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Comparisons of Health Outcomes of Overweight or Obese Youth Ages 3-15 Years Enrolled in Private Health Insurance Plans Versus Medicaid

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ABSTRACT

COMPARISONS OF HEALTH OUTCOMES OF OVERWEIGHT OR OBESE YOUTH AGES 3-15 YEARS ENROLLED IN PRIVATE HEALTH INSURANCE PLANS VERSUS MEDICAID

By

Parvin Sultana Ali

August 1, 2019

INTRODUCTION: Research on the relationship between types of health insurance and health outcomes among overweight or obese youth is lacking in the literature. In the United States, 17% of youth ages 2-19 years have been identified as being overweight or obese. More than 90% of youth ages 0-18 years in the United States have health insurance. It is important to understand if there are any significant relationships between types of insurance and health outcomes. According to the Kaiser Family Foundation, 54% of youth have privately-funded health insurance and 37% have Medicaid insurance, which is government-funded. Medicaid insurance is associated with lower household income levels, while private health insurance is associated with higher household income levels.

AIM: The aim of this study was to explore the relationship between types of health insurance and health outcomes among overweight or obese youth ages 3-15 years. Specifically, this study sought to answer these questions in overweight or obese American youth: (a) Is there an association between health insurance coverage type and general health status? (b) Is there an association between health insurance coverage type and asthma prevalence? and (c) Is there an association between health insurance coverage type and healthcare setting mostly visited for healthcare services?

METHODS: This study used the 2012 National Health and Nutritional Examination Survey (NHANES) National Youth Fitness Survey (NNYFS) data. Survey responses were completed by the parents or legal guardians of the study group. The main independent variable was type of health insurance. The dependent variables were perceived general health, asthma, and healthcare setting mostly visited for healthcare services. Overall general health status for each child was reported by their parents as “excellent,” “very good,” “good,” “fair,” or “poor” in NHANES NNYFS 2012. Excellent, very good, and good general health were categorized as “good general health” for this study. Fair and poor general health were categorized as “not good general health” for this study. The data analyses of this study were completed with IBM Statistical Package for the Social Sciences (SPSS) 22.0 for Windows.

RESULTS: There were no statistically significant differences in overall general health and the prevalence asthma between overweight or obese youth enrolled in Medicaid insurance and enrolled in private health insurance. Participants with Medicaid insurance had statistically significant lower odds of going to a doctor’s office or HMO mostly for healthcare services, as opposed to the emergency department or urgent care services, compared to participants with private health insurance (OR=0.16; CI=0.098-0.260). There were no statistically significant differences in overall general health and visits mostly to a doctor’s office or HMO for healthcare services between overweight or obese participants enrolled in Medicaid insurance and enrolled in

private insurance, after adjusting for the age, sex, race, and household income of participants as well as the age, sex, education level, and marital status of participants' parents or legal household guardians. Participants with Medicaid insurance had a statistically significant greater adjusted odds of having asthma compared to participants with private health insurance (aOR=2.6; CI=1.180-5.577).

DISCUSSION: Though not statistically significant for every variable, overweight or obese youth enrolled in Medicaid insurance had worse health outcomes than those enrolled in private health insurance, as measured by perceived general health, asthma prevalence, and the healthcare setting they visit mostly for healthcare services. Further research is needed to determine why youth enrolled in Medicaid may not go to a doctor's office or HMO more often for healthcare services compared those enrolled in private health insurance, as well as to better understand the relationship between other independent variables and type of health insurance, health outcomes, and healthcare.

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B.S. BIOLOGICAL SCIENCE, GEORGIA STATE UNIVERSITY

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APPROVAL PAGE

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Author's Statement Page

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Parvin Sultana Ali
Signature of Author

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CHAPTER I: INTRODUCTION

1.1 Background

In the United States, youth enrolled in private health insurance plans are generally covered through employer-based health insurance plans (of a parent or legal guardian's employer) or through non-group health insurance plans (such as plans purchased independently by their parent or legal guardian).¹ The percentage of all youth ages 0-18 years in the United States that have employer-based health insurance coverage is 49%, and the percentage of all youth ages 0-18 years in the United States years that have other, non-group private health insurance coverage is 5%.² Youth that are covered under public health insurance plans generally are covered through Medicaid or the Children's Health Insurance Program (CHIP). The percentage of all youth ages 0-18 years in the United States that are covered through Medicaid or CHIP is 37%.²

When compared to each other, Medicaid insurance coverage is typically associated with lower-income households of the pediatric populations, and private insurance coverage is typically associated with higher-income households of pediatric populations, as defined by federal poverty level guidelines.³ Despite these associations, "very few studies have captured the differences in the outcomes of pediatric patients based on their type of health insurance."³ One aspect that is lacking substantial research is the impact of insurance type on health outcomes in overweight and obese youth. This is an important aspect to focus on due to the increasing rates of obesity in the United States, spanning over the past three decades, rates which have now reached epidemic proportions.^{4,5} The present obesity rate compared to three decades ago has doubled for adults and tripled for youth.⁶ Currently, approximately one-third of adults in the United States are obese, and 17% of youth ages 2-19 years are obese.^{4, 5, 6, 7} This is alarming because being

overweight or obese are risk factors for other adverse health outcomes, such as asthma, diabetes, cardiovascular disease, and some cancers.^{7, 8} Therefore, it is important to address childhood obesity, especially considering that untreated childhood obesity puts youth at a risk for continuing to be overweight or obese into adulthood.⁹

Though there are many factors to consider in addressing childhood obesity, exploring the healthcare setting mostly utilized by children ages 3-15 years can play a vital role in identifying health concerns, such as obesity and overall health outcomes in this population.¹⁰ This is particularly important because the number of parents able to correctly perceive the weight status of their overweight or obese children has decreased by 30% compared to 1988-1994. Moreover, the number of overweight or obese youth ages 12-16 years able to correctly perceive their own weight status has also decreased by 30% compared to 1988-1994. Therefore, healthcare settings that have primary care providers (especially pediatricians), such as doctor's offices or health maintenance organizations (HMOs), are an especially important point of contact for overweight or obese youth. This is because addressing and monitoring the treatment of childhood obesity falls within the scope of expertise and abilities of primary care providers, even when pediatric patients and their families are unaware of the need to do so.¹¹

1.2 Purpose of Study

The association between childhood overweight and obesity and increased risk for adverse health outcomes has been established through substantial research. However, not many studies have focused on whether there are disparate health outcomes of overweight or obese pediatric patients when comparing their type of health insurance: private health insurance versus Medicaid insurance. If findings show that disparities do exist, additional research would be warranted to examine the reasons behind such disparities. This is especially pressing because of the current

epidemic rates of childhood obesity and the resulting health consequences. Thus, addressing the gaps that may exist for health outcomes among overweight or obese youth can result in a better understanding of addressing childhood obesity and associated outcomes.

1.3 Research Questions

The purpose of this study was to provide more insight into the nature of the relationship between types of health insurance (private insurance versus Medicaid insurance) and health outcomes.

Specifically, this study sought to answer these three questions in overweight or obese American youth ages 3-15 years:

- a. Is there an association between health insurance coverage type and general health status?
- b. Is there an association between health insurance coverage type and asthma prevalence?
- c. Is there an association between health insurance coverage type and healthcare setting mostly visited for healthcare services?

CHAPTER II: REVIEW OF THE LITERATURE

2.1 Overweight and Obesity Definition and Statistics

Obesity in a broad sense can be defined as the presence of “excess fat,” and this excess fat may result in adverse health outcomes.¹² The Centers for Disease Control (CDC) defines “overweight” as “greater than or equal to 85th percentile but less than 95th percentile for body mass index based on reference data from CDC growth charts.” The Centers for Disease Control (CDC) defines “obese” as “greater than or equal to 95th percentile for body mass index based on reference data from CDC growth charts.”⁵ For the past three decades, obesity rates have increased in both youth and adults. Twice as many adults and three times as many youth are currently obese compared to the obesity rates of adults and youth respectively in 1980. One-third of Americans are now obese.^{4,5} With regards specifically to youth in the United States, 14.9% of youth ages 2-19 years are overweight, and 16.9% of youth in the same age group are obese.¹³

2.2 Overweight and Obesity as Risk Factors and Comorbidities

These current rates of overweight and obesity are concerning, because research studies conducted on national and global scales have documented the various ways in which being overweight or obese can affect health and well-being. Countless studies have found detrimental health outcomes associated with overweight and obesity. Overweight and obesity are risk factors for or have comorbidities with at least thirty serious diseases.⁶ This includes asthma, diabetes, cardiovascular disease, kidney disease, and some cancers.⁸

Asthma

Multiple studies have found an association between obesity and asthma, with many of the studies finding that obese youth have a two times greater chance of having asthma compared to

healthy-weight youth. A causal relationship has not yet been determined; however, according to Beth A. Miller, MD, associate professor at the University of Kentucky College of Medicine, and director of the University of Kentucky Healthcare Asthma, Allergy, and Sinus Clinic in Lexington, KY, “there are studies that suggest that physiologically, obesity can cause asthma.”¹⁴ Possible mechanisms for this include: the under-expansion of lungs resulting in smaller breaths being taken by overweight or obese youth or chronic airway swelling and inflammation being more prevalent among overweight or obese youth.¹⁴

