QUANTIFYING THE EFFECTS OF COMMUNITY HEALTH CENTER
ACCESS ON HEALTH FOR MEDICALLY-VULNERABLE POPULATIONS

A Dissertation
Submitted to
the Temple University Graduate Board

In Partial Fulfillment
of the Requirements for the Degree
DOCTOR OF PHILOSOPHY

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May 2016

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ABSTRACT

Established in 1965 as a part of President Johnson's War on Poverty effort, the federal community health center (CHC) program is a primary source of federally-subsidized quality health care services for medically-vulnerable populations in the United States. Despite its current role as a medical safety-net for the nation's health care system, the CHC program did not begin as a public health program, but rather as a social justice program. Since its formalization, the CHC program has enjoyed relatively consistent Congressional support as a cost-effective means of providing primary healthcare to indigent populations; however, the narrative of the program has shifted overtime from a focus of empowerment and lifting communities out of poverty, to the fortification of the national health care system as a cost-effective provider of quality healthcare care for all. In this manuscript, I argue that this transition from community empowerment and the mitigation of fundamental causes of disease to a more risk-based emphasis on the issue of access, has diminished the urgency around the engagement of the structural effects of poverty on health in favor of a "one size fits all" approach to the provision of basic health care.

In an effort to objectively quantify the effects of geographic access on health as a means for evaluating the success of the contemporary program, this research project explores the extent to which proximal access to a CHC is significantly associated with various self-reported indicators of positive health outcomes. My primary research method is multivariable regression utilizing secondary data from the 2012 Southeastern

Pennsylvania Household Health Survey, the 2008-2012 5-year American Community Survey Estimate, and the Health Resources and Services Administration Data Warehouse. Using statistical modeling, I test the effect of CHC access on three distinct measures of individual health: (1) self-reported health status, (2) the likelihood of having pain lasting 6 months or more, and (3) the likelihood of having a usual source of health care. Within each model, I also test a series of interaction terms through nested sub-models to uncover any conditional effects of access for selected social groups. This statistical design offers the opportunity to explore whether the main association between access to a CHC and health varies based on the social characteristics and/or social environment of the individual.

The findings of my analysis suggest that the effect of CHC access varies for different social groups, with less disadvantaged groups, such as poor non-Hispanic whites with high social capital, and poor individuals living in areas of low disadvantage, receiving the greatest benefit from proximal CHC access. However, individuals at the extremes of social disadvantage benefit least from CHC access alone. I argue that while the provision of CHC access is a noble and necessary tactic for fighting the persistence of health disparities in our medically-vulnerable communities, focusing on access alone is insufficient to solve the problem. The pendulum must switch back to community empowerment and the eradication of structural threats to health to initiate real change for medically-vulnerable populations.

I dedicate this dissertation to my daughter, Kennedi. All of my accomplishments are in

sacrifice and preparation for her greatness.

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CHAPTER 1

INTRODUCTION

Being a member of a socially disadvantaged group is bad for your health (Daniels

et al. 2000; Lynch et al. 2000). This is especially true in the United States where

inequality is high and associated with significantly worse health outcomes for those

living at or below the poverty level (Lichter and Crowley 2002). Those living in poverty

are more likely to live in a disadvantaged neighborhood and have limited social networks

– two factors that are significantly associated with poor health, even after controlling for

the effects of personal disadvantage (Ross and Mirowsky 2001; Wen et al. 2003, Kim

and Kawachi 2006). Individuals in lower social positions, including racial minorities,

often face barriers to quality health care including lack of financial access, poor physical

access, language barriers and racism (Agency for Healthcare Research and Quality 2013).

Socially disadvantaged individuals also tend to have higher exposures to stress which has

a clear deleterious physiological effect on the body (Pearlin 1989; McEwen 2001).

For the past fifty years, the federal community health center (CHC) program has

been primarily responsible for providing access to quality primary health care services to

medically-vulnerable populations in the United States (Taylor 2004). CHCs[1] provide

medical services to more than twenty-two million patients through more than nine

thousand service sites across the nation (National Association of Community Health

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[1] In this manuscript, the acronym "CHC" refers to all federally-recognized community
health centers, including federally-qualified health centers (FQHCs) and Health Center
Look-Alikes. For more information on federal health center designations, see the HRSA
website at http://bphc.hrsa.gov/programopportunities/howtoapply/index.html.

Centers 2016). CHCs provide services to anyone in need of primary care services regardless of his or her financial status; while some of these patients are uninsured, most have Medicaid insurance, or private insurance that does not sufficiently cover all of the patient's health needs (e.g., family planning and contraceptive services). To offset the financial burden of predominately servicing Medicaid, uninsured and underinsured patient populations, CHCs receive significant subsidies from the federal and state governments enabling them to provide quality primary health care without the major concern of profitability. Nonetheless, efficiency, performance, and value are major concerns for external stakeholders of the program who entrust CHCs with public funds to provide a cost-effective medical safety-net to those most in need.

Evidenced by a $2 billion annual budget and an $11.5 billion funding increase resulting from the Affordable Care Act of 2010, the federal government values the CHC program as an effective means of addressing the health-related causes and consequences of poverty in the United States (Gillette 2010; Kaiser Family Foundation 2013). Empirical studies of CHC efficacy have highlighted various benefits of the program including a reduction in racial disparities for preventative health measures such as early prenatal care, cancer screening, and eye and foot care for diabetics (Shi et. al 2004, 2009), and improved access to care for uninsured and Medicaid CHC patients as compared to uninsured and Medicaid patients receiving care at non-CHC facilities (Shi et al. 2007). While efficacy studies demonstrate a health benefit of CHC utilization for social groups traditionally facing barriers to care, there is a gap in the literature pertaining to whether CHC availability is beneficial for an individual even when the center is not the

individual's primary source of care. This is an important distinction because the primary

driver of the CHC program is access and far more individuals have access to CHCs than

are regular users. Therefore, it is critical to understand how CHC availability affects the

health of individuals regardless of whether they are regular users of the services, and how

social and structural factors impacting the individual affect this primary relationship.

Social Factors Influencing Health

The factors influencing individual health are not singular in nature, but multi-

faceted (Link and Phelan 1995; Mechanic 2007). While biology and genetics are

important precursors to the variation in health outcomes for individuals, social conditions

are also fundamentally important as they disproportionately influence individuals'

exposures to health risks and protective health factors (Link and Phelan 2002). It is

widely documented in the fields of medical sociology, public health, and social

epidemiology that economically and socially disadvantaged groups have worse health

outcomes than their more advantaged counterparts, despite relatively high standards of

living in some regions of the world (Daniels et al. 2000; Lynch et al. 2000).

Although individual characteristics such as race, education and poverty status are

known to have significant effects on health outcomes, where one lives also has a

significant effect on health (Macintyre and Ellaway 2000; Ross and Mirowsky 2001;

Klinenberg 2003; Farmer 2010). Neighborhood disadvantage is a particularly important

predictor of health as it represents the level of social order and control in a neighborhood

which can have an indirect effect on the health of residents (Ross and Mirowsky 2001).

The spatial isolation, crime, poor proximity to resources, and stress-inducing environments of socially and economically disadvantaged neighborhoods have been linked to negative health outcomes for individuals beyond that of personal disadvantage (Ross and Mirowsky 2001; Browning and Cagney 2003). Although the mechanisms precipitating this association are indirect, the characteristics of an individual's neighborhood mediates the individual's exposure to protective and risk factors of disease.

Social capital, as defined by the types and depth of social connections that individuals have to one another, provides the opportunity for shared resources and networking that can help or hinder the health of individuals (Kawachi and Berkman 2001; Szreter and Woolcock 2004). An individual's level of social capital depends on the size of their networks, and the level of trust and reciprocity within these networks (Szreter and Woolcock 2004). Individuals with high social capital tend to have better access to health resources and social support from friends, family and neighbors that could help them cope in a medical crisis as compared to those with similar social characteristics but having low social capital (Kawachi and Berkman 2001).

Barrier-free access to quality health care, a cornerstone of the CHC program, is the primary predictor of health outcomes in this research project. Current studies of health and access suggest that unrestricted access to health care has marginal or better benefits for medically-vulnerable populations as compared to similar populations without access to care (Saver and Peterfreund 1993, Casanova and Starfield 1995, Andrulis 1998, Lynch et al. 2000). In the United States, those at the bottom of the social stratification ladder often face barriers to quality health care including financial challenges,

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transportation issues, language barriers, and uncompassionate care which ultimately

impedes their ability to get the medical help they need in a timely manner (U.S.

Department of Health and Human Services 2008).

Research Questions and Causal Model

The purpose of this research project is to isolate the effect of CHC access on self-

reported indicators of individual health. More specifically, I attempt to address the

following research questions through my analysis: 1) What is the nature of the

association between the availability of a low-cost quality health care option and measures

of an individual's health status? 2) How does the effect of having access to a low-cost

quality health care option on health vary based on the social characteristics of the

individual? 3) How does the neighborhood in which one lives affect the association

between the availability of low-cost quality health care options and the individual's

health status? 4) How does the social connectedness of the individual affect the

association between the availability of low-cost quality health options and health

outcomes for the individual?

To address these questions, this research project is comprised of three separate

statistical models measuring the effect of selected predictors on the following measures

of individual health: self-reported health (Model I), the prevalence of pain lasting six

months or more (Model II), and the likelihood of having a usual source of health care

(Model III). The primary independent variable for all three models is CHC access. Within

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each model, a series of interaction terms are included to measure the effect of personal disadvantage, level of neighborhood disadvantage, and social capital on the association between CHC access and each health outcome. Control variables include age, gender, insurance status, and the prevalence of chronic disease.

Data and Methods

The primary research method for this dissertation is multivariable statistical modeling. The specific goal of my research is to test whether increased geographic proximity to a CHC decreases the likelihood of poor health for individuals with social and/or structural barriers to care. Two out of the three statistical models have dichotomous outcomes (the likelihood of having a regular source of care and the prevalence of pain) and will therefore require the use of multi-level logistic regression models to test for the effects of the predictors on these variables. The remaining model has a categorical outcome (self-reported health) and will require the application of multi-level multinomial logistic regression.

The data for this analysis comes from three primary sources: the 2012 Southeastern Pennsylvania Household Health Survey (SPHHS); the 2008-2012 American Community Survey 5-year estimate (ACS); and the Health Resource Services Administration Data Warehouse (HRSA). Administered by the Public Health Management Corporation, the SPHHS is a bi-annual, randomized telephone survey of adults that collects data on various health behaviors and outcomes for households in the Philadelphia metropolitan area (Public Health Management Corporation 2014). The ACS

is compiled annually by the U.S. Census Bureau and provides general demographic characteristics for U.S. geographic areas as small as the census block. ACS data is available in single-year, three-year and five-year estimates (United States Census Bureau 2015). Using a slate of variables specific to my analysis, I extract community-level variables from the ACS and combine them with respondent-level data from the SPHHS to create a customized multilevel dataset. This approach facilitates the nesting of SPHHS responses within residential communities defined by census tracts. Because my research hinges on the ability to distinguish between health outcomes for individuals with proximal access to a CHC and those with less immediate access, an indicator is created which differentiates census tracts based on their proximity to a CHC using CHC location information from the HRSA website and county-level census tract maps from the U.S. Census Bureau. The proximity variable is applied to all census-tracts in the five-county Philadelphia metropolitan area.

Organization of Chapters

This dissertation is organized into six chapters. The structure of the manuscript is as follows:

Chapter 1: Introduction – The Introduction provides a general overview of the analysis, including the research questions to be addressed and structure of the project. The significance of the research project is also briefly discussed from a medical sociological and public health perspective.

Chapter 2: CHC History – The second chapter traces the origination of the federal CHC program from the War on Poverty efforts of the 1960's through its integral role in the Affordable Act of 2009 and beyond. The dispensary model of indigent health care is also prominently discussed as a nineteenth-century precursor to the modern CHC model of care.

Chapter 3: Literature Review & Conceptual Model – The third chapter offers a bridge linking the history of the CHC program to its current role as a medical safety-net for vulnerable populations in the United States. The status of the current program is discussed including its current scope of services and patient demographics. Existing efficacy studies are also introduced, as well as literature linking social factors (e.g., personal disadvantage, access, social capital and neighborhood disadvantage) to health outcomes. The conceptual model for this analysis is also introduced in this chapter.

Chapter 4: Data & Methods – The fourth chapter is a standard discussion of the data sources used in the analysis, including a detailed description of all the primary variables included in the statistical models. The methodological approach to the analysis is also discussed in detail within this chapter.

Chapter 5: Results – The Results chapter details the statistical findings of the analysis. Each statistical model is discussed in detail using charts, tables, and narrative analysis.

Chapter 6: Discussion & Conclusion – The final chapter of this dissertation attempts to reconcile the findings of the statistical analysis with the historical and

modern context of the CHC program. Policy recommendation are offered, in

addition to a commentary of the significance of the research findings from a

sociological perspective.

Significance of Project

Through this research project, I attempt to quantify the extent to which access to a

CHC is associated with better health outcomes, holding all other social and structural

factors constant. Understanding the effect of CHC access on health is an important

undertaking as the CHC program is one of the few federal programs that prioritizes the

primary health care of vulnerable populations on a national level. The CHC program is

also highly funded, despite the relatively small number of regular users of the services.

Consequently, this project attempts to test the potential benefits of the program beyond

that of regular use; I argue that as a safety-net provider, there should also be a measurable

health benefit to individuals of having low-cost quality health care *options* for urgent and

emergency care. In addition to quantifying the main effect between access and health,

this project explores whether this association changes based on the social position and

environment of the individual. For instance, having access to a CHC may not be an

important indicator of health for individuals living in relatively advantaged communities,

but for those living in disadvantaged neighborhoods, which tend to have fewer resources,

the availability of CHCs may have a critical impact on health outcomes.

This study is sociologically relevant as racial, social, and economic disparities in

health access and outcomes have persisted, and in some cases worsened, during the fifty

years since the formalization of the CHC program (Agency for Healthcare Research and Quality 2013). This persistent pattern of health stratification, despite transformative innovations in medicine and diagnostic testing since the 1960s, supports the argument that structural factors are likely to be more fundamental causes of health disparities making the management of behavioral and clinical risk factors an insufficient response to the health disparities crisis (Link and Phelan 1995; Daniels et al. 2000).

Finally, this dissertation project attempts to place the efforts of the CHC program within the context of the behavioral, social, and environmental structure that threatens its effectiveness in an effort to illuminate the strengths of the program from a broader perspective in addition to identifying the areas where there is more work to be done. More specifically, the project seeks to extend the current CHC efficacy literature and investigate whether individuals with better geographic access to a CHC are more likely to report better health outcomes than those without access, and whether this effect is the same for all social groups. I argue that if CHCs effectively reduce barriers to health care that contribute to poor health, individuals with access to a CHC should be less likely to report poor health when compared to similar individuals without access, as those with access have a viable option for receiving care and the opportunity for improving their health status.

CHAPTER 2

CHC HISTORY

Introduction

This chapter traces the creation of the CHC program from its beginnings as a demonstration poverty eradication program in 1965, to its integral role as a major component of the Affordable Care Act of 2010 and beyond. The purpose of this chapter is to explore the ways in which the program's unique beginnings have shaped its goals, stakeholder perceptions, and support over the years as a hybrid public health/poverty program. I argue that as an unintended consequence of the program's heavy reliance on advocacy and legislative support, the focus of the program has shifted from personal empowerment and the strengthening of families and communities, to the impersonal fortification of the health care structure as a medical safety-net for uninsured and under-insured Americans. One implication of this transition from empowerment to access, is the diminished emphasis on the identification and mitigation of fundamental causes of health disparities, in favor of a more general "one size fits all" approach to the distribution of care. The danger of the latter approach is that the effect of access on an individual's health is likely to differ based on her social characteristics and the social context in which she lives. Therefore, by engaging a unidimensional solution to the problem of disparities, the problem may actually be exacerbated for those with disproportionate barriers to care, as those with medical and social needs beyond basic access to health care are pushed to the margins of the healthcare safety-net system.

The War on Poverty

The formalization of the modern CHC program began as a part of the War on Poverty effort of the 1960's. The War on Poverty was a federally-funded social experiment with the goal of addressing the "causes and consequences" of poverty in the United States. The policy beginnings of the War on Poverty effort can be traced back to the Kennedy Administration, when Kennedy's brother, Attorney General Robert Kennedy, had a sincere interest in rectifying the national problem of juvenile delinquency (Lefkowitz 2007). Through meetings and site visits with non-profits, police departments, and localized task forces, Robert Kennedy came to believe that the causes of juvenile delinquency were structural, as opposed to behavioral or rooted in personality defects and subsequently concluded that community action was the best solution to address the "powerlessness and poverty" that precipitated delinquency in disadvantaged communities. Heeding the concerns of his brother, President Kennedy planned to use the eradication of poverty as the re-election platform for his second term – a goal that was never realized as a result of his assassination in 1963 (Lefkowitz 2007).

When Lyndon B. Johnson assumed office following the assassination of President Kennedy, he continued to push for a federal response to the problem of poverty. In his first State of the Union address in January of 1964, Johnson declared a "war on poverty" emphasizing the need for specific social programs, including medical coverage for the poor, expanded food stamps, extensions on minimum wage, federal aid to education and improvement of public facilities, and mass transit in poverty-stricken communities (Gillette 2010).

In an effort to dramatize the need for poverty programs, Johnson visited Appalachia in 1964 to illuminate the extreme poverty of families that would become the "face" of the War on Poverty program. Surrounded by photographers and the press, Johnson and his wife visited schools and families in the Appalachia region. During his visit, Johnson met with an unemployed father of eight, Mr. Fletcher, who had lost his job in a coal mine and had two children who had already dropped out of school to help the family with expenses. To make matters worse, Fletcher was also caring for a sick neighbor who could not afford to visit a doctor (Lefkowitz 2007). With the photos and stories from the trip prominently displayed in a 1964 *Life Magazine* article, Johnson's visit clearly demonstrated the dire condition of those living in rural poverty and the need for vocational, education, and health care programs to eradicate these ills on this segment of society. Shortly thereafter, the Economic Opportunity Act of 1964 (EOA) was passed by Congress.

