ASTHMA MANAGEMENT IN MILLENNIAL COLLEGE STUDENTS:
ATTITUDES AND PERCEPTIONS OF RESOURCES

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Thesis

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ABSTRACT

College students are a unique population with specific needs in regards to asthma self-management. During this transition period, adolescents face many challenges that can interfere with their ability to manage their asthma effectively. The purpose of this study is to describe Millennial college students’ level of asthma control and their attitudes and perceptions of how well their asthma is managed. A survey of asthma control was used to describe students’ perceived level of asthma control and their actual level control. In addition, a focus group was used to describe resources college students with asthma utilize for disease management and additional resources or adaptations that are necessary to better meet students’ needs.

This study found that the majority of first-year college students with asthma who have the perception that they are in control of their asthma are actually well controlled. However, there is still an opportunity to provide education to more closely align students’ perceptions about their asthma with their actual level of control. Data obtained from the focus group sessions revealed millennial first-year college students with asthma have a significant misunderstanding of asthma “control” and most do not recognize the basic processes of the disease. Students also face a variety of barriers and limitations that prevent appropriate access to care, as well as difficulties they experience adapting to environmental changes after coming to college, such as climate changes, living arrangements, or developing new routines.
DEDICATION

Dedicated to the students at The Ohio State University
VITA

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Fields of Study

Major Field: Allied Medicine
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CHAPTER 1
INTRODUCTION

Statement of The Problem:

Asthma is a chronic respiratory disorder characterized by airflow obstruction, bronchial hyper-responsiveness, and inflammation of the airways that can result in symptoms such as shortness of breath, wheezing, mucous production, and cough (U.S. Department of Health and Human Services [HHS], 2007). It is a relatively common disorder that affects more than 22 million Americans, yet if not managed appropriately, asthma can have serious and sometimes fatal outcomes (HHS, 2007). Uncontrolled asthma has resulted in a spike in the number of urgent healthcare visits and hospitalizations, poor health outcomes and quality of life, and a greater chance of death due to asthma. Research indicates there has been an increase in incidence and morbidity due to asthma by 100% over the past three decades (Reece, Holcroft, Faul, Quattrochhi, Nicolosi, 2002). Also, approximately 28 million physician office visits and 497,000 hospitalizations each year can be attributed to asthma-related issues (HHS, 2007). Of additional concern is that when asthma is not controlled most activities of daily living (ADL) may be impacted. In a survey of 2,509 adults with asthma or parents of children with asthma, work or school attendance was impacted in 25% of individuals, overall work was limited for 22%, and 17% experienced limitations in various other activities (Reece et al, 2002).
The various populations affected by asthma further supports the widespread impact of the disorder. Children and adolescents comprise nearly 5 million of the total number of individuals diagnosed making it the most common chronic illness among children and adolescents (Berg, Tichacek, & Theodorakis, 2004). Overall utilization of emergency department (ED) services is the highest for individuals ages 10-19, and asthma exacerbations are the leading cause of such ED visits each year (Reece et al, 2002). Unfortunately, in the year 2000, cases of uncontrolled asthma resulted in 223 deaths in children ages 0 to 17, with 54 of these deaths occurring in adolescents’ ages 15 to 17 (Berg, Tichacek, & Theodorakis, 2004). Such disproportionate findings may be due to unique challenges that further influence the adolescent’s ability to manage their asthma. As explained by Berg and colleagues (2004):

Adolescents may be at a greater risk for poor outcomes because of the developmental issues of their age group...[they] lack understanding of the disease, are non-adherent to medication regimens, and experience developmental changes that interfere with asthma self-management”. (p. 29-30)

College students are a unique population with specific needs regarding to asthma management. During this transition period, adolescents face many challenges that can interfere with their ability to manage their asthma effectively. Between attending classes, studying around the clock, coping with dorm life, participating in extracurricular activities, and maintaining an active social life, college can be pretty hectic for the average student. Therefore, it is reasonable to assume that remembering to take daily inhalers or measure peak expiratory flow rates (PEFR) can be lost in the chaos of daily life. The current generation of undergraduate college students is of particular concern when it comes to ensuring proper asthma management. This generation, often referred to as “Millennial”, is characterized by “their propensity for multitasking” which is only
encouraged by their easy access to technology (Pardue and Morgan, 2008). As students that are constantly “connected”, interrupting their activity to take an inhaler is quite unlikely in between attending class, extracurricular activities, and posting status updates on social media websites.

With evidence that incidence and morbidity due to asthma is still of concern for the general population, it’s understandable that newly-independent and often on-the-go college students are especially at risk. Asthma education may be a way to better prepare college students to deal with the challenges of managing asthma while in college. Asthma education programs have already documented success in helping college students decrease the frequency of asthma exacerbations, improve self-management techniques, increase use of early intervention strategies and treatment recommendations, reduce absences due to asthma-related illness, and enable students to be more active in sports activities (Tehan et al, 1989). Optimal self-management can be achieved with sufficient education about signs and symptoms of distress, knowledge of triggers, appropriate dosing of rescue and controller medications, proper spacer use, accurate peak expiratory flow monitoring, and regular physician visits. If college students are unaware of or neglect any of the criteria listed above, they are putting themselves at risk.

However, targeting this special population also has its difficulties. As a generation that finds comfort in technology, their willingness to learn by reading passively displayed information such as a brochure or pamphlet is rapidly diminishing. This generation is defined by “their propensity for multitasking, reliance on electronics, and need for immediate feedback”, thus online learning suits these students quite well (Pardue & Morgan, 2008). In order to best educate student’s of today, information needs
to be delivered in a medium that they both understand and identify with − online. Furthermore, in an age when many college courses are available online, class discussions are conducted virtually, and everything from alarm clocks to football scores are found on mobile data phones, the need for an Internet-based asthma education program is evident. However, with more research still needed on proper asthma self-management for college-age students in general, the effect technology might play on such programs is widely unknown.

Purpose & Research Questions:

Uncontrolled asthma continues to be a concerning health issue due to steady rates of urgent healthcare visits and emergency department influx (HHS, 2007). Particularly for adolescents in college, the combination of increased independence and responsibility, along with demanding academic and social schedules, does not create the most supportive environment for proper asthma management (Berg, Tichacek, & Theodorakis, 2004). Asthma management may be further complicated by a young adult’s skewed perception of his or her functional health, difficulty coping with the unpredictability of college life, and an inability to establish new support systems and resources away from home (Reece et al, 2002). The purpose of this study was to describe Millennial college students’ level of asthma control and their attitudes and perceptions of how well their asthma is managed. In addition, this study described resources college students with asthma utilize for disease management along with additional resources or adaptations that are necessary to better meet students’ needs.
The Health Belief Model (HBM) was used as the theoretical framework for this research. The study aligned with the constructs of perceived seriousness, perceived susceptibility, perceived benefits, perceived barriers, modifying variables, cues to action, and self-efficacy as a means of describing college students’ perceptions (Glanz, Rimer, & Lewis, 2002). The HBM supports the concept that health behavior, in this case the management of one’s asthma, can be determined by evaluating one’s personal beliefs or perceptions about a disease and the techniques used to decrease its occurrence. In this study, the following research questions were addressed:

1. What are the differences in perceptions of asthma control in first-year college students’ with asthma based upon whether or not they are adequately controlled?
2. What are first-year college students’ with asthma perceived needs of resources for asthma self-management?
3. What are the learning preferences of asthma education for college students with asthma?

Theoretical Framework:

The Health Belief Model (HBM) was developed in the 1950’s as a way to explain the widespread failure of people to participate in programs to prevent and detect disease (Glanz, Rimer, & Lewis, 2002). Initially, the model was used to help the U.S. Public Health Service understand why people were not utilizing free medical screening programs for diseases such as tuberculosis. The model is based on a value-expectancy theory, meaning each person has an innate desire to avoid illness or be well (value) and it
must be associated with a belief that a specific health action can prevent the illness (expectation). Ultimately, the HBM explains health behavior as one’s personal beliefs or perceptions about a disease and the strategies that are used to decrease its occurrence.

The study aligned with the constructs of the HBM and was used as a means of describing college students’ perceptions. The following constructs were used as a basis for research questions: perceived seriousness, perceived susceptibility, perceived benefits, perceived barriers, modifying variables, cues to action, and self-efficacy.

Definition of Terms:

Controlled asthma:

Constitutive Definition – absence of daytime or nighttime symptoms, infrequent need for quick-relief medications (no more than twice a week), peak flow readings within normal range, and no limitations to daily activities indicating the goals of therapy are met (GINA, 2009)

Operational Definition – self-report of asthma symptoms; ATAQ score of 0

Partially controlled asthma:

Constitutive Definition - daytime symptoms more than twice a week and sometimes at night, use of quick-relief medicine more than twice a week, peak flow rate less than 80% of normal, and asthma attacks that occur at least once a year but not weekly (GINA, 2009)

Operational Definition – self-report of asthma symptoms; ATAQ score of 1-2

Uncontrolled asthma:
Constitutive Definition – three or more of the features of partially controlled asthma at least three times a week and asthma attacks that occur weekly (GINA, 2009)

Operational Definition – self-report of asthma symptoms; ATAQ score of 3-4

Self-management:

Constitutive Definition – ability of individual to apply techniques, skills, or interventions to effectively take care of his or her asthma

Operational Definition – self-report of students’ performance of management interventions including the use of medication according to prescribed schedule, proper spacer techniques, peak flow monitoring, and daily symptom journal, obtained in focus groups

Transition:

Constitutive Definition – “the purposeful, planned movement of adolescents and young adults with chronic physical and medical conditions from child-centered to adult-oriented health care systems” (Sawyer, Blair, & Bowes, 1996).

Operational Definition – self-report of students’ shift in health care from pediatrician to adult healthcare practitioner and evidence of individual involvement in care

Assumptions & Limitations:

The following limitations are identified:

1. The participants were asked to self-report their level of asthma control as defined by frequency of symptoms and frequency of quick-relief medication used. The information that was self-reported by participants was used to categorize their
asthma as either “controlled” or “not controlled”. This study did not confirm self-reported information with further assessments such as pulmonary function testing. The sole use of self-reported data may not have been an accurate representation of participants’ actual level of asthma control.

2. The sample was a convenience sample of first-year students enrolled at The Ohio State University. Participation was on a voluntary basis and therefore random selection was not applied which would have provided a group that is most representative of the target population.

3. The study was used to describe participants’ perceptions of asthma management, as well as their attitudes of currently available asthma management resources/interventions. This information is purely subjective, and therefore may not be most representative of the target population.

Significance of Study:

According to the literature, asthma in the college-age population remains very poorly controlled. The fact that asthma management among these young adults is not consistent with the recommended asthma care guidelines is concerning. Most research to date has focused on asthma prevalence and management in those under the age of 18. Additionally, there is an immense need for future research on the management of asthma in college students to focus on the learning needs of this current cohort of college aged adults. The Millennial generation is both comfortable and reliant on technological devices as a means of information gathering, communication, and personal pleasure. Therefore, this study has contributed to the literature by describing the asthma self-management needs of college students today.
CHAPTER 2
REVIEW OF RELATED LITERATURE

Introduction:

A search was conducted of the MEDLINE database through the PubMed, Ovid MEDLINE, and EBSCOhost MEDLINE interfaces. Additional searches were conducted via OSU University Libraries and OhioLINK electronic journals. Keywords used in the search included “asthma”, “asthma management”, “asthma control”, “college students”, “adolescents”, and “asthma education”.

Prevalence & Impact:

Despite the large number of people affected by asthma, the severity of the disorder is often underestimated due to its relatively low rate of mortality, which ranges from 1-3% (Tehan, Sloane, Walsh-Robart, Chamberlain, 1989). However, thousands of individuals continue to experience great risk due to their asthma when it remains uncontrolled. Uncontrolled asthma has resulted in a spike in the number of urgent healthcare visits and hospitalizations, poor health outcomes and quality of life, and a greater chance of death due to asthma. Research illustrates there has been an increase in incidences and morbidity due to asthma by 100% over the past three decades, accounting
for approximately 28 million physician office visits and 497,000 hospitalizations annually (Reece et al, 2002; HHS, 2007).

The various populations affected by asthma further supports the widespread impact of the disorder. Thousands of adults, adolescents, and children are affected by asthma-related symptoms on a daily basis. As of 2002, children and adolescents comprise nearly 5 million of the total number of individuals diagnosed with asthma (Berg, Tichacek, & Theodorakis, 2004). Not surprisingly, it is the most common chronic illness among children and adolescents. Utilization of emergency department services is the highest for individuals ages 10-19, and asthma exacerbations are the leading cause of such ED visits each year (Reece et al, 2002). With an increase in the number of urgent healthcare visits due to asthma comes a negative impact on daily activities. It is estimated that approximately 20% to 25% of all school absences are asthma-related (Tehan et al., 1989). In a survey of 2,509 adults with asthma or parents of children with asthma, work or school attendance was impacted in 25% of individuals, overall work was limited for 22%, and 17% experienced limitations in various other activities (Reece et al., 2002).

