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## Characteristics of children attending asthma camp – American Lung Association (ALA) in Nevada, 2008

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CHARACTERISTICS OF CHILDREN ATTENDING ASTHMA  
CAMP – AMERICAN LUNG ASSOCIATION (ALA)  
IN NEVADA, 2008

by

Priyank Shetty

Bachelor of Dental Surgery

SDM College of Dental Sciences and Hospital, Dharwad

2006

A thesis submitted in partial fulfillment of  
the requirement for the

**Master of Public Health Degree**  
**Department of Epidemiology and Biostatistics**  
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**THE GRADUATE COLLEGE**

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**Priyank Shetty**

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**December 2009**

## ABSTRACT

### **Characteristics of Children Attending Asthma Camp – American Lung Association in Nevada, 2008**

by

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Assistant Professor of Epidemiology & Biostatistics  
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This study is based on data provided by American Lung Association (ALA) on the children participating in summer asthma camp in Las Vegas and Reno, Nevada. 56 children participated in the camp in 2008. Universal Health History Form was used which is a comprehensive form to be filled out by parent and physician. Pre-test and Post-test Asthma forms were used to ascertain asthma knowledge before and after the camp.

The purpose of this study was to assess the trigger knowledge of the camp attendees and the measure of agreement between Physician and Parent report of child's asthma severity. In Nevada, no studies to our knowledge have been done to evaluate the characteristics of asthma camp attendees.

The study result suggests significant positive correlation between Physician and Parents assessment of the asthma severity. As the asthma severity increased there was relative increase in the number of school days missed. Trigger knowledge was poor among 25.9% (n=7) of attendees, and 40.7% (n= 11) had moderate trigger knowledge and 33% (n= 9) had higher trigger knowledge.

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## CHAPTER 1

### INTRODUCTION

Asthma is a chronic lung disorder in which the airways become inflamed and narrow. Though the exact cause of asthma is unknown, agents or conditions which can cause an asthma attack have been identified and are called asthma triggers. Some of the major asthma triggers are dust mites, pollen, pet dander, cigarette smoke, mold, fragrances, chemicals, exercise, air pollution and weather.

The symptoms associated with asthma are wheezing (whistling sound during breathing), tightness of chest, shortness of breath and coughing (NHLBI, 2008). Clinically asthma is characterized by recurring and varied symptoms, airflow obstruction, bronchial hyperresponsiveness, and inflammation of airways. These collectively interact to determine the clinical manifestations and severity of asthma, and the response to treatment (NAEPP and NHLBI, 2007).

In 2007, approximately 34 million Americans were estimated to have life time asthma prevalence and current asthma prevalence was estimated to be around 22.9 million. In 2006, 9.9 million children in US under the age of 18 years (14%) had been ever diagnosed with asthma; 6.8 million children (9%) still had asthma (Bloom et al, 2007). According to preliminary data there were 3,563 deaths due to asthma in 2006 and mortality was higher in females. Females had an overall higher rate of asthma compared to males in the past and the trend has not changed. Females were 8.9% more likely than males to have ever been diagnosed with asthma and had a higher current prevalence rates, 36% more than males. The trend reverses in children with boys under 18 having current asthma prevalence rate 15% more than girls (ALA, 2009).

The current and lifetime asthma prevalence rates for children in Nevada was 7.1% and 11.8% in 2006 (BRFSS, 2006), and for adults in Nevada the current and lifetime asthma prevalence rates were 6.9% and 13.4% in 2007 (ALA, 2009).

This study is based on data provided by the American Lung Association (ALA) on the children participating in summer asthma camp in Las Vegas and Reno, Nevada. The children had facilities to do activities such as arts and crafts, swimming, canoeing and other fun outdoor activities. The information about the camp attendees like the age, gender, emergency contact information, healthcare provider information, camper health history, asthma history, school days missed and other relevant information was collected using the Universal Health History Form which is a comprehensive form to be filled out by both parent and physician.

### Purpose of Study

In Nevada, no studies to our knowledge have been done to evaluate the effectiveness of asthma camps. The purpose of this study was to create baseline data to evaluate efficacy of asthma camp for future studies in Nevada and compare with those from other states.

This descriptive study evaluates the characteristics of camp attendees in Nevada in regards to gender, school days missed, trigger knowledge, and asthma severity as per parent and physician. This study helps to answer the following research questions; 1) Is there a correlation between the parent and the physician's assessment of the camp attendees asthma severity 2) How does the severity of asthma relate with school days missed? 3) Are camp attendees knowledgeable of basic asthma triggers?

## Hypothesis

1. H0: There will be no correlation between clinician and parent assessed asthma severity of camp attendees.

H1 There will be a statistical correlation between clinician and parent assessed asthma severity of camp attendees.

2. H0: There will be no correlation between parent and clinician assessed severity level of camp attendees and school days missed.

H1: There will be a statistical correlation between parent and clinician assessed severity level of camp attendees and school days missed.

3. H0: Children attending the camp have adequate trigger knowledge.

H1: Poor trigger knowledge will be assessed among children attending the camp.

The results of this study will help assess the trigger knowledge of the camp attendees and assess the measure of agreement between clinician and parent report of child's asthma. This might give insights to what is lacking and what can be done collectively in the future by parents, physicians and such camps, to help asthmatic children better manage their symptoms and help prevent asthma attacks by increasing their knowledge.

## CHAPTER 2

### LITERATURE REVIEW

Asthma is a chronic inflammatory disorder affecting the airways. The asthma episode in context to symptoms, airflow obstruction, bronchial hyperresponsiveness and inflammation tend to vary from person to person; hence the difference in severity level and response to treatment. The current treatment though effective in controlling symptoms, reducing airflow limitations, and preventing exacerbations does not appear to prevent the underlying cause of asthma (NAEPP and NHLBI, 2007).

#### Pathophysiology and Pathogenesis of Asthma

The recurrent reduction in airflow in asthmatics is caused by changes in airways. *Bronchoconstriction* is the first response seen in acute exacerbations of asthma. This involves contraction of bronchial smooth muscles due to exposure to stimuli. Cold air, exercise, allergens or irritants can act as stimuli. Due to bronchoconstriction there is narrowing of airway which causes a decrease in airflow to the lungs. As the disease persists and progresses there is edema, inflammation, mucus hypersecretion and formation of inspissated mucous plugs. The smooth muscles in the airway undergo hypertrophy and hyperplasia. *Airway hyperresponsiveness* is a feature of asthma in which exaggerated bronchoconstrictor response is seen due to various stimuli. Treating the inflammation helps in asthma control by reducing the airway hyperresponsiveness. *Airway remodeling* occurs in some cases, which is a permanent structural change in the airway with resultant progressive loss of function which cannot be prevented or reversed fully by current therapy. The changes seen are thickening of sub-basement membrane,

subepithelial fibrosis, airway smooth muscle hypertrophy and hyperplasia, mucous gland hyperplasia and hypersecretion, and angiogenesis (NAEPP, 2007).

### Types of Asthma

Asthma was classified as extrinsic (allergic) or intrinsic (non-allergic) but recently asthma was reclassified into allergic, non-allergic/intrinsic, exercise-induced, nocturnal, occupational and steroid-resistant asthma.

*Allergic Asthma* as the name suggests is caused by allergens which can induce or elicit an allergic reaction. Some of the allergens are pollen, pet dander, dust mites, pollutants, smoke, chemicals, wood dust, viral infections and bacteria. About 90% of asthmatics have allergic asthma. Most children with asthma have allergy induced asthma.

*Intrinsic Asthma* is unlikely to occur in children. Allergens are not involved in this type and it usually occurs after the age of 40. Intrinsic asthma does not respond well to treatment. Some of the possible causes include respiratory irritants like perfumes, smoke, cleaning agents, fumes, cold air and upper respiratory infections.