The swift passage of the EOA was viewed by many as a way to memorialize President Kennedy, as the bill itself was relatively vague in terms of the types and scope of the programs that would be included under its umbrella. The omission of specific detail was both a function of the lack of precedent and an effort to be as neutral as possible in order to maximize bipartisan support (Gillette 2010). Sardell argues that, "it was a policy initiated within the executive branch, with Congress having a very limited role, little input from interest groups, and little attention from the general public" (1988, 50). Moreover, the design of the War on Poverty program was an experimental effort, as there was no blueprint for this type of comprehensive policy for legislators (Sardell

1988). The EOA did, however, specify the establishment of the Office of Economic

Opportunity (OEO) as the federal department that would provide oversight for the

programs funded through the bill. A unique characteristic of the effort was that the

individual programs funded by the bill were to be implemented and managed by private

and non-profit entities outside of local, state and federal government. As a result,

centralized oversight and management became critical to ensure the prudent use of public

funds and the confidence of Congress.

The Office of Economic Opportunity

The purpose of the OEO was to award funds and provide federal oversight for

local programs with a focus on the eradication of poverty – a lofty goal for a government

agency receiving less than 1.5% of the federal budget for the first five years of its

existence (Lefkowitz 2007; Gillette 2010). The primary objective was to "[expand]

opportunities to raise educational attainment and job skills to reduce poverty through

increased employment and earnings" (Bailey and Danziger 2013, 19). The initial budget

of $65 million had a great deal of flexibility in its allocation and as a result, the programs

funded under the OEO umbrella were varied with a unifying element of the prevention of

economic hardship (Lefkowitz 2007; Gillette 2010; Bailey and Danziger 2013). While

there were some flagship efforts (such as Job Corps and Head Start), it was the combined

influence of the programs that was the main focus of the agency (Gillette 2010; Bailey

and Danziger 2013). Nearly any grassroots program that had a good plan and a justifiable

reason why federal funds could help alleviate the causes and/or consequences of poverty had little trouble getting the attention of the agency (Bailey and Danziger 2013).

OEO administration was primarily comprised of appointees, with very few careerists at the helm. Kennedy's brother-in-law, Sargent Shriver, was named the Director of the agency. Jack Conway, the former director for industrial unions at the AFL-CIO, was in charge of community action, and Sandy Kravitz a social worker with a PhD in Public Policy had day-to-day responsibility for vetting potential funding recipients (Gillette 2010). The establishment of the agency was fast paced and heavily informed by non-traditional partners such as grass-roots activists, academics, and community-based interest groups that had historically been ignored in the policy-making process. OEO programs also had a large number of advocates, who were very passionate and put heavy pressure on Congress to support their causes (Gillette 2010).

The first community programs receiving funding under the OEO were Foster Grandparents (established in August of 1965), Legal Services, and Head Start (both established in September of 1965). The formal recognition of the need for health care services came a few months later, as program administrators of the earlier programs noticed that many OEO program users had untreated medical conditions, impacting the users' abilities to consistently participate in and benefit from the program offerings. For instance, it was discovered early on that over 25% of the children participating in the Head Start program had not ever seen a doctor and/or had serious untreated medical problems (Lefkowitz 2007). This made it difficult for the children to meet the academic and developmental milestones of the program. Despite this troubling finding, Head Start

administrators were wary of incorporating direct medical care within their scope due to budgetary concerns (Gillette 2010). While the Head Start program offered many social services under its programmatic umbrella, there was a lack of integration across the agency, leaving a space for the CHC program to enter the arena and address this need (Gillette 2010).

The OEO programs were distinct from public policy programs instituted by other federal agencies primarily due to the required component of community action and personal involvement as strategies to combat poverty. An important requirement for OEO programs was the engagement of communities in shaping the agenda of the programs, and the creation of jobs, training opportunities, and professional experience for people living in impacted communities (Gillette 2010). Shriver is credited with borrowing this community involvement concept from the structure of the Peace Corps, a program Shriver developed about five years prior to OEO under Kennedy's administration (Gillette 2010). Shriver explains:

> The concept of going into Ecuador to try to help people decide their own problems, and to energize them, motivate them, assist them to be able to handle their own problems themselves, is no different than the psychology you take into West Virginia or the South Bronx. In the Peace Corps, one called this process 'community development'; in the war against poverty, we called it 'community action.' (Gillette 2010, 81)

As innovative as this concept was, this concept of community empowerment was not embraced by all legislators, especially those wary of conferring power to poor and African-American communities during a time of political unrest in the United States.

This led to considerable criticism of the program at the federal, state, and local levels as discussed in detail in the following section.

Criticisms of the War on Poverty and OEO

The mid-20th century brought a heightened social awareness around the issue of poverty, exaggerated by a strong culture of activism precipitated by the civil rights and anti-war movements of the 1960s (Lefkowitz 2007). The public's preoccupation with the concept of economic inequality rose in a period of relative prosperity for the middle class following World War II, illuminating the distinction between economic classes for the average American. Popular books such as Galbraith's (1960) "The Affluent Society" and Harrington's (1963) "The Other America" also reminded Americans that the suburban affluence and prosperity enjoyed by many Americans strongly contrasted to the equally real, but often overlooked, poverty and economic hardship of many others, especially those living in rural towns and urban ghettos (Bailey and Danziger 2013). In 1959, Robert J. Lampman, an economist who would later be considered one of the "intellectual architects of the war on poverty," wrote a report to Congress warning of the slowing decline of poverty rates since the end of World War II (Passell 1997; Bailey and Danziger 2013). Lampman argued that a then current national poverty rate of more than 20 percent was not only damaging to those living in poverty, but also to society as the poor are much less likely to be active contributors to the workforce and tax base.

The rationalization for federal intervention on the issue of poverty was most explicitly stated in Johnson's 1964 Economic Report of the President in which he argues,

"we pay twice for poverty: once in the production lost in wasted human potential, again in the resources diverted to coping with poverty's social by-products. Humanity compels our action, but it is sound economics as well" (Council of Economic Advisors 1964, 56). In this sense, Johnson recognized the social justice issue of income inequality, but also acknowledged the economic benefits of improving people's economic situations so that they could be positive contributors to American society. By removing the structural forces exacerbating the causes and consequences poverty, it gave the poor a chance to break their perceived cycle of social disadvantage.

While there was general bipartisan support for the OEO and the associated War on Poverty programs, some critics were unsure about the sustainability of the programs in the long term. Many detractors did not think that the War on Poverty effort would survive over time as the programs associated with the effort were a partial solution to the issue of poverty (Lefkowitz 2007). Intergovernmental relations was also a major obstacle for the OEO and its programs (Lefkowitz 2007). Because the program depended on educational institutions, non-profits and community groups to manage programmatic efforts with minimal administrative guidance from the OEO, the structure of the program promoted the circumvention of city and state governments in the anti-poverty process. A particularly iniquitous objection rose from Southern legislators at the state level as they perceived the requirement of community involvement, coupled with the lack of state control, as dangerously providing economic support and political power to Black communities and organizations and thereby weakening the white power base in their jurisdictions (Sardell 1988).

In Congress, critics from the left argued that not enough money was trickling down from OEO to the individual to actually make a real difference in improving quality of life. There was also a concern that the structural causes of poverty, including racism and discrimination in the labor market, were being ignored in favor of the management of individual behaviors that were thought to perpetuate poverty (Bailey and Danziger 2013). Others cited the difficulties involved in measuring the success of a program with so many different potential outcomes and macro-level factors conflating measures of its success such as the economy, wages and interest rates, demographic shifts, and external policy changes (Bailey and Danziger 2013).

Critics from the right argued that the War on Poverty was motivated by politics and would undermine the personal responsibility of the poor (Gillette 2010). The War on Poverty was seen as an over-extension of the role of government and ignored the fact that personal responsibility and the willingness to embrace mainstream values were at the center of America's poverty problem. In this sense, the poor were perceived as part of an "underdeveloped society" that was taking advantage of the government to build the educational, vocational and health foundations necessary for productive participation in society (Gillette 2010). One year after the passing of the EOA, Daniel Patrick Moynihan, the then Assistant Secretary of Labor, released his widely cited report, "The Negro Family: The Case for National Action" (also known as the Moynihan Report) in which he argued that the disproportionally high poverty rates in the African-American community were of particular concern for the U.S. economy (Office of Planning and Research 1965). Rooted in Oscar Lewis' (1959) theory of the "culture of poverty," Moynihan's report was

a commentary on the hypothesized cultural predisposition of African-Americans to perpetuate generational poverty and anti-social behavior through the dysfunction of their family structure. Quoting E. Franklin Frasier, Moynihan states:

> As the result of family disorganization a large proportion of Negro children and youth have not undergone the socialization which only the family can provide. The disorganized families have failed to provide for their emotional needs and have not provided the discipline and habits which are necessary for personality development. Because the disorganized family has failed in its function as a socializing agency, it has handicapped the children in their relations to the institutions in the community. Moreover, family disorganization has been partially responsible for a large amount of juvenile delinquency and adult crime among Negroes. Since the widespread family disorganization among Negroes has resulted from the failure of the father to play the role in family life required by American society, the mitigation of this problem must await those changes in the Negro and American society which will enable the Negro father to play the role required of him. (Office of Planning and Research 1965)

According to Moynihan, it is not structural forces that are the cause of poverty, but the cultural beliefs, perceptions and behaviors that reinforce intergenerational poverty. The fundamental problem, according to Moynihan, is the failure of the Black family. Because of "family disorganization" and single-motherhood, Black children fail to receive the discipline and socialization required to successfully perform in American society. From Moynihan's perspective, the removal of external structural barriers will do little to solve the issue of poverty. As such, the required change to combat deeply ingrained and generational poverty must come from within the community that perpetuates it, most notably the African-American community. From this lens, the premise of the War on Poverty effort was considered by many conservatives to be a misguided approach to effectively addressing the issue of poverty on a federal level.

In his public defense of the program, President Johnson argued that the War on Poverty programs constituted a "hand up and not a hand out" to constituents (Gillette 2010). OEO also worked hard to strategically release funding to a large number of programs in a very short period of time at the beginning of the funding cycle, so that results could be achieved quickly and reported to Congress (Gillette 2010). However, "once the program became operational, new charges were added: that it was wasteful, mismanaged, counterproductive, and a cause of social and racial turmoil" (Gillette 2010, xiii). To counteract these new criticisms, the OEO instituted an internal Office of Inspection that reported directly to the OEO Director and provided audits of the programs to minimize fraudulent use of funds. Most program heads disagreed with this approach, but the perception of strong oversight and control coupled with measurable outcomes were critical for the ongoing support of the program (Gillette 2010).

Regarding criticisms of the program's structure, legislative supporters, most notably Ted Kennedy of Massachusetts, and pro-CHC interest groups argued that local and state governments had historically proven to fail the poor, and non-profits were in a much better position to recognize and meet the needs of communities that they serve. However, in the end, this oversight configuration between the federal agency and its programs did not sit well with local and state agencies, so the agency compromised and gave the states some veto power in the selection of programs, although OEO had the power to override any specific objections (Lefkowitz 2007).

Although the OEO lasted only a decade before being incorporated within other federal departments, virtually all of its components have survived for over fifty years

under ten different administrations. Since the implementation of the War on Poverty

initiative, the U.S. poverty rate dropped from 22.4% in 1956, to 12.6% in 1970, and

continued to fluctuate around 14% the 21st century (Gillette 2010; Bailey and Danziger

2013). Arguably, it is difficult to isolate the effects of the OEO program efforts from the

general economic trends that might have contributed to the decline in the poverty rate

over time, but the program is generally viewed as a positive effort by the federal

government to address the ills of poverty in the United States, although its tangible

benefits continue to be under debate (Pew Research Center 2014).

The Dispensary: A Precursor to the *CHC*

Satisfying the Needs of the Medical Profession

As a comprehensive provider of primary care services for indigent populations,

CHCs in their current form are mostly a twentieth century innovation. Dispensaries, a

precursor to the CHC, were privately-funded facilities located in large cities which had a

dual role of providing urgent care to the poor and working class, while serving as a

training ground for medical students (Rosenberg 1974; Sardell 1988). According to

Rosenberg, the dispensary was "the primary means for providing the urban poor with

medical care and a vital link in the prevailing system of medical education" (1974, 32).

The demand for dispensary patients for the purpose of medical training quickly became a

major driver behind the rise and fall of the dispensary model.

In addition to medical students, attending physicians also used dispensary

facilities as training grounds for new procedures, as well as a means for building up their

private practices and reputations. Dispensary physicianships, "served as a step in the career pattern of elite physicians" as they presented the opportunity to forge relationships with other elite physicians and philanthropists in the medical field (Rosenberg 1974, 40). Unsurprisingly, private physicians were not as fond of the dispensary service model as their hospitalist counterparts. The former group viewed dispensaries as diverting patients with the means to pay for services away from private physicians in favor of the free care offered by dispensaries. The American Medical Association (AMA), which started gaining political leverage in the late 19th century, energized around the concerns of the private physicians and started a "campaign against dispensary abuse" to reduce the scope of dispensary services. As part of the AMA's tactics to restrict the scope of dispensaries, the facilities were construed as "purveyors of ill-considered charity to the unworthy" (Rosenberg 1974, 51). To calm the concerns of the AMA, dispensary administrators instituted more stringent income requirements for patients, requiring users to pass a "means test" before receiving free care at the facilities (Rosenberg 1974; Sardell 1988). The power of private physicians also regulated dispensaries and other public health facilities to the provision of preventative services as opposed to curative efforts further protecting the "realm of the physician" as a profession (Sardell 1988). Facilities that overstepped their bounds in the eyes of the AMA found little political support at all levels of government and eventually closed. Legislative bills for the expansion of public health efforts into curative models failed to pass in Congress due to the powerful medical profession lobby (Sardell 1988).

Dispensary Services & the Worthy Poor

During the 18th and 19th centuries, patients with financial means often received medical treatment at home and the use of hospitals were generally reserved for "strangers and the poor" (Sardell 1988). Unlike contemporary CHCs, dispensaries offered "second-class, routine, episodic medicine" characterized by minor surgery, tooth extractions and common prescriptions (Rosenberg 1974). Most dispensaries employed one or two full-time physicians, a full-time apothecary, and a staff of new physicians or medical students who were often tasked with completing home visits for particularly acute patients (Rosenberg 1974). Similar to contemporary health-seeking patterns, dispensary patients were disproportionately female with most patients presenting for relatively benign ailments such as the common cold, bronchitis, and dyspepsia. Vaccinations were also a common visit purpose. Dispensary death rates were relatively low at two to three percent of patients treated (Rosenberg 1974).

Due to the philanthropic nature of dispensaries, many dispensary physicians were also "de facto" social workers, providing social services and connections beyond the scope of immediate medical care. Many of these social-minded physicians understood the basic effects of structural forces on their ability to effectively meet the health needs of indigent populations. In many cases, dispensary physicians developed nursing-based auxiliaries with the purpose of providing food, nutrition counseling, and hygiene education to the poor, demonstrating their understanding that "medicines could only be of marginal help when patients had to return to work before their complete recovery, while

their homes had no adequate heat, their tables only impure and decaying food"

(Rosenberg 1974, 48).

In addition to their philanthropic motivations, dispensary physicians also

recognized that caring for the medical needs of the poor was a smart economic

investment. Rosenberg points out:

> Other, more mundane, motives always coexisted with such humanitarian
> appeals. One was the familiar mercantilist contention that maintaining the
> health of the poor would not only save the tax dollars implied by the
> almshouse or hospital care of chronically-ill workers, but would aid the
> economy more generally by helping maintain the labor force at optimum
> efficiency. (Rosenberg 1974, 38)

This sentiment that was echoed in the justification for the war on poverty decades

later. It is also important to note, that amongst philanthropists at the time, there was also a

moral distinction between the "worthy poor" and those whose poor character placed them

at an economic disadvantage due to their "imprudence, filth and sexual immorality"

amongst other characteristics (Rosenberg 1974). Members of the latter group included

"the drunkard, the lunatic and cripple"; while the former included "married women of

respectable character" and hard-working and able bodied men in periods of sickness or

unemployment (Rosenberg 1974). By the mid-19th century, immigrants made up a

disproportionately high number of dispensary patients, which challenged the "Christian

benevolence" of dispensary supporters who saw themselves as doing God's work for the

worthy poor. Consequently, dispensary physicians increasingly found themselves unable

to relate to the "alienness" of their new clientele, leaving the physicians less committed to

the calling of charity health care. American-born dispensary users were also skeptical of

the newcomers, and increasingly avoided the facilities as a place for immigrant care. Rosenberg quotes a Boston dispensary physician stating, "deserving American poor…were often deterred from seeking aid because they shrink from seeming to place themselves on a level with the degraded classes among the Irish" (1974). These demographic changes in the dispensary clientele coupled with the negative reaction of traditional dispensary supporters were just the beginning of the dangerous decline of dispensary availability and use in the 19th century.

The Decline of the Dispensary

While dispensaries became prominent in the late 18th century and flourished in the 19th century, they all but disappeared by the 1920s. In 1871, 26 dispensaries treated nearly 20% of New York City's population; by 1900 there were approximately 100 dispensaries nationwide (Sardell 1988). Overall, there were three major causes for the decline of the dispensary. First was the changing demographic of the dispensary patient, as discussed in the previous section. Second was the fact that the dispensary growth pattern closely followed the growth and formalization of medical residency programs. As medical schools and hospitals increasingly developed their own outpatient departments and instituted a closed model of training using residency and internship program models, there was less of a need for dispensaries (Rosenberg 1974; Sardell 1988). Third was the connection between the perceived need for dispensaries and the economic cycle. Most dispensary funding came from private contributions from "physician-philanthropists" who not only donated financial gifts, but also donated their services. Dispensary

physicians also built formal and informal partnerships with other urban charities such as

the Children's Aid society, and the Board of Guardians for the Poor in order to maximize

the reach of their services (Rosenberg 1974). However, the charitable support of both

individual and organizational donors tended to dwindle as the economy worsened, with

the discretionary income and interest of philanthropists all but disappearing with the

onset of the Great Depression.

      In the end, despite the growing social need for dispensaries due to economic

downturn and the influx of new immigrants in need of health care, nearly none of the

facilities survived past the end of the Depression, and their patients were absorbed into

the newly formalized outpatient hospital system. The diminished demand for dispensary

patients for the purpose of medical training, coupled with the changing demographics of

the patient population and the declining economy, resulted in the relatively abrupt demise

of the dispensary in the United States. Private physicians treated the working class and

"worthy poor" charging nominal fees for their services, while hospital outpatient units

offered limited charity care for most others. However, there were substantial holes in this

approach to providing health care to vulnerable populations, as there was little

consideration for the increased number of individuals and families living in poverty and

with reduced access to medical care. As a result, millions of Americans routinely went

without care, which ultimately undermined the safety-net once provided by dispensaries.

