

# ASTHMA IN THE CHILD CARE CENTER: CARE PROVIDER KNOWLEDGE AND EFFICACY

By

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(Under direction of Charlotte Wallinga)

## ABSTRACT

The purpose of this study was to explore variables that influence child care providers' factual and self-reported asthma knowledge and providers' efficacy in caring for children with asthma. Participants included 138 child care providers who attended two of the 2003 Early Childhood Institutes in Georgia. The majority of participants were female, and 56% indicated their highest education level was high school/GED. Data were collected using the Asthma Knowledge and Training Needs of Child Care Providers Survey (Bales, Coleman, & Wallinga, 2003). The analysis consisted of a series of one-way analyses of variance (ANOVAs) and one regression. ANOVAs revealed that factual asthma knowledge significantly differed by written asthma guidelines, self-reported asthma knowledge significantly differed by size of work community, and asthma training and experience, and efficacy significantly differed by level of education. Self-reported asthma knowledge was a significant predictor of child care provider efficacy.

INDEX WORDS: Asthma, Child care, Efficacy, Knowledge

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## DEDICATION

I would like to dedicate this thesis to my parents. Throughout my life you have believed in every idea, dream, and goal that I have had. You have encouraged me to reach higher than I could ever have imagined and face each day with a smile. Your patience and love have been unceasing. Even at times when our opinions differed, you were just one step behind me, ready to catch me, cry with me, and laugh with me. Thanks especially for your optimism, for never saying “I told you so”, and for taking care of sweet Calla so many times. I owe this and so much more to you in honor of the amazing parents you have been and continue to be. I love you!

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## CHAPTER 1

### INTRODUCTION

The childhood years are challenging times, riddled with tasks such as developing autonomy, establishing a positive self-concept, learning to form friendships and establishing a sense of independence. Children with chronic illnesses may have an even more difficult time accomplishing these basic childhood tasks. Research indicates that children who have chronic illnesses are 1.3 to 3 times more likely to face psychological and social risks including developing behavioral problems, poor self-concept, and social withdrawal (Austin, 1989; Breslau, 1985).

Estimates show that 10-20% of children in the United States are affected by a chronic medical condition (Bowe, 2000). Asthma is one such chronic illness that has been estimated to affect just over six million children (American Lung Association [ALA], 2004a). In addition to this number, it is thought that many children with asthma go undiagnosed, raising estimates of the actual number of children with asthma to more than nine million (Bloom, Cohen, Vickerie, & Wondimu, 2003), indicating that children represent nearly half of the total population of people with asthma (Lucas, Schiller, & Benson, 2004). The incidence of childhood asthma is increasing, with a growth of approximately 5% each year (Centers for Disease Control [CDC], 2000). In fact, between the years of 1980 and 1994, asthma incidence increased 160% for children 4 years of age and under (U.S. Department of Health and Human Services (DHHS), 1999).

Statistics indicate that certain subgroups of children are at a higher risk for being affected by asthma. Hispanic children have a 17% greater incidence of asthma than Caucasian children while African American children have a 31% greater incidence of asthma than Caucasian children (CDC, 2000). Low-income populations, minorities, and children living in inner cities also experience disproportionately higher morbidity and mortality due to asthma (CDC, 2000).

Although it is known that the incidence of asthma in young children is rapidly growing and that certain subgroups of children are at a much higher risk for developing asthma, little is known about the asthma care that these young children receive when they attend child care. Research indicates that more than half of children under five years of age attend some type of child care (Forum on Child and Family Statistics, 2001), yet not much is known about child care provider preparedness to care for young children with asthma (Huss, et al., 2002; Juhn, St. Sauver, Shapiro, & McCarthy, 2002; Walders, McQuaid, & Dickstein, 2004). This study addresses child care providers' knowledge of asthma and care providers' efficacy in caring for young children who have asthma. (See Appendix A for definitions of knowledge and efficacy used in this study).

Researchers have established that many child care providers care for children who have asthma (Ramm, Bauman, Young, & Forero, 1994; Walders, McQuaid, & Dickstein, 2004). Such research also indicates that these child care providers may not have received adequate training to administer asthma medications and recognize asthma attacks. Additionally, many child care centers are not licensed to administer medication (Juhn, St. Sauver, Shapiro, & McCarthy, 2002), and licensing requirements vary by state (National Resource Center for Health and Safety in Child Care, 2004).

While little is known about asthma in preschool age children and child care, there is a body of information regarding asthma in school-age children, in both school and community settings (ALA, 2004c; Bowen, 1996; Hazell, Henry, Francis, & Halliday, 1995; Lynch, Lewis & Murphy, 1992; U.S. DHHS, 2004b; Neuhauser-Pritchett & Getch, 2001b; Thies, 1999; Wade, 2000; Wu & Hill, 1998). School-based studies of asthma have explored issues such as how teachers respond to children with asthma, the impact of providing routine asthma medications at school, asthma and chronic illness training, and parental satisfaction with asthma-related provisions at school (Bowen, 1996; Hazell, Henry, Francis, & Halliday, 1995; Lynch, Lewis, & Murphy, 1992; Neuhauser-Pritchett & Getch, 2001b; Thies, 1999; Wade, 2000). Data from these studies indicate that parents believe the school services for children with chronic illnesses, specifically asthma, may not be adequate. Teachers surveyed in such studies indicated that they do not believe they are adequately prepared to meet the special health care needs of students with asthma.

To address these issues, intervention programs have been organized to provide education to school-age children, school teachers and other school personnel (ALA, 2004c; U.S. DHHS, 2003). These programs provide information regarding common asthma facts, triggers, symptoms, and treatments, as well as classroom management with children who have special health care needs. Intervention programs are also conducted outside of the school setting. Community asthma intervention programs have primarily targeted Latino and African-American families. The foci of such programs center on improving the general well-being and health of children with asthma; however, a majority of the community education and intervention programs continue to be based on and include only families with children over five years of age. (CDC, 2003; U.S. DHHS, 2004b; Wu & Hill, 1998);

The prevalence of research and interventions regarding school-age children reflects an interest in the topic of childhood asthma. Nevertheless, it seems necessary that more research be conducted concerning the experience of younger children with asthma. As many as 60% of children between three and six years of age attend child care in settings outside their homes (Forum on Child and Family Statistics, 2001). Child care provider preparedness to care for children who have asthma is a particular topic that has been sparingly explored (Huss, et al., 2002; Juhn, St. Sauver, Shapiro, & McCarthy, 2002; Walders, McQuaid, & Dickstein, 2004).

### Purpose

The purpose of this study was to examine variables that influence child care providers' asthma knowledge and providers' efficacy in their care of young children who have asthma. Variables of particular interest included personal, professional, and center demographics, personal and professional experience with asthma and asthma training. Knowledge was examined from two perspectives, factual knowledge and self-reported knowledge. Also, links between child care provider demographic information, training, experience, knowledge and care provider efficacy in caring for young children with asthma were explored.

## CHAPTER 2

### LITERATURE REVIEW

The following is a review of literature on asthma in young children and the child care providers who care for them. This review is organized into sections that address (a) characteristics of asthma, (b) psychosocial and behavioral implications of asthma in young children, (c) bidirectional influences between families, teachers, and child care providers of children who have asthma, (d) an ecological perspective of children with asthma in child care centers, and (e) the status of research and gaps in the literature. Following the literature review is a statement of research questions and hypotheses for the present study.

#### Characteristics of Asthma

Asthma is a chronic illness that affects the body's ability to take in an adequate amount of oxygen and to release carbon dioxide from the lungs. Oxygen, in the form of air, is taken into the body through the mouth and nose, and transported to the lungs through airways called bronchial tubes and progressively smaller bronchioles. Asthma is a condition that is characterized by three elements: (a) increased mucus production in the airways, (b) inflammation of the airways, and (c) constriction of the ring-like muscles in the airways in reaction to any number of asthma triggers (Venes et al., 2001). When an asthma attack occurs, airways become significantly smaller due to inflammation, constriction and increased mucus, allowing less air to reach the lungs. Breathing becomes a strenuous process for the person experiencing an asthma attack because less air is exchanged in each breath. The immediate effect on the body is a lack of oxygen in the lungs and an increase in carbon dioxide. After a period of time without

medication to relieve an asthma attack, the entire body is affected. The lungs are not fully able to rid the body of carbon dioxide and take in an adequate amount of oxygen, resulting in shortness of breath, wheezing, and coughing (Venes et al., 2001). Delay in treatment can ultimately lead to death for individuals who have mild, moderate, or severe asthma. In fact, nearly the same number of deaths occur due to mild (33%) or moderate (31%) asthma cases as for severe (36%) cases of asthma (Robertson, Rubinfield, & Bowes, 1992).

### *Asthma Symptoms and Triggers*

The variety of asthma symptoms vary across individuals. Some common symptoms include shortness of breath, wheezing, and coughing (Hamm, 2004; Venes et al., 2001). In extreme cases, temporary bluing of the lips and fingernail beds can occur due to lack of oxygen in the body (Venes et al., 2001). An asthma attack occurs when an individual comes into contact with an asthma trigger. Common asthma triggers differ by individual, but can include dust and pollen, seasonal and food allergies, animal dander, strong scents contained in perfumes and many cleaning supplies, colds, infections, cold air, exercise, tobacco smoke, respiratory infections, dust mites, and extreme emotional upset (Strunk, 2002; Venes et al., 2001).

### *Asthma Treatments*

Medications used to treat asthma in young children fall into four broad categories: anti-inflammatories, bronchodilators, leukotrienes, and combination medications (ALA, 2004b; Banasiak & Meadows-Oliver, 2005; Larry Aull, personal communication, April 25, 2005; Venes, et al., 2001). Medications begin in liquid, tablet, granule, or powder form. Liquid medications are converted to a mist that is easily inhaled through an inhaler or nebulizer. Medications in tablet form are chewable, granules can be sprinkled over food, and powdered medications can be inhaled.



Anti-inflammatory medications are taken daily to control airway inflammation and prevent asthma attacks from occurring (ALA, 2004a). These preventive medications work by reducing swelling in the airways and decreasing the amount of mucus that could obstruct the airways. Leukotriene modifiers and combination medications are also used to prevent asthma attacks. They work in tandem with other medications to minimize airway inflammation and constriction (Banasiak, & Meadows-Oliver, 2005, Larry Aull, personal communication, April 25, 2005). Both types of medications are recommended for use to minimize asthma symptoms rather than stopping symptoms during an asthma attack. The leukotriene modifiers that have been approved for use in children under six years of age are available in tablets that can be chewed and swallowed or in granules that can be sprinkled over food (Larry Aull, personal communication, April 25, 2005). Single doses of the powdered combination medications are inhaled using a small hand-held device called a discus (Larry Aull, personal communication, April 25, 2005).

Bronchodilators, another type of asthma medication, are emergency medications used either to stop an asthma attack after it has started or to prevent anticipated asthma attacks (ALA, 2004b). These medications help to relax muscles in the airways so there is more room for air to pass. During an asthma attack, bronchodilators stop the inflammation that has begun. When trying to prevent asthma attacks, bronchodilators are used prior to contact with a known asthma trigger to keep airway muscles from constricting.

An inhaler is one device commonly used to administer liquid asthma medication. The inhaler is a small hand-held device that delivers “puffs” of medication into the patient’s mouth from a small cylinder that contains liquid medication (Heller et al., 2000). Due to the speed with which medication travels from the inhaler into the user’s mouth, a spacer is often used with an

inhaler to improve delivery of medication to the airways. A spacer is a small plastic chamber that attaches to the front of the inhaler. Medication is “puffed” from the inhaler into the spacer, where there is space for the mist particles to slow down so they can be inhaled into the patient’s airways. Without the spacer, a large amount of medication often ends up in the mouth, on the palate, or at the back of the throat instead of in the airways (Venes et al., 2001).

