The Connection Between State Policies and Health Outcomes: How State Unemployment Insurance Generosity Affects Type II Diabetes Incidence and Outcomes

Honorable Mention, 2019 John Dunlop Thesis Prize

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May 2019

M-RCBG Associate Working Paper Series | No. 118

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The Connection Between State Policies and Health Outcomes: How State Unemployment Insurance Generosity Affects Type II Diabetes Incidence and Outcomes

A thesis presented

by

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Presented to the
Department of Government
in partial fulfillment of the requirements
for the degree with honors
of Bachelor of Arts

Harvard College
March 2019
Abstract

How does state policy affect health outcomes? While researchers have looked at how social determinants affect patient health, few have directly studied the effects of income insecurity on health outcomes. In my research, I attempted to fill this gap in the literature by analyzing how state social policy can affect health outcomes via its effect on income security. I tested the connection between state unemployment insurance generosity and type II diabetes mellitus (T2DM) incidence and outcomes. In the quantitative component of my research, I found a statistically significant negative correlation between the minimum unemployment insurance benefits and the incidence of end-stage renal disease (ESRD) due to T2DM, as well as a statistically significant negative correlation between the maximum weekly unemployment insurance benefits and death due to T2DM. In the qualitative part of this research, which encompassed surveys of physicians and previously or currently unemployed patients with T2DM, I found that cultural background, access to a payer source, and a social support system were significant moderator variables.
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Chapter 1

Income Security and Health Outcomes: An Introduction

Imagine finding yourself in the emergency room in what would be the first of many bouts with vision issues. Now, this ER visit isn’t due to age-related vision deterioration or a pharmacological shortcoming of modern medicine. Rather you are a patient with diagnosed type 2 diabetes mellitus (T2DM) and you try your best to make do with PB&J sandwiches but you have bills to pay, a family to support, and no insurance due to being unemployed. As a result, you don’t prioritize taking that expensive medication or eating the nutritious food the doctor, you saw some time ago, recommended. Due to your inability to make lifestyle modifications you now find yourself sitting in the ER, but on the bright side, you finally got some medication to help you make do in the meantime.

Needless to say that this uncontrolled T2DM may put you at risk of many future health complications including amputations and blindness but until you can find a paying job with insurance all you can rely on are the unemployment insurance benefits to sustain you and your family. This is one of many personal patient narratives with T2DM patients that informed my research. More importantly, these personal narratives affirmed why I wanted to study how policies that influence income security can affect health outcomes.

The puzzle I tested in my research is how state unemployment insurance policies affect health outcomes. To explore this question I focused on state-level unemployment insurance policies and T2DM incidence and outcomes. More
specifically, my study was guided by my question on how the weekly unemployment insurance check amount and number of weeks that one is eligible for unemployment insurance benefits affects the incidence and complication rate due to T2DM? I obtained data on unemployment weekly check amounts and eligibility time periods for each state from the U.S. Department of Labor (DOL) database\(^1\). This enabled me to acquire information for the state policy component of my concept. For health outcomes, I obtained the number of diabetics in each state and their relevant metrics of health from datasets\(^2\) by the CDC.\(^3\) These datasets from the DOL and CDC provided me with the information to analyze the relationship between my dependent and independent variables. Once I obtained and analyzed the quantitative data, I conducted interviews and surveys of patients with T2DM and various physicians to show the possible mechanism connecting the independent and dependent variables. I utilized this research design to see how public policy can affect income security and thus subsequently affect health outcomes.

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\(^3\) “U.S. Diabetes Surveillance System.” *Centers for Disease Control and Prevention*, Centers for Disease Control and Prevention, gis.cdc.gov/grasp/diabetesdiabetesatlass.html#.
Health policy leaders have engaged in extensive discussion and research on the SDH. Researchers like Marmot\(^4\) view this through the lens of social status and the way such status shapes other factors like one’s environment, level of food security, and education level. Scholars like Heiman and Artiga\(^5\) also view the link between social determinants and health status in a broad manner that incorporates many variables, including factors related to economic security, physical environment, education, food, and social integration. This theory posits that these social factors play a greater role in predicting health quality and morbidity rates than do the quality of and level access to healthcare. From a policy perspective, a lot of this research has focused on how policies can be crafted to equalize these social determinants. However, I haven’t found much research connecting the social determinants to chronic illness, like T2DM, at the state level. There is a lack of current scholarship that relates to the effect of state social policies on health outcomes. In this study, I focused on the incidence of and long-term prognosis related to T2DM at the state level. I analyzed this through a nested analysis in which I quantitatively looked at the unemployment laws in each state and how they correlated to different metrics of diabetes prevention/treatment. To


conclude my research, I interviewed patients with T2DM and physicians in order to explain how various mediating and moderating variables play a part in this correlation.

Before I began my research, I made my own prediction on what the relationship between economic security and health outcomes would be based on my understanding of the social determinants of health (SDH). I predicted that the more economic security one has, particularly income security, the better their health quality will be. One can test how public policy affects income security and thus health outcomes by looking at policies related to unemployment insurance. As a result, I hypothesize that the more expansive an unemployment insurance program is, from a time and money perspective, the more income security individuals will have, which will lead to a higher quality of health. I see the higher income leading to better health in three specific ways: greater access to healthcare, the ability to afford prescription drugs, and the ability to make necessary lifestyle modifications. I hypothesized that since income security is something that has a greater time horizon, the impact it will have on one’s health will also be long-term. As a result, the effect of income security on health outcomes is best measured by how one is able to prevent and manage a chronic health condition.

The specific hypothesis that I tested is that the more generous a state’s unemployment insurance benefits are, measured by minimum and maximum weekly check amounts and weeks of eligibility, the better health outcomes the
state’s residents will have. I used incidence and complication rates due to T2DM as my response variables and thus indicators of health outcomes. The complications that I analyzed are end-stage renal disease and death. In my methods chapter, I outline the way in which I crafted my research design to test my hypothesis. My next chapter will contain my literature review which will provide some insight into existing literature on the SDH that informed my research motivations and process. The following chapter will also provide information on the structure of unemployment insurance and provide more insight into T2DM and its possible complications.

This thesis project consists of six chapters. The first introduces the topic and discusses the research question animating this thesis, including how previous work on the connection between health and socioeconomic factors has influenced the research design that I have chosen. The next chapter is a literature review about relevant findings on the SDH. I also analyze the history of unemployment insurance policy in the U.S. and give a brief insight into T2DM. In the following chapter, I cover the methods of how I conducted research on the quantitative and qualitative aspects of my thesis. In the quantitative chapter, I analyzed the regression results that display the relationship between unemployment insurance and T2DM. Next, the qualitative chapter uses interviews and surveys to provide more insight into the negative ways that income insecurity affects T2DM incidence and outcomes. It also aims to elucidate how other social policies and other non-policy related factors like family stability, stress, and relationships may
impact one’s health outcomes. In my conclusion, I provide an overview of the importance of studying SDH as a means to understand how to better invest in a healthier population.
Chapter 2

Social Privilege and Chronic Diseases: A Background

When it comes to the delivery of healthcare and population health, researchers like Braveman, Cockerham, and Magnan have extensively studied the SDH and how that affects patients’ health and the efficacy of medical treatment. In addition to this, entities like the New England Journal of Medicine, RAND Corporation, and the Robert Wood Johnson Foundation have done extensive analysis into these economic and social factors that affect someone’s

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health include economic stability, neighborhood and physical environment, educational opportunities, quality of food access, community integration and social support, and quality of healthcare access. Studies have shown that these factors have a much greater impact on health outcomes than immediate medical intervention. Some studies would say that these social determinants on a systemic level affect 20% of an individual’s health outcomes. However, researchers have estimated that when one factor in the effect that these social determinants have on one’s ability to engage in healthy behaviors this rises up to 60%. This is in comparison to an estimated 25% of one’s health that is determined by medical intervention itself.

In many ways, one’s health can be very tied to a social gradient that is very closely tied to one’s socioeconomic status. This means that one’s socioeconomic status can be a strong predictor of one’s current and future health.


In fact, Marmot argues that one’s socioeconomic status at the time of birth can have an effect on one’s health later in life even if the person has risen up the socioeconomic ladder. Even status differences between two individuals who earn the same amount of money can result in two different health outcomes for these individuals. These status differences whether rooted in one’s childhood experiences, education, ability to handle stress most likely drives disparate health outcomes between people of the same economic class. Marmot shows how education, income, environment, race, and other factors can have a direct link on one’s risk for adverse health events and likelihood for positive health outcomes. These determinants have a big effect on one’s health as they are indicators of one’s ability to maintain a healthy lifestyle. These determinants are also indicators of one’s ability to obtain the resources necessary to address illnesses, so it makes sense that these factors outside of medical intervention would have a great effect on one’s health.

Healthcare Disparities

SDH not only affect individual health but also drive healthcare disparities at the population level. With regards to individual health, there is evidence to suggest that lower socioeconomic status on its own has deleterious effects on one’s health. In their cross-sectional survey, Bird\textsuperscript{16} found that living in a

\textsuperscript{16} Bird, Chloe E, et al. “Neighbourhood Socioeconomic Status and Biological 'Wear and Tear' in a Nationally Representative Sample of US Adults.” \textit{Journal of Epidemiology & Community Health}, BMJ Publishing Group Ltd, 1 Oct. 2010, jech.bmj.com/content/64/10/860.
neighborhood with a preponderance of people with lower socioeconomic status was linked to greater “biological wear and tear” as measured by “allostatic load.” Allostatic load\(^{17}\) refers to how organs of the body are affected by their response to the elevated endocrine and neural hormones released due to constant external stressors. This effect was noticeable with very minor variation due to race or gender. This exemplifies how both the environmental aspect of the SDH and the economic security aspects work hand in hand to affect one’s health outcomes.

Obesity and the health issues that accompany it are on the rise within the U.S. This can partially be explained by the social determinant of health related to food access as there are food deserts in urban and rural areas. A study in Washington state described how people in many food deserts had trouble accessing healthy food due to their distant proximity to such foods.\(^{18}\) When it comes to healthcare disparities, the SDH often drive these disparities. When considering the economic aspect of the SDH, someone who is in the bottom 1% of the income distribution will live on average about 14.6 years shorter than one who is in the top 1% of the income bracket.\(^{19}\) It is possible that this is due to healthy behaviors that are highly


\(^{19}\) Adler, Nancy E., et al. “Addressing Social Determinants of Health and Health Disparities.” National Academy of Sciences, National Academy of Medicine, 19
correlated with socioeconomic status.\textsuperscript{20} I will explore the behavioral aspects of health in a later chapter. With regards to race, there has been a consistent\textsuperscript{21} racial gap in terms of life expectancy.\textsuperscript{22} This has been driven in large part due to the economic and wealth gap\textsuperscript{23} between minorities and whites. However, this may also be explained by differences in community integration\textsuperscript{24} and social support\textsuperscript{25}

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that may make it more difficult for minorities to obtain the support they need to access adequate healthcare resources. These disparities rear themselves in ominous ways such as the disproportionately high rates of maternal mortality among African-American women.\textsuperscript{26} A large body of literature on the SDH makes it clear that many health disparities\textsuperscript{27} that exist\textsuperscript{28} between different groups are rooted in differences in access to resources.\textsuperscript{29} Over time these racial disparities have slightly declined, due to the fact that mortality rates among African Americans are falling faster than among whites. The disparities for all causes of mortality including heart disease for those over sixty-five years of age has almost completely closed. However, black life expectancy still remains about four years lower than that of whites. Smith et al. argue how this gap in life expectancy can be explained by the fact that blacks in their 20s, 30s, and 40s are more likely to suffer from chronic health conditions occur in white people at younger ages. Right now black people on average can expect to live about four years less than


white people. Access to these various economic and social resources often determines one’s ability to obtain the resources necessary to stay healthy and obtain the necessary treatment when sick.