CHC Program Beginnings

The American healthcare system primarily consists of two models of care: "curative" emphasizing the treatment and cure of disease, and "preventative" emphasizing the prevention of disease (Kant and Rushefsky 2005). The curative model, characterized by cutting edge technologies in the advanced treatment of disease such as curing cancer or mapping human DNA, is the most lucrative aspect of the modern medical profession as it tends to receive the most attention, funding, and consideration from legislators and the general public. As such, powerful medical organizations such as the AMA, tend to focus their efforts on the maintenance and growth of funding streams specific to the curative aspect of health, pushing the preventative model to the fringes of the profession and even into the realm of the public health sector, especially for socially disadvantaged populations. Conversely, public health initiatives have historically been associated with the preventative care model as characterized by the sanitation effort of the nineteenth century, the push for immunizations in the twentieth century, and Michelle Obama's contemporary "Let's Move" campaign in the twenty-first century (Let's Move 2016).

Despite the relative wide-spread acceptability of Mrs. Obama's recent health campaign, public health programs have historically received limited enthusiasm and support from the federal government. Generally speaking, public reaction to social health crises has oscillated between apathy (such as the response to malaria and respiratory infections) and a strong collective response (such as the response to yellow fever and smallpox) (Duffy 1992). In their historical review of public health efforts, Kant and

Rushefsky (2005) argue that the public health sector has long suffered from "benign neglect" by the federal government. Public health efforts are often perceived by the public as targeting deviant behaviors of a small subset of the population who are sick due to their own poor choices and behaviors, which has translated into low levels of support and funding in Congress (Kant and Rushefsky 2005). Moreover, target populations are perceived to be disproportionately minority and/or economically disadvantaged resulting in a failure of the general population's ability to recognize the sweeping positive effects of public health efforts for society as a whole. This lack of political interest leaves most public health activities to be managed at the state and local level under block grants with little interference from the federal level (Kant and Rushefsky 2005).

Within this context, it is understandable that support for the establishment of CHCs did not emerge from public health efforts, but instead from an innovative social policy program, namely the War on Poverty. The national fixation on the issue of poverty, coupled with the activism of the 1960s, provided the financial opportunity for CHCs to formalize and receive federal funding under the guise of poverty prevention and management, an effort distinct from the realm of public health efforts. H. Jack Geiger is widely credited as the founder of the CHC program (Bailey and Danziger 2013). An academic and civil rights activist, Geiger was deeply concerned about health inequalities and the social causes of poor health. His model for indigent care in the United States proposed in 1964 was heavily influenced by Kark and Steuart's (1962) model of community-oriented primary care in South Africa. Geiger visited the South African site multiple times and was intrigued by the model where everyone in a defined area was

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considered a patient and consequently received specialized medical care and education in order to improve the health outcomes for the entire community. Geiger thought that is model could greatly benefit poor populations in the United States, but did not have a vison for its implementation and funding.

In the summer of 1964, Geiger served as a field coordinator for the Medical Committee for Human Rights providing health services to civil rights protestors and residents in the rural community of Mound Bayou, Mississippi (Bailey and Danziger 2013). By the Fall of the same year, Geiger had initiated a small community clinic in response to the staggering medical needs of the people living in that area. At the time, health outcomes for Blacks in Mississippi were comparable to a third world country. Due to extreme poverty and racism, many residents of Mound Bayou had never been examined by a doctor. Hospitals in the area were segregated and the availability of Black physicians was limited. Left with few options for care, Blacks eventually stopped trying to access traditional medical care at unwelcoming white facilities, and instead relied on home remedies which had a disastrous effect on health disparities for the region (Bailey and Danziger 2013).

In need of funding and a sustainable medical model for the community clinic, Geiger drew upon the historical success of the philanthropic funding model of the dispensary and reached out to a former colleague, Count Gibson, who was the chair of Preventative and Community Medicine at Tufts Medical School in search of a partnership agreement. In the proposed agreement, the medical school would provide some funding and oversight for the health center, while the site would offer Tufts students experience

with and access to a community-based health care model (Sardell 1988, Bailey and Danziger 2013). Situating the need for a health center within the context of a larger action plan to address the severe poverty in the community, the pair then approached the federal government for federal support and funding to augment the funds provided by the University, first seeking assistance from the surgeon general of the Department of Health Education and Welfare (HEW). Their timing perfectly coincided with the establishment of the OEO, to which they were immediately referred. Although the duo initially requested $30,000 for a feasibility study – they were granted $300,000, ten times the amount requested. With the additional funds, Geiger and Gibson expanded their plan to include an additional health center in South Boston near Tufts in the Columbia Point neighborhood.

The medical landscape in Boston was different, but just a dire as Mound Bayou. In Columbia Point, there was extreme poverty and medical need in the shadow of the elite medical and academic institutions of the city. Charity care was fragmented and not easily accessible by disadvantaged communities. There was also a lack of private physicians outside of hospital outpatient systems. In 1941, 65% of doctors worked in the communities in which they lived; this number plummeted to less than 40% by 1960 (Bailey and Danziger 2013). These factors created an excellent opportunity for health centers to bring services to urban communities with limited primary health care access. Columbia Point became the first of such facilities in the nation.

The expansion of the project scope, coupled with the need to expeditiously award OEO funds within the first year, resulted in another significant increase of Geiger and

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Gibson's budget from $300,000 to $1.3 million within a matter of weeks. However, not everyone was enthusiastic about the federal support of CHCs (Sardell 1988). External critics argued that the health center model weakened the traditional health system through its integration of the traditional separation between primary care and public health, disregard of boundaries between public and private medicine, utilization of a salaried group practice model (which challenges the fee-for-service model), and the promotion of a more diffuse patient-centered care model where the physician is a part of a larger team of professionals managing the patient's health (Sardell 1988). Harkening their opposition to the dispensary program decades earlier, the AMA initially opposed the funding of the CHC program stating that charity care currently offered by existing health professionals eliminated the barrier to care for poor populations.

CHC advocates pushed back, arguing that charitable care was limited due to barriers to receiving care including but not limited to transportation issues, long wait times at clinics, and a distrust of traditional hospitals and physicians (Gillette 2010). The AMA retorted with the argument that the War on Poverty programs created an unmanageable need for care which overwhelmed the charity care system which explained the long wait times and unwelcoming climates. OEO and program administrators countered that the programs were not creating "need" but "demand" and reminded the AMA of their clam that "no one" should lack medical care because of cost (Gillette 2010). In the end, the AMA generally accepted the CHC program as long as the centers restricted themselves to the treatment of indigent populations and implemented income

verification requirements for patients, similar to the restrictions placed on dispensaries a century earlier (Sardell 1988).

Within the OEO, Shriver was also skeptical about whether the program would be a success partially due to the lack of his role in its development and the challenges presented by the AMA (Sardell 1988; Bailey and Danziger 2013). To satisfy his doubts, Shriver enlisted the leader of the Head Start program, a program in which Shriver was heavily involved, to weigh in on the benefits of expanding the funding of Geiger and Gibson's project. The Head Start administrator, who was also a physician, supported the need for the health center and thus "saved" the program from being cut before it started. The grant was approved 6 months after initial conception in June of 1965 (Bailey and Danziger 2013). Within the next 18 months, the OEO was supporting similar CHC projects across eight cities.

Boston, Massachusetts soon became the epicenter of the CHC program as the Columbia Point facility had high visibility due to its connection to an elite university and strong congressional support. The site was widely considered an immediate success as Tufts took an existing home visit program and formalized it into an OEO funded health center within a housing project. A year after the center's opening, Senator Ted Kennedy became one of the most vocal and constant supporters of the program. With Kennedy's help, the CHC program was authorized two years later in 1967 with a $51 million earmark; thirty-three new centers were funded in the following year (Bailey and Danziger 2013).

In an attempt to leverage the success of the OEO CHC program, in 1968 the U.S.

Public Health Service (PHS) began funding health centers through their agency. This

effect was distinct from the OEO program, and was an attempt to reframe the discussion

away from poverty in favor of the coordination of national health care resources across

both the public and private sectors (Sardell 1988). Traditionally, the PHS:

> Avoided programs in areas in which organized medicine was sensitive:
> programs that might influence the delivery system of medical care in the
> United States, and programs that involved the federal government directly
> in financing continuing integrated care to significant numbers of
> Americans. (Sardell 1988, 69)

The position of PHS was a reflection of the long-term battle between the public

health sector and traditional medicine. As a result, the PHS health center program was

less successful than the OEO version and remained relatively small until it was merged

with the OEO program during the Ford Administration. Because of the historic interplay

between the PHS and the medical community, the scope of the PHS CHC program had a

relatively small funding base as compared to the OEO programs. As a result of the strong

lobbies and power behind medical doctors, public health agencies were often required to

stand down and bend to the general will of physician lobbies, the AMA, and other

medical-based interest groups, which ultimately led to the demise of the PHS program

(Kant and Rushefsky 2005).

Growth of the CHC Program

Consistent with the legislation that established the OEO, early health center federal guidance was vague. The centers were to provide a wide range of ambulatory services, be accessible, involve the community, collaborate with other agencies, and make use of Medicaid and Medicare funding, but there were few guidelines regarding the specific services to be provided (Bailey and Danziger 2013). During the first four years of the program, medical schools and hospitals with outpatient centers received the majority of funding dollars, but there was an ongoing tension resulting from the federal requirement of meaningful community involvement as the medical profession was not used to receiving guidance from outside entities. Local health departments also struggled with the program requirements as they were not accustomed to providing comprehensive care and were often "fearful of upsetting private practitioners" by stepping on their toes (Bailey and Danziger 2013). Capitalizing on this tension, community-based activists fought to separate CHCs from academic institutions and hospitals, emphasizing the need for the program to be driven by community need, not institutional missions and goals. The activists ultimately won this battle because of the OEO's commitment to the community-centered model, and they subsequently pushed for and ultimately acquired legislation that required each center to have a majority-user advisory board, or a governing board where users comprised at least one-third of the committee (Bailey and Danziger 2013). These new requirements prompted most hospitals, medical schools, and local health departments to opt out of the program. Unfortunately, once separated from larger institutions, many health centers had strained relationships with their previous

institutions with CHC physicians finding it difficult to obtain admitting privileges and specialty care for uninsured patients (Bailey and Danziger 2013). Professionalization of the CHC staff also became a concern once larger institutions abandoned the program, leaving less experienced administrative staffs to manage operations. The OEO subsequently offered governance training to health center administrators and community board members in an effort to help alleviate this problem.

Five years after the initial disbursement of program grants, there were one-hundred centers receiving funding from OEO, compared to thirty-three centers just two years prior to that year. Three pieces of legislation in the 1970's contributed to the rapid expansion of the CHC program. First, the National Health Service Corps (NHSC) program was authorized in 1970 under the Emergency Health Personnel Act, which proposed to increase the availability of medical professionals in "medically-underserved" communities with low physician to population ratios (Bailey and Danziger 2013). To encourage doctors to relocate to these areas, NHSC providers were offered financial remission for their medical school loans in exchange for providing care in these areas for a specific period of time, usually five years. While the NHSC contributed to an influx of physicians in underserved areas, research is mixed regarding whether physicians stayed in these areas after the initial reimbursement period. Nonetheless, the increased supply of physicians promoted the growth of CHCs in new underserved areas (Bailey and Danziger 2013). Second, in 1973, Congress specified and expanded the definition and calculation of "medically underserved areas" to include the consideration of percentage of people living in poverty, infant mortality rates, and the percentage of elderly residents, in

addition to the physician-to-population ratio in areas of interest (Bailey and Danziger 2013). This change subsequently increased the number of communities that became eligible to receive a funded health center. Many non-profits including churches took advantage of these new eligibility requirements, applying for new access point grants. Finally, in 1975, Congress authorized CHCs as "community and migrant health centers," reflecting the centers' commitment to various at-risk populations including the homeless, migrant workers, those living in public housing, and those with limited English proficiency. "Medically underserved areas" were also renamed as "health professional shortage areas," a required designation for the majority of social programs receiving federal assistance, including the CHC program.

In 1989, the CHC program received another boon as Congress authorized a new "federally qualified health center" designation for the centers which reflected their new eligibility for cost-based reimbursement from Medicaid. This was a huge financial win for centers as they could now be made "whole" and receive a full cost reimbursement for every Medicaid patient seen in their centers. Because the rates were based on the aggregated cost of all patients plus overhead, the favorable rate also helped to offset the cost of treating the uninsured, and for enabling services such as case management, outreach, health education, nutrition, and translation services (Bailey and Danziger 2013).

Despite the exponential growth of the CHC program since its implementation, the program has still faced significant external criticism and restrictions. Local physicians and pharmacists treating indigent populations have continuously raised concerns about the programs citing the funding and reimbursement structures for the centers as unfair, in

that CHCs receive both grants monies and Medicaid reimbursement rates that are based on services provided as well as overhead costs in order to offset the costs of uncompensated care, which is not the case for traditional providers (Sardell 1988). There has also been a great deal of effort by legislators and interest groups alike put into "structuring the issue" around the provision of charitable care to needy populations in a manner that is non-threating to the traditional model of health care (Sardell 1988). As a result of the strength of the medical lobby, the legislative support for the CHC program has fluctuated overtime, although in the end, it has withstood the budgetary and political challenges to its existence.

<div align="center">Surviving Administration Changes</div>

Over the past fifty years, support for the CHC program has been subject to the changing landscape of federal politics (Lefkowitz 2007). No President since Johnson has made poverty a national priority, although healthcare in general has received some specialized attention, especially around the issue of universal health care (Bailey and Danziger 2013). It is the policy networks comprised of activists, interest groups, and key legislators that have kept the CHC program on the national agenda and funded over the years (Sardell 1998). Lefkowitz (2007) offers a list of reasons for the program's political survival over the past five decades:

1. **The program is easy to understand**: the goal of the CHC program is simple – provide increased access to health services to those in need. Providing free or subsidized healthcare that is easily accessible is, on the surface, is a logical

approach to eliminating barriers to care for at-risk populations. This is a simple concept which easily understood by voters and legislators alike, despite its shortcomings in practice.

2. **CHCs provide concrete services**: The provision of basic primary care services such as physical exams, prenatal care and immunizations are widely accepted as correlated with improved health outcomes for individuals and society. The provision of these services are also relatively easy to quantify as a marker of the program's effectiveness.

3. **The program has bipartisan support:** Over the years, both Democrat and Republican administrations have supported the idea that basic healthcare should be accessible to all Americans, although the degree and magnitude of such services have been debated.

4. **The program's integration with Medicaid and Medicare:** Nearly half of CHC patients have Medicaid or Medicare insurance. By connecting their viability to these well-established programs, advocates of the CHC program have successfully intertwined the importance of the Medicaid and Medicare program with the need to support CHC programs on a federal level.

5. **Demonstrated success:** CHCs have strict reporting requirements as it relates to the number of patients that they serve and selected measures of health. Through the collection of these statistics, the CHC program has been able to make the case for the maximization of their federal funding allocation in order to reinforce the country's medical safety-net.

Tracing the program's long term success on a federal level, the following section highlights key changes in the oversight and legislation of the CHC program following Johnson's administration. The timeline demonstrates that while no other administration since Johnson has demonstrated a strong a federal commitment to the War of Poverty programs, the CHC program has managed to survive (and even thrive) as a result of the efforts of a few key legislators.

Nixon: 1969-1974

Elected in 1969, President Nixon immediately instituted a "new Federalism policy" with the goal to rollback many of Johnson's War on Poverty Programs (Lefkowitz 2007). Nixon was critical of Johnson's Great Society programs and endeavored to reduce the role of the federal government in social policy by shifting the onus of social policy down to the state level (Sardell 1988). The CHC program initially fared well through the change as compared to other poverty programs; however, the OEO as a distinct federal agency only lasted through Nixon's first term. Once the agency was eliminated, block grants managed at the state level were enacted for most of the OEO programs. In 1970, the oversight of the CHC program was transferred to HEW, which had a more conservative approach to indigent health care than the former OEO (Lefkowitz 2007).

With the transition from OEO to HEW, CHC program administration shifted from the federal level to regional HEW offices. Ironically, administrative decisions made by regional offices proved to be relatively unsympathetic to the communities served by the

CHC program. Between 1971 and 1973, there were 150 funded CHCs across the country, but no new grants were issued during this time period (Sardell 1988).

In 1973, Nixon proposed legislation to phase out the funding of CHCs pursuant to the belief that they could be self-sufficient. Ted Kennedy, who was then the head of the Senate Labor and Public Welfare Committee and a long-term support for the program, drummed up legislative support for CHCs, putting a damper on Nixon's attempt. In response to Nixon, Kennedy introduced a bill that not only increased support for the CHC program, but also specified the program in its own section of the Public Health Act.

Ford: 1974-1977

Nixon resigned in 1974, and President Ford pocket-vetoed Kennedy's CHC bill in 1974 with a full out veto 1975. Again, Kennedy flexed his political strength, and Congress ultimately overrode Ford's veto (Lefkowitz 2007). Senator Kennedy's 1975 legislation reauthorized the program, and specifically demarcated the required programmatic components for eligible centers receiving federal funds including the provision of primary and secondary services, and the need for a consumer board (as opposed to advisory board). The legislation also permitted CHCs to maintain 50% of excess funds received from third party and uninsured patients to reinvest in operations, a rare financial benefit for organizations with non-profit status.

During Ford's administration, the CHC program continued to be administered through the HEW Bureau of Community Health Services. During this time, HEW developed initial "Medically Underserved Area" (MUA) requirements and the Uniformed

Data System reports which "allowed the calculation of productivity and financial indicators – at first unpopular with the centers, but a major advantage in arguing their case with conservative decision-makers" (Lefkowitz 2007, 15). HEW also greatly expanded the program across many new congressional districts in rural areas and cities. The number of grantees grew exponentially from 158 in 1974 to 872 in 1980; however, the newer centers tended to be small in size, bringing the total CHC patient population to about 5 million users in total. Newer health centers also favored a "lean and mean" model, cutting non-essential services such as transportation and nutrition which were characteristic of traditional centers (Lefkowitz 2007).

The National Association of Community Health Centers (NACHC), the national advocacy group for CHCs, was also founded in 1975 during this time of expanded federal support for the CHC program.

Carter: 1977 -1981

Carter's administration brought social policy administration back to the federal level from the states, which proved beneficial for the CHC program (Sardell 1988). As a part of a larger effort to implement policy that favored preventative care over advanced research and care, Carter proposed a significant funding increase for the CHC program. During his administration, the CHC program was formally reauthorized under section 330 of the Public Service Act (National Association of Community Health Centers 2015). Congress also passed the Rural Health Clinic Services Act, which expanded the CHC program to include both community health and rural health centers (Lefkowitz 2007).

