4	5

How comfortable are you with your center's resources to assist children with asthma?	1	2	3	4	5
How comfortable are you with constraints on your classroom time as a teacher in helping children with asthma?	1	2	3	4	5
How comfortable are you talking with parents of children with asthma about their child's specific condition and treatment?	1	2	3	4	5

(Modified from Neuharth-Pritchett & Getch (2002). Teacher Capability and School Resource Scale for Asthma Management)

APPENDIX B

HUMAN SUBJECTS CONSENT LETTER

Asthma Knowledge and Training Needs of Child Care Providers
Asthma Training Survey Implied Consent Form

The attached survey is part of a research project entitled "Asthma Training Needs of Georgia Child Care Provider," conducted by Diane Bales, Mick Coleman, and Charlotte Wallinga from the Department of Child and Family Development at The University of Georgia, (706) 542-4930. Findings from this research may be published.

Purpose of the Study

The purpose of this study is to examine the asthma-related training needs and interests of early care and education providers in Georgia. Your participation in this study will allow organizations providing training to develop training that better meets your needs and helps children with asthma. Quality training related to asthma may result in higher job satisfaction and lower turnover among child care providers, as well as higher quality care for young children who have asthma as well as the other children in the classroom.

Voluntary Participation and Procedures

Your participation in this survey is completely voluntary. You do not have to take part in the survey if you do not want to. You can stop taking the survey at any time without giving any reason, and without penalty. The survey should take no more than 15 minutes to complete. If you choose not to participate, simply discard the survey. If you decide to complete this survey, you will be asked to do the following things:

1. Complete the enclosed survey (which should take about 15 minutes.) Please do not put your name on the survey.
2. Return the survey to the researcher at the registration table.
3. After completing the survey, you can voluntarily enter a drawing for a door prize. To register for the door prize, you must complete and return the survey, complete the "Door Prize Registration Form" and return the registration form to the marked box at the registration table. The door prize will be a gift basket valued at approximately $50.

Risks and Anonymity

No discomforts, stresses, or risks are expected as a result of completing this survey. The information you provide for the survey is anonymous. The demographic information that will be collected on the survey is general information and can in no way clearly identify you. The information that you provide for the door prize registration will be kept separate from the survey. After the door prize drawing takes place, all personal information about you will be shredded within 2 weeks.

Questions about the Research

If you have any questions, do not hesitate to ask now or at a later date. You may contact Diane Bales (706-542-7566), Mick Coleman (706-542-4899) or Charlotte Wallinga (706-542-4930) by phone or by writing to University of Georgia, Department of Child and Family Development, Dawson Hall, Athens, Georgia, 30602.

Sincerely yours,

Diane Bales, Ph.D.	Mick Coleman, Ph.D.	Charlotte Wallinga, Ph.D.
Assistant Professor	Professor	Associate Professor
(706) 542-7566	(706) 542-4899	(706) 542-4930

Additional questions or problems regarding your rights as a research participant should be addressed to Chris A. Joseph, Ph.D. Human Subjects Office, University of Georgia, 606A Boyd Graduate Studies Research Center, Athens, Georgia 30602-7411; Telephone (706) 542-3199; E-mail Address IRB@uga.edu