In the U.S. there are healthcare disparities not only within the African American community but also within the Latino, Asian American, and Native American communities. In a national study that compared the physical and mental health of different Latino groups (Mexican, Cuban, Puerto Rican, and Dominican) with native-born Caucasians, researchers found that mental and physical health scores were worse for Cubans, Puerto Ricans, and Dominicans than for whites, even after adjusting for demographic and socioeconomic variables. In addition to this, when it came to access to health insurance more than 15% of all three of these Latino subgroups didn’t have health insurance. As a whole, Latinos have the lowest rates of health insurance coverage amongst all major racial groups in the U.S. With regards to cardiovascular health, those of Dominican origin had


32 Ibid.

higher rates of self-reported hypertension compared to native-born whites while it was lower within other Latino groups. When it comes to the chronic health issue of T2DM, about 22% of adult Latinos suffer from this illness compared to about 14.3% of all U.S. adults. In addition to this, only 55% of these Latino patients with T2DM have been diagnosed compared to 63% of all U.S. adults. Latinos are also more likely to not have appropriate A1C and lipid screening and are less likely to have these metrics in check.

There are also health disparities amongst Asian Americans within the United States. These healthcare disparities tend to differ across different Asian subgroups as well. When it comes to cardiovascular health, Asians have a higher


mortality rate and tend to die earlier from stroke compared to white Americans.\(^{38}\) In addition to this, Asian Americans are less likely to undergo treatment for high blood pressure or high LDL cholesterol.\(^{39}\) Relative to white adults the obesity rate for Asian Americans is low. However, there are differences within Asian subgroups as Filipino adults have an obesity rate of 14% compared to rates of 6%, 5%, and 4% in Asian Indian, Vietnamese, and Chinese Americans respectively. With regards to T2DM, Asian Americans suffer from the illness at higher rates than white citizens do while suffering from it at lower rates than Hiss and African Americans. There are varying prevalence rates of T2DM amongst Asian American subgroups as it is higher among Asian Indian Americans, Japanese and Filipinos relative to Chinese Americans and Vietnamese Americans.\(^{40}\) Asian American men do suffer from T2DM at higher rates than Asian American women. Many of the healthcare disparities within the Latino and Asian American

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\(^{39}\) LDL cholesterol refers to cholesterol composed of low density lipoproteins. This is the type of cholesterol that leads to the formation of plaque in the artery walls and can lead to heart disease. “LDL: The ‘Bad’ Cholesterol.” \textit{MedlinePlus}, U.S. National Library of Medicine, 30 July 2018, medlineplus.gov/ldlthebadcholesterol.html.

community are due to lack of adequate health insurance\textsuperscript{41} which could be leading to the lack of adequate testing\textsuperscript{42} for and management of chronic health issues.\textsuperscript{43}

Healthcare disparities also result in increased healthcare costs. A 2011 study indicated that the costs of healthcare disparities in African American, Asian Americans, and Latinos from the years 2003-2006 alone was about $229 billion.\textsuperscript{44} This study also found that if preventable illnesses like T2DM, hypertension, and stroke that are disproportionately prevalent in African-American and Latino communities were reduced to levels in which they are found in Caucasians, then $23.9 billion in healthcare spending would have been saved in 2009 alone.

Overall, it is clear that there are clear racial and socioeconomic health disparities within the U.S. from cradle to grave and many of these disparities are driven by unequal access to social resources. For example, some studies cite how


\textsuperscript{44}“Center for Medicare Advocacy ||Racial and Ethnic Health Care Disparities.” Center for Medicare Advocacy, Center for Medicare Advocacy, www.medicareadvocacy.org/medicare-info/health-care-disparities/.
lack of access to adequate housing\textsuperscript{45} in childhood can impair well being in the long-term, others cite how lower levels of social support\textsuperscript{46} amongst those living in poverty can lead to poor health. It’s evident that a lot of these disparities in clinical outcomes can be traced to socioeconomic disparities and disparities in access to healthcare insurance. There is also a possibility that this is due to disparities in representation within the field of medicine. Damon Tweedy describes how patients in many cases patients are more likely to receive empathy from physicians who share the same racial background.\textsuperscript{47} He describes his own experiences as a medical student doing his clinical rotations when a young black female delivers a stillborn baby. Damon describes how the doctor found such an outcome to be inevitable and seemed to chalk up the outcome solely to the patient's lifestyle an attitude that he believes cost them the chance to save the baby. This assertion is validated as physicians have been shown to provide better care to those patients that they share a cultural connection with.\textsuperscript{48} These cultural


barriers make a difference with care delivery and minorities that are underrepresented in the medical field will be adversely affected. This is evident in the fact that African Americans and Latinos are vastly underrepresented among physicians. While representation has improved for Asian Americans, Latinos, and black women, black men are still underrepresented in the physician population. There has not been an improvement in the number of black men matriculating into medical school since 1978 and in a considerable number of years it has been worse. This leads to worse relationships for black men in the healthcare system, as a study by the National Bureau of Economic Research shows that black men are more likely to agree to invasive preventative services (e.g., those involving blood samples or injections) when seen by a black doctor. This was driven by better communication and trust between the doctor and patient. This makes a big impact as preventative screenings are key to preventing


and managing chronic illnesses. Disparities in chronic illnesses\textsuperscript{52} in many ways drive the black-white gap in mortality as most of the gap in health outcomes are driven by gaps in chronic health conditions.\textsuperscript{53} A lot of this distrust can be rooted in intentional historical episodes in which African Americans were intentionally subjected to ill-treatment within the U.S. healthcare system.\textsuperscript{54} An example of this is the Tuskegee syphilis health studies from 1932-1972 in which African Americans were intentionally not given treatment for syphilis even after penicillin was established as an effective treatment of choice. African Americans that agreed to take part in the study were not told of the they would not be given adequate treatment for syphilis. This is one of the many institutional instances of racism in U.S. medicine and contributes to distrust amongst African Americans today.

Public Policy Interventions

By addressing the SDH, a governmental policy can have a noticeable effect on health outcomes. In fact, a RAND study found a link between spending

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on old-age programs and public pensions and higher life expectancy and lower levels of infant mortality on a national level. This same study also found a stronger link between government spending and health outcomes than with private or charity spending. This study also showed that “states in the U.S. that spent more on public-welfare programs tend to have better health.” This finding suggests that a public safety net can positively alter the length of life by addressing certain social determinants. This is because increased investments in education and health can help improve health outcomes for communities by working “upstream” of existing health care problems. This is substantiated by a study by the RAND Corporation that describes how increased educational attainment improved health by providing individuals with improved health knowledge, improved work conditions, and improved social supports. The same study describes how social and public policies that make investments in public


welfare resources can improve community health. Some also frame criminal justice reform through a health lens as it can help alleviate social determinants related to community integration.\textsuperscript{59} Unemployment checks provide cash assistance to those who are unemployed. By providing this monetary supplement it is clear that this has an effect on the social determinant of health related to economic security.\textsuperscript{60} This is clear as studies show that those who are unemployed are more likely to experience instability in their interpersonal relationships and mental health issues so unemployment insurance can make a difference in how unemployment affects one’s health.\textsuperscript{61} Healthcare leaders are attempting to use public resources to more directly address the various SDH. In November 2018, the U.S. Secretary of Health and Human Services described how the Center for Medicare and Medicaid Innovation were working on ways for healthcare systems


to address their patients’ social needs such as housing and food. This could be implemented by using payment models that would reimburse hospitals for addressing such needs. This pilot program could then lead the way for other healthcare payers outside of Medicare and Medicaid to do the same thing. This sort of policy pilot would have the strength of the more than $1 trillion a year that is spent by Medicare and Medicaid and account for about ⅔ of U.S. healthcare spending. Different entities have implemented public-private partnerships to try and get healthy foods to food deserts in the nation. This includes a FreshWorks fund which is a public-private partnership in California to get loans and grants to grocers to provide fresh produce in food deserts. These are a few of the public policy innovations that are being geared towards reducing and managing the burden of public illness.

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U.S. Health Outcomes

When it comes to tracking health outcomes in the developed world it is crucial to look at chronic health issues. A chronic health issue is one that has a long-term effect on an individual and that has a long-term duration.\(^6\) Within the U.S. healthcare system, chronic health issues occupy a large proportion of medical attention as about 60% of adults have at least one chronic healthcare condition,\(^6\) and 42% have more than one. This problem gets worse with age as about 81% of adults age 65 or older have multiple chronic conditions. The incidence of chronic health issues in the U.S. is on the rise and about half of the U.S. population is projected to live with at least one chronic health issue by 2030.\(^6\)

Currently, different regions are ailed with these chronic health issues at different rates. For example, the incidence of T2DM is highest in Puerto Rico, followed by Mississippi; however, it is higher in the Deep South and Southwest compared to other regions.\(^6\) End-stage renal disease (ESRD), a complication of

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T2DM, is more prevalent in the South and Midwest compared to other regions of the country. The differences in health outcomes by region can partially be explained by differences in safety nets by region as the southern U.S. typically has a weaker safety net as shown by how the monthly welfare benefits at the state level under Temporary Aid to Needy Families (TANF), the federal welfare program, is lowest in the southern states. It also could be partially due to the fact that a higher number of African Americans and Hispanics live in the South compared to other regions of the country. However, while more people may be living with chronic disease than ever before it is clear that at least between 1960 and 1999 that survival rates for people with heart disease and stroke were up. Overall when looking at what makes a larger toll on Americans’ health, it is clear

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that chronic cardiovascular issues claim a higher percentage of deaths than they
did in 1900.\textsuperscript{73}

There are also large financial implications associated with chronic illness.
This is evidenced\textsuperscript{74} by the fact that Americans with one or more chronic health
care issues account for 90\% of total healthcare spending. In a nation that spends
more than $3 trillion on health care a year, this is a huge cost.\textsuperscript{75} Due to the
prevalence and financial costs of chronic illnesses within the U.S., it makes the
most sense to look at the incidence rate and the complications due to chronic
illness when measuring the health of the nation. Many chronic health conditions
are acquired over time-based on a litany of conditions and lifestyle factors that are
affected by social determinants. One of these illnesses is T2DM which is the
fourth most common chronic illness. According to the CDC, about one in ten
adults have it, and that figure is projected to rise to one in five by 2050.\textsuperscript{76} This is

\textsuperscript{73} Fung, Brian. “Chart: What Killed Us, Then and Now.” The Atlantic, Atlantic

\textsuperscript{74} “Health and Economic Costs of Chronic Disease | CDC.” Centers for Disease
Control and Prevention, Centers for Disease Control and Prevention, 11 Feb.

\textsuperscript{75} “National Health Expenditures 2017 Highlights.” CMS.Gov, Center for

\textsuperscript{76} “New CDC Report: More than 100 Million Americans Have Diabetes or
Prediabetes | CDC Online Newsroom | CDC.” Centers for Disease Control and
Prevention, Centers for Disease Control and Prevention, 18 July 2017,
already having negative health effects on the nation as in 2018 the death rate in
the U.S. rose for the third straight year.\textsuperscript{77} This is the first time this has happened
since the Spanish flu pandemic in 1916-1918. Diabetes’ contribution to this rise in
death rates in the U.S. isn’t insignificant as diabetes has been one of the top ten
causes of death in the last three years. The top ten causes of death which include
other chronic conditions like heart disease and kidney disease accounted for 74%
of all deaths in 2017.\textsuperscript{78} In addition, its negative effects take place over the
long-term. As a result, an individual's ability to maintain the proper medical care
and lifestyle determines one’s long-term prognosis. If one is not able to manage
T2DM then one can suffer one of the numerous complications which include
blindness, amputations, end-stage renal disease, and early death.\textsuperscript{79} For one to
properly manage this illness one must have the financial resources necessary to
obtain the necessary checkups and medications. For one to avoid such
complications, it is also important that one makes the necessary lifestyle
modifications. One’s lifestyle and environment also impact one’s risk of being a
type II diabetic in the first place. A study conducted by Stringhini et al. describes

\textsuperscript{77} Stobbe, Mike. “U.S. Life Expectancy Will Likely Decline For Third Straight


how socioeconomics differences make a difference in T2DM incidence.\textsuperscript{80}

Stringhini et al. found that differences in socioeconomic class explain 45% of the difference in unhealthy behaviors and body mass index explain 45% that leads to T2DM. About 50% of the effects remained unexplained, although psychosocial stressors might account for some of it.