The first *Healthy People* national report card of health trends was also issued during

Carter's tenure, which reinforced the federal commitment to addressing the factors

contributing to poor health outcomes for all Americans.

Reagan: 1981-1989

Fiscally conservative in his approach, President Reagan eliminated HEW,

transferring social health programs to the Department of Health and Human Services

(DHHS). As a part of the transfer, Reagan proposed that ten of the programs, one of

which was the CHC program, be put into a block grant with a 25% reduction in funds – a

recommendation that was met with considerable opposition from legislative supporters

on behalf of health center interest groups. Reagan's revised proposal was to put the health

centers into a voluntary block grant– if the states opted out, the federal coverage would

continue (Lefkowitz 2007). Health centers vehemently opposed the block granting of the

program and challenged the case in court, eventually winning their position. NACHC

played a pivotal role in the legislation and congressional events, as did the centers'

community boards which had many politically powerful and well-connected members.

"Thus the fight against what advocates called 'block and slash' tactics of the Reagan

administration was pursued on local, state and national levels" (Lefkowitz 2007, 19).

After the coordinated attack by CHC advocates, Reagan could not find a

congressional sponsor for his model. Despite this victory, the health center program still

experienced a reduction in its appropriation from $368 million in 1981 to $321 million in

1982. The effects of the cuts disproportionately trickled down to the individual centers.

Instead of cutting funding proportionally across all CHCs nationally, funding decisions were based on need based calculations. In the end, 187 centers out of nearly 900 were completely phased out, with others receiving severely reduced funding (Lefkowitz 2007). Nonetheless, the CHC program was reauthorized in 1988 despite the funding cuts (National Association of Community Health Centers 2015).

H.W. Bush: 1989-1993

The strong support for the CHC program on the Presidential level resumed under the H.W. Bush Administration. During this time, NACHC worked with the staff of liberal GOP senator John Chafee to develop a comprehensive reimbursement solution for health centers, the FQHC program. Through this new program, CHCs would qualify for FQHC status making them eligible to receive cost-based reimbursement rates from state-sponsored insurance plans. Medicaid quickly replaced a large portion of the federal grants and became the primary source of funding for the CHCs during this period and beyond.

Clinton: 1993-2001

During Clinton's administration, CHC appropriations increased by 65% from $757 million in 1995, to $1.2 billion in 2001 (Lefkowitz 2007). Despite this increase, the Clinton administration was not as supportive of the program as supporters anticipated. The program endured a major reform effort focused on managed competition, ultimately

resulting in the Health Center Consolidation Act of 1996, which consolidated all of the federal indigent health care efforts into one agency (Lefkowitz 2007).

G.W. Bush: 2001-2009

During his campaign and throughout his presidency, George W. Bush was a strong advocate of the health center program, even supporting the doubling of health center capacity (Lefkowitz 2007). Health centers benefited greatly from Bush's "compassionate conservativism" stance, which put them at the top of his social welfare priorities. Congress, however, was not as generous and in 2006 appropriated only $48 million of a $327 million budget increase proposed by Bush due to the federal deficit (Lefkowitz 2007). Although the full increase was not realized, the additional funding did allow health centers to focus on the provision of additional auxiliary services including dental care, substance abuse, and mental health (National Association of Community Health Centers 2015).

Obama: 2009 – Present

The CHC program was an integral component of President Obama's Affordable Care Act of 2010 (ACA). The ACA infused an additional eleven billion dollars into the CHC program over a five year period over and above the two billion dollar annual allocation for the expansion and infrastructure improvement of the nation's healthcare safety-net (Kaiser Family Foundation 2013). According to ACA projections, the proposed increase of insured Americans through expanded Medicaid and the health

insurance exchanges, is expected to increase the number of CHC patients from 44 million patients in 2015 and up to 50 million by 2019, compared to 19.5 million served in 2012 (Bailey and Danziger 2013). To meet this demand, it is estimated that the CHC program will need an additional 15,500 primary care physicians and 12,000-14,000 thousand nurses, in additional to the thousands of staff needed to support the expansion.

Conclusion

In her conclusion, Lefkowitz argues:

> We are constantly admonished to learn from history, but as I have traveled around the country I've also seen a jarring disconnect between the rich, emotional legacy of health centers and their need to compete in a modern marketplace as sophisticated providers. (2007, 135)

As illustrated by the ebb and flow of health center support over various administrations, health centers have needed to adapt to the social-political forces that shape the perception of the centers in society. As a result, CHCs have become highly dependent on the strength of advocacy and lobbying efforts by individual legislators, lobbyists, and advocacy groups to ensure their relevancy and existence.

Still, CHC advocates are not as powerful as the AMA or other physician-directed interest groups (Sardell 1988). As with many social programs, funding of the CHC program has not kept pace with the increasing costs of quality care provision. In fact, per capita health center funds decreased between 1985 and 2006 in real dollars (Bailey and Danziger 2013). This financial reality has required the program to be more sensitive to the requirements of funders, as opposed to the unique needs of their communities. As a

result, reporting and standardization have become a priority as centers are required to do more with less, and to make their operations as efficient as possible. This is a far cry from the early days of the program, where communities set the agendas and success was measured by the positive outcomes for the individual and the relative transformation of community poverty.

By tracing the CHC program from its precursor of the dispensary, to its experimental beginnings as a community empowerment and poverty program, to its eventual fortification as a medical safety-net for the nation's healthcare system, I have attempted to illuminate how and why the CHC program has needed to adjust to the political and social landscape in order to maintain its long-term viability. I argue that with this transition came the danger of a shifted focus away from community-centered health, and toward individualistic health outcomes rooted in the belief that sick communities can be transformed by the mere improvement of access. Today, the success of the CHC program is often measured in Congress by the millions of dollars saved in emergency room visits and uncompensated care, as opposed to the improvement of health outcome for our most vulnerable communities. Through this chapter, my goal has been to illustrate the how the social, political, and economic environment has necessitated this shift in focus for the CHC program. In the next chapter, I will discuss the current CHC landscape in contrast to its beginnings and lay the groundwork for my quantitative analysis.

CHAPTER 3

LITERATURE REVIEW & CONCEPTUAL MODEL

Introduction

In contrast to its experimental beginnings, the CHC program is currently a

permanently authorized federal program funding more than 1,200 health centers which

provide care through 9,000 service sites across the country (National Association of

Community Health Centers 2016). Over the past five decades, the CHC program has

enjoyed sustained support and advocacy at all levels of government, with limited

criticism from academic and policy experts (Taylor 2004). However, in an effort to

respond to fluctuating stakeholder expectations, CHC advocates and administrators have

gradually modified the focus of the program over time from the provision of healthcare

for the purpose of community empowerment and the eradication of poverty, to the

provision of healthcare in an effort to fortify the nation's healthcare system and reduce

the aggregate cost of uncompensated care. In this chapter, I argue that by primarily

focusing on the latter goal, the program's initial focus on the eradication of fundamental

social causes of poor health become secondary and generally unaddressed. This shift is

partially evident in the persistence of health disparities within disadvantaged

communities, despite the billions of dollars invested annually into the healthcare safety

net.

The purpose of this chapter is to describe the current CHC program landscape,

including patient demographics and services offered by the program. I will also provide

an overview of the current CHC efficacy literature and assess the strengths and potential

areas of improvement for existing studies. Finally, I will review the current research on

the relationship between access and health and introduce how my research will fit into the

current discourse on this issue. The chapter ends with the introduction of my conceptual

model, including the research questions and hypotheses that my research addresses. The

goal of this chapter is provide important context for my analysis by making the

connection explicit between the CHC program's beginnings, its current role in the

national healthcare landscape, and its current emphasis on access.

CHCs in the 21st Century

Serving a mixture of uninsured, insured, and underinsured patients, contemporary

CHCs position themselves as "provider[s] of choice, rather than provider[s] of last resort"

in today's health care landscape, evolving from "fringe providers" to critical components

of the nation's healthcare structure" (Katz et al. 2011). In the years since the

implementation of the ACA, the capacity of the CHC program has grown rapidly, due to

increased federal support, and improved its managerial acumen as necessitated by

increased public attention on the program's efficacy (Katz et al. 2011). Demographically,

CHCs primarily provide services to the most vulnerable populations in the United States

as they did in their earlier experimental years. The average household income of a CHC

patient is at or below $24,250 for a family of four (Office of the Assistant Secretary for

Planning and Evaluation 2015), and nearly 35% of patients lack insurance (National

Association of Community Health Centers 2014). Of those that are insured,

approximately 62% have state-subsidized Medicaid or CHIP insurances, 12.5% have Medicare, and 25% are privately insured. Moreover, 91% have household incomes at or below 200% of poverty, 64% are racial and/or ethnic minorities, and 29% are best served in a language other than English (Lefkowitz 2007).

Underscoring the serious health inequalities in modern society, Politzer et al. remind us that, "poor people can expect to live shorter lives with more chronic illnesses, and black children are two and a half times more likely than white children to die within the first year of life" (2003, 296). Moreover, those living in poverty are more likely to live in a disadvantaged neighborhood; there is a statistically significant association between neighborhood disadvantage and poor health which persists even after controlling for personal characteristics (Ross and Mirowsky 2001; Wen et al. 2003). Recognizing the distinct health needs of underserved populations, the CHC program strives to provide a broader and more culturally sensitive scope of care than traditional health care providers. By design, CHCs are located in communities with high poverty rates and limited access to health care. While there are CHCs located in every state, they tend to be clustered within and around urban areas. As a result, CHCs reach only about 25% of all Americans estimated to have inadequate access to primary care. According to NACHC estimates, more than 62 million Americans live in areas with a shortage of primary care physicians, but this number would grow to by more than 21 million if the CHC program did not exist (National Association of Community Health Centers 2014). Although nearly 79% of individuals without adequate access have some sort of health insurance, the population is still labeled as "medically-disenfranchised" and is considered to be a subset of a larger

"medically-underserved" population due to the lack of access to primary care services

(National Association of Community Health Centers 2014).

Describing their provision of care as "patient-centered," CHCs seek to treat the

needs of the full person as opposed to solely focusing on the diagnosis and treatment of

disease. In addition to primary care services, CHCs offer mental health, nutritional, and

social services as well as enabling services such as transportation support and discounted

medications. Some CHCs also provide assistance with the navigation of hospital systems

for uninsured patients requiring specialty care. A critical distinction between CHCs and

traditional primary health care providers is that CHCs provide service to patients

regardless of the patients' ability to pay (Taylor 2004). This "needs based" approach is an

effort to eliminate the financial barriers to care for uninsured populations. The centers

also actively assist eligible uninsured patients with the insurance application process for

Medicaid and Medicare coverage, as well as coverages available through the ACA, in

order to enroll as many uninsured patients in state-subsidized insurance plans as possible

(Katz et. al 2011).

Financial Incentives & Medicaid

While firmly rooted in its altruistic mission to serve as a medical safety-net for the

poor, there is also a substantial financial incentive for health centers to participate in the

federal CHC program. As discussed in the previous chapter, the status of FQHC confers a

number of financial benefits to CHCs which are not available to traditional primary

healthcare providers. CHCs with FQHC status can apply for federal, state, and local

grants to support capital and operational costs, receive discounted medications through the 340B program, access physicians through the National Health Service Corps, and receive group medical malpractice liability protection at no cost under the Federal Torts Claims Act of 1992 and 1995 (Katz et al. 2011; U.S. Department of Health and Human Services 2016). The most substantial financial benefit for CHCs is the cost-based Medicaid payment structure. In an effort to subsidize indigent care and minimize the outlay of federal grants, states provide "wrap-around" payments to CHCs at a rate equal to the centers' fully-loaded cost of care, including operational expenses (Takach 2008). This Medicaid reimbursement rate is significantly higher than that offered to private physicians, and is in addition to a monthly capitation payment.

The traditionally low Medicaid reimbursement rates for private physicians creates a disincentive for private physicians to service Medicaid patients, while simultaneously incentivizing CHCs to grow their Medicaid base in order to meet demand. A 2011 survey of ambulatory primary care physicians revealed that although 96% of physicians accepted new patients, 31% were unwilling to accept new Medicaid patients (Decker 2012). The author also found that physicians located in metropolitan areas were less likely to accept Medicaid than physicians located in more rural areas. Conversely, in many regions CHCs partner with the State to become a preferred provider in the Medicaid primary care network. In the most successful partnerships, CHCs are the default primary care physician for new enrollees that do not specify a provider or plan at the time of enrollment (Katz et al. 2011). Critics argue that the CHC program's prioritization of Medicaid patients is to the detriment of uninsured populations, as uninsured individuals

are overlooked and/or pushed towards city clinics and other charity providers in favor of Medicaid patients (Katz et al. 2011). In the Philadelphia metropolitan area, which is the focus of my research, these alternative charity care sites are limited as city clinics fall into the category of FQHC look-alikes and as such are federally recognized as part of the official CHC program. However, in many states this is not the case. As a result in these localities, alternative charity care may include public health clinics and clinics managed by churches, school based programs, or other non-profits such as homeless shelters and substance abuse treatment centers, which are subject to neither the benefits nor the requirements of the federal program.

While the federal government does require at least 30% of CHC patients to be uninsured, there is little financial incentive for centers to exceed this quota. Further complicating this issue is the fact that nearly one-third of the uninsured population is made up of undocumented immigrants who are ineligible for Medicaid and ACA benefits (Katz et. al 2011). Research has also shown that the provision of enabling services such as mental health, nutrition, and social services, which were a hallmark of CHC services, are not consistently offered across all CHC sites due to barriers of cost. Furthermore, these supplementary services are not monitored, required, or sufficiently funded by the federal government, nor are they consistently reimbursed by insurance companies (Wells et al. 2009).

Inadequacies in Design

While the CHC mission exhibits considerable sensitivity to the non-medical risk factors influencing health, it stops shy of fundamental engagement with the structural factors exacerbating poor health for vulnerable populations (Link and Phelan 2002). This limitation in scope is problematic, especially in light of the persistence of health disparities amongst socially disadvantaged (Agency for Healthcare Research and Quality 2013). By focusing on risk factors such as access and diagnostic testing/screenings, as opposed to the fundamental social causes of disease, CHCs offer a superficial and temporary solution to the problem of health disparities in the United States. This is in stark contrast to the early days of the CHC program when the program focused on addressing the social issues plaguing the health of communities and was implicitly linked with other social programs with the purpose of the eradication of poverty. While risk factors are easier to manage and report for the viability of the program, the original mission of transforming the health of entire populations and communities becomes lost. As safety-net medical providers, CHCs are one of the few programs that are close enough to the community to initiate real change in addressing some of the fundamental causes of poor health impacting our most vulnerable communities.

Another shortcoming in the design of the program is its foundational assumption that those who are ill will accept their "sick role" and willingly become patients if given the opportunity to do so (Parsons 1951). CHCs are promoted as easily accessible, quality health care option available to anyone that seeks them out. Further perpetuating this normative belief, federal reporting requirements compel the centers to provide annual

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progress data for all patients within the centers' care; however, non-regular users and some non-compliant patients (such as diabetics that come for services less than twice in a year) are generally excluded from the scope of the reporting (Bureau of Primary Health Care 2013). With health centers serving just a fraction of the medically-vulnerable people in United States, there is a large proportion of the population that could benefit from CHC programming, but are not users (Politzer et. al 2001). These non-users may become further disenfranchised and stigmatized due to their perceived non-compliance, as CHCs do little to pull potential patients into their care due to a lack of resources. This focus on traditionally-compliant patients coupled with the emphasis on risk factors as opposed to the fundamental causes of disease, systematically leaves the most marginalized populations out of the safety-net process to the detriment of population health outcomes.

CHC Efficacy Literature

Existing CHC efficacy research supports the assertion that CHC patients exhibit more positive indicators of health, better access to care, and higher satisfaction than patients with similar personal characteristics and receiving care at private medical facilities which do little to address the social needs of their patients (Politzer et al. 2003, Shi et. al 2004, Strelnick 2005, Hicks et al. 2006, Dor et al 2008). Outcome variables such as patient satisfaction rates, evidence of standardized care plans, preventative screenings rates, and documented improvements in chronic disease measures are common methods for measuring efficacy among researchers, interest groups, and legislators alike (Lefkowitz 2007). In a typical study, O'Malley et al. (2005) assess CHC

effectiveness based on the number of hospitalizations and emergency department visits for ambulatory care for CHC patients as compared to similar patients seeking care in non-CHC practices. Similarly, in their meta-analysis of CHC efficacy studies, Bailey and Danziger argue that "evaluations of CHCs on measures of quality of care, improving access, reducing disparities, and cost-effectiveness are overwhelmingly favorable," when comparing efficacy measures such as the percent uninsured patients served, the elimination of racial disparities in access, and decreased infant mortality and increase life expectancy for at-risk populations (2013, 249).

Despite the consistency of their findings, CHC efficacy studies share limitations as well. First, many studies compare CHC patients to non-CHC patients, but do not adjust for the likelihood that there may be a fundamental difference between patients who seek out medical care at CHCs and patients who do not (Politzer et al. 2001; Shi et al. 2004; Shi et al. 2009). In their 2001 study of CHC efficacy, Politzer et al. compare National Health Interview Survey (NHIS) responses of uninsured CHC patients to uninsured non-CHC patients and finds that CHC patients were half as likely to delay or forego care, or choose not to fill prescriptions due to cost. Preventative screening comparisons were also favorable to CHCs as the rate of clinical breast exams for uninsured CHC patients was higher than the national rate as measured by the NHIS for similar comparison groups. The rate of pap smears for the same group of CHC patients was even better as it exceeded both the national rate, as measured by the NHIS, and Healthy People 2000 goals (Politzer et. al 2001). The authors also found that uninsured CHC patients were also more likely to receive healthy lifestyle counseling as compared to the non-CHC patients, but rates were

still generally below the Healthy People 2000 goal, with the exception of physical activity and tobacco use counseling (Politzer et al. 2001). Similarly, Shi et al. (2009) compare selected health indicators for randomly selected CHC patients to a similar group of non-CHC patients and patients without a regular source of care. The authors find that the CHC patients had higher utilization of health care services than comparison groups and that racial and ethnic disparities in access and quality of care measures as defined by the National Healthcare and Disparities Report also disappeared for health center patients (Shi et al. 2009).