Black, Smith, Porter, Jacobsen, and Koebnick (2012) conducted a study which examined the association between childhood obesity and asthma.¹⁵ Their study was a population-based, cross-sectional study with 681,122 participants who were ages 6-19 years and covered under an integrated health insurance plan. They found that moderately obese participants had a 37% higher frequency of asthma compared to the normal weight participants. They found that extremely obese participants had a 68% higher frequency of asthma compared to the normal weight population.¹⁵ These findings suggest a causal relationship between the extent of obesity and asthma prevalence. Magnusson, Kull, Mai, Wickman, and Bergstrom (2012) conducted a study to expand upon the research examining the association between overweight or obesity and asthma.¹⁶ Their study focused on examining “the associations between high BMI and changes in BMI status during the first 7 years of life and asthma and allergic sensitization at age 8 years.”¹⁶ Their study followed a cohort of 2,075 youth from birth to age 8 years. They found that youth who were overweight or obese at age 1 year, 4 years, or 7 years had an increased risk for asthma incidence at age 8 years compared to youth who were normal weight. They did not find a significant association between BMI and asthma at 8 years for youth who were overweight or obese at age 18 months or at age 4 years when their BMI reflected a normal weight by age 7

years. They found an increased risk for asthma incidence, as well as inhalant allergies, at age 8 years for youth who were overweight or obese at age 7 years, regardless of their weight status during their previous years.¹⁶

Epilepsy

Daniels, Nick, Liu, Cassedy, and Glauser (2009) conducted a cohort study to examine the association between obesity and epilepsy.⁷ Their study participants included 251 youth ages 2-18 years in the epilepsy cohort and 597 youth ages 2-18 years in the “healthy” cohort. They found that youth who were diagnosed with epilepsy have greater body mass indices than youth who were not diagnosed with epilepsy. Among youth in the epilepsy cohort, 38.6% were overweight or obese compared to 28.4% of youth who were overweight or obese in the non-epilepsy cohort.⁷

Motor Skills

Sporis, Badric, and Miljkovic (2014) conducted a study to determine if obesity affects the motor abilities of girls.¹⁷ Their study participants were 413 girls ages 11-14 years. Their study involved conducting a series of motor skills analyses (e.g. running, sitting and reaching, tapping hand, tapping foot, long jumping, throwing) and obtaining body mass index (BMI) for each study participant. Their study found that overweight or obese girls had motor skills that were significantly lower than the girls that were not overweight or obese.¹⁷ This study shows that obesity can cause limitations on motor skills that would be useful for everyday functioning as well as for exercising, highlighting the detrimental physical functioning effects obesity can have on individuals.

Gut Health

Lee (2015) conducted a meta-analysis of twenty-one studies to determine the effects of obesity on gut health.¹⁸ These studies found that obesity was associated with many gastrointestinal symptoms including: vomiting, gastro-esophageal reflux, chest pain, diarrhea, and incomplete bowel movement. Moreover, these studies were conducted in Asia, where prior to the occurrence of growing obesity rates, many gut diseases had not been common.¹⁸ This study shows another aspect in which obesity can have detrimental physical effects, effects that have not been observed prior to the rise of obesity rates in a certain part of the world.

When considering the rates of overweight and obesity in the United States, these studies and countless others conducted in the United States and around the world show that a large portion of the American population, and the American pediatric population specifically, may be at an increased risk for developing not only asthma, diabetes, cardiovascular disease, kidney disease, some cancers, but also epilepsy, decreased motor level and abilities, and diminishing gut health, among a slew of other adverse health outcomes.

General Health

Obesity can also lead overweight or obese populations to have poor “general” or “overall” health. Rios-Martinez, Rangel-Rodríguez, and Pedraza-Moctezuma (2013) conducted a study on how obese individuals perceive the status of their overall health. Among their 224 study participants, they found that obese participants were more like to report feeling that their overall health has deteriorated or will deteriorate and to report feeling tired or exhausted, compared to normal weight participants. Moreover, participants who were morbidly obese reported more

limited physical movement ability, more overall pain, and poorer overall health, compared to participants who were obese but not morbidly obese.⁵⁶

2.3 Poverty, Education, and Childhood Overweight and Obesity

Overweight and obesity rates are prevalent among all socioeconomic statuses and age groups. However, these rates are greater in certain demographics compared to others. Using 1976-2008 data from the National Health and Nutrition Examination Survey (NHANES) and 2003 and 2007 data from the National Survey of Youth's Health (NSCH), Singh and Kogan (2014) completed a report on trends and patterns for childhood obesity in the United States.¹⁹ The study for their report included over 40,000 youth ages 10-17 years. They examined the relationship between household income, household education, and obesity. They found that there was a 10% increase in the obesity prevalence among youth 10-17 years between 2003 and 2007, while there was a 23% increase among the youth whose household income was below the Federal Poverty Level (FPL) during this same time frame.¹⁹ They also found that in 2007, 27.4% youth whose household income was below the FPL (categorized as "low-income") were obese compared to 10.0% of youth whose household income was equal to or greater than 400% of the FPL threshold (categorized as "high-income") who were obese (Figure 1). Youth in the low-income bracket had 2.7 times greater odds of obesity compared to youth in the high-income bracket. They also found that in 2007, 30.4% of youth whose parents had less than 12 years of education (categorized as "low-education") were obese compared to 9.7% of youth whose parents has a college degree (categorized as "high-education") who were obese (Figure 2). Youth in the low-education bracket had 3.1 times greater odds of obesity compared to youth in the high-education bracket. They also found that in 2007, around half of all youth in the low-income and low-education brackets were overweight, while around 23% of youth in the high-income or

high-education bracket were overweight. Lastly, they found that the prevalence of overweight and obesity has significantly increased for youth in the low-income bracket and the low-education bracket between 2003 and 2007, while the prevalence of overweight and obesity has remained the same and or decreased for youth in the high-income bracket and high-education bracket during that same time frame (Figure 1 and Figure 2).

Figure 1: Trends in Obesity and Overweight Prevalence (%) among Youth Ages 10-17 Years, by Household Income/Poverty Status (Federal Poverty Level [FPL]), United States 2003-2007¹⁹

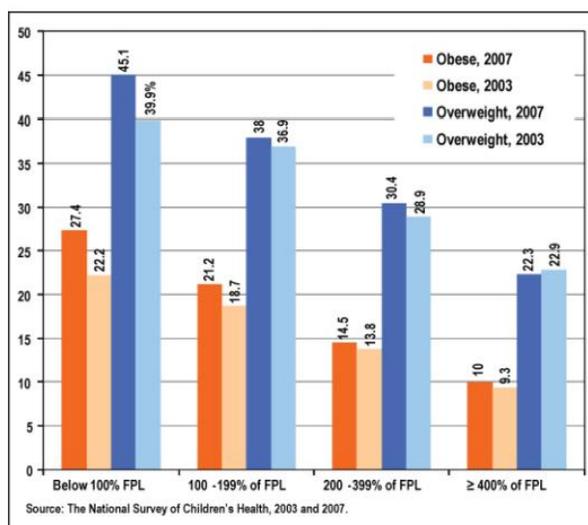
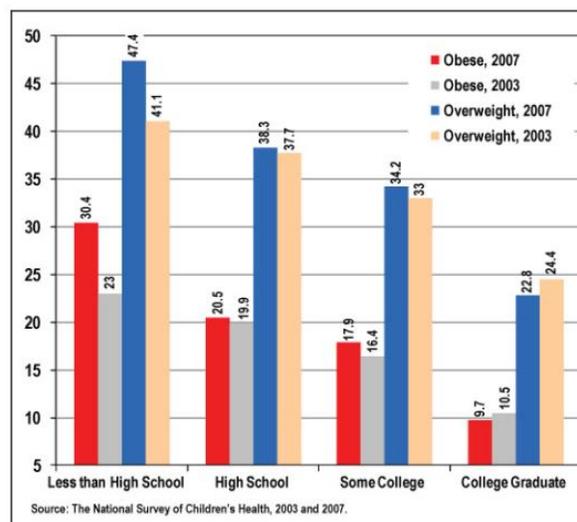


Figure 2: Trends in Obesity and Overweight Prevalence (%) among Youth Ages 10-17 Years, by Parental Education, United States 2003-2007¹⁹



Skelton, Cook, Auinger, Klein, and Barlow (2009) analyzed data for 12,384 youth ages 2–19 years in the United States using the Second National Health and Nutrition Examination Survey (NHANES II) 1976-1980, the Third National Health and Nutrition Examination Survey (NHANES III) 1988-1994, and NHANES 1999-2004.²⁰ In their study, “severely obese” was defined as “a BMI greater than or equal to 99th percentile” and “morbidly obese” as “a BMI greater than or equal to 40 kg/m².” They found that youth whose household income was in the highest income bracket had the lowest prevalence of severe obesity. They also found that severe obesity was 1.7 times more prevalent for youth whose household income was below the FPL

compared to youth whose household income was 300% greater than the FPL threshold.²⁰ The studies by Singh et al. and Skelton et al. show the inverse relationship between household income and childhood obesity.