\textbf{Unemployment Insurance}

Researchers\textsuperscript{81} have looked extensively at the effects of the SDH on population\textsuperscript{82} health. In addition, studies have shown that policies that supplement the safety net in general and bolster investments in public health can address these determinants and improve health outcomes. In the 1920s and early 1930s, some businesses voluntarily created unemployment insurance programs to help their workers get through the rough parts of the economic cycle. There was intense

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debate over whether and how the U.S. could institutionalize such a program on a national level. Wisconsin was the first state to implement such a program in 1932 and this model established the employer as a valuable partner in maximizing aggregate employment as the state would adjust the payroll tax based on how much unemployment a specific employer was responsible for.\textsuperscript{83}

Unemployment insurance has existed for decades, but there has not been a concerted effort to study how it may affect health outcomes. The joint federal-state unemployment insurance program was created under the Social Security Act of 1935 to provide temporary wage supplements for workers who are unemployed through no fault of their own, as determined by state law. Eligibility, benefit amount, and the amount of time one can receive unemployment insurance is set in large part by state law with some federal guidelines. Benefits for unemployment insurance are normally based on a percentage of the salary of an individual who was recently unemployed. It tends to go by the salary one earned in the most recent 52 weeks up to a certain state limit. In 1938 about $\frac{2}{3}$ of wage and salary employees were covered by unemployment insurance and by 1985 it was up to about 96% of such employees. This expansion was driven primarily by expanding the pool of workers eligible for such benefits, which in turn was paid for by expanding the number of firms that would have to pay the payroll tax and the sectors in which workers were eligible for unemployment insurance. Another

change in unemployment insurance is the time period of eligibility; when it was first enacted, eligibility was at about 16 weeks or less and now it is almost uniformly at about 26 weeks. However, there is some state policy variance as some states, primarily in the Southeast and Midwest, are below 26 weeks, and some are above 26 weeks. This difference in standard unemployment insurance structure could offer some state-level variation in health outcomes driven by this time difference of eligibility. Another major change to unemployment insurance is how unemployment insurance benefits became subject to income taxes in 1978.

In modern times unemployment insurance is a key social policy intervention used by policymakers to boost wellbeing in times of recession. As recently as 2012, during the debates over a possible fiscal cliff, a situation in which federal spending would have been substantially cut and tax rates would have sharply risen possibly sending the then weak U.S. economy into another recession. The issue of extending unemployment insurance benefits to two million U.S. citizens was front and center. The fact that, according to the Center for Poverty Research at the

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University of California, Davis, unemployment insurance helped lower the rate of childhood poverty during the last great recession shows the continuing importance of unemployment insurance policy and the effect it can have on lives.

Furthermore, Walter, Glymour, and Avendano examined the connection between the maximum unemployment insurance check amount on a state by state basis and the incidence of cardiovascular disease.\(^88\) They found that states with more generous unemployment insurance policies had lower rates of cardiovascular disease: a 1% increase in benefits was associated with an 18% decrease in cardiovascular disease. These effects remained even after taking regional variation into account. However, they disappeared after adjusting for state-level characteristics. This could be due to numerous confounding variables related to social welfare. It also could suggest that in the short term there is no association between the unemployment insurance policy and health outcomes. However, there has not been any research comparing how differences in unemployment insurance affect health outcomes in states. With my research focus, I aimed to see how the ceiling, floor, and time eligibility on unemployment insurance benefits affected chronic disease incidence and outcomes. This

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prompted me to investigate how unemployment insurance policy variation in different states led to a state-by-state variation in health outcomes. I chose T2DM due to its prevalence and its long-term physiological development. To check variation in diabetes, I looked at its incidence and long-term complications. The long-term complication that I focus on is ESRD.

Type II Diabetes

T2DM is an illness in which the body doesn’t properly use the hormone insulin, which is necessary for cells to use blood glucose as fuel. Unlike in type I diabetes, where the body fails to make insulin at all, in T2DM the body is making insulin but the cells are not able to respond to it and take up glucose from the blood. As a result, blood sugar levels in the body run at a higher level than normal, a condition called hyperglycemia. The body tries to overcompensate by producing more insulin but its capacity to do so is overwhelmed so the beta cells of the pancreas can get burned out. This condition tends to occur in older individuals and can be a result of a sedentary lifestyle, obesity, and poor diet. Genetics are also thought to play a role. T2DM is something that can develop over the years and in fact, some patients can have it for years and not know. It normally starts off with prediabetes in which fasting blood sugar levels are between 100-123. When these fasting blood sugar levels go above 126 then one

would be diagnosed with T2DM. If one is afflicted with T2DM and doesn’t get the disease under control one can suffer from nerve damage, ESRD, blindness, infection, limb amputations, and stroke. As of 2015, about 30 million Americans suffered from T2DM and about ⅓ of Americans have T2DM or prediabetes. Prediabetes is a condition in which one has elevated fasting blood sugar levels that haven’t quite crossed the threshold for one to diagnosed with T2DM. In the U.S. alone in the year 2012, T2DM cost the healthcare system about $245 billion. Individuals suffering from T2DM deal with medical costs that are 2.3 times higher than what they would in the absence of T2DM. These costs as a whole account for more than ⅕ of U.S. healthcare costs. This progression that leads to the development and the long-term complications from T2DM is determined by long-term health factors. These long-term health factors are affected by the SDH that affected one’s health in the long-term. This is because one’s ability to make

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92 “Economic Costs of Diabetes in the U.S. in 2012.” Diabetes Care, American Diabetes Association, 1 Apr. 2013, care.diabetesjournals.org/content/36/4/1033.

lifestyle changes to avoid the illness or prevent complications is rooted in many social factors.

**End Stage Renal Disease**

ESRD is an illness characterized by kidneys that are no longer able to function well enough to meet the body’s needs.\(^9^4\) Kidneys normally function to excrete wastes and excess fluid from one’s body; however, when one has ESRD, the kidneys only function at 10-15% of their capacity, causing fluid buildup and chemical imbalances in the body. Without a kidney transplant or dialysis, there is a strong risk of death.\(^9^5\) Uncontrolled T2DM can result in ESRD and anyone who has this illness is eligible for Medicare even if they don’t meet the usual age or disability qualifications.\(^9^6\) This has huge implications as it allows those who have ESRD to get a payer source for medical care that is of higher quality. This is because Medicare reimburses physicians more than Medicaid and has a greater available market so the pool of physicians one available to an ESRD patient is


greater. The available physician pool is effectively expanded because many physicians that accept Medicare don’t accept Medicaid and those who have ESRD and would be eligible for Medicaid but not Medicare are now able to get insurance to pay for their treatments. This is very important to consider as death due to T2DM via ESRD is less likely to be due to limited access to medical care but more likely to be due to other social and economic factors outside of the hospital. One of these factors is related to income security which is affected by the generosity of unemployment insurance at the state level.

Chapter 3

The Research Design

To build on the extensive literature related to the SDH, my thesis project takes a more focused lens by examining the connection between unemployment insurance policy at the state level and the incidence of and long-term complications due to T2DM. First, I crafted my testable hypothesis and collected data, then I created a mixed method, nested-analysis research design to carry out my test.

For the quantitative aspect of my project, I conducted regressions using a large-N OLS estimation technique to show the connection between unemployment insurance policy generosity and T2DM incidence and outcomes. I made nine regressions that modeled these relationships. The independent variables in my quantitative piece were used to exemplify varying levels of unemployment insurance generosity. The chart in appendix A displays state-level variation in unemployment policy for the year 2000 in order to give an example of how unemployment generosity differs state by state. The three independent variables that I used were (a) the average minimum weekly unemployment
insurance check amount, (b) the average maximum weekly unemployment insurance check amount, and (c) the maximum number of weeks that one can claim unemployment insurance benefits. The dependent variables in my quantitative piece were used to show T2DM incidence and outcomes. The three dependent variables that I used were (a) incidence of T2DM, (b) occurrences of ESRD due to T2DM, and (c) deaths due to T2DM. I created a total of nine regressions to chart the relationship between each independent and dependent variable. I took the average of each metric that measures the independent variables for the years 2000-2009. For two of the dependent variables, the incidence of T2DM and ESRD due to T2DM, I took the average of these metrics from the years 2000-2009. However, with regards to death due to T2DM, I only used the year 2005, because that is the only year in which publicly available statistics were available from 2000-2009. Some states didn’t have available numbers for each metric in each year so I took the average from years that the numbers are available for that particular state.

When I collected the incidence of T2DM in each state I looked at how many new cases of T2DM occurred in each state every year from 2000-2009 in which statistics were available. The numbers that I collected for patients that were diagnosed with T2DM were in units of thousands of adults aged 18-76. For the incidence of ESRD due to T2DM, I counted each new case of ESRD that

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98 “U.S. Diabetes Surveillance System.” Centers for Disease Control and Prevention, Centers for Disease Control and Prevention, gis.cdc.gov/grasp/diabetesdiabetes atlass.html#.
occurred in each state in every year from 2000-2009 for which statistics were available.\footnote{"U.S. Diabetes Surveillance System." Centers for Disease Control and Prevention, Centers for Disease Control and Prevention, gis.cdc.gov/grasp/diabetesdiabetes atlass.html#.} These numbers that I collected for those with ESRD were age-adjusted rates per 100,000 people above the age of 18. I used the CDC data that has an upper limit and a lower limit for each state. I took the average of this upper and lower limit when I calculated the value for ESRD per 100,000 people in each state. For these values of ESRD, I specifically limited it to those who suffered from ESRD due to T2DM. To calculate the number of deaths due to T2DM, I used the number of deaths per 100,000 people which was taken from the CDC database.\footnote{"National Center for Health Statistics." Centers for Disease Control and Prevention, Centers for Disease Control and Prevention, 9 Jan. 2019, www.cdc.gov/nchs/pressroom/sosmap/diabetes_mortality/diabetes.htm.}

For the qualitative aspect of my research, I had originally planned to use comparative case studies between different states. However, due to issues contacting individuals in specific states, which I will detail later on, I was not able to compare between states in my qualitative analysis. I was restrained in conducting patient interviews in one state.

I tried to reach out to physicians in states that exemplified a relationship between state policies and health outcomes. These states include Massachusetts, Oregon, Hawaii, and Mississippi. Due to a low response rate, I wasn’t able to
interview patients with T2DM in these specific states. I then conducted all of my patients' interviews at a primary care clinic in Wilmington, North Carolina. All of these patient interviews were with patients with T2DM who either have or were currently receiving unemployment benefits, to survey and interview. To interview physicians, I resorted to my personal network of mentors and a list of physicians that I have met in the past in order to create snowball samples of physicians to take part in my survey and interviews. This proved to help me to obtain survey responses and to successfully obtain interviews from physicians. I also reached out to different networks that I am a part of to try and find physicians that would like to participate in my survey and interview.