When comparing CHC patients to non-patients without controlling for social factors such as social capital, the study results, such as those cited above, may be susceptible to self-selection bias. It may be the case that the difference in health outcomes between the two groups reflects a measure of the inter-group difference as opposed to the effect of the CHC itself on health outcomes. While both the Politzer et al. (2001) and Shi et al. (2009) studies control for age, race and socioeconomic status, there are conceivably other social factors that distinguish individuals that choose to use CHC facilities and those that do not. Some of these factors may include the social capital of the individual, language restrictions, and geographic distance. I attempt to account for many of these factors in my research in an effort to minimize this potential self-selection bias.

Moreover, when considering Shi et al.'s (2009) study of CHC disparity reductions, one of the authors' main arguments is that a two-percentage point disparity in insurance rates between the "near-poor" and "poor" patient groups at non-CHC facilities disappears for CHC facilities therefore suggesting that CHCs eliminate the income

disparities for their patients as a function of the latter's patient-centered and holistic

model of care. While it is feasible that this outcome is due to programmatic and

operational differences between CHC and non-CHC facilities, it is also feasible that

higher income patients with insurance are more likely to utilize non-CHC facilities as

compared to those patients without insurance. Therefore, the CHC population may have a

lower percentage of higher income insured patients making the rate statistically

indistinguishable to the percentage of insured lower income patients (and thereby

statistically eliminating the disparity between income groups for the CHC facilities).

Through my research, I strive to account for the issue of self-selection by

controlling for a number of social factors including race and socio-economic status before

assessing the main effect between CHC access and health. Most importantly, my research

eliminates the distinction between users and non-users, instead comparing those with

proximal geographic access to those without geographic access, regardless of usage level,

while controlling for personal disadvantage. By doing so, my conceptual approach better

controls for the personal characteristics that may distinguish those that seek health care at

CHCs from those that do not. This is important because care-seeking behavior is likely

highly-correlated with other healthy behaviors that may influence health outcomes and

thus contribute to self-selection bias. However, it is still important to note that individuals

are not randomly distributed across the geographic scope of my analysis. Those living in

high disadvantaged urban areas are much more likely to have access to a CHC, but low

measures of health, while those living in more affluent suburban counties are less likely

to have access to a CHC, but have higher measures of health. As a result, there is still

some selection bias in my analysis, but it actually suggests that any findings of a positive association between access and health is actually a conservative estimate of the effect of CHC access.

A second limitation of current efficacy studies is that many studies use health indicators that are mandated by program reporting requirements, such as the administration of flu shots and pap smears, but exclude health indicators that are not readily tracked by CHCs or the federal government (Politzer et al. 2003; Schempf 2003; Shi et al. 2009). While these types of studies demonstrate evidence of the positive effects of CHC usage, it is unclear whether these findings can be extrapolated to other indicators of health such as self-reported health status or the prevalence of pain which are not widely tracked or prioritized by the CHC program. In their CHC efficacy study, Politzer et al. (2003) used low birth weight as one of the criteria for positive health outcomes and found that African-American female CHC patients deliver low birth rate babies at a rate 20% below the national average for African-Americans; a major success for the CHC program. Schempf et al. (2003) also finds evidence of higher immunization rates amongst children receiving care at CHCs compared to national rates, although rates were still below the expected range for African-Americans and patients with Medicaid insurance. While the results of these studies are important, my research expands the definition of health to include measures outside the traditional standards for the CHC program in an effort to isolate a broader effect of CHC access.

In response to the aforementioned limitations in the current body of literature, I argue that in order to fully assess the influence of CHC access on health disparities, it is

necessary to place the contributions of the CHC program within the larger social and

political context in which it functions (Bailey and Danziger 2013). This approach

necessitates the exploration of alternative definitions of health that may fall outside the

traditional scope of CHC mandated reporting, and the assessment of the impact of CHC

access not only for active patients, but for potential patients as determined by an

individual's proximity to CHC catchment areas. As explained in the previous chapter, the

CHC program is one of many programs with a goal of improving outcomes for socially

disadvantaged groups in the United States. It is therefore quite possible that the historical

success of the CHC program has been bolstered by larger political and environmental

changes such as legislative changes in healthcare, economic policy, and the combined

efforts of public policy programs in general, which may improve health outcomes for

CHC and non-CHC patients alike.

> Bailey and Danziger argue that:

> Although clearly the health of the poor improved dramatically since the
> War on Poverty…eliminating disparities is far more difficult, because
> health insurance and access to care are only two elements in influencing
> health; knowledge, resources, health-related behaviors, and security
> purchased through higher incomes are clearly other important
> determinants." (2013, 260)

The CHC program's risk-based approach to the reduction of health disparities is

beneficial for compliant and regular users of services, but does little to eliminate

disparities on a larger scale. Overcoming this hurdle requires a multi-pronged approach to

strengthening and expanding the safety net while leveraging resources that are already in

place to pull more patients into care, and to systematically focus on community building – an original goal of the program (Politzer et al 2001). The first few steps in this approach include understanding which groups benefit the most from the programs, identifying those groups that have access but do not show measurable benefits from said access, and understanding the social barriers contributing to this difference.

Access as a Risk Factor for Poor Health

Barrier-free access to quality health care is the cornerstone of the CHC program. In its promotional material, NACHC refers to *ACCESS* as an acronym illustrating the program's primary objectives: Affordable, Comprehensive Care, Expanded to Strengthen Service for All America (National Association of Community Health Centers and the Robert Graham Center 2007). Of the millions of Americans with insufficient access to primary health care, minorities and those living in poverty are grossly overrepresented as a proportion of this population (National Association of Community Health Centers 2014). Additionally, those at the bottom of the social stratification ladder often face barriers to quality health care including financial challenges, transportation issues, language barriers, and uncompassionate care, such as physicians that discriminate against patients as a result of social biases (U.S. Department of Health and Human Services 2008). Conversely, individuals without major barriers to quality health care are more likely to utilize preventative services and report more positive indicators of health.

The fiscal goal of the CHC program is to alleviate financial and personnel-related strains on the healthcare infrastructure through the provision of primary care access to vulnerable populations who would otherwise use emergency rooms, or forego care for ambulatory and preventative services (National Association of Community Health Centers 2008). The CHC program hinges its financial future on "the need to invest in accessible, affordable, high-quality primary care for all as a down payment on a more effective and efficient health care system" (National Association of Community Health Centers 2008, 3). The program asserts that an effective strategy for meeting this "primary care imperative" is to provide greater access to CHCs to those most in need.

The association between health care access and health is widely documented in epidemiological, public health, and medical sociology research (Saver and Peterfreund 1993, Casanova and Starfield 1995, Andrulis 1998, Lynch et al. 2000). Policy briefs generally supports the assertion that "widening access to an affordable and regular source of care in places where doctors are scarce helps break the cycle of disease and poverty" (National Association of Community Health Centers and the Robert Graham Center 2007, 13). More specifically, poor access to healthcare can result in delayed diagnosis and treatment of disease (Ayanian et al. 1993; Politzer et. al 2003). In their study of breast cancer mortality and insurance, Ayanian et al. find that uninsured women and those with Medicaid insurance generally present later for care than women with private insurance, resulting in the former group having more advanced cases of breast cancer when diagnosed (1993). Using the New Jersey State Cancer Registry and hospital discharge data, the authors found that the risk of breast cancer death was 40% higher for

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women with Medicaid and 49% higher for uninsured women as compared to women with private insurance. They conclude that access to a primary care physician, which is easier to obtain for the privately insured, increases the likelihood of early detection screening so that cancer is caught earlier in the disease cycle. They also suggest that hospitals with a high number of Medicaid and indigent patients may not have the technology for complex diagnoses potentially resulting in less effective treatment plans (Ayanian et al. 1993). In a later study, Politzer et al. reiterate this finding and argue that most cutting-edge medical technologies are not accessible to everyone due to high social inequalities in the U.S. health system (2003).

Studies have also suggested that access to insurance (Andrulis 1998; Lynch et al. 2000), the perception of the availability of health care (Saver and Peterfreund 1993), and physical proximity to services (Hadley and Cunningham 2004) have positive effects on health outcomes. Long-term uninsured individuals are shown to have more unmet health needs than the insured, and are more likely to go without care due to cost and are significantly less likely to have preventative care and diagnostic disease screening. (Ayanian et al. 2000). Recognizing the need for a multi-dimensional approach to the improvement of access, Ayanian et al. conclude that "Medicaid coverage alone – without efforts to enhance primary care and screening – may be insufficient to improve outcomes for poor women" (1993, 330). Similarly, NACHC argues that "focusing only on ensuring everyone had health insurance without ensuring them a regular source of primary care is like providing currency without a marketplace (2007, Executive Summary).

The concept of access is central to my analysis of CHC efficacy. My primary objective is to quantify the effect of having geographic access to CHCs on health outcomes for individuals. While access has been an important component of the CHC programs since its beginnings in the 1960s, it can be characterized as a means to two very different ends. Originally, primary healthcare access was a means for those living in poverty to address fundamental health issues that were preventing individuals from living healthy and productive lives. The concept of community was also very important as the CHC program was a part of a larger effort to transform the health of all members of a particular community. Now that the focus has moved away from the transformation of vulnerable communities and towards the reinforcement of the health care system as a whole, it is important to reassess the social benefits of CHC access for vulnerable individuals and communities.

Research Questions & Casual Model

The goal of this research project is to isolate the effect of access to a low-cost, quality health care option on health outcomes for individuals living in the Philadelphia metropolitan area. The following global research questions are central to my analysis: 1) What is the nature of the association between the availability of a low-cost quality health care option and measures of an individual's health status? 2) How does the effect of having access to a low-cost quality health care option on health vary based on the social characteristics of the individual? 3) How does the neighborhood in which one lives affect the association between the availability of low-cost quality health care options and the

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individual's health status? 4) How does the social connectedness of the individual affect the association between the availability of low-cost quality health options and health outcomes for the individual? These four questions guide my research with a goal of isolating the effect of CHC access on individual health, and assessing whether the effect is the same for everyone living in the same community. The purpose of this assessment is to challenge the assumption that the CHC program's singular focus on access is enough to transform the health of individuals living in its target communities. This is especially important as CHCs are purposefully located in areas of relatively high disadvantage and limited access to primary care services.

The conceptual model for the research project is provided in Figure 1.
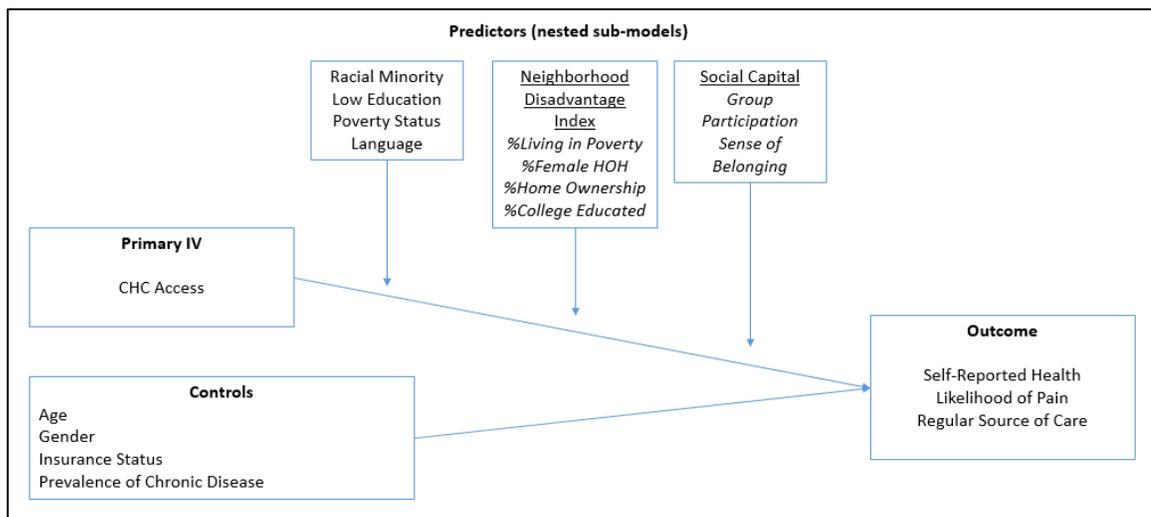
Figure 1. Conceptual Model

The project is comprised of three distinct statistical models measuring the effect of selected predictors on the following measures of individual health: self-reported health (Model I), the likelihood of having a usual source of health care (Model II), and the

prevalence of pain lasting six months or more (Model III). The primary independent

variable for all three models is CHC access. Within each model, a series of interaction

terms are tested individually using nested sub-models with the goal of isolating the

interactive effect of access and personal disadvantage, neighborhood disadvantage, and

social capital on each health outcome. After testing for the interaction terms, any

insignificant interaction terms are removed from the model, but the main effects of all

predictors remain included. My objective is to create one model for each of the three

health outcomes that best encompasses the relationship between CHC access and health.

Control variables included in the models are the individual's age, gender, insurance

status, and the prevalence of chronic disease. Table 1 outlines the structure of each

statistical model in the analysis.

Table 1
Outline of Statistical Models

Model	Main Dependent Variable	Main Independent Variable	Interaction Terms	Controls
Ia IIa IIIa	Self-Reported Health Status Likelihood of Having a Regular Source of Care Prevalence of Pain Lasting 6 Months or More	CHC Access	None	Age, Gender, Insurance Status, Prevalence of Chronic Disease
Ib IIb IIIb	Self-Reported Health Status Likelihood of Having a Regular Source of Care Prevalence of Pain Lasting 6 Months or More	CHC Access	Access*Race Access*Education Access*Poverty Status Access*Language	Age, Gender, Insurance Status, Prevalence of Chronic Disease
Ic IIc IIIc	Self-Reported Health Status Likelihood of Having a Regular Source of Care Prevalence of Pain Lasting 6 Months or More	CHC Access	Access*Sense of Belonging, Access*Participation in Neighborhood Organizations All significant interaction terms from sub-model b	Age, Gender, Insurance Status, Prevalence of Chronic Disease, Main effects for insignificant interaction terms from sub-model b
Id IId IIId	Self-Reported Health Status Likelihood of Having a Regular Source of Care Prevalence of Pain Lasting 6 Months or More	CHC Access	Access*Neighborhood Disadvantage Any significant interaction terms from sub-model c	Age, Gender, Insurance Status, Prevalence of Chronic Disease, Main effects for insignificant interaction terms from sub-model c

Hypotheses

There are four testable hypotheses associated with this research project.

H1: The main association between CHC access and each of the health outcomes will be positive but insignificant, holding all else constant. I draw this conclusion because I recognize that there are multiple factors that influence individual health, making it unlikely that the presence of a CHC alone will precipitate significant changes in health outcomes for most individuals.

H2: The association between CHC access and health will be significant and positive for members of socially disadvantaged groups including racial minorities and the poor, holding all else constant. Although the general effect of CHC access is likely insignificant, it is expected that CHC access will have a significant and positive effect on health outcomes for specific social groups traditionally facing barriers to care.

H3: The association between CHC access and health will be positive and significant for individuals living in areas of high disadvantage, holding all else constant. Extending the current research on neighborhood disadvantage and health, I argue that individuals living in disadvantaged neighborhoods have limited options for health care, making access to a CHC more critical for individuals living in these communities as compared to those living in more advantaged neighborhoods with more options for positive health maintenance.

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H4: The association between CHC access and health will vary based on the individual's level of social capital, holding all else constant. I argue that individuals with high social capital will benefit more from the availability of a CHC as compared to those with low social capital as they are more likely to be aware of the resource and use it as a result of their connectedness to other users.

Conclusion

The purpose of this chapter has been to provide an overview of the scope and goals of the modern CHC program, review the current academic and policy research on the topic of CHC efficacy, and to discuss the well-documented association between access and health. I have highlighted the emphasis on access as the central component of the modern CHC program, and how access serves as a means to increase primary care provider usage and preventative screening, while decreasing the number of unnecessary hospital visits for uninsured and underinsured patients. As stated in the conclusion of the historical chapter, the contemporary emphasis on access is quite different from the foundations of the CHC program as a poverty program with the goal of raising individuals out of poverty through community empowerment. With this transition came a shift away from community-centered health towards individualistic health outcomes rooted in the belief that sick communities can be transformed by the mere improvement of access.

In addition to illustrating the CHC programs increasing emphasis on access, this chapter also introduces the primary objectives of my current research project. Recognizing the singular importance of access in the CHC narrative, the goal of my research is to isolate and test the effects of CHC access on health. I hypothesize that while the main effect of CHC access will be insignificant, the effect will be significant for certain social groups such as minorities and those living in poverty. My research will also test well-documented assumptions about the effect of social capital, social characteristics, and neighborhood characteristics on health. It is my goal to contribute to the rich body of literature on the topic of CHC efficacy by offering an analysis which compares health outcomes for similar individuals in living in communities with different levels of CHC access, as opposed to assessing similar individuals with different levels of CHC usage. I will also use an alternative set of outcome variables, which are non-clinical, self-reported, and rarely used in the traditional assessment of CHC efficacy. My goal is to replicate the association between access and health, using slightly different variables and constructs than have been used in previous studies. Understanding the effect of CHC access on health is an important component of evaluating the efficacy of the CHC program. As a public program charged with addressing the primary care needs for the most vulnerable populations in our society, it is critical to understand which components of access are most helpful, and for whom, and where access falls short of addressing the needs of communities served by this important federal program.

CHAPTER 4

DATA & METHODS

Introduction

The stated goal of this dissertation project is to isolate the effect of CHC access on health in an effort to test the theory that "access matters" as it relates to improving health disparities in the United States. I also aspire to assess whether CHC access moderates the effects of well-documented barriers to care on health such as personal and neighborhood characteristics. In this chapter, I introduce the data sources, variables, and methods for my analysis. My goal is to offer a comprehensive and logical case for the structure of my analysis, and to provide explanations for assumptions germane to my approach. Accompanying this chapter are four appendices that provide specific detail on the selected variables and processes. The chapter begins with an overview of the primary sources of data and then provides an explanation of the variables selected for analysis including any recoding and their baseline distribution in the survey population. I conclude the chapter with a discussion of the statistical methods applied in the analysis.

Data

My data come from three primary sources: the 2012 SPHHS; the 2008-2012 ACS 5-year estimate; and the HRSA Data Warehouse. A detailed description of each data source follows below.