Even more staggering is data from the year 2000 that indicates cases of uncontrolled asthma resulted in 223 deaths in children ages 0 to 17, with 54 of these deaths occurring in adolescents’ ages 15 to 17 (Berg, Tichacek, & Theodorakis, 2004). Adolescents face unique challenges that further influence one’s ability to manage his or her asthma. Research conducted by Berg, Tichacek, & Theodorakis notes “adolescents may be at a greater risk for poor outcomes because of the developmental issues of their age group…[they] lack understanding of the disease, are non-adherent to medication...
regimens, and experience developmental changes that interfere with asthma self-management” (29-30). There are several factors that may conflict with the ability to properly manage the asthma of an adolescent. For example, parents have reported less confidence in managing the asthma of their child as the child grows older (Berg, Tichacek, & Theodorakis, 2004). In other cases, the management of one’s asthma may become a source of tension in the parent-child relationship as the child matures (Rhee, Wyatt, and Wenzel, 2006). Other issues that are unique to this age group include being more likely to participate in activities that may trigger asthma symptoms such as athletics or smoking and being more concern for one’s self-image, perhaps feeling self-conscious about his or her asthma when around peers.

College Students & Asthma:

The transition period adolescents experience when beginning college is specifically challenging. For a first-year college student, management of one’s asthma may be complicated by skewed perceptions of one’s functional health, coping with the unpredictability of college life, and difficulty identifying new support systems and resources available on campus (Reece et al, 2002). In a study conducted by Reese et al at a mid-size, urban, public university, a non-randomly selected convenience sample of 503 college students, ages 18 to 24, was gathered to identify issues that impede the self-management of asthma in college students (2002). Evidence of students’ misunderstanding of their own asthma symptoms was apparent following the application of a 42-item Asthma Severity/Management Survey (AS/MS). The survey assessed the frequency and type of symptoms, behavior patterns related to symptom monitoring,
initiating timely treatment, seeking additional health care services when necessary, and the ability of participants to perform proper self-management techniques such as inhaler use and peak expiratory flow rate (PEFR) monitoring. Severity was then determined using the 1997 asthma guidelines that categorize asthma severity based on number of daytime symptoms per week, number of nighttime symptoms per month, medication use, and evidence of physical activity limitations due to asthma. Based on the AS/MS survey, of 59 self-reported mild asthmatics, only 7 (12%) actually displayed symptoms consistent with mild asthma, whereas 44 (75%) could be classified as having moderate asthma and 8 (14%) had symptoms consistent with severe asthma.

Reece and colleagues found further support for the lack of self-awareness and understanding regarding one’s perceived functional health by using the Dartmouth COOP Charts (COOP) (Reece et al, 2002). The COOP assesses overall perceptions of health based upon participants’ response using a 1-to-5 scale, with higher score indicating lower levels of perceived functioning. For the 160 participants with moderate and severe asthma, perceived functional health was rated 2.3 and 2.4 respectively, while other students at the university rated their health between 3.4 and 3.1 respectively (Reece et al, 2002). This data shows that despite maturation in the age of an individual, one’s perception of his or her health can still be inaccurate.

Coping with unpredictability of college life is another challenge that adolescents transitioning from home to college must overcome. Although attending college presents the opportunity for greater independence and increased responsibility, this new environment can also be a source of stress due to increased academic and social demands (Berg, Tichacek, & Theodorakis, 2004). Between attending classes, studying around the
clock, dealing with dorm living, participating in extracurricular activities, and maintaining an active social life, college can be pretty hectic for the average student. Additionally, the current generation of college students is of particular concern when it comes to ensuring proper asthma management. This generation, often referred to as “Millennials”, is characterized by “their propensity for multitasking” which is only encouraged by their easy access to technology (Pardue & Morgan, 2008). As students that are “constantly connected”, remembering to take an inhaler is quite unlikely in between downloading songs and posting status updates on social media websites. In fact, research by Reece et al found “adherence behaviors of individuals with asthma include difficulty managing their illness because of denial and lack of environmental control. Frustrated by asthma-induced limitations, many [students] neglect their control medications or fail to measure PEFR’s (40)”. While only 22% of 198 students in the study had been instructed to measure PEFR daily, and 26% had actually received instruction on how to measure PEFR, only 4% reported PEFR monitoring on a daily basis (Reece et al, 2002).

In a study by Berg and colleagues, 13 qualifying students from a suburban-area Los Angeles high school completed the Child Health Survey for Asthma (CHSA) as preparation for participation in a 2-week Power Breathing Program that was aimed to educate students about asthma (2004). Scores on the CHSA showed 16.7% of participants admitted to never taking medication as recommended, 50% of participants expressed frustration in relying on asthma treatments, and 46.2% reported being upset about having asthma and needing asthma treatments (Berg, Tichacek, & Theodorakis, 2004). With so many academic and social obligations of students in college, often their
asthma management is neglected. Ironically, the result is often an increased interference in daily activities. All participants in the study by Reece et al believed asthma symptoms negatively impacted school and work attendance as well as participation in other activities (2002). Also, students with severe asthma in this study reported sleep interruptions due to asthma symptoms, which is further indicative of the severity. In another study that explored the influence asthma has on the quality of life of college students, 77 students with asthma from the University of South Carolina reported an average of 2.8 class days missed during the fall 1991 semester (Jolicoeur, Boyer, Reeder, Turner, 1994). It was noted that if this information was extrapolated over an entire school year, a college student with asthma could be absent from class up to 5.6 days during the year.

With asthma self-management difficult due to the unpredictability of college life, identifying new support systems and resources on campus is essential. Uncertainty and confusion surrounding college campus resources may affect the ability of students to properly manage their asthma. While 70% of the 198 participants in the Reece et al study did report seeing a health care provider for routine health care (2002), an additional burden may be present if college students must travel back to their hometown to visit their primary care physician (Wodka & Barakat, 2007). Also, for college students with greater asthma severity, the ability to see a primary care physician on short-term notice may not be a viable option (Reece et al, 2002). Despite free health care services and discounted prescriptions for students at the Thompson Student Health Center at the University of South Carolina (TSHC-USC), Jolicoeur and colleagues found that 31.3% of 77 students stated they could not afford medical treatment (Jolicoeur et al, 1994). Also,
65.5% claimed that seeking medical treatment on a college campus was inconvenient. Ultimately, 40.3% of students in the study did not seek medical treatment even when they thought it was necessary. Other health resources extensively underutilized in the study by Reece et al were seasonal flu shots (2002). The University Health Service in the study offered free influenza shots, yet only 31% of the study’s 45 participants with severe asthma received the vaccination. Scheduling limitations with out-of-town physicians and a lack of knowledge about available campus resources combined with the unpredictability of asthma symptoms can all contribute to an increased utilization of ED services.

Similar research in the arena of diabetes management highlights challenges that are especially unique to college students. One particular study by Wdowik, Kendall, Harris and Auld out of Colorado State University notes adolescents with chronic illnesses such as diabetes encounter “developmental priorities [that] may compete with demands of health care…and [a] shift in responsibility of care from parents to the individual [that] may cause confusion or anxiety” (p. 17, 2001). Using an expanded version of The Health Belief Model to study perceived threats, benefits, barriers, and cues to action for college students’ diabetes management, Wdowik and fellow researchers described specific challenges for college students’ management of their diabetes. Barriers to appropriate self-care included time management difficulties, inadequate finances, and inconveniences that occur due to the demands of disease management such as frequent physician visits and medication administration. Due to these unique barriers, recent research has begun to stress the importance transitioning patients with chronic illness from the pediatric health care environment to adult services (Sawyer, Blair, & Bowes, 1996). To help
college students better cope with the challenges of chronic disease management, easing the transition and shift in responsibilities onto the individual is key in minimizing future problems.

Asthma Education for College Students:

Due to these barriers, asthma in the college-age population remains very poorly controlled. Reece and colleagues determined that students with moderate or severe asthma either did not use a daily inhaler or were administering their inhaler more than 4 times per day (Reece et al, 2002). They further noted that “neither extreme is consistent with recommended asthma care” and can result in dangerous outcomes (40). However, Tehan et al comments:

Most studies on asthma self-management have involved children and families. A few studies have focused on adult asthmatics. Few studies reported in the literature have focused on adolescents in general and on college students in particular, despite the fact that asthma remains a serious problem for many young adults (514).

Therefore, most researchers conclude that adolescents, specifically those in the college setting, are in great need of asthma self-management education. The few studies that have evaluated education programs for college-age adolescents and young adults have had positive results. Most studies support asthma self-management education supporting its effectiveness in reducing urgent healthcare visits and hospitalizations, as well as increasing positive health outcomes and the quality of life in adolescent asthmatics.

Asthma education may be a way to better prepare college students to deal with the challenges of managing asthma while in college. One program that attributed students’ increased physical self-awareness with asthma education is the “Power Breathing
Program” developed by Berg and colleagues (Berg, Tichacek, & Theodorakis, 2004). The improved perception of functional health that participants reported following participation in the program allowed students to be more cognizant of asthma triggers and better able to understand when to take asthma medications. Another study by Tehan et al documented a decrease in urgent health care utilization by asthmatic college students following a “Breathe Free” asthma workshop that educated students on proper self-management techniques and directed students towards available campus resources (1989). In 1986, four years after the completion of the “Breathe Free” asthma workshop, a post-program audit of participants’ health records indicated the 11 participants accumulated a total of 30 health center visits over the four years, 29 of which were preventive in nature (Tehan et al, 1989). The chart review also supported the program’s effectiveness due to a “decreased frequency of asthma attacks noted by five students, improved self-management techniques for asthma symptoms resulting in seven students’ ability to be more active in sports activities, increased use of early intervention strategies and treatment recommendations by 10 students as a result of awareness of asthma triggers, [and] fewer missed school days noted by four students” (518).

However, targeting this special population also has its difficulties. As a generation that finds comfort in technology, their willingness to learn by reading an information brochure or pamphlet is rapidly diminishing. In order to best educate student’s of today, information needs to be delivered in a medium that they both understand and identify with – online. Unfortunately, there is a lack of documented research supporting the benefits of this type of asthma education program. However, some educational programs have provided asthmatic college students with other avenues
of support, such as peer groups or counseling. This type of educational intervention is important for college students with asthma while living away from family and other previously established support systems. Researchers Wodka and Barakat stated that adolescents with chronic illness typically have higher levels of family support than healthy adolescents (2007). However, for most students living on a college campus, the support of family members is no longer readily available. As a result, multiple studies have documented positive outcomes of a peer-oriented approach to asthma education. Berg et al states “The effect of group dynamics on adolescents can be significant. Group interaction can also provide an avenue that allows group problem solving and reduces stigma and trauma” (234). Participants in both the “Power Breathing Program” and the “Breathe Free” asthma workshop expressed satisfaction with the group-learning approach because it provided social support from others.
CHAPTER 3
METHODS

The purpose of this study was to describe college students’ need for more effective resources for optimal asthma self-management. As part of the needs assessment, students’ perceived level of asthma control and their actual level of control was determined. Using the Health Belief Model (HBM), the study measured characteristics that described students’ perceptions of the seriousness and susceptibility of their asthma, as well as perceived benefits, barriers, and any necessary cues to action that impact their asthma control. Additional information and demographic characteristics that described the population were studied. These included age, race, gender, smoking status, current living arrangements (dorm, off-campus, home, etc.), previous hospitalizations and ED visits.

Research Questions:

1. What are the differences in perceptions of asthma control in first-year college students’ with asthma based upon whether or not they are adequately controlled?

2. What are first-year college students’ with asthma perceived needs of resources for asthma self-management?
3. What are the learning preferences of asthma education for college students with asthma?

Research Design:

This was a descriptive study that utilized a mixed-method triangulation technique employing use of both surveys and focus groups to optimize the objectives of the study. A survey of asthma control was used to describe students’ perceived level of asthma control and their actual level control. A focus group was then used to describe attitudes and perceptions of benefits and barriers to current asthma resources available on campus. The focus group also explored any adaptations to current resources or additional resources needed to optimize students’ asthma self-management.

Study Population:

The population for this study was all current first-year undergraduate students enrolled Autumn quarter 2010 at The Ohio State University enrolled that had a self-reported diagnosis of asthma. Students were recruited to participate in the initial survey via an email invitation [Appendix A]. Students’ email addresses were obtained, upon permission, from the University list serve for all first year students. Email addresses were used in order to contact students, however all information obtained from the surveys was not be linked to students’ email address. All information obtained from the survey was anonymous. The entire population of first year students for whom an email address was included on the list serve, totaling over 5,000 students, was invited to participate in the study. The population was a convenience sample and participation in the study was voluntary.
Any student completing the initial online survey in its entirety was invited to participate in a focus group. Students answered an additional question at the end of the survey reserving their space in a focus group should they choose to participate. No identifying information was obtained from the focus groups. Focus groups were structured with no more than 12 participants per group. The focus group took place at central location on the OSU campus. Participation in the focus group was also voluntary, although a gift card incentive was given to all focus group participants. All completed survey data was used to describe the student population in terms of level of asthma control even if students did not choose to participate in the focus group. However, subjects that submitted incomplete surveys were not included in any part of the study.