Another device used to administer liquid asthma medication is a nebulizer, a larger machine that produces mist from liquid medication (Heller et al., 2000). All nebulizers have an air compressor, tubing, medication chamber, spacer, and mouthpiece that must be put together before use. When liquid is put into the medication chamber, the nebulizer converts it to a mist that travels to the patient through tubing that connects to either a mouthpiece or mask. The mouthpiece delivers medication only into the mouth, while a mask is used for inhalation through the mouth and nose (Heller et al., 2000).

#### Psychosocial and Behavioral Impact of Asthma in Young Children

In addition to the biological characteristics of asthma, there are also several psychosocial and behavioral implications of asthma in young children. Preschool-age children are among those with the greatest risk for developing psychosocial issues related to health care (Thompson & Stanford, 1981). Typical behavior characteristics of healthy preschoolers include increasing independence in decision making, control over one’s own behavior, magical thought, egocentrism, and a simple understanding of one’s own emotions (Erikson, 1997; Goldhaber, 2000). Magical thought is one particular cognitive attribute in young children that often leads children to see necessary medical procedures as personal attacks (Thompson & Stanford, 1981). For instance, nebulizers, used for taking asthma medication, make a humming noise while working. Magical thought can lead a child to see the nebulizer as an animate object that is acting

on their body of its own accord. This reasoning can lead to fear and unwillingness to take medication in young children.

Preschool-age children can also view their medications and asthma care as “bad” if they feel that these things are causing a loss of their developing sense of control and autonomy. The necessity to take medications and to restrict physical activity can operate as an imposition on personal sense of control and developing autonomy. Taking time to explain why medication must be taken and allowing children to participate in their asthma care can be very helpful in facilitating understanding of the diagnosis and gaining cooperation in care (Bolig, Yolton, & Nissen, 1991; Oremland, 1988).

Regression is yet another issue that occurs as a result of emotional stress and is commonly observed in children who experience chronic or acute illnesses (Thompson & Stanford, 1981). In stressful situations where control is limited or taken away, children can regress to previous developmental behaviors, such as excessive need for comfort items, loss of toilet-training, acting out, and refusing to comply with medical care (Curry, 1988). In the case of children who have asthma, the need to take asthma medication and limit activities may trigger regressive behaviors.

Side effects of asthma medications can produce adverse effects on child behavior as well. Common side effects of asthma medications in all age groups include nausea, loss of appetite, insomnia, nervousness, restlessness, headache, irritability, mood change, hyperactivity, inability to concentrate, and rapid heartbeat (Bender, 1995; Potts & Reagan, 2004; Venes et al., 2001). Brown, Avery, Mobley, Boccuti, and Golbach’s (1996) study of 61 preschool-age children with asthma revealed that it is quite common for children with asthma to take at least one daily medication, as did 93% of the children sampled. Additionally, 59% of the sample took at least

two medications daily to control asthma, increasing the risk of physical and behavioral side effects.

### Bidirectional Influences between Children with Asthma, their Families, School, and Child Care Settings

A basic understanding of the psychosocial and behavioral effects associated with asthma inspires the question of how young children with asthma affect their environments, such as home, school, and child care. Conversely, children with asthma are also affected by their families, teachers, and child care providers. The following section will provide an explanation of the bidirectional influences between children with asthma, their families, school, and child care settings.

#### *The Family*

Children with asthma develop an early dependence on their parents not only to provide the basic needs in life, but also to seek out and provide proper asthma care (Brown, Avery, Mobley, Boccuti, & Golbach, 1996). There are several characteristics of families and parents that may impact their children with asthma. General attitude toward asthma and barriers to providing proper care are two factors that have been discussed in the literature (Adams, Pill, & Jones, 1997; Mansour, Lanphear, & DeWitt, 2000).

One area that has been addressed in research is adult attitudes toward their own asthma diagnosis (Adams, Pill, & Jones, 1997). While the attitudes of adults toward their own asthma diagnosis do not equate to parental attitudes toward their child's asthma diagnosis, this information may indeed be helpful in gaining a perspective of how asthma is viewed by adults. Adams, Pill, and Jones (1997) studied the general attitudes of 30 adult asthma patients toward their disease. Their qualitative survey revealed two prevalent thought patterns regarding asthma:

acceptance and denial. One-half of the respondents were “deniers/distancers,” meaning that they would not admit to having a clinical diagnosis of asthma. People who were classified as distancers referred to their condition as having a “bad chest” or being “bronchial,” rather than “asthma.” These individuals chose not to acknowledge the severity of their asthma diagnosis, their need to receive medication regularly to control asthma, or a need for knowledge of how they can lead a healthy life with asthma. Management of asthma for these individuals consisted of intentionally avoiding activities that could trigger asthma attacks so they would not have to face the consequences. The other half of respondents were “acceptors,” meaning that they took proper steps for asthma care, including taking regular medications and seeking medical attention as necessary.

In addition to the lack of asthma knowledge that adults reported in Adams, Pill, and Jones’s (1997) study, Mansour, Lanphear, and DeWitt (2000) have also found a lack of asthma knowledge among parents of children with asthma. Their focus groups included 47 parents of children with asthma and revealed many barriers to asthma care for children. Parental lack of knowledge regarding asthma, medications and triggers were the most often mentioned barriers during focus groups. The second most often mentioned barrier for parents was their attitude toward asthma. In particular, many of the parents stated that they viewed daily preventative medications as unnecessary; their children only needed medicine when they had problems breathing. In addition to these barriers, parents stated that they lacked support from their child’s school and reported that the asthma education provided to them by health care providers was not adequate or easy for them to understand.

### *Children with Asthma in the School Setting*

As the prevalence of asthma in children grows each year (CDC, 2000), research on childhood experiences in educational and child care settings becomes more important. While the prevalence of asthma in preschool-age children is growing at a higher rate than any other age group (CDC, 2000), research on child care provider preparedness continues to be an area of research that is limited (Getch & Neuharth-Pritchett, 2004; Huss et al., 2002; Juhn, St. Sauver, Shapiro, & McCarthy, 2002; Walders, McQuaid, & Dickstein, 2004). On the other hand, research has been conducted on teacher preparedness to cope with their school age students who have asthma and other chronic illnesses (Bowen, 1996; Getch & Neuharth-Pritchett, 2004; Hazell, Henry, Francis, & Halliday, 1995; Lowenthal & Lowenthal, 1995; Lynch, Lewis, & Murphy, 1992; Mukherjee, Lightfoot, & Sloper, 2000; Thies, 1999).

Teachers of school-age children with asthma and other chronic illnesses often report that they believe they are not prepared to cope with students who have chronic illnesses, particularly asthma (Bowen, 1996; Getch & Neuharth-Pritchett, 2004; Hazell, Henry, Francis, & Halliday, 1995; Lowenthal & Lowenthal, 1995; Lynch, Lewis & Murphy, 1992; Mukherjee, Lightfoot, & Sloper, 2000; Thies, 1999). Problems reported include understanding diagnoses, having enough teachers to provide adequate care to students with asthma, managing an asthma attack, feeling comfortable having students with asthma and other chronic conditions in classrooms, and keeping up with students who have frequent absences. Parents of students with asthma have also reported that they do not think teachers fully understand their child's needs (Lynch, Lewis, & Murphy, 1992). Hazell, Henry, Francis, and Halliday (1995) interviewed 48 teachers of school-age children prior to an asthma education program. Seventy-five percent of teachers reported that if their student were having an asthma attack, they would send for somebody else to provide

care to the student. Likewise, only 8% of the teachers reported that they would follow written instructions from parents in caring for a student having an asthma attack. In a survey of 30 elementary school teachers, Bowen (1996) reported similar findings. All of the teachers in this study reported that they had taught a child with asthma, yet over half of the teachers stated that they did not feel comfortable in caring for a child during an asthma attack. Similar findings have also been reported by Neuharth-Pritchett and Getch (2001b) in their study of 291 elementary school teachers. Seventy-eight percent of participants indicated that they did not believe they were prepared to teach children with chronic illnesses, particularly asthma.

Mukherjee, Lightfoot, and Sloper (2000) surveyed teachers and parents of 58 primary and secondary school students with chronic illnesses about topics related to health care at school, including teacher needs in caring for students with special health care needs. Teachers reported that they lacked support in many areas when caring for students with chronic illnesses such as asthma, particularly in the areas of obtaining accurate information, ensuring that health-related information is passed between school administration and teachers, providing medical and emotional support to students, and coordinating support for chronically ill students.

### *Children with Asthma in the Child Care Setting*

Child care provider preparedness to care for children with asthma has received limited research attention compared to that of school teacher preparedness. Existing research on child care providers and children with asthma suggests that child care providers may not have sufficient asthma knowledge (Huss et al., 2002; Juhn, St. Sauver, Shapiro, & McCarthy, 2002; Ramm, Bauman, Young, & Forero, 1994; Walders, McQuaid, & Dickstein, 2004) and may feel limited comfort in caring for children with asthma (Walders, McQuaid, & Dickstein, 2004). Scholars may also be able to glean information about the care of young children with asthma

from literature on child care providers and healthy children. This research suggests that there may be professional factors that influence quality child care, including care provider level of education and training (Burchinal, Cryer, Clifford, & Howes, 2002; Howes, 1997; National Institute of Child Health and Human Development [NICHD] Early Child Care Research Network, 2000; Phillips, Mekos, Scarr, McCartney, & Abbott-Shim, 2000; Phillipsen, Burchinal, Howes, & Cryer, 1997; Whitebook, Howes, & Phillips, 1990). Research pertaining to communication between parents and child care providers, child care provider asthma knowledge, care provider efficacy in caring for children with asthma, level of education, and training will be reviewed in this section.

#### *Communication between Parents and Child Care Providers*

Many studies of parental asthma management show that parents are able to identify early warning signs of asthma attacks and that mothers most often report being the primary source of asthma information to child care providers (Brown, Avery, Mobley, Boccuti, & Golbach, 1996; Neuhaarh-Pritchett, & Getch, 2003; Hamm, 2004; Horner, 1997; Price, Bratton & Klennert, 2002; Sander, 1998; Sterling & Peterson, 2003; Warman, Silver, McCourt, & Stein, 1999). Considering such findings, it seems important that there would be a strong line of communication between parents of children who have asthma and the child care providers who care for them on a daily basis. In fact, many scholars remark that collaboration between parents and care providers is very important for children with asthma to receive proper care when away from home, whether at school or in child care (Lowenthal & Lowenthal, 1995; Neuhaarh-Pritchett & Getch, 2001a,b; Simeonsson, Lorimer, Shelley, & Sturtz, 1995; Strunk & Boyd, 1980). In samples of healthy children and their parents, researchers have found that strong



communication between parents and child care providers is often not the case (Britner & Phillips 1995; Endsley & Minish 1991; Shpancer et al., 2002).

Britner and Phillips (1995) report that parental involvement in their child's care setting was infrequent among 90 parents of preschool-aged children who attended 27 various child care centers. Parents and child care providers who participated in this study asserted that parental involvement in the child care center was neither important nor unimportant, rather, the quality of interactions between children and the child care provider was the most important quality of child care. More recently, Shpancer et al. (2002) revealed that all of the 37 parents of children ages 2-6 years who were interviewed confessed a lack of knowledge in many aspects of their child's care center including number of injuries, licensing, and caregiver education. Though this lack of communication between parents and child care providers has not been addressed in the asthma literature and it is not known how much care providers depend on parents for asthma information, level of asthma knowledge among child care providers has been briefly explored.