2.4 Lifetime Costs and Implications of Childhood Overweight and Obesity

Overweight and obesity are associated with other adverse health conditions, often requiring healthcare utilization and treatment. As obesity rates have increased, so has the financial burden of obesity on the American healthcare system and population. At least 25% of total healthcare expenses in the United States are associated with obesity.⁶ Furthermore, childhood obesity has been associated with a lifetime healthcare cost of approximately \$12,900 to \$19,000 more per patient compared to lifetime healthcare costs of youth who are normal weight and continue to be so throughout their lifetime.⁶

Untreated childhood obesity has very serious implications. Youth who are overweight or obese have higher risks for developing chronic health conditions related to obesity, including conditions and diseases that were once considered “adult” conditions. This includes asthma, hypertension, atherosclerosis, and type 2 diabetes. Furthermore, untreated childhood obesity puts youth at risk for being obese into adulthood as well. Research shows that 25% of youth who are 12-years-old and obese will continue to be obese as adults.⁹ The same outcome can be observed among 13-year-olds to 19-year-olds who are obese as well.²¹ Therefore, addressing overweight and obesity in youth is vital to decreasing and preventing overall obesity rates and the consequences that come along with being overweight or obese.

According to Bradley Appelhans, PhD, clinical psychologist and obesity researcher at the Rush University Prevention Center, “[obese children] don't tend to get to a healthy weight

without some kind of treatment plan.”⁹ It is not outside of the realm of possibility that parents or guardians on their own can begin some sort of treatment plan for their children (e.g. through appropriate behavior modification if their child has just began to become overweight and has not developed any serious health complications). The problem with this possibility is that for parents to be aware of a need to start a treatment plan, these parents must be aware of the correct weight status of their children, and many parents are not. A study by Duncan, Hansen, Wang, Yan, and Zhang (2015) found that a large percentage of parents thought their children were “just about the right weight” when he or she was actually overweight or obese.²² The parents in this study were asked to choose from “overweight,” “underweight,” or “just about the right weight” to describe their children. The data source for their study was the National Health and Nutrition Examination Survey (NHANES) from 1988 to 1994 and from 2007 to 2012. Surveys from 1988 to 1994 were the “early survey” with 3,839 participants that were ages 2-5 years. Surveys from 2007 to 2012 were the “recent survey” with 3,153 participants that were ages 2-5 years. With respect to the early survey, 96.8% of parents believed their children were just about the right weight when he or she was overweight. With respect to the recent survey, 94.9% of parents believed their children were just about the right weight when he or she was overweight. The probability that parents perceived their overweight or obese child as “overweight” was 0.18 in the early survey and 0.14 in the recent survey. The probability that parents were able to correctly categorize their children’s weight has decreased by 30%, after adjusting for demographics and BMI z-scores, when comparing the early survey to the recent survey.²²

Zhang (2015), who was part of the research team that conducted the study on the “Change in Misperception of Child's Body Weight among Parents of American Preschool Children,” has led a new study in which he and his research team found a decrease in the rate of

overweight and obese youth who are able to correctly perceive their weight status.²³ The data source for this study was also the National Health and Nutrition Examination Survey (NHANES) from 1988 to 1994 and from 2007 to 2012. Surveys from 1988 to 1994 were the “early survey” in this study with 1,720 participants that were ages 12-16 years. Surveys from 2007 to 2012 were the “recent survey” in this study with 2,518 participants that were ages 12-16 years. The adjusted probability that overweight or obese participants correctly categorized their weight as “overweight” has decreased by 30% when comparing the early survey to the recent survey.²³

Sarafrazi, Hughes, Borrud, Burt, and Paulose-Ram (2015) completed a CDC National Center for Health Statistic Data Brief Report highlighting weight perception findings among youth ages 8-15 years who participated in the 2005-2012 National Health and Nutrition Examination Survey (NHANES).²⁴ They found that the following percentage of youth who incorrectly perceived themselves as just about the right weight included: 81% of boys who were overweight, 71% of girls who were overweight, 48% of boys who were obese, and 36% girls who were obese. They also found that self-misperceived weight status prevalence was inversely proportional to household income: 26.3% among youth whose household income was greater than or equal to 350% of the FPL threshold, 30.7% among youth whose household income was 130-349% of the FPL threshold, and 32.5% among youth whose household income was less than 130% of the FPL threshold.²⁴

These increases in misperceptions are especially problematic considering that the prevalence of overweight and obesity in youth is also increasing. If youth and parents are not able to correctly identify concerns about childhood weight status, it is then particularly important that these youth are seen by healthcare professionals who can identify such concerns. It may be the only way youth who are overweight or obese can be identified and informed as such.²⁴ That

is, children and adolescents who are aware that they are overweight or obese are more likely to effectively modify behaviors.²⁵ Parental perception of childhood obesity also plays a key role in preventing and addressing overweight and obesity in youth, especially among younger youth.²²

2.5 Role of Healthcare Setting Utilization Behavior in Combating Childhood Overweight and Obesity and Associated Adverse Health Outcomes

There are different types of healthcare settings that are available in the United States for seeking healthcare services. This includes: doctor's offices with primary care providers, health maintenance organizations (HMOs), urgent care services, walk-in clinics, health centers, hospital outpatient departments, and hospital emergency departments.^{11, 26, 27}

Primary care providers at doctor's offices and HMOs can treat illnesses and injuries and provide preventative healthcare services.^{11, 27} Typically, patients can form long-term relationships with their primary care provider. Because of this, primary care providers who are familiar with the medical history of their patients: can provide health and wellness education to their patients, can assist with monitoring and maintaining chronic health conditions, are the first point of contact and action for illness and injury diagnosis and treatment, and can refer their patients to the situation-appropriate specialist.¹¹

Urgent care services and walk-in clinics provide easily accessible healthcare, which is helpful to patients when doctor's offices are closed or inaccessible. Patients with non-life threatening, urgent healthcare needs can be evaluated at urgent care facilities. Usually, there is a minimum of one medical doctor available at urgent care facilities. Patients with minor illnesses or injuries can be seen at walk-in clinics. Usually, patients are seen by a nurse practitioner or physician assistant at walk-in clinics.¹¹

Federally qualified health centers (FQHCs), often referred to as community health centers (CHCs), are patient-directed and community-based. They provide health resources to communities that would otherwise have limited access and are in underserved communities. They serve high-needs or at-risk populations (e.g. homeless populations, immigrant populations). They provide health and supplemental services (e.g. transportation, education, translation), with sliding fee scales based on ability to pay. They are governed by a board that comprises of at least 51% of members who are part of the community and utilize the health center. Lastly, many receive enhanced Medicare and Medicaid reimbursement.^{28, 29, 30}

Hospital outpatient departments provide medical services and tests without requiring patients to stay overnight at the hospital. Outpatient services can vary from hospital to hospital but may include: prevention and wellness programs, diagnostic testing, treatments such as surgery and chemotherapy, physical therapy, and rehabilitation. Though the medical professionals at hospital outpatient departments are highly-trained, many times the medical professionals or the outpatient departments only have one service or a few services in which they specialize in.²⁶

Hospital emergency departments, often referred to as emergency rooms, provide medical care to patients with immediate medical care needs. This includes patients with life-threatening illnesses or injuries.³¹ Most emergency rooms differ from other healthcare facilities in that patients have a legal right to emergency room services (e.g. screening evaluations, stabilizing treatments) regardless of whether they can afford to pay for such healthcare services.³²

Medical professionals at all these types of healthcare settings can evaluate and treat youth. However, a primary care provider, particularly a pediatrician, is best trained to address and manage care for chronic conditions in youth, such as childhood obesity and associated

adverse health outcomes in their patients.¹⁰ There are many reasons why primary care providers can adequately address and manage chronic conditions in youth, including the nature and length of the doctor-patient relationship of primary care physicians and their patients, the familiarity that primary care providers have regarding the medical history and medical records of their patients, their ability to refer patients to the appropriate next steps after addressing such a condition, and in the case of pediatricians, medical knowledge specialized to youth.^{11, 26} Patients often seek medical care at urgent care facilities and walk-in clinics due to ease and convenience, at emergency departments due to access to emergency room services regardless of their ability to pay at the time of service, and at outpatient hospital departments for a combination of reasons as well.^{11, 32} In general, healthcare professionals at these facilities do not have the intimate knowledge of the past medical history and records of their patients that primary care providers do. They do not have long-term relationships with their patients as primary care providers do. They may not have the training or services available to treat chronic conditions. Even if a primary care provider, particularly a pediatrician, is not able to treat a chronic condition, they are trained to be able to monitor signs and symptoms for any such healthcare concern, e.g. through routine check-ups and physicals. Furthermore, they can refer patients to the appropriate setting for care and can track the care of their patients to ensure patient adherence and compliance. Moreover, healthcare professionals at urgent care facilities, walk-in clinics, hospital outpatient departments, and hospital emergency departments are more likely to focus only on the acute condition for which their patients are seeking treatment. In contrast, primary care providers are responsible for the overall health and well-being of their patients. Primary care providers can better address childhood obesity or other chronic conditions, even when a patient who is overweight or obese comes in to be treated for an unrelated health issue.^{10, 11, 26}

