

12-2019

## **Affordable Care Act and Preventive Care Usage: A Mixed Method Analysis of Cardiovascular Care**

Brit Peek

*University of the Incarnate Word*, [bpeek@student.uiwtx.edu](mailto:bpeek@student.uiwtx.edu)

Follow this and additional works at: [https://athenaeum.uiw.edu/uiw\\_etds](https://athenaeum.uiw.edu/uiw_etds)



Part of the [Community Health and Preventive Medicine Commons](#), and the [Health and Medical Administration Commons](#)

---

### **Recommended Citation**

Peek, Brit, "Affordable Care Act and Preventive Care Usage: A Mixed Method Analysis of Cardiovascular Care" (2019). *Theses & Dissertations*. 364.  
[https://athenaeum.uiw.edu/uiw\\_etds/364](https://athenaeum.uiw.edu/uiw_etds/364)

This Dissertation is brought to you for free and open access by The Athenaeum. It has been accepted for inclusion in Theses & Dissertations by an authorized administrator of The Athenaeum. For more information, please contact [athenaeum@uiwtx.edu](mailto:athenaeum@uiwtx.edu).

AFFORDABLE CARE ACT AND PREVENTIVE CARE USAGE: A MIXED METHOD  
ANALYSIS OF CARDIOVASCULAR CARE

by

BRIT PEEK

A DISSERTATION

Presented to the Faculty of the University of the Incarnate Word  
in partial fulfillment of the requirements  
for the degree of

DOCTOR OF BUSINESS ADMINISTRATION

UNIVERSITY OF THE INCARNATE WORD

December 2019

Copyright by  
Brit Peek  
2019

## ACKNOWLEDGMENTS

¡Sí se puede! Yes, you can! Cesar Chavez knew it and I learned it! Growing up in a third world country, I imagined myself on a quest full of possibilities with the opportunity to advance in life by acquiring a higher level of education. The consideration seemed like an impossible fantasy. Even at an early age, I shared my dream with my beloved middle-school classmates, at that time, most of them laughed at the idea that I would, one day, move to another country and reach a high level of excellence and success, vested by academic pursuits. Faith and hope were on my side. Through diligent work, the opportunity was created and the doors to college opened in Abilene Texas, where this small town became my new home.

Shortly after my arrival, I quickly realized the immense amount of struggles that I would have to overcome. My lack of bilingual skills and the relentless culture shock challenged me with the opportunity to decide my path; stay and deal with the unknown or go back home. Faith kept me going, as I knew deep in my soul that it would be alright. The mountain was so high to climb on my own but without a doubt, there have been a multitude of exceptional individuals who have motivated, supported, and lifted my spirits to help me overcome the daunting struggles that I faced during this chapter of my life.

I could not have arrived where I am today, if it weren't for the precious love and amazing support of two strangers, who later would become my American Mom and Dad. My mom, Ruth Blasingame, is now gone but while she was here, she treated me as if I were one of her own kids.

## ACKNOWLEDGMENTS—Continued

Over the years, my dad, Ross Blasingame, has been there for me, always cheering me on and always present. His unconditional love has filled my soul with comfort and grace. Since the beginning of my arrival, mom and dad opened their home and their hearts by affording me the opportunity to live and share life with them. They did this by renting out a bedroom in their home at a very modest cost. I still remember the smell and taste of the savory homemade bread and how it kept me going to complete the daily tasks of learning a new language along with the myriad of other ordeals I faced on a daily basis. In their home, I felt safe, secure, and most importantly, loved! As the days and years went by, their children and other members of their family have all been there for me. It is with humble gratitude that I thank each of them for all their affection and tenderness, and above all, their prayers and support.

During my sophomore year in college, I saw an ad posted on the school's bulletin board and it said something along the lines: "Do you want to reach your full potential by continuing your education?" With excitement, I read the details of the program carefully. As a McNair Scholar, one would be assigned a Professor to learn how to produce a doctorate-level research paper and learn the ropes to reaching the highest level of education, while presenting at the prestigious Ronald E. McNair Post-Baccalaureate Achievement Program's national conference. As a first-generation, low income, and minority college student, I fit the profile. I hung around with students who shared similar values so I felt at home! Through the program, I had the terrific opportunity to work closely with Dr. Malcolm Coco, as my first academic mentor. By sharing his guidance, I learned the preliminary steps of an academic research paper. Dr. Coco continued to

## ACKNOWLEDGEMENTS—Continued

encourage me to excel by suggesting that I enroll in a Master's Degree program. God had other plans in mind, and soon after my college graduation, we relocated to Dallas, Texas, due to a work promotion my husband received. Considering the next options, I almost enrolled at the University of North Texas, but the arrival of a small bundle of joy was on the way. My dear son, Aaron, took precedence and my plans for furthering my education were temporarily placed on hold.

As the years went by, the thought of going back to school continued to resurface. The busy schedule of working full-time, being a mom, and a wife consumed my days. However, the morrow came when I recognized that my son and husband were no longer as dependent on me for daily responsibilities, a level of independence had been reached. Once again, I found myself considering the option of completing the long-awaited dream and after almost 15 years, I decided to enroll in the master's degree in Business Administration (MBA) program at Texas A&M San Antonio. The first days and weeks seemed mind boggling task; learning the ropes of online classes and relearning how to study and write research papers, again, became almost too much to accomplish. In that first semester, I reminded myself of the dedication and strong personality instilled in me by my biological mom, Martha Osvelia. Growing up, she taught me not to give up and remain consistent with the process. I am grateful for her teachings, thanks to her, I have been able to overcome the toughest times of this ordeal. Even when I felt like giving up, I remained firm to my convictions and the goal in mind. Mom has continuously said how proud she is of my accomplishments and I thank her for it. Another unique individual who was there for me was my step-dad, George Carrington. He kindly read several of my assignments and using his niche for

## ACKNOWLEDGEMENTS—Continued

the English language, he suggested corrections and enhanced my knowledge of the English grammar. Like my mom, dad has provided words of encouragement.

In the middle of my master's degree, I happened to reconnect with Dr. Coco. I had not seen him in about five years. While catching up, I asked him about doctorate programs. He was the first person who encouraged me to continue the journey after completing my master's degree. During this memorable conversation, he instilled in me confidence and reignited the fire that I had pushed aside for over a decade. That day, I looked at programs and started researching the best options that would fit my profile. I was on fire taking as many graduate classes as I could to promptly complete my master's degree and move on to the next level. It was then when I had the pleasure of meeting Dr. Mengying He, a brand new PhD graduate and visiting Healthcare Management Professor at Texas A&M. The first day that she entered the classroom, I knew she would be a very special person in my academic journey. While walking around campus, I asked her so many questions about doctorate programs and the expectations of a terminal degree. She shared many stories and continuously told me: "You can do it, too!" I am thankful for the life changing visits. It is her commitment to academia and her encouragement that gave me the strength to keep going.

Fast forward, it was Friday at 6:00 p.m., my first doctorate class. My heart was racing, I felt excited and fearful at the same time! It was the beginning of the final step. Next day, I made it a point to introduce myself to all the members of my class and I expressed to them my desire to collaborate. It was soon after that when those partnerships generated a high return on investment. Thanks to their ongoing friendships and mutual support, we completed multiple, complicated

## ACKNOWLEDGEMENTS—Continued

assignments and projects that, at times, took us away from our families by meeting at school in the early weekend morning hours, or working on examining problems and research documents until late hours of the night. I cannot give enough thanks to all my classmates and now my friends who stood beside me as a united front, while cheering one another on to the finish.

As the program progressed, the time arrived to start making decisions about options for the final research project. From the beginning, I always desired to complete a dissertation. However, the thought of writing a five chapter study seemed almost unreal! Continuing with my journey of faith, I left it to Him (God), and in my last year, I met the angel that would guide me through the complex labyrinth of dissertation writing. It is with a heartwarming feeling that I thank Dr. Kruti Lehenbauer, she is a whole lot more than a dissertation advisor! As her mentoree, I've learned how to think broadly and amassed the courage to overcome what can seem to be the impossible, along with putting the pieces of the puzzle together to generate a beautiful portrait of research based prose. Although there have been challenging times, I could always count on Dr. Lehenbauer. Today, I have tremendous respect and admiration for her love for academia and education. I feel equipped with the tools to continue my journey of higher education, and I am confident that she will be a part of my life for many years to come, as she is not only my mentor but a cherished friend. I have would like to extend a thank you to the members of my dissertation committee, Dr. Kiser and Dr. Xenakis, your support and guidance has made a tremendous difference on my professional and academic growth.

Working full-time and taking a full load of doctorate school classes is an overwhelming task that takes hold of every minute of the day and night. This achievement could not have been



## ACKNOWLEDGEMENTS—Continued

accomplished without the ongoing support of my work teammates. Each of them continuously expressed words of encouragement and shower the proverbial garden of my dreams with nurturing water by advocating on my behalf to reach the finish line. The peace of mind this brought to the workplace allowed me to accomplish the pending school tasks. Thank you so much to all of you, I could not be here without you! I have also to thank my manager, Bridget Lamme, she never once questioned or denied my multiple time-off requests needed to complete the ongoing homework assignments. She has been a great cheerleader and a big supporter of this program.

A special thanks goes to my friend Julie Wiley, who, at the last minute, stepped in to use her marvelous editorial skills to spend countless hours reviewing my paper. The extra pair of eyes truly made a difference in the outcome! I cannot wait to celebrate this achievement with her!

Another exceptional friend that I need to thank is Diane Rodriguez. In my desperation to find a friend to enroll with me in this program, Diane took the bait! She has hung tough and has survived the grueling journey. Unquestionably, the road to success would have been infinitely more difficult had I not had such a friend and confidant close by to share the good and the stressful times. Together, we have cheered each other, we have cried together, and united we will be walking the stage. My dear friend, Diane, thank you for being there and for putting up with my nonsense! We did it!

The endless hours sitting at my desk writing discussion posts, reading, and analyzing data has taken the majority of my time. Therefore, I'm grateful for the patience and flexibility that

## ACKNOWLEDGEMENTS—Continued

members of my family have afforded me. Even though I had to miss multiple family events and gatherings, their response has been nothing less than favorable. Through their words of encouragement, I can feel their deep sense of pride for this accomplishment as I am the first person within the immediate members of my family to earn a doctorate level degree. I cannot wait to have the time to make-up for the missed family reunions and gatherings. Thank you all!

My dear son, Aaron, you have seen me struggle and have shared the wins. As you grow into adulthood, I hope you remember the experience, and one day, when I am not here, review this dissertation. Feel proud because you too helped me make it happen. The road has not been easy, as I have not been there for you all the time and I am sure that occasionally my mood has not been the best. However, you have remained supportive and always ready to give me a hug sharing your kind heart in the long days of writing and analyzing data. Thank you, buddy!

Lastly, I do not have enough words to express my appreciation to my beloved husband, Tom. The day that I finally earned the courage to tell him that I would like to enroll in doctorate school, he has been there for me every step of the way. Even though times were scarce and precious, I enjoyed the long walks discussing ideas for the dissertation and collectively bouncing research findings and discussing the analysis outcomes. There were days where he was exhausted from a long day at work. In addition, he too, was pursuing his master's degree, yet would happily read my writings, made suggestions, and provided me with ideas to broaden my horizons. Thank you, honey, for cooking, cleaning, taking care of our son and our pets, watering the plants, fixing the car, etc. Many thanks for putting up with my “not so” great attitude. Instead

## ACKNOWLEDGEMENTS—Continued

of being upset with me, you kept things calm and focused on the goal, reaffirming me that I could do this! And, I did!

So here we are, standing together at the end of the finish line. This degree and dissertation, I dedicate to you all, my friends, family and coworkers; most importantly God for blessing me with the strength and opportunity of living in a nation where hard work can yield huge results.

“¡Sí se puede! We did it, together! Cesar Chavez knew it and now I lived it! I love you all dearly.

Brit Peek

AFFORDABLE CARE ACT AND PREVENTIVE CARE USAGE: A MIXED METHOD  
ANALYSIS OF CARDIOVASCULAR CARE

Brit Peek

University of the Incarnate Word, 2019

It is a commonly held belief that access to health insurance affects the level of utilization of preventive care services, and thus plays a crucial role in the effective management of avoidable chronic illnesses, decreasing levels of premature mortality, and enabling individuals to live wholesome long lives. Based on this belief, among other goals, the Affordable Care Act (ACA) was designed to increase access to health insurance and related medical services for the population of the United States. This dissertation attempts to identify whether this belief is valid or not by testing whether the usage of preventive care changed between the pre and post ACA era, with emphasis on the comparisons between the insured and uninsured groups in both eras. Following the health care consumption determining Andersen Behavioral Model (1995), this study focuses on predisposing factors, enabling factors, and need factors to determine whether preventive care for cardiovascular services is utilized at higher rates among insured individuals for each year and whether the usage of preventive care increased in the post-ACA era due to increase in the access to preventive services via the mandates regarding health insurance. For this comparative quantitative study, data was obtained for the years 2009 and 2015 from the annual Medical Expenditure Panel Surveys (MEPS) which include sociodemographic, economic, and medical information for over 30,000 observations per year. The dependent variable for the analysis is the usage of cardiovascular care services including cholesterol testing and blood

pressure screenings every year among adults and the key independent variable is the medical insurance status of individuals. Other sociodemographic variables include race/ethnicity variables, marital status, household income, language spoken at home, educational attainment of individual, gender, age, usual source of medical care, and self-perceived health status. The methodology involves conducting descriptive statistical analysis, inferential statistical analysis, and logistical regression analysis to compare the insured and the uninsured groups for both years of interest, as well as comparing the uninsured groups for each year with each other. While the ACA appears to have definitely resulted in a reduction in the proportion of uninsured people, the proportion of the Hispanic-minority group among the uninsured has increased, indicating a worrisome trend in the population. Neither have the general socioeconomic characteristics between the insured and the uninsured changed between the statistical analysis periods which were approximately twenty four months, nor have there been any changes in the characteristics of the uninsured groups except for a higher Hispanic-minority representation in 2015. The odds of getting preventive care went down for the uninsured group from 54% to 64% from 2009 to 2015 indicating that the uninsured in the post-ACA era were worse off than their pre-ACA era counterparts. Our results indicate that while having insurance might be a necessary condition for increasing the use of preventive care services as an enabling factor, it is certainly not a sufficient condition because the need and predisposing factors of an individual play a crucial role in determining their utilization of preventive care.

## TABLE OF CONTENTS

LIST OF TABLES.....	xvi
LIST OF FIGURES .....	xvii
UTILIZATION OF CARDIOVASCULAR PREVENTIVE CARE SERVICES .....	1
Background of the Problem .....	1
Health Disparities.....	4
Statement of the Problem.....	7
Research Questions and Hypothesis .....	9
Theoretical Framework.....	10
The Significance of the Study.....	11
Limitations and Delimitations of the Study .....	12
Summary.....	13
LITERATURE REVIEW .....	15
Preventive Care Services .....	15
Affordable Care Act.....	17
Medicaid Expansion.....	24
Andersen Behavioral Model of Health Service .....	26
Wellness and Preventive Healthcare Services .....	29
The Face of the Uninsured.....	36
Healthy People 2020.....	41
Literature Review Conclusions.....	42

## Table of Contents—Continued

## LITERATURE REVIEW

Summary .....	43
---------------	----

## RESEARCH METHODOLOGY.....44

Overall Approach and Rationale.....	44
-------------------------------------	----

Research Question and Hypothesis.....	46
---------------------------------------	----

Research Methodology .....	47
----------------------------	----

Data Collection .....	48
-----------------------	----

Medical Expenditure Panel Survey.....	49
---------------------------------------	----

Participants.....	51
-------------------	----

Sample Size and Characteristics .....	52
---------------------------------------	----

Dependent Variables.....	53
--------------------------	----

Independent Variables .....	54
-----------------------------	----

Logistic Regression.....	56
--------------------------	----

Interpreting the Results from Logistical Regressions.....	59
---	----

Protection of Human Subjects: Ethical Considerations .....	61
--	----

Summary .....	61
---------------	----

## RESULTS.....63

Data Access and Preparation .....	64
-----------------------------------	----

Sample Characteristics.....	65
-----------------------------	----

Demographic Data Analysis—2009 MEPS Database .....	66
--	----

Pre- and Post-ACA Comparative Analysis: Utilization of Hearttest Services Among the Uninsured Population.....	78
---	----

## Table of Contents—Continued

## RESULTS

Uninsured: Variable Comparative Analysis .....	79
Analysis of Outcomes .....	81
General Discussion and Potential Alternative Tests .....	88
Summary .....	90
CONCLUSION.....	92
Discussion.....	92
Conclusions from Research Findings .....	96
Recommendations for Future Research .....	98
Summary .....	99
REFERENCES .....	101



## LIST OF TABLES

Table	Page
1. MEPS Data Results Years 2009 and 2015.....	52
2. Research Variable Explanation.....	55
3. Summary Statistics for MEPS Years 2009 and 2015 .....	58
4. Descriptive Statistics for MEPS Year 2009.....	67
5. MEPS Year 2009: Independent Variable “age” .....	69
6. MEPS Year 2009: Independent Variable “usualcare” .....	70
7. Descriptive Statistics for MEPS Year 2015.....	73
8. MEPS Year 2015: Independent Variable “age”.....	75
9. MEPS Year 2015: Independent Variable “usualcare” .....	76
10. Z-test: Simple Test of Proportion .....	79
11. Two Sample T-tests with Unequal Variance .....	83
12. Hearttest Logistic Regression Estimates for MEPS Years 2009 and 2015 .....	85

LIST OF FIGURES

Figure	LIST OF FIGURES	Page
1.	The Andersen Behavioral Model of Health Services Use .....	11

## Utilization of Cardiovascular Preventive Care Services

### Background of the Problem

“Sale más caro el caldo que las albóndigas” (the broth is more expensive than the meatballs). Such sayings bring simple yet profound common sense to complicated scenarios such as the state of the American healthcare system in today’s society. It would seem that the “broth” of our system while tasty with technology, lacks the sustenance of the much more desirable meatballs yet costs more and is less nurturing. How can preventive care services be stirred in with cost saving measures to create a dish that is both savory and satisfying?

Chronic illnesses and diseases are abundant in U.S. society with about 80% of Americans clinically diagnosed with a single medical condition, and 77% of the adult population is suffering the effects of two or more long-term illnesses (National Council on Aging, 2015). Studies conducted in the past have demonstrated that the survival rate for comorbid patients, those suffering from two or more illnesses, greatly diminishes when dealing with major chronic diseases such as cancer or cardiovascular-related ailments (Heron, 2013). As a result, about 1.5 million people, dies prematurely from common chronic illnesses annually (Heron, 2013).

To improve this overwhelming statistic, one of the viable solutions would be to increase the consumption of preventive healthcare services. The early identification and treatment of chronic illness symptoms may decrease the probability of developing a full-blown illness or, at a minimum, might delay secondary complications. However, the uncertainty in the United States economy (Dillman, Mancas, Jacoby, & Ruth-Sahd, 2014) and the increasing cost of health insurance has prohibited many Americans from being able to afford the premiums needed to retain an insured status. Therefore, through the years, the number of uninsured has grown, reaching its highest peak in 2009, where roughly 50.9 million Americans (Lyon et al., 2011) or

one out of every three Americans (Dillman et al., 2014) reported being uninsured. The overwhelming number of uninsured left a vast service gap United States citizens.

During his time in office, President Barack Obama, advocated for passing a new law that ultimately became one of the nations' most controversial adjustments within the medical industry. After a series of long debates, the new healthcare reform, Affordable Care Act (ACA), was signed into law in the spring of 2010, today it is best known by its nickname: "Obamacare." As initially planned, the law targeted prevention healthcare services, it required health insurances to adjust their plans and include these preventive services free of charge. Healthcare insurance holders would not be required to pay co-pays or co-insurance fees, upon receipt of life-saving services (Centers for Medicare & Medicaid Services, 2013) Chronic diseases, such as heart disease, cancer, and diabetes, are responsible for 7 of 10 deaths among Americans each year and account for 75% of the nation's health spending and often are preventable. The Affordable Care Act is the healthcare insurance reform legislation passed by Congress and signed into law by President Obama on March 23, it will help make prevention affordable and accessible by requiring health plans to cover recommended preventive services without charging a deductible, copayment or co-insurance (Centers for Medicare & Medicaid Services, 2013). The principal purpose for the modification of the insurance plans was to reduce healthcare disparity levels within the American population; it also required healthcare and insurance entities to disclose their quality care programs and adjusted Medicaid's reimbursement requirements to target health outcomes. This effort enhanced the levels of care and services rendered to patients, laying the foundation for the creation of new creative healthcare initiatives centered on the delivery of the most efficient practices to generate high levels of healthcare outcomes (Karliner, Marks, & Mutha, 2016).

The law intended to increase levels of healthcare insurability and by doing so to increase insurance revenues which would, in the long run, decrease healthcare cost for everyone. On the surface, the intent of the radical law seemed to have a positive outcome. However, it is uncertain if this reform yielded the expected return on investment. Thereby, this study performed a quantitative comparison analysis during the pre and post-implementation of “Obamacare” to measure the outcomes of one of the main mandates: Access and utilization of preventive care services.

The Medical Expenditure Panel Survey (MEPS) is a large scale survey sponsored by the Agency for Healthcare Research and Quality (AHRQ), every year the agency surveys a representative sample of the American population to measure healthcare services in the United States. The comparative quantitative study conducted in this research utilized MEPS data for the years 2009 and 2015 as a representation of the pre and post-ACA era. This study analyzed the impact of the Obamacare law approximately four years after its inception. The identification of utilization trends is important because it provides insights into the relationship between access and consumption of healthcare services. The assessment is a source that can be used to determine if the passing of the healthcare reform was successful in meeting one of its main mandates: Increased utilization of preventive care services.

Slightly less than a decade after since the passage of Obamacare, late in 2007, the courts overturned the individual mandate; thereby the future outcome and survival of Obamacare is unknown. However, the results of this study could be utilized as a baseline or as an additional source of information for the future of healthcare policies intended to expand healthcare coverage and utilization alike.