#### *Asthma Knowledge in Child Care Providers*

Scholars have found that child care providers have some knowledge of asthma symptoms, triggers, and treatments (Juhn, St. Sauver, Shapiro, & McCarthy, 2002; Ramm, Bauman, Young, & Forero, 1994; Walders, McQuaid, & Dickstein, 2004). Walders, McQuaid, and Dickstein (2004) studied 61 Head Start (HS) and Early Head Start (EHS) teachers. These teachers, when asked about their knowledge of asthma symptoms, were able to name, on average, two asthma symptoms, most often wheezing (55% of providers) and shortness of breath (36% of providers). The same sample of HS and EHS teachers was slightly more knowledgeable in asthma triggers than symptoms, naming exercise/physical exertion, hot and cold weather, and

allergies as common triggers. Conversely, only 19% of the teachers were able to identify colds and infections as asthma triggers, two of the most common in young children (Strunk, 2002).

Another study of HS staff and directors by Huss et al. (2002) revealed that while 83% of the 12 directors surveyed reported that staff members were responsible for giving asthma medications, staff might not have been prepared for this task. Fifty percent of the 268 staff members surveyed did not know whether their HS site had asthma action plans for children in their care or not. Additionally, only 56% of the staff members had attended an asthma education program.

Ramm, Bauman, Young, and Forero (1994) surveyed 247 Australian child care workers and found asthma knowledge results similar to the American sample of Walders, McQuaid, and Dickstein (2004). Australian child care workers in this study reported wheezing (98%) and breathlessness (97%) most often as asthma symptoms. Inhaler use was the most often-reported asthma treatment in this sample. Concurrently, a large proportion of care providers also identified incorrect treatment methods such as steam inhalation and chest physiotherapy. Interestingly, about 66% of this group of child care workers, a majority of who were involved in the care of children with asthma, expressed that they did not think they should be responsible for medical care of children with asthma. They claimed that parents were “irresponsible” who left their child in child care on days when they were having asthma symptoms. These child care providers stated that their concerns in caring for children with asthma included not having sufficient time or staff to provide proper care, lack of knowledge for proper medication administration, classroom disruption, and lack of information from parents regarding asthma.

In addition to child care providers, child care directors have been the subjects of asthma knowledge research (Huss et al., 2002; Juhn, St. Sauver, Shapiro, & McCarthy, 2002). One

hundred child care directors were interviewed by Juhn, St. Sauver, Shapiro, and McCarthy (2002) and expressed an average asthma knowledge score of 75% on the Questionnaire for Asthma Knowledge (Juhn, St. Sauver, Shapiro, & McCarthy, 2002). Bivariate correlations indicated the factors that significantly contributed to asthma knowledge for the child care directors included state funding of the child care center and a shorter length of time employed in their current position.

#### *Asthma Care Efficacy in Child Care Providers*

Child care provider efficacy is another factor that can influence children with asthma in the child care setting. Efficacy, as defined for the purpose of the present study, addresses child care provider comfort in their own competency to care for children with asthma. Although child care provider efficacy has received little research attention, Walders, McQuaid, and Dickstein (2004) have explored comfort in caring for children with asthma from the perspective of Head Start (HS) and Early Head Start (EHS) teachers. Their sample of 61 HS and EHS teachers addressed comfort in administering medication to children with asthma and responding to an asthma attack. The survey entitled “The Childhood Health Questionnaire” was used to assess asthma knowledge, preparedness, and training of the HS and EHS teachers. Respectively, 47% and 48% of teachers reported that they felt “neutral” to “very uncomfortable” in administering medication and recognizing asthma attacks. While level of formal education was not reported for this sample, 44% of the teachers reported that they had received some type of formal asthma training. Even so, there was no significant relation between asthma training and comfort in caring for children with asthma.

### *Education and Training in Child Care Providers*

Many researchers have found that level of education and training are integral components of quality child care for healthy children (Burchinal, Cryer, Clifford, & Howes, 2002; Howes, 1997; NICHD Early Child Care Research Network, 2000; Phillips, Mekos, Scarr, McCartney, & Abbott-Shim, 2000; Phillipsen, Burchinal, Howes, & Cryer, 1997; Whitebook, Howes, & Phillips, 1990). The National Institute of Child Health and Human Development (NICHD) Early Child Care Research Network (2000) revealed the importance of care providers' level of training and educational specialization in early childhood development in their study of 1216 healthy toddlers and preschool-age children (NICHD Early Child Care Research Network, 2000). Researchers visited child care centers participating in this study for a period of 36 months, beginning when participating children were 14 months old. Child care centers were assessed six times over the course of the study in areas such as child-adult ratio, group size, caregiver education, caregiver beliefs, caregiver experience, and caregiver specialized training. Positive care giving was consistently higher when caregivers had more experience in child care, a high level of education, and more child-centered beliefs (NICHD Early Child Care Research Network, 2000). The NICHD Early Child Care Research Network (2000) findings have been supported by many other studies of child care quality (Howes, 1997; Phillips, Mekos, Scarr, McCartney, & Abbott-Shim, 2000; Phillipsen, Burchinal, Howes, & Cryer, 1997; Whitebook, Howes, & Phillips, 1990), including that of Burchinal, Cryer, Clifford, and Howes (2002). Their study, which included 418 preschool classrooms, revealed that care providers who were educated at the baccalaureate level and who had received specialized child care training provided consistently higher quality care when compared with other child care providers.

As care provider knowledge and training are important components of quality care for healthy children, Landis and Chang (1991) report that these are also important components of quality child care for children who have chronic illnesses. Their recommendations for the care of children with chronic illnesses, based on numerous pediatrician reports, indicate that caregiver competency regarding the nature of the child's illness and potential complications are the most important criteria for quality care.

There are a variety of ways in which child care providers might gain competency in childhood asthma, including credentialing programs (Council for Professional Recognition, 1998; Professional Administrator National Credential, 2004), training programs (Allergy and Asthma Foundation of America [AAFA], 2005; American Academy of Pediatrics, 2004), and various Internet sources (Early Childhood Focus, 2004; Hamm, 2004; Maternal and Child Health Library, 2004; U.S. DHHS, 2004a). As Internet information sources are beyond the scope of the current study, only credentialing options and training programs will be discussed here.

Nationwide child care credentialing programs include the Child Development Associate (Council for Professional Recognition, 1998) and the National Administrator's Credential (Professional Administrator National Credential, 2004). Both of these programs offer unique educational experiences for child care providers and administrators. Training topics focus on norms and theories of child development, providing developmentally appropriate activities to children, professionalism, providing a safe and healthy environment, and nutrition. The inclusion of information regarding childhood illnesses is left to the discretion of training providers in each of these credentialing programs and varies from state to state. Therefore, it is not a certainty that child care providers will receive asthma information from credentialing programs (Dr. Anita Smith, personal communication, September 20, 2004).

Asthma training opportunities and materials for child care providers are available through a variety of organizations. The Allergy and Asthma Foundation of America (AAFA) is one such organization that provides training materials to child care providers (AAFA, 2005). Asthma and Allergy Essentials for Child Care Providers is a training kit produced by the AAFA that can be purchased by child care providers. Its contents include information on the recognition of asthma symptoms and tips on providing proper care to children with asthma. Also included in the kits are environmental checklists so that centers can reduce potential asthma triggers, and asthma action cards for recording specific information about each child's condition and treatment procedures. While these may be useful tools for child care providers, utilization of this program in terms of the amount of use, who uses it, and outcome of usage is largely unknown (Jacqi Vok, personal communication, September 27, 2004).

The American Academy of Pediatrics (2004) provides another training program for child care providers who are interested in becoming Child Care Health Consultants (CCHC). The training curriculum includes a session entitled "Caring for Children with Chronic Health Conditions." In the session, child care providers and administrators learn about asthma and other illnesses that affect young children, as well as proper care for children with chronic conditions (Katherine Otto, personal communication, September 21, 2004). In fact, the textbook utilized in this training, *Caring for our Children* (American Academy of Pediatrics, 2002), includes the national guidelines for care of children with asthma as set forth by the American Academy of Pediatrics. The majority of CCHC training attendees, however, tend to be educational trainers and technical assistance providers rather than child care providers who have direct contact with children (Katherine Otto, personal communication, September 21, 2004).

### An Ecological Perspective of Children with Asthma in Child Care Centers

As indicated in the previous section, there are several factors that may be related to child care providers and their care of young children with asthma. An understanding of how child care providers view and attend to children with asthma can be constructed as a component of the child's ecological system. Ecological perspective scholar Vayda (1983), asserts that the ecological perspective is useful for "...focusing on significant human activities or people-environment interactions and then explaining these interactions by placing them within progressively wider or denser contexts" (p. 265). The present study utilizes an ecological perspective to explore child care provider knowledge of childhood asthma and efficacy in caring for children with asthma, as a function of the child's ecological system.

The study of human ecology and adaptation as a means for explaining social organization developed from the study of biological ecology in the early 20<sup>th</sup> century (Vayda, 1983). Human ecology is concerned with human development as it is nested in a variety of social environments ranging from proximal to distal (Vayda, 1983). The ecological perspective can be thought of as a set of concentric circles, with each progressively larger circle encompassing a larger set of environmental influences (Bronfenbrenner, 1994) (see Figure 1).

Ecological systems that influence childhood development include the microsystem, mesosystem, exosystem, and macrosystem (Bronfenbrenner, 1979). The child is situated at the center of the microsystem, which consists of bidirectional direct interactions. The microsystem could include family, child care providers, peers and friends. The bidirectionality of such relationships implies that the child influences and is influenced by components of the microsystem. For this particular study, the microsystem will encompass child care providers and families of children with asthma. The mesosystem is contained in the next concentric circle

and can be thought of as a system of microsystems. In other words, the mesosystem is composed of interactions between any two microsystems. For a preschool-age child, these interactions may include linkages between family and friends, home and child care, or friends and child care. The next ecological system is the exosystem, which includes settings where the child has limited interactions or does not directly interact such as extended family, neighborhood, parents' workplace, and child care provider training programs. While interactions with the exosystem may be limited or indirect, the child is still affected. For example, the quality of asthma training that child care providers receive could affect the quality of asthma care that the child receives in child care. The final concentric circle is the macrosystem, a set of cultural, economic, religious, and government patterns. A preschool-age child may be indirectly influenced by medical advances in their community, the national financial climate, the quality of child care in their community, and cultural views and practices related to childhood illness (Bronfenbrenner, 1979) (see Figure 1).

Inherent to studies of ecosystem is the concept of adaptation, the process of growth and integration of new information and change in ecosystems (Bubolz & Sontag, 1993). People are able to adapt their thought processes and daily patterns in reaction to change in environment and also alter their environment to meet changing personal needs. For example, a child with severe asthma who attends child care moves to a new neighborhood and will begin a new child care arrangement. The child must adapt to the change in daily patterns at the new child care center, and relationships with new care providers, peers, and friends. Likewise, the new child care center and care providers must also adapt to the special health care needs of the child by providing daily and emergency medications and providing alternative physical activities that are suitable to a child with severe asthma.