Instrumentation:

The subjects’ actual level of control was measured using the Asthma Therapy Assessment Questionnaire (ATAQ) (Merck & Co., 2010). This instrument has established validity and reliability and has been recommended by the National Heart, Lung and Blood Institute (NHLBI) for use with subjects’ age 12 years and older. The ATAQ resulted in subjects’ classification of asthma control as “well controlled”, “not well controlled”, or “poorly controlled”. Each answer was scored with the indicated point value (0 or 1) and the total scores indicated the following: 0 points = asthma is well controlled, 1-2 points = asthma is not well controlled, 3-4 points = asthma is poorly controlled. For this study, any score indicating asthma is either “not well controlled” or “poorly controlled” were defined by the “not well controlled” category.

Subjects’ perceived level of asthma control was measured using the Perceived
Control of Asthma Questionnaire (PCAQ) (Katz, Yelin, Eisner, and Blanc, 2002). This is an 11-item instrument that assessed individuals’ perceptions of their ability to manage their asthma. The PCAQ has been used in a variety of studies and has established validity and reliability. Responses are measured using a 5-point Likert scale for each of the 11 questions resulting in a possible total score of 11 to 55. It is important to note that questions 2, 7, 8, 10, and 11 were reverse-scored. A lower score indicated the perception of less control over one’s asthma versus a higher score, which indicated the perception of more control. In previous studies, the PCAQ items have shown high internal consistency (Cronbach’s $\alpha = 0.76$).

Data Collection Procedures:

Recruitment for this study was accomplished via an email sent to first year students from The Ohio State University enrolled in the introductory University course during autumn quarter 2010. The survey was distributed during the first two weeks of the second quarter, beginning in January. Those that had a self-reported diagnosis of asthma were asked to participate in the study and complete an online survey constructed in Survey Monkey®. The survey was used to gather demographic information including age, gender, race, smoking status, current living arrangements, previous hospitalizations, ED visits, and asthma medications being used [Appendix B]. Questions from both the ATAQ [Appendix C] and PCAQ [Appendix D] instruments were also included on the initial survey.

An incentive to participate in the focus group was provided in the form of a gift card. Focus group questions described attitudes and perceptions about any benefits and
barriers to current asthma resources/interventions available on campus, or any adaptations and additional resources needed to optimize students’ asthma self-management [Appendix E]. The focus group sessions were conducted towards the middle of the second quarter, in the month of February. An experienced, neutral-party facilitator conducted all focus group sessions. Information from the focus groups was audio-recorded during the sessions and transcribed following the meetings.

Data Analysis Procedures:

The descriptive statistics obtained from the ATAQ and PCAQ questions on the survey were scored according the standards for each instrument. The ATAQ was scored using the established ATAQ groups of “well controlled” and “not well controlled” asthma. A t-test was then performed using the categorical data obtained from the ATAQ and the continuous data from the PCAQ, scored 11 through 55. Statistical significance was defined as p < 0.05.

A panel of experts reviewed focus group questions prior to the sessions. The focus group data was recorded, transcribed, and then inter-rater reliability was used to evaluate focus group information. This review process was used to evaluate focus group data for relevant themes.
CHAPTER 4
RESULTS, DISCUSSION, AND CONCLUSIONS

Results of Survey Data:

The population for the study included current first-year undergraduate students’ enrolled autumn quarter 2010 at The Ohio State University self-reporting as having a diagnosis of asthma. Of the 127 total respondents, 106 completed the entire initial survey, and 10 students participated the focus group sessions. Of the respondents, the mean age was 18.4 years old and female students comprised a majority of the students. Also, an overwhelming 92% of individuals currently lived on campus in the dorms.

<table>
<thead>
<tr>
<th>Age</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>62</td>
<td>58.5</td>
</tr>
<tr>
<td>19</td>
<td>42</td>
<td>39.6</td>
</tr>
<tr>
<td>20</td>
<td>2</td>
<td>1.9</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>35</td>
<td>33.0</td>
</tr>
<tr>
<td>Female</td>
<td>71</td>
<td>67.0</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>80</td>
<td>75.5</td>
</tr>
<tr>
<td>Black</td>
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<td>12.3</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td>Asian</td>
<td>10</td>
<td>9.4</td>
</tr>
<tr>
<td>Mixed</td>
<td>2</td>
<td>1.9</td>
</tr>
<tr>
<td>Living Arrangements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dorm</td>
<td>98</td>
<td>92.5</td>
</tr>
<tr>
<td>Off-campus Housing</td>
<td>6</td>
<td>5.7</td>
</tr>
<tr>
<td>Home</td>
<td>2</td>
<td>1.9</td>
</tr>
</tbody>
</table>

Table 1. Demographics of First-Year College Students with Asthma
Students’ were asked several questions pertaining to their health history as it may have related to their asthma management. While approximately 21% of students answering the survey admitted to having smoked at some point in their life, only about 5% of students currently smoked. Of these students, all answered that they do not smoke more than one pack per day. Also, nearly 40% of first-year Ohio State students with asthma reported to having visited the ED at some point in their life due to asthma with four students reporting to have visited the ED for their asthma since coming to college. Similarly, 28% of students responded that they have been hospitalized due to their asthma including four students that have been hospitalized since coming to college.

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ever Smoked</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>22</td>
<td>20.8</td>
</tr>
<tr>
<td>No</td>
<td>84</td>
<td>79.2</td>
</tr>
<tr>
<td><strong>Currently Smoke</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>5</td>
<td>4.7</td>
</tr>
<tr>
<td>No</td>
<td>101</td>
<td>95.3</td>
</tr>
<tr>
<td><strong>Ever Visted ED for Asthma</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>43</td>
<td>40.6</td>
</tr>
<tr>
<td>No</td>
<td>63</td>
<td>59.4</td>
</tr>
<tr>
<td><strong>Number of ED Visits since College for Asthma</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>102</td>
<td>96.2</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td>3.8</td>
</tr>
<tr>
<td><strong>Ever Hospitalized for Asthma</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>30</td>
<td>28.3</td>
</tr>
<tr>
<td>No</td>
<td>76</td>
<td>71.7</td>
</tr>
<tr>
<td><strong>Number of Hospitalizations since College for Asthma</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>102</td>
<td>96.2</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td>3.8</td>
</tr>
</tbody>
</table>

Table 2. Health History of First-Year College Students with Asthma
Approximately 60% of students answering the survey admitted to not having an asthma action plan. When determining whom students visit for routine asthma care, they were permitted to select more than one location: hometown healthcare provider, a provider in the Columbus area, or the Wilce Student Heath Center (SHC). However, very few participants selected multiple provider locations. Also, approximately 24% of students responding to the survey reported that they do not visit any healthcare provider for routine asthma check-ups. Yet, of the other 76.4% that do attend routine asthma check-ups, at the time of data collection, almost 38% of students stated they had not seen a healthcare provider for a routine asthma check-up in the past year.

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Asthma Action Plan</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>42</td>
<td>39.6</td>
</tr>
<tr>
<td>No</td>
<td>64</td>
<td>60.4</td>
</tr>
<tr>
<td><strong>Have Routine Asthma Care</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>81</td>
<td>76.4</td>
</tr>
<tr>
<td>No</td>
<td>25</td>
<td>23.6</td>
</tr>
<tr>
<td><strong>Routine Visits to Hometown HP</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>75</td>
<td>70.8</td>
</tr>
<tr>
<td>No</td>
<td>31</td>
<td>29.2</td>
</tr>
<tr>
<td><strong>Routine Visits to Columbus HP</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>10</td>
<td>9.4</td>
</tr>
<tr>
<td>No</td>
<td>96</td>
<td>90.6</td>
</tr>
<tr>
<td><strong>Routine Visits to Student Health Center</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>5</td>
<td>4.7</td>
</tr>
<tr>
<td>No</td>
<td>101</td>
<td>95.3</td>
</tr>
<tr>
<td><strong># of Routine Appointments/year (24 missing)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>31</td>
<td>37.8</td>
</tr>
<tr>
<td>1</td>
<td>32</td>
<td>39.0</td>
</tr>
<tr>
<td>2</td>
<td>18</td>
<td>22.0</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>1.2</td>
</tr>
</tbody>
</table>

Table 3. Asthma Prevention by First-Year College Students with Asthma
Actual Level of Asthma Control (ATAQ):

The Asthma Therapy Assessment Questionnaire (ATAQ) portion of the survey resulted in subjects’ classification of asthma control as either “well controlled” or “not well controlled” as determined by their answers to four questions used to qualify one’s level of control. With 67 students scoring zero points upon answering the four questions, it was determined that 63% of first-year college students’ with asthma answering the survey were categorized as having well controlled asthma. Of the remaining students, 25 scored one point, 12 students accumulated two points, and 2 other students scored three points, resulting in 39% of students grouped into the not well-controlled category.

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well Controlled</td>
<td>67</td>
<td>63.2</td>
</tr>
<tr>
<td>Not Well Controlled</td>
<td>39</td>
<td>36.7</td>
</tr>
</tbody>
</table>

Table 4. ATAQ Score

Perceived Control of Asthma (PCAQ):

Subjects’ perceived level of asthma control was measured using the Perceived Control of Asthma Questionnaire (PCAQ) (Katz, Yelin, Eisner, and Blanc, 2002). The survey included 11 questions used to assess individuals’ perceptions of their ability to manage their asthma. Respondents could accumulate a possible total score between 11 and 55 with a lower score indicating the perception of less control over one’s asthma versus a higher score that would indicate the perception of more control. The PCAQ has been used in several studies and has established validity and reliability. In this study, the PCAQ items showed high internal consistency, with a Cronbach’s alpha of 0.87, and therefore, a single PCAQ score was calculated. This is quite similar to other studies such
as that completed by Katz et al, in which they determined the Cronbach’s alpha to be 0.76.

The PCAQ scores of first-year college students’ with asthma completing the survey ranged from 14 to 55, with a median score of 42, mean of 43, and a 7.15 standard deviation. The students’ response frequencies on the PCAQ items also aligned with the overall PCAQ scores. With a median of 42 and a mean of 43, the majority of students had the perception that they were in control of their asthma. Similarly, for the questions such as “I can reduce my asthma by staying calm and relaxed” and “I am coping effectively with my asthma”, 41% and 47% respectively answered that they agree with those statements. Also, when answering questions that were reverse-scored, students were more likely to disagree or strongly disagree with statements such as “my asthma is controlling my life”, for which 64% of students strongly disagreed. Overall, the response frequencies for the PCAQ items indicate that first-year college students with asthma perceive their asthma to be well controlled.
Perceived Control vs. Actual Level of Control:

The statistics obtained from the ATAQ and PCAQ questions on the survey were scored according the standards for each instrument. The ATAQ was then scored using the established ATAQ groups of “well controlled” and “not well controlled” asthma. The interval data obtained from the PCAQ remained continuous, with a possible score between 11 and 55. A t-test was then performed using the PCAQ score to examine differences between the two ATAQ categories. This showed that a total of 65 students who had well-controlled asthma also had the perception of more control of their asthma.

<table>
<thead>
<tr>
<th>Statement</th>
<th>SD</th>
<th>D</th>
<th>N</th>
<th>A (%)</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce asthma by being calm &amp; relaxed</td>
<td>2.9</td>
<td>13.3</td>
<td>38.1</td>
<td>41.0</td>
<td>21.0</td>
</tr>
<tr>
<td>*Asthma hits out of the blue</td>
<td>29.2</td>
<td>34.9</td>
<td>20.8</td>
<td>8.5</td>
<td>6.6</td>
</tr>
<tr>
<td>If I do everything right, I can manage my asthma</td>
<td>0.9</td>
<td>7.5</td>
<td>18.9</td>
<td>35.8</td>
<td>36.8</td>
</tr>
<tr>
<td>I can do a lot by myself to cope with my asthma</td>
<td>1.9</td>
<td>2.9</td>
<td>20.0</td>
<td>46.7</td>
<td>28.6</td>
</tr>
<tr>
<td>When I’m in control of my personal life, my asthma does not affect me</td>
<td>0.9</td>
<td>14.2</td>
<td>27.4</td>
<td>28.3</td>
<td>29.2</td>
</tr>
<tr>
<td>I have the ability to control my asthma</td>
<td>0.9</td>
<td>7.5</td>
<td>17.9</td>
<td>40.6</td>
<td>33.0</td>
</tr>
<tr>
<td>*I would feel helpless if I wasn’t able to rely on others for help with my asthma.</td>
<td>24.5</td>
<td>39.6</td>
<td>21.7</td>
<td>11.3</td>
<td>2.8</td>
</tr>
<tr>
<td>*No matter what I can’t get relief from my asthma</td>
<td>43.4</td>
<td>34.0</td>
<td>16.0</td>
<td>5.7</td>
<td>0.9</td>
</tr>
<tr>
<td>I am coping well with my asthma</td>
<td>1.9</td>
<td>0.9</td>
<td>11.3</td>
<td>47.2</td>
<td>38.7</td>
</tr>
<tr>
<td>*It seems like fate and other factors beyond my control affect my asthma</td>
<td>26.4</td>
<td>29.2</td>
<td>28.3</td>
<td>14.2</td>
<td>1.9</td>
</tr>
<tr>
<td>*My asthma controls my life</td>
<td>64.2</td>
<td>21.7</td>
<td>11.3</td>
<td>0.9</td>
<td>1.9</td>
</tr>
</tbody>
</table>

*Items were reverse-scored
Table 5. PCAQ Response Frequencies
with a mean PCAQ score of 44 and a standard deviation of 7.02. Additionally, 39 students with asthma that was not well controlled had a PCAQ mean score of 41 with a 7.09 standard deviation. This data approached significance (p = .051) indicating a discrepancy in PCAQ score based upon whether the students’ asthma was well controlled.