## **Health Disparities**

Traditionally, low income and minority groups suffer the consequences of discrimination and racial unfairness, resulting in health disparities and lack of access to medical services (Kimbrough-Melton, 2013). The disparity yields low levels of utilization for preventive care services which will ultimately delay the identification and management of chronic illnesses and its potential secondary complications. In some instances, where the unmanageable disease has progressed to a point where it is no longer curable, causing the individual to suffer from life-long constraints, pain, suffering, and in extreme instances, premature death.

The Office of Disease Prevention and Health Promotion reported that many health disparities exist in the United States that are often interpreted to mean racial or ethnic disparities where differences in health outcomes exist to a greater extent between the various populations (Office of Disease Prevention and Health Promotion, 2014). An individual's race or ethnicity, sex, sexual identity, age, disability status, socioeconomic status, and geographical location contribute to an individual's ability to achieve good health (Office of Disease Prevention and Health Promotion, 2014). The elimination of disparities is a comprehensive initiative that combines addressing basic needs (such as access to healthcare services) as well as the socioeconomic factors that influence health, which are commonly defined as the population's or individual's determinants of health. The report states that its primary goal is to decrease disparities to enhance health outcome for Americans (Office of Disease Prevention and Health Promotion, 2014). The identification of the determinants of health for specific ethnic groups is essential because it has a direct connection with the levels of preventive care services' consumption.

The disparity and underutilization of preventive services delay the discovery and proactive treatment of chronic illness (Hill, Granado, Opusunju, Peters, & Ross, 2011) and unfortunately, in the last few decades, the number of Americans suffering from chronic diseases has grown. Treating the illnesses has tremendous economic repercussions, in the United States 75% of the national medical care expenditure is utilized to pay for expensive treatments, medications and doctor's office visits (Centers for Medicare & Medicaid Services, 2013).

The top three chronic illnesses in the United States are heart disease, diabetes, and cancer. Prevalence of these chronic diseases among the American society has resulted in high mortality levels, sadly seven out of ten deaths are attributed to the long-term illnesses. Thereby, it is imperative to find potential avenues to address the issue of health disparities, which would ultimately improve the utilization of preventive care services and health outcomes. One of the most arguable topics in today's medicine is the connection between a person's socio-economic status and their wellness. Therefore, it is vital for communities and policymakers to consider providing non-traditional healthcare services such as healthy foods, transportation, secure housing, clean water and air, as well as local affordable medical services (Office of Disease Prevention and Health Promotion, 2014).

The uninsured rate is increasingly higher for traditional marginalized ethnic groups such as African-Americans, Hispanics, and American-Indians. Compared to minority groups, Anglo-Americans are two to three times more likely to be insured (Derksen, 2013). The low levels of medical coverage have a domino effect on the use of preventive healthcare services. This disparity poses healthcare-related challenges and is potentially damaging medical outcomes for individuals of these minority and ethnic groups. The cost of treating and managing medical conditions is expensive; comprehensively it plays a critical role in the economy. In the years

2003 to 2006, the combined cost of medical treatment and lost work productivity amounted to over \$1.24 trillion (Hegenauer, 2016).

The economic outlook on treating a comorbid patient's healthcare complexities is enormous. In 2007, Americans spent \$174 billion on direct and indirect medical expenses for chronic illnesses (Pu & Chewing, 2013). In the case of cardiovascular-related illnesses, the frequent utilization of preventive care services, such as yearly blood pressure checks and cholesterol screenings, could potentially decrease the economic burden as the effects of these illnesses would be discovered prematurely, decreasing the cost of treating an advanced stage chronic illness.

In the late 2000s, lawmakers argued the need to review the current state of affairs. It became evident that the high cost of healthcare services was unsustainable and change was imminent. Healthcare reform was designed to address issues like health disparities, the utilization of preventive care services and access to healthcare. The movement called for the debate of critical aspects such as the proposed transformation to close the disparity gap among the different population groups. It suggested necessary changes to services offered by medical insurance companies, many of which were required to be "free;" this was explicitly the case for preventive care services, which by law everyone should receive without having to pay an out-of-pocket expense or a co-payment (Woolf & Campos-Outcalt, 2013). The redesign included the expansion of preventive care coverage and made it unlawful to deny services to those individuals who had been dismissed initially from coverage due to their pre-existing conditions.

### **Statement of the Problem**

The consistent and ongoing utilization of preventive care services is essential because it is the foundation for positive health outcomes (Donley, 2015). The early identification of a



chronic illness reduces the costs of medical expenses, proactive steps to manage one's medical conditions could stop or delay the development of secondary diseases or symptoms generated by a properly managed chronic illness (Dillman et al., 2014). Measuring the utilization of preventive care services for traditional uninsured populations is a vital step in the development of future strategies to improve health outcomes. With roughly sixty months of data, it is uncertain the overall impact that ACA has and will continue to have with regards to narrowing the healthcare disparities. Access to healthcare is significant not only from a psychological perspective, it also plays an important role in the economy and the continuous growth of this nation. One of the main factors in the continuous growth of the American economy is to contain healthcare expenditure. The early identification and management of chronic illnesses through the increased utilization of preventive care services could be one of the main elements in the achievement of this endeavor.

The purpose of this dissertation is to quantify the pre- and post-implementation impact of the Affordable Care Act with regards to the utilization of preventive care services among members of the following racial and ethnic groups: Non-Hispanic White, Non-Hispanic Black, Non-Hispanic (other races), Asian and Hispanic. This is a quantitative study utilizing second-hand data from the MEPS, which is a large-scale survey sponsored by the AHRQ. The survey measures a variety of healthcare-related inquiries to identify usage trends among families, individuals, and medical providers. The survey's questions have not changed dramatically since its inception in 1996, thereby it is a reliable source of data to measure the scope of usage, the cost of healthcare, and the access to care among individuals living in the United States.

There are two major components included in the MEPS survey: Household and Insurance Components. This study utilizes the preventive care scores included in the Household

Component of the MEPS survey. The data results for the year 2009 represent ACA pre-implementation measurements, while the 2015 data results signify the utilization trends during the post-ACA era. A comparative analysis between both sets of data provided answers to the original research question: How has the pre and post-implementation of the Affordable Care Act impacted the utilization of recommended preventive care services for non-Hispanic white, non-Hispanic black, non-Hispanic (other races), Hispanic and Asian-Americans?

The analysis of the study followed the U.S. Preventive Services Task Force's (USPSTF) suggested utilization guidelines for the following preventive care services: mammography, colonoscopy, sigmoidoscopy, blood stool test, Pap smear, blood pressure, blood cholesterol, routine physical test, advice to quit smoking, and receipt of influenza vaccination. The services were grouped into three categories: cancer, cardiovascular-related illnesses, and wellness. According to USPSTF, an individual must consider these types of preventive care services as part of their ongoing healthcare portfolio to prevent the development of a chronic illness, or to aid the individual in their management of an acquired disease. During the progress of this study, the scope changed and it was decided to focus the analysis on preventive care services, utilized in the identification of cardiovascular illnesses. Therefore, the measurements for blood pressure and blood cholesterol screenings took on the representation of cardiovascular preventive care services or the dependent variable hearttest. On April 2019, the USPSTF guidelines for blood pressure changed, therefore our analysis reports the former recommendation suggesting that adults 18 years and older must receive a blood pressure check every 2 years. Researchers interested in this topic are encouraged to consider the updated USPSTF's blood pressure guidelines for future studies.

The study analyzes the levels of preventive care utilization through a series of independent demographic variables to include the participant's gender, race/ethnic background, healthcare coverage, total family income, marital status, highest level of education, primary language spoken at home, participant's age, source of care, and perceived health and mental status.

Additionally, this study identifies the impact of ACA on the utilization of preventive care services focusing on the uninsured and other groups who might be experiencing healthcare disparities such as underserved populations. The study investigates the key factors influencing the racial/ethnic groups to obtain preventive healthcare services. The goal of the research is to enhance the literature on this topic by providing facts and suggestions on how to strengthen our current healthcare policy to support the members of the underserved groups and ensure that the minimal standards of preventive care services are followed by a large percentage of the racial groups studied.

### **Research Questions and Hypothesis**

Utilizing MEPS' data for the years 2009 and 2015, the hypothesis included in the study guided the research to quantitatively compare the utilization of preventive care services for the racial/ethnic groups: Non-Hispanic white, non-Hispanic black, non-Hispanic other races, Hispanic, and Asian, during the pre and post-implementation of the Affordable Care Act. The literature review, along with the analysis of the data delivers facts about the various levels of usage and how the usage has changed through the years. This study intends to identify future suggestions to improve utilization of preventive care services, enhance access to care, and narrow the gap in the social determinants of health which would ultimately increase health outcomes and lower the cost of healthcare services in the United States. The research question is:

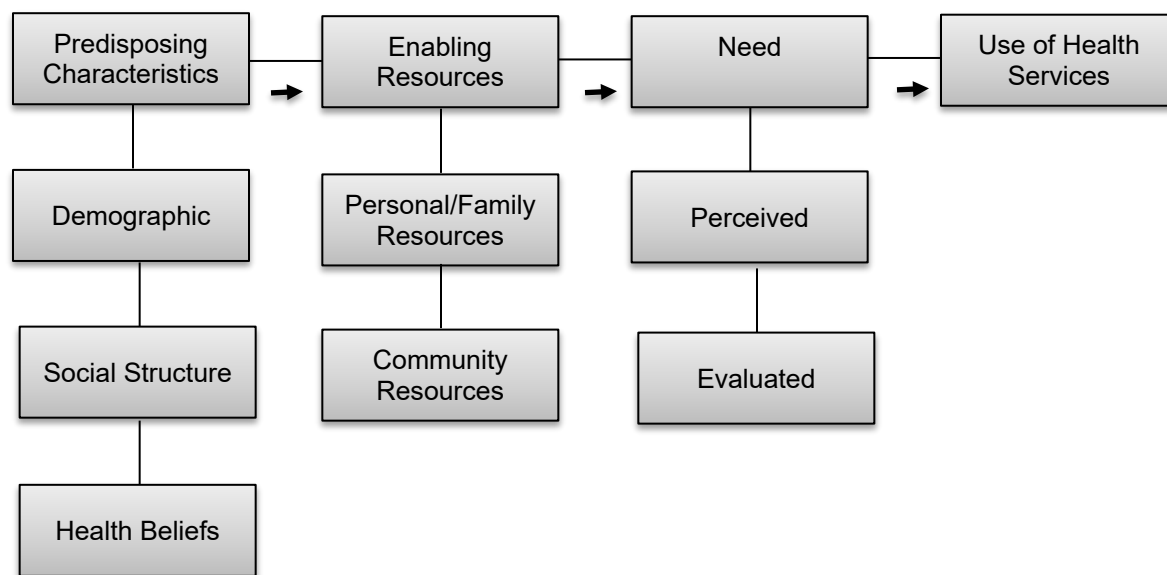
How has the pre and post-implementation of the Affordable Care Act impacted the utilization of recommended preventive care services for uninsured people of various racial/ethnic groups in the United States?

This dissertation tests the hypothesis of socioeconomic and demographic factors, such as race, ethnicity, gender, age, income, marital status, education, primary language, and medical care factors, such as usual sources of health care, insurance status and the perceived mental health status have a significant impact on the use of preventive care in the United States. Since our primary independent variable is insurance status, the study aims to test this hypothesis by comparing the results from 2009 (pre-ACA implementation) and 2015 (post-ACA) to determine if access to insurance makes a difference in the use of preventive care services. The preventive care services included in the cardiovascular screening group is used as the dependent variable for evaluating this hypothesis.

### **Theoretical Framework**

The consumption of preventive care services is influenced by a variety of factors to include an individual's cultural background or their philosophy towards the quality of care and expected health outcomes, and access to care and medical coverage (Pustylnik, 2013). The Andersen's behavioral model of health services use is a well-known, used multilevel model employing a person's values and contextual variables surrounding the individual to identify the expected level of healthcare utilization. The model is composed of three elements: "predisposing variables" (e.g., a person's age), "enabling variable" (e.g. a person's income level), and "need variables" (e.g., severity of illness); the interaction among these elements yield expected level of healthcare usage within the studied populations (Ogunsanya, Jiang, Thach, Bamgbade, & Brown, 2016). Figure 1 depicts the model. In this study, the relevant factors significantly associated with

the utilization of preventive care services, could be useful for providing additional information on avenues to expand access to healthcare coverage (Andersen, 1995).



*Figure 1.* The Andersen behavioral model of health services use. Adapted from Andersen, R. M. (1995). Revisiting the behavioral model and access to medical care: Does it matter? *Journal of Health and Social Behavior*, 36(1), 1. <https://doi.org/10.2307/2137284>

### The Significance of the Study

One of the main purposes of the Affordable Care Act was to expand access to healthcare and increase the utilization of preventive healthcare services. The results of this quantitative analysis presented the relationship between access to care and utilization of preventive care services to detect early stages of chronic illnesses such as cancer, cardiovascular-related illnesses, and wellness levels among members of the racial and ethnic groups studied. Increasing the levels of preventive care utilization is essential because it improves the overall societal health outcomes delaying the offset of illness when managing the symptoms during the early identification of key identifiers. The expected outcome is to improve the levels of health, raise productivity levels, reduce the cost of treating acute illness(es), and ultimately improve a person's outlook on life (Centers for Medicare & Medicaid Services, 2013). Additionally, early

treatment reduces costs in treating advanced illnesses, thereby generating a better economic outcome for both the individual and the community. Identifying the reasons for increase or decrease of utilization would provide lawmakers and healthcare institutions with alternatives to promote strategies to expand access to healthcare and the use of preventive care services, as well as establish alternatives to improve health outcomes for Americans.

### **Limitations and Delimitations of the Study**

The limitations of the study include the data provided for the MEPS is voluntary and self-reported, therefore the data cannot be quantifiably checked. The data relies on the participant's honesty and accurate recollection of past events to answer appropriately a series of questions and events that might have occurred in past years. The participants included in the study are adults, therefore results from the survey will not be transferrable to pediatric populations. Within a two-calendar cycle, MEPS' surveyors host a series of participant interview sessions (Agency for Healthcare Research and Quality, 2009), as a result, there is a limitation in the survey's timing completion. Also, the fluctuation of the time during data collection might influence the results of the analysis.

### **Summary**

The primary purpose of the ACA was to expand access to medical services and utilization of preventive care services among members of the U.S. population. The early detection of chronic illnesses yields economic gains for the individual because it reduces the expenditure levels of treating advanced comorbidities before they reach chronic and acute status (Maciosek, Coffield, Flottemesch, Edwards, & Solberg, 2010). This quantitative study analyzes the impact the passage of the Affordable Care Act had with regards to the utilization of preventive care services to promptly uncover and treat the symptoms of chronic disease processes.

This chapter provided an overview of the problem, its significance, and the study's frame of reference. The theoretical fabric utilizes the Andersen's Behavioral Model of Health Services Use to indicate the factors and variables influencing the utilization of preventive healthcare services. The next chapter, Chapter 2 titled Literature Review presents and analyzes the key concepts found in the literature about the relationships between and among chronic diseases, preventive care utilization, access to health insurance, and the socioeconomic factors that contribute to these.

Chapter 3, titled Data and Methodology, discusses the research methodology in the form of a pre-test, post-test design framework to identify whether the ACA contributed to an increase in the utilization of preventive care services, as a result of easier access to health insurance among the population in the United States. A logistical model that estimates the probability of receiving cardiovascular preventive care services as a function of socioeconomic factors is presented using MEPS survey data from the year 2009 to represent a pre-ACA analysis and from the year 2015 to represent a post-ACA analysis of the use of preventive services and the factors impacting it.

Chapter 4, titled Results, presents the detailed results comparing the outcomes from the logistic regressions, from the years 2009 and 2015 with special focus on identifying the significant differences between the two years in terms of access to and utilization of preventive care services by race/ethnicity, insurance status, gender, marital status, educational attainment, income, primary language, source of usual care, and individual perception of mental and physical health.

Chapter 5, titled Conclusions and Future Scope, is the concluding chapter that brings together the results and their implications on policy relating to healthcare in the United States,

with some focus on the Medicare expansion proposals being considered by various states. We also present the future scope of this research in both quantitative and qualitative terms to demonstrate the impact it can have on public health policy in the United States.



## Literature Review

“Dig the well before you are thirsty” - (Chinese Proverb)

### Preventive Care Services

Access to preventive care services is vital for the care and well-being of individuals, these are defined as medical screenings, regular doctor’s visits, and other prophylactic healthcare-related services that may prevent a disease or health-related challenges are similar to seeking life sustaining water before it is needed. Preventive care services are essential for everyone, they play a crucial role for individuals who might have a family history or predisposition toward developing a chronic illness and, most importantly, to those who are currently suffering the effects of an acute disease like cancer or cardiovascular-related illnesses. The early diagnosis of an illness could improve a person’s future health outcome and those who select the proactive approach have the tools to manage the consequences of the disease effectively during the early stages of an illness. Timely prevention could ultimately enhance an individual’s health (Leone, Rovito, Mullin, Mohammed, & Lee, 2017).

Preventive care services are relevant to members of a community because it aids them in living longer, healthier lives free of pain and suffering. Having good health infiltrates every area of their lives allowing them the freedom to work and earn the means necessary to support their families and the community. (Vaidya, Partha, & Howe, 2011). There is a direct connection between health outcomes and the economy. Healthy individuals can allocate funding to pay for things or services outside of the healthcare arena. Contrarily, those suffering from one or more chronic illnesses have to allocate a portion of their earnings to pay for services to treat their disease(s). In some instances, the high cost of healthcare forces some individuals to remain under an uninsured status, which leads them to depend on county hospital Emergency Centers or ERs

in their areas for care, as well as on free community health clinics to receive needed medications and care.

Even though most realize the importance of utilizing preventive care services, there is a large percentage of the American population who chooses not to use preventive care services. The Office of the Assistant Secretary for Planning and Evaluation estimated that 48.6 million people held an uninsured status in 2011, this equates to 15.7% of the United States population (Holden, Chen, & Dagher, 2015). One of the main reasons is due to the lack of access to healthcare institutions or the inability to afford the high cost of healthcare coverage insurance premiums. As a result, there is a high percentage of low-income families who have, for years, remained uninsured, regarding healthcare. Whatever the case, it is evident that in the United States, there has been an ongoing trend of inadequacy in the consumption and access to medical care services, which would include the utilization of preventive care services (Vaidya et al., 2011).

The lack of utilization of preventive care services has a negative effect on the economic outlook, the cost of managing an advanced chronic illness is substantially higher than receiving a preventive care service empowering the individual with the information necessary to manage the illness during the early stages of the disease. Compared to the average marginal cost of \$474 for a preventable doctor's visit, in 2010, there were over \$1.1 million avoidable emergency room visits, which add up to more than \$558 million (Yu, Hill, Ricks, Bennet, & Oriol, 2017). Even though utilizing preventive care services outweighs the cost of treating chronic illnesses, there are pockets of Americans who are unable to receive life-saving services. Their main struggle is the lack of healthcare coverage, to address this matter, during his term in office, President Barack Obama and his representatives launched a quest to design and pass a healthcare reform.

## **Affordable Care Act**

The prohibitive cost of healthcare forced the American public to change the course of action and embrace the idea of approving the passage of a healthcare reform which would ensure its future sustainment. On March 23, 2010, Congress voted and signed the Affordable Care Act, as a federal law statute. Under ACA's umbrella, the healthcare reform provided coverage for a wide range of preventive and screening services. The law included sixty-three preventive services used to test and prevent a range of illnesses (National Conference of State Legislatures, 2014). The preventive services were segregated into three distinct groups of services solely focused on addressing the needs of adults, women, and children.

There are several types of preventive care services, the primary prevention method includes services such as immunization shots, while the secondary prevention method is made to recognize the preliminary stages of a potentially chronic disease. The outcomes of the preventive services, such as cancer screening, can aid individuals with the proper information to develop a comprehensive medical plan with their family doctor to treat the early symptoms of the disease (Holden et al., 2015). Preventive care services are also necessary to impede further complications in situations where an individual has already acquired a chronic illness.

ACA included the U.S. Preventive Services Task Force(USPSTS) suggested type "A" and "B" preventive care services, these are services that have a high likelihood that the receipt of the preventive care services will produce moderate to substantial benefits (Agency for Healthcare Research and Quality, 2009). This decision yielded a wide array of criticism among health insurance leaders and policymakers. The debate centered on the inclusion of evidence-based and scientific strength preventive care services, ignoring the patient's opinion, a doctor's decision or

a court ruling was frustrating, many felt that services under the type “A” or “B” might not be necessary (Woolf & Campos-Outcalt, 2013).

One of the requirements in the ACA was the removal of coverage barriers and limitations on who can and cannot be eligible to participate in the insurance plan (Karliner et al., 2016). The healthcare reform prohibits insurance companies from issuing denials due to pre-existing conditions and outlaw the elimination of coverage due to the diagnosis of a new illness. Insurance carriers can no longer include maximum coverage limits in an individual’s yearly or lifetime coverage (Karliner et al., 2016). This opened the door to more than 105 million people becoming eligible to renew their coverage (Obama, 2012). Before the passage of ACA, the cost of medical insurance was higher for females than for males, but Obamacare stopped the practice by prohibiting gender-driven pricing (Karliner et al., 2016). The mandates of the healthcare reform generated a sense of relief and joy for parents of 17 million children (Obama, 2012) who had experienced the effects of pre-existing conditions, a large percentage of these families were unable to obtain the needed life-changing treatments, due to their inability to reissue the policies which were denied prior to the mandate (Karliner et al., 2016).

Before ACA, about a quarter of the population equating to millions of Americans lived in an uninsured status. The lack of coverage hiked healthcare costs; the continuous increase in price grew uncontrollably; and for many, healthcare became an unaffordable and unreachable privilege. For the struggling, healthcare institutions delivery of care became quantitative versus a qualitative service ignoring the overall health outcomes on the delivery of care (Obama, 2012). The transformation of the healthcare system meant the expansion of preventive care services as well as providing the population with an avenue to receive life-saving services such as

screenings for a variety of chronic illnesses and the procurement of immunizations (Obama, 2012).