The Southeastern Pennsylvania Household Health Survey

Administered by the Public Health Management Corporation in Philadelphia, Pennsylvania, the SPHHS is a bi-annual, randomized telephone survey of adults that collects data on various health behaviors and outcomes for households in the Philadelphia metropolitan area (Public Health Management Corporation 2014). The full scope of the survey includes questions related to the health status and behaviors of adults aged 18-59 years old, children aged 0-17 (as collected from an adult proxy), and seniors aged 60 and older. The survey also collects basic demographic information about the respondents and their households. In 2012, the full sample size of the survey was 12,763 interviewees residing in one of five Pennsylvania counties: Philadelphia County, Montgomery County, Delaware County, Chester County, and Bucks County. Interviews of children under the age of 18 were excluded from the scope of this analysis, reducing my sample size to 10,018 respondents. The reason for excluding children is two-fold. First, because all three of the outcome variables are self-reported, I decided that it was more desirable to use first-hand accounts of health status as opposed to proxy responses. Second, in Pennsylvania, minors under the age of eighteen require parental consent to get non-emergency treatment, with the exception of contraceptive, pregnancy, and sexual transmitted disease management (American Civil Liberties Union of Pennsylvania 2014). This restriction in effect inhibits the ability for minors to make their own decisions about CHC utilization; and as a result, I have excluded minors under the age of eighteen from my analysis.

The American Community Survey

The ACS is a dataset compiled annually by the U.S. Census Bureau comprised of detailed self-reported demographic information from over 100,000 randomly-selected households across the country (United States Census Bureau 2015). This aggregated data source offers general demographic trends for U.S. geographic areas as large as the nation as a whole and as small as the census block. ACS data are available in single-year, three-year and five-year estimates. The selected level-2 unit of analysis in my study is census tract. I selected census tract as the unit of analysis because it is the smallest shared unit of analysis in both the SPHHS and the ACS. It is also a more reliable proxy for neighborhoods than zip codes and Public Use Microdata Areas. Because census tract is not available in the single-year or three year files of the ACS, I used the 2008-2012 five-year estimate file in my analysis. According to the U.S. Census Bureau, the five-year estimate is the "most reliable" and best used when "precision is more important than currency" in statistical analysis (2015). Restricting the data to the 5-county metropolitan Philadelphia area, the total number of census tracts in the file was 998. All 998 census tracts had at least one matching response in the SPHHS file, therefore the full ACS sample-size was retained after merging the files.

The Health Resource Services Administration Data Warehouse

The HRSA data warehouse is a public, web-based source of information about federal programs providing services under the Department of Health and Human Services umbrella. One of the preformatted reports available in the warehouse is a list of all HRSA

Health Care Delivery Sites (U.S. Department of Health and Human Services 2015).

Using the "Site Directory" option and filtering for the centers in Bucks, Montgomery, Delaware, Chester, and Philadelphia Counties in Pennsylvania, the Site Directory report generated a list of eighty-three active CHC service sites in the Philadelphia metropolitan area. Using a combination of the available fields on HRSA export and web searches, I narrowed the eighty-three sites to forty-five that were considered to be in scope for my analysis. Important considerations for whether a CHC was within scope included: having no restriction on the type of patient accepted for care, predominately providing primary health care services, and being open and active during the time of the SPHHS survey collection. A list of the excluded categories and the associated number of sites is provided below:

- Fifteen service sites were excluded because they restrict their intake to special populations such as students or in-house patients receiving behavioral, mental health, and/or drug-abuse treatment

- Eleven service sites were excluded due to having a "Site Opened" date after January 1, 2012 (3 months prior to the initiation of the 2012 SPHHS survey process)

- Five service sites were excluded because they exclusively offer non-primary health care service such as mental health or dental services

- Four service sites were excluded because they were solely administrative office sites

- Three sites were excluded because they were either duplicated (due to a
  relocation of the site) or permanently closed during the specified timeframe

As previously stated, forty-five centers remained after the exclusions, and were considered within scope for this analysis. A detailed list of the excluded service sites is provided in Appendix A. Within-scope service sites are listed in Appendix B. The next section provides a description of each variable extracted from the three aforementioned datasets.

<div align="center">Variables</div>

This analysis centers on a core set of predictor and control variables and their effect on three distinct outcome variables. In this section, I will provide a brief overview of each variable, as well as its univariate statistics. A detailed operationalization of variables, along with the descriptive statistics for all variables in the analysis is provided in Appendix C. While the full sample size of the merged dataset was 10,018 respondents, after recoding and listwise deletion, the final sample size was 8,786 respondent nested in 981 census tracts.

<div align="center">*Predictor Variable*</div>

The main predictor in my analysis is CHC Access. The ability to distinguish between health outcomes for individuals living in census tracts with proximal access to a CHC and those living within census tracts with limited or no access is a critical factor in my research. Consequently, I have created an indicator for use in the merged dataset that

differentiates census tracts based on their proximity to a CHC. CHC Access is a user-defined variable created using CHC location information from the HRSA website and the 2010 county-level census tract maps from the U.S. Census, which are the most recent public version of the maps that were available at the time of analysis (United States Census Bureau 2015). The creation of the access variable was a three step process:

Step 1 – Identification of the Census Tract ID for all CHCs within the 5-County Philadelphia Metropolitan area: Using the CHC address information from the HRSA database export, I located the associated census tracts for each CHC location using the "Address Finder" engine on the *American Factfinder* website (United States Census Bureau 2015). The census tract IDs were identified for each center and used in the next step to identify the IDs for the contiguous tracts.

Step 2 – Identify the Census Tracts Contiguous to a Census Tracts with CHCs within their Boundaries: Using 2010 Census Tract Reference maps downloaded from the U.S. Census Bureau website, I marked the location of each CHC census tracts. Then I identified the identification number of any census tract sharing at least one border with a CHC census tract. Appendix D outlines the proximity designations resulting from this manual identification process.

Step 3 – Create Variable and Assign Values to for each Census Tract ID in the Combined Data File: Once I had identified all of the census tracts with a CHC within its borders and/or in a contiguous census tract, I

created a CHC access variable using Stata and assigned a value of "1" for

census tracts with a CHC within its boundaries and "0" for all other census

tracts. The resulting variable was a tract-level dichotomous indicator that

was mapped to each individual respondent based on his/her census tract.

Although information was gathered for census tracts contiguous to a CHC,

this designation was not used in the final version of the models because

the category was not significantly different than the category of "No

Access."

After all recoding was completed and listwise deletion performed, 95.8% of the

respondents in the sample resided in census tracts designated as "0" (No Access) and

4.2% of respondents resided in a census tract designated as "1" (Access).

Outcome Variables

The three outcome variables in this analysis are intended to explore different

aspects of the relationship between CHC access and health. The first outcome variable is

self-reported health, which serves as a proxy for an individual's general health state. The

second outcome variable is the prevalence of chronic pain. Pain is also closely related to

perceptions of health and is hypothesized to be less prevalent for individuals with better

access to medical interventions. The third variable, having a regular source of care, is a

measure of perceived health care access. This variable will measure whether geographic

access to a CHC increases the perception of having better access to care, which in turn

can impact an individual's health status. The following paragraphs explore these constructs in more detail.

Self-Reported Health

Self-reported health is commonly used as a measure of health in sociological, epidemiological and medical research; but, it is rarely used as a primary outcome in studies of CHC efficacy. Self-reported health is strongly correlated with mortality, but its mechanisms are poorly understood (Jylhä 2009). The benefits of self-reported health as an indicator of health include its convenience, and the fact that it is self-determined and therefore lacking the requirement of specific diagnoses or symptomatic evidence. These benefits can also be perceived as short-comings as the measure's basis of determination is often context-specific and subjective. In her meta-analysis of self-reported health, Jylhä argues that "self-rated health, an individual and subjective conception that is related to the strongest biological indicator, death, constitutes a cross-road between the social world and psychological experiences on the one hand, and the biological world, on the other" (2009, 308). As evidence of this argument, the author offers a model of the cognitive process that is shaped by the cultural environment of the individual as she compares her perceptions of her current state of health to social expectations, past states of health, current knowledge of medical diagnoses, and the perceived state of others, in a process that is not always logical (Jylhä 2009). Schnittker (2007) also supports this position that ratings of self-reported health are shaped by the macro-social environment. In his study of self-reported health and gender he argues:

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Women have long reported worse self-rated health than men. This difference, however, may be changing. Rising educational attainment and labor force participation over the last two decades may have improved women's health, yet some have speculated that such benefits are increasingly threatened by a variety of other important changes, including growing difficulty balancing work and family…The upward trend in women's absolute health reflects a progressive increase in women's education, while the closing of the gender gap reflects women's growing rates of labor force participation. (Schnittker 2007, 221)

Self-reported health's strong connection to mortality is not causative in nature, but instead reflects the measure's strength as a singular proxy for the major biological, social, and physiological factors that influence one's health. The accuracy of the measure's prediction depends on the accuracy and thoroughness of the individual's cognitive process when developing the rating. Despite this subjective nature of the assessment, the link between self-reported health and mortality persists in studies of multiple cultures and social groups across the world (Marmot et al. 1991; Jylhä 2009).

In this analysis, self-reported health data are extracted from the SPHHS and operationalized by the question, "Would you say your health, in general, is excellent, very good, good, fair or poor?" Responses are reported on a 5-point Likert scale with 1 = Excellent and 5 = Poor. To simplify the structure of my analysis and to intensify the differences between categories, the five possible responses were recoded and collapsed into the following three categories: (1) Poor health (comprised of the "poor" response), (2) Moderate health (combination of the "fair and good responses"), and (3) Best health (combination of the "very good and excellent" responses). After all recoding was completed and listwise deletion performed, 54.9% of respondents reported having Best

health, 40.5% reported Moderate health, and 4.7% report Poor health. To accommodate the structure of multinomial logistic regression, I assigned the "Poor" health category as the reference group to which the other two comparisons were made.

Chronic Pain

The second outcome variable is the prevalence of pain lasting six months or more. While self-reported health is correlated with mortality, the prevalence of pain is closely related to measures of morbidity (Von Korff et al. 1988). Like self-reported health, the incidence of pain is also subjective and very difficult to assess using external tools of diagnosis (Crook et al. 1984). Individuals experiencing chronic pain are more likely to seek medical care, making access to quality health care services an important factor in reducing their symptoms. According to Elliott et al., "Chronic pain is one of the most common reasons why people seek medical care; patients with chronic pain use health services up to five times more frequently than the rest of the population" (1999, 1248). Chronic pain often interferes with individual's daily routines, negatively impacts the perception of one's health, and causes psychological distress (Gureje et al. 1998). Proper pain management by primary care physicians has been shown to relieve the severity of pain in patients; however, even without significant barriers to access, the likelihood of seeking care for pain depends on factors such as the severity of the pain, knowledge about its cause, and the nature of previous interactions with healthcare providers for similar problems (Crook et al. 1984).

In this analysis, the chronic pain data are from the SPHHS question, "Do you have pain lasting six months or more?" Responses to this question were coded as dichotomous "Yes" or "No" responses. After all recoding was completed and listwise deletion performed, 26.0% of respondents report currently having pain lasting six months or more. 74.0% report no incidence of chronic pain.

Usual Source of Care

Having a usual source of care is routinely measured in health-based surveys in the United States. While not a direct proxy for health, the concept of having a regular source of care is a rough measure of one's perception of access to care. Hadley and Cunningham (2004) argue that after controlling for the fact that safety-net providers, such as CHCs, are usually located in areas of the greatest need, better access to the providers is associated with a greater likelihood of reporting having a regular source of care. Research also suggests that having a regular source of care increases the likelihood that individuals receive preventative screenings and services which reduce the need for emergency care in the future (Xu 2002; DeVoe et al. 2003). In their study of CHC efficacy, Politzer et al. found that the vast majority of CHC patients report having a regular source of care as compared to just 75% of patients nationally (2001). Furthermore, sources of care that are specific, such as a specific physician as opposed to a specific site, and sources of care that are regular, are most effective at decreasing barriers to care (Politzer et al. 2001; Xu 2002).

In this analysis, the concept of having a usual source of care is represented by the SPHHS question of, "Is there one person or place you usually go to when you are sick or want advice about your health?" In the survey, respondents are offered a dichotomous response option of either "Yes" or "No." After all recoding was completed and listwise deletion performed, 91.9% of the respondents reported having a usual source of care. 8.1% of respondents reported that they did not have a regular source of care.

Independent Variables

In addition to the primary predictor of CHC access, this analysis includes the assessment of the main and interactive effects of a number of secondary predictors on health. The secondary predictors are separated into three groups: Personal Disadvantage (Race, Education, Poverty Status, and English as a Second Language); Neighborhood Disadvantage; and Social Capital (Organizational Participation and Sense of Belonging). Each of these categories is explored in detail in the following section.

Personal Disadvantage

In this analysis, personal disadvantage variables provide insight into the relationship between the social status of the individual and health, and how this relationship changes with the introduction of CHC access. Historically, health care in the United States has been unequally distributed and has promoted the persistence of health inequalities amongst social groups. Two major findings of the government-issued 2012 National Healthcare Quality Report were that: (1) "health care quality and access are

suboptimal, especially for minority and low-income groups" and (2) "overall quality is

improving, access is getting worse, and disparities are not changing" (Agency for

Healthcare Research and Quality 2013, 2). There is a substantial body of research rooted

in Link and Phelan's (1995) framework of social conditions as a fundamental cause of

disease. Link and Phelan argue that the most effective way of addressing health

disparities is not through the management of individual risk factors and behaviors, but by

"contextualizing" the risk factors within the larger social structure which unequally

distributes barriers to care based on one's social position. Further illustrating this point,

the authors' state:

> A fundamental cause [of disease] involves access to resources, resources
> that help individuals avoid diseases and their negative consequences
> through a variety of mechanisms. Thus, even if one effectively modified
> intervening mechanisms or eradicates some diseases, an association
> between a fundamental cause and disease will reemerge. As such,
> fundamental causes can defy efforts to eliminate their effects when
> attempts to do so focus solely on the mechanisms that happen to link them
> to disease in a particular situation. (Link and Phelan 1995, 81)

Structural in nature, social conditions work together to restrict one's placement in

the social hierarchy. Through this analysis, I attempt to quantify the effects of social

conditions on health, and assess whether their effects change as a result of having access

to a CHC. Particularly prominent in the health disparities literature, is the condition of

income inequality. While poverty alone can significantly hinder one's ability to access

health resources, a more fundamental source of the disparity between high and low

income groups is the problem of inequality. There is social gradient in health that persists

across all levels of socio-economic status, not just for the poor (Marmot et al. 1991;

Kennedy et al. 1998; Lynch et al. 1998; Link and Phelan 2002). This is best represented

by an inherent lack of equality in the distribution of healthcare as those at the top of the

socio-economic structure have better physical, financial, and cultural access to care,

while those at the bottom receive fractured care produced by the prevalence of multiple

barriers to access that start as early as childhood (Daniels et al. 2000; Lichter and

Crowley 2002). As Farmer argues in his critique of medical ethics and global inequality,

"poverty is succinctly defined as a lack of money, but twenty-first century poverty is also

about things like access to antiretroviral medications and other fruits of science and

progress" (2010, 531). Farmer (2010) also points to other sources of the structural

violence on the poor caused by racism and the denial of basic human entitlements

including access to healthcare.

While there is some evidence suggesting that access to a primary care physician

can offset some of the effects of economic disadvantage on health, the research is limited

as it specifically relates to CHCs. Shi and Starfield (2001) argue that neighborhood

disadvantage modifies the effect of physician supply on health. The authors state:

> In areas with high income inequality, the role of primary care physician
> supply appears particularly limited in attenuating the adverse effect of
> income inequality on mortality in Blacks. This finding is likely to be a
> result of compromised access to primary care physicians for Black
> populations, even in the presence of primary care physicians. (Shi and
> Starfield 2001, 1249)

The effect of safety net expansion is also thought to have a disproportionate effect

based on social group due to traditional CHC usage patterns. O'Malley et al. argue that

ethnic minorities and the uninsured are most likely to benefit from increased CHC access,

and that ethnic minorities are much more likely than non-Hispanic whites to use CHCs for their primary care (2005). This finding is an important precursor to the present study.

In the present study, poverty status is used as a proxy for economic disadvantage. Poverty status is an imputed variable in the SPHHS calculated from the household size and income variables, and compared to the federal poverty guidelines. Because CHCs provide subsidized services to patients with household incomes at or below 200% of poverty, I have selected the poverty variable from the SPHHS that uses 200% of poverty as its cut off. For this variable, poverty status is dichotomized as "Yes" (Living in Poverty), or "No" (Not Living in Poverty). After all recoding was completed and listwise deletion performed, 74.9% of the survey respondents were designated as non-poor; 25.1% of respondents were categorized as Poor.

Race is initially captured in the SPHHS using six distinct categories: White, African-American, Asian or Pacific Islander, American Indian or Alaska Native, Biracial or Multiracial, or Something Else (which is specified by the respondent). The survey also records whether or not the respondent is of Hispanic or Latino origin. For my analysis, I elected to use a variation of the race variable provided by survey administrators that allows the comparison of Hispanic/Latinos to all other racial groups. Because minorities in the United States have traditionally held a lower social position than non-minorities due to racial discrimination, and there was no significant difference between minority groups in the preliminary analysis of the data, I collapsed the race variable into two dichotomous groups: non-Latino White and Racial/Ethnic Minority. After all recoding was completed and listwise deletion performed, 71.0% of the survey respondents self-

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identify as non-Latino White, while 29.0% fell into the category of Racial/Ethnic Minority.

Education is measured in the SPHHS by the question, "What was the last grade of school that you completed?" Responses are collected on a five point scale with 1=Less than high school graduate and 5=Post-college (more than 16 years). Selecting college degree as an indicator of high educational attainment, I dichotomized the education variable into two categories: College Degree and No College Degree, with the category of "No College Degree" including all respondents holding an Associates degree or less. After all recoding was completed and listwise deletion performed, 59.1% of respondents reported being a college graduate. Of all respondents, 40.9% report having less than a college degree.

Finally, in an effort to capture the effect of being a non-English speaker on health outcomes, I assessed whether English is the primary language spoken at home as measured in the SPHHS using the question, "Do you speak a language other than English in your home?" Reponses were collected as a dichotomous "Yes" or "No" response and were used as such in my analysis. After all recoding was completed and listwise deletion performed, 10.8% of the survey respondents report speaking a language other than English at home, compared to 89.2% of respondents that reported primarily speaking English at home.