<table>
<thead>
<tr>
<th>ATAQ</th>
<th>n</th>
<th>PCAQ Mean</th>
<th>PCAQ SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well Controlled</td>
<td>65</td>
<td>44</td>
<td>7.02</td>
</tr>
<tr>
<td>Not Well Controlled</td>
<td>39</td>
<td>41</td>
<td>7.09</td>
</tr>
</tbody>
</table>

Table 6. t-test of PCAQ and ATAQ

Results of Focus Group Data:

Data obtained from the focus group sessions conducted at The Ohio State University supported the findings of several distinct themes related to first-year college students’ asthma self-management. Three experts in the field of asthma management independently reviewed the focus group data prior to a joint review process. Upon joint review, three specific themes among first-year college students with asthma were identified. Focus group data revealed millennial first-year college students with asthma have a significant misunderstanding of asthma “control” and recognizing processes of the disease. Also, students face a variety of barriers and limitations that prevent appropriate access to care. Additionally, these students do experience some difficulty adapting to
environmental changes after coming to college, which was attributed to such factors as climate changes, living arrangements, or adapting to new routines.

Understanding Asthma as a Disease:

First, it was established that for students participating in the focus group sessions, the majority unknowingly established that there was a large disconnect between their perceived level of asthma control and the actual symptoms they experienced. One first-year student in the focus group shared that her asthma “hasn’t been as big of a problem”, however later in the session she admitted to recently having had a panic attack that led to an asthma attack. She then stated “I realized I need to actually bring my medicine around with me and be prepared if something were to happen”. Also, this same student later explained that her asthma resulted in a visit to the ED when she was at home on break from school, lending to the findings that her asthma was actually less controlled then she let on. Similarly, one session began with a participant stating that he has not experienced any asthma symptoms since about the age of 15, however later on he commented that there have been times recently that he had chest tightness and was “able to hear [himself] breathing”. Another student commented that he has not had an asthma attack in two or three years, but did indicated having shortness of breath when walking during cold weather.

Further deficits in the knowledge of asthma were noted when students expressed the ability to manage their asthma by “controlling it themselves”. Students in the focus groups noted techniques such as “control[ling] my muscles” or having a friend help them “relax” as a means of self-management. One student stated that “I just developed an
ability to control it… I feel it getting really bad but it’s not to the point where I can do an inhaler, so like I just put my hands up, breathe, and I can control it myself”. In another case, the focus group facilitator asked students where they would go for help if they were having shortness of breath. One student’s response was “I generally, if I would have any kind of [shortness of breath], it would be less than, like usually around maybe five to ten minutes of any significant difficulty breathing, so my only option is to find a warm place. Like I wouldn’t have any time to get to a hospital… so [I’d] just get somewhere and be still I guess”.

One similarity among first-year asthmatic college students attending the focus groups was that the students generally had an adequate understanding of asthma basics. Many students knew proper medication terminology such as “rescue” and “maintenance” medications and understood specific symptom triggers such as smoke, dust, and exercise. Yet when asked whether students would want more information about their asthma, many agreed that additional education would be helpful. However, one student commented, “like what would you target in a class…I feel like an actual activity would better than just being talked at because unless you’ve just been diagnosed… unless you’re new to it, I don’t feel like [hearing] ‘this is what’s happening to you’, like I already know that”. Another preference was expressed when a student suggested “send[ing] an email, like here’s where you can get information, this is how you can do this… so they don’t have to leave [the dorm]. They can just sit at their computer or something.”
Access to Care:

Another theme identified as contributing to the mismanagement of asthma by first-year college students participating in the focus groups were issues surrounding access to care. In trying to determine students’ perceived need of resources, it was evident that first-year college students with asthma on Ohio State’s campus are largely unaware of resources that are available for asthma management. Most students that took part in the focus groups were unsure of where they would go for assistance with their asthma, even in an emergency.

I don’t know, out of habit I would think the ER (Emergency Room) because that’s where I always went. It was never during my doctor’s office hours, so I almost always went to the hospital. So, I don’t know, I think it would be wherever my roommate took me because I wouldn’t go by myself.

Two other students emphasized the convenience of the location as a determining factor of how they would choose where to go for help if they were having difficulty breathing. “I would probably go to the Student Health Center because it’s closer than the medical center”, noted one student.

But, perhaps two of the biggest problems in terms of students’ access to care were healthcare facility or pharmacy location as well as insurance restrictions. This information was disclosed when an individual explained the difficulty that arises when trying to determine where to go for help with her asthma.

I don’t know [where I would go] because I’m not covered by the school’s health insurance, so I have to figure out the closest medical place that accepts my insurance…I think my mom told me that my insurance is not accepted by it [Wilce Student Health Center], so I don’t think I could go there.

Ironically enough, most college students are eligible to remain on their parents’ health insurance while in school, yet the Wilce Student Health Center on Ohio State’s campus is
limited in the types of health insurance that it accepts. Similarly, several students explained the difficulties they experience when trying to obtain their medications. While the majority of students admitted to still relying on their parents to either send or bring them their asthma medications to school, the issue of pharmacy location was addressed by many students. “The CVS closest to me doesn’t have a pharmacy so that has been a big thing, like I have to walk a mile to get an inhaler”. Another student also confirmed, “the most hassle is getting the prescriptions when I need them instead of going home…it’d probably be nice if they made a pharmacy on south campus”.

Environmental Changes:

Another issue that seemed to plague first-year college students with asthma is that they seemed to experience some degree of difficulty adapting to environmental changes after coming to college. These environmental changes ranged in prevalence and impact, yet each supports the conclusion that first-year students with asthma are significantly affected by their surroundings. One of the greatest changes in environment felt by the majority of students in the focus groups was the climate. Many students participating in the focus group sessions commented on the role climate plays in terms of their asthma control.

My biggest problem is that I’m from California so I’m used to the warmer weather and coming here [Ohio State], when it started getting cold I noticed it a lot more walking to classes like “Oh, that actually kind of hurts”. It’s mainly just the lower temperatures that have been the biggest factor for me.

Other students also commented on the impact the climate has had on their asthma. One participant shared “there would be a couple mornings where it would be pretty cold and I was kind of running late…I’d have a difficult time when I got there. There was twice
when I had to take my inhaler when I got to class”. Another student also echoed the effect temperature has on his asthma, commenting; “my chest tightens up when it’s super cold”. Also, the students from all three focus groups indicated there were distinct differences in the weather between academic quarters resulting in increased shortness of breath more during winter quarter than autumn. For example, one student added, “walking across campus has been a little bit worse this quarter because of the cold temperature”.

For this reason, many students indicated that when it comes to asthma education, it would be far more beneficial for much of it to take place during autumn quarter. Students even suggested incorporating asthma education into the First-Year Experience (FYE) seminar series. This series provides educational presentations spanning many areas and first-year students are required to attend several during their first quarter at school. Many students also shared that their preference would be to learn about asthma resources on campus during orientation. This way, first-year students and their parents would both be able to adequately prepare for lifestyle changes prior to coming to campus.

While students largely discussed environmental changes pertaining to the cold weather experienced in Central Ohio, many also commented on the impact other triggers such as allergies, smoke, and illness have on their asthma. One student in particular required regular visits to a healthcare provider for allergy shots. She said, “I used to only have exercise-induced asthma…and then over the summer, towards the end of last year I got pneumonia which branched from my asthma and allergies”. Another participant in the same focus group acknowledged that if she knows she is going to be around allergens or smoke she makes sure to have her inhaler nearby. Also, often asthmatics may
experience increased symptoms when exposed to allergens such as dust and smoke. While another student did not definitively make the connection between asthma and allergens, she noted that her living arrangements may have had some impact on her asthma worsening since coming to college:

Mine’s almost been worse since I’ve gotten here [to college]. It used to only strictly bother me exercising or stuff. But there’s been a couple of mornings, most recently it was early last month, when I woke up, and I mean the room temperature was fine, everything else was fine, but I woke up wheezing…I don’t know if there was dust. Like I have allergies as well. Something like that was bothering me.

Exercise was also mentioned several times throughout the three focus group sessions as having an impact on students’ asthma. For example, one student explained the process she went through when participating in team sports in high school. She said that she was referred to a respiratory therapist for education to help alleviate symptoms that she experienced during conditioning for the sport. She also noted that her parents were very involved in the process, sitting in on the education talks with the therapist. Examples such as this are markedly different from the situations students face while exercising at college. One student gave the example of how she sometimes forgets her inhaler before she exercises. “I forgot my inhaler before…and went on a long run and then I got a few miles out and wasn’t able to get my inhaler until I ran a few miles back, so that became a problem”.

This transition was also evident when discussing possible locations for asthma resources and education. Students in the focus group sessions stressed the importance of having more support when working out for help with their asthma. Whether it serves to ease the transition of being more self-reliant when exercising or simply as a safety net, when asked where services for support should be provided, a couple students mentioned
Ohio State’s recreational facilities. “Mine only acts up if I’m exercising or playing sports…so I think just have a trained person on staff…just to make sure there is someone that could handle the situation”.

While a few students clearly understood the importance of maintaining their fitness and continuing exercise despite having asthma, there was a notable concern by some students that exercise triggered their asthma. One student described how he manages his asthma by sharing, “just maintaining and exercising…otherwise I lose fitness and I become a little bit more prone [to symptoms] and have to worry about it a little but more. But I’ve been exercising relatively regularly and with that I’m fine”. However, another student said that for him exercise affects his asthma in a different way. He shared that when playing football, “it was a level of fatigue that started slow. Like throughout the game you get normal fatigue but as soon as I would start wheezing…it was completely different”.

Discussion of Survey Data:

Of over 5,000 first-year undergraduate students enrolled autumn quarter 2010 at The Ohio State University, a total of 106 students self-reported as having a diagnosis of asthma and completed the initial survey in its entirety. Given this disorder affects more than 22 million out of approximately 300 million Americans, the data from this survey is rather proportionate to the general population (HHS, 2007). Also, since utilization of Emergency Department (ED) services is highest for individuals ages 10-19, with asthma exacerbations as the leading cause of such visits, it is not surprising that nearly 40% of
first-year Ohio State students with asthma reported to having visited the ED at some point in their life due to asthma (Reece et al, 2002).

Also, it is not surprising that questions that probed at the preventive measures students are taking to manage their asthma indicated a significant number of students do not abide by such measures. The data obtained from this portion of the survey supports the research done by Reece and fellow colleagues (2002). This study reported that while 70% of the 198 participants in their study reported as seeing a health care provider for routine health care, an additional burden may be present if college students must travel back to their hometown to visit their primary care physician (Wodka & Barakat, 2007). Also, for college students with greater asthma severity, the ability to see a primary care physician on short-term notice may not be a viable option (Reece et al, 2002). Yet, data from this survey indicated that while over 70% do see a healthcare provider for routine asthma care, nearly 38% of students had not visited someone in the past year for a routine check-up. Rather than suggesting students are neglecting the responsibilities of managing their asthma, this data supports the finding that the majority of first-year college students’ perceptions of their asthma are supported by their actual level of control. The fact that about 38% of students did not see a healthcare provider in the past year may actually be a representation of how their perceptions align with their actual level of control.

When comparing student’s ATAQ and PCAQ scores for those completing the survey, the results were somewhat expected based upon initial survey data. The majority of first-year college students with asthma who have the perception that they are in control of their asthma actually are well controlled. There were 45 students, or 43% of students
that fit into this scenario. However, after comparing the scores it was also evident that there is still an opportunity to more closely align students’ perceptions about their asthma with their actual level of control. For 18 students, or 17% of those answering the survey, despite having the perception that their asthma is in control, these students’ actual level of asthma control fell within the not well-controlled range. Additionally, many more students were not well attuned to their condition since 20 students whose responses indicated perceptions of low control despite their ATAQ score indicating that they had well controlled asthma.