Additionally, healthcare disparity and access to care have improved for a percentage of uninsured low-income families, many have taken advantage of the healthcare rebates issued to them. The funds have aided the families to obtain healthcare coverage by enrolling in healthcare plans sponsored by their employer or the Healthcare Market Exchange. Traditionally, the insurability rates among college-aged youth have been low. Obamacare changed this by allowing parents to extend insurance coverage for their children until they reached the age of 26 years (Obama, 2012). The expansion was a big benefit to those families and young adults that otherwise would have no other way to afford or continue healthcare coverage.

Three years after the inception of Obamacare, Pu and Chewing (2013) explored the possible reasons for racial disparities among minority populations. Utilizing a national survey database and the Andersen's Healthcare Utilization Model, they found a relationship between consumption of preventive care services and social determinants of health. Narrowing their study, they discovered a connection between age, income, insurability status, the geographical area where an individual resides and their respective consumption of preventive care services. They found that young individuals residing in rural and low-income areas had less probability of utilizing diabetic preventive care services (Pu & Chewing, 2013). Thereby, there is an excellent opportunity for healthcare professionals and lawmakers to allocate additional funding to address the shortages within the social determinants of health to improve the utilization levels of preventive care (Pu & Chewing, 2013).

In 2013, the Government sponsored, Healthcare Market Exchange, opened to the public. After a series of major technical struggles, by the end of the year, citizens of 36 states had an

opportunity to sign-up for national sponsored healthcare coverage (“History of the Affordable Care Act,” 2018). Moving from an uninsured to an insured status meant access to care and the opportunity to obtain preventive care and primary healthcare services. On its first year, more than 8 million Americans enrolled in the Health Market Exchange program (Young, 2014). This number does not include the millions of people who purchased health plans from third-party organizations and insurance agents (Young, 2014).

Shortly after the passage of the Affordable Care Act, lawmakers, corporate organizations, and individuals questioned one of the most contentious parts of the law: the individual mandate which required every United States resident to hold a basic level of health insurance coverage (Kimbrough-Melton, 2013). During the years 2013 to 2018, enforced tax penalties were felt by those individuals who opted to remain uninsured. In December 2017, with the support of the Republican party, President Donald Trump passed a tax bill purging the individual mandate’s tax penalty (“History of the Affordable Care Act,” 2018). Therefore, effective in 2019, Americans will no longer be required to have health insurance coverage.

Navigating the Healthcare Market Exchange was complicated, specifically for uninsured populations. The vocabulary and within the Healthcare Market Exchange system made it difficult for many to select the proper coverage. To address the challenge, the Federal Government, hired and trained HN hence forth to be referred to as HN. These individuals aided uninsured citizens and immigrants alike in their decision to select the most appropriate healthcare coverage. The HN work as consultants and are trained to aid vulnerable populations in overcoming cultural barriers that would prohibit them from gaining access to healthcare services (Shommu et al., 2016). A sizable percentage of HN ended up working at offices of Federal Qualified Health Centers (FQAC) and free healthcare clinics, where they could target low-

income uninsured citizens and guide them through the selection of an insurance program that would best fit their needs.

In some communities, where the immigrant population is prevalent, medical institutions have taken a step further by allocating funding to hire Community Navigators. Their role has a mutual purpose, like the HN, Community Navigators provide direction regarding elections to the Healthcare Market Exchange. Additionally, their most important task is to be the connection among healthcare providers and underserved population, the end outcome is to decrease the level of healthcare disparities among their served communities (Shommu et al., 2016). Rather than providing healthcare services, the Community Navigators offer ethnically customized educational support to the members of vulnerable populations. Their goal is to guide them through the cumbersome healthcare system by ensuring that the proper coverage is selected and utilized to its fullest and orientating them on techniques to enhance the communication between them and their medical providers (Shommu et al., 2016). Utilization of Community Navigators provides the needed link that newly-arrived pilgrims (Shommu et al., 2016) need to overcome fundamental social and cultural challenges such as financial constraints, low levels of education, language, religious or ethical challenges (Thompson, Horton, & Flores, 2007).

By the year 2014, the additional Obamacare's mandatory regulations went into effect. Insurance carriers were required to satisfy the yearly assigned financial, medical loss ratios (MLR) for individual or group coverage insurance plans to provide transparency, expenditure accountability, and lower the healthcare cost. In other words, insurance carriers must spend the minimum MLR requirement of the premiums collected on medical care offered to their insurers. If the required MLR is not met, the carrier is mandated to issue credits, rebates or refunds to the covered individuals or organizations who underutilized the service. The standard requires a

minimum of 80% MLR for individual or small group insurance plan and 85% MLR for medium to large group plans (Kirchhoff, 2014). For example, if an insurance carrier collected \$1,000 in yearly premiums from a small group, the minimum healthcare expenses spent through the fiscal year is \$800 or in the case of a large group, the MLR amount will be \$850 (Kirchhoff, 2014).

The expansion of coverage began on January 1, 2014, and it applied to every insurance plan including medical plans offered to individuals and small, medium, and large organizations alike (National Conference of State Legislatures, 2014). According to the law, services rendered by the carrier's preferred in-network must hold a minimum cost to the patient (National Conference of State Legislatures, 2014). Increasing healthcare coverage yielded a positive decline in the percentage of the uninsured population. A well-renowned healthcare research organization states that the percentage of uninsured dropped roughly around ten percent between the years 2015 and 2014, a similar trend followed for the years 2015 and it capped out during the 2016 fiscal year in which 26.7% of the population held an uninsured status ("Key facts about the uninsured population," 2018). It is unclear what the impact of the 2017 individual mandate tax penalty purge would have to the levels of uninsured residents living in the United States.

A government-sponsored healthcare research organization, the AHRQ, measures healthcare utilization trends by issuing the yearly MEPS. The large scale nationwide survey's goal is to collect data from a sample population formed of single individuals, families, medical providers and employers across the 50 states (Agency for Healthcare Research and Quality, 2009). The agency seeks to gather facts about the utilization frequency, the cost of receiving healthcare services and the type of payment utilized to pay for the service. In the Household component, one of three segments included in the MEPS survey is a series of inquiries related to



the usage of preventive care services. The data trends provide good knowledge of the status of healthcare services in the United States.

The results of the 2009 survey reflected the uninsured status of the American population during the pre-ACA implementation era. During this year, MEPS surveyed 36,855 individuals, 17.52% of this sample population described themselves as holding an uninsured status (Agency for Healthcare Research and Quality, 2009). Five years after the inception of Obamacare, the uninsured rate decreased by 5.57%, data for the 35,427 participants surveyed in 2015 yielded an 11.95% uninsured rate (Agency for Healthcare Research and Quality, 2009). The post-ACA uninsured results seem, on the surface, to be a representative of positive outcomes and a walk in the right direction to achieve the mandate of national healthcare coverage.

Even though the trend of uninsured participants is declining, there is still a high number of uninsured individuals living in the United States; not having access to healthcare services contribute to the delay of the diagnoses of chronic illnesses and potentially premature death. In 2016, the National Census Bureau reported that percentage of uninsured individuals for this calendar year had dropped to 8.8% (Barnett & Berchick, 2018). Therefore, the initial results indicate that the passage of ACA might be having a potential positive outcome by lowering the uninsured rate to almost half its original amount. However, enrollment in healthcare services is not a good indicator of behavioral change, utilization of preventive care services, thereby this study quantifies MEPS' survey data to discover the possible correlation between insured status and the utilization of preventive care services.

### **Medicaid Expansion**

During the implementation of the ACA, the original law included Medicaid expansion for the entire country. However, in 2012, the United States Supreme Court made a ruling which

allowed states to opt out of the amplification of the program (Kino & Kawachi, 2018). State lawmakers argued and advocated from their points of view regarding the extension; at the end, each state made the decision to enhanced Medicaid coverage or opt out from it. As an incentive to expand Medicaid services, states received federal funding targeted to finance the additional cost that states would need to implement the increase of the coverage base (Kino & Kawachi, 2018).

Medicaid expansion meant access to healthcare insurance for those uninsured individuals whose income levels meet the minimum criteria of 133% poverty level or roughly \$15,500 yearly earnings (2014 rate) for a single adult household (Akinyemiju, Jha, Moore, & Pisu, 2016). The primary purpose for the augmentation of services was to address healthcare inequalities for traditionally underrepresented groups such as low-income minority communities (Akinyemiju et al., 2016) as well as enhance the utilization of preventive care services such as pap smear, mammograms, and PSA tests (Kino & Kawachi, 2018). Specifically for cancer screening, a recent study measured the usage of women's health preventive care services, its findings suggest that low-income, uninsured women in non-expanded states have significantly lower rates of prescreening than those living in states where Medicaid was enhanced (Sabik, Tarazi, & Bradley, 2015).

Decision makers for "opt-out" states justified their decision based on cost and mistrust that the federal funding would be sufficient to meet the needs of the potential eligible individuals and families; they claim that their state's small budgets and tax revenue restrictions are not sufficient to ensure long-term sustainability. As of late 2018, 36 states, including the District of Columbia, had successfully expanded Medicaid, 13 others have opted out, and the states of Utah and Wisconsin expanded Medicaid to 100% of the federal poverty level (Families USA, 2013).

The federal funding loss to those states that opted out of the Medicaid expansion is sizable. For example, in 2015 the state of Texas rejected the extension; this decision prevented the state from collecting an estimated \$100 billion in federal funds over a decade timeframe (Mangan, 2015). The politician's rigid decision not to expand Medicaid services, leaving things on a "status quo" basis, forced low-income uninsured to remain without coverage. Lack of affordable care meant the absence of access and underutilization of preventive services which would ultimately increase the cost of healthcare; chronic illnesses might not be discovered or managed until they have reached an acute status. Eventually, someone has to "foot the bill" to care for the uninsured individuals who present themselves to the local hospital's ER department in need of receiving primary or specialty care for untreated medical conditions such as diabetes or hypertension. Sadly, private and public hospitals end up writing off millions of dollars every year to treat the uninsured (Mangan, 2015) which could precipitate the closure of institutions who are unable to remain in business due to costly write-offs and because of a lack of reimbursements. As a result, citizens in "opt-out" states are forced to pay additional funds in property or sales taxes to compensate for the shortfall of Federal funding (Mangan, 2015). There is no doubt that Medicaid expansion is a crucial issue in the conversation of access to care. However, the question remains if this is the best avenue to pursue toward providing accessibility to the American uninsured or is there a better strategy to widen ingress to services and lower healthcare costs?

### **Andersen Behavioral Model of Health Service**

In 1968, Dr. Ronald Andersen developed the Andersen "Behavioral Model of Health Service" to aid healthcare providers and researchers with measuring the utilization of medical services by identifying specific reasons that families considered when seeking healthcare

services. The measurement pinpoints healthcare disparities among a group of individuals or communities, the outcome is relevant to policymakers and healthcare leaders because it provides a guideline to allocate funding appropriately thus expanding access to everyone (Andersen, 1995). The original model measurement was to analyze an individual or a family unit level of utilization of healthcare services. Shortly after the development of the model, Dr. Andersen dropped the family measurement because it became challenging to develop a consistent measurement of the family as a unit. The specific and unique circumstances that each family member brought made it impossible to develop a consistent and replicable measurement applicable to future studies (Andersen, 1995). Therefore, today the model is solemnly used to measure an individual's unit of analysis (Andersen, 1995). As depicted in Figure 1, the model proposes that the individual's predisposition to utilize health care services will enable or hinder the utilization of medical services. In addition to the predisposing factors, an individual needs to be able to receive certain services, therefore their ability to identify family and community resources to obtain the necessary healthcare services is imperative. Culturally, if the anticipated return on investment, or in this case, the positive benefit of acquiring medical services will drive the level of healthcare consumption. Thanks to Anderson's model, predisposing, enabling, and the need (necessary) factors provide the researcher with a reasonably good measurement representative of a community or group of individuals (Andersen, 1995).

Each section of the model has carefully been selected to measure the specific factors that might influence an individual's likelihood of utilizing health services. Under the Predisposing Characteristics, the Demographic Factors are the individual's respective age and gender, these represent biological attributes suggesting the possibility that people will need services (Hulka & Wheat, 1985). The second element of the Predisposing Characteristics component is the Social

Structure or an individual's social status within the community where they reside. It also includes an individual's ability to deal with their ongoing health issues and the communal support received (Andersen, 1995). The conventional measurements utilized under the Social Structure include the individual's level of education, their type of work or occupation held, and their respective ethnicity (Andersen, 1995).

The third contributor of the Predisposing Characteristics measurement is the individual's Health Beliefs, this includes a wide range of factors such as the individual's perspectives, a position about the illness or level of health, and background information on their health level. The combination of these factors will influence healthcare interactions, or the provision of services needed to address the person's current health struggles and future subsequent consequences (Andersen, 1995). Health Beliefs are imperative in the measurement of the Predisposing Characteristics component because it provides a potential explanation on the impact and influence that a social structure would have on an individual's utilization of healthcare services (Andersen, 1995). Thereby moving the individual onto the second component level of the model: Enabling Resources whereby the individual would seek local community healthcare services (Andersen, 1995) to address their healthcare needs to include the utilization of preventive care services.

The individual's genetics such as prior family history are factors that will encourage an individual to obtain preventive care services and managing more efficiently the potential development of chronic genetic illnesses. Additionally, the individual's psychological characteristics, such as mental dysfunction or cognitive impairment would have an impact on the individual's level of healthcare services' consumption (Andersen, 1995).

The second component of the Andersen Behavioral Model Enabling Resources refers to the individual's Community Resources available to include the level of health personnel and access to local medical facilities, hospitals or community health clinics. Personal/Family Resources is the individual's ability to meet their means. In other words, it is the individual's monetary resources and their ability to afford the cost of health insurance and medical expenses. A Community Measurement component that needs consideration of an individual's living in remote locations, commuting distances to the closest medical facility, usually longer distances lower the utilization of healthcare services (Andersen, 1995). Additionally, the lack of medical personnel or specialty providers must be weight onto the likelihood that an individual will utilize health services.

The individual's need is the third component of Andersen's Behavioral model. This factor considers an individual's perspective on their health and their experience with the treatment of the illness, pain suffered and the level of stress that the person might encounter when managing a chronic disease (Andersen, 1995). All of these factors encourage or deter the individual from seeking professional assistance and support (Andersen, 1995).

Under this model, Health Beliefs are an essential criteria in the appraisal of the utilization of preventive health services (Andersen, 1995). For instance, individuals who believe their health might be a risk are highly encouraged to utilize preventive care services to evaluate and verify their current health status.

### **Wellness and Preventive Healthcare Services**

Wellness is an ongoing, dynamic and active approach to make life choices that will yield favorable health outcomes (Agarwal, Baechle, Behara, & Rao, 2016). In the proactive process of modifying one's way of life, wellness touches all facets of one's life to include the mental,

physical, and social well-being of an individual (Agarwal et al., 2016). A variety of medical institutions has suggested preventive healthcare services to aid individuals in the managing of one's comprehensive wellness portfolio. Today, the advances in the medical industry have developed a robust catalog of preventive care services, a good portion is considered for individuals fitting the definition of an average healthy individual while many others have been designed to meet the needs of those who might be suffering from a chronic illness such as cancer.

Sadly, cancer is a reoccurring word heard by a large percentage of the U.S. population, the latest report by the American Cancer Society states that over 15.5 million Americans suffer(s) from the detrimental effects of cancer-related illnesses (American Cancer Society, 2017). The agency forecasts an expected increase in the diagnosis of cancer-related illnesses, in 2017, it anticipated the discovery and diagnosis of 1,688,780 new cases of cancer (American Cancer Society, 2017). In many instances, the development of the disease or secondary health complications dramatically diminishes a person's life expectancy. The ongoing trend suggests that roughly 600,920 Americans are expected to end their life prematurely every year, putting this in perspective that is 1,650 people dying daily due to cancer-related illnesses (American Cancer Society, 2017). The staggering numbers make cancer the number two killer in the United States, it is exceeded only by cardiovascular illnesses.

Everyone is susceptible to acquiring cancer; the American Cancer Society data reports that approximately 80% of new cancer cases occur in those over 50 years of age (American Cancer Society, 2017). They are many types of cancers, some of the most common ones include female breast cancers, uterine or cervix, colon or rectum, leukemia, lung and bronchus, melanoma of the skin, prostate, urinary bladder, and non-Hodgkin's lymphoma. The

uncontrollable growth and spreading of the abnormal cells attack vital organs that will ultimately cause premature death. Researchers have worked throughout the years trying to identify the underlying reasons and the root causes of the disease, yet they have been unsuccessful in their pursuits. Nonetheless, they have identified specific factors that contribute to the likelihood of acquiring the disease, many of them include unhealthy eating habits, lack of exercise, and the use of tobacco (Billington et al., 2001).

Healthcare providers indicate that the use of tobacco highly increases the likelihood of developing severe medical conditions such as lung cancer, cardiovascular-related illnesses, chronic obstructive airways diseases, cerebrovascular diseases and other types of mouth-related illnesses, such as tumors of the mouth (Billington et al., 2001). Smoking cessation programs are highly encouraged to those individuals currently using tobacco or any other substances that could impede health outcomes (Billington et al., 2001). The decrease in the development of a potentially chronic illness produces a high dividend payment. Specifically for primary preventative services, taking a daily aspirin to lower the risk of a heart attack or preventing the development of alcohol and tobacco-related illnesses by the utilization of cessation programs could generate sizable saving generating revenues of up to 1.5 billion dollars every year (Agarwal et al., 2016).

Preventive diagnostic measures such as colonoscopy, sigmoidoscopy and blood stool tests will help impede colorectal cancers. Preventive cancer tests for women include screenings of the breast, mammography and cervical Pap smear exams, as preemptive prophylactic measures toward diagnosing these severe types of cancers in their earliest stages. Timely detection enables the individual and the healthcare provider with the opportunity to develop and



initiate a treatment that could be less invasive, and result in a successful outcome in preserving a woman's life.

The treatment of cancer and its complications have a high cost attached to it, the AHRQ estimates that the direct medical cost (total of all health care expenditures) for cancer in the United States, in 2014, was \$87.8 billion (American Cancer Society, 2017). The cost of the treatment is higher for uninsured patients who are members of racial and ethnic groups, where the use of preventive care services is lower than those who are insured. There is no doubt that the early cancer diagnosis will provide the individual with an opportunity to treat the disease at its first stages and in doing so decrease the cost of treating the illness and give the individual the resources needed to improve their quality of life. Therefore, the proper utilization of preventive care services plays a fundamental role and one that cannot be ignored.

Parents should consider having their children, at an early age, receive the human papillomavirus (HPV) vaccine, which could prevent several types of cancers linked to the virus (Ulrike, 2015). The high levels of cancer illnesses are increasing the need for additional awareness and immunization rates within the HPV vaccination (McRee, Reiter, Gottlieb, & Brewer, 2011). The current guidelines state that girls and boys alike should receive two doses of the lifesaving immunization - the first dose is given within the age of 11 to 12, and the second, at age 13 to 26 years (McRee et al., 2011). In the preventive industry, HPV vaccinations might be challenging to attain for children of those families whose parents might have cultural constraints and difficulties to establish open discussions regarding sexual health and sexually transmitted diseases prevention (McRee et al., 2011).

A similar type of cultural and social constraints sometimes lead to the spread of highly contagious illnesses like the airborne influenza virus, most commonly known as the flu. In the

United States, the Centers for Disease Control and Prevention (CDC), is the agency responsible for tracking and preventing the spread of chronic illnesses from including influenza. The variety of influenza virus strands travels across the globe attacking the human immune system, and in many instances, the disease yields secondary health complications, such as pneumonia (Garten, 2018). Every year CDC scientists are challenged by the ongoing genetic transformation of the influenza virus, forcing to decrease the levels of transmission. The experts must adjust the make-up of the vaccine. The severity level of the flu vaccine is measured by the number of patients showing flu-like symptoms and recorded at physician's offices and ER departments (Garten, 2018). The spread of the disease varies every year, this is due in part to the changes in the vaccine, if the strain of virus selected for the immunization is relevant during the flu season, the result is the decrease in the number of positive flu cases. However, if the wrong type of virus is selected, the result can be and usually is an inordinate amount of preventable flu cases resulting in major negative socioeconomic ramifications, for those who are lengthy, immunocompromised hospitalization or even death may be the outcome. During the 2017-2018 influenza season, the level reached a high severity, influenza-related hospitalizations reached the highest levels ever recorded, totaling 710,000 flu-related hospitalizations for individuals suffering from severe symptoms of the H3N2 flu virus strain (Centers for Disease Control and Prevention, 2019). The bacteria targeted people age 65 and older; this population accounted for 58% of the recorded cases (Centers for Disease Control and Prevention, 2019).

The staggering numbers are a reminder of the importance of receiving the flu vaccine before the start of the flu season. To immunize an entire nation is a significant undertaking and it is not only the responsibility of healthcare providers, but it is a community effort where everyone

should participate. Due to their weak or underdeveloped immune system, compared to the rest of the population, children and the elderly are considered to be at a higher risk.

Increasing the immunization levels reduces the spread of the virus and the potential containment of a flu pandemic. Addressing this matter, some states and local governmental institutions have put forward efforts to target underserved populations where the immunization levels are low. For example, in 2011, the state of Massachusetts passed an initiative to broaden access to immunize specific groups within their population (Massachusetts Department of Public Health Immunization Program, 2017). The state provided health education messages for both English and non-English speakers. The development of customized materials reaches out to those individuals who recently immigrated into the United States, the uninsured, or to the members of low-income groups who are most likely not to be aware of the potential consequences of not receiving the vaccination (Massachusetts Department of Public Health Immunization Program, 2017).

The latest report states that during the 2015-2016 flu season, about 50% of the residents of the state of Massachusetts were immunized for the flu (Massachusetts Department of Public Health Immunization Program, 2017), impressively about 85% children between the ages of 6 months to 4 years of age received the vaccination (Massachusetts Department of Public Health Immunization Program, 2017). Perhaps, other states across the nation may consider following Massachusetts' lead in the developing of similar programs to broaden access to the flu vaccine. Comprehensive vaccination initiatives are needed to reduce the mortality rates of flu and influenza-related illnesses.