Neighborhood Disadvantage

When it comes to health status, place matters (Chen et al. 2013). Although individual characteristics such as race, education and poverty status are predicted to have a strong effect on health outcomes, where one lives also has a significant effect on health (Macintyre and Ellaway 2000; Ross and Mirowsky 2001; Klinenberg 2003; Farmer 2010). The socio-economic status of one's neighborhood is a particularly important predictor of health as it represents the level of social order and control in a neighborhood which can have an indirect effect on the health of residents (Ross and Mirowsky 2001; Browning and Cagney 2003). Ross and Mirowsky's study of neighborhood effects on health supports the argument that the structural effects of neighborhood disadvantage have a significant effect on health over and above personal disadvantage. The authors conclude:

> Health is not undermined directly by living near poor people... Rather, high rates of poverty and mother-only families and low rates of college education and home ownership compromise the ability of residents to create and maintain public order. The breakdown of social control and order in disadvantaged neighborhoods appears to form the major link to individual health. (Ross and Mirowsky 2001, 270)

This breakdown of social control then contributes to fear and social mistrust which then leads to feelings of powerlessness and fear which has a physiological effect on health. There is a relatively small body of literature that argues that it is actually neighborhood advantage, not disadvantage, that is the underlying force of structural factors contributing to health outcomes (Browning and Cagney 2003; Wen et al. 2003). Browning and Cagney explain that, "affluent residents may draw more and higher quality

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health services and reinforce the viability of local organizations and services that indirectly benefit health" (2003, 554). A study of neighborhood affluence and healthy behaviors partially supported this theory and found a moderating effect of affluence on walking, although the mechanisms behind the prevalence of walking was mixed (Ross 2000). While individuals with higher levels of education and income were more likely to walk, so were individuals living in neighborhoods of high economic disadvantage. The authors conclude that while the prevalence of walking is similar for both groups, the purpose for walking is different. Those living in poor neighborhoods likely use walking as a primary source of mobility, while affluent individuals walk for the purpose of exercise or pleasure (Ross 2000). While the magnitude of the effects are similar, direction of the effect was difference suggesting that a more nuanced approach to uncovering the association between healthy behavior patterns and neighborhood disadvantage might be warranted.

Using the framework of Ross and Mirowsky's (2001) study as a guide, I have conceptualized the effect of neighborhood disadvantage on health using an index of neighborhood-level indicators. The index is measured on the census-tract level (level 2) and comprised of demographic variables extracted from four ACS variables: poverty rate, percentage of households headed by single women, the percentage of the population with more than a high school diploma, and the prevalence of home ownership. The four population-level variables were then mapped to each survey respondent using census tract as the linking variables. Before combining the variables into an index and before listwise deletion, the percentage distributions for the combined dataset were as follows:

mean poverty rate of the respondents' census tract = 13.4% (range = 0% – 85%, standard

deviation = 13.7 percentage points), mean percentage of households headed by single

women in the respondent's census tract = 14.1% (range = 0% – 60.5%, standard

deviation = 10.6 percentage points), mean percentage of the population holding at least

an Associate's degree in the respondent's census tract= 40.4% (range = 0% - 97.4%,

standard deviation = 21.0 percentage points), and the average rate of homeownership in

the respondent's census tract = 64.7% (range = 0% - 100%, standard deviation = 20.9

percentage points). The four variables were then combined into an index using the

following formula:

Neighborhood Disadvantage Index = Poverty Rate + Percentage of Female-
Headed Households + (100 – Percentage of Individuals with at least an Associate's
Degree) + (100 – Home Ownership Rate)

As illustrated in the equation above, the education and homeownership variables

were reverse coded due to their inverse relationship with neighborhood disadvantage. The

raw index scores ranged from 0.271 to 2.782 with a mean of 1.225 and a standard

deviation of 0.560. The raw scores were then z-standardized for use in the statistical

analysis. The standardized z-scores ranged from -1.705 to 2.782 (with mean of 0 and a

standard deviation of 1). After all recoding was completed and listwise deletion

performed, the range remained the same, but the mean changed to -0.004 and the

standard deviation was 0.998.

Social Capital

Social ties are strongly associated with variations in health outcomes (Putnam 2000; Klinenberg 2003). Those who lack social ties have significantly higher levels of all-cause mortality rates as compared to their well-connected peers. On an individual-level, this relationship may be attributable to a lack of access resources for individuals that are poorly connected as well as a lack of emotional support (Kawachi et al. 1999). On a community level, neighborhoods with low social capital, as characterized by weak social ties, lack of trust and reciprocity, and low civic involvement have higher mortality rates than similar neighborhoods with high social capital (Lochner et al. 2003). Kawachi et al. (1999) offer three plausible pathways explaining the relationship between contextual social capital and health: (1) the diffusion of health information; (2) the promotion of healthy norms of behavior; and (3) the exertion of social control over deviant behavior. In this model, the structured solidarity of the community ties promotes healthy behaviors through the stigmatization of deviance and the sharing of information. Complementing this model, Kawachi and Berkman (2001) identify two mechanisms underlying the association between mental health and social ties: the "main effects" model which encompasses the structural effects of social capital on mental health such as the influence of social networks and the desire for social integration, and the stress buffering model which speaks to factors such as perceived support which diminish the effects of stress for individuals.

Research has already established a connection between social capital and self-reported health: those with higher individual and/or neighborhood social capital are

significantly less likely to report poor health as compared to those with low social capital (Kim and Kawachi 2006; Sundquist and Yang 2007). My research attempts to replicate these findings and to discern whether CHC access further moderates the effect of social capital on health. I use two measures of social capital as collected through the SPHHS: participation in neighborhood organizations and feeling a sense of belonging. The neighborhood participation question asks, "How many local groups or organizations in your neighborhood do you currently participate in such as social, political, religious, school-related, or athletic organizations?" Responses are open-ended and range from zero to twelve or more organizations with a mean of 1.2 organizations. The responses were then dichotomized into two responses: Participates (1 or more organizations) and Does Not Participate (0 organizations) as I am mostly interested in distinguishing those that do not participate at all from those with some participation. After all recoding was completed and listwise deletion performed, 55.9% of respondents report participating in at least one neighborhood organization. 44.1% report not participating in any neighborhood organization.

The SPHHS question related to the individual's sense of belonging is, "Please tell me if you strongly agree, agree, disagree or strongly disagree with the following statement: I feel that I belong and am a part of my neighborhood." Reponses are collected on an ordinal four-point scale ranging from 1 = Strongly Agree to 4 = Strongly Disagree. The responses were then dichotomized into two groups: Feels a Sense of Belonging (combination of Strongly Agree and Agree) and Does Not Feel a Sense of Belonging (combination of Strongly Disagree and Disagree). After all recoding was completed and

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listwise deletion performed, 86.2% of respondents report feeling a sense of belonging in their neighborhood. 13.8% report that they do not feel a sense of belonging in their neighborhood.

Control Variables

The control variables used in this analysis are: age of the respondent, gender, insurance status, and whether the respondent has a chronic disease condition. After all recoding was completed and listwise deletion performed, the respondents are majority female (62.9%) with an average age of 53 years old. The vast majority of respondents also have health insurance (92.8%). The measure of chronic disease condition is comprised of four chronic health conditions: Asthma, Diabetes, Arthritis, or Hypertension. A positive indication of at least one of these conditions translates into a positive indication for the chronic disease condition variable. Disease conditions only present during pregnancy were excluded. After all recoding was completed and listwise deletion performed, 15.5% of respondents report having Asthma, 13.9% report having Diabetes, 31.0% report having Arthritis, and 35.8% report having Hypertension. After combining the variables and listwise deletion, 57.9% of the respondents report having at least one chronic condition and 42.1% of respondents report that they do not have a chronic disease condition as defined in this analysis.

Methods

The selected method of analysis for this dissertation project is quantitative in nature and utilizes logistic regression and multinomial logistic regression to isolate the effects of CHC access on three separate measures of health outcomes and behaviors. Because the self-reported health variable has three categorical outcomes, multinomial logistical regression is the method of analysis for one of the three models. An extension of logistic regression, the multinomial logistic regression approach allows for the comparison of multiple categories within a single outcome variable without the need to dichotomize the outcome categories as would be required for standard logistic regression models. This specification facilitates a more nuanced understanding of the predictors on self-reported health. Ordered logistic regression was also considered as a method, however, diagnostic testing of the data revealed that the assumption of parallel assumptions as diagnosed by the Brant test was violated (p <0.001). Upon closer inspection of the significant variables, the coefficients for seven out of the eight variables included in the model were of particular concern as the effects change signs and widely vary across the two cut points in the model. The results of the Brant test are available in Appendix E. Multinomial logistic regression was performed as an alternative to the ordered logistic regression method.

The remaining two models have dichotomous outcomes, therefore logistic regression is the selected method of analysis. All three models include both level-1 (individual) and level-2 (community) variables which can impact the ability to isolate effects of individual characteristics from the effects of the environment in which one

lives. To account for the fact that individual survey respondents are nested within shared census-tracts, a statistical adjustment was made using the vce (cluster) function in Stata.

An important step in the specification of my final model was to test for significant interaction terms in an effort to determine how social status effects the main association between CHC access and health. Appendix F shows the results of this process. In general, I tested the interactive effect of CHC Access and each individual predictor in the model on health to assess whether the interaction term was significant and added value to the model. Once significant interactions were identified, they were retained in the final nested models.

For all three outcomes, the base model tests the main effect of CHC Access and the control variables on health. A second sub-model incorporates the main effects and significant interaction terms for the personal disadvantage variables (Race, College, Poverty, and English as a second Language). A third sub-model adds the main effects and significant interaction terms for the Social Capital variables (Participation and Belonging). A final sub-model adds the main effect and interaction term, as appropriate, for the Neighborhood Disadvantage Index. Odds ratios and relative risk ratios are also calculated to aid in the interpretation of the regression coefficients.

CHAPTER 5

RESULTS

Introduction

The goal of this statistical analysis is to explore the varying effects of CHC access on three health outcomes: self-reported health status (SRH), the likelihood of reporting pain lasting six months or more (PAIN), and the likelihood of having a regular source of healthcare (RSC). This chapter presents the results of the analysis by outcome. To aid in the interpretation process, the logistic regression coefficients are presented as odds ratios; the coefficients in the multinomial logistic regression model are presented as relative risk ratios.

As discussed in the previous chapter, the primary independent variable for all three outcomes is CHC Access. Within each model, a series of interaction terms are tested individually using nested sub-models with the purpose of isolating the interactive effect of CHC Access and personal disadvantage, CHC Access and neighborhood disadvantage, and CHC Access and social capital on each health outcome. After testing for significant interaction terms, any non-significant interaction terms were removed from the model, but the main effects of all predictors remained included. My objective was to create one model for each of the three health outcomes that best illustrates the relationship between CHC access and health. Control variables included in the models are the individual's age, gender, insurance status, and his/her prevalence of chronic disease.

In terms of the structure of the tables and analysis, each outcome model is represented by Roman numerals:

- SRH: Model I

- PAIN: Model II

- RSC: Model III

Within each outcome model, there are nested sub-models represented by capital letters. All three outcomes follow the same sub-model structure. Sub-model A (baseline model) represents the main effect of CHC Access controlling for age, gender, insurance status, and prevalence of chronic disease. Sub-model B represents the effect of CHC Access with the inclusion of personal disadvantage predictors. Sub-model C represents the effect of CHC Access with the inclusion of both personal disadvantage and social capital predictors. Finally, sub-model D (full model) represents the effect of CHC Access with the inclusion of personal characteristic, social capital, and neighborhood disadvantage characteristics. For the sake of simplicity, only sub-models A (the baseline model) and D (the full model) are presented in the body of this chapter. The full versions of all three outcome models are included in Appendices G, H and I.

Model I: Self-Reported Health

Model I tests the effect of CHC Access on self-reported health, controlling for personal disadvantage, social capital, and neighborhood disadvantage using multinomial logistic regression. As discussed in the introduction, the full set of results for this model consists of four nested sub-models. For the sake of simplicity, only sub-models A (the

baseline model) and D (the full model) are presented in this section. The full versions of all four SRH sub-models are included in Appendix G. The results for the baseline and full model are presented below in Table 2.

In Table 2, the first two columns display the relative risk ratios for the likelihood of reporting Moderate vs. Poor health for each predictor. The third and fourth columns display the relative risk rations for the likelihood of reporting Best vs. Poor health for the same set of predictors. A more specific description of each of the columns is provided below:

Column 1 – Moderate vs. Poor Health, Baseline Model: The first column presents the relative risk ratios for the baseline model which is comprised of just the CHC access variable and the control variables.

Column 2 – Moderate vs. Poor Health, Full Model: The second column presents the relative risk ratios for the full model which includes the CHC access, personal disadvantage, social capital, and neighborhood disadvantage predictors, as well as the control variables and any significant interaction terms.

Column 3 – Best vs. Poor Health, Baseline Model: Column three displays the coefficients for the baseline Best vs. Poor health model which is comprised of just the CHC access variable and the control variables.

Table 2

Relative Risk Ratios for the Likelihood of Reporting Moderate or Best Health as Compared to Poor Health by CHC Proximity, Personal Characteristics, Social Capital and Neighborhood Disadvantage

Variables	Moderate vs. Poor Health		Best vs. Poor Health	
	Baseline Model	Full Model	Baseline Model	Full Model
<u>CHC Proximity</u>				
Access (No Access)	0.7135 *	1.0234	0.3348 **	0.9812
Access* Living in Poverty		2.4230 *		5.0322 **
Access*Racial Minority		0.1926 **		0.1584 **
Access* Sense of Belonging		2.4257 *		1.8738
<u>Personal Characteristics</u>				
Living in Poverty (Not Living in Poverty)		0.3337 **		0.2068 **
Racial/Ethnic Minority (non-Hispanic White)		1.3108		1.0359
Less than College Degree (College Degree)		0.9105		0.5799 **
English not Primary Language (English Primary)		0.7274 *		0.6362 **
<u>Social Capital</u>				
Sense of Belonging (No Sense of Belonging)		1.3214 *		1.8790 **
Participation in Neighborhood Orgs (No Participation)		1.6417 **		2.1662 **
<u>Neighborhood Disadvantage</u>				
Neighborhood Disadvantage Index (standardized)		1.0022		0.7731 **
<u>Control Variables</u>				
Age	0.9994	0.9983	0.9884 **	0.9844 **
Female (Male)	1.2142	1.3355 **	1.1904	1.4118 **
Uninsured (Insured)	1.1748	1.6420 *	0.4550 **	1.0851
Chronic Disease (No Chronic Disease)	0.3759 **	0.3994 **	0.1028 **	0.1281 **
Constant	17.9166	18.1247	106.4078	102.3779
R2		0.0855		0.1458

N= 8786 (981 census tracts)
*=p<.05 **=p<.01

Column 4 – Best vs. Poor Health, Full Model: The fourth and final column displays the coefficients for the full Best vs. Poor health model which includes the CHC access, personal disadvantage, social capital, and neighborhood disadvantage predictors, as well as the control variables and any significant interaction terms.

CHC Access

In Model I, the effect of CHC Access on self-reported health is captured in four ways: the (main) effect of CHC Access, the interactive effect of CHC Access and poverty, the interactive effect of CHC Access and race, and the interactive effect of CHC Access and having a sense of belonging. In the full model which includes all of the predictors and significant interaction terms, the main effect of CHC Access represents the effect of access on health for non-poor, non-Hispanic whites, with no sense of belonging in their neighborhood. For simplicity, going forward this group will be referred to as privileged whites with low social capital. In the baseline model, the main effect of access is not restricted to any specific social group.

Looking first at the baseline model which includes only the CHC access predictor and control variables, the effect of CHC Access on self-reported health is negative and significant for both health comparisons. More specifically, having access to a CHC decreases the likelihood of reporting moderate health as compared to poor health by 29%, holding all else constant. Similarly, having access to a CHC decreases the likelihood of reporting best health as compared to poor health by 67%, holding all else constant.

In the full models, the main effect of CHC Access (which is restricted to privileged whites with low social capital) is insignificant for both the moderate versus poor health and best versus poor health comparisons; however, there are significant interaction effects of CHC Access for the poverty, race, and social capital variables. The inclusion of these three interaction terms as a group slightly improves the fit of the full model as measured by McFadden's R^2 statistic. McFadden's R^2 increases from 0.144 for the full model without the interaction terms, to 0.146 for the full model including the interaction terms (McFadden's adjusted R^2 generally remains the same across the two nested models at 0.141). The p-value of the difference in the likelihood ratio index is less than 0.001 further indicating that the difference in the models is significant. Table 3 summarizes the conditional effects of CHC Access on self-reported health.

Table 3
Conditional Effect of CHC Access on Self-Reported Health (Relative Risk Ratios)

Variable	Moderate Health v. Poor Health	Best Health v. Poor Health
Living in Poverty	2.4798	4.9378
Not Living in Poverty	1.0234	0.9812
Racial/Ethnic Minority	0.1972	0.1554
Non-Hispanic White	1.0234	0.9812
Sense of Belonging	2.4825	1.8387
No Sense of Belonging	1.0234	0.9812

Looking first at the conditional effect of CHC Access and poverty, for those living in poverty the odds of better levels of health is much higher if they have CHC access. The odds of moderate vs poor health increase by a factor of 2.48 (a 148% increase) and for best vs poor health by a factor of 4.94 (a 394 % increase). But CHC access hardly affects health for those who do not live in poverty; it increases the odds of

moderate versus poor health by 2.3% and decreases the odds of best versus poor health by 1.9%.

Conversely, the interaction effect of CHC Access and race is significant and negative. The likelihood of reporting moderate versus poor health for racial/ethnic minorities decreases by 80% for those with CHC access as compared to minorities without CHC access. For the best versus poor health comparison, the effect of CHC Access for minorities is slightly worse. More specifically, the likelihood of reporting best versus poor health for racial minorities decreases by 84% for those with CHC access as compared to those without CHC access. Equivalent to the effect of CHC access conditioned on poverty level, CHC access barely affects health for non-minorities; it increases the odds of moderate versus poor health by 2.3% and decreases the odds of best versus poor health by 1.9%.

Finally, the interaction effect of CHC Access and social capital, as measured by the sense of belonging in one's community, is positive and significant for those who feel they belong. For those with a sense of belonging having access to a CHC increases the likelihood of reporting moderate versus poor health by nearly 150% as compared to those without a sense of belonging, holding all else constant. For the best versus poor health comparison, the pattern is less apparent, as having access to a CHC for those who felt they belong increases the likelihood of reporting best health as versus poor health by 87% over those who feel they don't belong, holding all else constant. Like the two aforementioned interactive relationships, the conditional effect of CHC Access for those that do not feel they belong is equivalent to the main effect of CHC Access; for this

group CHC access increases the odds of moderate versus poor health by 2.3% and decreases the odds of best versus poor health by 1.9%.