*Exercise-Induced Asthma* occurs with strenuous exercise due to loss of heat and moisture in the lungs. Coughing is the usual symptom associated with this type of asthma, but in cold and dry conditions severe symptoms can occur.

*Nocturnal Asthma* as the name suggests is sleep related and, affects people when they are sleeping. Although named as nocturnal, asthma symptoms can occur at any time of the day while the person is sleeping. Symptoms are usually worse between midnight and early morning. Some of the possible triggers are allergens in bedding or bedroom, a

decrease in room temperature, and gastroesophageal reflux. Nocturnal asthma affects 75% of asthmatics.

*Steroid-Resistant Asthma* occurs usually due to excessive use of steroids which can lead to status asthmatics, which is a severe form of asthma attack which does not respond to medication. Mechanical ventilation is required to reverse the condition (Lungfocus.com, 2009).

### Prevalence

In 2007, 114.5 per 1000 persons in America were estimated to have life time asthma prevalence whereas current prevalence was estimated to be 77.1 per 1000 persons. Life time prevalence of asthma for 2007 was 8 million in the 5-17 age group, which is highest among the age groups. Current asthma prevalence rates too were higher for the age group 5-17 years, 99.9 per 1000 population (ALA, 2009).

The lifetime and current asthma prevalence rates for children in Nevada was 11.8% and 7.1% in 2006 (BRFSS, 2006). For the adults in Nevada, the lifetime asthma prevalence rate was 13.4% which is higher than the national prevalence rate of 12.9% whereas the current asthma prevalence rate was 6.9% which is lower than the national prevalence rate of 8.2% in 2007 (ALA, 2009; BRFSS 2009).

### Mortality

Asthma is associated with significant mortality especially in older age group. People 65 or older had the highest at risk based death rate and females had higher at risk

death rates compared to males. In 2005 there were 3,563 deaths due to asthma and women accounted for 66% of those deaths (MMWR, 2004).

### Healthcare Utilization

Asthma hospitalizations represented about 3% of all hospitalizations among children in 2004 (Akinbami et al, 2006). In 2004, 1.8 million emergency department visits due to asthma were reported (MMWR, 2007). Asthma hospital care expenditures was 4.7 billion dollars and physician services cost 3.8 billion dollars in 2007 (ALA, 2009). In America, high rates of emergency department visits and hospitalizations are seen among blacks and Hispanics (especially Puerto Ricans). Hospitalization rates are 3 to 6 times higher among blacks and Puerto Ricans compared to whites. In general, minority children are at a greater risk for asthma (AAFA, 2005).

A study of asthma admissions at University Medical Center (UMC) of Southern Nevada in Las Vegas has shown longitudinal increase in admissions over the years. Blacks and Hispanics had higher asthma related emergency healthcare utilization compared to whites (Henderson, 2009- Unpublished Thesis).

### Cost

Asthma ranks within the top ten prevalent conditions causing limitation of activity and cost a total of 19.7 billion dollars in health care costs in America for the year 2007. The direct health care cost was 14.7 billion dollars and the remaining 5 billion dollars were indirect costs (lost productivity). Prescription drugs accounted for 6.2 billion dollars of the direct health care cost (ALA, 2009). Asthma is the fourth leading cause of work



absenteeism in adults, resulting in approximately 15 million missed days annually and accounts for approximately 3 billion dollars in indirect costs (AAFA).

### Missed Days

Asthma is a top cause of student absences due to chronic diseases (Moonie et al., 2008). Asthma accounts for approximately 14 million lost school days annually (CDC). The exact cause for school days missed in asthmatic children has not been studied in regards to the asthma episodes, doctor appointments, to avoid asthma triggers during certain seasonal change and or poor medical management of the disease (Taras et al., 2005).

The number of school days missed increases with the presence of asthma and as asthma increases in severity level (Moonie et al., 2008). A review of 66 studies addressing asthma and school absenteeism by Taras and Potts-Datema has shown a significant correlation between asthma and high rates of school absenteeism (Taras et al., 2005).

### Academic Performance

As children with asthma miss more school days than their peers, academic performance is thought to be affected. Several studies have been done to assess the correlation between academic performance and school days missed. Studies have shown that there is no significant effect of asthma on academic performance (Moonie et al., 2008; Taras et al., 2005). However those having persistent asthma were seen to perform worse than their counterparts in certain standardized test (Moonie et al., 2008). In certain

other subpopulations of children like the ones with disturbed sleep, kindergarten children and those with severe and ongoing symptoms perform poorly according to some studies (Taras et al., 2005). These variations in certain subgroups of asthmatic children need further investigation.

### Disparities

There is a disparity in asthma prevalence, morbidity and mortality among various ethnic groups. African Americans have 3 times higher death rate compared to Whites. Hispanics are a diverse group and overall their death rate due to asthma is lower than Whites and African American, however there are a lot of differences among the subgroups. Mexican Americans have lower death rates compared to Whites, whereas Puerto Ricans have 3 times higher death rate compared to Whites (AAFA & NPC, 2005). Hospitalization rates are 3 times higher among African American compared to Whites. The mortality rate is highest among African American women; it is 2.5 times more than Caucasian women (AAFA).

Gender plays a role in the risk of asthma. Females have higher asthma prevalence than males. Females were 8.9% more likely than males to have ever been diagnosed with asthma and had a 36% higher current prevalence rates than males (ALA, 2009). Death rates are higher among women and they account for 65% of overall deaths. (AAFA).

Age is also an important predictor of asthma. The lifetime and current prevalence rates for asthma are highest in 5-17 age group for both whites and blacks. The current prevalence rates were lowest in age group under 5 for whites and 18-44 for blacks (ALA,

2009). Children (<18) account for 44% of hospitalizations due to asthma whereas senior citizens (65 and >) account for 60% of deaths due to asthma (AAFA).

### Asthma Management and Asthma Camps

The *Guidelines for Diagnosis and Treatment of Asthma* were developed in 1991 by the National Asthma Education and Prevention Program (NAEPP) and recently updated in 2007 to improve asthma care in the U.S. Expert Panel Report-3 in 2007 put forth some new strategies to improve asthma management. Modifications were done in stepwise approach to manage long term asthma. New focus was laid on multifaceted approaches to patient education and to the control of environmental factors or co-morbid conditions that affect asthma. Asthma treatment strategies for managing exacerbations were also changed (NHLBI and NAEPP, 2007).

Asthma action plan is developed with the help of doctor to control asthma. It is a written plan which explains daily treatment and measures to control asthma in long term as well as how to deal with asthma attacks. It explains when the symptoms require doctor visit or an emergency room visit. Everyone with asthma must have an asthma action plan. In children, the asthma action plan must be shared with caregivers so that they can help the child follow the plan (CDC, 2009).

A study by Spurrier et al. based on interviews on with parents of children hospitalized due to asthma, showed that parents who perceived their children were more vulnerable to medical illness were significantly more likely to keep their children home from school ( $P = 0.01$ ), were more likely to take their children to the general practitioner

(GP) for acute asthma care ( $P = 0.02$ ), and were more likely to be give their children regular prevention medication ( $P = 0.02$ ) (Spurrier et al., 2000).

Studies have shown that as asthma severity increases, the lack of agreement between patient and provider increases. Despite appropriate assessment of asthma severity, physicians are under treating patients with severe asthma (Moonie et al., 2005).

About 120 asthma camps are held every year in which nearly 10,000 children participate nationwide. The study by Welch (2007) used the Universal health form and Child asthma short form. The study also used the validated Childhood Asthma Control Test (C-ACT). The study suggested that there was substantial burden of asthma on children participating in asthma camps. The study included 1,783 participants from 24 camps across 17 states. The results suggested camp attendees had moderate to severe asthma as assessed by parents (Mean=4.86) on a 10 point scale. Inadequately controlled asthma was seen in 37% of the children using C-ACT. There was improved asthma self-management in children who had participated in the prior year (Welch et al., 2007).The Welch study had a very large sample and used standardized forms and tools. There was only parent assessed asthma severity, and physician assessed severity has not been reported to compare correlation between both. The impact of asthma camps on attitude of children and parents were found to be positive (Plante et al., 2001; Silvers et al., 1992).