The lack of utilization of preventive care services has had detrimental health outcomes for the American population resulting in an increased number of new cardiovascular-related

illnesses. In many instances, related behavioral adjustments like increasing physical exercise and following a healthy diet might delay the progress of the disease (Mokdad, Marks, Stroup, & Gerberding, 2004). Yearly, about 610,000 or one out of every four individuals dies from heart-related illnesses (National Center for Chronic Disease Prevention and Health Promotion, Division for Heart Disease and Stroke Prevention, 2017). Males are more susceptible to developing cardiovascular illnesses, more than half of the deaths within this group are heart-related (National Center for Chronic Disease Prevention and Health Promotion, Division for Heart Disease and Stroke Prevention, 2017). In the developing world, the United States remains the number one country with the highest percentage of deaths related to cardiovascular disease. A 2006 estimate reported an economic impact accounting \$403.1 billion for the treatment of heart-related illnesses (Vaidya et al., 2011).

Many might argue that the cost of offering preventive measures for everyone could “break the bank” and perhaps the expenditures allocated to this line item. However, it is proven that this is not the case, on the contrary, managing the prevention of cardiovascular diseases will produce an estimated decrease to approximately 17%, saving the United States roughly \$149 billion every year (Vaidya et al., 2011). Saving even a fraction of these expenditures could equip the nation with additional resources allocated to preventive care strategies.

To reduce the cardiovascular-related illnesses, an individual may consider adjusting their behaviors by ceasing smoking or, at a minimum, reducing the use of tobacco and its related products (Benjamin et al., 2019). Obesity also plays a significant role in plaque buildup and blocking the flow of blood in the arteries and causing heart attacks (Benjamin et al., 2019). The recommendation is that individuals take precautionary measures reducing alcohol consumption,

exercising regularly, eating a healthy diet and utilizing preventive care services such as yearly blood pressure check-ups and cholesterol screenings.

Although the message of eating well and exercising seems to be redundant, a large group of Americans refuse to make the behavioral changes necessary to improve their current health status. The excuse for many is the lack of health coverage and the potential high out-of-pocket costs of seeing a doctor on an ongoing basis to obtain the suggested preventive services, this is especially the case for members of low-income vulnerable populations (Vaidya et al., 2011). It is proven that individuals who remain on an uninsured status, for long periods of time, will generally underutilize preventive care services resulting on the mismanagement of illnesses and unfortunately for many, the delay of services and the disease's mismanagement results in the development of chronic illnesses that treatment is not reversible (Vaidya et al., 2011).

Researchers have studied individuals of the different racial/ethnic groups living in the United States, and they have found that there are racial/ethnic differences in the usage of preventive care services; compared to Hispanics all other non-Hispanic groups score higher in their utilization of preventive care screenings (Vaidya et al., 2011). Education and awareness of the importance of utilizing preventive care services are found to be one of the leading root causes for the preventive care utilization shortage.

### **The Face of the Uninsured**

Access to care and utilization of preventive care services is such an essential topic for the healthcare industry whereby untreated chronic illnesses such as diabetes or hypertension cause patients to suffer the effects of acute disease and its secondary symptoms (Kirchhoff, 2014). Due to the negative socioeconomic characteristics found in underserved communities which are largely comprised of minority groups preventive services are grossly underutilized as a

consequence of financial and geographic constraints (Weitz, Freund, & Wright, 2001). For some individuals, the lack of utilization could be due to their remote place of residence, not every rural town has access to a local community care clinic. Long driving distances force individuals to discontinue the management of their medical symptoms, this conduces to the development of chronic illnesses.

A unique and innovative model to address a person's inability to travel long distances to obtain healthcare services is the usage of the 2,000 Mobile Health Clinics (MHCs), available across the nation by providing preventive and critical healthcare services (Yu et al., 2017). The customized vehicles provide services to remote locations or neighborhoods where there is a lack of medical services and to meet the needs of vulnerable populations by providing transportation. (Yu et al., 2017). This model aids healthcare professionals in the monitoring of the medically disenfranchised, their primary goal is to lower health disparities and prevent the development of chronic diseases; in any given year MHCs render 6.5 million medical care visits (Yu et al., 2017). MHCs offer a variety of services ranging from basic primary and urgent care to specialty care in the dental and mental health counseling fields; others are equipped with sophisticated equipment to provide preventive care services like mammography and ophthalmology (Yu et al., 2017). Unfortunately, not every state in the nation has the funding or resources available to meet the needs of the entire population. Therefore, there is still a large segment of the population that is challenged by the lack of access to healthcare services.

In addition to access, the absence of healthcare coverage handicaps those individuals who might need preventive care services but are unable to afford it. As mentioned earlier, one of the primary mandates for the Affordable Care Act was the expansion of care to decrease the uninsured in the United States. In 2016, three years after the implementation of the healthcare

market exchange, 13% of adult women remained in an uninsured status. The rate of insurability increased to 15% for African-American women, and the score for Latina women was 24%, and the rate for low-income women increased to an alarming 25% (Karliner et al., 2016).

In 2012, to investigate the determinants that affect access to care for minority groups who hold an uninsured status, a study examined the connection between racial disparity and the levels of insurability, too (Doh, 2012). The variables researched included the social demographics of the uninsured and the influence of the state's economy as well as the states' ideology (Doh, 2012). The data utilized for the study considered the 2010 United States Census results and forecasted the data to measure the potential outcome and changes through the year 2019 (Doh, 2012). The research results showed a clear connection between an individual's ethnic background and his/her level of insurability, this is important to point out because it has consequences on the levels of quality of care received by the members of the uninsured minority groups. It also affects an individual's ability to afford out-of-pocket healthcare payments needed to consume required healthcare services, the delays on the treatment of symptoms could evolve into an acute illness or, in worst instances, premature death (Doh, 2012).

The literature review on this topic establishes a connection between the level of uninsured rates and social demographic characteristics (Doh, 2012). The uninsured rate is more significant among immigrants or minority groups, this is due in part that members of these communities might be unaware on how to maneuver around the complex healthcare system, or perhaps many hold cultural values that do not match with the way that American healthcare is rendered (Doh, 2012).

There are also economic constraints that may force families to remain in an uninsured status, such is the case for single-parent families where the household income is restricted due to

a single source of income (Doh, 2012). Other sociodemographic variables that influence the level of insurability are age and employment status, usually the higher the income, the less the likelihood that an individual would be uninsured (Doh, 2012).

A large percentage of uninsured women do not receive the recommended preventive women's health services issued by the USPSTs. Every three years, women between the ages of 21 to 65 must receive a pap smear to prevent cervical or ovarian cancer (United States Department of Health and Human Services, 2015). Starting at age 40 to 74, women should consider getting a mammogram to detect the early signs and symptoms of breast cancer (United States Department of Health and Human Services, 2015). The lack of utilization of these preventive care services delays its diagnoses complicating the treatment and survival rate of advanced diseases.

Additionally, delay of early diagnoses increases the healthcare cost, forcing already burdened patients to identify avenues to manage and treat chronic diseases. Women who are unable to afford the cost of healthcare insurance, or perhaps immigrants who hold an illegal status and are ineligible to purchase Market Exchange insurance, their only option is to seek services offered by community health centers or charity clinics (Denson & Keele, 2016). The programs offered at these clinics are designed to target the needs of these low income and uninsured women (Denson & Keele, 2016). Even though many of these communal clinics are designed to meet the needs of vulnerable populations, at times, women are unable to receive the proper preventive healthcare services due to clinic restricted funding (Denson & Keele, 2016). Therefore, many give-up on their attempt to find a source to receive preventive care services.

The delay could cause detrimental outcomes for these women. Communities across the country should debate this topic to identify avenues to increase the levels of free or low-cost



preventive care services offered to the uninsured. By moving this strategy to the top of the priority list, illnesses such as cervical or breast cancer are diagnosed during the early stages of the disease which could save a woman's life and potentially avoid further healthcare and economic complications.

Also, low-income men struggle with receiving essential preventive healthcare services. In addition, they are potentially lacking healthcare coverage because research indicates that men are more prone to hold higher levels of disenfranchisement and an unwillingness to visit a physician on a regular basis (Leone et al., 2017). As a result, compared to women, men will usually have a higher percentage of morbidities (Leone et al., 2017). Nine out of the ten top leading causes of death, there is a statistical upward trend showing men are more likely to die five years earlier than women (Leone et al., 2017). Additionally, a large percentage of the male population tends to hold higher-risk occupations, resulting in decreased levels of health and reduced quality of life indicators compared to women (Leone et al., 2017).

The implications for men's poor health outcomes affect the economy of the United States – it lowers work productivity levels which accounts annually for about \$136 to \$142 billion. Additionally, it generates an increase in lost time at work and a decrease in salary, which in the long run, could potentially contribute to the need for welfare services (Leone et al., 2017). The impact of such circumstances create a cascade of effects on family members who might carry the burden of taking care of individuals who are unable to work, due to chronic health conditions.

Cultural barriers profoundly influence a person's decision to seek out preventive care services. Therefore, it is imperative that medical personnel receive training on techniques to modify their delivery of care – fulfilling a variety of multicultural needs (Sharp, 2013). For a large percentage of men, going to the doctor infringes on their cultural values. Many people

think that going to the doctor does not offer any benefit or is considered an unpractical and time-consuming chore. At times, the cultural values such as “machismo” build a brick wall as men prefer not to participate in preventive services to avoid feeling embarrassed or fearful of the outcome of the tests (Leone et al., 2017). Other factors include the lack of coping mechanisms, money shortages or scarcity of time. In certain circumstances, the struggle is due to the lack of education which might influence the individual’s decision to avoid treatment (Leone et al., 2017). Even if the symptoms of illness might be present, the reluctance to deal with healthcare and wellness matters might be too much of a burden, therefore this population often neglects to seek medical support.

Every ten years, the United States Census Bureau collects demographic and medical insurability status from every person living in the United States. Classification of an individual’s insurability status includes private, government insured coverage, or the uninsured. In 2010, the census reported that almost 20% of individuals below retirement age did not maintain consistent medical insurance (DeNavas-Walt, Proctor, & Smith, 2010).

Race plays a vital role in healthcare because it aids policymakers in targeting strategies that address the lack of access to healthcare for specific ethnic groups. Doh’s Study suggests that among the major ethnic groups, Hispanics play an essential role because the insurability ratio among the members of this group is higher than others (2012). The 2010 United States Census indicated an alarming upward trend in regard to the number of individuals who were identified as Hispanic and reported being uninsured (Doh, 2012). This data signifies an additional 15 million uninsured Hispanics over what was reported in the 2000 United States Census (Doh, 2012). This study categorized the uninsured by their state of residence. The results showed a correlation between ethnicity and insurability, United States with high levels of Hispanic populations held

the highest insured rates. This finding emphasizes the connection between the uninsured and an individual's ethnicity and its corresponding sociodemographic variables.

### **Healthy People 2020**

Every ten years, the United States Department of Health and Human Services launches a traditional "ten-year" agenda, the purpose of such is to improve the nation's health. On December 2, 2010, the agency issued the Healthy People 2020. Its mission – of the decade initiative – was to designate target health improvement priorities through public awareness campaigns and additional research, regarding the factors influencing targeted groups of social determinants of health (Centers for Disease Control and Prevention & National Center for Health Statistics, 2019). The ultimate goal is to improve the quality of care to enhance an individual's life span and prevent premature death (Centers for Disease Control and Prevention & National Center for Health Statistics, 2019). In its pursuit to eliminate healthcare disparities and enhance the levels of health equity among diverse groups; the agency is encouraging healthcare providers, medical institutions, and the public in general, to create a harmonious structure. The social and physical environments surrounding every American will promote good health for everyone to enhance the quality of life for individuals across all stages of life (Centers for Disease Control and Prevention & National Center for Health Statistics, 2019).

This study intends to provide a quantitative model to analyze the pre and post-implementation impact of the ACA with regards to the utilization of preventive care services. The author wishes outcomes of the analysis will be used to enhance the literature review about this topic, as well as equip future lawmakers with data to strengthen healthcare access initiatives such as Healthy People 2020. Due to the short timeframe, since the inception of Obamacare, it is difficult to forecast the influence that the law will have on the nation's healthcare system;

therefore future legislation is needed to improve the obstacles of access to care that many Americans face today.

### **Literature Review Conclusions**

This study highlights the importance of utilizing preventive care services. It also underlines the suggested USPSTF preventive healthcare guidelines and explains the impact of healthcare reform. The level of utilization pre and post-ACA is relevant because it measures the effectiveness of the Affordable Care Act with regards to the expansion of access to preventive care services which will ultimately improve the management of chronic illnesses. Even though wellness is a personal choice, there are a series of factors that influence a person's ability to receive timely and proper healthcare services. This study describes the myriad of social determinants affecting access to care, as well as explaining the relationship between having a gateway to services or a disparity in the ability to receive them. A further aspect of this inquiry centers on illuminating utilization of preventive, diagnostic services, as well as receipt of immunizations and programs such as smoking cessation and routine physical screenings between those who are fortunate enough to have healthcare coverage and those who do not. An additional caveat being whether those with insurance take advantage of the medical procedures afforded them by their coverage, regarding maintaining good health through the employment of prophylactic ministrations. In summary, do those who took advantage of the numerous variables of preventive care manifest less of a burden on the coffers of the United States medical community? The purpose of this research is to identify whether that is the case or not.

The results of the analysis will provide lawmakers and other people of relevant standing with the knowledge to advocate for new efforts to improve future adjustments to the law. Increasing access to healthcare services and utilization of preventive care services within the

American population is the key to improving the management of the nation's healthcare expenditures.

### **Summary**

This chapter delineates the importance of consistently utilizing the suggested preventive care services specified by the USPSTF. Further, it describes the impact that the passage of the Affordable Care Act has had with regards to expanding healthcare access and widening the utilization of preventive care services to manage chronic illnesses better. The socioeconomic factors addressed in this review, offer a comprehensive insight into healthcare disparities and the obstacles that many face in their pursuit of acquiring prophylactic services.

Chapter 3 outlines the research methodology utilized in this study to include the overall approach and rationale used to measure the selected MEPS' cohorts by defining its characteristics and the reasoning for its selection. Additionally, this segment features details of the statistical models employed in the analysis of the chosen dependent and independent variables.

## Research Methodology

“A penny saved is a penny earned” - (African American Proverb)

### Overall Approach and Rationale

One premise behind the ACA was to “earn the pennies” by making preventive services and diagnostics more readily available and create an avenue to decrease the high levels of early mortality rates and the development of chronic illnesses (Mangin, Sweeney, & Heath, 2007). This quantitative, comparative study intends to measure the utilization of preventive care services for cardiovascular-related illnesses during the pre and post-implementation of the Affordable Care Act for the uninsured non-Hispanic white, non-Hispanic black, Hispanic, Asian, as well as other races and ethnicities in the country. The purpose of the Affordable Care Act is to minimize health disparities and decrease the high levels of the uninsured population in the United States (Kimbrough-Melton, 2013). To address this issue, the government issued a series of directives and mandates. Two of those mandates included the opening of the Healthcare Insurance Marketplace, a government sponsored service offering affordable medical insurance for single individuals, families, and small businesses (HealthCare.gov, 2019). The second required insurance companies to include preventive care services as a free service to insurance holders (Kimbrough-Melton, 2013). Obamacare founders believed that the inclusion of these two mandates would address the issues of health disparity and insurability in the country.

The literature provides insights into the different levels of preventive care usage and how it has changed over the years. The purpose of this study is to examine ACA’s pre and post-implementation outcomes to detect and determine if the passage of the healthcare reform with its quest of reducing health disparities by lowering the uninsured rates among Americans has been successful.

In 1996, the federal government developed the MEPS, this is a “large-scale [set of] surveys of families and individuals, their medical providers, and employers across the United States” (Agency for Healthcare Research and Quality, 2009). The purpose of the survey is to gather facts and data regarding the specific health services that United States citizens utilize. The survey includes a variety of measurements to include types of services obtained, utilization frequency, and expenditures (Agency for Healthcare Research and Quality, 2009). It also measures economics and healthcare costs, like types of payments used for the rendering of healthcare services, the scope and the varieties of healthcare insurances available to the American workforce.

MEPS incorporates three significant components: Household, Insurance (Employer), and Medical Provider. This study utilized the Household component where a healthcare survey is given to selected family members and persons in districts across the United States (Agency for Healthcare Research and Quality, 2009). MEPS includes a few inquiries, regarding access and utilization of preventive healthcare services, the questions follow the recommendations issued by the United States Preventive Service Task Force dividing uninsured adult individuals, according to their ethnicity, race, and household income (Holden et al., 2015).

A comparative study, using MEPS results for the years 2009 and 2015, measure ACA’s outcomes among MEPS’ survey participants. The comprehensive results serve as a sample representation of the impact that the implementation of the ACA has had on the utilization of preventive services among residents of the United States. The analysis utilized participant demographic characteristics as the independent variables for the study. A logistical regression analysis correlated the participant’s demographics with the utilization of selected preventive care services. The participant’s socioeconomic characteristics included in this study are a person’s

race or ethnicity, gender, household income, insurability status, marital status, years of education, primary language, age, usual source of care, and the perceived health and mental status. The different types of preventive care services used among the members of the researched population represent the dependent variable – cardiovascular – which incorporates preventive care services designed to diagnose the presence of high blood pressure and cholesterol.

As pertains to cardiovascular illnesses, this study incorporates the participant's frequency of utilization of blood pressure and cholesterol measurements.

### **Research Question and Hypothesis**

This research aims to measure the utilization of preventive care services in the United States for insured and uninsured populations before and after the implementation of the ACA. A comparative analysis utilizing MEPS' survey results for the years 2009, will serve as the representation of the pre-ACA implementation, and the 2015 survey results represent the post-ACA implementation outcomes in terms of the utilization of preventive care services. The preventive services in our service area include two forms of cardiovascular measurements (hypertension and blood cholesterol levels).

How has the pre and post-implementation of the Affordable Care Act impacted the utilization of recommended preventive care services by insurance status in the population in the United States?

The specific hypotheses to test and their expected outcomes from the data are as follows:

1. Is the usage of preventive care services higher among insured participants? If so, are these outcomes the same for the year 2009 and for 2015? We expect to find that preventive care services are used more by insured participants as compared to uninsured participants in both years.



2. Does the use of preventive care services vary by an individual's socioeconomic characteristics such as race, ethnicity, age, gender, income level, educational level, and primary language spoken at home? We expect to find that higher levels of income, education are associated with higher use of preventive care services. There might also be differences based on age, gender, race, and ethnicity which will be explored.
3. Does an individual's usual source of healthcare determine how likely they are to utilize preventive care services? We expect that individuals whose usual source of care is a physician's office are likely to utilize preventive services more than the others.
4. How are preventive care services utilized among uninsured participants in the 2009 and 2015 surveys and what are their characteristics? We expect to find that the increase in insurability that was granted by the ACA would result in changes among the characteristics of the uninsured population and their usage of preventive care services.

### **Research Methodology**

This study conducts a comparative quantitative design by comparing the outcomes of two or more independent variables representing the effect or cause of outcomes. In other words, the independent variables are the influencers of change in the dependent variable (Creswell, 2013). *Causal-comparative research* investigates the effect of independent variables of two or more groups for events that have occurred in the past. *Correlational design* compare independent variables through a serious of a statistical analysis that will measure the outcomes of the research (Creswell, 2013). The relationships among two or more variables could be quite sophisticated and, in some instances, its interpretation could be challenging. Specific statistical techniques have been developed to enhance the meaning of the results and provide a better understanding of the outcomes. The most common statistical correlational designs are structural equation

modeling, logistic regressions, and linear modeling (Creswell, 2013). Logistic regression analysis is the statistical quantitative comparative analysis utilized in this study. Two separate logistic regression analysis for 2009 and 2015 MEPS were conducted for the dependent variable cardiovascular. Thereafter, a comparative analysis measures the effect of the healthcare reform in the utilization of preventive care services among the uninsured racial groups studied for the years 2009 and 2015.

### **Data Collection**

This study utilizes the secondary data gathered by the government sponsor national healthcare survey: MEPS. Due to its size and consistency, this source of data is a reliable source for studying the consumption of health services for Americans. Scholars utilize secondary sources of data in situations where collecting their data might be cost prohibited or out of the researcher's purview. There are many pros of utilizing secondary research data, they are easily accessible, and many are free of charge, or they are available at a marginal cost (Trzesniewski, Donnellan, Lucas, & Association, 2010). The content of a large percentage of this database is extensive and sufficient to complete statistical analysis. For researchers who intend to conduct primary research the secondary data could be used to provide the basis for primary research and a potential background on the topic studied.

A few drawbacks of utilizing secondary research data is that data collected might not fulfill the purpose of the research, lacking important variables necessary to complete the statistical analysis, and ultimately the answer to the research question(s). There could also be inaccuracies on the second data collected because the researcher does not have control over how the data is collected and stored (Trzesniewski et al., 2010). Therefore, portions of the data may not be relevant to the study or the data might be incomplete. Scholars using secondary data must

be careful and questioning the quality and integrity of the data, always keeping in mind the result of the research and how the second-hand data variables relate to the current research (Trzesniewski et al., 2010). Not doing so, would generate inaccurate or skewed data results, in the worst-case scenario, the results reported might be incorrect.

### **Medical Expenditure Panel Survey**

Every year, the large-scale MEPS randomized survey selects 32,000 to 40,000 single or family American residents. Furthermore, the survey makes contact with healthcare providers (physicians, healthcare facilities, pharmacies, etc.) servicing survey participants, and their respective employers (Agency for Healthcare Research and Quality, 2009). The primary purpose of the survey is to provide a source of data to identify the healthcare cost and healthcare utilization trends in the United States.

The survey consists of five data panel collection questions, MEPS surveyors and participants will complete, a panel at a time, during the five rounds of interviews taken place throughout two and a half years. MEPS survey contains two sections specifically focused on preventive care services, both are completed during rounds three and five. To measure the levels of preventive care services received by the participant, MEPS' surveyors collect details about the type of service and utilization frequency for a variety of preventive care services: yearly physical check-ups, bi-yearly dental examinations, annual flu vaccination, to name a few (Agency for Healthcare Research and Quality, 2006).

MEPS is divided into two separate components – the Household and the Insurance Component. Participant responses regarding healthcare usage and their medical provider data are included in the Household Component, while the insurance component solely focuses on

employer insurance driven data. For this research, only the Household component data for specific years will be analyzed and evaluated.