Tapping into my network allowed me to target physicians who work in healthcare organizations in different geographic settings. Targeting physicians in different geographic settings allowed me to control for differences in the proximity of patients to medical facilities and for access to fresh foods that are prevalent in many states. To interview patients with T2DM, I went to a primary care medical practice and obtained consent from patients, fitting the previously specified profile, to interview them. These interviews allowed me to test my possible causal mechanisms, in which my independent variable affects medical appointment adherence, lifestyle quality, prescription adherence, and stress levels. I hypothesized that these four factors on their own could lead to greater incidence of T2DM. In addition, I hypothesized that those who already have T2DM would have less control of their illness, as indicated by fasting glucose level and A1C
levels, which would lead to more long-term complications. I used my interviews to test this causal mechanism and to see which of the four factors in the second step of my causal mechanism is most relevant and how these factors are affected by income security.

Due to the fact that there were many moderator variables that are difficult to account for, I used open-ended interviews and surveys to test my hypothesized causal mechanisms and to answer my central question. The open-ended interview style that I employed was very useful in explaining my hypothesis but also accounting for how my proposed hypotheses may interact with each other and how other moderating variables affect my study.

For the interviews with the patients, I employed two sets of questions that contain a mix of open and closed-ended questions. These questions can be found in Appendix B. I used a single set of open and closed-ended questions for my interview with physicians. These questions can also be found in Appendix D of my thesis.

To complement my interviews, I surveyed patients with T2DM and physicians. I used these surveys with the patients and physicians to account for moderating variables and to directly compare the way in which physicians and the patients themselves understand the social determinants of health and how they view their respective efforts to prevent and manage T2DM. These surveys can be found in Appendices C and E respectively.
These qualitative methods were used to supplement my quantitative study that explains the correlation between a state's unemployment insurance policies and their health outcomes. I used them to create a qualitative chapter to add some explanation to my quantitative results and to show the possible impact unemployment policy can have on the SDH. However, in my next chapter, I describe the quantitative connection I found between state unemployment insurance policies and health outcomes.

Overall, I utilized four possible causal mechanisms to connect my independent and dependent variables. In my first possible causal mechanism, the independent variable affects medical appointment adherence, which affects the incidence of T2DM and the complication rate due to T2DM amongst patients with the illness. Income insecurity affects medical appointment adherence in two ways, First, if one has less income security, one will spend time that one should be going to one’s medical checkups trying to find a job. In addition, if one has less income security, one will be reluctant to spend extra money on medical co-pays. In my second proposed causal mechanism, the independent variable affects lifestyle, which affects the incidence of T2DM and the complication rate due to T2DM amongst patients with the illness. Income insecurity can negatively affect diet quality, as the less extra income, one has, the lower the quality of foods one will buy because of the cheaper costs. In my third proposed causal mechanism, the independent variable can affect prescription adherence, which affects the incidence of T2DM and the complication rate due to T2DM amongst patients with
the illness. Income insecurity can lead to less adherence to prescription schedule because if one cannot afford to buy their prescriptions on their limited income, and may instead choose to buy food and other necessities. However, this can also be influenced by lagging medical appointment attendance which I tested for in my interviews. In my final proposed causal mechanism, my independent variable affects stress levels, which affects the incidence of T2DM and the complication rate due to T2DM amongst patients with the illness. For example, income security can increase one’s stress levels due to fear of losing housing and other necessities. However, there are other factors outside of the variables that I tested for that can cause stress. In fact, all of my proposed causal mechanisms contain factors that I cannot account for which I accounted for in my interview style.
Chapter 4

Unemployment Insurance and T2DM: The Relationship

In this chapter, I detailed the connection between the economic security aspect of the SDH and health outcomes. I did this by using three independent variables that are related to the unemployment insurance policy and connecting them to three dependent variables related to T2DM incidence and outcome. I did a state-by-state comparison on these policies for the years 2000-2009 as this enabled me to avoid moderator variables like welfare reform\textsuperscript{101} in the 1990s and the Affordable Care Act\textsuperscript{102} in 2010.

The three independent variables I used are maximum weekly unemployment benefits one can obtain, the minimum weekly unemployment benefits one can obtain, and the longest number of weeks one can obtain unemployment insurance. The three dependent variables I connected with these independent variables are the average incidence of T2DM from 2000-2009, long-term complications due to T2DM, and death rate due to T2DM. For the


long-term complications due to T2DM, I used end-stage renal disease as the measurement proxy. For the death, due to T2DM, I was only able to obtain data from 2005 so this is the only year that I used for it.

For this quantitative aspect of my project, I charted OLS regressions showing the connection between unemployment insurance policy generosity and T2DM incidence and outcomes. I made nine total regressions that modeled these relationships. The independent variables in my quantitative piece were used to show unemployment insurance generosity. The three independent variables that I used were the minimum weekly unemployment insurance check amount, the maximum weekly unemployment insurance check amount, and the maximum number of weeks that one can claim unemployment insurance benefits. The dependent variables in my quantitative piece were used to show T2DM incidence and outcomes. The three dependent variables that I used were the incidence of T2DM, the incidence of ESRD due to T2DM, and deaths due to T2DM. I created a total of nine regressions to chart the relationship between each independent and dependent variable. I employed specific data collection methods in order to construct these OLS regressions. One can find more details over how I collected this data in my previous methods chapter.

Before I obtained data, using my knowledge on the SDH literature, I made a general prediction on what I would find in my quantitative chapter. I predicted that there would be a connection between state policies and health outcomes. I predicted that this would manifest itself in terms of a statistically significant
relationship between the independent variables related to unemployment insurance and the dependent variables related to T2DM incidence and outcome. In addition, I predicted that there would be a statistically significant negative correlation between all three independent variables and the dependent variables.

If my hypothesis had turned out to be completely true I would have found a strong, negative correlation between the three independent variables and the three dependent variables. In other words, I would have found that the more generous unemployment insurance benefits were, based on the metrics that I measured, the lower the incidence of T2DM and the medicated complications related to T2DM. However, my quantitative analysis validated some but not all of my hypothesis.

**Empirical Analysis and Results**

One of the regressions that had significant results \((p = 0.03)\) was the regression that relates the average minimum weekly check for unemployment insurance and the average rate of ESRD from 2000-2009. This meant that changes in the average minimum unemployment insurance check amount were associated with changes in the average incidence of ESRD due to T2DM from 2000-2009. In this relationship, I found that the higher the minimum amount of weekly unemployment insurance, the lower the incidence of ESRD.

In this regression, I saw that the average incidence of ESRD due to T2DM was 246.1703 thousand per state across the country. For each dollar
increase in the average minimum weekly unemployment insurance benefits, there was a decrease in ESRD due to T2DM of .5036 thousand people. The T value for the slope is -2.224. Since the Pr(>|t|): is less than five percent, it is unlikely that the relationship between the variables is due to chance. According to the multiple R-squared calculations, 9.166% of the variance in T2DM incidence rates can be explained by the average maximum weekly benefit. This figure is 7.312% when using the adjusted R-squared indicator.\textsuperscript{103} The F statistic was greater than one (4.945 on 1) which is a good indicator that there was a relationship between the explanatory and response variable.

\textsuperscript{103} The adjusted R-squared indicator adjusts for the number of variables in the regression model.
While my data may have shown a statistically significant relationship, the relationship is not exact by any means. For example, the decrease in ESRD due to T2DM, for each extra dollar in the minimum weekly unemployment insurance check can vary by .2265 thousand people. In addition, the actual incidence of ESRD due to T2DM can differ from the true regression line by approximately 51.21 thousand people, on average. Any prediction for the decrease in ESRD for each dollar increase to the minimum weekly unemployment insurance check amount will be off by about 20.82% for the decrease in ESRD. For the data set as a whole, the distribution of the residuals is asymmetrical. This is because the minimum residual is -87.136, the 1Q residual is -27.948, the median residual is -8.848, the 3Q residual is 14.658, and the maximum residual is 197.3.

The second regression that had significant results (p = .03) is the regression that connects the rate average maximum unemployment benefit weekly check in a state from 2000-2009 and the death rate due to T2DM in the year 2005.

104 Independent Variables:
Average Maximum weekly benefit (AMB) = Maximum Average weekly unemployment check amount (2000-2009) (Dollars)
Average Minimum weekly benefit (AWB) = Minimum Average weekly unemployment check amount (2000-2009) (Dollars)
Average Maximum Time Eligibility (AMT) = Maximum Average unemployment check eligibility period (2000-2009) (Dollars)
Dependent Variables:
Average Diabetes Incidence (AIR) = Average incidence of T2DM (thousands of adults aged 18-76) (2000-2009)
End Stage Renal Disease (ARD) = Average incidence of ESRD due to T2DM (age-adjusted rates per 100,000 people above the age of 18) (2000-2009)
Death Rate in 2005 (D05) = number of deaths per 100,000 people (2005)
I found that the higher the average weekly maximum unemployment benefit in a state from 2000-2009, the lower the death rate in 2005. This meant that changes in the average maximum unemployment insurance check amount were associated with changes in the death rate due to T2DM in 2005.

This regression model showed that the average death rate due to T2DM is 30.112968 thousand per state. For each dollar increase in the average maximum weekly unemployment insurance benefits, there was a decrease in T2DM death of .013467 thousand people. The T value for the slope is -2.154. The Pr(>|t|) is less than 5% so it is unlikely that the relationship between the variables is due to chance. According to the Multiple R-squared calculations, 8.813% of the variance in T2DM incidence rates can be explained by the average maximum weekly benefit. This figure is 6.914% when using the adjusted R-squared indicator. In addition, the F statistic was larger than one (4.639 on 1) which is a good indicator
that there is a relationship between the explanatory and response variable.

Figure 2: Relationship between AMT and D05

First, the relationship modeled by this data set contains residuals that are roughly symmetric. This is because the minimum residual is -10.53, the 1Q residual is -3.10, the median residual is .05, the 3Q residual 1.94, and the maximum residual is 12.04. The decrease in the T2DM death rate for each dollar increase in the average maximum weekly unemployment benefit differs from the true regression line by approximately 4.402 thousand people, on average. It should be noted that when calculating the residual standard error that one
observation was deleted due to missingness. Any predicted decrease in death due to T2DM due to a dollar increase in the average maximum weekly benefit will be off by about 14.61%. In addition, the decrease in T2DM death rate varied by .0006253 thousand people.

Now there were seven other relationships related to the unemployment insurance policy and diabetes incidence and outcomes that were not statistically significant. However, in order to understand how state unemployment insurance policy affects health outcomes, it is important to look at these outcomes as they offer insight into the aspects of unemployment insurance that either doesn’t have an impact on health outcomes or that need further study to determine how they affect health outcomes. It is important to note that since the results of the following studies were not statistically significant, one can’t draw conclusions with regards to what direction the independent variables move the dependent variables.

The relationship between the average maximum weekly benefit amount for unemployment insurance in each state from 2000-2009 and the average incidence of T2DM from 2000-2009 was not a statistically significant relationship. There also wasn’t a statistically significant relationship between the average maximum weekly benefit amount for unemployment insurance in each state from 2000-2009 and the average incidence of ESRD from 2000-2009 due to type to T2DM. The relationship between the average minimum weekly benefit amount for unemployment insurance in each state from 2000-2009 and the
average incidence of T2DM from 2000-2009 was not a statistically significant relationship. There also wasn’t a statistically significant relationship between the average minimum weekly benefit amount for unemployment insurance in each state from 2000-2009 and death due to type to T2DM in 2005. In addition, there was not a statistically significant relationship between the average maximum time eligibility for unemployment insurance and the three dependent variables. The statistical output for all of the regressions without statistically significant results are below and the regressions can be found in Appendix F.