Interaction and interdependency are additional concepts in the study of human ecology that are integral to understanding human behavior. Interaction is a process whereby change in one part of the ecosystem instigates change in another part of the ecosystem (Bubolz & Sontag, 1993). For example, societal shift toward both parents working can lead to an increased need for child care. Child care providers, in turn, may need to gain more specialized knowledge in common childhood illnesses, which would be more likely to occur when more children are present in child care. Interdependency explains the mutual dependency between components of an ecosystem for growth and change (Bubolz & Sontag, 1993). In the previous example, interdependency can also be conceptualized, as child care providers may begin to rely more on community training and information sources regarding childhood illness to cope with the change in their work environment.

The present study focused on the microsystem, mesosystem, and exosystem of preschool-age children with asthma. Emphasis was placed on variables that influenced child care providers' knowledge of asthma and their efficacy in caring for young children who have asthma.

#### Status of Research and Gaps in the Literature

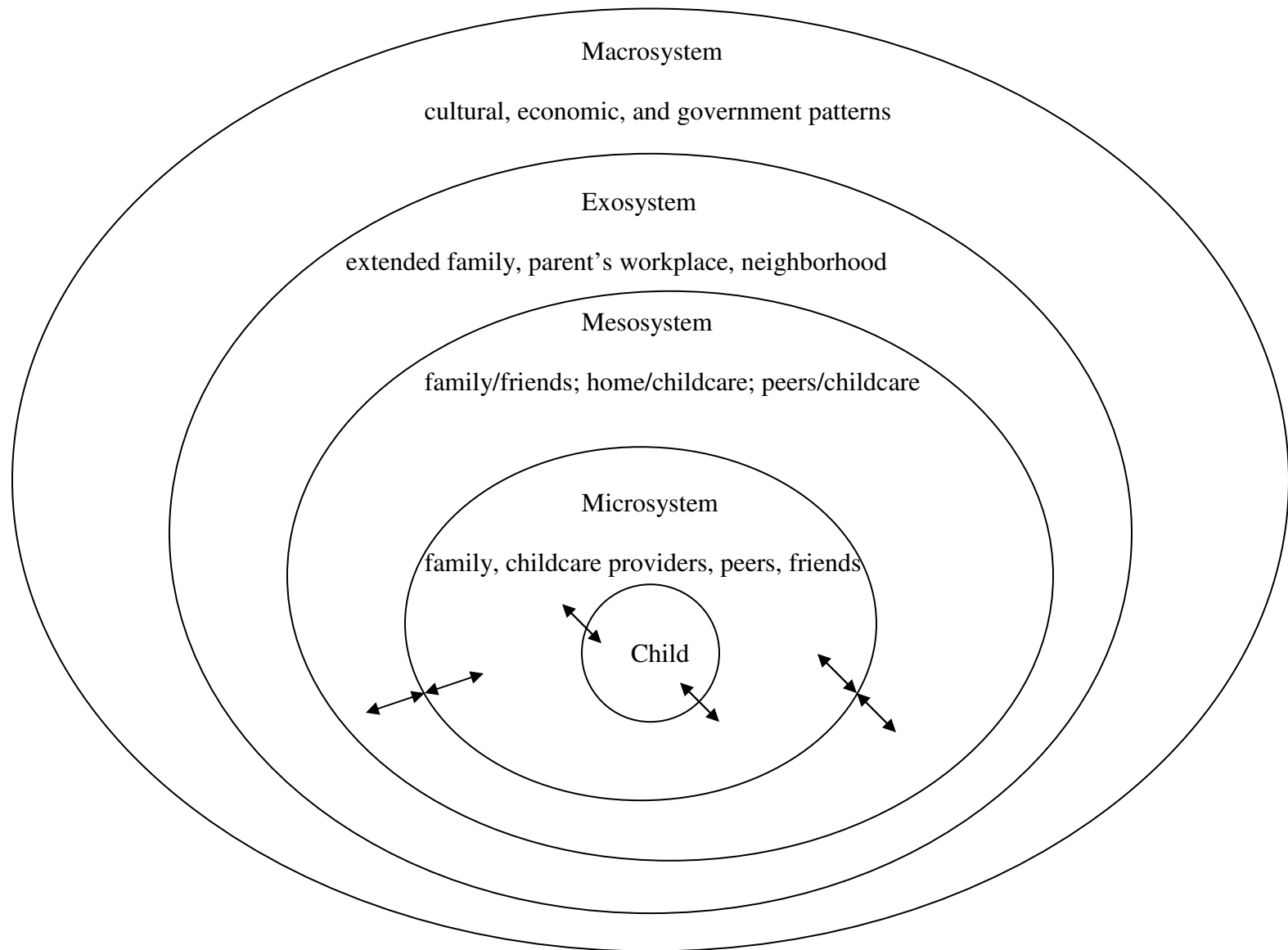
Young children with asthma experience many challenges in their psychosocial development. These challenges can be supported or amplified in their child care experience. Research has explored teacher preparedness to cope with the needs of older children with asthma, as well as a limited view of child care provider preparedness to care for young children with asthma. While the existing research on child care provider asthma knowledge and efficacy to care for children with asthma suggests that child care providers are somewhat unprepared, very limited formal research has so far been conducted on this topic.

As the number of young children who have asthma grows, child care providers will have an increasing chance of coming into contact with children who have asthma. Providers who are not trained about the recognition of asthma attacks, providing medications, and managing an asthma attack have little preparation for coping with the situation. It is for this reason that further research on child care providers' knowledge of asthma and efficacy in caring for children with asthma is warranted. Further research in this area would help provide insight about how to better prepare child care providers for their experience with young children who have asthma.

### Hypotheses

The purpose of this study was to examine variables that influence child care providers' asthma knowledge and providers' efficacy in their care of young children who have asthma. Based on the literature and research previously discussed, the following hypotheses were examined:

1. Child care providers' factual knowledge of asthma will differ based on personal, professional, and center demographics, personal experience with asthma, professional experience with asthma, and asthma training.
2. Child care providers' self-reported knowledge of asthma will differ based on personal, professional, and center demographics, personal experience with asthma, professional experience with asthma, and asthma training.
3. Child care providers' efficacy in caring for children with asthma will differ based on personal, professional, and center demographics, personal experience with asthma, professional experience with asthma, asthma training, factual asthma knowledge, and self-reported asthma knowledge.



*Figure 1.* Bronfenbrenner's ecological model (1994)

## CHAPTER 3

### METHODS

The following chapter contains descriptions of the participants in this study as well as the instruments that were used to assess demographic, training and experience variables, and child care provider asthma knowledge and efficacy. Also, the procedures that were used to conduct the study are presented.

#### Participants

All participants at the 2003 Early Childhood Institute (ECI) conferences in Waycross, Georgia and Warner Robins, Georgia were invited to participate in the present study. Approximate attendance for both conferences was 225 people. Attendees included child care providers and foster parents in the state of Georgia. Child care providers included administrators, lead teachers, assistant teachers, and inclusion specialists.

Of the 225 surveys that were distributed to conference attendees, 138 were returned for an overall response rate of 61%. There was a slightly greater response rate at the Waycross site (64%) than the Warner Robins site (58%).

#### Measures

Participants completed the Asthma Knowledge and Training Needs of Child Care Providers Survey (Bales, Coleman, & Wallinga, 2003) (see Appendix B). The survey was used to collect data regarding personal, professional, and center demographics, personal asthma experience, professional asthma experience, and asthma training. Three asthma knowledge scales were employed in order to assess three dimensions of asthma knowledge: general

knowledge; knowledge regarding common symptoms, triggers, and treatments; and self-reported knowledge. Child care providers' efficacy in caring for children with asthma was also assessed using a Likert-type scale.

### *Demographic Questions*

Eleven questions were asked of participants to gather information about their personal and professional demographics as well as demographics of their workplace. The four personal demographic items consisted of age, gender, racial group, and highest education level completed. Five items were used to assess professional demographics including years in current position, years working with children who have special needs, years working in child care, job title, and the size of the work community. The four items used to assess workplace demographics included accreditation status, type of center, reception of state funding for child care assistance, and whether written health guidelines with provisions for asthma care are available.

### *Asthma Training and Experience*

Several items were used to assess experience and training. Asthma experience was divided into two categories, personal and professional. The extent of professional asthma experience was examined with the following question: "Have you had a child in your classroom in the last year with asthma?" Personal experience was measured in a yes/no format based on having a close family member with asthma. The respondent was then asked to indicate who had asthma from the following choices: self, spouse, child, parent, siblings, and other. Two asthma training items consisted of a yes/no question and an indication of where the training was received (college course, workshop, other).

### *General Knowledge of Asthma*

The scale for general knowledge was modified from a National Heart, Lung, and Blood Institute survey entitled “Check Your Asthma I.Q.” (U.S. Department of Health and Human Services [U.S. DHHS], 1996). The original survey consisted of 12 statements regarding asthma facts (i.e. Asthma cannot be cured, but it can be controlled). Respondents were to indicate an answer of “true” or “false” for each statement. Five of the responses were false while seven were true. For the purpose of this study, the scale was modified so that instead of a true/false response format, the response for each item was rated on a continuum from 1 (strongly disagree) to 5 (strongly agree) regarding the validity of statements. The five false statements in the original scale were reverse scored in the current study so that instead of 1 representing a response of “strongly disagree,” 1 represented a response of “strongly agree.” A high score on the general knowledge scale indicated a high level of knowledge regarding common asthma facts. Potential scores on this scale ranged from 0 - 60.

Previous reports of validity and reliability were not found for this scale. This study was used to determine its reliability in a sample of child care providers.

### *Knowledge of Symptoms, Triggers and Treatments*

The scale for knowledge of common asthma symptoms, triggers and treatments was adapted from the Juhn, St. Sauver, Shapiro, and McCarthy (2002) Questionnaire for Asthma Knowledge. Modifications were minimal, consisting of changing the response phrasing. For instance, the original survey provided a response format of 1(disagree completely), 2 (disagree somewhat), 3 (unsure), 4 (agree somewhat) and 5 (agree completely). Phrasing was changed so that 1 indicated “strongly disagree,” 2 indicated “disagree,” 3 indicated “not sure,” 4 indicated “agree,” and 5 indicated “strongly agree.”

This scale is divided into three subscales, one each for asthma symptoms, triggers and treatments. Six items were used to assess knowledge of asthma symptoms, three of which were reverse scored. Eight items were used to assess knowledge of asthma triggers, again with three reverse-scored items. Four items comprised the asthma treatment subscale, with 2 reverse-scored. Each item was rated on a continuum from 1 (strongly disagree) to 5 (strongly agree) based on whether or not the respondent believed the items were true symptoms, triggers or treatments for asthma. The reverse-scored items were not actual asthma symptoms, triggers or treatments such as “diarrhea” (false symptom), “laughing” (false trigger), and “Tylenol” (false treatment). The total potential range of scores for these subscales was from 0 - 90.

The coefficient alpha for this instrument has been reported between .88 - .92 in previous uses with samples similar to the one in this study (Juhn, St. Sauver, Shapiro, & McCarthy, 2002). Such coefficient alphas indicate a fairly high internal consistency estimate of reliability for the instrument. Validity information was not found for this instrument.

### *Self-reported Asthma Knowledge*

Self-reported asthma knowledge was assessed using a scale that consisted of six phrases regarding topics of asthma knowledge (e.g. asthma medications) (Bales, Coleman, & Wallinga, 2003). Participants were asked to rate their knowledge in each area on a continuum from 1 (definitely do not know) to 4 (definitely know) based on their own perception of their knowledge in each area. To “know” was defined in the subscale directions as “I understand or am aware of this topic.” Scores on this scale ranged from 0 – 24.