Discussion of Focus Group Data:

Students’ perception of asthma control, or in other words, their ability to properly manage their asthma, directly conflicts with the students’ actual reported symptoms. The symptoms discussed in each focus group suggest both a misunderstanding of what constitutes “controlled asthma” and indicate a lack of proper asthma management. The 2009 Edition of the Global Initiatives for Asthma (GINA) define controlled asthma as the absence of daytime or nighttime symptoms, infrequent need for quick-relief medications (no more than twice a week), or no limitations to daily activities (2009). Yet, several first-year students in the focus groups reported either the presence of asthma symptoms or need for quick-relief medications.

Similarly, students misunderstood the term “self-management”. Self-management can be described as one’s ability to apply techniques, skills, or interventions such as appropriate medication dosage or proper administration techniques to effectively manage his or her asthma. In stark contrast to this definition, students in the focus groups
noted they utilize techniques such as “control[ling] my muscles” or having a friend help them “relax” as a means of self-management. These responses and other similar statements are not only troubling, but indicate a total lack of knowledge about the management of asthma.

As characterized by their generation, known as the “Millenials”, students in this study supported previous research that indicated they prefer for much of the information they receive to be delivered online (Pardue & Morgan, 2008). Students supported this conclusion by insisting that brief information, delivered electronically, rather than in a class format, would be the most beneficial. One thing that the focus group sessions uncovered is that regardless of the medium in which education is delivered, the shortfall in most young adults’ asthma education is with more specific, individualized care. Students know and understand the basics, but it was apparent that more advanced knowledge about the physiology of the disease and specific resources on campus would lend to students’ better understanding of how to appropriately manage one’s asthma.

Other comments made by students in the focus group sessions that addressed access to care as a barrier to their asthma self-management align with the findings of a study completed by Jolicoeur and colleagues. While some first-year college students with asthma at Ohio State indicated finding a healthcare facility that accepts their insurance, students in the Jolicoeur et al study had similar access issues. They found that despite free health care services and discounted prescriptions for students at the Thompson Student Health Center at the University of South Carolina (TSHC-USC), 31.3% of the 77 students in the study stated that they could not afford medical treatment (Jolicoeur et al, 1994). Also, 65.5% claimed that seeking medical treatment on a college
campus was inconvenient. Ultimately, 40.3% of students in the study admitted that they did not seek medical treatment even when they thought it was necessary. Both students from this study and Jolicoeur’s study expressed that for first-year students who must undergo radical changes that take place as they begin college, also having to understand health insurance restrictions and navigate a complicated health care system can be additional challenges.

Another theme identified from the focus group data, involved the impact exercise had on first-year students’ management of their asthma. Most first-year college students with asthma, especially those involved in athletics, needed to adjust to, and become self-motivated and self-monitored when exercising. For many students, this was a significant transition to go from participating in team sports in high school under the direction of coaches and trainers to needing to be self-reliant when it comes to exercising. If the student is uninformed or unaware of proper preventive measures they should take, especially when exercising, the outcome could be quite dangerous.

While asthma mortality and morbidity remains rather low, there is data from the year 2000 that indicates cases of uncontrolled asthma resulted in 223 deaths in children ages 0 to 17, with 54 of these deaths occurring in adolescents’ ages 15 to 17 (Berg, Tichacek, & Theodorakis, 2004). These deaths occurred in individuals that are just one or two years away from attending college. Symptoms such as this are referred to in recent literature by researchers Reece et al. It was determined that in a survey of 2,509 adults with asthma or parents of children with asthma, that work or school attendance was impacted in 25% of individuals, overall work was limited for 22%, and 17% experienced limitations in various other activities (2002). It is important to educate students on proper
prevention strategies not only to decrease chances of an exacerbation, but also because if one’s asthma is properly managed, the negative affect it has on students’ participation in other activities will also be limited.

Conclusions:

The purpose of this study was to describe Millennial college students’ actual level of asthma control and their perceived level of control, as well as attitudes and perceptions of how well their asthma is managed. In addition, the study described resources college students with asthma currently utilize for disease management along with additional resources or adaptations that are necessary to better meet students’ needs. From the data obtained from both the initial online survey as well as the follow-up focus group sessions, several conclusions have been outlined below:

1. The findings of the study indicate that for first-year college students with asthma, the majority of students’ perceptions of their asthma are supported by their actual level of control.

For 43% whom perceived themselves to be in high control over their asthma, they actually were well controlled as established by the ATAQ. However, discrepancies between students’ perception of control and their actual level of control still existed. Despite having the perception that their asthma is well controlled, 17% of students answering the survey had ATAQ scores that fell within the not well controlled range. This data indicates that there is still a significant opportunity to more closely align students’ perceptions about their asthma with their actual level of control.
The finding that there are still many students whose perception of their asthma control differs from their actual level of control was evidenced during the focus group sessions, as well. The student that shared that her asthma “hasn’t been as big of a problem”, however later in the session admitted to recently having had a panic attack that led to an asthma attack and also had to make an ED visit due to her asthma, did not have perceptions that matched her actual level of control. Similarly, another participant that stated that he has not experienced any asthma symptoms since about the age of 15 but later commented that there have been times recently that he has had chest tightness and was “able to hear [himself] breathing” was also someone that had perceptions about his asthma that differed from his actual level of control.

In terms of perceived seriousness, a phrase used in the value-expectancy theory known as the Health Belief Model (HBM), students in the study do not perceive their asthma to be a serious concern. Therefore, a significant portion of students’ perceptions about their level of control differs from their actual level of control. Similarly, the focus group sessions highlighted the beliefs that students’ perceive themselves to be in more control of the disease than they are in actuality. These findings support those from similar studies referred to in recent literature. In a non-randomly selected convenience sample of 503 college students, ages 18 to 24, from a mid-size, urban, public university, data supported students’ lack of self-awareness and understanding regarding one’s perceived functional health (Reece et al., 2002). In this study, based a 42-item Asthma Severity/Management Survey (AS/MS), of 59 self-reported mild asthmatics, only 7 (12%) actually displayed symptoms consistent with mild asthma, whereas 44 (75%)
could be classified as having moderate asthma and 8 (14%) had symptoms consistent with severe asthma.

Examples such those found in recent literature, as well as the findings from this study, support the case that more asthma education is need for first-year college students with asthma as they make the transition from home to campus. Relating back to the HBM, a cue to action is that better asthma education could benefit students by providing them with more advanced, individualized knowledge about the physiology of the disease, prevention strategies, and necessary coping techniques. Also, students should be made aware of specific resources on campus to use in order to more appropriately manage their asthma. These tools would not only help to decrease asthma symptoms, but also better align students’ perceptions of their disease with their actual needs.

2. Many first-year college students with asthma had deficits in their knowledge of resources on campus for asthma management.

First, it was evident that first-year college students with asthma on Ohio State’s campus are largely unaware of resources that are available for asthma management. Most students that took part in the focus group sessions were unsure of where they would go for assistance with their asthma, even in an emergency. When asked where she would go for help, one student commented, “I don’t know, out of habit I would think the ER because that’s where I always went [at home].” Another student appeared equally misinformed, stating “I generally, if I would have any kind of [shortness of breath], it would be less than, like usually around maybe five to ten minutes of any significant difficulty breathing, so my only option is to find a warm place. Like I wouldn’t have any time to get to a hospital...so [I’d] just get somewhere and be still I guess”.

In terms of perceived needs of resources, students in the study did highlight the need for greater access to care. Students stressed both the need for a closer, more convenient pharmacy from which to obtain asthma medications, as well as on-campus healthcare facilities that do not limit students with insurance restrictions. Both the lack of a convenient pharmacy and an available healthcare facility on campus describe students’ perceived barriers to resources that would help students with proper asthma self-management, assisted with developing an action plan that is relevant to students while on campus, and encouraged to share this plan with roommates, friends, and instructors. In a similar study of college students with diabetes, researchers described barriers to appropriate self-care including time management difficulties, inadequate finances, and inconveniences that occur due to the demands of disease management such as frequent physician visits and medication administration (Wdowik, Kendall, Harris, 2001). Using information obtained from the focus group, the cue to action that would help college students with asthma better cope with the challenges of chronic disease management is to ease the transition and shift in responsibilities onto the individual. Rather than insisting on radical changes such as relocating an entire pharmacy, educating students on the quickest bus route to the nearest pharmacy or providing students with information about what insurances are accepted at the Student Health Center would both help ease the transition to college.

3. First-year college students with asthma had unique preferences for learning about management of their asthma.

In this study of first-year college students with asthma, students in the focus group
provided great insight as to the learning preference of the current generation of college students known as “Millenials”. The Millenial generation is both comfortable and reliant on technological devices as a means of information gathering, communication, and personal pleasure. As described by Pardue and Morgan, this generation is characterized by “their propensity for multitasking” which is only encouraged by their easy access to technology (2008).

Students learning preferences supported research done by Pardue and Morgan that “Millenials prefer active and engaging activities, such as simulations and group work, not learning by lecture or the teacher-centered approaches that faculty tend to favor” (2008).

For example, one student in the focus group directly stated, “I feel like an actual activity would better than just being talked at” and others commented that a class, such as the FYE series, rather than a brochure would be more informative. “I think a class would be more direct, especially for people who want to know more, because there would be someone certified to actually answer all their questions and give them more information about it,” one student noted.

Also characteristic of this generation, is that they prefer for information to be delivered in short, concise format and to be convenient to access, such as online of via email. For example, when asked about preferences for asthma education, a student said it would be helpful to “send an email, like here’s where you can get information, this is how you can do this…so they don’t have to leave [the dorm]. They can just sit at their computer or something.” Another student commented on the frustration he experienced when searching the university’s website for information about asthma. He said his search led him through several sub-links before finding the information that was relevant to him.
and he would have appreciated an easier process. The information obtained from the focus group session highlights the learning preferences of college-age students to be interactive, convenient, and easily accessed online.
CHAPTER 5

Asthma is a chronic respiratory disorder characterized by airflow obstruction, bronchial hyper-responsiveness, and inflammation of the airways that can result in symptoms such as shortness of breath, wheezing, mucous production, and cough (U.S. Department of Health and Human Services [HHS], 2007). It is a relatively common disorder that affects more than 22 million Americans, yet if not managed appropriately, asthma can have serious and sometimes fatal outcomes (HHS, 2007). Uncontrolled asthma continues to be a concerning health issue due to steady rates of urgent healthcare visits and emergency department influx (HHS, 2007).

College students are a unique population with specific needs regarding asthma management. During this transition period, adolescents face many challenges that can interfere with the ability to manage their asthma effectively. Particularly for adolescents in college, the combination of increased independence and responsibility, along with demanding academic and social schedules, does not create the most supportive environment for proper asthma management (Berg, Tichacek, & Theodorakis, 2004). Asthma management may be further complicated by a young adult’s skewed perception of his or her functional health, difficulty coping with the unpredictability of college life, and an inability to establish new support systems and resources away from home (Reece et al, 2002).
This study describes college students’ need for more effective resources to obtain optimal asthma self-management. The purpose of this study was to describe Millennial college students’ actual level of asthma control and their perceived level of control, as well as attitudes and perceptions of how well their asthma is managed. In addition, the study described resources college students with asthma currently utilize for disease management along with additional resources or adaptations that are necessary to better meet students’ needs.

Background:

Despite the large number of people affected by asthma, the severity of the disorder is often underestimated due to its relatively low rate of mortality, which ranges from 1-3% (Tehan, Sloane, Walsh-Robart, Chamberlain, 1989). However, thousands of individuals continue to experience great risk due to their asthma when it remains uncontrolled. Uncontrolled asthma has resulted in a spike in the number of urgent healthcare visits and hospitalizations, poor health outcomes and quality of life, and a greater chance of death due to asthma. Research illustrates there has been an increase in incidences and morbidity due to asthma by 100% over the past three decades, accounting for approximately 28 million physician office visits and 497,000 hospitalizations annually (Reece et al, 2002; HHS, 2007).

The various populations affected by asthma further supports the widespread impact of the disorder. Thousands of adults, adolescents, and children are affected by asthma-related symptoms on a daily basis. As of 2002, children and adolescents comprise nearly 5 million of the total number of individuals diagnosed with asthma.
(Berg, Tichacek, & Theodorakis, 2004). Not surprisingly, it is the most common chronic illness among children and adolescents. Adolescents in particular face unique challenges that further influence one’s ability to manage his or her asthma. Research conducted by Berg, Tichacek, & Theodorakis notes “adolescents may be at a greater risk for poor outcomes because of the developmental issues of their age group…[they] lack understanding of the disease, are non-adherent to medication regimens, and experience developmental changes that interfere with asthma self-management” (29-30).

Research Design:

This is a descriptive study that utilized a mixed-method triangulation technique employing use of both an initial survey and follow-up focus group to optimize the objectives of the study. A survey of asthma control was used to describe students’ actual level of asthma control, as well as their perceived level of control. Focus groups were conducted to better describe attitudes and perceptions of benefits and barriers to current asthma resources available on campus. The focus group also explored any adaptations to current resources or additional resources needed based upon learning preferences in order to optimize students’ asthma self-management.