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Overall, the statistically significant results indicated that both the average maximum weekly check amount for unemployment insurance and the minimum weekly check amount for unemployment insurance have an effect on T2DM outcomes. One can see that the maximum weekly check amount for unemployment insurance had an effect on the deaths due to T2DM in 2005 and that the minimum weekly unemployment check amount had an effect on the average incidence of ESRD due to T2DM from 2000-2009.

With regards to the effects of the maximum weekly check amount for unemployment on the deaths due to T2DM in 2005, it is clear that the higher the maximum weekly check amount in each state the lower the death rate due to T2DM. On the higher end, Massachusetts had the highest maximum weekly check amount from 2000-2009 which was close to about $800. On the lower end of the spectrum is a cluster of states including Mississippi, Alabama, and Arizona which gave a maximum weekly check of about $200 to its unemployed citizens. One can see that in the year 2005, Boston had a death rate below the national average for deaths due to T2DM. However, among the states with the lowest amounts of maximum weekly unemployment insurance, all three also fall below the average death rate due to T2DM in 2005. Alabama comes the closest to hitting
it falling just below 30 thousand deaths for the year. The state with the highest
deaths due to T2DM in 2005 is Louisiana. The state didn’t have the lowest
weekly check amount, however, the weekly check among was clearly beneath the
average maximum weekly check amount from 2000-2009 and was in the lower
fourth of average maximum weekly check amount. In addition to this, 6/7 of the
states with death rate due to T2DM in 2005 above the national average had
maximum weekly check amounts below $400. Also, % of states with deaths due to
T2DM in 2005 that were below 20,000 had maximum unemployment insurance
weekly benefit greater than $400. This shows that the maximum weekly
unemployment insurance check amount has a clear noticeable effect on death due
to T2DM in 2005. There are a few outliers in the graph as Nevada has the second
lowest number of deaths due to T2DM in 2005 even though the average
maximum weekly unemployment insurance check amount is less than $400.

Overall, the results of this regression show that the stronger an economic
safety net that diabetic patients can be given by a patient the greater ability that it
can give patients with T2DM to take care of themselves and avoid mortality. Now
when looking at death due to T2DM one is looking at deaths between the ages of
18 and 76. This is a wide age range so it is hard to know where exactly these
patients with T2DM were in their development with T2DM. One can’t know if it
was death that was driven by a long-term inability to make lifestyle changes or a
short term inability to obtain necessary medication or even insulin. This will be an
aspect that I attempt to address in the qualitative chapter of my thesis project.
However, I do think that the connection of the minimum unemployment insurance amount to the average occurrence of ESRD due to T2DM from 2000-2009 can offer some complementary insight to the understanding of how social policy can affect chronic illness management.

With regards to the effects of average minimum weekly check amount for unemployment insurance had an effect on the average incidence of ESRD due to T2DM from 2000-2009, it is clear that the higher the minimum check amount in each state the lower the incidence of ESRD due to T2DM. Here we see that Oregon has the lowest minimum weekly check for unemployment insurance at above $200 dollars a week. On the other end of the distribution, Hawaii has the lowest amount for the minimum weekly check amount for unemployment insurance followed very closely by Louisiana as both are under $25. We saw that for this time period that Oregon had an average incidence rate of ESRD that was well below the average of 246.1703 thousand per state per year. Both Louisiana and Hawaii have incidence rates of ESRD due to T2DM that are well above the averages for the states per year. One can also see that all states that have an average minimum unemployment insurance weekly check above $75 have incidence rates of ESRD due to T2DM below the average. At the lower end of the minimum weekly check, distribution is more of a mixed story, there are numerous states with a weekly minimum check below the $50 mark that have rates of ESRD due to T2DM below yearly the average. Many states have rates of ESRD that hover between 200,000 and 250,000 per year; this is especially true of states that
offer a weekly minimum check amount between $25 and $50 a week for their unemployed citizens. However, states that do offer less than $25 a week in the weekly minimum unemployment insurance benefits had considerably higher rates of ESRD due to T2DM than states that offered between $25 and $50 in the minimum weekly unemployment insurance benefits. A notable outlier in the results is Wyoming which has the lowest rates of ESRD due to T2DM and yet has a minimum weekly check less than $25. This could be due to the lower cost of living in Wyoming which would make the unemployment insurance checks go further in Wyoming than in other states. It also could be due to the demographics of Wyoming which results in fewer cases of T2DM and thus complications due to it.

Overall, it is clear that the minimum weekly check amount of unemployment insurance has an impact on complications due to T2DM. I think it many ways this shows the importance of the level at which an income floor is set through unemployment insurance. This floor, assuming it is all an unemployed person has access to income-wise, is an indicator of the cash that individual would have to take care of his or her own basic needs. This figure is important for patients with T2DM that live on the economic fringes as it represents all the available income for food and medication. The size of this income affects the ability for the patient to obtain necessary foods to sustain oneself and it would also affect the type of foods the patient can afford. In addition to this, it would affect if the patient can afford necessary medications. Now, this doesn’t tell the
whole story as access to insurance and the generosity of other social policies play a part in these results. However, income does make a difference in the T2DM outcome. This measure supports my previous measure on how the maximum weekly unemployment insurance amount affected death due to diabetes in 2005. This is because if ESRD is not adequately attended to it can be part of a causal mechanism that leads to death due to T2DM. The interesting part is that in such a causal mechanism the input factor leading to ESRD that is more important is the minimum weekly check amount. For the input variables leading to death due to T2DM, the maximum weekly check amount is a more important explanatory factor. It will be interesting to draw out the causal mechanism as I drive into my interviews and surveys.

In conclusion, it clear that unemployment insurance policies have a numerical impact on long-term complications due to T2DM. This is evident in both how unemployment insurance generosity levels at the low and high ends affected ESRD rates due to T2DM and death rates due to T2DM, respectively. However, I can also conclude that unemployment insurance policies don’t have a statistically significant impact on the incidence of T2DM. This would lead me to conclude that unemployment insurance policies mainly affect health outcomes for patients with T2DM by the ways in which they affect how one is able to manage and deal with their T2DM. However, many of my relationships that relate unemployment insurance generosity and T2DM incidence and outcomes didn’t have statistically significant results. This indicated to me that while
unemployment insurance policies affect how one would be able to manage and deal with T2DM, it is crucial to listen to one-on-one narratives of how exactly this effect manifests itself. This will allow me to see how levels of income security affect one’s ability to manage T2DM. Ideally, it will also allow me to see how other factors related to socioeconomic status and social policies affect one’s ability to manage T2DM. These factors are important to consider as some could play an equal or even larger role than unemployment insurance generosity in determining T2DM outcomes. Some of these factors will even help provide me insight into how exactly unemployment insurance policies tend to have an impact on T2DM outcomes. These factors could also help provide me the missing piece to my study that could explain why unemployment insurance policies that I measured didn’t have a statistically significant impact on T2DM incidence. Having this clearer picture will allow me to do a much better job of drawing conclusions of unemployment insurance policies affect type II diabetic outcomes. This insight drove me to use my interviews and surveys to try and look for other social and economic factors rooted in other public policies or even private social factor that impact health outcomes for those who are income insecure.
Chapter 5

Patients and Physicians: An up-close Insight

I observed statistically significant correlations between the minimum weekly unemployment insurance check amount and the incidence of end-stage renal disease due to T2DM, as well as the maximum weekly unemployment insurance check amount and deaths due to T2DM in 2005. Now, I provide some context for these results through the interviews I conducted with patients with T2DM, as well as physicians who have treated patients with T2DM.

I conducted in-person interviews with seven patients with T2DM who are or have been unemployed. These interviews took place in Wilmington, North Carolina. In contrast, I conducted three phone interviews with physicians located in different states. The purpose of these interviews was to trace the causal mechanism of how varying levels of unemployment insurance generosity can affect one's ability to make the lifestyle choices that prevent T2DM. I also wanted to see how unemployment insurance generosity affects prescription and medical appointment adherence, as well as stress levels. In the broader sense, these interviews gave me a direct insight into the way income security affects one's ability to avoid or manage chronic illness. In addition to this, the interviews gave me a greater context into how other social factors and policies that interact with these social factors can impact health outcomes.

The two sets of interview questions that I asked patients with T2DM served two distinct purposes. The first set of questions served to directly probe at
how unemployment insurance benefits and the income security that it impacts can affect health. The second set of questions served to help me understand how other social factors related to health affect patients’ experience in the prevention and management of chronic illness. I wanted to see how and to what extent these social factors affect how patients are able to deal with chronic health issues. I also wanted to see how these other variables interact with the variable of income insecurity to affect health outcomes. As previously mentioned, these questions can also be found in Appendix B of my thesis project.

After the interview, I gave the patients a quick survey with five yes/no questions to gain an understanding of how these patients feel about the SDH and their ability to access helpful resources. These survey questions can be found in Appendix C.

In addition to this, I asked three physicians one set of questions to gain their insight on what factors, outside of the clinic, affect their patients’ health. I also wanted to obtain their insight on patient compliance and self-sufficiency. The interview questions can be found in Appendix D of this project.

In addition to these interviews, I sent a yes/no email survey to physicians in order to probe further into how social/policy issues affect their patients’ health. These questions mirrored the same survey questions that I gave the patients because I wanted to compare and contrast how physicians and patients viewed these issues, particularly in regards to patient adherence and agency. The survey questions can be found in Appendix E of my project.
Patient perspective

Income and Health

The first set of questions that I asked the patients were related to income. This was in order to test different causal mechanisms that affect how individuals who are at risk of or have T2DM are able to address their health issues.

In response to the question of how one would spend an extra ten dollars of unemployment benefits, 71% of current or formerly unemployed patients with T2DM would spend more money on food. These patients described how extra money would enable them to consume a healthier diet. One patient gave a frank assessment of how having this extra ten dollars would allow him to eat more nutritious food "instead of PB&J." Another type II diabetic described how she would eat a "salad of some nature" due to the need to consume more vegetables but not too much fruit due to the sugar in it. This showed that patients would spend extra unemployment insurance money on healthier food. Since the question was related to how the patients would spend an extra ten dollars of unemployment, it seems likely that for each extra dollar that a state spends on unemployment insurance, the more an unemployed person is likely to spend extra money on more nutritious food. Patients also cited how they would spend the extra money on medicine, gas, cleaning supplies, and co-payments for medical appointments. When I asked patients how they set spending priorities as their
unemployment insurance money dwindled, most patients stated that they prioritized their resources on general household needs. 29% of patients that I interviewed prioritized paying bills as funds their weekly income declined. One patient described how she would “go out and get diabetic socks” and would buy something that she likes. This patient also prioritized tithing at her place of religious worship and purchasing items for the elderly in her church. This suggests that the patient maintained an ethos of philanthropy even when her unemployment benefits were running down. It could also suggest that she has good social supports that allow her to be more charitable as her income supports dwindle. One patient described how any extra money goes to “necessities to stay above water” in addition to gas and transportation. One patient stated that as his benefits dwindle, all priorities are put on hold and the focus is on bills and “maintaining the household.” The patient noted that he suffered negative health effects when he didn’t prioritize medication due to being low on cash.

Furthermore, the patient articulated how this was especially harmful when he lacked insurance because this made medical appointments and prescription drugs too expensive. This is because a patient that doesn’t have health insurance must pay the full list price for a prescription rather than a discounted co-pay. This patient cited how his first bout with vision issues was due to not having medicine. He gingerly cited how winding up in the ER allowed him to obtain the medicine that he needed. This episode exemplified how a lack of funds, paired with a lack of health insurance, can be detrimental to one’s health. This story showed that a
lack of insurance was a crucial reason why the patient ended up in the ER with vision issues.