There was no available validity or reliability data for the self-reported asthma scale as this was the first time it had been used. This study was used to determine the scale’s reliability in a sample of child care providers.

### *Asthma Efficacy*

Asthma efficacy was assessed through a comfort/efficacy scale modified from Neuharth-Pritchett and Getch's (2004) Teacher Capability and School Resource Scale for Asthma Management. Four questions were drawn from the scale overall with three coming from the first subscale, entitled Teacher Capability in Social and Emotional Aspects of Asthma Management, and one coming from the second subscale, entitled School Resources/Institutional Capability for Asthma Management. Wording was only slightly changed in those questions to indicate child care settings instead of school settings. One supplementary question was added to the scale: "How comfortable are you with constraints on your classroom time as a teacher in helping children with asthma?" Following modifications, the current scale was composed of five questions regarding comfort in various areas of asthma care such as administering medications, resources regarding asthma, time constraints, and communication with parents of children with asthma. Participants were asked to rate their comfort level with each item on a continuum from 1 (very uncomfortable) to 5 (very comfortable) for each statement. Potential scores ranged from 0 – 30 on this measure of efficacy.

Internal consistency has been reported for the original scale (Neuharth-Pritchett & Getch, 2004), based on the two subscales that comprise it. The first subscale, Teacher Capability in Social and Emotional Aspects of Asthma Management, has a reported internal consistency of .83, based on 589 cases. The second subscale, School Resources/Institutional Capability for Asthma Management, has a reported Cronbach's alpha of .86 based on the same 589 cases. Both alpha values reflect a high level of internal consistency.



### Procedure

Attendees at the Early Childhood Institute (ECI) conferences in Waycross, GA and Warner Robins, GA were given surveys in conference information packets as they arrived at the ECI site. Implied consent forms and instruction sheets were included with each survey. The attendees were informed of the survey upon arrival and verbally asked to complete the survey at their leisure throughout the conference day. Completed surveys were placed in a collection box located near the conference registration desk. When participants turned in a completed survey they were able to enter a drawing for one of two gift baskets, each priced at approximately \$50. Each drawing was held at the end of each conference day.

### Analysis of Data

Data analysis was conducted in two steps. First, descriptive statistics were run for all demographic variables as well as for asthma training and professional and personal experience with asthma. Second, one-way analyses of variance (ANOVA's) were conducted using SPSS 8.0 to assess variance in each of the factor variables based on the dependent variables, asthma knowledge and efficacy. Factor variables included personal, professional, and center demographics, as well as asthma training and asthma experience, both professional and personal. Correlations were conducted between each of the outcome variables, factual asthma knowledge, self-reported asthma knowledge, and asthma care efficacy. Lastly, a linear regression was run to investigate whether or not self-reported asthma knowledge predicted care provider asthma efficacy, based on significant correlation results.

## CHAPTER 4

### RESULTS

The purpose of this study was to examine the variables that influence child care providers' asthma knowledge, and providers' efficacy in their care of young children with asthma, including personal, professional, and center demographic variables, asthma experience and asthma training. The results of this research are presented in two sections. The first section is a descriptive analysis of the personal, professional, and center demographics of the sample as well as the participants' asthma training and experiences. The second section presents the findings of analyses of variance and regression analysis.

#### Descriptive and Scale Statistics

Data on several demographic and background variables were collected from the participants in this study. Almost all of the participants in this study were female, and more than half were between the ages of 31 and 50 years old. The majority of the sample, 91%, identified their race as either White or Black. Participants indicated that they were predominantly either lead or assistant teachers (71%), and 77% revealed that they worked at a private child care center or a center that was not community, church, or college sponsored. The demographic and background characteristics of the sample are presented in Tables 1-4.

Information on the participants' factual knowledge, self-reported knowledge, and asthma care efficacy was collected. The distribution and mean values of these scales are presented in Table 5. On average, the participants scored high in the area of factual knowledge ( $M = 105.5$ ), however, there was a wide range of variability in the participants' knowledge scores (Range =

24-130). The mean score of the participants' self-reported asthma knowledge was 16.31, with scores that ranged from 3-24. The mean score for asthma care efficacy was 19.1, while scores ranged from 5-25. The reliability of each of these scales was computed and found to be acceptable with coefficient alphas greater than 0.70 on each of the three scales (factual knowledge scale:  $\alpha = 0.76$ , self-reported knowledge scale:  $\alpha = 0.91$ , and asthma care efficacy scale:  $\alpha = 0.84$ ).

Correlation analyses were also computed for the three study scales to investigate any existing relationships (see Table 5). No significant relationship was evident between the factual knowledge and self-reported knowledge of the participants, although a significant relationship did emerge between the self-reported knowledge and efficacy scales. If child care providers showed a high level of self-reported knowledge, they were also more likely to report a high level of efficacy in caring for young children with asthma.

### Hypothesis Testing

Following analysis of demographic and scale data, one-way analyses of variance (ANOVAs) were conducted to investigate differences in the means of (a) child care provider factual asthma knowledge, (b) provider self-reported asthma knowledge and (c) provider efficacy in caring for children with asthma related to demographic variables, asthma experience, and asthma training. To further examine the prediction of child care provider efficacy in caring for children with asthma by self-reported asthma knowledge, a regression analysis was also utilized. Following are the results of each of the proposed hypotheses. The results of these analyses are presented in Tables 6 through 9.

### *Hypothesis One: Factual Asthma Knowledge*

It was hypothesized that child care providers' factual knowledge of asthma would differ significantly based on personal, professional, and center demographic variables, professional experience with asthma, personal experience with asthma, and asthma training. Results indicated that factual asthma knowledge did not significantly vary based on any of the training, experience, personal, or professional demographic variables. In fact, factual asthma knowledge was only found to significantly vary based on written asthma guidelines.

The difference in factual asthma knowledge based on written asthma guidelines in the child care center was significant,  $F_{(1,92)} = 4.56, p < 0.03$ . Those individuals who reported the presence of written asthma guidelines in their child care center showed a lower level of factual asthma knowledge. The strength of this relationship was small, indicating that written asthma guidelines only accounted for 4.7% of the variance in factual asthma knowledge (see Table 6).

### *Hypothesis Two: Self-Reported Asthma Knowledge*

It was hypothesized that child care providers' self-reported knowledge of asthma would differ significantly based on personal, professional, and center demographic variables, professional experience with asthma, personal experience with asthma, and asthma training. The analyses of variance showed that the mean for self-reported asthma knowledge differed significantly based on a number of variables including size of work community, asthma training, professional experience, and personal experience.

Self-reported asthma knowledge differed significantly based on the size of city where the participant worked,  $F_{(3,117)} = 5.50, p < 0.001$ . There were four levels of the variable size of community; therefore, follow-up tests were conducted to evaluate pairwise differences among the groups using the Bonferroni method. A significant difference in self-reported knowledge

emerged between the group of individuals who reported working in a large city (50,000 and over) and those who reported working in either a rural area/small town (under 2,500) or a small city (10,000 – 49,999). The self-reported level of asthma knowledge indicated by those living in a large city was significantly greater than those living in a rural area/small town, or small city. The strength of this relationship was quite large, with community size accounting for approximately 12% of the variance in self-reported asthma knowledge. The results of these analyses are reported in Table 7.

Self-reported asthma knowledge also differed significantly for asthma training,  $F_{(1,119)} = 11.65, p < 0.001$ . Individuals who reported having participated in an asthma training program also reported a higher degree of asthma knowledge than those who had no asthma training. A separate ANOVA was conducted between self-reported asthma knowledge and workshop-based training to investigate specific differences in knowledge based on type of training. Due to a low number of people having participated in a college course-based training or any other type of asthma training, an ANOVA could only be conducted for workshop-based training. Self-reported asthma knowledge differed significantly based on workshop training,  $F_{(1,120)} = 12.30, p < 0.001$ . Participation in a workshop-based asthma training program indicated higher scores on self-reported asthma knowledge. The effect size of workshop-based training on self-reported knowledge was moderate indicating that 9.3% of the variance in self-reported knowledge was due to workshop training. The results of these analyses are reported in Table 7.

Significant differences based on personal experience with asthma were also found for self-reported asthma knowledge,  $F_{(1,120)} = 24.06, p < 0.000$ . Separate ANOVAs were conducted to evaluate whether there were specific differences in knowledge based on the family member who had asthma. Self-reported asthma knowledge showed significant differences when the

participants had asthma,  $F_{(1,123)} = 5.49, p < 0.02$ , and when they had a child with asthma,  $F_{(1,123)} = 11.15, p < 0.001$ . When the participants reported having asthma, they showed a higher self-reported knowledge of asthma. The effect size for this relationship was small; however, with personal asthma diagnosis contributing to only 4.3% of the variance in self-reported knowledge. Participants who reported having a child with asthma also tended to score higher on self-reported knowledge. The effect size of having a child with asthma was moderate, indicating that 8.3% of the variance in self-reported asthma knowledge was due to child's asthma diagnosis. Having a sibling or other family member with asthma did not contribute to significant differences in self-reported asthma knowledge. Having a spouse with asthma or having a parent with asthma could not be evaluated, as there were too few individuals in each group.

The ANOVA between professional experience with asthma and self-reported asthma knowledge was significant as well,  $F_{(1,118)} = 3.92, p < 0.05$ . Those who reported having had a child with asthma in their classroom in the last year also reported a higher degree of asthma knowledge. The strength of this relationship indicates that only 3.2% of the variance in self-reported knowledge is due to professional experience with asthma. The results of analyses for personal and professional experience are reported in Table 7.

### *Hypothesis Three: Efficacy*

It was hypothesized that child care providers' efficacy in their care of children with asthma would differ significantly based on personal, professional, and center demographic variables, professional experience with asthma, personal experience with asthma, and asthma training, and would be significantly correlated with factual and self-reported asthma knowledge. Analyses of variance (ANOVAs) were conducted to evaluate differences in providers' efficacy based on demographic variables, asthma experience, and asthma training. The ANOVAs

showed that efficacy only differed significantly based on level of education,  $F_{(3,121)} = 4.61$ ,  $p < 0.004$ . Follow-up tests revealed that there was a significant difference between the bachelor's/master's degree group and the high school diploma/GED and child care credential groups. There was, however, no significant difference between the bachelor's/master's degree group and the associate's degree group. The group of individuals who had received either a high school diploma/GED or child care credential showed a higher level of efficacy than those individuals who held a bachelor's degree or master's degree. The strength of this relationship was moderate, with level of education contributing to 10.3% of the variance in efficacy. The results of these analyses are presented in Table 8.

As reported in the descriptive statistics summary, a significant correlation coefficient was found between self-reported asthma knowledge and provider efficacy. To further investigate this relationship, a linear regression was conducted with SPSS Version 8.0 to determine if self-reported asthma knowledge significantly predicted child care providers' efficacy in caring for young children with asthma. The scatterplot for self-reported asthma knowledge and efficacy, as shown in Figure 2, indicated that the two variables were linearly related. The correlation between self-reported asthma knowledge and efficacy was .39. Approximately 16% of the variance in efficacy was accounted for by its linear relationship to self-reported asthma knowledge, as indicated by the R-squared statistic. The results of this analysis are reported in Table 9.