In the Household Component, identified survey participants meet with an assigned MEPS' surveyor, who hosts the household interview. In the course of the meeting, the surveyor gathers, via electronic media, the demographic data, income level and employment status of the participant. Thereafter, the healthcare consumption status of a person is measured and recorded through a series of inquiries relating to the health status, forms of payment, utilization frequency of preventive and general medical care services, accessibility to healthcare services and satisfaction levels with received services (Agency for Healthcare Research and Quality, 2009).

The MEPS follow the guidelines set forth by the USPSTS. The recommendations provided are the result of objective, evidence-based assessments and define the advisable preventive services that each American must obtain through different stages of life. The USPSTF was created in 1984 when President Ronald Reagan assigned an independent counsel to define the types of healthcare services that each American should receive on an ongoing basis. The independent council hosted matter experts who utilized their proficiency in evidence-based research to objectively categorize by the strength of evidence on four levels of preventive care services: A, B, C, D (United States Preventive Services Task Force, 2018).

The "A" grade is USPSTF's primary recommendations because there is a high possibility that the preventive care service will substantially generate a baseline to alert the individual in the prevention of a chronic illness (United States Preventive Services Task Force, 2018). In other words, there is a clear connection between the preventive care service outcome and the potential development of a lingering illness. USPSTF defines "B" services as those in which the results generate a moderate certainty that the baseline results are substantial in the prevention of the

chronic illness (United States Preventive Services Task Force, 2018). Both levels, “A” and “B,” preventive healthcare services are highly recommended and encouraged to be a part of an individual’s regimen utilization of preventive care services. Thereby, during the drafting of the ACA law, both of these recommendations were incorporated as insurance coverage mandatory offerings.

Due to reducing assurance, “C” services are only recommended on as needed basis and with prior recommendation and approval by a medical professional. The return on investment is modest, its consumption is discouraged for the general population (United States Preventive Services Task Force, 2018). The suggestion is to only offer “C” level services to selected patients who, due to their circumstances, might require the additional preventive service. Lastly, “D” services are discouraged because USPSTF has not identified clear evidence and a high certainty to indicate that the preventive care service has a benefit in the identification or management of a person’s wellness (Woolf & Campos-Outcalt, 2013).

### **Participants**

The target population researched in this study are the families and individuals living in the United States who participated in the MEPS. The survey contains three major components: Household, Insurance, and Employer. For this study, the population targeted are those participants who completed the Household Component. MEPS 2009 survey results symbolize the utilization outcomes of the pre-ACA implementation, the analysis of the 2015’s MEPS survey data signify the effects of the preventive care utilization rates among the three ethnic groups during the post-ACA implementation. The correlational quantitative design between these two sets of data was conducted to evaluate the effect of the healthcare reform concerning the use of preventive care services among the three uninsured groups studied.

## Sample Size and Characteristics

According to Table 1, the number of participants in the MEPS has fluctuated yearly, included in this table is the total amount of participants who completed the survey during the years 2009 and 2015, the number of uninsured and its corresponding percentage. Immediately, it is evident that the percentage of uninsured participants has declined after the implementation of ACA. However, this number does not provide utilization percentages or the ability to forecast the potential levels of utilization of preventive healthcare services among a diverse group of individuals – making this is one of the primary reasons for proceeding with a quantitative statistical analysis of the data.

Table 1

*MEPS Data Results Years 2009 and 2015*

Affordable Care Act Era	Year	Number of Participants	Uninsured Participants	
			Number	Percentage
Pre-ACA	2009	36,855	6,456	17.52%
Post-ACA	2015	35,427	4,234	11.95%

The national public domain database representing the outcomes of the MEPS for the years 2009 and 2015 is the bank of data used in the analysis of this study. Appendix A shows how the selected independent and dependent variables were measured in the MEPS data sets. The Appendix provides the unique variable identification and the variable code assigned during the data collection by MEPS and subsequent data analysis in this dissertation. Specifically, for preventive care services, the variable identification lists the USPSTF's recommended frequency guidelines. Participant' demographics: Household income level, gender, race and ethnicity,

insurance status, marital status, education, primary language, age, usual source of care, and the perceived health and mental status are the independent variables for this study. Preventive care services have been segregated into three categories: cancer (mammogram, colonoscopy, sigmoidoscopy, blood stool tests, Pap smear), cardiovascular (blood pressure check, blood cholesterol screening), and wellness (routine physical checkup, receipt of doctor's advice to quit smoking, and receipt of influenza vaccination). The scope of this study focuses on cardiovascular health as the dependent variable.

Since the primary purpose of this study is to measure the different levels of utilization for recommended preventive care services for the uninsured, during the pre-and post-implementation of the Affordable Care Act, a statistical analysis that could generate probability and forecasting outcomes through the generation of categories was needed. Given that all the dependent variables measuring the use of preventive care considered in our hypotheses are binary, the logistic (logit) regression model was chosen to identify how each independent variable contributes to either increasing or decreasing the odds of obtaining preventive care in the samples. The development of the unique logistical probability algorithms adds to the literature review providing scholars with a profile that could be utilized and applied to a wide range of possibilities within the independent variables included in this study.

### **Dependent Variables**

In order to conduct this study, 10 preventive care services included in the MEPS for years 2009 and 2015 were selected in order to begin the process of comparing the two years. After recognizing that the costs of preventive care services for cancer can be prohibitive, and the access to getting full physical checkups might be limited to those who have insurance, we decided to use cardiovascular care as our primary focus for the study. Cholesterol tests and blood

pressure checks are easy preventive care screenings to obtain and they are equally accessible and recommended for men as well as women of all ages. This help control the variation in the use of preventive care by eliminating costs of getting care as a variable in our model. As shown in Table 2, our model includes 10 independent variables and two base variables that ultimately constituted the dependent variable hearttest for the years 2009 and 2015. Using the recommended frequency usage level guidelines set forth by the USPSTS to generate a representation of the impact of utilization of preventive care services, the binary variable cardiovascular was created to measure the sample's usage with regards to heart related preventive care services on a yearly basis. We find that the usage of preventive care services has gone up between the years 2009 and 2015, but only marginally with an increase from 86% to 88% in cardiovascular preventive care related preventive care measures. Whether these differences are significant or not will need to be tested.

### **Independent Variables**

The independent variables included in this study were obtained in the MEPS survey of participants for both years. As seen in Table 2, we created five binary variables white, black, Hispanic, Asian, otherrace to represent different race/ethnicities, the female variable to represent gender, lninc variable to represent the log of family income in dollars, married to represent marital status, continuous variable education to represent the years of education, two binary variables English and Spanish to represent primary language spoken at home, continuous variable age to represent age of respondent in years, a categorical variable usualcare

Table 1

#### *Research Variable Explanation*



Independent Variable	Description of Variable
UNINS	=1 if uninsured through the year; 0 otherwise
white	=1 if Non-Hispanic white; 0 otherwise
hispanic	=1 if Hispanic; 0 otherwise
black	=1 if Non-Hispanic black; 0 otherwise
asian	=1 if Non-Hispanic asian; 0 otherwise
otherrace	=1 if Non-Hispanic other race; 0 otherwise
income	Family income in 2009, in dollars
lnincome	Natural log of family income
married	=1 if married; 0 otherwise
education	Number of years of education
english	=1 if primary language at home is english; 0 otherwise
spanish	=1 if primary language at home is spanish; 0 otherwise
age	Age in years of respondent on last day of year
female	=1 if respondent is female, 0 otherwise
usualcare	=1 if doctor; 2 if hospital non-ER; 3 if ER; 0 otherwise
menthlth	=1 Excellent; 2 very good; 3 good; 4 fair; 5 poor
<b>Base Tests</b>	
bpcheck	=1 if blood pressure checked within 2 years for age>18y
cholesterol	=1 if cholesterol measured in the last year for 40-75y
<b>Dependent Variable</b>	
hearttest	=1 if bpcheck or cholesterol = 1

representing the respondent's usual source of receiving medical care, and an ordinal variable menthlth representing the perceived mental and health status ranging from 1 to 5, as obtained

from the MEPS survey for the years 2009 (representative of the pre-ACA implementation) and 2015 (representative of the post-ACA implementation). Each variable has its own unique set of measurable identifications representing continuous or discrete scales. The descriptions for all independent and dependent variables are included in Table 2. The corresponding descriptive statistics for the MEPS data sets from the years 2009 and 2015 are found on Table 3. More details of these variables will be discussed in Chapter 4.

### **Logistic Regression**

Throughout the years, the broad range of interactions widened the study of statistics and enhanced the need to create comprehensive regression analysis techniques. Logistic regression analysis is a comprehensive technique that measures probabilities and forecasting (Mehmetoglu & Jakobsen, 2017). A requirement for this analysis is that the measurement values for the dependent variable must be binary in nature wherein a “1” is indicative of the presence of factors related to the dependent variable whereas a “0” denotes the absence thereof (Mehmetoglu & Jakobsen, 2017). One of the main advantages of a logistic regression analysis is its flexibility, converting the data measurements into dummy variables (0 and 1), the model can accommodate nonmetric variables (Hair, Black, Babin, & Anderson, 1998). Thanks to the dichotomous recoding of the dependent variable, the logistic regression does not rely on discriminant analysis. Thus dependent variables do not need to be assigned to different sets of categories before running the analysis.

The statistical graphical representation of a logistic regression model will follow an “S” curve, most commonly known as a logistic curve (Hair et al., 1998). At low levels, the interaction between the independent and dependent variables yields narrow percentages of

likelihood, many are close to the value of “0,” but they never would take on the value of “0” (Hair et al., 1998). Likewise, as the independent variable measurements increase, so does the value of the dependent variable, the incremental influence exerted into the dependent variable will stabilize when the value reaches close to the maximum value of “1” (Hair et al., 1998).

The first step in the logistic regression analysis is to inspect the dependent variable’s measurements and recode accordingly to satisfy the binary value requirement. To meet this standard, the metrics for cardiovascular preventive care services included in this study adhere to the suggested USPSTF preventive utilization guidelines. For example, USPSTF suggests that adults over the age of 18 must check their blood pressure at a minimum, one time every two years, to answer the question: “About how long has it been since (PERSON) had (PERSON)’S blood pressure checked by a doctor, nurse or health professional?,” MEPS offered survey participants six different options/metrics to respond to this inquiry: 1 = within past year, 2 = within past two years, 3 = within past three years, 4 = within past five years, 5 = more than five years, and 6 = never. Satisfying the USPSTF guidelines, a binary score of “1” indicates that the individual is actively engaged in seeking preventive care, “0” otherwise. In this instance, metrics 1 and 2 fulfilled utilization requirement being they are measured as “1.” The remaining options, 3 through 6, took on the value of “0,” or did not meet the usage requirements which translates as the participant is not engaged in seeking cardiovascular preventive care services. The recoding cholesterol preventive care service can be found in Table 3 “Base Tests” section.

The second step classified each preventive care service into one of the main dependent variable analyzed in this study: hearttest. This variable measures cardiovascular-related illnesses, its estimation compromises the scores of blood pressure check and cholesterol ratings, the binary

Table 3

*Summary Statistics for MEPS Years 2009 and 2015*

Independent Variables	2009 All Observations					2015 All Observations				
	Total	M	SD	Min	Max	Total	M	SD	Min	Max
UNINS	36,855	0.175	0.380	0	1	35,427	0.120	0.324	0	1
white	36,855	0.416	0.493	0	1	35,427	0.371	0.483	0	1
hispanic	36,855	0.290	0.454	0	1	35,427	0.325	0.469	0	1
black	36,855	0.203	0.402	0	1	35,427	0.195	0.396	0	1
asian	36,855	0.064	0.245	0	1	35,427	0.071	0.257	0	1
otherrace	36,855	0.027	0.162	0	1	35,427	0.038	0.191	0	1
income	36,829	55,523	51,116	0	556,128	35,418	61,710	58,614	0	521,685
lnincome	35,764	10.566	0.973	1.61	13.23	34,257	10.654	0.998	2.20	13.16
married	36,848	0.363	0.481	0	1	35,418	0.343	0.475	0	1
education	36,855	9.431	5.734	-1	17	35,427	4.905	6.821	-1	17
english	36,166	0.771	0.420	0	1	35,426	0.608	0.488	0	1
spanish	36,166	0.181	0.385	0	1	35,427	0.292	0.455	0	1
age	36,024	34.800	22.027	1	85	34,779	36.136	22.415	1	85
female	36,855	0.522	0.500	0	1	35,427	0.520	0.500	0	1
usualcare	36,830	0.889	0.646	0	3	35,377	1.003	0.719	0	3
menthlth	35,547	1.916	0.993	1	5	34,289	1.927	1.009	1	5
bpcheck	24,951	0.860	0.347	0	1	24,577	0.884	0.321	0	1
cholesterol	2,024	0.643	0.479	0	1	2,149	0.659	0.474	0	1
hearttest	24,964	0.860	0.347	0	1	24,586	0.884	0.321	0	1

score of “1” for either one of these prophylactic services suggests that the participants are committed to utilizing preventive care service for cardiovascular-related illness, “0” otherwise.

The following model is estimated for conducting the logistical regressions for all the dependent variables and to obtain the corresponding co-efficient for the independent variables.

$$Y_j = f(\text{UNINS}_j, \text{white}, \text{black}, \text{hispanic}, \text{asian}, \text{otherrace}, \text{married}, \text{education}, \text{age}, \text{lnincome}, \text{english}, \text{spanish}, \text{usualcare}, \text{menthlth}, \text{female})$$

Where j= 2009, 2015

### Interpreting the Results from Logistical Regressions

In its purest form, an ordinary least squares (OLS) test measures the linear probability models between two variables, the outcomes of the regression can yield outcomes below “0” or above “1,” this is an obstacle for researchers wanting to evaluate the percentage probability interaction between one or more variables. The solution to this dilemma is to transform the linear probability model into a logistic probability model (Rodriguez, 2007). The first step in this process is to convert the linear probability “ $\pi_i$ ” to an odds “ $\text{odds}_i$ ” measurement (Rodriguez, 2007).

$$\text{odds}_i = \frac{\pi_i}{1-\pi_i}$$

Logarithms measurements are the natural logs of the calculated variables; these are used in the second step of the process whereby the log-odds and logit measurements are calculated (Rodriguez, 2007). This action removes the OLS’ restrictions by mapping the set of probabilities into the ranges “0, 1.”

$$\text{logit}(\pi_i) = \log\left(\frac{\pi_i}{1-\pi_i}\right)$$

This study utilizes Stata software to measure the logistic regression; the system utilizes two commands: *logit* measures coefficients while *logistic* displays odds ratios. For odds the statistical software measures the probability that an event will happen by dividing the probability

that this event will not happen, i.e. probability (attainment)/ probability (omission) (“Logistic Regression with Stata Chapter 1: Introduction to Logistic Regression with Stata,” 2019). On the contrary, odds ratio measures the probability of success or failure among two separate groups. If we represent the probability of getting a particular test done,  $p(Y_j=1)$  as  $p_i$ , we can write our model in the following form:

$$\ln\left(\frac{p_i}{1-p_i}\right) = \beta_0 + \beta_1 UNINS_j + \beta_2 white + \beta_3 black + \beta_4 hispanic + \beta_5 asian + \beta_6 otherrace + \beta_7 married + \beta_8 education + \beta_9 age + \beta_{10} lnincome + \beta_{11} english + \beta_{12} usualcare + \beta_{13} menthlth + \beta_{14} female + \beta_{15} spanish$$

where j= 2009, 2015

The interpretation of the above logistic regression model will be on the log (odds) scale and can be obtained directly by using the “logistic” regression command in STATA. The slopes of each binary independent variable in these results represent the difference in the log odds for the two values for the particular variable. For instance,  $\beta_{14}$  represents the difference in the log odds of obtaining a certain preventive care treatment between females (female = 1) and males (female = 0). We will be obtaining the transformed odds interpretation by using the “logit” command in STATA which would enable us to obtain the odds ratios for each of the binary independent variables. The odds ratio for the female variable for instance, gives us the ratio of the odds for women and odds for men in obtaining a certain preventive care. If this odds ratio is greater than 1, it indicates that the odds of obtaining preventive care of a certain type are greater for women than for men. Thus, the slopes of the logistic and logit regressions enable us to identify the log odds as well as odds ratios for all of our binary independent variables. Moreover, we can obtain the probability of obtaining preventive care for a given independent variable, X as follows:

$$P(X_i = 1) = \frac{odds_i}{1 + odds_i}$$

Since income, education, and age are not binary variables, the interpretation of the slopes in the logistic regression and the odds ratios in the logit regression needs to be done more carefully. In these cases, the slope of the continuous variables represents the log of the proportional increase of the odds of getting preventive care corresponding to a one unit increase in the independent variable. Thus, if the coefficient for age is  $\beta_9$  then,  $e^{\beta_9}$  is the proportional increase of the odds of getting preventive care corresponding to the annual increase in age.

### **Protection of Human Subjects: Ethical Considerations**

The data utilized for the study is secondary public information generated by the MEPS, and as such, the participant's ethical approvals and consents to participate in the study are waived.

### **Summary**

The quantitative comparative analysis included in this study utilizes a logistic and logit regression analysis to measure the relationship between the grouped preventive care services: cardiovascular against the 10 demographic characteristics among Blacks, Whites, Hispanics, Asians, and other races during the pre and post-ACA implementation. The primary purpose of the study's findings is to identify alternatives for policymakers to adjust and pass future legislation to enhance the utilization of preventive care and decrease healthcare expenditures by managing the effects of chronic illness during its early phases.

The combination of Andersen's theoretical framework along with the robust logistic and logit regression statistical analysis affords an insight into the utilization levels of preventive care services during the pre and post-ACA implementation for the populations studied. The interpretation of the analysis yields a series of probabilities and odds measurements applicable to a wide range of populations which could be useful for the enhancement and development of

future legislation or for healthcare organizations interested in enhancing their prophylactic healthcare initiatives.

Chapter 4 incorporates the findings of the study to include details regarding data cleaning, results, and demographic analysis as well as particulars about the inferential data analysis and the interpretation of such. The description of the evaluation expands the knowledge of the current body of preventive care literature review and future solutions for healthcare initiatives to enhance access and usage of these vital medical services.



## RESULTS

“Hope for the best, but prepare for the worst” -(English Proverb)

This quantitative comparative study seeks to measure the consumption of prophylactic cardiovascular services during the pre and post-implementation of the Affordable Care Act for the following populations living in the United States: Non-Hispanic white, non-Hispanic black, non-Hispanic other races, Asian, and Hispanic. The intention is to examine the impact that the passage of the ACA has had with regards to minimizing health disparities among these groups. The early detection of chronic illnesses through the utilization of preventive care services is vital because it facilitates the prompt diagnosis of chronic illness that if unmanaged, could yield premature mortality rates and thereby facilitates an individual’s ability to prepare for a health challenge while affording a better opportunity to prevent it.

The ruling agency in charge of designating the recommended usage of the precautionary services is the USPSTS. This agency has set utilization standard levels for children and adults. This research quantifies the utilization of blood pressure and blood cholesterol screening included in the national healthcare poll MEPS as a representation of usage of cardiovascular-related preventive care services. The USPSTF recommended guidelines utilized in this study included the analysis of adults age 18 years and older who received blood pressure screenings every two years. An annual blood cholesterol screening frequency was analyzed for adults between the ages of 40 to 75 years. The study seeks to answer the research question: How has the pre and post-implementation of the Affordable Care Act impacted the utilization of recommended cardiovascular preventive care services by insurance status in the population of the United States? The ultimate endeavor of this examination is to address the four research questions listed in chapter 3.

Chapter 4 presents the results obtained by estimating the models that were outlined in Chapter 3. We start by presenting the descriptive statistics for the datasets from 2009 and 2015 and comparing the various characteristics and preventive care utilization among insured and uninsured groups in both years. Comparative tests of preventive care utilization and the difference in the proportion of the uninsured in the two years, pre and post-ACA implementation are provided to demonstrate the disparities in the characteristics of the population. We then provide the estimates of the logistical regression to analyze which variables significantly impact the cardiovascular preventive care utilization in both years and among both groups based on insurance access.

### **Data Access and Preparation**

The survey results from the MEPS for the years 2009 and 2015 contains the data for the dependent and independent variables included in this study. As discussed in the previous chapter, categorical variables were coded as binary with a value of “1” to indicate the presence of a characteristic and “0” otherwise. The continuous variables simply took on the values associated with the variable. One exception was made in the case of the education variable, where many individuals in the 2015 dataset did not respond to the question of number of years of education in the same manner as the 2009 dataset. To offset the loss of information this could potentially create in the dataset, a value of “-1” was assigned to the individuals that did not provide this information for the education variable for both years. STATA version 15.0 was used to estimate the models and clean up the datasets because it allows the researcher to manipulate, explore, visualize, and obtain the needed results to make inferences and interpretations of the outcomes of the analysis.

The included independent variables for both samples are race/ethnicity, household income, marital status, number of years of education, primary language spoken at home (English or Spanish), the usual source of care, and the participant's perceived mental/health status. Preventive care services related to cardiovascular health such as blood pressure and cholesterol screenings were combined to create the dependent variable, hearttest which took the value of "1" if either one or both services were obtained by the individual and took the value of "0" if both services were not obtained by the individual. The determination of whether these services were obtained in a timely manner or not was based on the USPSTs guidelines, which state that individuals ages 18 to 39, should receive blood pressure check-ups every six months and individuals between the ages of 40 and 75 should get an annual blood cholesterol screening. Any individuals who met this criteria were coded as "1" for the corresponding variable (blood pressure, cholesterol) and "0", otherwise.

### **Sample Characteristics**

There are specific details about the independent variables which incorporate the participants' demographics, as well as the outcomes of the preventive care services representing the dependent variable cardiovascular. The specifics for each variable are essential as it provides the reader with a glance view of the population studied. The demographic data analysis is divided into two separate segments; the 2009 MEPS data portrays the pre-ACA implementation findings, while the details of the 2015 MEPS database illustrates the outcomes during the post-ACA implementation.

The sample size for both databases is relevant and robust; the number of participants ranges between 35,000 and 37,000 for each year in question. The statistical analysis includes two separate sets of observations; the first one is a quantitative analysis of all survey participant

observations, while the second segregates the results for the uninsured participants for each year researched. The goal is to describe the outcomes of both groups and outline their differences and considerations.