Fitzpatrick studied an innovative asthma camp intervention for childhood asthma among urban blacks offered by American Lung Association of the District of Columbia which showed a reduction in school absences, emergency room visits and hospitalizations by 36 to 69%. It was a 3-year pilot study of children ages 5-10 with asthma in which parent or guardian was also involved. The study had 84 participants (mean age 9.6) who

were predominantly black (93%) and male (73%). The camp had educational sessions on asthma triggers, art therapy, coloring book, exercise classes, and equipment modalities. There was increase in usage of new techniques such as inhaler or aerosol from 10% to 78% and breathing or warm-up exercises was being done by 55% of participants as assessed by follow-up interviews (Fitzpatrick et al., 1992).

The results from this study assert the importance of asthma camp as a means of teaching asthma management skills. The study had children who were predominantly Black males. This is both a weakness and strength of the study, as the study cannot be generalized to the whole population but focuses on the group having a high prevalence rate of asthma.

## CHAPTER 3

### MATERIALS AND METHODS

#### Data Collection

This study is based on data provided by the American Lung Association (ALA) on children participating in summer asthma camp in Las Vegas and Reno, Nevada. A total of 33 children participated in the camp in Las Vegas and 23 in Reno. The children engaged in activities such as arts and crafts, swimming, canoeing and other fun outdoor activities. The information about the camp attendees like the age, gender, emergency contact information, healthcare provider information, camper health history, asthma history, school days missed and other relevant information was collected through the Universal Health History Form (Figure 1) which is a comprehensive form filled out by parent and physician. Pre-test (Figure 2) and Post-test Asthma forms were used to ascertain asthma knowledge before and after the camp. To protect the identities and personal information of the participants, the data was de-identified. Approval was obtained from the University of Nevada, Las Vegas Institutional Review Board. Data was collected in raw form and entered in a database on SPSS which was password protected.

STAPLE PHOTO HERE

<b>FOR OFFICE USE ONLY</b>
Scale: 1=Mild 2=Moderate 3=Severe
Asthma Ranking _____
Social/Emotional Ranking _____
Other Notes: _____ _____

**ASTHMA CAMP UNIVERSAL HEALTH FORM**

**A. GENERAL INFORMATION - to be completed by parents**

NAME OF CHILD \_\_\_\_\_

PREFERS TO BE CALLED \_\_\_\_\_

Birthdate \_\_\_\_\_ Sex  Female  Male Age At Camp \_\_\_\_\_ Present grade (or recent past grade) \_\_\_\_\_

Name(s) of Parents (or Guardians)

Father \_\_\_\_\_ Phone Home ( ) \_\_\_\_\_ Work ( ) \_\_\_\_\_ Cell ( ) \_\_\_\_\_

Email \_\_\_\_\_

Mother \_\_\_\_\_ Phone: Home ( ) \_\_\_\_\_ Work ( ) \_\_\_\_\_ Cell ( ) \_\_\_\_\_

Email \_\_\_\_\_

or Guardians \_\_\_\_\_ Phone Home ( ) \_\_\_\_\_ Work ( ) \_\_\_\_\_ Cell ( ) \_\_\_\_\_

Email \_\_\_\_\_

MAILING ADDRESS \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

Are parents living together?  Yes  No

Are there any custody or visitation restrictions? If so, describe:  
\_\_\_\_\_

**IF NOT AVAILABLE IN AN EMERGENCY, PLEASE NOTIFY: (this must be filled out)**

Name \_\_\_\_\_ Relationship to child \_\_\_\_\_ Phone( ) \_\_\_\_\_

Name \_\_\_\_\_ Relationship to child \_\_\_\_\_ Phone( ) \_\_\_\_\_

Who is your child's primary care MD?

Pediatrician  Family Practitioner  Don't Know  Other

If other: \_\_\_\_\_

Name of child's regular physician \_\_\_\_\_ Phone \_\_\_\_\_ Address \_\_\_\_\_

Does your child currently see an asthma specialist?  Yes  No

If so, which type?  Allergist  Pulmonologist  Don't Know

Name of child's asthma physician \_\_\_\_\_ Phone \_\_\_\_\_

Address \_\_\_\_\_

Figure 1. Universal Health History Form

## WHAT DO YOU KNOW ABOUT ASTHMA?

The following can trigger an asthma attack (check all that apply):

Smoke  
Stuffed animals/ toys  
Animals/pets  
Dust/ dustmites  
Cockroaches  
Grass/flowers  
Mold or mildew  
Chalk/ chalk dust  
Strong smells/ perfumes  
Having a cold  
Stress or emotional upset  
Changes in weather  
Exercise

### ASTHMA AND YOU

- Yes  No Is it best to keep your asthma a secret.
- Yes  No Kids with asthma can run and play sports when they feel well.
- Yes  No Can you do things to control your asthma?
- Yes  No Can you catch asthma from someone else?
- Yes  No Should children with asthma exercise?
- Yes  No Asthma-occurs more in some families than others.
- Yes  No Can stress, or worrying a lot, make your asthma worse?
- Yes  No It is okay to ask people around you not to smoke.
- Yes  No It is best to avoid smoky places.
- Yes  No Foods never trigger an asthma episode.
- Yes  No Everyone has the same asthma triggers.
- Yes  No I am uncomfortable when I have to take my asthma medication around others.
- Yes  No I am embarrassed to talk about my asthma.
- Yes  No Telling others about my asthma can make everyone feel better.

Kids with asthma can participate in activities if they:

- a) Take their medication
- b) Avoid their asthma triggers
- c) Follow their asthma plan
- d) All of the above

Figure 2. Pre-Test Form



## Variables

### Asthma Severity

The Universal health history form has two classifications to assess asthma severity. The first classification (NHLBI) is based on severity of clinical features which is filled by the Physician of the camp attendee. The asthma is classified as Intermittent, Mild Persistent, Moderate persistent or Severe persistent. The asthma is said to be intermittent if the symptoms occur less than once a week and there are only brief exacerbations. Nocturnal symptoms are not seen more than twice a month. Forced Expiratory Volume 1 (FEV1) or Peak Expiratory Flow is greater than or equal to predicted 80%. PEF or FEV1 variability is less than 20%.

In mild persistent asthma, symptoms occur more than once a week but less than once a day. The exacerbations may affect activity and sleep. Nocturnal symptoms can be seen more than twice a month. FEV1 or PEF is greater than or equal to predicted 80%, however PEF or FEV1 variability is less than 20-30%.

In moderate persistent asthma, daily symptoms are observed with exacerbations which may affect activity and sleep. Nocturnal symptoms are seen more than once a week. There is daily use of inhaled short acting beta2-agonist. FEV1 or PEF is 60-80% of predicted and FEV1 or PEF variability is greater than 30%.

In the case of severe persistent asthma, daily symptoms with frequent exacerbations are seen. There is limitation of physical activities and frequent nocturnal asthma symptoms. FEV1 or PEF is less than or equal to 60% of predicted and FEV1 or PEF variability is greater than 30% (Koshak, 2007).

The second classification of asthma was on a 10 point scale with 0 being having no asthma, 1 having least and 10 being severe asthma. This was filled in by both parent and the physician.

### School Days Missed

Another variable utilized for analyses was the school days missed by the camp attendees due to asthma in the past year. Asthma attacks can be discomforting and severe so as to cause children affected by it to miss school during the episodes of asthma.