Table 1

*Frequencies and Percentages of Personal Demographic Variables for**Participants*

Variable	<i>n</i>	%
Gender ( <i>N</i> = 134)		
Female	128	95.5
Male	6	4.5
Age (years) ( <i>N</i> = 134)		
>20	10	7.5
21-30	24	17.9
31-40	37	27.6
41-50	37	27.6
51+	26	19.4
Education ( <i>N</i> = 130)		
High school/GED	73	56.2
Childcare credential	16	12.3
Associate's degree	21	16.2
Bachelor's degree	10	7.7
Master's degree	7	5.4
Other	3	2.3



Table 1 (continued)

Variable	<i>n</i>	%
Racial group ( <i>N</i> = 134)		
White	61	45.5
Black	62	46.3
Hispanic/Latino	5	3.7
Asian or Pacific Islander	3	2.2
Multi-racial	2	1.5
Other	1	0.7

Table 2

*Frequencies and Percentages of Professional Demographic Variables for  
Participants*

Variable	<i>n</i>	%
Years in current position ( <i>N</i> = 114)		
0-2	50	43.9
3-5	31	27.2
6-8	19	16.7
9+	14	12.3
Years in childcare ( <i>N</i> = 127)		
0-2	41	32.3
3-5	25	19.7
6-8	16	12.6
9+	45	35.4
Years working with special needs ( <i>N</i> = 71)		
0-2	43	60.6
3-5	9	12.7
6-8	3	4.2
9+	16	22.5
Size of work community ( <i>N</i> = 131)		
Rural/small town	30	22.9
Large town	20	15.3
Small city	56	42.7
Large city/suburb	25	19.1

Table 2 (continued)

Variable	<i>n</i>	%
Job title ( <i>N</i> = 132)		
Administrator	17	12.9
Lead teacher	44	33.3
Assistant teacher/floater	50	37.9
Other	21	15.9

Table 3

*Frequencies and Percentages of Center Demographic Variables for Participants*

Variable	<i>n</i>	%
Type of center ( <i>N</i> = 138)		
Privately owned	62	44.9
Chain or franchise	2	1.4
College sponsored	1	0.7
Church sponsored	11	8
Community sponsored	19	13.8
Other	43	31.2
Written asthma guidelines ( <i>N</i> = 135)		
Yes	62	45.9
No	32	23.7
Do not know	41	30.4
State funding ( <i>N</i> = 131)		
Yes	82	62.6
No	18	13.7
Do not know	31	23.7
Accreditation ( <i>N</i> = 113)		
NAEYC	49	43.3
Montessori	3	0.02
Do not know	55	48.7
Other	9	0.08

Table 4

*Frequencies and Percentages for Participant Asthma Training and Asthma**Experience*

Variable	<i>n</i>	%
Asthma training ( <i>N</i> = 131)		
Yes	27	20.6
No	104	79.4
Professional asthma experience ( <i>N</i> = 133)		
Yes	78	58.6
No	55	41.4
Personal asthma experience ( <i>N</i> = 132)		
Yes	77	58.3
No	55	41.7
Personal asthma diagnosis ( <i>N</i> = 135)		
Yes	16	11.9
No	119	88.1
Child with asthma ( <i>N</i> = 135)		
Yes	32	23.7
No	103	76.3
Parent with asthma ( <i>N</i> = 135)		
Yes	8	5.9
No	127	94.1

Table 4 (continued)

Variable	<i>n</i>	%
Spouse with asthma ( <i>N</i> = 135)		
Yes	3	2.2
No	132	97.8
Sibling with asthma ( <i>N</i> = 135)		
Yes	18	86.7
No	117	13.3
Other family member with asthma ( <i>N</i> = 135)		
Yes	24	17.8
No	111	82.2

Table 5

*Intercorrelations, Means, and Standard Deviations for Factual Knowledge, Self-Reported Knowledge, and Efficacy Scales (N = 123)*

Measure	1	2	3
1. Factual Knowledge	---	.17	.01
2. Self-Reported Knowledge		---	.39***
3. Efficacy			---
M	105.53	16.31	19.14
SD	17.30	3.96	3.94

\*\*\* $p < .001$

Table 6

*Means, Standard Deviations, and One-Way Analysis of Variance (ANOVA) for*

*the Effects of Written Asthma Guidelines on Childcare Provider Factual*

*Asthma Knowledge (N = 94)*

Written Asthma Guidelines	Factual Knowledge			
	M	SD	df	F
No Guidelines	111.28	12.41	1,92	4.56*
Guidelines	102.79	20.61		

\* $p < .05$ .



Table 7

*Means, Standard Deviations, and One-Way Analyses of Variance (ANOVA) for the Effects of Community Size, Asthma Training, and Experience Variables on Child Care Provider Self-Reported Asthma Knowledge*

	Provider Self-Reported Knowledge			
	M	SD	df	F
Community Size ( <i>N</i> = 121)				
Small Town	15.10 <sub>a</sub>	3.13	3,117	5.50***
Large Town	16.33	4.47		
Small City	15.56 <sub>b</sub>	3.68		
Large City	18.84 <sub>a,b</sub>	3.92		
Asthma Training ( <i>N</i> = 121)				
Yes	18.52	4.86	1,119	11.65***
No	15.61	3.47		
Workshop Training ( <i>N</i> = 122)				
Yes	18.70	3.80	1,120	12.30***
No	15.64	3.76		
Personal Experience ( <i>N</i> = 122)				
Yes	17.67	3.54	1,120	24.06***
No	14.36	3.83		

Table 7 (continued)

	Provider Self-Reported Knowledge			
	M	SD	df	F
Personal Asthma Diagnosis ( <i>N</i> = 125)				
Yes	18.44	3.56	1,123	5.49*
No	16.00	3.93		
Child Asthma Diagnosis ( <i>N</i> = 125)				
Yes	18.29	3.11	1,123	11.15***
No	15.66	4.00		
Professional Experience ( <i>N</i> = 120)				
Yes	17.04	3.93	1,118	3.92*
No	15.61	3.92		

\* $p < .05$ . \*\*\* $p < .001$ .

*Note.* Means in rows sharing subscripts are significantly different. For all variables, higher means indicate higher self-reported knowledge scores.

Table 8

*Means, Standard Deviations, and One-Way Analyses of Variance (ANOVA) for the Effect of Education Level on Child Care Provider Efficacy in Caring for Young Children with Asthma (N = 125)*

	Provider Asthma Care Efficacy			
	M	SD	df	F
Education Level				
High School/GED	19.62 <sub>a</sub>	3.34	3,121	4.61**
CDA, CCP, TCC, NAC	20.13 <sub>b</sub>	4.94		
Associate Degree	19.25	3.81		
Bachelor's/Master's Degree	15.88 <sub>a,b</sub>	4.70		

\*\* $p < .01$ .

*Note.* Means in rows sharing subscripts are significantly different. For all education level groups, higher means indicate higher efficacy scores.

Table 9

*Summary of Regression Analysis for Self-Reported Asthma Knowledge Predicting*

*Child Care Provider Efficacy in Caring for Young Children with Asthma (N = 123)*

Variable	B	SE B	$\beta$
Self-Reported Knowledge	.398	.09	.40***

*Note .*  $R^2 = .16$ , Adjusted  $R^2 = .14$ , ( $N = 123$ ,  $p < .000$ )

\*\*\* $p < .001$



*Figure 2.* Scatterplot depicting the prediction of child care provider efficacy based on self-reported asthma knowledge.

## CHAPTER 5

### DISCUSSION

The purpose of this study was to examine variables that influence child care providers' asthma knowledge and providers' efficacy in their care of young children who have asthma. Factors of particular interest included personal demographic factors including age, gender, and education; the professional demographics of job title, and years working in child care, current position, and experience with children who have special needs; and center demographics such as the size of the work community, the type of center, program accreditation, state funding for child care assistance, and written asthma guidelines in the child care center. Other factors of interest were personal and professional experience with asthma and asthma training experiences. A discussion of the results by hypothesis will be presented, as well as limitations, recommendations for future research, and implications of this study.

#### Hypothesis One: Factual Asthma Knowledge

It was hypothesized that significant differences would exist in factual asthma knowledge based on personal, professional, and center demographic factors, asthma training, and asthma experience. Analyses revealed that the only area of significance was in the center demographic written asthma guidelines in child care centers. Results indicated that factual asthma knowledge was in fact lower for child care providers who had written asthma guidelines at their center. This finding has not been indicated in previous research regarding child care provider asthma knowledge. Written asthma guidelines have not been studied in research on child care provider asthma knowledge. A possible explanation for the current finding is that when there are no

asthma care guidelines to follow in a child care center, care providers are left to their own devices to gather asthma information when needed. The efforts of child care providers could result in them finding sources of accurate asthma information, for instance internet sites created by groups like the American Lung Association (2004c) and the American Academy of Allergy, Asthma, and Immunology (2005). The effect size for written asthma guidelines was also quite small, indicating that other variables, beyond the scope of the present study, may also be responsible for variation in factual asthma knowledge. It is interesting to note that of the 135 participants who responded to this question, 30% (41) reported that they did not know if their child care center had written asthma guidelines or not and so were excluded in this analysis.

Snider and Fu (1990) report that child care providers who are more educated are more knowledgeable regarding child development and developmentally appropriate practice. Similar results were not found in the present research, where there were no differences in factual asthma knowledge based on education level. Perhaps this is due to the fact that there was little variation in education level in the current study, as over 50% of participants reported that high school diploma/GED was their highest level of education. Snider and Fu (1990) also report that child care provider knowledge was not affected by length of tenure, a finding that is consistent with the present study.

Other factors that have been researched in relation to factual asthma knowledge include personal and professional asthma experience and teaching experience. Rodehorst (2003) found in a study of 212 elementary school teachers that factors such as personally having asthma, years of teaching experience, and professional experience with asthma were not related to factual asthma knowledge. Findings in the present study are consistent with Rodehorst (2003) in that

the present demographic variables did not contribute significantly to differences in factual asthma knowledge.

Existing research suggests that there are other professional and center demographic factors related to child care provider asthma knowledge such as length of tenure and child care state funding (Juhn, St. Sauver, Shapiro, & McCarthy, 2002). The literature indicates that shorter length of tenure (length of time in current child care position) and the presence of state funding in child care centers may contribute to greater factual asthma knowledge among child care providers. Conflicting results were found when these variables were examined in the current study. While there was a negligible difference in factual asthma knowledge based on length of tenure, this difference was in the same direction as in previous research. At the same time, the average length of tenure in the present study was about three years, while the average tenure in the Juhn, St. Sauver, Shapiro, & McCarthy (2002) study was much longer at 8.7 years, which may account for conflicting findings.

State funding for child care assistance in child care centers also led to insignificant differences in asthma knowledge in the present study. Again, this finding was contradictory to the only other study that has examined this variable by Juhn, St. Sauver, Shapiro, and McCarthy (2002). They report that asthma knowledge was lower when child care centers received state funding for child care assistance. In the current study, there was a small percentage of participants (13%) who reported that their child care center did not receive state funding and an additional 23% of participants who did not know if their center received state funding, decreasing the reliability of this result. This may be related to ambiguity in the current study. It is possible that the question was not clear to participants and that participants were not sure whether or not their center received state funding for child care assistance.



Asthma training was another variable measured in the present study that was not significantly related to factual asthma knowledge. The body of empirical research on child care provider asthma knowledge is small and has not been found to address the impact of asthma training programs on child care provider knowledge. There is, however, one study of asthma knowledge in adults who have asthma indicating that an asthma education video increased knowledge of asthma symptoms (Wigal, et al., 1993). No indication was made of how this finding might relate to different settings such as child care. Studies of child care provider trainings also show that in contrast to the current study, providers who received child development training are more knowledgeable about child development following the training and also engage children in more complex levels of play following training (Cassidy, Hicks, Hall, Faran, & Gray, 1998; Rhodes & Hennessy, 2001).