### **Demographic Data Analysis—2009 MEPS Database**

The descriptive statistics for the pre-ACA implementation are presented in Table 4 and include 36,855 observations. In the 2009 MEPS dataset, 41.6% of participants were non-Hispanic white, 20.3% were non-Hispanic black, 29% were Hispanic, 6.4 were Asian, and 2.7% were of non-Hispanic other races. The uninsured sample included 6,456 observations out of which 26.8% were non-Hispanic white, 17.6% were non-Hispanic black, 48.8% are Hispanic, 4.7% were Asian, and 2.1% were of non-Hispanic other races.

The income variable represents the annual household income for 2009. Out of the 36,829 participants, who answered this question, the mean income was \$55,523 with a standard deviation of \$51,116, indicating that about 68% of the sample had a household income between \$4,000 to \$106,000 in 2009. Among the uninsured 6,456 participants, the mean was \$39,254 with a standard deviation of \$37,596 indicating that about 68% of the uninsured sample had between \$2,000 and \$77,000 in annual household income in 2009.

In the overall sample, 36% of individuals were married, which is not significantly different from the uninsured sub-sample. Moreover, in the general sample, 52% of the individuals were female, whereas, in the uninsured sub-sample, only 46% of the individuals were female, indicating that more males than females are uninsured.

The education variable represents the number of years of schooling attained by an individual. For the general sample, 25% of the participants acquired 12 years of education, while 35% went on to achieve higher levels of education. The uninsured individuals that answered this

Table 4

*Descriptive Statistics for MEPS Year 2009*

Independent Variable	2009 All Observations					2009 Uninsured Observations				
	Total	M	SD	Min	Max	Total	M	SD	Min	Max
UNINS09	36,855	0.175	0.380	0	1					
white	36,855	0.416	0.493	0	1	6,456	0.268	0.443	0	1
hispanic	36,855	0.290	0.454	0	1	6,456	0.488	0.500	0	1
black	36,855	0.203	0.402	0	1	6,456	0.176	0.381	0	1
asian	36,855	0.064	0.245	0	1	6,456	0.047	0.213	0	1
otherrace	36,855	0.027	0.162	0	1	6,456	0.021	0.144	0	1
income	36,829	55,523	51,116	0	556,128	6,456	39,254	37,596	0	404,815
lnincome	35,764	10.566	0.973	1.609	13.229	6,192	10.257	0.932	1.609	12.911
married	36,848	0.363	0.481	0	1	6,450	0.367	0.482	0	1
education	36,855	9.431	5.734	-1	17	6,456	9.944	4.466	-1	17
english	36,166	0.771	0.420	0	1	6,249	0.556	0.497	0	1
spanish	36,166	0.181	0.385	0	1	6,249	0.390	0.488	0	1
age	36,024	34.800	22.027	1	85	6,335	34.701	14.977	1	85
female	36,855	0.522	0.500	0	1	6,456	0.464	0.499	0	1
usualcare	36,830	0.889	0.646	0	3	6,452	0.514	0.708	0	3
menthlth	35,547	1.916	0.993	1	5	6,025	2.007	0.987	1	5
Base Tests										
bpcheck	24,951	0.860	0.347	0	1	5,196	0.686	0.464	0	1
cholesterol	2,024	0.643	0.479	0	1	241	0.539	0.499	0	1
Dependent Variable										
hearttest	24,964	0.860	0.347	0	1	5,200	0.686	0.464	0	1

question accounted for 6108 observations, 31% of participants under this category completed 12 years of education, whereas 24% earned additional years of education. The comparative results indicate an 11% difference for higher education levels between the general population and the uninsured population. Consequently, it is fair to imply that compared to the general population, uninsured individuals complete fewer years of education, and many do not pursue learning after high school graduation. It is important to note that in 2015 dataset, a larger portion of the individuals refused to answer the question regarding years of education. In order to prevent loss of other relevant information, we represent those that had missing education information with a -1. For the sake of consistency, we also applied the same criteria to the 2009 dataset, which is why the minimum value of education is being indicated as “-1” instead of “0”.

Under the primary language spoken at home, 77% of 36,166 observations selected English as their primary language versus 18% who selected Spanish. The uninsured sample included 6,249 observations wherein 55% of the population elected English as their primary language, and 39% picked Spanish. The results of this comparative analysis suggest that a more significant percentage of the uninsured population speak Spanish at home, in doing so, one could assume that a more significant percentage of these families are minority groups.

The demographic variable age yielded a mean of 34.8 years of age with a standard deviation of 22.02. The uninsured sample included 6,335 observations resulting in average age of 34 with a standard deviation of 14.9. For the purposes of this study, the cardiovascular preventive care does not apply to minors (under the age of 18), and people over the age of 65; the latest group qualifies for Medicare services. This implies that the lack of insurance or the difference between insured and insured status might not matter too much to these segments of the population because they have other resources available to their disposal. Thereby, their data

is not considered in the analysis of the study. According to Table 5, 28.72% of the general population was under the age of 18, only 12.22% of the uninsured participants in the survey were under the age of 18. When considering the general population, 58% were between the ages of 19 and 64, whereas 85.27% of the uninsured belonged to that age group indicating that this age group is the most susceptible to lacking insurance as compared to the other two. Those who are over the age of 64, who technically qualify for Medicare or similar insurance make up 12% of the whole sample while they only represent 2% of the uninsured sub-group.

Table 5

*MEPS Year 2009: Independent Variable "age"*

Age Range	All Obs.		Uninsured	
	Freq.	Percent	Freq.	Percent
Age ≤ 18	10,584	28.72	789	12.22
19 to 64	21,596	58.6	5505	85.27
Age ≥ 65	4,675	12.68	162	2.51
Total	36,855	100	6,456	100

The usual source of care variable is coded as "1" to indicate a primary doctor as the usual source of care, "2" to indicate hospital non-emergency room as the usual source of care, and "3" to indicate hospital emergency room as the usual source of care. The purpose of this variable is to identify the most used avenue of receiving medical care. The assumption is that people would typically be expected to receive medical care from their doctor, unless an emergent need arises.

According to Table 6, a total of 36,830 participants answered this question with 27% mentioning no usual source of care, 58% indicating that they visited a doctor for medical care, 15% indicating that they used a hospital non-emergency room department, and 0.34% used a hospital emergency room. In contrast, out of the 6,452 uninsured individuals, 60% mentioned no usual source of care, 28% indicated that they visited the doctor, 11% utilized the hospital non-emergency room department, and 0.53% selected a hospital emergency room department as their usual source of care. At a glance, it is evident that compared to the whole sample, a significantly less percentage of the uninsured seek the services of a physician for their usual source of care and almost twice as many did not even select an option for usual source of care.

Table 6

*MEPS Year 2009: Independent Variable "usualcare"*

<i>usualcare</i>	All Observations		Uninsured	
	Freq.	Percent	Freq.	Percent
None	9,820	26.66	3,913	60.65
Doctor	21,392	58.08	1,798	27.87
Non-ER Hospital	5,492	14.91	707	10.96
Hospital ER	126	0.34	34	0.53
Total	36,830	100	6,452	100

For the last independent variable, participants rated their perceived mental/health status as follows: 1= excellent, 2 = very good, 3 = good, 4 = fair, and 5 = poor. Out of the entire sample of 35,547 participants, 45% rated their status as excellent, 26% as very good, 22% as good, 5%



as fair, and 1% as poor. In contrast, among the 6,025 uninsured participants 40% perceived their health status to be excellent, 27% as very good, 27% as good, 5% as fair, and 1% as poor.

Although the rates for this variable are somewhat similar for both groups, the uninsured do score their perceived level of mental/health status slightly lower than the rest of the population.

The examination of hearttest utilization includes measuring usage levels for two base tests: blood pressure and cholesterol screening. Particularly for blood pressure, this study follows the recommended USTSF guidelines suggesting that adults over 18 years old must check their blood pressure, at a minimum, once every two years. In the year 2009, the 24,951 adult participants addressed this question by selecting one of the six options provided to them: 1 = within past year, 2 = within past two years, 3 = within past three years, 4 = within past five years, 5 = more than five years, and 6 = never. Individuals who meet the USPSTF's directives or those who selected "1" or "2" as their options produced an 86% utilization of cardiovascular preventive care services. In contrast, the uninsured population sample under this category scored 68% utilization for the 5,159 survey participants who chose to answer this question. Comparatively, the percentage of utilization among the general population is close to 20% higher than in the uninsured population.

The second quantification for the cardiovascular dependent variable is the blood cholesterol check. USPSTF proposes that adult's ages 40-75 must complete a cholesterol check every year. The sub-sample, or those ages 40-75, generated an account of 2,024 participants, to answer this question they selected one of the following six options: 1 = within past year, 2 = within past two years, 3 = within past three years, 4 = within past five years, 5 = more than five years, and 6 = never. The analysis output stated that 64% of the sample met the general guidelines for cholesterol screening. The utilization of cholesterol check among the 242

uninsured respondents was 54%. Under this category, there is a 10% dissimilarity in the utilization of cholesterol as a preventive measure for cardiovascular illnesses between the general population and those uninsured participants.

As an overall estimation, the combined calculation of cholesterol and blood pressure make up the dependent variable hearttest. Following the stated USPSTF guidelines, overall 24,964 participants measured 86% as the combined utilization level for this category. The total number of uninsured observations accounted for 5,200, resulting in 68% utilization level. Comparatively speaking, the uninsured population consume 18% less cardiovascular preventive care services than those participants who had access to health insurance.

#### **Data Analysis—2015 MEPS Database**

The descriptive statistics for the post-ACA implementation are presented in Table 7 and included 35,427 observations. In the 2015 MEPS dataset, the findings resulted that about 37% observations were non-Hispanic white, 19.5% were non-Hispanic black, non-Hispanic other races were 3%, Asian were 7%, and 32.5% were Hispanic. The uninsured sample included 4,234 observations out of which 20.4% were non-Hispanic white, 17.2% were non-Hispanic black, 55.8% were Hispanic, Asian were 4.3%, and 2.3% were non-Hispanic other races.

The income variable indicates the annual household income for 2015. The average mean household income for 35,418 participants was \$61,700, with a standard deviation of \$58,600, this indicates that about 68% of the sample has a household income between \$3,000 and \$120,000. Among the uninsured, the average household income was \$43,300, and the standard deviation was \$42,500, denoting that about two thirds or 68% of the uninsured population earn between 0 and \$86,000.

Table 7

*Descriptive Statistics for MEPS Year 2015*

Independent Variables	2015 All Observations					2015 Uninsured Observations				
	Total	M	SD	Min	Max	Total	M	SD	Min	Max
UNINS15	35,427	0.120	0.324	0	1					
white	35,427	0.371	0.483	0	1	4,234	0.204	0.403	0	1
hispanic	35,427	0.325	0.469	0	1	4,234	0.558	0.497	0	1
black	35,427	0.195	0.396	0	1	4,234	0.172	0.377	0	1
asian	35,427	0.071	0.257	0	1	4,234	0.043	0.203	0	1
otherrace	35,427	0.038	0.191	0	1	4,234	0.023	0.151	0	1
income	35,418	61,710	58,614	0	521,685	4,234	43,380	42,497	0	452,339
lnincome	34,257	10.654	0.998	2.197	13.165	4,031	10.370	0.911	5.011	13.022
married	35,418	0.343	0.475	0	1	4,226	0.350	0.477	0	1
education	35,427	4.905	6.821	-1	17	4,234	5.111	6.411	-1	17
english	35,426	0.608	0.488	0	1	4,233	0.395	0.489	0	1
spanish	35,427	0.292	0.455	0	1	4,234	0.533	0.499	0	1
age	34,779	36.136	22.415	1	85	4,140	35.972	14.639	1	85
female	35,427	0.520	0.500	0	1	4,234	0.450	0.498	0	1
usualcare	35,377	1.003	0.719	0	3	4,231	0.602	0.807	0	3
menthlth	34,289	1.927	1.009	1	5	3,920	1.981	0.998	1	5
Base Tests										
bpcheck	24,577	0.884	0.321	0	1	3,451	0.702	0.458	0	1
cholesterol	2,149	0.659	0.474	0	1	157	0.599	0.492	0	1
Dependent Variable										
hearttest	24,586	0.884	0.321	0	1	3,451	0.702	0.457	0	1

In the overall sample, 35% of the individuals were married, which is not significantly different from the uninsured sub-sample. Furthermore, in the general population, 52% were female respondents, and in the uninsured sub-sample, only 45% of the individuals were female, indicating that more males than females are uninsured.

Under the independent variable education, 17,465 participants disclosed the number of years of education earned, 26% of the population attained 12 years, while the remaining 37% achieved higher levels of education. Comparatively, 35% of the 2,222 uninsured participants obtained 12 years of education, whereas 23% completed additional years of education. This category points out to the fact that the uninsured population is 15% less likely to further their schooling past the 12<sup>th</sup> grade or the equivalent of high school graduation.

Under the primary language spoken at home participants, 61% of 35,426 observations selected English as their primary language versus 30% who selected Spanish. The uninsured sample included 4,234 observations wherein 40% of the individuals elected English as their primary language and 53% picked Spanish. Therefore, the results of this comparative analysis suggest that a more significant percentage of the uninsured population speak Spanish at home, in doing so, one could assume that a more significant percentage of these families are minority groups.

The demographic variable age yielded a mean of 36.1 years of age with a standard deviation of 22.41. The uninsured sample included 4,234 observations resulting in average age of 35.9 years with a standard deviation of 14.63. Depicted in Table 8 are the age segments of the population since the cardiovascular preventive care, as stated in the 2009 analysis, the results of examination do not include minors or, due to their Medicare eligibility, people over the age of 65. Based on the data, we find that while 27.47% of the general population was under the age of

18, only 10.27% of the uninsured participants in the survey were under the age of 18. When considering the general population, 58.37% were between the ages of 19 and 64, whereas 86.68% of the uninsured belonged to that age group indicating that this group is the most susceptible to lacking insurance as compared to the other two. Those who are over the age of 64, who technically qualify for Medicare or similar insurance make up 14.16% of the whole sample while they only represent 3.05% of the uninsured sub-group.

Table 8

*MEPS Year 2015: Independent Variable “age”*

<i>Age range</i>	All Observations		Uninsured	
	Freq.	Percent	Freq.	Percent
Age ≤ 18	9,732	27.47	435	10.27
19 to 64	20,680	58.37	3,670	86.68
Age ≥ 65	5,015	14.16	129	3.05
Total	35,427	100	4,234	100

The usual source of care variable is coded as “1” to indicate a primary doctor as the usual source of care, “2” to indicate hospital non-emergency room as the usual source of care, and “3” to indicate hospital emergency room as the usual source of care. The purpose of this variable is to identify the most used avenue of receiving medical care. The assumption is that people would typically be expected to receive medical care from their doctor unless an emergent need arises.

According to Table 9, the outcomes for the 35,277 participants who answered this inquiry included 50% of the population used a doctor’s office, 24% went to the hospital as their primary

source of care, and 0.50% sought the emergency room as their principal means of care. In contrast, out of the 4,231 uninsured individuals 59.54% mentioned no usual source of care, 21.67% indicated that they visited the doctor, 17.89 utilized the hospital non-emergency room department, and 0.90% selected hospital emergency room department as their usual source of care. At a glance, it is evident that compared to the whole sample, significantly less percentage of the uninsured seek the services of a physician for their usual source of care and almost twice as many did not even select an option for usual source of care.

Table 9

MEPS Year 2015: Independent Variable “usualcare”

usualcare	All Observations		Uninsured	
	Freq.	Percent	Freq.	Percent
None	8,915	25.2	2,519	59.54
Doctor	17,600	49.75	917	21.67
Non-ER Hospital	8,686	24.55	757	17.89
Hospital ER	176	0.5	38	0.9
Total	35,377	100	4,231	100

The response options for the *perceived mental health status* data collected in this survey included: 1 = excellent, 2 = very good, 3 = good, 4 = fair, and 5 = poor. In the 2015 MEPS, 34,289 general individuals, the ratings yielded the following results: 45% excellent, 25% very good, 23% good, 5% fair, and 1% poor. The uninsured observations sample included 3,920 participants; their consolidated results were: 43% excellent, 24% very good, 27% good, 5% fair,

and 0.9% poor. Although the rates for this variable are somewhat similar for both groups, the uninsured do score their perceived level of mental/health status slightly lower than the rest of the population.

The first base test examined to measure hearttest utilization was a *blood pressure* check. In the year 2015, the 24,577 adult participants addressed this question by selecting one of the six options provided to them: 1 = within past year, 2 = within past two years, 3 = within past three years, 4 = within past five years, 5 = more than five years, and 6 = never. Individuals who meet the USPSTF's directives or those who selected "1" or "2" as their options, produced an 88% utilization of cardiovascular preventive care services. In contrast, the uninsured population sample under this category scored 70% utilization for the 3,451 survey participants who chose to answer this question. Comparatively, the percentage of utilization among the general population is close to 18% higher than in the uninsured population.

The second quantification for the cardiovascular dependent variable is the *blood cholesterol* check. USPSTF proposes that adult's ages 40 to 75 must complete a cholesterol check every year. In 2015, the sample generated an account of 2,149 observations, participants selected one of the following six options: 1 = within past year, 2 = within past two years, 3 = within past three years, 4 = within past five years, 5 = more than five years, and 6 = never. The analysis output stated that 66% of the sample met the general guidelines for cholesterol screening. The utilization of cholesterol check among the 157 uninsured respondents was 60%. Under this category, there is a 6% dissimilarity in the utilization of cholesterol as a preventive measure for cardiovascular illnesses between the general population and those uninsured participants.

As an overall estimation, the combined calculation of cholesterol and blood pressure make up the dependent variable hearttest. Following the stated USPSTF guidelines, overall

24,586 participants measured 88% as the combined utilization level for this category. The total number of uninsured observations accounted for 3,451, resulting in 70% utilization level.

Comparatively speaking, the uninsured population consume 18% less cardiovascular preventive care services than those participants who had access to health insurance.

### **Pre- and Post-ACA Comparative Analysis: Utilization of Hearttest Services Among the Uninsured Population**

One of the hypotheses of this study is to measure the utilization of hearttest services by insurance status in the population of the United States, which leads to the following research question: “How are preventive care services utilized among uninsured participants in the 2009 and 2015 surveys and what are their characteristics?” By comparing the mean values of all the independent variables, we can try to identify if the characteristics of the uninsured are different in the years 2009 and 2015. We will only test for significance, if we find that the difference between the means is a substantial amount in order to focus on the sizeable differences versus minor changes in the mean values.

Before we compare the characteristics within the uninsured groups from 2009 and 2015, let us identify whether the number of uninsured in 2009 and 2015 are significantly different by doing a simple test of proportion. According to Table 10, the results of the test indicate that there is a clear difference in the proportion of the uninsured people between 2009 and 2015 indicating that there is an impact of the ACA on the proportion of the uninsured in the United States. The 5% drop in the proportion of uninsured in our samples is important to keep in mind when we compare the characteristics of the uninsured between the two samples.



Table 10

Z-test: *Simple Test of Proportion*

Year	Proportions	Sample size (N)	p-hat	q-hat	std. err	z-value	p-value
2009	0.175	36,855					
2015	0.120	35,427	0.148	0.852	0.003	20.814	0.000

Result: Proportions significantly different at 99%

### Uninsured: Variable Comparative Analysis1

Summary statistics for all variables for the uninsured observations for both years is given in Tables 4 and 5. In the race/ethnicity variable, the non-Hispanic white group had a reduction of 0.064, between 2009 and 2015, indicating an increased rate of insurance among this race and ethnic group in the samples. Also, non-Hispanic black and non-Hispanic other race had a slight reduction in their means. However, the drop was so small that, in the big picture, the change is insignificant, concluding that the total amount of uninsured individuals within these populations remained the same during the pre-and post ACA implementation. In the Hispanic group, the mean increased by 0.070 signifying that the Hispanic individuals had an incremental growth of 7% between the years 2009 and 2015. The rise correlates to the research in the field which states that a large portion of the uninsured population is made up by minority groups primarily represented by the individuals of Hispanic ethnicity.

The mean average lnincome level for the uninsured population in the post-ACA implementation increased by 1.2%; this margin change indicates that the uninsured sample surveyed in 2015 had a slightly higher level of household income as compared to the 2009

survey data. The mean for married individuals sampled in the uninsured groups decreased by 1.8% between the two years. In the education variable, the means dropped from 9.9 to 5.1. This sharp drop of four years of education on an average in the uninsured samples for the two years might be driven by the fact that fewer people responded to the question of years of education in the 2015 survey and therefore we should not derive any conclusions regarding changes in educational attainment levels between the two groups.

In the language spoken at home variable, there is an interesting finding whereby uninsured individuals who spoke English at home, their mean decreased by 0.162 pointing out to a reduction of English-speaking uninsured individuals. The Spanish speaking households absorbed the decline by growing the mean value to 0.14, pointing out to a 14.3% increase in uninsured Spanish-speaking individuals in the post ACA era. The shift between English to Spanish speaking uninsured households is evidence to the fact that there is an increasing percentage of minorities that makeup the uninsured population within the United States.

The mean value for the age variable increased from 34 to 35, due to the small change, this result is marginal. The mean for the female variable yielded a slight reduction between the pre-and post ACA implementation as it scored a mean of 0.45 in 2015 and a 1.4% change. The outcome implies that there was a slight post-ACA implementation reduction for uninsured females. However, the small change is not sufficient evidence to suggest that there is a significant shift in the number of uninsured females after the implementation of the Affordable Care Act.

The mean average value for the usual source of care variable increased from 0.5 to 0.6 in the post-ACA era indicating that higher proportions of people in 2015 data were choosing a doctor as their primary source of care, as compared to no regular source of care. This change is

not big enough to derive any conclusions regarding use of usual care among the uninsured in the pre-ACA and post-ACA era. Similarly, the marginal change in the mean for perceived health and mental status is not sufficient to derive any reliable conclusions regarding the self-perception variable for the two years.