### Trigger Knowledge

There were 13 triggers which are known most likely to cause an asthma attack. The number of triggers identified by the individual was used to divide the camp attendees in to three groups based on their knowledge of asthma triggers. If the attendees identified only 1 to 4 triggers they were said to have low trigger knowledge. If they identified 5 to 8 triggers they were said to have medium trigger knowledge and those who identified 9 or more were said to have high trigger knowledge.

### Statistical Analysis

Spearman's rho was used to assess whether the parent and physicians assessment of the children's asthma was correlated. Spearman's rho was also used to assess the correlation between school days missed and asthma severity on 10 point scale by both physician and parent. Spearman's rho is a measure of the linear correlation between two

variables. It differs from Pearson's correlation only in that the computations are done after the numbers are converted to ranks (Hyperstat online, 2007).

To assess the correlation between asthma severity by the NHLBI scale as provided by physicians and school days missed, Kendall's Tau was used. Kendall's tau is a measure of correlation, and so measures the strength of the relationship between two variables (Blackwell Science Ltd, 2001). Descriptive analyses were done to assess the level of trigger knowledge among the camp attendees. Descriptive statistics and proportions was used analyze key demographic variables like gender, age and grade. Normality tests were run on the severity level of asthma by physician and parent, and school days missed in order to determine the choice of statistical test.

## CHAPTER 4

### RESULTS

Camp attendees had more male participants than females. Of the total 56 camp attendees 30 (53.6%) were male and 26 (46.4%) were female (Table 1). The age of the children attending the camps were from 7 to 14 years. Of the 56 camp attendees 52 had provided their age. The mean age is 10.91; the median and mode both are 10. Eighteen children were aged 10 (34.6%) and 69.2% of the children who had given their age were 10 yrs or older (Table 2).

The details of the participant's grade level were collected along with other demographics. The mean grade of the participants was 4.47, median was 4 and mode was 4. Of the 53 participants who had given grade, 20 (37.7%) were 4<sup>th</sup> graders. The participants were from Grades 1 to 9 with 62.3% in 4<sup>th</sup> grade or lower (Table 4). Of the 56 participants 55 had given details whether they had an Asthma action plan. Only 8 (14.5%) had the Asthma action plan (Table 5).

Table 1. Gender Distribution among the Camp Attendees

Gender	Frequency n	Percent %
Male	30	53.6
Female	26	46.4
Total	56	100.0

Table 2. Age Distribution Among the Camp Attendees

Age	Frequency n	Percent %
7	3	5.8
8	7	13.5
9	6	11.5
10	18	34.6
11	6	11.5
12	5	9.6
13	5	9.6
14	2	3.8
Total	52	100.0

Note: Mean= 10.91, Median= 10 and Mode= 10.

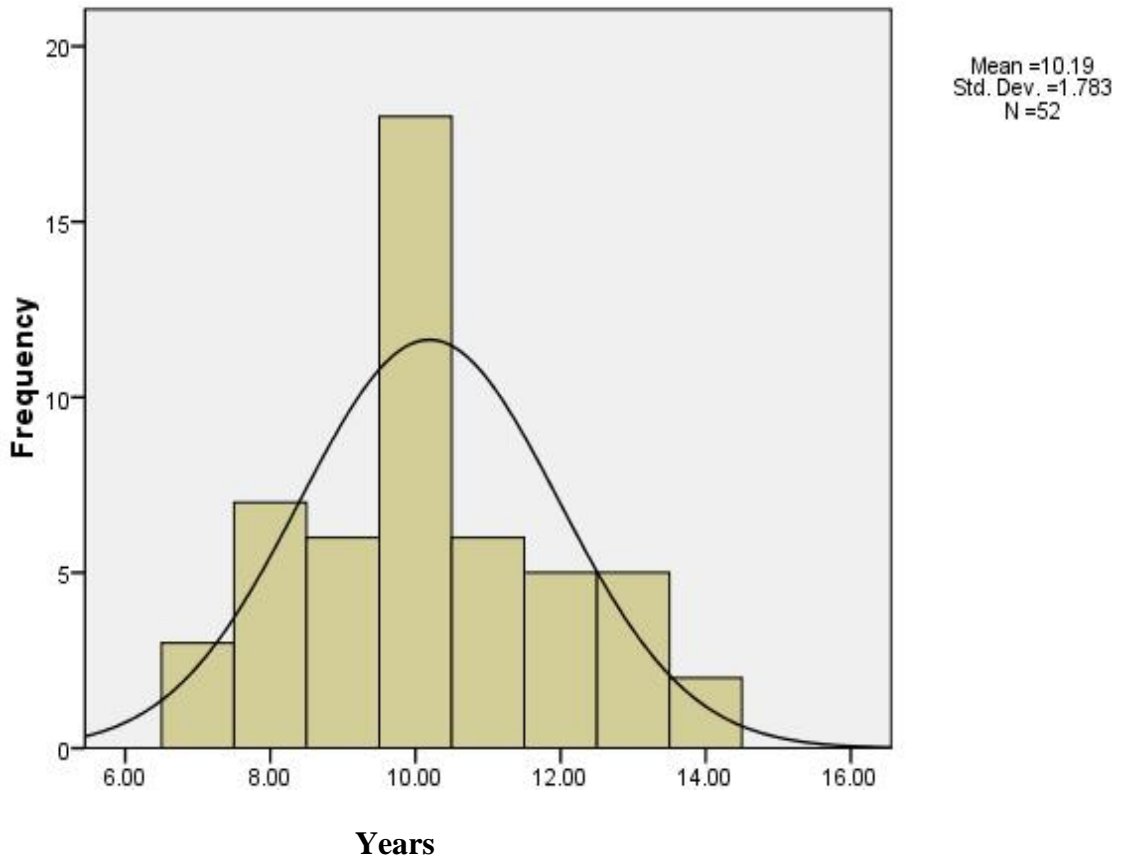


Figure 3. Age Range of Camp Attendees

Table 3. Grade Level Among the Camp Attendees

Grade	Frequency n	Percent %
1	1	1.9
2	3	5.7
3	9	17.0
4	20	37.7
5	7	13.2
6	7	13.2
7	3	5.7
8	2	3.8
9	1	1.9
Total	53	100.0