2.6 Private Health Insurance versus Medicaid

Private insurance plans are accessible for youth and adults in the United States through purchasing group-based insurance plans (e.g. employer-based insurance plans) or non-group-based insurance plans. There are several different types of private health insurance plans that are offered by private insurance companies. Health maintenance organization (HMO) insurance plans require the selection of a primary provider, with the primary care provider being chiefly responsible for and consolidating the care of his or her patients. Often, recommendations or referrals from a primary care provider are required for a patient to be seen by a specialist or have certain medical tests done. In-network healthcare providers are accessible with a referral from a primary care provider, but out-of-network healthcare providers are not covered under an HMO insurance plan. Preferred Provider Organization (PPO) insurance plans are an option for patients who would like more flexibility than an HMO plan. Patients do not have to select one primary care provider, referrals are not needed in many instances, and patients may still be covered at some portion if they choose to see a healthcare provider that is out-of-network. Though PPO insurance plans are more flexible than HMO insurance plans, PPO insurance plans typically have higher costs compared to HMO insurance plans.²⁷ Exclusive Provider Organization (EPO) insurance plans are another type of insurance plan, which generally cost less than HMO and PPO plans. Patients have access to EPO network healthcare providers, but out-of-network healthcare providers are not covered under an EPO insurance plan. Point of Service (POS) insurance plans are a combination of HMO and PPO insurance plans. POS insurance plans require the selection of a primary provider who patients see for routine office visits and check-ups. Patients also have the option of seeing out-of-network providers, but at a greater cost to them. Lastly, High

Deductible Health Plan (HDHP) insurance plans typically have lower premiums but higher deductibles that need to be met before the health insurance coverage benefits apply.³³

Medicaid is a healthcare program in the United States that allows youth, adults, pregnant women, individuals with disabilities, and seniors who meet certain requirements to receive health insurance coverage.³⁴ Medicaid is administered to these individuals at the state level, with funding for the program received from both the state and federal level. Benefits of the program include:

Inpatient hospital services, outpatient hospital services, early and periodic screening, diagnostic services, treatment services, nursing facility services, home health services, physician services, rural health clinic services, federally qualified health center services, laboratory and x-ray services, family planning services, nurse midwife services, certified pediatric and family nurse practitioner services, freestanding birth center services, and tobacco cessation counseling for pregnant women.³⁴

There are also other optional benefits that Medicaid may provide such as “prescription drugs, clinic services, and physical therapy.”³⁴ The extent of the benefits available for individuals enrolled in Medicaid is determined at the state level, but “early, periodic screening, diagnosis and treatment (EPSDT)” services are available to all youth who are enrolled in Medicaid. Medicaid income limits for adults and youth vary from state to state but are generally determined as a certain percentage below the Federal Poverty Level (FPL). States have the option of setting income limits higher than the federal income limits (e.g. with modified adjusted gross incomes through income deductions for certain groups).^{34, 25} At least 43 million youth have health insurance coverage through either Medicaid or the Youth's Health Insurance Program.³⁴ All

youth ages 0-6 years whose family income is up to 133% of the Federal Poverty Level (FPL) are eligible for Medicaid in all states.³⁴ All youth ages 6-18 years whose family income is up to 100% of the Federal Poverty Level (FPL) are eligible for Medicaid in all states.³⁴ The Youth's Health Insurance Program is a health insurance enrollment option for uninsured youth ages 0-19 years whose family income is higher than the income limits set forth for Medicaid eligibility.³⁴

Chang, Freed, Prosser, Patel, Erickson, Bagozzi, and Balkrishnan (2014) conducted a study to compare health utilization outcomes for youth who have asthma and are enrolled in private health insurance or Medicaid insurance.³ Their study included 6,435 youth ages 3-18 years with Medicaid and 4,592 youth age 3-18 years with private health insurance. They found that among youth with asthma, those who had Medicaid had lower rates of medication adherence, 20% greater rates of inpatient hospitalization, 48% greater odds of emergency room visits, and 42% less rates of outpatient visits, compared to youth who had private health insurance.³

2.7 Poverty, Healthcare, and Insurance

After adjusting for demographics, individuals in lower income brackets have a greater likelihood of skipping or delaying healthcare services because of the costs associated with such medical treatment. This includes medical care, dental care, mental health care, and prescription drug needs. Other factors that contribute to skipping or delaying healthcare services include: not having health insurance coverage and not having a routine place in which a patient seeks healthcare services.³⁶ The majority of youth in the United States do have health insurance coverage (either private or public insurance) and do have a routine place in which they receive healthcare services. Among youth under age 18 years, 6.5% do not have any sort of health insurance coverage, and 3.8% do not have a routine place in which they receive healthcare services.³⁷ This leaves socioeconomic status as well as any difference in type of health insurance

and difference in type of routine facility for healthcare services as the top contributing factors to adequate healthcare treatment. With regards to socioeconomic status and insurance, Medicaid insurance coverage is generally associated with lower socioeconomic status and private insurance with higher socioeconomic status.³

2.8 Household Parental Demographics and the Health and Healthcare of Youth

In addition to participant age, participant sex, participant race, and family income-to-poverty level, the participants' head of household age, head of household sex, head of household highest level of education completed, and head of household marital status were controlled for when calculating the adjusted odds for this study. This was done due to the complex associations that exist between parental demographics of households, particularly household headship demographics, and the health, healthcare, and overall well-being of the youth in the households.

The head of household is typically the main or sole financial provider of a household. Financial disparities currently exist between men and women, with women being more likely to be financially underprivileged compared to men. Though the workforce almost equally consists of men and women, there is gender-wage gap for practically all occupations in the United States, with an average wage gap of 21% between men and women.³⁸ This lack of gender neutrality in the workforce means that households with female heads are more likely to be financially disadvantaged compared to households with male heads. Due to the nature of their role within the household, women who are the heads of their household tend to have greater autonomy and control of their household compared to women who are not.³⁹

Household marital status also correlates with household income and the health of youth in households. Households with single mother heads earn an average income that is 47% of the average income earned in married couple households.⁴⁰ The percentage of households with youth

and divorced heads that earn a household income below the Federal Poverty Level is 28% compared to 19% that earn a household income below the Federal Poverty Level for households with youth and without divorced heads.⁴¹ Low-income households with unmarried female heads are more likely to remain impoverished compared to low-income households with married couples and low-income households with unmarried male heads.⁴² The percentage of youth who have poor overall health and are living in households with single parent heads is 22% compared to 12% of youth who have poor overall health and are living in nuclear family households.⁴³ Youth living in nuclear family households have the lowest rate of emergency room usage compared to youth living in households comprising of every other family type.⁴⁴ Youth living in married couple households are less likely to be exposed to cigarettes (second-hand smoke) and alcohol, because individuals who are married smoke less cigarettes and drink less alcohol compared to individuals who are not.⁴⁵

With household income differences that exist between female versus male household heads as well as the marital status of households, it is important to note the association of income and chronic health conditions. Among youth in households that are low-income, 32.4% have a chronic health condition, and 11.4% feel limited by it. Among youth in households that are not low-income, 26.5% have a chronic health condition, and 7.0% feel limited by it. The percentage of youth in low-income households who feel limited by their chronic health condition increases to 14.1% when these youth become adolescents. The percentage of youth not in low-income households who feel limited by their chronic health condition remains almost unchanged at 7.8% when these youth become adolescents.⁴⁶ Additionally, two times as many youth are considered as having not “very good” health in low-income households compared to households that are not low-income.⁴⁶

Parental income is associated with whether their children have employer-based private health insurance coverage. Most adults who earn less than \$24,000 annually do not have employer-based health insurance, and many never do throughout the course of their lifetime. The number of adults who earn between \$24,000 and \$48,000 annually that have employer-based health insurance increases as their age does. Among adults who earn greater than \$48,000, 80% have employer-based health insurance.⁴⁷ Because most youth under 18 years that have private health insurance coverage are covered under the insurance policies of their parents, the number of youth who have private health insurance increases as their parental income increases.

Parental age is also associated with whether their children have employer-based private health insurance. Compared to youth whose parents are not in their 40s, youth whose parents are in their 40s are more likely to have private health insurance. This can be attributed to the percentage of adults who have employer-based private health insurance peaking at the age group of adults in their 40s, with that percentage being 64% of adults in their 40s. Compared to youth whose parents are not in their mid-twenties, youth whose parents are in their mid-twenties are less likely to have private health insurance. This can be attributed to health insurance coverage being at its lowest for adults in their mid-twenties.⁴⁷ Again, because the majority of youth who have private health insurance coverage are covered under the health insurance policies of their parents, health insurance coverage rates differ in adults by age and affect the type of health insurance of their children as well.

The correlation between household income and pediatric health has been established. A third factor that is correlated with the first two is household education. Education and income are proportionally related: as the highest level of education increases so does income earned. The median annual income for households with heads that have some high school education is

approximately \$25,000 or less. The median annual income for households with heads that are high school graduates or equivalent is approximately \$40,000. The median annual household income is approximately \$50,000 for heads of household with some college education without a degree, \$60,000 for heads with an associate degree, and \$80,000 for heads of household with a bachelor's degree. The median annual household income for heads of household with master's degree, professional degree, or doctorate degree is \$100,000 or greater.⁴⁸ This means that youth living in households with heads who have more education are more likely to be living in higher-income, higher-socioeconomic status households compared to youth living in households with heads who have less education.