In understanding asthma knowledge related to asthma training in child care providers, it may also be beneficial to examine training programs from the perspective of another chronic childhood illness. Contrary to findings in the present study, Baskin, Saylor, Furey, Finch, and Carek (1983) found that workshop training might in fact be a highly effective method of increasing knowledge for individuals who care for young children with illnesses. Their study evaluated the efficacy of workshop training on childhood cancer for elementary school teachers, finding that the workshop was effective in significantly improving teachers' factual knowledge of childhood cancer. In the present study, there were no significant differences in mean asthma knowledge for child care providers who had attended a workshop-based asthma training. The lack of significance may be attributed to the fact that there was a relatively small percentage of participants (18%) reporting attendance of workshop training for asthma. Information about the content of the asthma training workshops attended by the participants in this study or the ways in

which information was relayed during those workshops was not obtained. These were two factors that might affect the usefulness of such workshops.

As with asthma training, there is no available empirical research that could be found that addresses personal or professional experience with asthma in relation to child care providers' factual asthma knowledge. Again, it is necessary to refer to research on elementary school teachers' experience with another chronic childhood illness, cancer. Baskin, Saylor, Furey, Finch, and Carek (1983) report that in addition to workshop-based training, personal and professional experience with cancer were significant predictors of elementary school teachers' factual cancer knowledge. Findings in the present study are not consistent with this literature. It was hypothesized that personal and professional asthma experience would contribute to child care providers' factual asthma knowledge; however, this hypothesis was not confirmed. While there was a slight increase in factual asthma knowledge for child care providers who had personal asthma experience, there was no significant difference in factual asthma knowledge based on either personal or professional asthma experience. One possible explanation for the lack of significance in these findings is that there may be interactions between other variables and experience that were not examined here. For instance, had interactions between factors such as length of time working in child care, job title, and training been considered in relation to experience and asthma knowledge, a significant difference may well have been found in knowledge. The length of time since a child care provider had personally or professional experienced asthma could have also affected their knowledge of asthma in the present study.

#### Hypothesis Two: Self-Reported Asthma Knowledge

It was hypothesized that significant differences would exist in self-reported asthma knowledge based on personal, professional, and center demographic factors, asthma training, and

asthma experience. Data analyses revealed several factors that contributed to significant differences in child care provider self-reported asthma knowledge. These factors were in the areas of center demographics, asthma training, and experience with asthma.

The only demographic factor that contributed to significant differences in child care provider self-reported asthma knowledge was the size of the communities (e.g. city size) where child care providers worked. Care providers working in large cities scored higher on self-reported asthma knowledge than their counterparts who lived in small cities or small towns. Links between self-reported asthma knowledge and size of work community have not been found in the existing literature, perhaps because self-reported asthma knowledge appears to be a relatively new topic studied with child care providers. Therefore, it may be useful to employ Bronfenbrenner's Ecological Model (see Figure 1) (Bronfenbrenner, 1979) to understand this finding. When considering the ecological model of a young child with asthma in child care, the child care provider is located in the child's microsystem. When placed in a large city rather than a small city or town, there are potential differences in the exosystem and macrosystem of the given ecological model. For instance, there may be a broader degree of asthma education resources available in a large city rather than a small city or town. A larger number of resources could perhaps provide child care providers with a greater sense of their own asthma knowledge as opposed to child care providers working in smaller communities with fewer resources. Additionally, there are more people in large cities than in small cities or towns, perhaps increasing child care providers' exposure to children with asthma, and societal and cultural awareness of asthma and other childhood chronic illnesses.

Interestingly, results of follow-up tests for size of work community indicated that self-reported asthma knowledge of child care providers in large cities (50,000+) was greater than

small towns (under 2,500) and small cities (10,000 – 49,999), but not greater than child care providers who worked in large towns (2,501 – 9,999). This finding could have been a result of lack of clarity in the survey question. It may also be explained by fundamental differences in the particular communities or centers where child care providers in this study worked, especially considering that the Early Childhood Institutes where data were collected were conducted in and around small towns. It is also important to note that small percentages of participants reported living in either large towns (14%) or large cities (18%). It was beyond the scope of the present study to examine size of work community in relation to care providers' experience with asthma or cultural views, however, such relationships may be useful to further explain the links between self-reported asthma knowledge and size of work community.

In the present study significant results were not found among personal or professional demographic factors and self-reported asthma knowledge. This lack of findings is similar to the results of Baskin, Saylor, Furey, Finch, and Carek's (1983) research. They reported that knowledge of childhood cancer was not predicted by elementary school teachers' age, gender, or years of experience. Rodehorst (2003) has also reported that the number of years of teaching experience is not significantly related to asthma knowledge.

Asthma training was another factor examined in relation to self-reported asthma knowledge in the present study. Self-reported asthma knowledge was found to differ significantly based on whether or not child care providers had participated in previous asthma training. More specifically, child care providers who reported participating in some form of professional asthma training had a greater degree of self-reported asthma knowledge than those who had not participated in asthma training. Participants in the current research reported having participated in workshop or college-based asthma training at some point in their career, but there

is no way to know what the content of the training may have been or when it may have taken place. While only 19% of the current sample reported attendance at previous asthma training, this result, to a degree, supports research findings that child care providers who have child care training provide higher quality care to healthy children (Burchinal, Cryer, Clifford, & Howes, 2002; Howes, 1997; NICHD Early Child Care Research Network, 2000; Phillips, Mekos, Scarr, McCartney, & Abbott-Shim, 2000; Phillipsen, Burchinal, Howes, & Cryer, 1997; Whitebook, Howes, & Phillips, 1990).

Child care providers in the present study indicated that they knew significantly more about asthma symptoms, triggers, and treatments when they had participated in asthma training. While there is no previous research to refer to regarding asthma training programs and child care provider self-reported asthma knowledge, this finding is similar to previous research on cancer training programs for elementary school teachers. Baskin, Saylor, Furey, Finch, and Carek (1983) found that teachers who participated in a workshop-based training program reported that they were more informed and knowledgeable about childhood cancer following the workshop.

Personal and professional experiences with asthma were additional factors that led to significant differences in self-reported asthma knowledge in the present study. Child care providers who reported having personal experience with asthma showed a significantly higher degree of self-reported knowledge than those who had no previous experience. In particular, those who had asthma themselves or had a child with asthma scored higher on self-reported asthma knowledge. Professional experience with asthma also made a significant difference in self-reported asthma knowledge for child care providers. Those who had a child with asthma in their care in the last year reported that they knew more about asthma than those who had not had a child with asthma in their care in the last year. Links between personal or professional

experience and self-reported asthma knowledge have not been found in the existing literature as there are very few studies that examine asthma knowledge with child care providers or teachers in depth (Huss et al., 2002; Walders, McQuaid, & Dickstein, 2004).

At the same time, findings of the current study provide further potential links between the body of research on quality child care and care of young children with asthma. There have been reported links between child care experience and overall positive caregiving of healthy children (i.e. caregiver positive affect, positive touch, stimulates development) where child care providers who had more experience showed more positive caregiving behaviors (Burchinal, Cryer, Clifford, & Howes, 2002; NICHD Early Child Care Research Network, 2000). Again, the literature on child care providers and asthma knowledge is sparse at best, therefore research has not been found to further discuss links between self-reported asthma knowledge and child care providers personal or professional experience with asthma. While research does not point to links between self-reported asthma knowledge and asthma experience, there are possible explanations. For instance, it is logical to believe that, as with the present study, people who personally or professionally experience asthma believe they know more than those who have no experience with asthma. At the same time, negative personal or professional experiences, in which individuals have not been able to provide appropriate care, may lead to diminished reports of self-reported asthma knowledge.

### Hypothesis Three: Child Care Provider Asthma Efficacy

It was hypothesized that significant differences would exist in child care provider efficacy in caring for children with asthma based on personal, professional, and center demographic factors, asthma training, asthma experience, and factual and self-reported asthma knowledge. Efficacy was explored in the present study as the degree of comfort child care

providers held in their competence to care for young children with asthma. Child care provider education level, a personal demographic factor, was the only variable that led to significant differences in care provider efficacy to care for children with asthma. Scholars have found that level of education is related to high quality child care in general. As with child care training, care provider level of education seems to be an important factor in the quality of child care provided to healthy children (Burchinal, Cryer, Clifford, & Howes, 2002; Howes, 1997; NICHD Early Child Care Research Network, 2000; Phillips, Mekos, Scarr, McCartney, & Abbott-Shim, 2000; Phillipsen, Burchinal, Howes, & Cryer, 1997; Whitebook, Howes, & Phillips, 1990). In studies of child care quality, education at the baccalaureate level appears to be optimal for highest quality of care to children.

These findings are in contrast to results in the present study, which indicate that individuals with high school diploma/GEDs or child care credentials such as the Child Development Associate, Technical Certificate of Credit, or National Administrator's Credential had higher levels of efficacy than care providers who held bachelor's or master's degrees. It is necessary to consider that there was a relatively small group of individuals in the current study who had been educated at the college level ( $n = 17$ ), decreasing the reliability of this finding. It is possible that those child care providers who are less educated may feel a greater sense of efficacy in caring for children with asthma than their more educated counterparts. As education increases, child care professionals may be more likely to understand their gaps in knowledge, thus affecting their efficacy.

Personal experience with asthma is another demographic factor that has been linked to efficacy to care for children with asthma in the literature (Rodehorst, 2003). Rodehorst found that elementary school teachers who had asthma themselves reported a higher sense of efficacy

in caring for their students who have asthma. Rodehorst's findings are inconsistent with results of the present study, which indicate that care providers' efficacy did not differ significantly based on personal experience with asthma. Efficacy definitions in the present study and Rodehorst's study were similar. In the present study, however, few participants reported having asthma (11%), providing a possible explanation for the inconsistency between study findings. Similar to the present findings, Rodehorst (2003) reported that there were no other links between experiential factors and efficacy.

Child care providers' asthma training was also examined in relation to asthma care efficacy. There were no significant differences found in care providers' asthma care efficacy based on asthma training in the present study. While efficacy has been a rather understudied construct relative to child care providers and asthma training, comfort, one of the defining principles of efficacy in this study, has been briefly investigated in the child care and asthma literature. The only researchers found to examine care provider asthma comfort related to training are Walders, McQuaid, and Dickstein (2004). They report that child care providers' comfort in caring for children with asthma was not related to asthma training, a finding supported in the present study.

It is necessary to refer to literature based on elementary school teachers for a further discussion of efficacy and training. In a study of health education training, Telljohann, Everett, Durgin, and Price (1996) reported that eight months following training, elementary school teachers reported a greater sense of efficacy in providing health education to their students than they did prior to training and at a higher level than teachers who did not participate in the training. While this finding is contradictory to the present study, it should be considered that there was a large percentage of participants (75%) in the present study who had not participated



in asthma training. It is possible that the results of this analysis are compromised due to the low number of participants who had previous asthma training.

Similar to asthma training, there is little available research addressing personal or professional asthma experience in relation to child care providers' asthma care efficacy. For this reason, it is necessary to refer to research on asthma care comfort. Bowen (1996) conducted the only research that has been found regarding asthma experience and asthma care comfort in teachers. Bowen (1996) found that all of the 30 teachers interviewed had at one time taught a child with asthma. In spite of this fact, over half of these teachers reported that they did not feel comfortable caring for a student during an asthma attack. Results of the current research are complimentary to Bowen's research, showing that asthma care efficacy did not differ based on professional experience with asthma. It was further found that personal asthma experience did not lead to any significant differences in asthma care efficacy. Interestingly, there was little difference in the number of participants who had either professional or personal asthma experience and those who had not.