Furthermore, it is clear that the amount of money that patients received for their unemployment insurance benefits affected how they were able to address their health issues. For example, 71% of the patients interviewed stated that the amount of money that they receive through their unemployment insurance benefits affects how they are able to address their health issues. The patients that receive Medicaid, an insurance program that provides insurance to those who are disabled or low-income adults, felt that income insecurity was less of a hindrance to their ability to address their health issues. In these cases, access to free medical care and highly subsidized medication seemed to make up for an unemployment insurance check that may not be enough to cover one’s necessary medical needs. However, there are some patients for whom the generosity of their unemployment insurance benefits affected their ability to address their health issues. One of these patients mentioned having difficulty with obtaining the necessary medications to manage her own illness. This same patient describes how the medications needed to manage T2DM can add up and be very expensive. Another patient described how “it will never be enough based on the cost of living.” This patient also described how in her mind the generic medicine is not the same as the name brand versions, so she is willing to pay more for the brand name medication. Another patient described how unemployment insurance doesn’t provide one with enough money to take care of one’s health as one must be on a “tight, tight budget.”
While most individuals whether they are unemployed or not must manage their individual budgets. However, since I was interviewing those who are or have been unemployed, they most likely don’t have as much of a safety net to rely on. As a result, it makes sense that these patients with T2DM would prioritize their day-to-day necessities over their long-term health. However, when I asked patients about if they neglected their health as their unemployment check eligibility period ended, only 29% of patients stated that they did. However, one of these patients also said that one “can’t have it both ways” as it was necessary to obtain “housing, gas in the tank, and medicine.” The contrast in the response to my question led me to assume that these patients do what they can to attend to their health with their limited funds. With the unfortunate reality being that patients are aware that they don’t have the resources to be as proactive as possible with their health. This led me to conclude that the patients were doing what they could to take care of their health; however, their income insecurity is what constrained their ability to live in accordance with best health practices. The patients clearly believe that income played a role in their ability to satisfy their basic needs as all interviewed patients described incoming income as being important in satisfying their basic needs. A few patients described how incoming income was important when it came to setting goals and in being able to make good decisions. It seemed like income played a huge role for many patients in terms of being able to pay for bills, housing, and other basic needs. In addition to this, patients also seemed to be less stressed when they had incoming income and
one patient described incoming income as being calming in the sense that one knows that they have “something that [one] can count on.” It was clear to me that having a steady stream of incoming income can help lower patient stress. This stress has its own effects on the patient's body and would affect the patient's ability to take actions to improve the patient’s health. One patient described how “without a good income you can’t make good decisions” which shows that one needs a steady income to live a healthy lifestyle. This patient also emphasized that good insurance is a necessity. This showed that when it came to obtaining healthcare resources that insurance access matters just as much as income. This makes a lot of sense as the amount of money one spends on healthcare whether it be seeing a physician or taking medication is dictated in large part on whether one has health insurance. Lack of insurance can make obtaining prescriptions and going to scheduled appointments cost prohibitive.

Overall, it is clear that one’s income level had a huge effect on one’s ability to take care of one’s health. Patients I interviewed seemed like they would spend extra unemployment insurance dollars on items either directly related to medical care or general health and wellness. In addition, the salience of housing costs and other bills were noteworthy as this confirmed what a lot of literature I referenced earlier about the SDH would suggest about how social factors related to housing, food access, and environment impacts one’s health.

Other Social Determinants of Health
In order to root out how other social factors affect patients’ health, I asked patients a second set of questions that were meant to account for how differences in income security led to different health outcomes. These questions were also supposed to provide insight into how other social determinants related to health could work with income security to affect health outcomes.

In response to my first question related to diet quality, all of the patients that I interviewed confirmed that their physicians advised them on the quality of their diets. This led me to make two conclusions. First, this exemplified that diet is an integral part of chronic disease control. This is huge as it implied that patients without adequate income security, may have worse health outcomes due to poor dietary and lifestyle habits. In addition, this also shows that some individuals who are income insecure but don’t suffer a high incidence of T2DM or suffer fewer complications due to T2DM may avoid such fate due to circumstances in which they have access to fresh, healthy foods. In response to a question on medication adherence, only 29% of patients indicated that they had recent trouble accessing their necessary medication. Most patients stated that they took their prescribed medications. However, it is clear that access to a source of insurance is a key factor in determining medication accessibility. One patient referenced how his trouble accessing medication was due to financial hardship and lack of contact with physicians. This is because when this individual was unemployed he lacked health insurance. This individual also cited a previous challenge with being “caught in line” as he made too much to qualify for
Medicaid yet his employer didn’t offer insurance. Another patient who had been adherent to her prescription needs cited that without Medicaid and, later on in her life, Medicare she wouldn’t have been able to afford her prescriptions. In this case, it was clear that access to a healthcare payer source had a bigger impact on the patient’s ability to afford her prescription medication. This is especially due to the structure of drug pricing in the U.S. that makes drugs much cheaper when one has health insurance. Access to health insurance is a moderating variable that could help explain why many relationships between variables related to unemployment insurance generosity and T2DM incidence and outcomes in the quantitative chapter weren’t statistically significant. This is because more generous unemployment benefits, wouldn’t necessarily give one enough financial resources to afford prescription drugs.

In addition, income insecurity can result in poor health outcomes by prohibiting individuals from accessing necessary medical attention. To test this theory, I asked patients if they have missed multiple appointments. If patients did, I inquired into their reasons for doing so. The patients had quite a mixed experience in this regards. 43% of patients stated that they don’t miss their appointments. 29% of patients stated that lack of transportation and ill feelings as prevented them from going to some scheduled appointments with their physician. One patient missed an appointment because he “puts his kids before himself” as he emphasized how his own father has to remind him to take care of himself. Patient’s adherence to medical appointments was about much more than income.
Factors like transportation and general health status seemed to make an impact. While income security dictated whether or not patient’s had access to transportation, access to public transportation also had an impact. It should be noted that I conducted these interviews in Wilmington, North Carolina which doesn’t have a robust public transit system. This may explain why transportation was a noted issue. In such a setting, lack of affordable public transit could compound issues of income insecurity to result in missed medical appointments. With regards to feeling ill, I believe that illness could have led to a positive feedback mechanism leading to more illness. A future researcher would gain better insight by analyzing a patient’s social situation at home. Social isolation could be a factor as a patient with a supportive family or community may be more likely to push through obstacles to see their physician.

When questioned, 71% of the patients stated that they have never had issues with housing insecurity. However, none of the patients reported having any current housing insecurity issues. One of the patients described how getting married put an end to her housing security woes as she and her husband work together to support each other. The other patient’s housing insecurity issues ended once he was no longer unemployed. Unemployment insurance generosity didn’t have much of an effect on the housing security of the patients that I interviewed.

As documented earlier, stress is a big social factor that affects health outcomes. As a result, I probed into the effects of income insecurity on stress levels in order test how stress due to finances can affect health outcomes. I asked
all the patients I interviewed what their sources of stress were. The sources of stress that were most common were related to family and income. In fact, 43% and 57% of the patients respectively cited income and family as stressors in their life. One can see that income insecurity itself leads to increased levels of stress for the patients. This meant that being on a limited income in and of itself was a health risk for the patients. Also, I would assume that the less generous a state’s unemployment insurance benefits are, the greater the amount of stress the unemployed and those at risk of being unemployed face due to finances. One patient, in particular, mentioned how “not being able to work anymore and make a bigger income” was a source of stress in and of itself. This led me to believe that financial stress may not be solely due to lack of money but may also be due to a lack of agency wrapped around the idea that one is not able to earn a larger living. In addition, the feeling of being trapped in a certain economic state may be a source of stress. Patients that experienced family stress often attributed such stress to traumatic experiences or worries about a distressed family member. One patient described the stress she experiences due to her husband who is a Vietnam veteran that suffers from PTSD. Another patient described the stress she experiences due to her two young sons who suffer from mental illness’ that require medication. These anecdotes confirmed that trauma involving a loved one over a prolonged period can increase one’s stress levels. This could be in large part due to the lifestyle adjustments that these patients had to make due to their familiar stressors. In addition, these family issues most likely exert a large emotional and financial
burden on these patients that are already dealing with financial constraints. Overall, the interviews made it clear that stress has a negative impact on one’s health. This negative health effect seemed to be very harmful with stressors that manifested themselves over a long period of time. If these individuals don’t have good coping strategies this stress could lead to long-term physiological damage to their bodies. For these patients with T2DM, this stress could lead to dire complications. It is clear that unemployment insurance generosity has an impact on the number of resources one has to address their chronic stressors. Policies that can help people better address their needs or at least feel in better control of their circumstances can lower stress levels and lead to better health outcomes.

My interviews with the patients gave me deep insight into the way income insecurity can affect patients lives. I gained an insight into what issues income insecurity can cause and exacerbate. In addition, I saw the time horizon through which these social factors can affect patients. For example, long-term issues related to illness in the family or income insecurity itself were the most causes of stress. Also, income insecurity and lack of health insurance were the biggest factors driving the lack of medication adherence and appointment absenteeism. In the community that I conducted interviews, housing insecurity didn’t have a big effect on health outcomes. On the other hand, despite not explicitly inquiring into transportation, I saw that a lack of transportation was an issue that could drive adverse health outcomes. This could be due to the fact that the city in which I interviewed patients was not urban. As a result, it made sense that housing costs
were less of an issue while transportation was more of an issue for patients. Also, I confirmed the importance of diet in dictating health outcomes. This is due to the fact that all of these patients were counseled by their physicians on diet quality. This led me to conclude that the decline in diet quality, that unemployment leads to can play a big part in driving adverse health outcomes. To supplement my findings on how social determinants affect patient health, I asked the patients a series of yes/no survey questions to gain an idea of how the patients feel about the resources they have access to other than unemployment insurance. I also wanted to gain an idea of their understanding of and thoughts on the SDH.

Figure 4: Patient Survey question on ability to address one’s own health (N=7)
Figure 5: Patient Survey Question on local resource adequacy (N=7)

Figure 6: Patient survey Question on SDH awareness (N=7)
The results of this survey while limited were indicative of a few things. First, the results showed that a majority of patients believe that income has an effect on their ability to take care of their health. This confirms the premise
underlying my thesis, which is that income security is an important social determinant that affects health outcomes. In addition, an overwhelming majority of patients felt like they live in an area with adequate resources to help deal with unemployment. This finding may have been skewed upwards, relative to the general population due to the fact that I interviewed patients who had some form of health insurance. The results could have been different if I interviewed patients at a community health center or in an urban setting with more poverty. In addition, it was interesting to observe that over 70% of interviewed patients are aware of what the SDH encompass. This shows that patients are aware that the decisions they make outside of visiting a doctor's office affect their health. It also showed that the information surrounding this issue is well known. However, not all patients who were aware of what the SDH agreed that it had an important impact on their health. However, over 70% of patients believed that they did all that they could to take care of their health. This could mean that some patients believe that making the best use of their resources involves doing what is necessary to get to the doctor's office without making lifestyle modification. Overall, it's clear that the patients I interviewed believe that social factors affect their health and that they do their best to lead healthy lifestyles.

Physician Perspectives

Limiting Factors on Patients
The first question I posed to the physicians was on what prevents their patients from adhering to their scheduled medical appointments. The factors that came up were financial in nature, as some physicians cited how patients have trouble affording their visits. Physicians cited how childcare costs and lack of transportation can keep patients away. Two of the physicians that I interviewed live in larger urban settings, so this seems to confirm that transportation issues can hurt patients in both urban and non-urban settings. However, physicians were unanimous in their view that many patients don’t value follow-up visits. Physicians felt like patients would only come in when they had an urgent medical problem. One doctor described how “Diabetes is [a] painless disease, [so] by the time they feel pain, it is too much.” This made a lot of sense in the fact that a patient who has T2DM may not sense any pain or disturbances until the complications of the illness set in. Another doctor summarized this point by citing how apathy and “social ignorance” prevent patients from seeing the importance of preventative medicine.