In summary, the relevant findings for the uninsured population are an increase in the income levels, and more significantly the age of the population. It is said that the United States is a melting pot made up of a variety of racial groups, this is corroborated by the fact that in our sample there was a sizable increase in the survey participants who spoke Spanish at home while a similar percentage decreased in the survey participants who spoke English as the primary home language. In the race variable, it is intriguing to point out that there is a lesser amount of non-Hispanic white individuals in 2015 signifying that over 6% of the population within this ethnic group successfully obtained and retained eligibility access to healthcare insurance after the passage of the Affordable Care Act. Contrarily, the Hispanic group decreased its enrollment in healthcare insurance. Therefore, it can be implied that the implementation of the Affordable Care Act has not had a positive impact in the levels of access to healthcare insurance within the Hispanic population, resulting in a decreased utilization of cardiovascular preventive care services.

### **Analysis of Outcomes**

Now that we have presented the descriptive analysis and results from the datasets, we can continue with the inferential analysis by performing *t*-test to examine whether there is a significant difference between the usage of preventive cardiovascular care between the insured and the uninsured sub-samples for the year 2009 (pre-ACA) as well as for the year 2015 (post-ACA). The purpose of these tests is to help identify if the ACA reduced any potential disparities

in the usage of preventive care between insured and uninsured populations in the United States as a result of increased access to health insurance. After that, we will proceed to analyze the results of the logistical regressions for the dependent variable hearttest which combines blood pressure and cholesterol screening preventive care, as discussed in Chapter 3.

**T-test.** There are two sub-samples within the 2009 as well as the 2015 datasets based on the uninsured variable, which takes the value of 0 for individuals who had insurance in the respective year and the value of 1 for individuals who did not have insurance for all of the respective year. The t-tests function under the null hypothesis that there is no significant difference in the utilization of preventive cardiovascular care, as measured by hearttest, between the insured and uninsured sub-samples for each year. This implies that we are performing a two-tailed t-test. If the value of the t-statistic is significant at the 0.05 level, we can reject the null hypothesis that the two sub-samples have equal utilization of hearttest. It is important to note that we are using a significance level of 0.05 (corresponding to a 95% confidence level) simply because it is standard practice in literature. We are also functioning under the assumption that the variances among utilization of cardiovascular care are not equal in the insured and uninsured populations. Since we do not have population means or variances, the sample means and variances are utilized for the test, but the results are generalizable to the full population (beyond just the samples) since we have a large number of observations in both sub-samples.

Using the command “ttest hearttest, by (UNINSYR) level (95) unequal” in STATA for the respective datasets, we can obtain the results of the t-test for each year. As seen in Table 11 the results for year 2009 show that the t-value is 32.45 with a corresponding p-value of 0.000. The results for year 2015 show that the t-value is 26.31 with a corresponding p-value of 0.000. Thus, we can reject the null hypotheses that there is no significant difference in hearttest

utilization between the insured and the uninsured in either 2009 or in 2015. The t-tests confirm that there is indeed a significant difference between the means of hearttest utilization among insured and the uninsured in both years.

Table 11

*Two Sample T-Tests With Unequal Variance*

Difference:		diff = mean(0) - mean(1)			
Ho:		diff = 0			
Ha:		diff != 0			
		2009		2015	
Group	Obs	Mean	Obs	Mean	
0 = insured	19,764	0.905	21,135	0.913	
1 = uninsured	5,200	0.685	3,451	0.702	
Difference		0.2195		0.2111	
t-value		32.45		26.31	
Degrees of Freedom		6,325		3,887	
p-value		0		0	

**Logistical regression analysis.** When estimating the logistical regression models discussed in Chapter 3, we obtain the odds ratios for all the independent variables in our study to identify how they impact the use of preventive care for cardiovascular screening in the sample. The dependent variable, hearttest is a dichotomous variable taking on the value of 1 if either of the two screenings (hypertension and cholesterol) were performed in the time suggested by the USPTF guidelines and a value of 0 if neither one of them was performed. The logistical estimates for the year 2009 represent the pre-ACA outcomes and the estimates for the year 2015 represent the post-ACA outcomes in our samples.

The purpose of analyzing these models is to attempt to answer our research question: “Does the usage of cardiovascular preventive care services vary by an individual’s economic socioeconomic characteristics such insurance status, race/ethnicity, age, gender, income level, educational level, perceived mental/physical condition, and primary language spoken at home?” and to identify if there are remarkable changes in the way preventive cardiovascular care is used in the pre-ACA and the post-ACA era. In Table 12, we present the results for both, the 2009 and 2015 models, and we will discuss the implications of each independent variable in detail below.

When interpreting the odds ratios, it is important to keep in mind that the direction of the probability of obtaining hearttest for any given independent variable is determined by the sign of the Z-value. For instance, for the UNINS variable, the Z-values are negative for both years indicating that the probability of getting preventive care decreases when the value of UNINS changes from 0 to 1 in the sample. Similarly, it is important to note that odds ratios correspond directly to the odds of obtaining hearttest as compared to 1. Thus, if the odds ratio is greater than 1, it indicates increased probability of obtaining a hearttest for each unit increase in the value of dichotomous, ordinal, and continuous variables. For instance, for non-Hispanic black population with an odds ratio of 1.267 in the year 2009, we can state that non-Hispanic black individuals are 26.7% more likely than others to obtain hearttest in the year 2009. On the other hand, if the independent variable is in a log form (such as our income variable), the interpretation is based upon an increase in unit percentage of the variable. For instance, in 2009 the odds ratio corresponding to the  $\ln$ income variable was 0.985, implying that for each additional 1% increase in the household income, the odds of an individual obtaining hearttest decreased by 0.015 or 1.5%. We will now discuss all the independent variables in more detail here.

Table 12

*Hearttest Logistic Regression Estimates for MEPS Years 2009 and 2015*

Dependent Variable	2009			2015		
Hearttest	Odds Ratio	Z	P>z	Odds Ratio	Z	P>z
UNINS	0.466	-15.88	0.000	0.373	-18.37	0.000
white	0.961	-0.27	0.787	1.539	3.44	0.001
black	1.267	1.55	0.120	1.690	4.02	0.000
hispanic	0.996	-0.03	0.980	1.253	1.57	0.115
asian	0.613	-2.86	0.004	0.969	-0.21	0.838
income	0.985	-0.63	0.531	1.039	1.54	0.123
female	2.308	19.35	0.000	2.028	15.37	0.000
married	1.513	8.80	0.000	1.452	7.20	0.000
education	1.115	16.03	0.000	1.016	4.94	0.000
english	1.400	3.06	0.002	1.188	1.74	0.082
spanish	1.102	0.74	0.462	0.991	-0.07	0.944
age	1.045	27.26	0.000	1.043	24.49	0.000
usualcare	1.889	18.71	0.000	1.751	17.69	0.000
menthlth	1.120	5.00	0.000	1.079	3.24	0.001
Constant	0.096	-7.37	0.000	0.235	-4.52	0.000
Number of observations	23,867			23,517		
Log likelihood	-7526.06			-6828.34		
LR chi2(14)	4156.83			3092.54		
Prob > chi2	0.000			0.000		
Pseudo R2	0.2164			0.1846		

***Uninsured.*** The uninsured variable in both 2009 and in 2015 shows a clear and statistically significant decreased odds of obtaining hearttest in the samples. In 2009, the odds ratio is 0.466 demonstrating that there was a 53.4% decrease in the likelihood of getting a hearttest among the uninsured as compared to the insured individuals. In 2015, these odds were even lower, with a value of 0.373 demonstrating a 62.7% decrease in the likelihood of getting a hearttest among the uninsured as compared to those that had insurance. Since this variable is

significant at the 0.001 level, we can say that in the post-ACA era, the odds of getting preventive cardiovascular care are even lower than they were in the pre-ACA era.

**Race/ethnicity.** The race/ethnicity variables are split into five categories in our analysis for both years: non-Hispanic white, non-Hispanic black, Hispanic, Asian, and non-Hispanic other races. In 2009, the odds ratio for non-Hispanic white was 0.961, indicating an almost 4% lower probability than other races for obtaining hearttest. However, this variable was not significant at the 0.05 level because the Z-value is lower than 1.96. In 2015, the corresponding odds ratio was 1.539, and was statistically significant at the 0.05 level, indicating an increased probability of getting hearttest by almost 54% as compared to other races.

**Household income.** The income variable is a log variable in our estimates. Thus, the odds ratio represents the increased (or decreased) probability for each additional one percent increase in income. In 2009, the odds ratio for the income variable was 0.985, indicating a decrease of 1.5% in the probability of getting hearttest for each one percent increase in income. However, this was not statistically significant at the 0.05 level. On the other hand, the 2015 odds ratio for income was 1.039, indicating a 3.9% higher probability of getting hearttest for each additional one percent increase in income. This value is also not statistically significant with a p-value of 0.115.

**Female.** The female variable in 2009 and 2015 is statistically significant at the 0.05 level, indicating an increased probability of getting hearttest relative to males. The likelihood of utilizing cardiovascular preventive services among females yielded relatively similar outcomes indicating a 2.3 (pre-ACA) and 2 (post-ACA) times higher probability of consuming the life-saving prophylactics care services.



***Marital status.*** The marital status variable for both years is statistically significant at the 0.05 level, the odds ratio of utilizing hearttest services for married individuals compared to those who are not married is 1.51 for 2009, and in 2015 it was 1.45. The finding means that married individuals during the pre-ACA period were 51% more likely to consider using cardiovascular preventive care services. Likewise the post-ACA scored a 45% increase likelihood in the consumption of blood pressure and cholesterol screenings.

***Educational attainment.*** In our model, education was statistically significant at the 0.05 level; for the year 2009, the percentage odds hearttest utilization for each one year of earned education was 11.1%. Unexpectedly, the year 2015 yielded only a 1.6% odds increase. Therefore, we can conclude that education is relevant in the awareness and desire to obtain cardiovascular preventive care services.

***Language spoken at home.*** English and Spanish were selected as the two variables representing the language spoken at home. The only statistical significant value found in our model for these two constants was the pre-ACA English variable yielding a p-value of 0.002. A 1.400 odds ratio indicate an increased 40% probability that people speaking English utilized hearttest services in the year 2009. On the other hand, there is a 1.188 odds ratio for post ACA output suggesting that 18.8% of the English speaking population has an increased probability of utilizing cardiovascular preventive care services. The Spanish variable was not statistically significant at the 0.462 value for 2009 and 0.944 for the year 2015. Therefore the 1.102 odds ratio or 10.2% increased probability during the pre-ACA era, the 0.991 odds ratio for the post-ACA suggested an almost 1% decreased utilization in hearttest services for individuals who spoke Spanish at home; however, due to the low levels of statistical significance the output of this variable is non-relevant within this model.

*Age.* Within the years 2009 and 2015, the p-value output of 0.001 for the variable age suggested a high statistically significant level. As expected, the odds ratio output generated very similar estimates of 1.045 and 1.043, respectively; meaning that during the pre-ACA and post-ACA era there is a 4.5% and a 4.3% increased probability of utilizing hearttest services for every one-year increase in age.

*Usual source of care.* The usual source of care variable yielded a statistically significant p-value of 0.001 in both pre and post-ACA eras. The odds ratio output decreased in 2015 by 0.138 which means that the value of usual care changes from 1 to 2, the probability of getting hearttest decreased by 13.8%. This suggests that individuals who are going to a private doctor are less likely to receive cardiovascular preventive care services compared to those who utilize the hospitals or the ER. This is in due in part to the mandatory tests that are required to be conducted when treating a patient who is admitted to the hospital.

*Perceived mental/health status.* The perceived mental and health status variable for both years is statistically significant at the 0.001 level, the odds ratio output decreased in 2015 by 0.041 meaning that the value of perceived mental/health status changes from 1 to 2, the probability of getting hearttest decreased by 4.1%. The results indicate that the perceived level of mental and health status has slightly declined after the passage of the Affordable Care Act, however, the percentage difference is so small and it does not pose a relevant difference and we can comfortably suggest that the perception of one's mental and health status was about the same during the pre and post-ACA implementation.

### **General Discussion and Potential Alternative Tests**

We find that many of our variables such as some race and ethnicity variables, income, and language spoken at home (English or Spanish) are not significant in our model even though

one would imagine that these variables impact the decision-making in households. The race and ethnicity variables are showing a lack of significance because the omitted variable category is “other races,” which comprises only 2 to 3% of our samples. However, since our goal is to compare the outcomes for 2009 and 2015, we can overlook the statistical significance aspect and focus more on whether the odds ratios for these variables improved or not between 2009 and 2015. One hypothesis is that the large significance of the uninsured variable is capturing some of these effects, especially when we consider that there was a difference in the pre-ACA and post-ACA uninsured populations in the United States. In order to test this hypothesis, we can estimate the models for each year separately for the insured and the uninsured populations or estimate two-stage least square models to capture the uninsured variable as an instrument in the first stage and then use those estimates to derive the final results. However, this exercise is beyond the current scope of this dissertation since it is difficult to obtain more information regarding the income or language spoken at home variables.

In the analysis, it was discovered that the variables female, married, education, and age were statistically significant because they all scored a p-value equal to or less than 0.05. However, when we compared the odds ratio among these variables, we found a decreasing value in the odds ratio. The highest decrease of odds ratio was the female variable; it scored an odds ratio of 0.28 or a 28% decreased probability that a female would utilize hearttest services in 2015. The variable education also dropped its odds ratio scoring value of 0.099, pointing out to the fact that the population has diminished the years of education earned by roughly 10% in the post-ACA era. This is a significant finding because the literature on this topic emphasizes the importance of education as it enhances the individual’s awareness and the importance of utilizing

preventative care services; therefore the decrease of education years earned could potentially have an impact on the future usage of cardiovascular preventive care services.

The odds ratio for married individuals changed by 0.061 inferring that there is a 6.1% lesser chance of getting preventive care among married people in 2015 than in 2009. Per the literature review, this is a noteworthy finding because married individuals tend utilizing preventative care services at a higher level compared to their counterparts. Age also has a slight reduction in its odds ratio value though the change only represented a less than 1% change between the pre-and post ACA implementation; thereby not suggesting a sizeable impact of age in the findings.

The examination of the data for the usual source of care yielded a statistically significant value of 0.001 and the comparative analysis of their odds value decreased after the implementation of the Affordable Care Act. Specifically for usual source of care, the probability of getting hearttest decreased by 13.8% meaning that compared to those serviced rendered at the hospital and its ER departments, American citizens are less likely to receive prophylactic cardiovascular services at their physician's office. This is important because there might be proactive efforts that private physicians could take in the advice and suggested testing rendered to the patients during their regular routine check-ups.

### **Summary**

The purpose of this chapter was to outline the results of the quantitative analysis, described the outcomes of each variable contained in the statistical model and defined the impact of each variable in the pre-and post-implementation of the Affordable Care Act. We have successfully established the fact that race, income, and language do not play a significant role in the outcomes of our model. Although we found that six variables do have a significant impact in

the utilization of hearttest, the highest percent change between the pre-and the post-ACA where female scoring a 28% difference followed by the usual source of care and the earned years of education.

One of the key takeaways from this chapter is that while having insurance might be a necessary condition for increasing the use of preventive care services as an enabling factor, it is certainly not a sufficient condition because the need and predisposing factors of an individual play a crucial role in determining their utilization of preventive care. There is still more work to be done in educating policy holders and facilitating behavior change leading to increased usage of the preventive services that are available to them but in large part are currently being grossly underutilized.

Chapter 5 gives an overview and a comprehensive summary of the conclusion, its analysis, and findings of the study. It also suggests potential implications of future healthcare legislation and its connection with regards to the utilization of preventive care services. Lastly, it will discuss the contribution that this dissertation had in the literature review for the topic of the utilization of cardiovascular preventive care services by insurance status in the United States population.

## **Conclusion**

As was illustrated through the use of multicultural proverbs and saying at the beginning of each chapter, it is evident that all cultures value prevention as an avenue for saving money, time, and grief. This section summarizes the research and presents a synopsis of the quantitative comparative statistical analysis findings which were guided by the research hypothesis and its consequential research questions. The study's analytical outcomes and the literature review findings specify the importance of the study offering meaningful data and a statistical model that lawmakers and healthcare leaders could utilize for future legislation. Lastly, it presents potential recommendations for future investigations to enhance the literature on this topic. The objective of this study was to analyze the pre and post- Affordable Care Act implementation to measure the utilization of preventive care services among non-Hispanic white, non-Hispanic black, non-Hispanic other race, Asian, and Hispanic groups. The scope of the study included usage data for blood pressure and cholesterol screening as the two primary preventive care services utilized to detect and potentially prevent cardiovascular-related chronic illnesses.

## **Discussion**

In American society, about 80% of adults are clinically diagnosed with a single medical condition, and 77% of the adult population is suffering the effects of two or more long-term illnesses (National Council on Aging, 2015). Cancer, diabetes, and cardiovascular-related diseases are the top chronic morbidities in the United States. The prevalence results in high mortality levels causing seven out of ten deaths, yearly 1.5 million people, or more than 60% of the adult population living in the United States dies prematurely (Heron, 2013). The impetus behind the long battle to pass, implement, and infiltrate the Affordable Care Act was in large part to close the gap between the "haves and the "have-nots" in American society, as regards to

access to healthcare insurance coverage, which in part affords the client the benefit of receiving preventive care services aimed at streamlining the tide of disease processes in their early stages and helping the individual to enjoy better quality of life for longer than would have been the case should such services have been unavailable.

The early identification and the treatment of chronic illness symptoms may decrease the probability of developing a full-blown illness and its secondary complications. Therefore, the utilization of preventive care services plays a vital role in the delay and development of such.

Due to a variety of factors including uncertainty in the United States economy (Dillman et al., 2014), the increased cost of health insurance, lack of education (Best et al., 2017), cultural beliefs (Shommu et al., 2016), among others, a percentage of the American population is unable to abide by the suggested preventative care utilization guidelines issued by the United States Preventive Service Task Force (Best et al., 2017). As a result, a percentage of Americans have remained in an uninsured status reaching the highest level in 2009, where roughly 50.9 million Americans (Lyon et al., 2011) or one out of every three United States residents (Dillman et al., 2014) reported being uninsured. The lack of access to healthcare insurance decreased the consumption of preventive healthcare services resulting in acute, chronic illnesses whereby the soaring costs of treating the ailment placed in jeopardy the livelihood of those suffering from the effects of the illness (Cline, Sweeney, & Cooper, 2018).

As a nation, the treatment of comorbid patients, or those suffering from more than one chronic illnesses has hefty economic repercussions which amount to 75% of the national medical expenditure. The sizeable expenditure is utilized to pay for treatments, medications, and doctor office visits (Centers for Medicare & Medicaid Services, 2013). How consumption of preventive services in two areas was explored that could significantly lower this massive expenditure?

A person's socioeconomic status has a direct influence on their health (Chen, Weider, Konopka, & Danis, 2014), members of traditional marginalized ethnic groups such as Hispanics fit the definition of a low socioeconomic status, which translates to decreased usage of preventive care services and high morbidity levels due to the delay of treatment and diagnoses (Velasco-Mondragon, Jimenez, Palladino-Davis, Davis, & Escamilla-Cejudo, 2016). In the late 2000s, President Barack Obama and members of his cabinet addressed the healthcare disparity issue, the draft and proposal of a new law resulted in heated debates, at the end, members of Congress agreed to pass the Affordable Care Act, a healthcare reform whose statutes included the inclusion of free preventive care, expansion of the state's Medicaid services, and removed the denial of healthcare coverage due to pre-existing conditions.

One of the directives that caused a series of controversies was the individual mandate, this portion of the law required every citizen or resident of the United States to subscribe to healthcare insurance coverage, individuals who opted out, had to pay a tax penalty. In late 2017, Congress adjusted the tax penalty charge, therefore, in 2019 Americans will no longer be financially penalized for not having healthcare insurance (Congressional Budget Office, 2017). Consequently, it is unknown the potential impact and future repercussions that this adjustment will have on the overall number of uninsured Americans, and the probable variations in the utilization of preventive care services. Even though the long-lasting effects of the healthcare reform are unknown, it is essential to analyze the impact that the law has had with regards to the utilization of prophylactic services and employ the findings when considering the development of future healthcare legislation.

The purpose of this dissertation was to quantify ACA's pre-and post-implementation impact in the utilization of cardiovascular preventive care services by demographic



characteristics of the population. The study's hypothesis sought to answer: "How has the pre-and post-implementation of the Affordable Care Act impacted the utilization of recommended cardiovascular preventive care services by insurance status in the population of the United States?" Four research questions were included in the study that compared ACA's pre and post-implementation and its effect on the cardiovascular preventive care utilization among Americans. It identified the individual's social, economic characteristics with regards to the usage of cardiovascular preventive care services, measured the individual's usual source of healthcare services, and defined the utilization levels for the uninsured population.

This study analyzed the Household Component of the MEPS data to estimate the quantitative models for testing these hypotheses. The data selected for this study included the analysis of the 2009 survey, which represented the pre-ACA implementation input; the observations included in the 2015 survey produced the post-ACA implementation results. The research methodology for the study included the quantitative statistical tests: comparative descriptive statistical analysis, two-tail t-test, proportional ratio analysis, and logistic regression analysis.

The study's problem statement was to quantify the pre-and post-implementation impact of the ACA with regards to the utilization of cardiovascular preventive care services. The study's findings tested the null hypothesis' assumptions and provided explanations to the research questions which incorporated the evaluation of the sample's blood pressure check and blood cholesterol screenings; their combined outputs acted as this study's dependent variable which was named hearttest signifying the cardiovascular preventive care services utilization level. The survey participants' demographics delineated the study's independent variables: a person's race/ethnicity, income, marital status, years of education earned, English or Spanish as the

primary language spoken at home, age, sex, usual source of care, and the perceived mental health status.

### **Conclusions from Research Findings**

The first statistical examination conducted was the two-tail t-test; this function measures the level of significance in the utilization of preventive cardiovascular care services among the insured sample and the uninsured subsamples for each year. In 2009 the t-test value equal to 32.45 with a corresponding p-value of 0.000. Similarly, for the year 2015, the t-value was 26.31 and a p-value of 0.000. This review suggests the rejection of the null hypothesis signifying that there is a difference between the means of hearttest utilization among insured and uninsured in both years.