Parental education, in particular maternal education, is also correlated with pediatric health. As the number of women able to pursue higher education increased in the 1960s and 1970s, so too did infant birth weight and gestational age, two measures of infant health. Mothers who have higher education are more likely to engage in health behaviors that positively affect their children.⁴⁸ Mothers who have higher education are less likely to smoke, less likely to drink, more likely to take vitamins, and more likely to get prenatal care than mothers who are less educated.⁴⁹

2.9 Summary

Almost one-third of youth in the United States are either overweight or obese. This puts these youth at an increased risk for overweight and obesity-related or associated adverse health outcomes, many of which were previously seen in adults only. Examples include: asthma, diabetes, cardiovascular disease, kidney disease, some cancers, epilepsy, decreased motor level and abilities, and diminishing gut health. Therefore, it is important that childhood overweight and obesity as well as other chronic conditions be addressed and treatment monitored, which the

appropriate healthcare professionals can do. This is especially true if they see pediatric overweight or obese patients on a routine basis and are responsible for monitoring the overall health and well-being of their patients, such as in the manner that primary care providers would be able to.

Most youth in the United States do indeed have a routine place that they receive healthcare services, the percentage of this being 96.2% of youth.³⁷ Furthermore, most youth in the United States have healthcare insurance coverage, the percentage of this being 93.5% of youth.³⁷ Therefore, it is important to understand if a difference in the type of insurance coverage (private versus public health insurance) for youth, and in particular for those who are overweight or obese, is associated with a difference in health outcomes in these youth. Moreover, it is important to understand if the routine place in which these youth receive healthcare services the most differs by type of type of insurance (again private versus public), since primary care providers, particularly pediatricians, have the expertise and ability to address and monitor the health status and treatment, particularly for chronic conditions, of youth.

There is a greater association of poverty with adverse health outcomes and a greater association of poverty with Medicaid, a public health insurance program, compared to private health insurance plans. The purpose of this study is to gain a better understanding of the relationship between type of insurance (private insurance versus Medicaid), health, and healthcare utilization for overweight and obese youth. The study by Chang et al. has shown differences in healthcare utilization by type of insurance coverage among youth who have asthma.³ This study has similar aims for overweight or obese youth with regard to their health and healthcare.

CHAPTER III: METHODS

This cross-sectional study was conducted to examine the association between types of health insurance and selected health variables for overweight or obese youth ages 3-15 years. The main independent variable for this study was health insurance coverage type (private insurance or Medicaid insurance). The dependent variables for this study were perceived general health, asthma, and healthcare setting mostly visited for healthcare services.

Institutional Review Board (IRB) approval was not needed for this study due to the use of de-identified secondary data. Secondary data for this study were obtained from the 2012 National Health and Nutritional Examination Survey (NHANES) National Youth Fitness Survey (NNYFS).

The NNYFS was conducted by the Centers for Disease Control and Prevention (CDC). CDC researchers utilized several stages of sampling to collect primary survey data nationwide. CDC researchers screened participants in households based on sex, age, and location. CDC researchers completed interviews answered by the parents or legal guardians of eligible participants and physical exams on eligible participants (n=1,576). Refer to the “Appendix” for more in-depth methods used by the CDC to sample and collect data.

For this study, age, sex, race, family income-to-poverty ratio, and head of household information data were obtained from the 2012 NNYFS demographics questionnaires. Health insurance data were obtained from the 2012 NNYFS health insurance questionnaires, which included questions regarding current health insurance coverage status and type of health insurance. Asthma data were obtained from the 2012 NNYFS medical conditions questionnaires, which included questions regarding whether a child had been told he or she has asthma by a healthcare professional, current asthma status, asthma attack occurrence within the past year, and

whether a healthcare professional has prescribed medication for asthma. General health and healthcare utilization data were obtained from the 2012 NNYFS hospital utilization and access to care questionnaires.

“Underweight” was defined as “less than 5th percentile for body mass index based on reference data from CDC growth charts.” “Normal weight” was defined as “greater than or equal to 5th percentile but less than 85th percentile for body mass index based on reference data from CDC growth charts.” “Overweight” was defined as “greater than or equal to 85th percentile but less than 95th percentile for body mass index based on reference data from CDC growth charts.” “Obese” was defined as “greater than or equal to 95th percentile for body mass index based on reference data from CDC growth charts.” Participants were categorized “overweight or obese” if their BMI was greater than or equal to 85th percentile based on reference data from CDC growth charts.

Since this study focused on health insurance and health outcomes of overweight and obese youth, only the 2012 NNYFS data for overweight or obese participants who had either private health insurance or Medicaid were used. This resulted in a sample size of 434 youth ages 3-15 years. Underweight or normal weight participants of the 2012 NNYFS were excluded from the study. Participants of the 2012 NNYFS who did not have private health insurance or Medicaid were also excluded from the study. Lastly, participants of the 2012 NNYFS who had missing data for weight status or insurance status were excluded from the study.

“Poverty” was defined as having an income-to-poverty ratio below 1. Participants were considered as “having asthma” if at least one of the following questions were answered affirmatively in 2012 NNYFS: child has been told he or she has asthma by a healthcare professional, currently has asthma, asthma attack has occurred within the past year, and

healthcare professional has prescribed medication for asthma. Participants were categorized as having generally good health if the question regarding general health was answered with “excellent,” “very good,” or “good.” Participants were categorized as not having generally good health if the 2012 NNYFS question regarding general health was answered with “fair” or “poor.” Participants were categorized as going to a primary care provider mostly for healthcare services if they answered in the 2012 NNYFS that they go to a “doctor’s office” or “HMO” most often for healthcare services. Participants were categorized as not going to a primary care provider mostly for healthcare if they answered in the 2012 NNYFS that they go to a “clinic,” “health center,” “hospital emergency room,” “hospital outpatient department,” or “some other place” most often for healthcare services.

The analyses of this study were completed with IBM Statistical Package for the Social Sciences (SPSS) 22.0 for Windows. The frequencies of basic characteristics of eligible participants were obtained. The frequencies in which certain characteristics (fair to poor general health, positive asthma status, and doctor’s office or HMO mostly visited for healthcare services) were present among the main independent variable, type of health insurance (private insurance versus Medicaid insurance), were obtained. Univariate logistic regression analysis was used to determine if there was any association between types of health insurance and the selected health outcomes general health, asthma, and healthcare setting visited mostly for healthcare services. Odds ratios and the associated confidence interval of 95% were calculated, and a p-value less than 0.05 was considered significant. Multivariate logistic regression analysis was then performed to determine the association between types of health insurance and the selected health variables as well as to control for predictor factors. This was done by including multiple independent variables in the model along with type of health insurance to control for the other

predictors. Adjusted odds ratios and the associated confidence interval of 95% were calculated, and a p-value less than 0.05 was considered significant.

CHAPTER IV: RESULTS

Basic characteristics of eligible participants can be found in Table 1, including frequencies for age groups, sex, race, and family income-to-poverty ratio. The ages of the participants in the study were normally distributed, ranging from 3 years to 15 years. The mean age was 9.37 years ($SD\pm 3.52$). The sex distribution of the study participants included 53.7% male study participants and 46.3% female study participants. The type of insurance among all participants can be found in Table 1 as well, with 58.1% of the participants having private health insurance and 41.9% of the participants having Medicaid insurance. Lastly, the general health status, asthma status, and healthcare setting mostly visited for healthcare services among all participants can be found in Table 1. Among all participants, 3.5% had fair to poor health, 20.3% had asthma, and 75.1% visited a doctor's office or HMO mostly for healthcare services.

Table 1: Descriptive Characteristics of Eligible Participants

	N	Percent (%)
Age		
3-4 years	48	11.0
5-10 years	206	47.5
11-13 years	121	27.9
14-15 years	59	13.6
Sex		
Male	233	53.7
Female	201	46.3
Race		
White	167	38.5
Hispanic	131	30.2
Black	105	24.2
Multiracial/Other	31	7.1
Family Income-to-Poverty Ratio		
Family Income <100% FPL	123	28.3
Family Income ≥100% FPL	292	67.3
Insurance		
Private	252	58.1
Medicaid	182	41.9
General Health		
Excellent to Good	419	96.5
Fair to Poor	15	3.5
Asthma		
Yes	88	20.3
No	346	79.7
Healthcare Setting Mostly Visited		
Doctor's Office or HMO	326	75.1
Clinic, Health Center, Outpatient Hospital, or ER	108	24.9
Total	434	100.0

Basic characteristics of the heads of household of the eligible participants can be found in Table 2, including frequencies for age groups, sex, highest level of education obtained, and marital status. The ages of the heads of household of the study participants were normally distributed ranging from 18 years to 79 years. The mean age was 40.61 years ($SD \pm 9.389$). The

sex distribution of the heads of household of the study participants included 44.7% male heads of household and 55.3% female heads of household.

Table 2: Descriptive Characteristics of Heads of Household of Eligible Participants

	N	Percent (%)
Head of Household Age		
18-19 years	3	0.7
20-29 years	30	6.9
30-39 years	182	42.0
40-49 years	142	32.7
50-59 years	67	15.4
60-69 years	7	1.6
70-79 years	3	0.7
Head of Household Sex		
Male	194	44.7
Female	240	55.3
Head of Household Highest Level of Education		
Some High School Education	92	21.6
High School Graduate or Equivalent	90	21.2
Some College Education	131	30.8
College Graduate or Above	112	26.4
Head of Household Marital Status		
Married	273	62.9
Widowed	6	1.4
Divorced or Separated	79	18.8
Never Married	36	8.6
Living with Partner	27	6.4
Total	434	100.0

Rates of general health status, asthma status, healthcare setting mostly visited for healthcare services among participants by their type of insurance can be found in Table 3. Among participants with private health insurance, 2.4% had fair to poor health, 19.4% had asthma, and 88.9% visited a doctor's office or HMO mostly for healthcare services. Among participants with Medicaid, 4.9% had fair to poor health, 21.4% had asthma, and 56.0% visited a doctor's office or HMO mostly for healthcare services.