Study Population:

The population for this study included all current first-year undergraduate students enrolled autumn quarter 2010 at The Ohio State University enrolled that have had a self-reported diagnosis of asthma. The campus is a large (50,000+ students), urban, state university in the Midwestern United States. Students were recruited to participate in
the initial survey via an email invitation. The population was a convenience sample and participation in the study was completely voluntary. Any student completing the initial online survey in its entirety was invited to participate in a follow-up focus group. Focus groups sessions were limited to no more than 12 participants per group. However, the first group consisted of four students and the last two groups had only three students in attendance at each. A total of ten students participated in the focus group portion of the study.

Instrumentation:

Multiple instruments were utilized in the survey portion of the study in order to identify first-year college students’ actual level of asthma control and their perceived level of control. The subjects’ actual level of control was measured using the Asthma Therapy Assessment Questionnaire (ATAQ) (Merck & Co., 2010). This instrument has established validity and reliability and has been recommended by the National Heart, Lung and Blood Institute (NHLBI) for use with subjects’ age 12 years and older. The ATAQ resulted in subjects’ classification of asthma control as “well controlled”, “not well controlled”, or “poorly controlled”. Each answer was scored with the indicated point value (0 or 1) and the total scores indicated the following: 0 points = asthma is well controlled, 1-2 points = asthma is not well controlled, 3-4 points = asthma is poorly controlled. For this study, scores indicating asthma is “poorly controlled” was classified according to GINA guidelines as not well-controlled asthma (GINA, 2009).

Subjects’ perceived level of asthma control was measured using the Perceived Control of Asthma Questionnaire (PCAQ) (Katz, Yelin, Eisner, and Blanc, 2002). This is
an 11-item instrument that assesses individuals’ perceptions of their ability to manage their asthma. The PCAQ has been used in a variety of studies and has established validity and reliability. In previous studies, the PCAQ items have shown high internal consistency (Cronbach’s $\alpha = 0.76$). Responses are measured using a 5-point Likert scale for each of the 11 questions resulting in a possible total score of 11 to 55. It is important to note that questions 2, 7, 8, 10 and 11 are reverse-scored. A lower score indicates the perception of less control over one’s asthma versus a higher score, which would indicate the perception of more control.

Focus group questions were reviewed by a panel of experts prior to any of the sessions being conducted. The sessions were each facilitated by a neutral, experienced researcher. All information obtained during the focus group sessions was audio recorded and then manually transcribed. Inter-rater reliability was used to evaluate the focus group transcriptions for common themes.

Results of Survey Data:

The population for the study included current first-year undergraduate students’ enrolled autumn quarter 2010 at The Ohio State University self-reporting as having a diagnosis of asthma. Of the 127 total respondents, 106 completed the entire initial survey, and a total 10 students participated in one of the follow-up focus group sessions. Of the 106 survey respondents, the mean age was 18.4 years old, with students’ ages ranging from 18 to 20 years. Female students comprised a majority of the students answering the survey, while most students also identified as white in race. An
overwhelming 92% of individuals currently lived on campus in the dorms, while the remaining eight students either lived in off-campus housing or still at home.

<table>
<thead>
<tr>
<th>Age</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>62</td>
<td>58.5</td>
</tr>
<tr>
<td>19</td>
<td>42</td>
<td>39.6</td>
</tr>
<tr>
<td>20</td>
<td>2</td>
<td>1.9</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>35</td>
<td>33.0</td>
</tr>
<tr>
<td>Female</td>
<td>71</td>
<td>67.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Race</th>
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<th>%</th>
</tr>
</thead>
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<tr>
<td>White</td>
<td>80</td>
<td>75.5</td>
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<tr>
<td>Black</td>
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<td>12.3</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td>Asian</td>
<td>10</td>
<td>9.4</td>
</tr>
<tr>
<td>Mixed</td>
<td>2</td>
<td>1.9</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Living Arrangements</th>
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<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dorm</td>
<td>98</td>
<td>92.5</td>
</tr>
<tr>
<td>Off-campus Housing</td>
<td>6</td>
<td>5.7</td>
</tr>
<tr>
<td>Home</td>
<td>2</td>
<td>1.9</td>
</tr>
</tbody>
</table>

Table 1. Demographics of First-Year College Students with Asthma

Students’ were asked several questions pertaining to their health history as it may have related to their asthma management. While approximately 21% of students answering the survey admitted to having smoked at some point in their life, only about 5% of students currently smoked. Of these students, all answered that they do not smoke more than one pack per day. Also, nearly 40% of first-year Ohio State students with asthma reported to having visited the ED and 28% of students responded that they have been hospitalized due to their asthma at some point in their life.
<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ever Smoked</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>22</td>
<td>20.8</td>
</tr>
<tr>
<td>No</td>
<td>84</td>
<td>79.2</td>
</tr>
<tr>
<td><strong>Currently Smoke</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>5</td>
<td>4.7</td>
</tr>
<tr>
<td>No</td>
<td>101</td>
<td>95.3</td>
</tr>
<tr>
<td><strong>Ever Visited ED for Asthma</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>43</td>
<td>40.6</td>
</tr>
<tr>
<td>No</td>
<td>63</td>
<td>59.4</td>
</tr>
<tr>
<td><strong>Number of ED Visits since College for Asthma</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>102</td>
<td>96.2</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td>3.8</td>
</tr>
<tr>
<td><strong>Ever Hospitalized for Asthma</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>30</td>
<td>28.3</td>
</tr>
<tr>
<td>No</td>
<td>76</td>
<td>71.7</td>
</tr>
<tr>
<td><strong>Number of Hospitalizations since College for Asthma</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>102</td>
<td>96.2</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td>3.8</td>
</tr>
</tbody>
</table>

Table 2. Health History of First-Year College Students with Asthma

When reporting prevention strategies students utilize, approximately 60% of students answering the survey admitted to not having an asthma action plan. When determining whom students visit for routine asthma care, they were permitted to select more than one location: hometown healthcare provider, a provider in the Columbus area, or the Wilce Student Health Center (SHC). However, very few participants selected multiple provider locations. Also, approximately 24% of students responding to the survey reported that they do not visit any healthcare provider for routine asthma check-ups. Yet, of the other 76.4% that do attend routine asthma check-ups, at the time of data collection, almost 38% of students stated they had not seen a healthcare provider for a routine asthma check-up in the past year.
Actual Level of Asthma Control:

The Asthma Therapy Assessment Questionnaire (ATAQ) portion of the survey resulted in subjects’ classification of asthma control as either “well controlled” or “not well controlled” as determined by their answers to four questions used to qualify one’s level of control. With 67 students scoring zero points upon answering the four questions, it was determined that 63% of first-year college students’ with asthma answering the survey were categorized as having well controlled asthma. Of the remaining students, 25 scored one point, 12 students accumulated two points, and 2 other students scored three points, resulting in 39% of students grouped into the not well-controlled category.
Perceived Control of Asthma:

Subjects’ perceived level of asthma control was measured using the Perceived Control of Asthma Questionnaire (PCAQ) (Katz, Yelin, Eisner, and Blanc, 2002). The survey included 11 questions used to assess individuals’ perceptions of their ability to manage their asthma. Respondents could accumulate a possible total score between 11 and 55 with a lower score indicating the perception of less control over one’s asthma versus a higher score that would indicate the perception of more control. The PCAQ has been used in several studies and has established validity and reliability. In this study, the PCAQ items showed high internal consistency, with a Cronbach’s alpha of 0.87, and therefore, a single PCAQ score was calculated.

The PCAQ scores of first-year college students’ with asthma completing the survey ranged from 14 to 55, with a median score of 42, mean of 43, and a 7.15 standard deviation. The students’ response frequencies on the PCAQ items also aligned with the overall PCAQ scores. With a median of 42 and a mean of 43, the majority of students had the perception that they were in control of their asthma. Similarly, for the questions such as “I can reduce my asthma by staying calm and relaxed” and “I am coping effectively with my asthma”, 41% and 47% respectively answered that they agree with those statements. Also, when answering questions that were reverse-scored, students were more likely to disagree or strongly disagree with statements such as “my asthma is controlling my life”, for which 64% of students strongly disagreed. Overall, the response

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well Controlled</td>
<td>67</td>
<td>63.2</td>
</tr>
<tr>
<td>Not Well Controlled</td>
<td>39</td>
<td>36.7</td>
</tr>
</tbody>
</table>

Table 4. ATAQ Score
frequencies for the PCAQ items indicate that first-year college students with asthma perceive their asthma to be well controlled.

<table>
<thead>
<tr>
<th>Item</th>
<th>SD</th>
<th>D</th>
<th>N</th>
<th>A</th>
<th>SA (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce asthma by being calm &amp; relaxed</td>
<td>2.9</td>
<td>13.3</td>
<td>38.1</td>
<td>41.0</td>
<td>21.0</td>
</tr>
<tr>
<td>*Asthma hits out of the blue</td>
<td>29.2</td>
<td>34.9</td>
<td>20.8</td>
<td>8.5</td>
<td>6.6</td>
</tr>
<tr>
<td>If I do everything right, I can manage my asthma</td>
<td>0.9</td>
<td>7.5</td>
<td>18.9</td>
<td>35.8</td>
<td>36.8</td>
</tr>
<tr>
<td>I can do a lot by myself to cope with my asthma</td>
<td>1.9</td>
<td>2.9</td>
<td>20.0</td>
<td>46.7</td>
<td>28.6</td>
</tr>
<tr>
<td>When I’m in control of my personal life, my asthma does not affect me</td>
<td>0.9</td>
<td>14.2</td>
<td>27.4</td>
<td>28.3</td>
<td>29.2</td>
</tr>
<tr>
<td>I have the ability to control my asthma</td>
<td>0.9</td>
<td>7.5</td>
<td>17.9</td>
<td>40.6</td>
<td>33.0</td>
</tr>
<tr>
<td>*I would feel helpless if I wasn’t able to rely on others for help with my asthma.</td>
<td>24.5</td>
<td>39.6</td>
<td>21.7</td>
<td>11.3</td>
<td>2.8</td>
</tr>
<tr>
<td>*No matter what I can’t get relief from my asthma</td>
<td>43.4</td>
<td>34.0</td>
<td>16.0</td>
<td>5.7</td>
<td>0.9</td>
</tr>
<tr>
<td>I am coping well with my asthma</td>
<td>1.9</td>
<td>0.9</td>
<td>11.3</td>
<td>47.2</td>
<td>38.7</td>
</tr>
<tr>
<td>*It seems like fate and other factors beyond my control affect my asthma</td>
<td>26.4</td>
<td>29.2</td>
<td>28.3</td>
<td>14.2</td>
<td>1.9</td>
</tr>
<tr>
<td>*My asthma controls my life</td>
<td>64.2</td>
<td>21.7</td>
<td>11.3</td>
<td>0.9</td>
<td>1.9</td>
</tr>
</tbody>
</table>

*Items were reverse-scored

Table 5. PCAQ Response Frequencies

Perceived Control vs. Actual Level of Control:

The statistics obtained from the ATAQ and PCAQ questions on the survey were scored according the standards for each instrument. The ATAQ was then scored using the established ATAQ groups of “well controlled” and “not well controlled” asthma. The interval data obtained from the PCAQ remained continuous, with a possible score
between 11 and 55. A t-test was then performed using the PCAQ score to examine differences between the two ATAQ categories. This showed that a total of 65 students who had well-controlled asthma also had the perception of more control of their asthma, with a mean PCAQ score of 44 and a standard deviation of 7.02. Additionally, 39 students with asthma that was not well controlled had a PCAQ mean score of 41 with a 7.09 standard deviation. This data approached significance (p = .051) indicating a discrepancy in PCAQ score based upon whether the students’ asthma was well controlled.

<table>
<thead>
<tr>
<th>ATAQ</th>
<th>n</th>
<th>PCAQ MEAN</th>
<th>PCAQ SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well Controlled</td>
<td>65</td>
<td>44</td>
<td>7.02</td>
</tr>
<tr>
<td>Not Well Controlled</td>
<td>39</td>
<td>41</td>
<td>7.09</td>
</tr>
</tbody>
</table>

(p = .051)
Table 6. t-test of PCAQ and ATAQ

Results of Focus Group Data:

Data obtained from the focus group sessions conducted at The Ohio State University supported the findings of several distinct themes related to first-year college students’ asthma self-management. Three experts in the field of asthma management independently reviewed the focus group data prior to a joint review process. Upon joint review, three specific themes among first-year college students with asthma were identified. Focus group data revealed millennial first-year college students with asthma have a significant misunderstanding of asthma “control” and recognizing processes of the
disease. Also, students face a variety of barriers and limitations that prevent appropriate access to care. Additionally, these students do experience some difficulty adapting to environmental changes after coming to college, which was attributed to such factors as climate changes, living arrangements, or adapting to new routines.