In the logistic regression model, the odds ratios for the independent variables: race/ethnicity, income, and language spoken at home (English or Spanish) yielded insignificant results in our model. The p-values for the remaining independent variables met a statistically significant range, however their odds ratios were so low that the variables female, age, and perceived health and mental status were considered to be marginal on its value. Further research is needed to yield a concise interpretation. There was a 6% decrease in usage of hearttest services by married individuals during the post-ACA implementation.

Education is an essential factor in the consumption of healthcare services, specifically for our model; the post-ACA results show a 10% decrease in years of education earned. The literature review shows a clear connection between the level of education and the use of health care services as the years decreased, so is its usage. Finally, the usual source of care odds ratio output decreased by 13.8%, suggesting that individuals who are going to a private doctor are less likely to receive cardiovascular preventive care services compared to those who utilize the

hospitals or the ER. The effect is due in part to the mandatory tests that are required to be conducted when treating a patient.

In the comparative analysis to measure the utilization of hearttest services among the uninsured population, the first step was to perform a simple test of proportion which indicated a 5% drop in the proportion of uninsured between the years 2009 and 2015. A comparative means value analysis of the independent variables identified the characteristics of the uninsured prior and after the passage of ACA. The analysis output suggested that the variables married, female, usual source of care, and perceived mental and health status do not play a sizeable role in the result of our research. The race variable had a significant role; in 2015, non-Hispanic white decreased by 6% while Hispanic increased by 7%. The fact that the percentage of minority populations are increasing in the uninsured groups is reaffirmed by the language variable, which yielded a 16% decrease in English speakers and an increase of 14% for Spanish speakers. Therefore, lawmakers issuing future legislation must consider targeting their regulations to provide education and services to minority groups and considering the distribution of bilingual educational information to meet the needs of the Spanish speaking families.

As expected, the odds ratio output generated very similar estimates of 1.045 and 1.043, respectively; meaning that during the pre-ACA and post-ACA era there is a 4.5% and a 4.3% increased probability of utilizing hearttest services for every one-year increase in age.

During the post-ACA era, the age of the uninsured increased 3.7%, this is a marginal change in the age of the uninsured. In the year 2015, the variable  $\ln$ income yielded a 1.2% increase. The minimal boost was not enough to compensate for the rising cost of healthcare services; thereby we can confidently conclude that one of the reasons why members of this

population remained in an uninsured status is because they simply do not have enough revenue to pay for healthcare coverage.

### **Recommendations for Future Research**

As stated earlier, through the findings of the study, we rejected the null hypothesis and established that there is a significant difference between the means of cardiovascular care utilization among insured and uninsured in both years. However, in order to test additional data in regards to the significance of the uninsured variable, a two-stage least square model would be recommended to capture the uninsured variable as an instrument in the first stage and then use those estimates to derive the final results.

The USPSTF's blood pressure guidelines changed after the analysis of our study was concluded, therefore, a recommendation for future research includes adjusting the criteria for the variable bpcheck to include the new screening interval guidelines: adults ages 18 to 39 who have a normal blood pressure must receive screening every 3 to 5 years (United States Preventive Services Task Force, 2019). It is recommended that adults aged 40 years and older received an annual screening (United States Preventive Services Task Force, 2019). Thereby, future study must delineate this element on their quantitative study.

Additional future research includes the analysis of other prophylactic care services utilized in the diagnosis and prevention of other chronic illnesses such as cancer or diabetes. Although this study did not analyze these dependent variables, because the cardiovascular-related illness is considered to be the number one diagnosed morbidity in the United States, it provides a reasonably good assessment on the levels of utilization among Americans.

The last recommendation for future research includes repeating this analysis utilizing 2009 as a baseline for the pre-ACA implementation and comparing it with the future 2019 data

as a representation of the impact that the law would have after a decade of its inception. It will be interesting to see how the levels of uninsured and preventive care consumption have changed by comparing its findings to the outcomes of this study. By doing this, legislators and other people in positions of interest will have a clear picture of the healthcare reform's influence and its long-term consequences.

### **Summary**

In conclusion, this quantitative, comparative study involved the examination of the pre- and post-ACA implementation with regards to the utilization of preventive care services in the population of the United States of America. The findings highlighted a decrease in the number of uninsured individuals. The reduction has benefited the non-Hispanic white communities while the ethnic Hispanic group has absorbed the increase; this fact was corroborated by the proportional increase in the Spanish speaking households and the decrease of uninsured English speaking families. Income increased in the uninsured, it was not sizable enough to compensate for the high cost of medical insurance.

In the logistic analysis model, it was discovered that the variables female, married, education, english, age, usualcare, and menthlth variables met the required p-value and odds ratio values of significance at the 0.05 level. In any case, the variable married is an important finding because the being married increases the odds of getting cardiovascular preventive care services in both years by about 50%. Similarly, women are twice as likely as men to get preventive care services, indicating that the gender matters significantly in the ability and willingness to seek timely care. While the education variable is significant, further analysis would be required to identify its exact impact on the increase in odds of getting preventive care

because we had a lot of missing information about educational attainment, especially in the post-ACA era.

This study outlined the importance of preventive care services and identified the impact of the healthcare reform with regards to the consumption of such. There is no doubt that the changes in legislation will shape the outcomes and the future survival of ACA. It is up to lawmakers and healthcare administrators to consider the findings of this research while seeking for future regulation. Broadening access and ultimately, the utilization of preventive healthcare services would decrease the cost of healthcare services and positively impact the economic outlook of the United States of America.

As the great American forefather Benjamin Franklin said over centuries ago, “an ounce of prevention is worth a pound of cure.” That adage will always hold true and with today’s amazing advancements in healthcare and its technology, as well as knowledge regarding best practices in prevention, it has never been more pertinent. In Franklin’s day one might have traded some eggs for medical services, nowadays an individual might have to trade the proverbial “pound of flesh” for treatment when a few “eggs” worth of prevention could have done the trick. Only time will tell whether our elected officials will heed the sage advice and wisdom espoused by the great minds of the past and present.

## References

- Agarwal, A., Baechle, C., Behara, R. S., & Rao, V. (2016). Multi-method approach to wellness predictive modeling. *Journal of Big Data* 3(1), 1–23. <https://doi.org/10.1186/s40537-016-0049-0>
- Agency for Healthcare Research and Quality. (2019). *Survey Background*. Retrieved from [https://meps.ahrq.gov/mepsweb/about\\_meps/survey\\_back.jsp](https://meps.ahrq.gov/mepsweb/about_meps/survey_back.jsp)
- Akinyemiju, T., Jha, M., Moore, J. X., & Pisu, M. (2016). Disparities in the prevalence of comorbidities among US adults by state Medicaid expansion status. *Preventive Medicine*, 88, 196–202. <https://doi.org/10.1016/j.ypmed.2016.04.009>
- American Cancer Society (2017). *Cancer facts & figures 2017*. Retrieved from <https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/annual-cancer-facts-and-figures/2017/cancer-facts-and-figures-2017.pdf>
- Andersen, R. M. (1995). Revisiting the behavioral model and access to medical care: Does it matter? *Journal of Health and Social Behavior*, 36(1), 1. <https://doi.org/10.2307/2137284>
- Barnett, J., & Berchick, E. (2018). *Health insurance coverage in the United States: 2016*. Retrieved from <https://www.census.gov/library/publications/2017/demo/p60-260.html>
- Benjamin, E. J., Muntner, P., Alonso, A., Bittencourt, M. S., Callaway, C. W., Carson, A. P., ... Virani, S. S. (2019). Heart disease and stroke statistics-2019 update: *Circulation*, 139(10), e56–e66. <https://doi.org/10.1161/CIR.0000000000000659>
- Best, A. L., Vamos, C., Choi, S. K., Thompson, E. L., Daley, E., & Friedman, D. B. (2017). Increasing routine cancer screening among underserved populations through effective communication strategies: Application of a health literacy framework. *Journal of Cancer Education*, 32(2), 213–217. <http://dx.doi.org.uixt.idm.oclc.org/10.1007/s13187-017-1194-7>
- Billington, R., Chan-Kam, J., Harrington, P., Monteiro, G., Puska, P., Raw, M., & Skevington, S. (2001). *Encouraging people to stop smoking*. Retrieved from [http://www.who.int/mental\\_health/evidence/stop\\_smoking\\_whomsdmdp01\\_4.pdf](http://www.who.int/mental_health/evidence/stop_smoking_whomsdmdp01_4.pdf)
- Centers for Disease Control and Prevention. (2019). *What you should know for the 2017-2018 influenza season*. Retrieved from <https://www.cdc.gov/flu/about/season/flu-season-2017-2018.htm>
- Centers for Disease Control and Prevention, National Center for Health Statistics. (2019). *Healthy People 2020*. Retrieved from [https://www.cdc.gov/nchs/healthy\\_people/hp2020.htm](https://www.cdc.gov/nchs/healthy_people/hp2020.htm)

- Centers for Medicare & Medicaid Services. (2013). *Background: The Affordable Care Act's new rules on preventive care*. Retrieved from <https://www.cms.gov/CCIIO/Resources/Fact-Sheets-and-FAQs/preventive-care-background.html>
- Chen, C., Weider, K., Konopka, K., & Danis, M. (2014). Incorporation of socioeconomic status indicators into policies for the meaningful use of electronic health records. *Journal of Health Care for the Poor and Underserved*; Baltimore, 25(1), 1–16. <http://doi.org/10.1353/hpu.2014.0040>
- Cline, E., Sweeney, N. L., & Cooper, P. B. (2018). Medical home model: Reducing cost, increasing care, and improving outcomes for uninsured, chronically ill patients. *Nursing Economics*, 36(1), 7–12.
- Congressional Budget Office. (2017). *Repealing the individual health insurance mandate: An updated estimate*. Retrieved from <https://www.cbo.gov/publication/53300>
- Creswell, J. W. (2013). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). Thousand Oaks, CA: Sage.
- DeNavas-Walt, C., Proctor, B., & Smith, J. (2010). *Income, poverty, and health insurance coverage in the United States: 2009*. Retrieved from <https://www.census.gov/prod/2010pubs/p60-238.pdf>
- Denson, V., & Keele, R. (2016). Cervical cancer screening practices of volunteer providers in faith-based clinics. *The Journal for Nurse Practitioners*, 12(1), 27–34. <https://doi.org/10.1016/j.nurpra.2015.09.005>
- Derksen, D. J. (2013). The Affordable Care Act: Unprecedented opportunities for family physicians and public health. *Annals of Family Medicine*, 11(5), 400–402. <https://doi.org/10.1370/afm.1569>
- Dillman, J., Mancas, B., Jacoby, M., & Ruth-Sahd, L. (2014). A review of the literature: Differences in outcomes for uninsured versus insured critically ill patients. *Dimensions of Critical Care Nursing*, 33(1), 8–14. <https://doi.org/10.1097/DCC.000000000000012>
- Doh, S. (2012). Health insurance and racial disparity in the United States. *International Review of Public Administration*; 17(1), 79-103. <https://doi.org/10.1080/12264431.2012.10805218>
- Donley, R. (2015). Determinants of health are the building blocks. *Health Progress*, 96(3), 30–33.
- Families USA. (2013). *A 50-State look at Medicaid Expansion*. Retrieved from <https://familiesusa.org/product/50-state-look-medicaid-expansion>



- Garten, R. (2018). Update: Influenza activity in the United States during the 2017–18 season and composition of the 2018–19 influenza vaccine. *Centers for Disease Control and Prevention*, 67:634–642. <https://doi.org/10.15585/mmwr.mm6722a4>
- Hair, J. F., Black, W., Babin, B., & Anderson, R. E. (1998). *Multivariate data analysis* (5th ed.). Upper Saddle River, NJ: Prentice Hall.
- HealthCare.gov. (2019). *Exchange*. Retrieved from <https://www.healthcare.gov/glossary/exchange/>
- Hegenauer, C. L. (2016). Are we covered? Health insurance disparities in the Affordable Care Act era. *Michigan Sociological Review*, 30(93–108), 135.
- Heron, M. (2013). Deaths: Leading causes for 2010. *National Vital Statistics Reports*, 62(6), 97.
- Hill, M., Granado, M., Opusunju, J., Peters, R., & Ross, M. (2011). The impact of income, public assistance and homelessness on seeking medical care. *American Journal of Health Studies*, 26(3), 174–181.
- History of the Affordable Care Act. (2018). Retrieved from <https://www.ehealthinsurance.com/resources/affordable-care-act/history-timeline-affordable-care-act-aca>
- Holden, C. D., Chen, J., & Dagher, R. K. (2015). Preventive care utilization among the uninsured by race/ethnicity and income. *American Journal of Preventive Medicine*, 48(1), 13–21. <https://doi.org/10.1016/j.amepre.2014.08.029>
- Hulka, B. S., & Wheat, J. R. (1985). Patterns of utilization: The patient perspective. *Medical Care*, 23(5), 438–460. <https://doi.org/10.1097/00005650-198505000-00009>
- Karliner, L., Marks, A., & Mutha, S. (2016). Reducing health care disparities for minority women in the era of the Affordable Care Act: Opportunities within primary care. *Journal of Health Care for the Poor and Underserved*, 27(2), 392–415. <https://doi.org/10.1353/hpu.2016.0098>
- Key facts about the uninsured population. (2018). Retrieved from <https://www.kff.org/uninsured/fact-sheet/key-facts-about-the-uninsured-population/>
- Kimbrough-Melton, R. J. (2013). Health for all: The promise of the affordable health care act for racially and ethnically diverse populations. *American Journal of Orthopsychiatry*, 83(2–3), 352–358. <https://doi:10.1111/ajop.12042>
- Kino, S., & Kawachi, I. (2018). The impact of ACA Medicaid expansion on socioeconomic inequality in health care services utilization. *PLoS One*, 13(12), e0209935. <http://dx.doi.org.uivtx.idm.oclc.org/10.1371/journal.pone.0209935>

- Kirchhoff, S. M. (2014). *Medical loss ratio requirements under the Patient Protection and Affordable Care Act (ACA): Issues for congress*. Washington, DC: Congressional Research Service.
- Leone, J. E., Rovito, M. J., Mullin, E. M., Mohammed, S. D., & Lee, C. S. (2017). Development and testing of a conceptual model regarding men's access to health care. *American Journal of Men's Health, 11*(2), 262–274. <https://doi.org/10.1177/1557988316671637>
- Logistic Regression with Stata Chapter 1: Introduction to Logistic Regression with Stata. (2019). Retrieved from <https://stats.idre.ucla.edu/stata/webbooks/logistic/chapter1/logistic-regression-with-statachapter-1-introduction-to-logistic-regression-with-stata/>
- Lyon, S., Benson, N., Cooke, C., Iwashyna, T., Ratcliffe, S., & Kahn, J. (2011). The effect of insurance status on mortality and procedural use in critically ill patients. *American Journal of Respiratory and Critical Care Medicine, 184*(7), 809–815.
- Maciosek, M. V., Coffield, A. B., Flottemesch, T. J., Edwards, N. M., & Solberg, L. I. (2010). Greater use of preventive services in U.S. health care could save lives at little or no cost. *Health Affairs, 29*(9), 1656–1660. <https://doi.org/10.1377/hlthaff.2008.0701>
- Mangan, D. (2015). *Don't mess with Medicaid expansion? A lesson from Texas*. Retrieved from <https://www.cnbc.com/2015/05/29/texas-pays-a-big-price-for-saying-no-to-medicaid-expansion.html>
- Mangin, D., Sweeney, K., & Heath, I. (2007). Preventive health care in elderly people needs rethinking. *British Medical Journal; London, 335*(7614), 285. <https://doi.org/10.1136/bmj.39241.630741.BE1>
- Massachusetts Department of Public Health, Division of Epidemiology and Immunization. (2017). *Long-term care facilities (LTCF): Control of influenza and pneumococcal disease 2018—2019*. Author. Retrieved from <https://www.mass.gov/files/documents/2018/09/20/long-term-care-control.pdf>
- McRee, A.-L., Reiter, P. L., Gottlieb, S. L., & Brewer, N. T. (2011). Mother–daughter communication about HPV vaccine. *Journal of Adolescent Health, 48*(3), 314–317. <https://doi.org/10.1016/j.jadohealth.2010.07.006>
- Mehmetoglu, M., & Jakobsen, G. (2017). *Applied statistics using Stata: A guide for the social sciences*. London, England: Sage.
- Mokdad, A. H., Marks, J. S., Stroup, D. F., & Gerberding, J. L. (2004). Actual causes of death in the United States. *JAMA, 291*(10), 1238–1245. <https://doi.org/10.1001/jama.291.10.1238>

- National Center for Chronic Disease Prevention and Health Promotion, Division for Heart Disease and Stroke Prevention. (2017). *Heart disease facts*. Retrieved from <https://www.cdc.gov/heartdisease/facts.htm>
- National Conference of State Legislatures. (2014). *Preventive services covered under the Affordable Care Act*. Retrieved from <http://www.ncsl.org/research/health/american-health-benefit-exchanges-b.aspx>
- National Council on Aging. (2015). *Facts about healthy aging*. Retrieved from <https://www.ncoa.org/news/resources-for-reporters/get-the-facts/healthy-aging-facts/>
- Obama, B. (2012). Securing the future of American Health Care. *The New England Journal of Medicine*, 367(15), 1377–1381. <http://dx.doi.org.uiwtx.idm.oclc.org/10.1056/NEJMp1211514>
- Office of Disease Prevention and Health Promotion. (2014). *Disparities—healthy people 2020*. Retrieved from <https://www.healthypeople.gov/2020/about/foundation-health-measures/Disparities>
- Ogunsanya, M. E., Jiang, S., Thach, A. V., Bamgbade, B. A., & Brown, C. M. (2016). Predictors of prostate cancer screening using Andersen’s Behavioral Model of Health Services Use. *Urologic Oncology: Seminars and Original Investigations*, 34(12), 529.e9–529.e14. <https://doi.org/10.1016/j.urolonc.2016.06.016>
- Pu, J., & Chewning, B. (2013). Racial difference in diabetes preventive care. *Research in Social and Administrative Pharmacy*, 9(6), 790–796. doi:10.1016/j.sapharm.2012.11.005
- Pustylnik, N. (2013). Relationship between health coverage and use of preventive medical services (Doctoral dissertation). Retrieved from ProQuest Dissertations & Theses Global. (3583261.)
- Rodriguez, G. (2007). *Logit models for binary data*. Retrieved from <https://data.princeton.edu/wws509/notes/c3.pdf>
- Sabik, L. M., Tarazi, W. W., & Bradley, C. J. (2015). State Medicaid expansion decisions and disparities in women’s cancer screening. *American Journal of Preventive Medicine*, 48(1), 98–103. <https://doi.org/doi:http://dx.doi.org.uiwtx.idm.oclc.org/10.1186/s12939-016-0298-8>
- Sharp, M. (2013). The impact of the Affordable Care Act on the impending doctor shortage: A prospective analysis. Retrieved from ProQuest Dissertations & Theses Global. (10129439)
- Shommu, N. S., Ahmed, S., Rumana, N., Barron, G. R. S., McBrien, K. A., & Turin, T. C. (2016). What is the scope of improving immigrant and ethnic minority healthcare using community navigators? A systematic scoping review. *International Journal of Equity in*

*Health*, 15(6). <https://doi.org/doi:http://dx.doi.org.uiwtx.idm.oclc.org/10.1186/s12939-016-0298-8>

- Thompson, J., Horton, C., & Flores, C. (2007). Advancing diabetes self-management in the Mexican American population: A community health worker model in a primary care setting. *Diabetes Educator*, 33(S6), 159S-165S.
- Trzesniewski, K. H., Donnellan, M. B., Lucas, R. E., & Association, A. P. (2011). *Secondary data analysis: An introduction for psychologists*. Washington, DC: American Psychological Association.
- Ulrike, W. (2015). A 9-valent HPV vaccine in women. *The New England Journal of Medicine*, 372(26), 2566–2569. <http://dx.doi.org.uiwtx.idm.oclc.org/10.1056/NEJMc1504359>
- U.S. Department of Health and Human Services, Agency for Healthcare Research and Quality. (2014). *Guide to clinical preventive services, 2014*. Retrieved from <https://www.ahrq.gov/prevention/guidelines/guide/index.html>
- U.S. Preventive Services Task Force. (2018). *Grade definitions*. Retrieved from <https://www.uspreventiveservicestaskforce.org/Page/Name/grade-definitions>
- U.S. Preventive Services Task Force. (2019). *Final recommendation statement: High blood pressure in adults: Screening*. Retrieved from <https://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/high-blood-pressure-in-adults-screening#consider>
- Vaidya, V., Partha, G., & Howe, J. (2011). Utilization of preventive care services and their effect on cardiovascular outcomes in the United States. *Risk Management and Healthcare Policy*, 4, 1–7. <https://doi.org/10.2147/RMHP.S15777>
- Velasco-Mondragon, E., Jimenez, A., Palladino-Davis, A. G., Davis, D., & Escamilla-Cejudo, J. A. (2016). Hispanic health in the USA: A scoping review of the literature. *Public Health Reviews*, 37. <http://dx.doi.org.uiwtx.idm.oclc.org/10.1186/s40985-016-0043-2>
- Weitz, T. A., Freund, K. M., & Wright, L. (2001). Identifying and caring for underserved populations: Experience of the national centers of excellence in women's health. *Journal of Women's Health & Gender-Based Medicine*, 10(10), 937–952. <https://doi.org/10.1089/152460901317193521>
- Woolf, S. H., & Campos-Outcalt, D. (2013). Severing the link between coverage policy and the US Preventive Services Task Force. *JAMA*, 309(18), 1899. doi:10.1001/jama.2013.3448
- Young, J. (2014). *More than 8 million have signed up for Obamacare, in latest tally*. Retrieved from [https://www.huffingtonpost.com/2014/05/01/obamacare-report\\_n\\_5247872.html](https://www.huffingtonpost.com/2014/05/01/obamacare-report_n_5247872.html)

Yu, S. W. Y., Hill, C., Ricks, M. L., Bennet, J., & Oriol, N. E. (2017). The scope and impact of mobile health clinics in the United States: A literature review. *International Journal for Equity in Health*, 16(1), 178. doi:10.1186/s12939-017-0671-2