Note: Mean= 4.47, Median= 4 and Mode=4

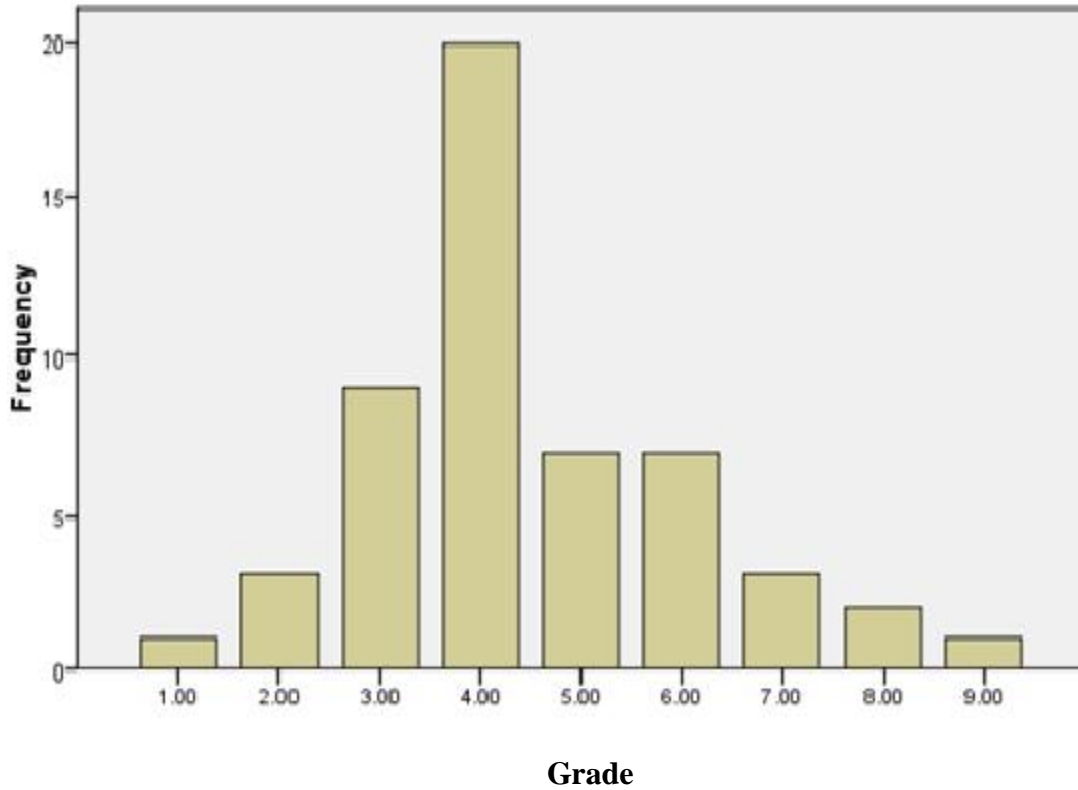


Figure 4. Grade Range of Asthma Camp Participants

Table 4. Asthma Action Plan on File

	Frequency	Percent
Yes	8	14.5
No	47	85.5
Total	55	100.0

Eighty one and half percent (81.5%) of camp attendees were treated for asthma by a pediatrician, 13% by a family practitioner and 5.6% specified others (Table 5). Of the 53



on whom data were available specialists were used by only 37.7% of camp attendees (Table 6).

Table 5. Type of Physician Treating Camp Attendees

	Frequency n	Percent %
Pediatrician	44	81.5
F P	7	13
Other	3	5.6
Total	54	100

Table 6. Use of a Specialist by Camp Attendees

	Frequency n	Percent %
Yes	20	37.7
NO	33	62.3
Total	53	100

The Physicians NHLBI Classification of Asthma severity suggests, 50% have intermittent asthma (n=20), 27.5% have mild persistent asthma (n=11), 12.5% have moderate persistent asthma (n=5), 10% have severe persistent asthma (n=4) (Table 7).

Table 7. Physicians Assessment of Asthma Severity by NHLBI Scale

NHLBI Scale	Frequency n	Percent %
Intermittent Asthma	20	50.0
Mild Persistent Asthma	11	27.5
Moderate Persistent Asthma	5	12.5
Severe Persistent Asthma	4	10.0
Total	40	100.0

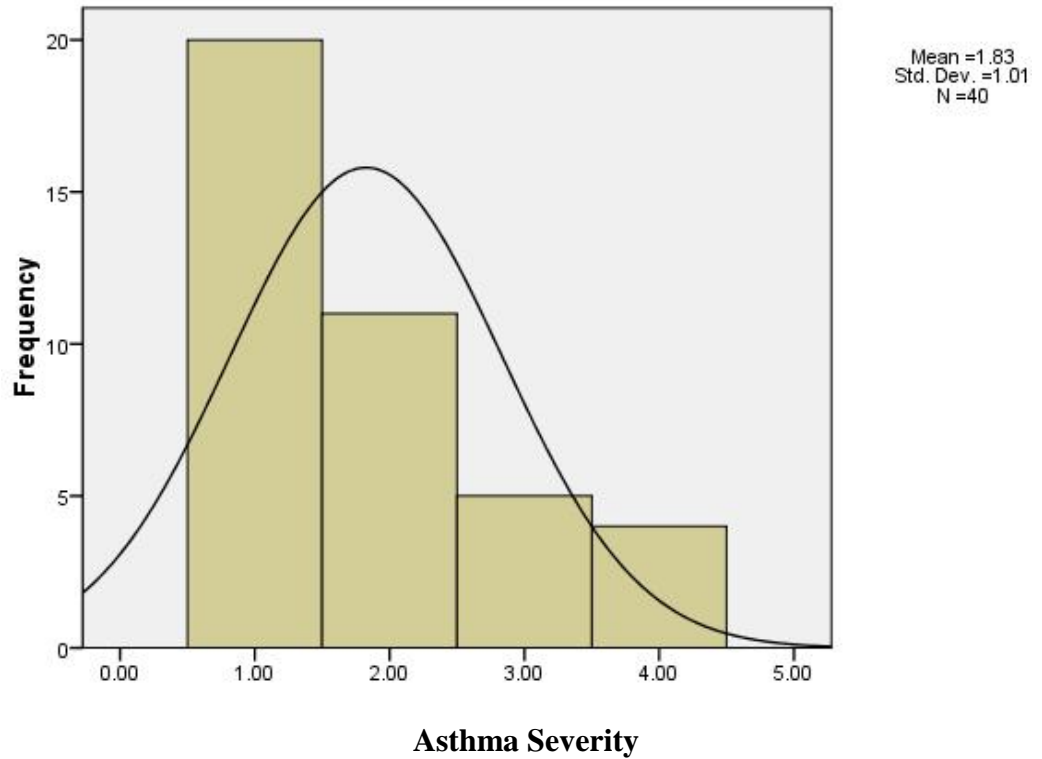


Figure 5. NHLBI Asthma Severity as Assessed by Physician

A total of 52 camp attendees gave details of the number of school days missed during the past year. Fifty percent (50%) had missed 4 or more school days in the past

year due to asthma. The maximum number of school days missed by an attendee was 36 (Table 8). The mean school days missed due to asthma is 5.42, median is 3.5 and mode is 0 (Table 8).

Table 8. School Days Missed Due to Asthma

Days Missed	Frequency n	Percent %
0	10	19.2
1	1	1.9
2	7	13.5
3	8	15.4
4	4	7.7
5	6	11.5
6	1	1.9
7	5	9.6
8	1	1.9
10	4	7.7
11	1	1.9
15	1	1.9
16	1	1.9
30	1	1.9
36	1	1.9
Total	52	100.0