Table 3: Rates of General Health, Asthma, and Healthcare Setting Mostly Visited for Healthcare Services of Eligible Participants by Type of Insurance

	Private Insurance	Medicaid
General Health		
Excellent to Good	246 (97.6%)	173 (95.1%)
Fair to Poor	6 (2.4%)	9 (4.9%)
Asthma		
Yes	49 (19.4%)	39 (21.4%)
No	203 (80.6%)	143 (78.6%)
Healthcare Setting Mostly Visited		
Doctor's Office or HMO	224 (88.9%)	102 (56.0%)
Clinic, Health Center, Outpatient Hospital, or ER	28 (11.1%)	40 (44.0%)

Univariate analyses of insurance type and general health, asthma, and health setting mostly visited for healthcare services can be found in Table 4. Participants with Medicaid insurance had 2.133 times greater odds of having fair to poor general health compared to participants with private insurance. This difference was not statistically significant. Participants with Medicaid insurance had 1.130 times greater odds of having asthma compared to participants with private insurance. This difference was not statistically significant. Participants with Medicaid insurance were 15.9% less likely to go to a doctor's office or HMO mostly for healthcare services compared to participants with private insurance. This difference was statistically significant.

Table 4: Univariate Analysis of Insurance and General Health, Asthma, and Healthcare Setting Mostly Visited for Healthcare Services

	Odds Ratio	95% CI	P-value
General Health			
Private Insurance (Reference)			
Medicaid	2.133	0.746-6.102	0.158
Asthma			
Private Insurance (Reference)			
Medicaid	1.130	0.705-1.811	0.612
Healthcare Setting Mostly Visited			
Private Insurance (Reference)			
Medicaid	0.159	0.098-0.260	< 0.001*

*. OR is significant at the 0.05 level (2-tailed).

Multivariate analyses for insurance and each of the dependent variables can be found in Table 5, Table 6, and Table 7 respectively. Adjusted odds ratios controlled for participant age, participant sex, participant race, family income-to-poverty level, head of household age, head of household sex, head of household highest level of education completed, and head of household marital status.

Controlling for the predictor factors, participants with Medicaid insurance had 2.016 times greater adjusted odds of having fair to poor general health compared to those with private insurance. This difference was not statistically significant. Controlling for the predictor factors, participants living with married heads of household (reference group) and widowed heads of household (OR=0.0; CI=0.000) as well as never married heads of household (OR=0.0; CI=0.000) had the same adjusted odds of having fair to poor general health.

Table 5: Multivariate Analysis for General Health

Predictor Variable	Odds Ratio	95% CI	P-value
Insurance			
Private (Reference)			
Medicaid	2.016	0.411-9.882	0.388
Age			
	0.992	0.837-1.177	0.931
Sex			
Male (Reference)			
Female	0.420	0.123-1.431	0.165
Race			
White (Reference)			
Hispanic	1.387	0.244-7.875	0.712
Black	1.171	0.162-8.478	0.876
Other/Multiracial	7.452	0.988-56.219	0.051
Family Income-to-Poverty Ratio			
≥100% FPL (Reference)			
<100% FPL	0.711	0.159-3.185	0.655
Head of Household Age			
	1.011	0.941-1.086	0.764
Head of Household Sex			
Male (Reference)			
Female	4.258	1.104-16.416	0.035*
Head of Household Highest Level of Education			
College Graduate or Above (Reference)			
Some College	1.523	0.227-10.243	0.665
High School Graduate or Equivalent	2.522	0.341-18.658	0.365
Some High School	7.590	0.937-61.445	0.058
Head of Household Martial Status			
Married (Reference)			
Widowed	0.000	0.000	0.999
Divorced or Separated	0.486	0.108-2.200	0.349
Never Married	0.000	0.000	0.998
Living with Partner	0.959	0.157-5.851	0.964

*. OR is significant at the 0.05 level (2-tailed).

Controlling for the predictor factors, participants with Medicaid insurance had 2.565 times greater adjusted odds of having asthma compared to those with private insurance. This difference was statistically significant.

Table 6: Multivariate Analysis for Asthma

Predictor Variable	Odds Ratio	95% CI	P-value
Insurance			
Private (Reference)			
Medicaid	2.565	1.180-5.577	0.017*
Age			
	1.111	1.019-1.210	0.017*
Sex			
Male (Reference)			
Female	1.121	0.657-1.913	0.675
Race			
White (Reference)			
Hispanic	0.479	0.209-1.101	0.083
Black	0.723	0.355-1.472	0.371
Other/Multiracial	0.735	0.252-2.147	0.574
Family Income-to-Poverty Ratio			
≥100% FPL (Reference)			
<100% FPL	0.605	0.274-1.333	0.212
Head of Household Age			
	1.005	0.968-1.043	0.798
Head of Household Sex			
Male (Reference)			
Female	1.308	0.680-2.516	0.420
Head of Household Highest Level of Education			
College Graduate or Above (Reference)			
Some College	1.232	0.614-2.473	0.557
High School Graduate or Equivalent	1.154	0.516-2.579	0.727
Some High School	0.505	0.178-1.432	0.199
Head of Household Martial Status			
Married (Reference)			
Widowed	0.454	0.031-6.544	0.562
Divorced or Separated	0.573	0.259-1.267	0.169
Never Married	1.006	0.367-2.758	0.991
Living with Partner	0.160	0.019-1.345	0.092

*. OR is significant at the 0.05 level (2-tailed)

Controlling for the predictor factors, participants with Medicaid insurance were 64.2% less likely to go to a doctor's office or HMO mostly for healthcare services compared to participants with private insurance. This difference was not statistically significant.

Table 7: Multivariate Analysis for Healthcare Setting Mostly Visited for Healthcare Services

Predictor Variable	Odds Ratio	95% CI	P-value
Insurance			
Private (Reference)			
Medicaid	0.642	0.291-1.415	0.272
Age			
	1.053	0.957-1.159	0.288
Sex			
Male (Reference)			
Female	0.786	0.417-1.483	0.458
Race			
White (Reference)			
Hispanic	0.178	0.078-0.408	< 0.001*
Black	0.668	0.250-1.784	0.421
Other/Multiracial	0.186	0.047-.734	0.016*
Family Income-to-Poverty Ratio			
≥100% FPL (Reference)			
<100% FPL	0.713	0.327-1.555	0.395
Head of Household Age			
	0.999	0.959-1.041	0.965
Head of Household Sex			
Male (Reference)			
Female	0.795	0.365-1.732	0.564
Head of Household Highest Level of Education			
College Graduate or Above (Reference)			
Some College	0.923	0.282-3.017	0.894
High School Graduate or Equivalent	0.279	0.088-0.878	0.029*
Some High School	0.069	0.021-0.232	< 0.001*
Head of Household Martial Status			
Married (Reference)			
Widowed	1.485	0.133-16.637	0.748
Divorced or Separated	0.494	0.208-1.172	0.110
Never Married	0.527	0.172-1.618	0.263
Living with Partner	0.168	0.048-0.580	0.005*

*. OR is significant at the 0.05 level (2-tailed).

CHAPTER V: DISCUSSION AND CONCLUSION

5.1 Discussion of Research Questions and Study Implications

A large percentage of youth in the United States have either private health insurance or Medicaid insurance.² Despite the high number who have either of these two types of insurance plans, very few studies have compared health outcomes of youth by private insurance versus Medicaid insurance. Private health insurance is generally associated with higher socioeconomic status and household income levels.³ Medicaid is generally associated with lower socioeconomic status and household income levels. Lower socioeconomic status is associated with many adverse health conditions.³ Thus, the relationship between types of health insurance and health outcomes of youth is an area of research that needs more focus. Moreover, because childhood obesity is also associated with other adverse health outcomes, it is important to address and treat obesity during childhood.^{7,8} This is especially pressing due to epidemic levels of childhood obesity in the United States and the increased risk that overweight or obese youth have of being overweight or obese as an adult compared those youth that are normal weight.^{4,5,9} Though there are many ways in which childhood obesity can be addressed and treated, primary care providers, and in particular pediatricians, have the skills, knowledge, expertise, and resources to address it effectively.^{10, 11, 26} Though the majority of youth have a particular type of healthcare setting which is utilized mostly for their healthcare needs, it is not always in a primary care setting.

The purpose of this study was to conduct research on the relationships between obesity, types of insurance, and health outcomes. This study focused on comparing the perceived general health status, asthma status, and healthcare setting utilization behavior of overweight and obese youth by their type of insurance. Data from the 2012 National Health and Nutritional Examination Survey (NHANES) National Youth Fitness Survey (NNYFS) were used for this

study. Only youth ages 3-15 years who were overweight or obese and had either private health insurance or Medicaid insurance were included in the study (n=434).