My second question was what factors prevent patients from obtaining their prescriptions? 67% of the physicians I interviewed pointed out cost as being the overwhelming reason why their patients fail to take their prescription drugs. The majority of physicians felt that a lack of prescription drug coverage made prescription drugs unaffordable for patients. One doctor noted that there are a few patients that can afford these drugs but have other priorities. Another doctor felt that patients don’t take their prescriptions because “many drugs we give don’t
make them feel better.” This take on the issue would suggest that a patient with limited income may make a value proposition on a drug based on how he/she feels. If the patient doesn’t feel better, then he/she may determine that it is not worth the cost based on his/her own experience. If a patient doesn’t think about the effects of an illness like T2DM, it makes sense that he/she may use how medication makes them feel like a proxy for how effective the medication is.

My third question was on what prevents patients from making necessary lifestyle modifications to address their chronic illnesses. Two physicians I interviewed seemed to view this primarily from a cultural standpoint. One doctor took note of how cultural practice sometimes rooted in ethnic beliefs or habits can make a difference. This same doctor noted how this is especially tough if one doesn’t have a support system. Another doctor points out that it would be tough for a patient with T2DM to make significant lifestyle changes if others in the home don’t make similar changes. Another doctor noted how these cultural issues are particularly problematic in the African American community. He described how “traditional southern fried- grease and lard diet are considered good eating but they bring you closer to [the] grave.” In the context, this really exemplified how diets prevalent in some racial and ethnic communities are not healthy in excess in the long term. This physician also cited how African Americans have a greater distrust of the medical system that stems from past discrimination in research, such as in the Tuskegee Air experiments. Another doctor pointed out that many patients don’t make these lifestyle changes due to “therapeutic
nihilism,” a condition that refers to the hopelessness with which patients view their condition. It would make sense that someone who doesn’t feel like their condition can improve will put less effort into getting better. I think this is especially something to consider for someone who faces income insecurity, considering the plethora of other seemingly insurmountable life obstacles that would come along with such a socioeconomic situation.

Overall, it is clear that in the eyes of physicians, the issues that limit their patients, while primarily related to income insecurity, in many ways can also be cultural and psychological. It seems that adhering to scheduled medical appointments and taking necessary prescriptions are issues related to income. However, with regards to lifestyle modifications, culture and the support systems in one’s environment can make a big impact. Culture and support systems are more closely tied to one’s class than one’s income level at a certain period in time. For individuals who are unemployed long-term or spend a lot of their lives working at or right above the poverty line, culture is an important factor to look at in regards to one’s likelihood to adopt healthy behaviors.

Views on Social Determinants

The next five questions I asked physicians were geared toward understanding how physicians feel about the SDH. Specifically, I asked physicians how they felt about the effects of a patient’s income on health, adherence to schedule medical appointments and lifestyle modifications, and use
of prescribed drugs. I also wanted to hear what physicians had to say about their patients’ access to resources to help them weather unemployment.

All three physicians that I interviewed agreed that income has a tangible effect on patients’ health. In fact, two physicians spoke about how patients often ration health resources due to their limited incomes. One doctor referenced how “people split pills” due to their limited income and oftentimes can’t seek a follow-up. One doctor felt that being low-income can lead to adverse health outcomes. This doctor pointed out that high-income people can over-utilize the health system, which can be just as dangerous as under-utilizing it. When pressed on if their communities have the necessary resources to help the unemployed, these physicians had very divergent perspectives. One of the physicians felt that his community has many resources to help the unemployed. He describes how Montgomery County, Maryland, where he lives, is one of the wealthiest in America and has numerous resources to help people obtain health care, food, and jobs. Another doctor who lives in Nevada felt that the answer wasn’t so clear, as it depends on “how you define resources.” He also explained that a population's access to resources is very time specific. For example, in the wake of the financial crises of the late 2000s, there were not enough resources in his community to help the unemployed.

Furthermore, the physicians that I interviewed pointed out how their patients’ income has a big effect on their ability to attend necessary appointments, obtain necessary prescriptions and to make necessary lifestyle modifications. The
physicians found that income, as well as access to a payer source and adequate transportation, affected the patient’s ability to attend medical appointments. One doctor cited how sometimes those who are the poorest and qualify for Medicaid “have more access than self-payers.” This seemed to suggest that those who are working class and fall above the threshold for Medicaid eligibility may have very low access to insurance. In addition, this doctor’s sentiment led me to think that states that expanded Medicaid under the expanded eligibility standards for Medicaid under the Affordable Care Act better enabled their low-income and working-class patients to access medical care. However, for patients with access to payer source issues like lack of transportation and affordable childcare can prevent patients from attending appointments. A doctor based in New York City described how expensive transportation causes patients in the Bronx to call 911 to get transportation to the hospital for insulin refills. Furthermore, the physicians all indicated that aspects of diet and nutrition are affected by one’s income level. The physicians had multiple reasons for this finding. First, geographic isolation could cut low-income individuals from access to fresh foods not available for purchase in certain neighborhoods. A doctor who lives in the Washington D.C. pointed out that many people who live in inner-city D.C. “get food from the corner store with fast food, candy, chips, and liquor” due to a lack of regular grocery stores. Another doctor cited how guidelines for healthy eating are just not practical for many poor people and suggested that these healthy eating guidelines would be better described as wealth guidelines. The physicians I interviewed also believe
that income plays a big part in preventing patients from obtaining necessary prescription drugs. These physicians see income insecurity and lack of a payer source as making prescriptions unaffordable for their patients. However, these physicians also share some skepticism over the motives of the pharmaceutical industry. One doctor felt that “gouging and greed” on behalf of pharmaceutical companies are making drugs too expensive. He cited how insulin had become more expensive even though it had cheaper to make his point clear. Another doctor felt that pharmaceutical companies “created [a] market to benefit drug companies not the end users” as he pointed out that these companies are driven to get patients on drugs and not to use evidence-based medicine to cure patients. Overall, it is clear that these physicians believe that income has a huge effect on patients ability to access a physician and to follow recommended guidelines to improve their health. However, there are factors beyond one’s income stability that can make healthcare services more expensive. There are also other priorities like family and childcare that a patient may prioritize over his/her own healthcare that will affect health outcomes. Speaking to these physicians showed me that income and the wider policies that affect the cost of utilizing healthcare can affect the availability of healthcare.

Patient Population Comparisons

The interviews that I conducted clarified the great effect that access to a health payer source has on a patient's ability to afford necessary care and to
follow through on a doctor's lifestyle and medical recommendations. However, not all payer sources are equal and one’s payer source can give insight into one's socioeconomic status. Medicaid is a payer source that provides health insurance to those who have low incomes. Medicare provides publicly funded insurance for those over 65. I asked physicians if there are differences in drug and lifestyle modification adherence rates between patients on Medicaid versus those on Medicare or private insurance policies. If there were differences, I probed to see if these differences were due to financial constraints or personal negligence.

67% physicians that I interviewed felt that there were huge differences between their patients on Medicaid and their other insured patients. These physicians believed that Medicaid patients were less able to change their lifestyle and obtain necessary medications. One doctor felt that Medicaid patients were advantaged due to how they get medicine for “pennies on the dollar.” The physicians who pointed out that Medicaid had less effective medical interventions had different explanations for why they had different outcomes. One physician felt like these interventions were less effective primarily for financial reasons. The same physician felt like a small portion of these ineffective interventions were due to patient negligence. The other doctor who noticed that interventions with Medicaid patients felt that it is not at all due to patient negligence and that placing the responsibility on the patient would be “blaming the victim as patients are victims of a disease.” The doctor who didn’t think medical interventions with patients on Medicaid were less effective believed that
Medicaid patients do better than patients with private insurance. The doctor believed this was due to the cheap medicine that Medicaid patients get. However, when it came to lifestyle modifications he believed that those on Medicaid and Medicare tend to be older and as a result don’t tend to change their lifestyle. Overall, it is clear that income level has a big impact on health behaviors and since Medicaid patients tend to be indigent they may not have as much education on the importance of making lifestyle modifications. It was important to note that while Medicaid patients get prescriptions at a lower price than other patients, these medications most likely make up a larger percentage of their income. Since Medicaid patients receive subsidized medication, I imagine that their lower income most likely affects their ability to make lifestyle modifications to eat healthier foods and to adopt healthier lifestyle standards.

General Factors and Observations

To conclude my interviews, I wanted to get a sense of what non-financial issues physicians believe prevent patients from being able to address their health issues most effectively. I also wanted to get a sense of how their patients with T2DM but without complication were able to avoid complications. This allowed me to connect the economic factors with other social factors.

It seemed like social factors outside of the realm of policy interventions seem to be the dominant social factors that affected patients’ ability to address their health issues. The social factor that physicians mentioned the most was
culture. The doctor I interviewed from Nevada mentioned how cultural practices that subsist within Asian and Latino ethnic groups can pose obstacles to proper medical interventions. Another doctor cited how cultural practices that one picks up as one grows up has a huge impact on one’s ability to make lifestyle adjustments. This doctor also described how medical interventions have stigmas attached to them in certain communities. In addition to culture, one doctor noted how the lack of a support system can make it harder for a patient to make lifestyle modifications. The lack of a support system could have made an already difficult situation more trying. This difficult situation led to what a doctor I interviewed referred to as “existential nihilism.” At that point, patients think there is no point in continuing to make adjustments to improve their condition. When it comes to factors that have influenced some patients with T2DM to avoid long-term complications the physicians I interviewed had a wide variety of answers. One doctor felt that positive relationships with one's health provider were the largest determinant of the long-term health of a patient with T2DM. Another doctor felt that education and genetics were the largest factors that determine long-term prognosis. This doctor stated that education would determine whether one has exposure to routine healthcare. However, this doctor also felt like genetics makes a big impact on one’s long-term T2DM prognosis. He explains how some people who are “genetically stronger” can be “happier than counterparts with [the] same disease.” The doctor goes on to describe how this can be seen with other illnesses including heart disease and cancer.
Overall, it was clear that these physicians believe that income has a big impact in determining health outcomes for their patients. It was clear that income had the largest impact in termed how it affects the behaviors that patients engage in around diet and lifestyle. Income also impacted physician and medication access; however, this effect is compounded by payer source access. This is because low-income people with access to Medicaid can receive patient care and heavily subsidized drugs. These physicians also seemed to believe that other factors, beyond the realm of policy, had huge impacts on patient outcomes. These include the patient's cultural background and environment. These seemed to drive the underlying factors that would cause one to develop a chronic disease like T2DM and can affect the effectiveness of interventions. A patient’s cultural upbringing can make it more difficult to make lifestyle modifications if the patients' communities view these lifestyle modifications in a negative manner. A patient’s environment has a big effect as it can make it more expensive for a patient to adopt lifestyle changes. The expense is higher due to the increased transportation costs for traveling to an area with fresh foods. Finally, it is also crucial to consider a patient’s support system and how it can help a patient obtain the resources necessary to treat his/her chronic illness. While the doctor’s perspective on what determined patients’ health is not perfect it can offer insight into the barriers that prevent patients with access to medical care of some sort from effectively addressing their chronic health issues. To gain a more precise view of how physicians view the SDH, in relation to how their patients see it, I
asked five yes/no survey questions, that are similar to the ones I asked patients, to get an idea of how physicians view social factors affecting health in comparison to patients.