Note: Mean= 5.42, Median= 3.5 and Mode= 0

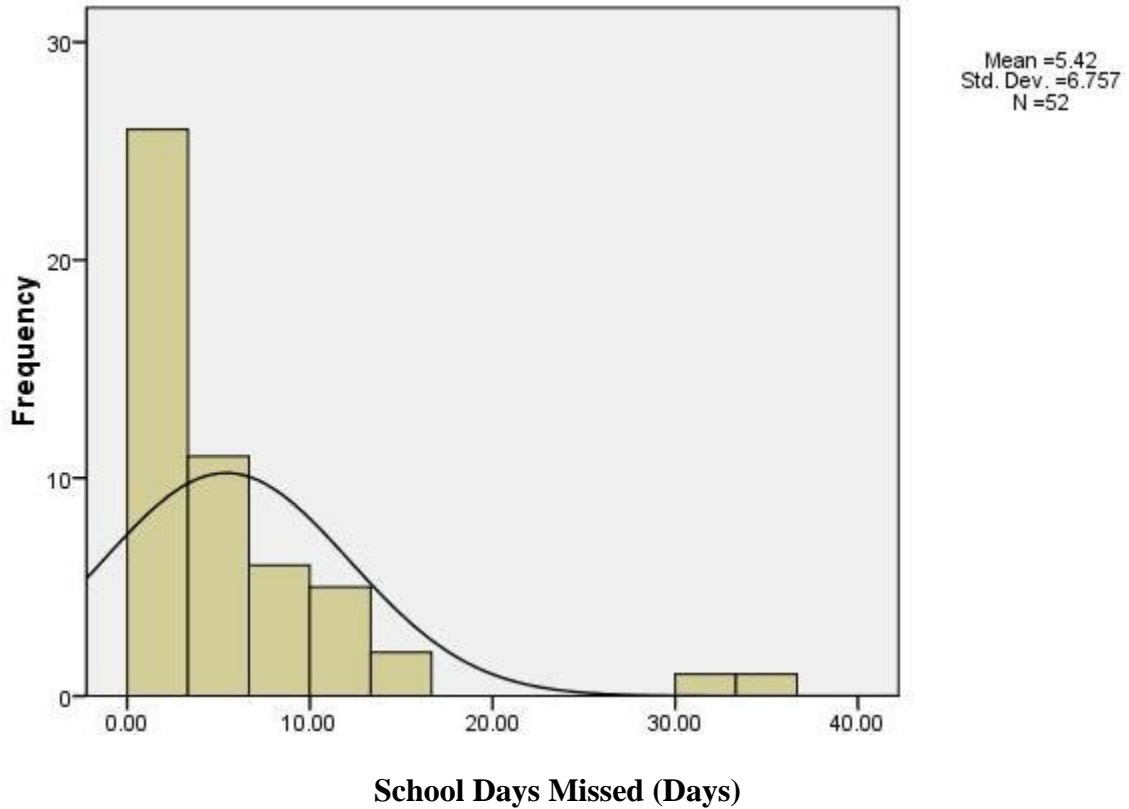


Figure 6. School Days Missed due to Asthma

The physicians assessment of the severity of asthma in children attending the camp showed 32.5% of children had a 2 on a 10 point scale whereas 57.5% of children had a rating of 3 or more (Table 9). The sample size was 40 and mean asthma severity is 3.42, median is 3 and mode is 2 (Figure 5).

The parents assessment of asthma severity in children attending the camp showed 20.4% of children had a 2 on a 1 to 10 scale whereas 72.2% of children had a rating of 3 or more (Table 10). The sample size was 54 and mean asthma severity is 4.31, median is 4 and mode is 2 (Figure 6).

Table 9. Asthma Severity as Assessed by Physician on 10 Point Scale

Asthma Scale	Frequency n	Percent %
1	4	10.0
2	13	32.5
3	8	20.0
4	3	7.5
5	5	12.5
6	5	12.5
7	1	2.5
10	1	2.5
Total	40	100

Note: 1 is least and 10 most severe asthma

Note: Mean= 3.42, Median= 3 and Mode= 2

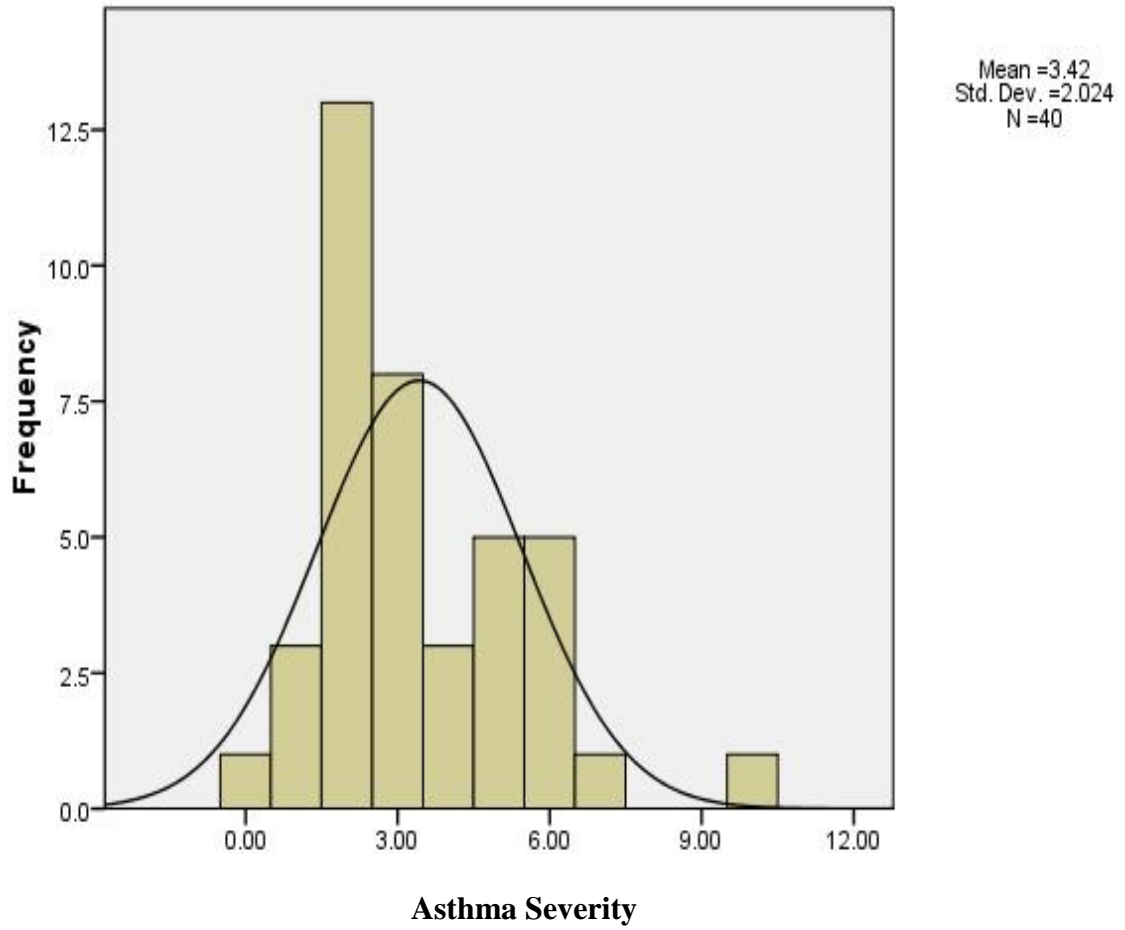


Figure 7. Asthma Severity as Assessed by Physician on a 10 Point Scale

Table 10. Asthma Severity as Assessed by Parent on a 10 Point Scale

Asthma Scale	Frequency n	Percent %
1	4	7.4
2	11	20.4
3	6	11.1
4	10	18.5
5	9	16.7
6	3	5.6
7	5	9.3
8	4	7.4
9	1	1.9
10	1	1.9
Total	54	100.0