Understanding Asthma as a Disease:

First, it was established that for students participating in the focus group sessions, the majority unknowingly established that there was a large disconnect between their perceived level of asthma control and the actual symptoms they experienced. One first-year student in the focus group shared that her asthma “hasn’t been as big of a problem”, however later in the session she admitted to recently having had a panic attack that led to an asthma attack. She then stated “I realized I need to actually bring my medicine around with me and be prepared if something were to happen”. Also, this same student later explained that her asthma resulted in a visit to the ED when she was at home on break from school. Similarly, one session began with a participant stating that he has not experienced any asthma symptoms since about the age of 15, however later on he commented that there have been times recently that he had chest tightness and was “able to hear [himself] breathing”.

Further deficits in the knowledge of asthma were noted when students expressed the ability to manage their asthma by “controlling it themselves”. Students in the focus groups noted techniques such as “control[ling] my muscles” or having a friend help them “relax” as a means of self-management. One student stated that “I just developed an ability to control it…I feel it getting really bad but it’s not to the point where I can do an
inhaler, so like I just put my hands up, breathe, and I can control it myself”. In another case, the focus group facilitator asked students where they would go for help if they were having shortness of breath. One student’s response was “I generally, if I would have any kind of [shortness of breath], it would be less than, like usually around maybe five to ten minutes of any significant difficulty breathing, so my only option is to find a warm place. Like I wouldn’t have any time to get to a hospital...so I’d just get somewhere and be still I guess”.

One similarity among first-year asthmatic college students attending the focus groups was that the students generally had an adequate understanding of asthma basics. Many students knew proper medication terminology such as “rescue” and “maintenance” medications and understood specific symptom triggers such as smoke, dust, and exercise. Yet when asked whether students would want more information about their asthma, many agreed that additional education would be helpful. However, one student commented, “like what would you target in a class…I feel like an actual activity would better than just being talked at because unless you’ve just been diagnosed...unless you’re new to it, I don’t feel like [hearing] ‘this is what’s happening to you’, like I already know that”. Another preference was expressed when a student suggested “send[ing] an email, like here’s where you can get information, this is how you can do this...so they don’t have to leave [the dorm]. They can just sit at their computer or something.”

Access to Care:

Another theme identified as contributing to the mismanagement of asthma by first-year college students participating in the focus groups were issues surrounding
access to care. In trying to determine students’ perceived need of resources, it was evident that first-year college students with asthma on Ohio State’s campus are largely unaware of resources that are available for asthma management. Most students that took part in the focus groups were unsure of where they would go for assistance with their asthma, even in an emergency.

I don’t know, out of habit I would think the ER (Emergency Room) because that’s where I always went. It was never during my doctor’s office hours, so I almost always went to the hospital. So, I don’t know, I think it would be wherever my roommate took me because I wouldn’t go by myself.

Two other students emphasized the convenience of the location as a determining factor of how they would choose where to go for help if they were having difficulty breathing. “I would probably go to the Student Health Center because it’s closer than the medical center”, noted one student.

But, perhaps two of the biggest problems in terms of students’ access to care were healthcare facility or pharmacy location as well as insurance restrictions. This information was disclosed when an individual explained the difficulty that arises when trying to determine where to go for help with her asthma.

I don’t know [where I would go] because I’m not covered by the school’s health insurance, so I have to figure out the closest medical place that accepts my insurance…I think my mom told me that my insurance is not accepted by it [Wilce Student Health Center], so I don’t think I could go there.

Ironically enough, most college students are eligible to remain on their parents’ health insurance while in school, yet the Wilce Student Health Center on Ohio State’s campus is limited in the types of health insurance that it accepts. Similarly, several students explained the difficulties they experience when trying to obtain their medications. While the majority of students admitted to still relying on their parents to either send or bring
them their asthma medications to school, the issue of pharmacy location was addressed by many students. “The CVS closest to me doesn’t have a pharmacy so that has been a big thing, like I have to walk a mile to get an inhaler”. Another student also confirmed, “the most hassle is getting the prescriptions when I need them instead of going home…it’d probably be nice if they made a pharmacy on south campus”.

Environmental Changes:

Another issue that seemed to plague first-year college students with asthma is that they seemed to experience some degree of difficulty adapting to environmental changes after coming to college. These environmental changes ranged in prevalence and impact, yet each supports the conclusion that first-year students with asthma are significantly affected by their surroundings. One of the greatest changes in environment felt by the majority of students in the focus groups was the climate. Many students participating in the focus group sessions commented on the role climate plays in terms of their asthma control.

My biggest problem is that I’m from California so I’m used to the warmer weather and coming here [Ohio State], when it started getting cold I noticed it a lot more walking to classes like “Oh, that actually kind of hurts”. It’s mainly just the lower temperatures that have been the biggest factor for me.

Other students also commented on the impact the climate has had on their asthma. One participant shared “there would be a couple mornings where it would be pretty cold and I was kind of running late…I’d have a difficult time when I got there. There was twice when I had to take my inhaler when I got to class”. Another student also echoed the effect temperature has on his asthma, commenting; “my chest tightens up when it’s super cold”. Also, the students from all three focus groups indicated there were distinct
differences in the weather between academic quarters resulting in increased shortness of
breath more during winter quarter than autumn. For example, one student added, “walking across campus has been a little bit worse this quarter because of the cold temperature”.

For this reason, many students indicated that when it comes to asthma education, it would be far more beneficial for much of it to take place during autumn quarter. Students even suggested incorporating asthma education into the First-Year Experience (FYE) seminar series. This series provides educational presentations spanning many areas and first-year students are required to attend several during their first quarter at school. Many students also shared that their preference would be to learn about asthma resources on campus during orientation. This way, first-year students and their parents would both be able to adequately prepare for lifestyle changes prior to coming to campus.

While students largely discussed environmental changes pertaining to the cold weather experienced in Central Ohio, many also commented on the impact other triggers such as allergies, smoke, and illness have on their asthma. One student in particular required regular visits to a healthcare provider for allergy shots. She said, “I used to only have exercise-induced asthma…and then over the summer, towards the end of last year I got pneumonia which branched from my asthma and allergies”. Another participant in the same focus group acknowledged that if she knows she is going to be around allergens or smoke she makes sure to have her inhaler nearby.

Exercise was also mentioned several times throughout the three focus group sessions as having an impact on students’ asthma. One student gave the example of how she sometimes forgets her inhaler before she exercises. “I forgot my inhaler before…and
went on a long run and then I got a few miles out and wasn’t able to get my inhaler until I ran a few miles back, so that became a problem”. This transition was also evident when discussing possible locations for asthma resources and education. Students in the focus group sessions stressed the importance of having more support when working out for help with their asthma. A couple students mentioned Ohio State’s recreational facilities as a place to provide additional resources for students with asthma. “Mine only acts up if I’m exercising or playing sports…so I think just have a trained person on staff…just to make sure there is someone that could handle the situation”.

Discussion of Survey Data:

Of over 5,000 first-year undergraduate students enrolled autumn quarter 2010 at The Ohio State University, a total of 106 students self-reported as having a diagnosis of asthma and completed the initial survey in its entirety. Given this disorder affects more than 22 million out of approximately 300 million Americans, the data from this survey is rather proportionate to the general population (HHS, 2007). Also, since utilization of Emergency Department (ED) services is highest for individuals ages 10-19, with asthma exacerbations as the leading cause of such visits, it is not surprising that nearly 40% of first-year Ohio State students with asthma reported to having visited the ED at some point in their life due to asthma (Reece et al, 2002).

Also, it is not surprising that questions that probed at the preventive measures students are taking to manage their asthma indicated a significant number of students do not abide by such measures. The data obtained from this portion of the survey supports the research done by Reece and fellow colleagues (2002). This study reported that while
70% of the 198 participants in their study reported as seeing a health care provider for routine health care, an additional burden may be present if college students must travel back to their hometown to visit their primary care physician (Wodka & Barakat, 2007). Also, for college students with greater asthma severity, the ability to see a primary care physician on short-term notice may not be a viable option (Reece et al, 2002). Yet, data from this survey indicated that while over 70% do see a healthcare provider for routine asthma care, nearly 38% of students had not visited someone in the past year for a routine check-up. Rather than suggesting students are neglecting the responsibilities of managing their asthma, this data supports the finding that the majority of first-year college students’ perceptions of their asthma are supported by their actual level of control. The fact that about 38% of students did not see a healthcare provider in the past year may actually be a representation of how their perceptions align with their actual level of control.

When comparing student’s ATAQ and PCAQ scores for those completing the survey, the results were somewhat expected based upon initial survey data. The majority of first-year college students with asthma who have the perception that they are in control of their asthma actually are well controlled. There were 45 students, or 43% of students that fit into this scenario. However, after comparing the scores it was also evident that there is still an opportunity to more closely align students’ perceptions about their asthma with their actual level of control. For 18 students, or 17% of those answering the survey, despite having the perception that their asthma is in control, these students’ actual level of asthma control fell within the not well-controlled range. Additionally, many more students were not well attuned to their condition since 20 students whose responses
indicated perceptions of low control despite their ATAQ score indicating that they had well controlled asthma.

Discussion of Focus Group Data:

Students’ perception of asthma control, or in other words, their ability to properly manage their asthma, directly conflicts with the students’ actual reported symptoms. The symptoms discussed in each focus group suggest both a misunderstanding of what constitutes “controlled asthma” and indicate a lack of proper asthma management. The 2009 Edition of the Global Initiatives for Asthma (GINA) define controlled asthma as the absence of daytime or nighttime symptoms, infrequent need for quick-relief medications (no more than twice a week), or no limitations to daily activities (2009). Yet, several first-year students in the focus groups reported either the presence of asthma symptoms or need for quick-relief medications.

Similarly, students misunderstood the term “self-management”. Self-management can be described as one’s ability to apply techniques, skills, or interventions such as appropriate medication dosage or proper administration techniques to effectively manage his or her asthma. In stark contrast to this definition, students in the focus groups noted they utilize techniques such as “control[ling] my muscles” or having a friend help them “relax” as a means of self-management. These responses and other similar statements are not only troubling, but indicate a total lack of knowledge about the management of asthma.

As characterized by their generation, known as the “Millenials”, students in this study supported previous research that indicated they prefer for much of the information
they receive to be delivered online (Pardue & Morgan, 2008). Students supported this conclusion by insisting that brief information, delivered electronically, rather than in a class format, would be the most beneficial. One thing that the focus group sessions uncovered is that regardless of the medium in which education is delivered, the shortfall in most young adults’ asthma education is with more specific, individualized care. Students know and understand the basics, but it was apparent that more advanced knowledge about the physiology of the disease and specific resources on campus would lend to students’ better understanding of how to appropriately manage one’s asthma.

Other comments made by students in the focus group sessions that addressed access to care as a barrier to their asthma self-management align with the findings of a study completed by Jolicoeur and colleagues. While some first-year college students with asthma at Ohio State indicated finding a healthcare facility that accepts their insurance, students in the Jolicoeur et al study had similar access issues. They found that despite free health care services and discounted prescriptions for students at the Thompson Student Health Center at the University of South Carolina (TSHC-USC), 31.3% of the 77 students in the study stated that they could not afford medical treatment (Jolicoeur et al, 1994). Also, 65.5% claimed that seeking medical treatment on a college campus was inconvenient. Ultimately, 40.3% of students in the study admitted that they did not seek medical treatment even when they thought it was necessary. Both students from this study and Jolicoeur’s study expressed that for first-year students who must undergo radical changes that take place as they begin college, also having to understand health insurance restrictions and navigate a complicated health care system can be additional challenges.
Another theme identified from the focus group data, involved the impact exercise had on first-year students’ management of their asthma. Most first-year college students with asthma, especially those involved in athletics, needed to adjust to, and become self-motivated and self-monitored when exercising. For many students, this was a significant transition to go from participating in team sports in high school under the direction of coaches and trainers to needing to be self-reliant when it comes to exercising. If the student is uninformed or unaware of proper preventive measures they should take, especially when exercising, the outcome could be quite dangerous.

While asthma mortality and morbidity remains rather low, there is data from the year 2000 that indicates cases of uncontrolled asthma resulted in 223 deaths in children ages 0 to 17, with 54 of these deaths occurring in adolescents’ ages 15 to 17 (Berg, Tichacek, & Theodorakis, 2004). These deaths occurred in individuals that are just one or two years away from attending college. Symptoms such as this are referred to in recent literature by researchers Reece et al. It was determined that in a survey of 2,509 adults with asthma or parents of children with asthma, that work or school attendance was impacted in 25% of individuals, overall work was limited for 22%, and 17% experienced limitations in various other activities (2002). It is important to educate students on proper prevention strategies not only to decrease chances of an exacerbation, but also because if one’s asthma is properly managed, the negative affect it has on students’ participation in other activities will also be limited.
Conclusions:

The purpose of this study was to describe Millennial college students’ actual level of asthma control and their perceived level of control, as well as attitudes and perceptions of how well their asthma is managed. In addition, the study described resources college students with asthma currently utilize for disease management along with additional resources or adaptations that are necessary to better meet students’ needs. From the data obtained from both the initial online survey as well as the follow-up focus group sessions, several conclusions have been outlined below:

1. The findings of the study indicate that for first-year college students with asthma, the majority of students’ perceptions of their asthma are supported by their actual level of control.