Asthma care efficacy was also examined in its relation to factual asthma knowledge and self-reported asthma knowledge. Results indicated that while factual asthma knowledge was not significantly related to efficacy, self-reported asthma knowledge emerged as a significant predictor of efficacy. Child care providers who reported having a greater degree of asthma knowledge also reported that they felt more efficacious in caring for young children who have asthma. These results denoted the conceptual differences in factual asthma knowledge and self-reported asthma knowledge. Self-reported knowledge was a subjective measure of knowledge in the present study. Participants were asked to indicate how much they thought they knew about different topics of asthma management. When child care providers' indicated a higher self-

reported knowledge of asthma, they would have been expected to feel more comfortable, competent, and confident in their ability to care for children who have asthma, leading to a higher level of efficacy as was seen in the current findings. Factual asthma knowledge was an objective measure that indicated child care providers' actual knowledge of asthma. Since this measure was not based on participants' perceptions of their knowledge, it is logical that it was not related to participants' perceptions of their efficacy to care for children with asthma. The differences found between factual asthma knowledge and self-reported asthma knowledge have not been found in previous research as little comparison has been made between factual and self-reported knowledge in child care providers.

### Limitations

This study has the potential to contribute to the body of literature concerning child care providers who work with children who have asthma. As with all research, though, this study has limitations that affect its generalizability to other studies. The sample, composed mainly of child care providers in southern and central Georgia, was a convenience sample. This sampling technique introduces points for consideration. First, the information gained about asthma knowledge and asthma care efficacy is isolated to a relatively small segment of child care providers. There may be significant differences in the resources available to child care providers dependent on their geographic location, all of which could not be considered in this project. Second, there was a response rate of 61% and while that is an acceptable rate, it is important to consider that 39% of the people who received surveys chose not to participate. It is possible that only individuals who were interested in or had experience with asthma participated in this study. A higher response rate may have yielded more information about factors that contribute to differences in child care providers' asthma knowledge and their efficacy in caring for children

with asthma. Third, while a majority of participants indicated that they were child care providers, there was also a small group of participants who marked “other” for their job title (15% of sample). Although this group represents a small portion of the sample, the results may not solely represent the perspectives of child care providers.

The instrument used could have also contributed to limitations in the current study. While the instrument was useful in gathering information on child care providers’ knowledge of asthma and efficacy in caring for children with asthma, additional refinement of the survey may be valuable. Areas of improvement on the survey might include asking additional questions that examine the type of college degree participants held, their attitudes toward caring for children with chronic illnesses, the amount of administrative support child care providers felt they had in caring for children with asthma, the amount of communication child care providers had with parents of children with asthma, and factors in asthma training such as the content and timing of training. Each of these items could provide greater depth to the information that is gathered about child care provider asthma knowledge and their efficacy in caring for children with asthma.

The response format on the current survey also posed a challenge in data analysis. One way analysis of variance (ANOVA) was the primary method of analysis due to the nature of the independent variables. While this method of analysis provided informative results, other response formats may have also been beneficial in explaining how the factors contribute to asthma knowledge and asthma care efficacy. For instance, participants were asked to indicate a range of their years of experience in child care, in their current position, and with children who have special needs. Allowing participants to indicate the exact number of years they have been

working in child care, in their current position, and working with children who have special needs would allow for other types of analyses.

Sample size is another factor that limits this study. A larger sample would have allowed for more in-depth analysis in several areas. For instance, there were significant differences in self-reported asthma knowledge based on personal asthma experience and asthma training. The sample size was large enough to conduct post-hoc investigations of differences in self-reported knowledge when the respondent had asthma or had a child with asthma. However, there were not enough participants who had a spouse or parent with asthma to investigate differences they may have made in self-reported asthma knowledge. Likewise, there were not enough respondents who had participated in previous asthma training to investigate differences that may have existed in workshop, college-course, or other types of trainings related to self-reported asthma knowledge. A larger overall sample size may have yielded a greater number of participants with personal asthma experience and asthma training to conduct a more in-depth analysis of these variables.

#### Recommendations for Future Directions

Research in the field of children with asthma and child care providers is becoming more substantial; however, more research is necessary to fully understand the factors that influence care provider knowledge and care provider asthma efficacy. Research focusing on larger samples and specific groups, using different sampling techniques, and utilizing trainings and longitudinal studies is needed.

A larger sample size may be beneficial. Replicating this study with a larger group of child care providers could provide more descriptive results due to greater power in the analysis. Replicating this study with a more specific sample would allow researchers to highlight specific

groups, such as privately owned versus college-sponsored child care centers to assess specific differences that may exist in child care providers' asthma knowledge and care providers' asthma care efficacy.

Different sampling techniques are another recommendation for future research on asthma in child care centers. Specifically, focus groups where researchers are able to ask more in-depth questions and obtain explanations for participant responses could be utilized. Discussions regarding how previous experience, training, and education influence asthma knowledge and feelings of efficacy could be held during focus groups. Such studies may be the basis for future research, and asthma training programs that are more focused on the needs and experiences of participants. Designing new instruments based on studies of focus groups and further validating the reliability of existing instruments may also be beneficial.

Information obtained from focus groups and other existing research may be utilized as the basis for longitudinal studies that assess the effectiveness of training programs. In this case, the long-term impact of asthma training could be assessed on child care providers' asthma knowledge and asthma care efficacy. Longitudinal research can provide a wealth of information on types of training that are beneficial and optimal methods of delivering information to child care providers.

### Implications

The findings of the present study provide empirical information on factors that contribute to child care providers' asthma knowledge and care providers' asthma efficacy. This information can be applied to professionals doing research on asthma in child care centers, conducting training for child care providers and communities, and working in child care settings as administrators, lead teachers, assistants, and inclusion specialists. Based on results of the

current study several variables have been found that contribute to significant differences in child care providers' asthma knowledge and care providers' efficacy to care for children with asthma. This is one of few studies that have investigated factors related to asthma knowledge and asthma care efficacy. Previous research has primarily focused only on levels of knowledge and efficacy, and attitudes toward caring for children with asthma.

Information obtained from this study could assist practitioners who design and conduct training programs for child care providers. Child care providers may benefit from trainings on asthma symptoms, triggers, treatments, and facts, as knowledge in each of these areas varied in this study. Professionals who provide education and training to child care providers can include asthma training in college courses, workshops, credentialing programs, and national, state and local child care conferences. The results of this study may prove to be a valuable source of information to guide the content of such trainings and workshops. Likewise, there is a continued need to provide community asthma education and to increase community asthma resources, as the prevalence of asthma is rapidly increasing. Parents and community organizations can be valuable sources of asthma information to child care providers, but only when they have accurate and specific information regarding asthma.

The implications of the present study can also impact administrators of child care programs. They may see the need to analyze and increase asthma education and resources in their centers and assess knowledge and efficacy among their own employees. Some of the most important aspects of asthma care in a child care setting are the need for education about asthma and the provision of accessible medications and individualized care plans for each child who has asthma. These resources, however, are only useful when child care providers are familiar with them, know that they are available, and feel efficacious enough to utilize them.

Ultimately, child care providers who are more knowledgeable and who feel more efficacious will be able to provide more comprehensive care to children with asthma, addressing their cognitive, emotional, social, physical, and health needs. Increased asthma knowledge and asthma care efficacy among child care providers may result in an improved quality of life for young children with asthma.

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## APPENDICES

## APPENDIX A

### DEFINITIONS OF ASTHMA KNOWLEDGE AND EFFICACY

### Definitions of Asthma Knowledge and Efficacy

1. Factual asthma knowledge was defined as the objective assessment of child care providers' asthma knowledge.
2. Self-reported asthma knowledge was defined as the subjective assessment of child care providers' asthma knowledge.
3. Efficacy was defined as child care providers' reported comfort in their competence or confidence to care for children who have asthma.

APPENDIX B  
SURVEY ITEMS

## Items from the Asthma Knowledge and Training Needs of Child Care Providers Survey

### Demographic Items

- 1) I am a (Circle one):            o male            o female
- 2) How old are you?
- o 20 years or less            o 41-50 years old
- o 20-30 years old            o 51+ years old
- o 31-40 years old
- 3) 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 or Technical Diploma
- o Bachelor's Degree in \_\_\_\_\_
- o Master's Degree or more in \_\_\_\_\_
- o Other. Please specify \_\_\_\_\_
- 4) I consider myself to be a part of the following racial group. (Check one)
- o Black (non-Hispanic)
- o White (non-Hispanic)
- o Hispanic/Latino
- o American Indian or Alaskan Native
- o Asian or Pacific Islander
- o Multi-Racial

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

<u>Child Care</u>	<u>Your Current Position</u>	<u>Children with Special Needs</u>
<input type="radio"/> 0-2 years	<input type="radio"/> 0-2 years	<input type="radio"/> 0-2 years
<input type="radio"/> 3-5 years	<input type="radio"/> 3-5 years	<input type="radio"/> 3-5 years
<input type="radio"/> 6-8 years	<input type="radio"/> 6-8 years	<input type="radio"/> 6-8 years
<input type="radio"/> 9+ years	<input type="radio"/> 9+ years	<input type="radio"/> 9+ years

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

- ☐ Rural area or small town (under 2,500)
- ☐ Large town (2,501 – 9,999)
- ☐ Small city (10,000 – 49,999)
- ☐ Large city (50,000 and over)

7) Which job title listed below best describes your current position? (Check one)

- ☐ Administrator
- ☐ Inclusion Specialist
- ☐ Lead Teacher
- ☐ Other. Please specify \_\_\_\_\_
- ☐ Assistant Teacher/Floater

8) How would you characterize the center where you work? (Check one)

- ☐ Privately owned
- ☐ Chain or franchise
- ☐ College or technical school sponsored
- ☐ Church sponsored
- ☐ Community, or organization sponsored
- ☐ Other. Please specify \_\_\_\_\_

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

- ☐ Yes      ☐ No      ☐ Do not know

10) Does your program receive state funding for child care assistance?

- ☐ Yes      ☐ No      ☐ Do not know

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

- ☐ NAEYC
- ☐ Montessori
- ☐ Do not know
- ☐ Other. Please specify \_\_\_\_\_

12) Have you had professional training related to asthma?

- ☐ Yes      ☐ No

If so, what kind of training?

- ☐ College course
- ☐ Workshop
- ☐ Other, please specify \_\_\_\_\_

13) Have you had a child in your classroom in the last year with asthma?    Yes    No

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

- ☐ Yes      ☐ No

If so, who has asthma?

- ☐ Self      ☐ Siblings
- ☐ Spouse      ☐ Other, please specify \_\_\_\_\_
- ☐ Child
- ☐ Parent



*Scale Items**Factual Asthma Knowledge.*

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)*

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 = Don't 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)

*Self-Reported Asthma Knowledge.*

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

*Asthma Care Efficacy.*

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 you 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
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*(Modified from Neuhaarh-Pritchett & Getch, 2002)*

APPENDIX C  
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 Providers,” 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 decided 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 this 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.  
Assistant Professor  
(706) 542-7566

Mick Coleman, Ph.D.  
Professor  
(706) 542-4899

Charlotte Wallinga, Ph.D.  
Professor  
(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](mailto:IRB@uga.edu).