Note: 1 is least and 10 most severe asthma

Note: Mean= 4.31, Median= 4 and Mode= 2

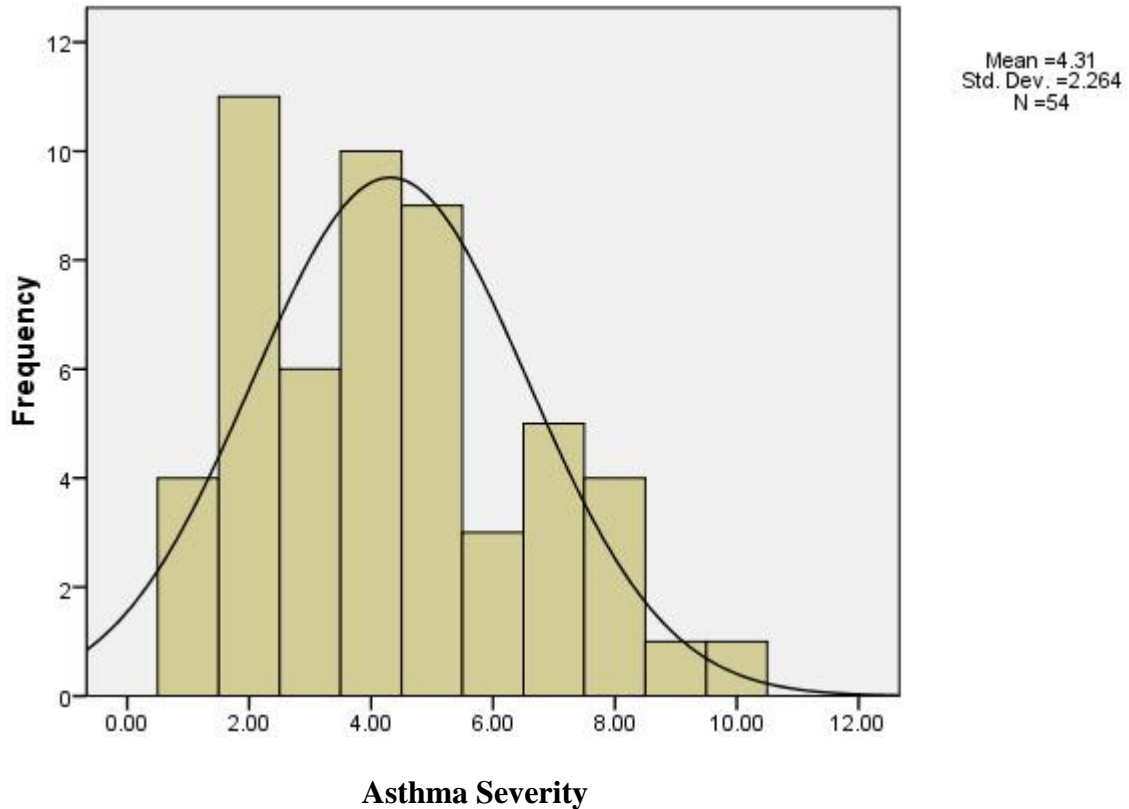


Figure 8. Asthma Severity as Assessed by Parent on a 10 Point Scale

Normality Test results show Kolmogorov-Smornov (Lilliefors significance correction) value for physician NHLBI asthma severity is .277 ( $p < .001$ ), school days missed is .268 ( $p < .001$ ). Physician assessed asthma severity by 10 point scale is .246 ( $p < .001$ ) and Parent assessed asthma severity by 10 point scale is .158 ( $p > .01$ ). Normality test results show Shapiro-Wilk value for physician NHLBI asthma severity is .790 ( $p < .001$ ), school days missed is .648 ( $p < .001$ ), physician assessed asthma severity by 10 point scale is .876 ( $p < .01$ ) and parent assessed asthma severity by 10 point scale is .928 ( $p > .01$ ) (Table 11). Normality test results suggested school days missed and physician assessed asthma severity are not normally distributed. However Normality test results



were not significant for parent assessed asthma severity which suggests it is normally distributed.

Table 11. Tests of Normality

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Physician NHLBI	.277	36	.000	.790	36	.000
School Days Missed	.268	36	.000	.648	36	.000
Physician Assessed	.246	36	.000	.876	36	.001
Parent Assessed	.158	36	.024	.928	36	.022

a. Lilliefors Significance Correction

The analysis of correlation between physician and parents assessment of asthma severity by Spearman's Rho shows the correlation coefficient to be .653 and probability value .000 ( $p < .001$ ) (Table 12). This result shows that there is significant positive correlation between physician and parents assessment of the asthma severity.

The Correlation coefficient of asthma severity by physician NHLBI classification and school days missed is .449 with probability value being .001 ( $p < 0.01$ ) (Table 13). This shows there is significant positive correlation between the two variables.

Table 12. Correlation of Physician and Parent Assessed Asthma Severity

			Physician Assessed	Parent Assessed
Spearman's rho	Physician Assessed	Correlation Coefficient	1.000	.653**
		Sig. (2-tailed)	.	.000
		N	40	39
	Parent Assessed	Correlation Coefficient	.653**	1.000
		Sig. (2-tailed)	.000	.
		N	39	54

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Table 13. Correlation of Physician NHLBI and School Days Missed

			Physician NHLBI	School Days Missed
Kendall's tau_b	Physician NHLBI	Correlation Coefficient	1.000	.449**
		Sig. (2-tailed)	.	.001
		N	40	37
	School Days Missed	Correlation Coefficient	.449**	1.000
		Sig. (2-tailed)	.001	.
		N	37	52

\*\* . Correlation is significant at the 0.01 level (2-tailed).

The analysis of correlation between physicians assessment of asthma severity (1 to 10 scale) and school days missed (or days at home due to asthma) by Spearman's Rho shows the Correlation coefficient to be .529 with a probability value .001 ( $p < .01$ ) (Table 14).

The analysis of correlation between parents assessment of asthma severity (1 to 10 scale) and school days missed (or days at home due to asthma) by Spearman's Rho shows the correlation coefficient to be .529 and probability value .000 ( $p < .001$ ) (Table 14). These results show a significant positive correlation between school days missed, and physicians and parents assessment of the asthma severity.

Table 14. Correlation of Asthma Severity and School Days Missed

			Physician Assessed	Parent Assessed	School Days Missed due to Asthma
Spearman's rho	Physician Assessed	Correlation Coefficient	1.000	.653**	.529**
		Sig. (2-tailed)	.	.000	.001
		N	40	39	37
	Parent Assessed	Correlation Coefficient	.653**	1.000	.529**
		Sig. (2-tailed)	.000	.	.000
		N	39	54	52
	School Days Missed due to Asthma	Correlation Coefficient	.529**	.529**	1.000
		Sig. (2-tailed)	.001	.000	.
		N	37	52	52

\*\* . Correlation is significant at the 0.01 level (2-tailed).

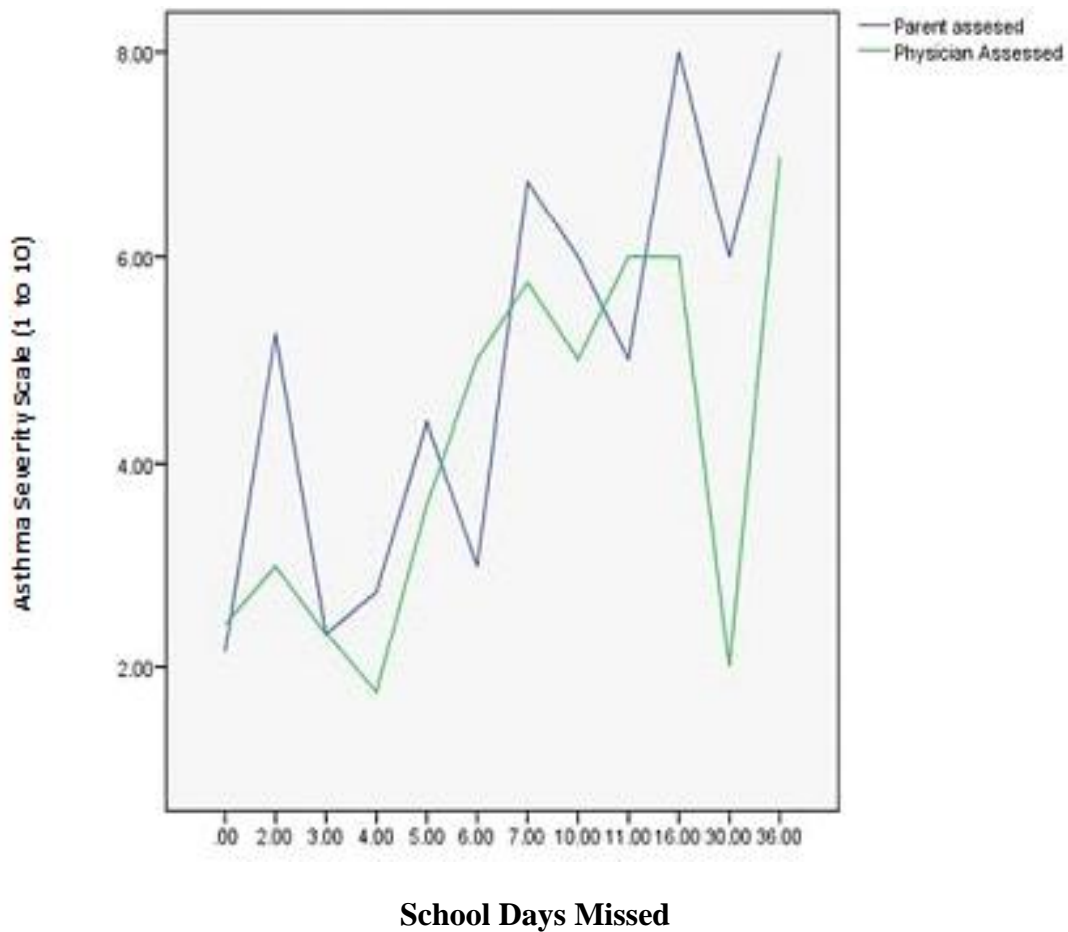


Figure 9. Parent and Physicians Assessment of Asthma severity in relation with school days missed