Figure 9: Physician survey question on income and health ($N=12$)

Figure 10: Physician survey question on local unemployment resources ($N=12$)
Figure 11: Physician survey question on SDH ($N=12$)

Figure 12: Physician survey question on SDH and patient health ($N=12$)
These responses showed that physicians strongly believe that income and the broader SDH have an important effect on a patient’s health. In fact, 100% of physicians surveyed felt like income and social factors play an important factor in influencing health. Physicians were split down the middle on whether or not their communities have adequate resources to help those who are unemployed. This suggests that physicians were split on whether or not their patients have the resources needed to address their health needs. However, about 67% of physicians didn’t think that patients willingly neglect their scheduled appointments or necessary prescriptions and lifestyle changes. This led me to assume that many physicians felt like their patients were constrained due to broader social factors affecting their health and response to treatment. The contrast in answers might have been because physicians viewed the broader unemployed population that may contain many healthy people differently from their own patients. It was clear
that physicians believe that SDH are important and deeply influence their patients’ health.

Compared to patients, physicians were more uniform in their belief that income has an important effect on a patient's health. In addition to this, a higher percentage of patients than physicians believe that there are adequate resources in their community to help the unemployed. This could have been because either the physicians had a pessimistic view of the various ways in which people address their unemployment or that the physicians and patients interviewed had different views on the necessary resources for the unemployed. I suspect that physicians may have been slightly skeptical in their assessment of patient motives. This might have been because these physicians observe that many indigent patients disproportionately don’t adhere to the necessary health and lifestyle modifications. On the other hand, these patients might have felt satisfied with their health even if they weren’t doing all they could to live healthy lifestyles. This assumption is validated by the fact that patients were less aware than physicians of what the SDH refers to. In addition, patients that were aware of the SDH were less convinced that the SDH have a drastic impact on one’s health. In terms of whether patients were doing their best to improve their health based on their circumstances, patients and physicians were in rough agreement on this. Patients were only 4.7% more likely than physicians to feel like it was not the patient's own fault for not adhering to their appointments, prescriptions, or lifestyle recommendations. Overall, it is clear that patients were less informed on
the SDH and this may have driven them to not see the necessities of the unemployed from a healthcare lens.

Conclusions

In conclusion, it is clear that income insecurity has an effect on one’s ability to prevent and address chronic health issues. One can see that more generous unemployment insurance benefits allow patients to better meet their basic needs. More importantly, these individuals would be able to meet their basic needs in a healthier manner. This leads me to think that greater income security can better enable one to make lifestyle changes. This is crucial for a patient with T2DM as it could the patient delay or prevent complications. I would imagine that this would be a reason why more generous unemployment insurance benefits could help patients avoid negative complications due to T2DM. One’s income level had an effect on access to physicians appointments and prescription drugs; however, this effect was moderated by one’s access to health insurance. Those with income insecurity but with access to a payer source like Medicaid had less trouble paying for physician appointments or prescription drugs. It is clear that access to a payer source was a big moderating variable when it comes to how income insecurity affects one’s access to a physician or prescription drugs. While it was clear that income insecurity negatively affects a patient's ability to engage in lifestyle modifications, the availability of social support systems and culture are
big moderating variables when it comes to a patient’s ability to make lifestyle modifications.

Overall, it is clear that income security along with other proxies related to socioeconomic status have a large impact on whether one is able to prevent and manage chronic health issues. It looks like unemployment insurance policy has an impact with regards to how it can make patient care and prescriptions more affordable for a patient. In the long-term, income security can enable a patient to pursue a healthier lifestyle given that the necessary social supports are in place.
Chapter 6
Policy and Social Supports

This research project supplements the existing research on the SDH with a more focus on economic security. Oftentimes, the literature on the SDH focuses on how indicators like housing, social environment affect one’s health; however, I wanted to address how the amount of money one has or doesn’t have would affect one’s health. This is due to the fact that the amount of money one has dictates one’s purchasing power and one’s purchasing power has a big effect in the expensive healthcare marketplace. The expense of the healthcare marketplace is especially pertinent in the U.S. context that I focused on in my research, as the medicine and treatment in U.S. healthcare system is some of the most expensive in the World according to a Commonwealth Fund study.105 This same study highlighted how U.S. policies support a safety net that is much weaker than most OECD nations. The commonwealth fund’s analysis of the U.S. safety net included unemployment insurance policies. This insight presented an opportunity to look at how variation in state policies around unemployment insurance could affect one’s income security and thus health outcomes.

Overall, it is clear that the economic aspect of the SDH does have an impact on health outcomes. One can also see that social policies can make an impact on income security and as a result affect health outcomes. In particular, it

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is clear that there is a relationship between unemployment insurance generosity at the state level and health outcomes. This respective relationships between the minimum and maximum weekly unemployment insurance check amounts and the incidence of ESRD due to T2DM and death due to T2DM in 2005 prove this relationship. This leads me to believe that investments to improve income security in a state would also be investments to improve the health of those in a state.

Moreover, it is clear that improved income security can improve health for people by enabling them to make lifestyle changes to avoid and better manage illness. Improved income security can also reduce the stress that people face which improves health. Now it is important to note that while income security can give one the financial resources to improve one’s lifestyle or alleviate financial stress that social support systems also can have a big impact in this regards. It is clear from my interviews patients who have families that are willing to morally support them in their lifestyle modifications and even more so adapt their practices are better able to take care of their health. In addition to this, it is important to note that cultural practices amongst various communities can make it easier or more difficult for a patient to adopt healthiest practices.

While income security can improve access to physicians and to prescription drugs it is clear that access to a payer source can have an even larger effect. This is because in the U.S. healthcare system access to a healthcare payer source drastically reduces the effective amount that one has to pay in order to receive routine treatment for a doctor or to receive prescription drugs. This may
even suggest that when thinking of how income security affects health one should look beyond the scope of cash but into insurance access.

Limitations and Directions for Future Research

There are numerous ways that those conducting future research into how state policies affect health outcomes can improve upon my research design from both a quantitative and a qualitative perspective. First of all, one could account for the percentage of citizens living in poverty in each state as well as the average income of each state. Demographic information related to race would also be valuable in order to better control for factors outside of unemployment insurance policies that influence T2DM rates in each state. Also, one should increase the sample size of the physicians and patients interviewed as it is possible that my sample size is not representative due to its small size. This issue of representativeness could have been exacerbated by the fact that I relied on my own personal network of physicians to obtain subjects to interview. A future researcher may want to find physicians outside their own network to interview. Due to increased healthcare experimentation at the state level, it would be useful to incorporate measures that quantitatively look at how state investments in Medicaid expansion have affected health outcomes. In addition, since states are currently receiving federal waivers to use their Medicaid dollars to pay for the SDH it would be useful to look at the return on investment of such measures on health outcomes. Furthermore, with regards to measuring health outcomes, it may
be useful for future researchers to expand the range of illnesses analyzed to include stroke, heart disease, Alzheimer's disease, and Arthritis. This would provide a broader measure of health outcomes than just looking at T2DM.

From a qualitative standpoint, when conducting the interviews one could interview physicians and patients that come from selected cities with specific demographic compositions and lifestyle metrics. Also, a future interview design would be more effective if interview sites (states) were selected based on variation in the dependent variable based on one’s quantitative results. It also would also be helpful if a future researcher obtained specific demographic information from interviewed subjects in order to gain a greater idea of how interviewees background may skew their answers. In addition, I would suggest that future researchers ask patients and physicians to name a few social determinants of health in order to obtain a measure of their knowledge of the topic. To try and better account for other social factors related to one’s social supports, a future researcher should ask questions about one’s family life and personal environment. Finally, it would be helpful to expand the range of stakeholders in the healthcare system who are interviewed. In particular, it would be insightful to interview clinical social workers whose job entails focusing on the patients’ social needs.

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Foremost, my research focused on the time from 2000-2009 in order to control for welfare reform in the 1990s and the enactment of the affordable care act in 2010. This means that future research may want to look at how measures like statewide Medicaid expansion affects the relationship between income security and health outcomes. From a time perspective, one could also look at how salient income security via policy was in regards to predicting health outcomes in a recessionary time period versus time of economic expansion due to the changing economic conditions in the time following 2009.

Finally, one can see that it is worthwhile to look into the SDH when looking at what affects one’s health. My research has shown that the economic aspect of SDH can make a difference. I have also shown that state policies that improve economic security can tangibly improve health outcomes, even within a ten-year time span. This is important as I believe my research has helped to validate the importance of an adequate safety net as a means of ensuring the health of people. In particular, I have shown that even dollars that aren’t geared directly to paying for the costs of healthcare services impact health due to their effect on one’s lifestyle and ability to access healthcare services. Health doesn’t just rely on patients’ experiences in the hospital or clinic. Health is determined by one’s status and environment. Policymakers crafting health policies and physicians attempting to be the best advocates for their communities and patients would be prudent to expand their views of what helps promote good health to
include social and income factors when thinking about how to improve healthcare in America.
Appendix A:

State-level Maximum and Minimum Unemployment Payments for the Year 2000

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**Appendix B:**

The first(1-5) and Second set(6-10) of interview questions for patients with T2DM
First Set of interview Questions for patients with T2DM:

1. If your unemployment benefits included an extra $10 a week, what would you spend it on?

2. As the weekly check amount for your unemployment benefits dwindle what do you prioritize for spending the remaining amount of money on?

3. Does the amount you get for unemployment insurance affect how you are able to address your health issues? If so, how?

4. As you near the end of your unemployment check eligibility period, did you neglect your health?

5. Can you describe how important incoming income is to your ability to satisfy your basic needs?

6. Does your healthcare provider advise you on your diet quality?

7. If you have not been using your prescribed medication, is it due to financial hardship or lack of contact with your physicians?

8. If you have missed multiple medical appointments why is this so?

9. Has housing security been an issue for you?

10. What are the sources of stress in your life?

     **Appendix C:**

**Survey questions for patients with T2DM**

1. Do you believe that your income has a tangible effect on your ability to take care of your health?
2. Do you live in an area with adequate resources to help you deal with unemployment?

3. Are you aware of what the social determinants of health care are?

4. If you answered yes to the previous question, do you think that social determinants have an important effect on your health?

5. Do you believe that you do the best to make the most use of your resources to take care of your health?

Appendix D:

Interview Questions for physicians

1. What factors prevent your patients from adhering to their scheduled medical appointments?

2. What factors prevent your patients from obtaining their necessary prescriptions?

3. What factors prevent your patients from making necessary lifestyle modifications to address their chronic illness?

4. Do you believe that income has a tangible effect on your patient/client's health?

5. Do you live in an area with adequate resources to help those who face unemployment?

6. Can you describe your take on how your patients/clients income affects their ability to attend scheduled medical appointments?

7. Can you describe your take on how your patients/clients income affects
their ability to adhere to recommended lifestyle modifications?

8. Can you describe your take on how your patients/clients income affects their ability to obtain necessary prescriptions?

9. Compared to your Medicare and privately insured patients, is a difference in drug and lifestyle modification recommendation adherence with patients who are insured through Medicaid?

10. If Medicaid patients are less adherent to your recommendation do you think it is due to their financial situation or the patient's own negligence?

11. In general, outside of a patient's financial situation what other factors do you find to affect their ability to prevent and address health issues? Which factors matter the most to you?

12. For your patients who are diabetic and have avoided long-term complications what factors do you think have influenced this?

Appendix E:

Survey questions for physicians

1. Do you believe that income has a tangible effect on a patient's health?

2. Do you live in an area with adequate resources to help those who face unemployment?

3. Are you aware of what the social determinants of health care refer to?

4. If you answered yes to the previous question do you think that social determinants have an important effect on patient health?
5. Do you believe that Patients who don’t adhere to their appointments, prescriptions, and lifestyle modification willingly refuse to do so?

Appendix F:

Statistically Insignificant Regression Results

The Relationship between AMT and AIR
The relationship between AMT and ESRD

The relationship between AWB and AIR
The relationship between AWB and D05
The relationship between AMT and AIR

The relationship between AMT and ESRD
The relationship between AMT and D05
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