For 43% whom perceived themselves to be in high control over their asthma, they actually were well controlled as established by the ATAQ. However, discrepancies between students’ perception of control and their actual level of control still existed. Despite having the perception that their asthma is well controlled, 17% of students answering the survey had ATAQ scores that fell within the not well controlled range. This data indicates that there is still a significant opportunity to more closely align students’ perceptions about their asthma with their actual level of control.

The finding that there are still many students whose perception of their asthma control differs from their actual level of control was evidenced during the focus group sessions, as well. The student that shared that her asthma “hasn’t been as big of a problem”, however later in the session admitted to recently having had a panic attack that led to an asthma attack and also had to make an ED visit due to her asthma, did not have
perceptions that matched her actual level of control. Similarly, another participant that stated that he has not experienced any asthma symptoms since about the age of 15 but later commented that there have been times recently that he has had chest tightness and was “able to hear [himself] breathing” was also someone that had perceptions about his asthma that differed from his actual level of control.

In terms of perceived seriousness, a phrase used in the value-expectancy theory known as the Health Belief Model (HBM), students in the study do not perceive their asthma to be a serious concern. Therefore, a significant portion of students’ perceptions about their level of control differs from their actual level of control. Similarly, the focus group sessions highlighted the beliefs that students’ perceive themselves to be in more control of the disease than they are in actuality. These findings support those from similar studies referred to in recent literature. In a non-randomly selected convenience sample of 503 college students, ages 18 to 24, from a mid-size, urban, public university, data supported students’ lack of self-awareness and understanding regarding one’s perceived functional health (Reece et al., 2002). In this study, based a 42-item Asthma Severity/Management Survey (AS/MS), of 59 self-reported mild asthmatics, only 7 (12%) actually displayed symptoms consistent with mild asthma, whereas 44 (75%) could be classified as having moderate asthma and 8 (14%) had symptoms consistent with severe asthma.

Examples such those found in recent literature, as well as the findings from this study, support the case that more asthma education is need for first-year college students with asthma as they make the transition from home to campus. Relating back to the HBM, a cue to action is that better asthma education could benefit students by providing
them with more advanced, individualized knowledge about the physiology of the disease, prevention strategies, and necessary coping techniques. Also, students should be made aware of specific resources on campus to use in order to more appropriately manage their asthma. These tools would not only help to decrease asthma symptoms, but also better align students’ perceptions of their disease with their actual needs.

2. Many first-year college students with asthma had deficits in their knowledge of resources on campus for asthma management.

First, it was evident that first-year college students with asthma on Ohio State’s campus are largely unaware of resources that are available for asthma management. Most students that took part in the focus group sessions were unsure of where they would go for assistance with their asthma, even in an emergency. When asked where she would go for help, one student commented, “I don’t know, out of habit I would think the ER because that’s where I always went [at home].” Another student appeared equally misinformed, stating “I generally, if I would have any kind of [shortness of breath], it would be less than, like usually around maybe five to ten minutes of any significant difficulty breathing, so my only option is to find a warm place. Like I wouldn’t have any time to get to a hospital...so [I’d] just get somewhere and be still I guess”.

In terms of perceived needs of resources, students in the study did highlight the need for greater access to care. Students stressed both the need for a closer, more convenient pharmacy from which to obtain asthma medications, as well as on-campus healthcare facilities that do not limit students with insurance restrictions. Both the lack of a convenient pharmacy and an available healthcare facility on campus describe students’ perceived barriers to resources that would help students with proper asthma self-
management, assisted with developing an action plan that is relevant to students while on campus, and encouraged to share this plan with roommates, friends, and instructors. In a similar study of college students with diabetes, researchers described barriers to appropriate self-care including time management difficulties, inadequate finances, and inconveniences that occur due to the demands of disease management such as frequent physician visits and medication administration (Wdowik, Kendall, Harris, 2001). Using information obtained from the focus group, the cue to action that would help college students with asthma better cope with the challenges of chronic disease management is to ease the transition and shift in responsibilities onto the individual. Rather than insisting on radical changes such as relocating an entire pharmacy, educating students on the quickest bus route to the nearest pharmacy or providing students with information about what insurances are accepted at the Student Health Center would both help ease the transition to college.

3. First-year college students with asthma had unique preferences for learning about management of their asthma.

In this study of first-year college students with asthma, students in the focus group provided great insight as to the learning preference of the current generation of college students known as “Millenials”. The Millenial generation is both comfortable and reliant on technological devices as a means of information gathering, communication, and personal pleasure. As described by Pardue and Morgan, this generation is characterized by “their propensity for multitasking” which is only encouraged by their easy access to technology (2008).
Students learning preferences supported research done by Pardue and Morgan that “Millenials prefer active and engaging activities, such as simulations and group work, not learning by lecture or the teacher-centered approaches that faculty tend to favor” (2008). For example, one student in the focus group directly stated, “I feel like an actual activity would better than just being talked at” and others commented that a class, such as the FYE series, rather than a brochure would be more informative. “I think a class would be more direct, especially for people who want to know more, because there would be someone certified to actually answer all their questions and give them more information about it,” one student noted.

Also characteristic of this generation, is that they prefer for information to be delivered in short, concise format and to be convenient to access, such as online or via email. For example, when asked about preferences for asthma education, a student said it would be helpful to “send an email, like here’s where you can get information, this is how you can do this…so they don’t have to leave [the dorm]. They can just sit at their computer or something.” Another student commented on the frustration he experienced when searching the university’s website for information about asthma. He said his search led him through several sub-links before finding the information that was relevant to him and he would have appreciated an easier process. The information obtained from the focus group session highlights the learning preferences of college-age students to be interactive, convenient, and easily accessed online.
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APPENDIX A: EMAIL INVITATION

November 28, 2010

Dear First-Year Student:

Hello, I am a graduate student in the School of Allied Medical Professions at The Ohio State University. Along with faculty members, I am currently completing a research project and I am asking for your participation. The purpose of this study is to describe levels of asthma control and students’ attitudes and perceptions of how well asthma is managed among first-year college students. In addition, this study will describe resources college students with asthma currently utilize for disease management and help determine if additional resources on campus are necessary to better meet students’ needs.

I am seeking information from any first-year college student with asthma. If you have had a previous diagnosis of asthma, been treated for asthma in the past, or currently self-report as having asthma you qualify to participate in this study. Those under the age of 18 cannot complete the survey.

I would greatly appreciate it if you could take some of your time to complete the attached survey. Your participation is completely voluntary. Please answer the questions as truthfully as possible. Your responses will remain anonymous.

Anyone completing the survey will then be invited to participate in a follow-up focus group. Again, participation in the focus group is voluntary. During the 1-hour focus group session, your responses will be audio taped. No identifying information will be asked from those participating in the focus group discussion. A $20 gift card will be given upon participation in the focus group.

We would like you to take the time to complete the questionnaire, as its results will serve to guide further research and training. You may choose to withdraw from the study at any time without penalty. If you have any questions, please feel free to contact us using the information below.
Thank you for your time,

Margaret Sullivan, BS, RRT
sullivan.399@osu.edu

Georgianna Sergakis, PhD, RRT
sergakis.3@osu.edu

For questions about your rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact Ms. Sandra Meadows in the Office of Responsible Research Practices at 1-800-678-6251.
APPENDIX B: INITIAL SURVEY

1. Age ____

2. Gender  M / F (circle one)

3. Race ____________________

4. Do you currently smoke?  ___YES  ___NO
   a. Have you ever smoked?   ___YES  ___NO
   b. If so, how many packs per day? ______

5. What is your current living arrangement?  ___Dorm
   ___Off-campus
   ___At home
   ___Other

6. Do you have an asthma action plan?  ___YES  ___NO

7. Who do you see for routine asthma checkups?  ___Doctor in hometown
   ___OSU Student Health Center
   ____I don’t see anyone
   ______________Other
   a. If seeing a healthcare practitioner for routine asthma checkups,
      approximately how many times per year? ______

8. Have you ever had any hospitalizations due to asthma?  ___YES  ___NO
   a. How many hospitalizations since coming to campus? ______
9. Have you ever had any Emergency Department visits due to asthma?  ___YES
    ___NO
    a. How many Emergency Department visits since coming to campus?
        ______
APPENDIX C: INITIAL SURVEY (ATAQ)

Check on only 1 answer for each question.

1. In the past 4 weeks, did you miss any work school, or normal activity because of you asthma?
   ____ YES  ____ NO  ____ UNSURE

2. In the past 4 weeks, did you wake up at night because of asthma?
   ____ YES  ____ NO  ____ UNSURE

3. In the past 4 weeks, did you believe that your asthma was well controlled?
   ____ YES  ____ NO  ____ UNSURE

4. Do you use an inhaler for quick relief from asthma symptoms?
   ____ YES  ____ NO  ____ UNSURE

   If yes, in the past 4 weeks, what was the highest number of puffs in 1 day you took of your inhaler?
   ____ 0  ____ 1-4 puffs  ____ 5-8 puffs  ____ 9-12 puffs  ____ More than 12 puffs
APPENDIX D: INITIAL SURVEY (PC AQ)

Please respond to each question with 1 of the following options

Strongly Disagree (SD)      Disagree (D)      Neutral (N)       Agree (A)       Strongly Agree (SA)

1. I can reduce my asthma by staying calm and relaxed.
2. Too often, my asthma just seems to hit me out of the blue.
3. If I do all the right things, I can successfully manage my asthma.
4. I can do a lot of things myself to cope with my asthma.
5. When I manage my personal life well, my asthma does not affect me as much.
6. I have considerable ability to control my asthma.
7. I would feel helpless if I couldn’t rely on other people for help when I’m not feeling well from asthma.
8. No matter what I do, or how hard I try, I just can’t seem to get relief from my asthma.
9. I am coping effectively with my asthma.
10. It seems as though fate and other factors beyond my control affect my asthma.
11. Asthma is controlling my life.
APPENDIX E: FOCUS GROUP TRANSCRIPTS

Investigator: I am ______________ a faculty/student member in the School of Allied Medical Professions at The Ohio State University. We are currently completing a research project about asthma management in college students. The purpose of this study is to describe students’ level of asthma control and their attitudes and perceptions of how well their asthma is managed among first-year college students. Today I will be asking you questions in order to better describe resources that are needed for college students with asthma.

There are no risks in participating in this session. Participation is voluntary – you may refuse to participate or withdraw at any time without penalty or loss of benefits which you are otherwise entitled. The benefit of participating is that your experiences will serve to guide further research and implementation of asthma education services. You will receive a $20 gift card today whether or not you participate.

Your answers will be confidential and I will only summarize what you say, not tell anyone who said what. No identifying information will be asked during this session. Would you mind if I tape record the discussion? (If yes – record, If no from any participant – take only handwritten notes). Does anyone have any questions that I can answer for you? Would you mind answering our questions today?

1. Please describe any previous experience with asthma education you may have received.
   Secondary Questions
   A. Has any education been from a physician, nurse, respiratory therapist, or pharmacist?
   B. Has education mostly been one-on-one or in a group?
   C. Have you ever received brochures, handouts, or any written educational materials?

2. Please describe how you manage your asthma?
   Secondary Questions
   A. Do you have an asthma action plan? If yes – how well do you follow your plan?
   B. Do you take medications daily or just as needed?
   C. Has obtaining your asthma medication changed since coming to campus?
   D. Are friends, roommates, or teachers aware of your asthma needs?
3. Please describe any asthma symptoms that you have experienced since coming to college.

Secondary Questions
A. Have these symptoms changed since coming to campus?
B. Are you able to self-manage these symptoms? If so – how?

4. Have you had to go somewhere on campus for help due to shortness of breath? If so, where?

Secondary Questions
A. If yes - Please describe your experience at these facilities.
B. Where else on campus would you like to go if you were having shortness of breath?

5. Have you ever had questions or concerns about managing your asthma?

Secondary Questions
A. If yes - Where on campus would you like to go if you had questions or concerns about managing your asthma?
B. Are there any additional services for students with asthma that you would like to see provided on campus?
C. If you wanted to know more about managing your asthma, in what way would you like to receive this information? Written (brochures, handouts)? Verbal (individual or group)? Online (emails, discussion pages)

Your answers are very important to us and we thank you for taking the time to be with us today.

Please feel free to contact us if you have any questions or concerns – Georgianna Sergakis at 614-292-8445 or by email at sergakis.3@osu.edu (Card with information will be given to participants).

For questions about your rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact Ms. Sandra Meadows in the Office of Responsible Research Practices at 1-800-678-6251.