To assess the trigger knowledge data, the pre-test camp form was used. This was available for 33 children from the Las Vegas camp. Out of 33 attendees, 27 had answered the trigger knowledge question. The descriptive analysis shows 25.9% had poor trigger knowledge, 40.7% had moderate level of trigger knowledge and 33.3% had high trigger knowledge (Table 15).

Table 15. Asthma Trigger Knowledge

	Frequency n	Percent %
Low or poor trigger knowledge	7	25.9
Moderate trigger knowledge	11	40.7
High trigger knowledge	9	33.3
Total	27	100.0

Note: 1 to 4 triggers – low or poor trigger knowledge  
 5 to 8 triggers- moderate trigger knowledge  
 9 to 13 triggers- high trigger knowledge

## CHAPTER 5

### DISCUSSION

To our knowledge, this study is the first one to compare parent and physicians asthma severity rating among the participants in a camp setting and the first study in Nevada on Asthma camp attendees. The camp data was collected from Reno and Las Vegas in 2008 summer asthma camp with a total of 56 participants.

Age and Gender disparity is seen with prevalence of asthma. In adults (18 or more), females exhibit higher prevalence rates compared to males whereas in children below 18, boys exhibit higher prevalence rates (ALA, 2009). Our study had a higher number of male participants (53.6%) which is the gender having more prevalence for that age group.

Only 8 (14.5%) specified they had an asthma action plan out of a total of 55 participants. This suggests most physicians are not providing asthma action plan to the participants in this study. The EPR-3 report suggests providing all patients of asthma a written asthma action plan based on signs and symptoms and/or PEF of particular individuals by the physician (NAEPP and NHLBI, 2007).

#### Asthma Severity

Results of asthma severity of the participants by physicians and parents showed that, overall parents thought the level of asthma severity was more in participants compared to the physician. The mean of physicians assessment of asthma severity is 3.42 (n=40) compared to parents assessment of asthma severity which was 4.31 (n=54). The mean parents assessment of asthma severity of 4.31 is comparable to the mean of parent

reported asthma severity of 4.86, seen in the Welch study which was also measured on a 10 point scale (Welch et al., 2007). The study result suggests significant positive moderate correlation between physician and parents assessment of the asthma severity. Similar results were observed in another prospective observational study by Moonie et al. In this study, 723 asthma patients (aged < 1 – 85 years) in two primary care clinics showed a moderate measure of agreement between patient self-reported and primary care physician-classified asthma severity ( $k = 0.48$ ;  $p < 0.001$ ). It was seen that with increasing severity of asthma there was decrease in the agreement (Moonie et al., 2005).

The null is rejected for the first hypothesis as there is a correlation between clinician and parent assessed severity of camp attendees.

#### School Days Missed and Asthma Severity

Studies in the past have shown a positive correlation between asthma and school days missed (Moonie et al. 2008; Taras et al., 2005). The Spurrier study suggests that higher the parental perception of the child's asthma severity the greater number of school days were missed. Our study too shows a significant positive correlation between school days missed and asthma severity. The analysis of physician and parent assessment of asthma severity with school days missed showed the same correlation coefficient value of .529 with variation in significance level but p value was <.01 in both cases. This suggests that as the asthma severity increased there was relative increase in the number of school days missed too.

There was moderate positive correlation between school days missed and asthma severity hence the null is rejected for the second hypothesis.

### Trigger Knowledge of Camp Attendees

Trigger knowledge was poor among 25.9% of attendees which was more than what was expected. 40.7% had moderate trigger knowledge and 33% had higher trigger knowledge (N= 27). It is important to know what can trigger asthma attack so as to avoid the triggers as much as possible and prevent or reduce future asthma attacks. It is expected that a minimum of 75% of attendees will have high trigger knowledge and there would be no one with poor trigger knowledge. Asthma camps not only help to educate children regarding asthma but also have a positive impact on the attitude of children and parents (Wendy et al., 2001). The null is rejected for the third hypothesis as the children attending the camp do not have adequate trigger knowledge.

### Limitations of the Study

The sample size of this descriptive study is small and hence cannot be generalized. Income details, race and other details were not given so we could not study the differences in these sub-categories and cannot say if these children are representative of Nevada population. Since only data for 2008 was available only limited analysis was possible.

There is a possibility of recall bias as parents had to remember how many school days in the past year had been missed due to asthma. Another bias that might have occurred in this study is the classification bias of asthma severity on a 10 point scale. There is no clear distinction given for the various levels of this classification and hence the assessment of severity might vary among both parents and physician.



The Universal Health History forms were not completely filled by all participants leading to a smaller usable sample. The portion of the Universal health history form to be filled by physicians was missing in most of the data from Reno. So the study result is more reflective of camp attendees from Las Vegas. The pre camp survey form was different among both the camps hence we could not use data from the North. The trigger knowledge assessment was only possible on the participants in Las Vegas which included a questionnaire on asthma triggers. There was low return of post surveys due to which we were not able to compare pre and post surveys to assess the impact of the camp on the participants asthma control and knowledge.

#### Strength and Future Implications of the Study

We have physician diagnosed asthma instead of a self-report. There was a significant portion of the universal health history form which was completed by physicians. The physician assessed asthma severity was used to compare with parents assessment of their child's asthma; this is usually missing in other asthma camp related data.

This is one of the first studies in Nevada looking at the characteristics of asthma camp attendees. This will provide a baseline for future studies in Nevada. The results of this study will help look into the fact that physicians are not giving an Asthma Action plan to the children who participated in this camp. In the future, with higher sample size, pre and post survey comparisons can be done to assess the effectiveness of asthma camp in regards to asthma knowledge and management skills.

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APPENDIX I

UNLV INSTITUTIONAL REVIEW BOARD (IRB) APPROVAL



**Biomedical IRB – Exempt Review  
Approved as Exempt**

**DATE:** February 27, 2009

**TO:** **Dr. Sheniz Moonie**, Epidemiology & Biostatistics

**FROM:** Office for the Protection of Research Subjects

**RE:** Notification of IRB Action by Dr. John Mercer, Chair  
Protocol Title: **Characteristics of Asthma Camp Attendees - American Lung Association of Southern Nevada**  
OPRS# 0901-2980

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This memorandum is notification that the project referenced above has been reviewed by the UNLV Biomedical Institutional Review Board (IRB) as indicated in Federal regulatory statutes 45CFR46.

The protocol has been reviewed and deemed exempt from IRB review. It is not in need of further review or approval by the IRB.

*Any changes to the exempt protocol may cause this project to require a different level of IRB review. Should any changes need to be made, please submit a **Modification Form**.*

If you have questions or require any assistance, please contact the Office for the Protection of Research Subjects at [OPRSHumanSubjects@unlv.edu](mailto:OPRSHumanSubjects@unlv.edu) or call 895-2794.

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Graduate Faculty Representative, Dr. Patricia Alpert, Ph.D.