There was no statistically significant difference in overall general health between overweight or obese participants enrolled in Medicaid insurance and private insurance, when unadjusted (OR=2.1; CI=0.746-6.102) and after adjusting for predictor factors (aOR=2.0; CI=0.411-9.882). However, one reason for this may be due to the small sample size of the youth who had generally fair to poor health (n=6 among youth with private insurance, n=9 among youth with Medicaid). Literature has shown that lower household income is associated with poorer general health among the overall pediatric population.⁴⁵ Therefore, it is critical to further examine the relationship between household income and general health among a pediatric population that has a greater risk of adverse health outcomes than the overall pediatric population: the overweight or obese pediatric population.

Participants with Medicaid insurance had greater odds of having asthma compared to participants with private insurance (OR=1.1; CI=0.705-1.811), but this difference was not statistically significant. After adjusting for the predictor factors, participants with Medicaid insurance had statistically significant greater adjusted odds of having asthma compared to participants with private insurance (aOR=2.6; CI=1.180-5.577). The unadjusted odds were not significant, but the adjusted odds showed a greater and significant difference in asthma prevalence when comparing the two types of insurance of the participants. This is an important finding, because the literature has found an association between socioeconomic status and asthma as well as socioeconomic status and Medicaid.³ This study shows that type of insurance is correlated with asthma prevalence. Thus, there is a possibility that asthma prevalence can be decreased among a demographic known to have a high asthma prevalence (youth who have low

socioeconomic status) if the nature of the relationship between private versus Medicaid insurance and asthma is better understood. This highlights the need for further research into the relationships that socioeconomic status, type of insurance, and asthma have with each other.

Participants with Medicaid insurance had statistically significant lower odds of going to a doctor's office or HMO mostly for healthcare services compared to participants with private insurance (OR=0.16; CI=0.098-0.260). After adjusting for the predictor factors, participants with Medicaid insurance had lower adjusted odds of going to a doctor's office or HMO mostly for healthcare services compared to participants with private insurance (aOR=0.64; CI=0.291-1.415), but this difference was not statistically significant. Since the adjusted odds did not show significance in the difference, it is important to learn through future research how other predictor factors may play a role in where youth go mostly for healthcare services. Nevertheless, there was a significant difference in the unadjusted odds, which showed that overweight or obese youth who have Medicaid were less likely to go to a doctor's office or HMO mostly for healthcare services than those that have private insurance. Because of this, it may be possible that the youth who go to other health settings may be undiagnosed or underdiagnosed for conditions such as asthma. Moreover, the literature shows that youth with chronic health conditions in low-income households feel more limited by the health conditions such as asthma and other chronic conditions than those in high-income households.^{4,5} This study shows two possible contributing factors to the gap in the diagnoses, management, and ability to thrive when having obesity may be type of health insurance and healthcare setting utilization behavior, since both factors also differ by household income. Therefore, it is imperative that public health professionals and healthcare professionals assist in bridging any gaps that may exist regarding

healthcare setting visited by type of health insurance, since healthcare setting mostly visited for healthcare services can affect the long-term and continuum of care that patients receive.

Herndon et al. (2012) stated that children who have Medicaid are less likely to adhere to asthma controller therapy. Based on this literature, Herndon et al. completed a study to evaluate asthma medication adherence and health outcomes of children with Medicaid. They found that among 18,456 children ages 2-18 years with asthma and enrolled Medicaid insurance, 20% adhered to their inhaled corticosteroids prescribed treatment and 28% adhered to their leukotriene inhibitors prescribed treatment. Moreover, the children that had the highest adherence to their medication treatment had less odds of emergency department visits compared to children that had the lowest adherence. Additionally, Herndon et al. indicated that low adherence rates show that initiatives need to be taken to improve these rates.⁵⁴ The study by Herndon et al. is a critical piece of data to compare to the findings in this study. This study found that overweight obese children with Medicaid were more likely to have asthma. Herndon et al. found that children with Medicaid were also less likely to adhere to asthma medication. This study found that overweight or obese children with Medicaid are more likely to go to urgent care facilities or the emergency department than to a primary care provider. Herndon et al. found that emergency department visits were correlated with lower medication adherence among children with asthma that have Medicaid.

Additionally, a study by Bingemann (2011) included 490 children ages 1-18 years with asthma. She found that older children, children that lived in medium-income or high-income households, children that were patients at doctor's offices or asthma clinics, and children with treatment plans had less association of asthma exacerbations.⁵⁵ She also found that younger children, children with a history of emergency department visits, children with a history

nebulizer usage, and children with pets in their home had a greater association with asthma exacerbations.⁵⁵ Her study designates income level rather than type of health insurance; however, since the literature indicates that children in low-income households are the ones more likely to be enrolled in Medicaid, the findings in her study for asthma incidences are similar to the findings in this study for asthma prevalence. This study found that participants with Medicaid had both a greater likelihood of having asthma as well as emergency department visits, and the study by Bingemann also shows a correlation between asthma and emergency department visits.

One interesting finding in this study was that controlling for the predictor factors, participants living with married heads of household had the same adjusted odds of having fair to poor general health as widowed heads of household (OR=0.0; CI=0.000) as well as never married heads of household (OR=0.0; CI=0.000). The rate of children living with widowed heads of household is low in the United States, with less than 10% of children experiencing a parental death before the age of 18 years.⁵⁰ Among children living with one-parent heads of household, roughly 4% of them live with widowed heads of household.⁵¹ After a decade of research, McLanahan and Sandefur (1994) found that the well-being and outcomes of children who live with a widowed parent tend to be better than children of all other single-parent households. McLanahan and Sandefur found that children living with a widowed parent are 50% less likely to experience teen pregnancy and to drop out of school compared to children of all other single-parent households.⁵² As found in the literature, the low number of participants living with widowed heads of household was present in this study as well. Six out of 434 participants in this study lived with widowed heads of household. The literature has found that children living with widowed heads of household fare better than children living with all other single-parent heads of household.⁵⁰ This study found that overweight and obese children ages 3-15 years living

with widowed heads of household fare the same as those living with married heads of household, when comparing the general health of each group.

This study also found that overweight and obese children ages 3-15 years living with never married heads of household fare the same as those living with married heads of household, when comparing the general health of each group. The never married category of parents is unique for several reasons. The rate of children born to and raised by never married mothers has increased in the United States. In 1996, the rate of children living with a never married mother was 36%, an increase by 29% compared to 1970. In 2007, the rate of children born with parents who were unwed was 40%, an increase by 22% compared to 1980. Around half of the children born with unwed mothers do not live with their biological fathers. Almost 70% of children living with never married mothers live in poverty, whereas 45% of children living with divorced mothers live in poverty. Never married mothers tend to be younger, less educated, more economically disadvantaged, less likely to be employed (and by extension less likely to receive benefits of employment such as health insurance through employment), and live in poorer neighborhoods, compared to divorced mothers and married mothers.⁵⁰ After analyses of nine physical health indicators and six mental health indicators in the 2003 National Survey of Children's Health, Bramlett and Blumberg found that children in single-mother households had worse physical and mental health outcomes than children in married households.⁵³ However, the similarities in outcomes between the participants in this study that lived with married heads of household and never married heads of household could be due to trends in recent years. The number of children born to unmarried mothers is quantifiable. The number of children that spend their entire childhood living with a never married mother is not as easily quantifiable. Additionally, an increase in never married mothers can be attributed to an increase in couples

that choose to cohabitate long-term rather than marry, with such family units often ending up officially reported as single-mother families.⁵⁰ As such, children in these households may have fathers or father figures within their households not being accounted for in the data. Given the literature on children in single-mother households, this study resulted in data that is the opposite of what is to be expected from the literature for never married heads of household. This finding, combined with the rise in cohabitating couples, both show that it is critical that these studies go a step further to distinguish between never married mothers that cohabitate with long-term partners versus those that are truly single mothers to determine if health outcomes may differ between the two sub-groups.

5.2 Study Limitations and Strengths

BMI was used to determine if a participant was overweight or obese and was an eligibility criterion for study participants. However, BMI is not always a good measure of obesity due to muscle mass weighing more than fat mass. Another limitation of this study was that the sample size was not very large, with only 434 participants who were eligible for inclusion in the study. An additional limitation is that much of the data were “self-reported” (reported by parents or legal guardians), meaning the data may be subject to recall bias. General health was even more limited in this study due to the small sample size for fair to poor health (n=15), as well as the subjective and self-reporting nature of the survey question related to general health. Furthermore, parents or legal guardians who answered the general health question may have answered according to how they perceived interviewers would like them to answer. Additionally, due to the vague nature of the term “general health,” literature on this is more limited than specific health conditions such as asthma.

Another limitation is that there may be participants in the study who had undiagnosed asthma. The participants may not be aware of their asthma status at the time of the study due to not being diagnosed or treated by a healthcare professional for asthma or not recognizing the signs and symptoms of asthma. In fact, two of the four questions determining asthma status for this study asked specifically about whether the study participant has been told he or she has asthma or has been prescribed medication for asthma by a healthcare professional.

Since this study was a cross-sectional study, there was no way to see if the study participants had a different type of health insurance previously or how long they have had their current type of health insurance. Despite the limitations, a strength of the study is that the data is nationally representative of the pediatric population ages 3-15 years, because the primary data that this study utilized came from surveys and examinations completed for and by youth across the United States. Furthermore, this study compared health outcomes and healthcare utilization by type of insurance, which few studies so far have done, especially regarding patients who have chronic or long-term conditions such as obesity or asthma. The subjects in this study included overweight or obese children only, which is also a strength due much of the literature not factoring in weight.

There was no statistically significant difference in overall general health between overweight or obese participants enrolled in Medicaid insurance and private insurance, when unadjusted (OR=2.1; CI=0.746-6.102) or after adjusting for predictor factors (aOR=2.0; CI=0.411-9.882). There was no statistically significant difference of having asthma between overweight or obese participants enrolled in Medicaid insurance and private insurance (OR=1.1; CI=0.705-1.811). After adjusting for the predictor factors, participants with Medicaid insurance did have a statistically significant greater adjusted odds of having asthma compared to

participants with private insurance (aOR=2.6; CI=1.180-5.577). Absence of statistical significance does not mean that these youth do not need any sort of healthcare intervention. General health was “self-reported” (reported by parents or legal guardians) as were two of the four questions for the asthma status criteria (“asthma attack within the past year?” and “still have asthma?”). Therefore, the data for these variables may be especially subject to recall bias, as is always a concern with self-reported data. The possibility of inability to correctly recall health information can be compounded with the literature showing that parents and youth both incorrectly perceived the youth’s overweight or obese status as “just about the right weight.”^{22, 23, 24} Because studies have found that many parents and their children have not been able to correctly recognize the appropriate weight of the youth, it is also possible that they may not correctly recognize signs and symptoms of “fair to poor” general health status or asthma status of the youth, both of which may be less “obvious” through casual observation of a child or adolescent in a non-clinical setting by non-healthcare professionals.

Therefore, this study highlights that it is imperative that children be seen by healthcare professionals equipped with the knowledge and ability to evaluate and manage chronic and long-term conditions such as obesity, asthma, “fair to poor” general health, and a slew of the associated conditions that may occur with each of these. Primary care providers are typically better able to know the overall health and well-being of their patients. This enables primary care providers to address, treat, and monitor chronic conditions, as opposed to solely acute conditions like providers may at many other facilities.^{10, 11, 26} Additionally, having a relationship with a primary care provider may increase the likelihood that children will be more inclined to follow the recommendations of their doctor, specifically as it relates to weight management and proper nutrition.³ This study also highlights how there is a disproportionate

amount of children with chronic illnesses such as obesity that have Medicaid who do not receive the same level of access to a primary care provider compared to their peers that have private health insurance.

Lastly, another strength is that this study is specifically looking at Medicaid as a factor rather than income level, even though low-income is correlated with increased Medicaid enrollment. This is an important distinction because it means that it is possible that changes to Medicaid at a systemic level could potentially help with improvements in health outcomes even if income levels were to stay the same for families of children with Medicaid.

5.3 Suggestions for Future Research

Suggestions for future research would be to use a greater sample size to complete similar studies, specifically a study with a sample size in which there are a greater number of participants with general health that is fair or poor. One such suggestion would be to complete a study in which all the children in the study have fair to poor general health and compare their future health outcomes as well as past medical history and review similarities and differences between those that have Medicaid compared to those with private health insurance.

Furthermore, if similar studies are conducted regarding obesity, another suggestion is to use abdominal obesity as an eligibility criterion instead of BMI. Abdominal obesity may help provide more insight on the relationship between obesity, health, and healthcare due to BMI not always being indicative of obesity status. The inclusion criterion in this suggestion would be children that are “overweight or obese” based on their abdominal obesity status. This can be compared to studies in which the inclusion criterion was BMI to see if outcomes differ from the literature if abdominal obesity is the inclusion criterion rather than BMI.

This study examined the association between types of insurance and asthma. Future studies should expand this research question to analyze the relationship between socioeconomic status, type of insurance, and asthma. More studies on type of insurance and tracking the type of insurance of children as they age could also provide better insight on the effects of insurance type on health outcomes such as asthma. For example, would asthma attacks and other respiratory illnesses improve for children who go from having Medicaid to having private health insurance during their childhood? Longitudinal studies could be completed for this.

The odds of going to a doctor's office or HMO for the participants enrolled in Medicaid were lower compared to those enrolled in private health insurance. This was significant when unadjusted, but not significant when the odds were adjusted for with other variables. Therefore, future studies should analyze how various predictor factors of youth as well as their parents relate to the type of healthcare, healthcare quality, healthcare behavior, and health outcomes of the youth, e.g. how likely youth are to be seen by a primary care provider mostly for healthcare services.

This study compared differences in health outcomes and healthcare by type of insurance among overweight and obese participants. Future studies like this study but among participants with other chronic conditions, such as diabetes or epilepsy, may help shed more light on the health outcomes and healthcare of youth with these chronic health conditions as well. Studies such may highlight which chronic conditions may need to be further monitored or addressed by healthcare professionals, specifically primary care providers. Additionally, further studies should be completed to determine why children with chronic health conditions with Medicaid may not be going to a primary care provider, e.g. what factors may lead these children to be taken to an

urgent care facility, the emergency department, etc. most often for healthcare services rather than a doctor's office with a primary care provider.

Lastly, future studies on household income and possible healthcare changes to Medicaid may provide better insight into the relationship between these factors to determine if changes can offset disparities caused by low income. Such studies may show that changes to Medicaid at a systemic level, such as the number and quality of providers that accept Medicaid or increases to the reimbursement rates to providers by Medicaid, may improve health outcomes in children with Medicaid even if their household incomes remain the same.

5.4 Conclusion

The aim of this study was to explore the relationships between types of health insurance and health outcomes among overweight or obese youth ages 3-15 years. The findings showed that overweight or obese children with Medicaid tend to have worse general health status, were more likely to have asthma, and were less likely to see a primary care provider, with varying statistical significance, compared to their peers with private health insurance.

There are many reasons for why youth would benefit from having a long-term primary care provider, such as their expertise and ability to diagnosis, treat, and manage chronic and long-term health conditions. Furthermore, a huge portion of the pediatric population is at risk for the potential detrimental effects of obesity as well as other associated adverse health outcomes, and according to Trust for America, a non-profit community health organization in the United States, "the country is failing to address the obesity crisis with the urgency it deserves."⁶ For these reasons, childhood obesity warrants greater public health and healthcare actions as untreated childhood obesity can continue to be health and financial burdens at the individual

level, community level, and national level. These outcomes affect the entire healthcare system in the United States in terms of care, coverage, and costs. Lastly, disparities that may exist between private health insurance and Medicaid insurance should also be addressed and managed by the public health professionals and healthcare professionals to bridge any gaps that may exist in the quality and outcome of care for the pediatric population in the United States. Due to children with Medicaid also being more likely to live in low-income households compared to those with private health insurance, it is critical that public health professionals work together with not only healthcare professionals, but policy makers, decision makers, and regulators to address disparities and adverse health outcomes that may be disproportionately affecting low-income families to improve quality of care and quality of life for all children and families.

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APPENDIX

Methods by the Centers for Disease Control and Prevention (CDC) to Sample and Collect Data

Secondary data for this study were obtained from the 2012 National Health and Nutritional Examination Survey (NHANES) National Youth Fitness Survey (NNYFS). The NNYFS was conducted by the Centers for Disease Control and Prevention (CDC).

The Centers for Disease Control and Prevention (CDC) collected primary survey data, which were used as a secondary data for this study. Geographic coverage for the survey was throughout the United States. Data were collected in multiple stages of sampling for the 2012 NNYFS by the CDC. Primary sampling units (PSUs), which were counties, were selected based on analytical goals set forth by researchers. Segments of the PSUs that were large enough for NHANES and NNYFS were then selected with only one type of survey completed per household, either NHANES OR NNYFS. The unit of analysis for the 2012 NHANES NNYFS was the individual children and adolescents ages 3-15 years that were eligible and enrolled in the study. No information is publicly available regarding how a child or adolescent was selected to participate when there were multiple children per household.

Stratified sampling was used to select participants for the 2012 NHANES NNYFS. The stratified sampling was completed in four stages. The first stage was primary sampling units. This was predominantly at the county level. The second stage was to ensure that there were enough dwelling units, which were households, within each primary sampling unit. The third and fourth stages were the selection of households and individuals living in the households. This was done based on age and sex, with the goal of an equal number of each sex for each age sub-category at the time of screening: ages 3-5 years, ages 6-11 years, and ages 12-15 years.

An approximately equal sample size was obtained for each age group and sex during both the interview stage and the examination stage. Researchers completed a total of 1,640 interviews and 1,576 examinations for the 2012 NHANES NNYFS. The age and sex breakdown for the interviews were as follows: 187 males ages 3-5 years, 181 females ages 3-5 years, 377 males ages 6-11 years, 385 females ages 6-11 years, 259 males ages 12-15 years, and 251 females ages 3-15 years. The age and sex breakdown for the examinations were as follows: 179 males ages 3-5 years, 173 females ages 3-5 years, 358 males ages 6-11 years, 374 females ages 6-11 years, 250 males ages 12-15 years, and 242 females ages 3-15 years.

Researchers conducted screener interviews at households to determine if households had eligible children to participate in the 2012 NHANES NNYFS based on sex and age, contingent upon household address verification (n=1,640). For eligible children who participated in the survey, data were collected in mobile examination centers (MECs) with examination rooms and interview rooms, which is where information was gathered via in-person interviews (with survey responses given by parents or legal guardians) and onsite examinations (e.g. fitness, physical activity, body measurements of the eligible participants). Each study participant completed fitness and physical activity measures in conditions that were identical to one another. Researchers completed body measurement information for participants using equipment onsite (n=1,576).