For a general perspective of how the effect of CHC Access varies for different combinations of personal disadvantage, branch diagrams were compiled illustrating the various effects of CHC Access on self-reported health for different sub-populations (see Figure 2 below).
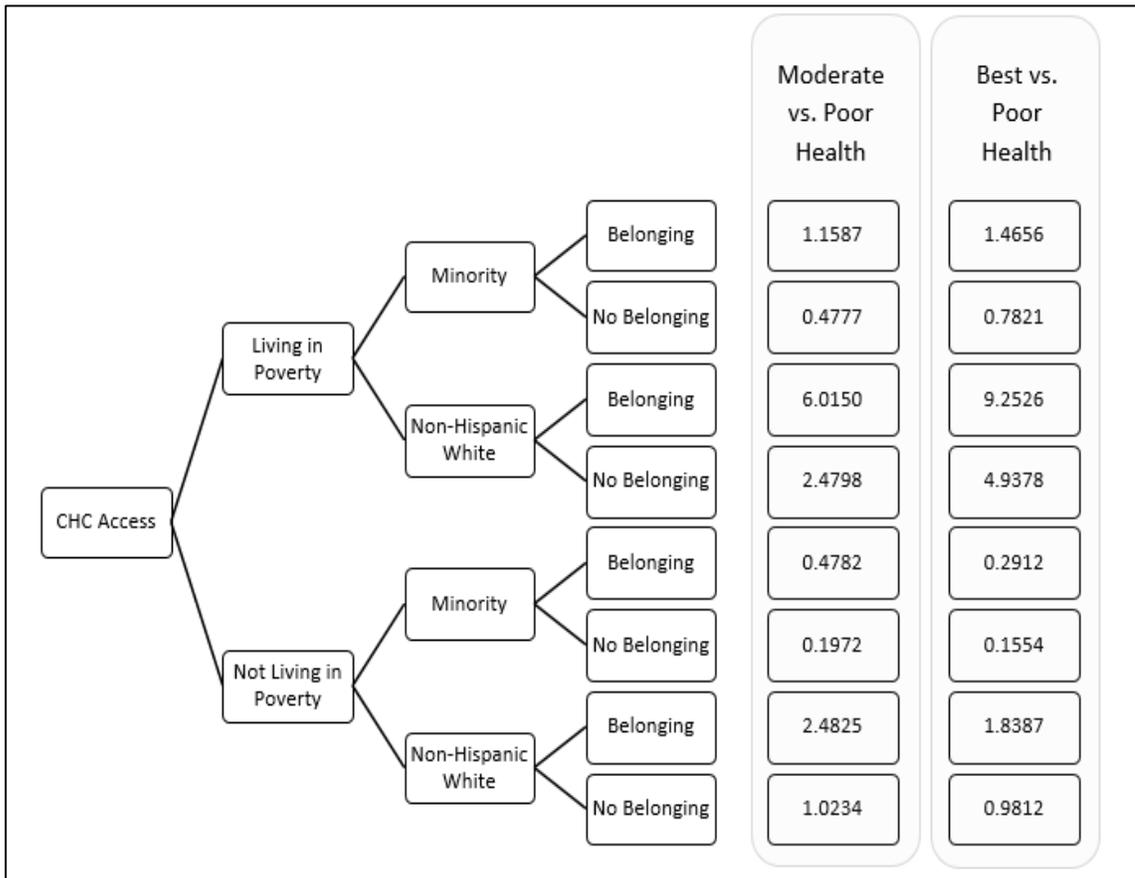
Figure 2. Various Conditional Effects of CHC Access on the Likelihood of Reporting Moderate or Best Health as Compared to Poor Health (Relative Risk Ratios)

Figure 2 illustrates the considerable variation in the effect of CHC Access on self-reported health across different combinations of social disadvantage. The branches of the

figure represent all the combinations of the dichotomous outcomes for the poverty, race, and sense of belonging variable in the model. The first column of numeric values presents the effect of CHC Access on health for the moderate versus poor health comparison. The second numeric column presents the effect of CHC Access on health for the best versus poor health comparison.

One of the most interesting findings of the branch model is that there is a notable influence of racial privilege as whites appear to benefit more from CHC access than minorities, especially if they have a sense of belonging in their community. For poor whites with a sense of belonging in their neighborhood, those with CHC access were six times as likely to report moderate health as opposed to poor health, and nine times as likely to report best health as opposed to poor health, as compared to their counterparts with no CHC access. Comparatively, the effect for poor minorities with a sense of belonging was also positive, but not as stark. For minorities with the same social characteristics as the non-Hispanic white group, having access to a CHC increased the likelihood of reporting moderate health by just by just 16%, and increased the likelihood of reporting best health by 47% as compared to the equivalent social group without access to a CHC.

It is also notable that the positive effect of CHC access on self-reported health either doubles or triples (depending on the outcome comparison) for those with a sense of belonging across both racial and poverty categories. For instance, for poor minorities with a sense of belonging, CHC access increases the likelihood of reporting moderate health versus poor health by 16%. For the same social group without a sense of

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belonging, having CHC access actually decreases the likelihood reporting moderate health versus poor health by 52%. In the best versus moderate health comparison, these percentages are 48% and 22%, respectively. It is also interesting to note that the effect of CHC Access is generally much smaller in magnitude for non-poor individuals, suggesting that there is a little effect of access for those that are better off financially.

Personal Disadvantage

In this study, the category of personal disadvantage is comprised of four separate predictors: poverty status, race, education, and primary language. Two of the personal characteristic variables, poverty and race, are components of an interaction term; therefore the assessment of the main effect of these variables on self-reported health is restricted to individuals without CHC access. Education and primary language do not significantly interact with CHC Access, so their effects are the same for those with and without access to a CHC. In general, with the exception of race, the effect of personal disadvantage on self-reported health is negative and significant. This finding suggests that personal disadvantage is associated with a lower likelihood of reporting better health holding all else constant.

For the education variable, the effect of CHC Access is only significant for the best versus poor comparison. More specifically, having less than a college degree decreases the likelihood of reporting best health versus poor health by 42% holding all else constant; the effect is insignificant in the moderate versus poor health comparison. The effect of speaking a language other than English at home on self-reported health is

negative and significant. Holding all else constant, those that speak a language other than English at home are 27% less likely to report moderate health as compared to poor health. The likelihood of reporting best health versus poor health decreases by 36% for the same group, holding all else constant.

Because poverty and race are a part of interaction terms, their main effects on self-reported health are restricted to the population without access to a CHC. For those without CHC access, being poor decreases the likelihood of reporting moderate health by 67%, holding all else constant; similarly, the likelihood of reporting best health versus poor health decreases by 79% for this group, holding all else constant. The main effect of race on health (restricted to those without CHC access) is insignificant in the full model for both health comparisons.

<center><i>Personal Disadvantage – Conditional Effects</i></center>

Table 4 and Table 5 display the conditional effects of the racial minority and poverty variables, depending on the level of access to a CHC.

Table 4		
Conditional Effect of Poverty on Self-Reported Health (Relative Risk Ratios)		
Variable	Moderate Health v. Poor Health	Best Health v. Poor Health
CHC Access	0.8085	1.0406
No CHC Access	0.3337	0.2068

Looking first at the poverty variable, the data suggest that the negative effect of poverty is weakened for those with access to a CHC as compared to those without access. For those without access to a CHC, being poor decreases the likelihood of reporting moderate health versus poor health by 67%, holding all else constant. For those with access to a

CHC, being poor decreases the likelihood of reporting fair or good versus poor health by just 19%, holding all else constant. The best versus poor comparison presents an even starker picture of the conditional effect of poverty on self-reported health. For those with CHC access, being poor slightly increases the likelihood of reporting best versus poor health by 4% holding all else constant. For those without access to a CHC being poor decreases the likelihood of reporting the higher health category by 79%, holding all else constant.

Table 5		
Conditional Effect of Minority Status on Self-Reported Health (Relative Risk Ratios)		
Variable	Moderate Health v. Poor Health	Best Health v. Poor Health
CHC Access	0.2525	0.1641
No CHC Access	1.3108	1.0359

For the minority variable, being a racial/ethnic minority decreases the likelihood of better health as compared to whites for those with access to a CHC, and increases the likelihood of reporting better health for those without CHC access. More specifically, for those with access to a CHC, being a minority decreases the likelihood of reporting moderate versus poor health by 75% as compared to whites, holding all else constant. For those without access to a CHC, being a minority increases the likelihood of reporting fair or good versus poor health by 31% holding all else constant. For the best versus poor comparison, being a minority decreases the likelihood of reporting better health by 84%, holding all else constant, for those with access to a CHC. For those without access, being a minority increases the likelihood of reporting better health by 4% as compared to whites, holding all else constant.

Social Capital

The coefficients for the social capital variables suggest that there is a positive and significant association between social capital and self-reported health, holding all else constant. Of the two variables measuring social capital, only sense of belonging had a significant interaction with CHC Access. As a result, the main effect of sense of belonging on self-reported health is restricted to those without access to a CHC. Referring to first to the participation variable in the full model, those that participate in at least one neighborhood organization are 1.64 times as likely as those that do not participate in any organizations to report moderate health versus poor health, holding all else constant. This same group is 2.17 times as likely as non-participants to report best versus poor health, holding all else constant.

For the sense of belonging variable (is restricted to those without access to a CHC), having a sense of belonging in one's neighborhood is associated with a 32% increase in the likelihood of reporting moderate versus poor health, holding all else constant. Similarly, for the same restricted sub-group, having a sense of belonging is associated with an 88% increase in the likelihood of reporting best versus poor health, holding all else constant.

Social Capital – Conditional Effects

Table 6 displays the conditional effects of sense of belonging on self-reported health, depending on the level of access to a CHC.

Table 6
Conditional Effect of Belonging on Self-Reported Health (Relative Risk Ratios)

Variable	Moderate Health v. Poor Health	Best Health v. Poor Health
CHC Access	3.2052	3.5209
No CHC Access	1.3214	1.8790

As stated in the previous section, the effect of belonging is both positive and significant for those without access to a CHC. The positive interaction term suggests that the effect of sense of belonging on self-reported health is even larger for individuals living in a neighborhood with access to a CHC. More specifically, for those with access to a CHC, those with a sense of belonging in one's neighborhood are more than 3.2 times as likely to reporting moderate health versus poor health, as compared those with CHC access but without a sense of belonging, holding all else constant. For those without access to a CHC, having a sense of belonging increases the likelihood of reporting fair or good versus poor health by just 32%, holding all else constant. Turning to the best versus poor comparison, for those with CHC access, having a sense of belonging in one's neighborhood more than triples the likelihood of reporting better health as opposed to poor health, holding all else constant. For those without CHC access, the effect of belonging is smaller, increasing the likelihood of reporting better health as opposed to poor health by 88%, holding all else constant.

Neighborhood Disadvantage

The model suggests that the main effect of neighborhood disadvantage on self-reported health is significant and negative for the best versus poor health comparison, but is insignificant in the moderate versus poor health comparison. Higher neighborhood

disadvantage is associated with a lower likelihood of reporting best health as compared to poor health, holding all else constant. More specifically, a one standard deviation increase in neighborhood disadvantage decreases the relative risk of reporting best health by 23%, holding all else constant.

Control Variables

The effect of age on self-reported health is insignificant for the moderate versus poor comparison, but is significant and negative for the best versus poor comparison. For each year increase in age, the likelihood of best health decreases by 1.6%, holding all else constant. For every ten year increase in age, the likelihood of reporting best versus poor health decreases by 15%. Being a female has a significant and positive effect on health. Females are 1.3 times as likely as males to report moderate versus poor health, holding all else constant. Similarly, females are 1.4 times as likely as males to report best versus poor health, holding all else constant. Being uninsured was significant in the fair or good versus poor comparison, but insignificant in the best versus poor comparison. Somewhat paradoxically, the model suggests that being uninsured actually increases the likelihood of reporting moderate versus poor health by 64% as compared to those that are insured, holding all else constant. This may also be due to reverse causality in that those without employer insurance but feel that their health is good, may not feel the need to seek out private insurance, thereby leaving them uninsured but reporting good health. Finally, the effect of having a chronic disease on self-reported health is negative and significant for both the moderate versus poor, and best versus poor comparisons. Having a chronic

disease decreases the likelihood of reporting fair or good health by 60%, holding all else constant. Similarly, having a chronic disease decreases the likelihood of reporting best health by 87%, holding all else constant.

Model II: Pain

Model II tests the effect of CHC Access on the likelihood of pain lasting six months or more, controlling for personal disadvantage, social capital, and neighborhood disadvantage using logistic regression. As discussed in the introduction to this chapter, the full set of results for this model consists of four nested sub-models. For the sake of simplicity, only sub-models A (the baseline model) and D (the full model) are presented in this section. The full versions of all four PAIN sub-models are included in Appendix H. The odds ratios for the baseline and full models are presented below in Table 7.

CHC Access

In this model, the effect of CHC Access on the likelihood of pain lasting six months or more is captured in three ways: the main effect of CHC Access, the interactive effect of CHC Access and poverty, and the interactive effect of CHC Access and neighborhood disadvantage. In the baseline model, which contains just the CHC access and control variables, the effect of CHC Access is significant and positive, suggesting that CHC access is associated with a higher likelihood of reporting pain lasting six months or more, holding all else constant.

Table 7

Odds Ratios for the Likelihood of Pain Lasting Six Months or More by CHC Proximity, Personal Characteristics, Social Capital, and Neighborhood Disadvantage

Variables	Baseline Model	Full Model
CHC Proximity		
Access (No Access)	1.3420 **	0.9582
Access* Living in Poverty		0.4788 **
Access*Neighborhood Disadvantage		1.3408 **
Personal Characteristics		
Living in Poverty (Not Living in Poverty)		1.8826 **
Racial/Ethnic Minority (non-Hispanic White)		0.8915
Less than College Degree (College Degree)		1.3087 **
English not Primary Language (English Primary)		1.2204 *
Social Capital		
Sense of Belonging (No Sense of Belonging)		0.6477 **
Participation in Neighborhood Orgs (No Participation)		0.9334
Neighborhood Disadvantage		
Neighborhood Disadvantage Index (standardized)		1.0894 *
Control Variables		
Age	0.9997	1.0003
Female (Male)	1.2264 **	1.1682 **
Uninsured (Insured)	1.5257 **	1.0838
Chronic Disease (No Chronic Disease)	4.7687 **	4.2696 **
Constant	0.1046	0.1243
R2	0.0834	0.1109
N= 8786 (981 census tracts)		
*=p<.05 **=p<.01		

More specifically, having access to a CHC increases the likelihood of reporting pain by 34% as compared to those without CHC access. In the full model, the main effect of CHC Access on the likelihood of pain is restricted to the population of non-poor individuals living in a neighborhood of average disadvantage (meaning the standardized index value is zero). Restricted to this sub-group, the main effect of CHC Access on the likelihood of reporting pain lasting six months or more becomes insignificant.

While the main effect of CHC Access on the likelihood of pain is insignificant for the restricted sub-population, there is a significant interaction effect of CHC Access depending on an individual's poverty status and the level of disadvantage in their neighborhood. As previously stated, in the full models, the main effect of CHC Access on pain (which is restricted to non-poor individuals living in areas of average disadvantage) is insignificant. However, there are significant interaction effects of CHC Access for individuals based on their poverty status and level of neighborhood disadvantage. For the model as a whole, the inclusion of these two interaction terms combined slightly improves the fit of the model as measured by McFadden's R^2 statistic. McFadden's R^2 increases from 0.110 for the full model without the interaction terms, to 0.111 for the full model including the interaction terms (McFadden's adjusted R^2 improves from 0.107 to 0.108). The p-value of the difference in the likelihood ratio index is less than 0.001 further indicating that the difference in the models is significant. Table 8 summarizes the conditional effects of CHC Access on pain.

Table 8	
Conditional Effect of CHC Access on the Likelihood of Reporting Pain Lasting Six Months or More (Odds Ratios)	
<u>Variable</u>	<u>Odds Ratio</u>
Living in Poverty	0.4588
Not Living in Poverty	0.9582
Low Neighborhood Disadvantage	0.3975
Average Neighborhood Disadvantage	0.9582
High Neighborhood Disadvantage	2.3010

Looking first at the effect of CHC Access as conditioned on poverty status, CHC access appears to have a negative effect on pain, suggesting that CHC access decreases the likelihood of reporting pain lasting six months or more as compared to those without CHC access in general. Moreover, the effect size for CHC Access is larger for those living in poverty. For poor people, having access to a CHC decreases the likelihood of reporting pain by 54% as compared to poor people without CHC access, holding all else constant. For the non-poor, the effect of CHC Access is much smaller with a 4% decrease in the likelihood of reporting pain as compared to those without access, holding all else constant.

In terms of the effect of CHC Access as conditioned on neighborhood disadvantage, having access to a CHC appears to lower the likelihood of reporting pain for those living in neighborhoods of low and average disadvantage as compared to those without access, and increases the likelihood of reporting pain for those living in areas of high disadvantage as compared to those without access. For those living in areas of low disadvantage (represented by a standardized index score of negative three), having access to a CHC decreases the likelihood of reporting pain lasting six months or more by 60% as

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compared to those living in areas of low disadvantage without access to a CHC, holding

all else constant.[2] For those living in areas of average disadvantage (represented by a

standardized index score of zero), having access to a CHC decreases the likelihood of

reporting pain lasting six months or more by just 4% as compared to those living in areas

of average disadvantage without access to a CHC, holding all else constant. Conversely,

for those living in areas of high disadvantage (represented by a standardized index score

of positive three), those having access to a CHC are 2.3 times as likely to report having

pain as those living in areas of high disadvantage without access to a CHC, holding all

else constant. Further exploring the conditional effect of CHC Access, Figure 3 displays

the various effects of access on the likelihood of reporting pain as conditioned on poverty

status and neighborhood disadvantage.

The branch diagram further supports the finding that CHC access has a favorable

effect on pain for poor people living in neighborhoods of relatively low disadvantage

(represented by a standardized index score of negative three), but exacerbates the

likelihood of pain for non-poor people living in areas of high disadvantage (represented

by a standardized index score of positive three). The branch diagram further supports the

finding that CHC access has a favorable effect on pain for poor people living in

neighborhoods of relatively low disadvantage (represented by a standardized index score

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[2] The conditional effect of CHC Access by neighborhood disadvantage is calculated as:

$$e^{(\text{Log Odds } \textit{Access} + \text{Log Odds } \textit{Neighborhood Disadvantage x Neighborhood Disadvantage Score})}$$

of negative three), but exacerbates the likelihood of pain for non-poor people living in areas of high disadvantage (represented by a standardized index score of positive three).
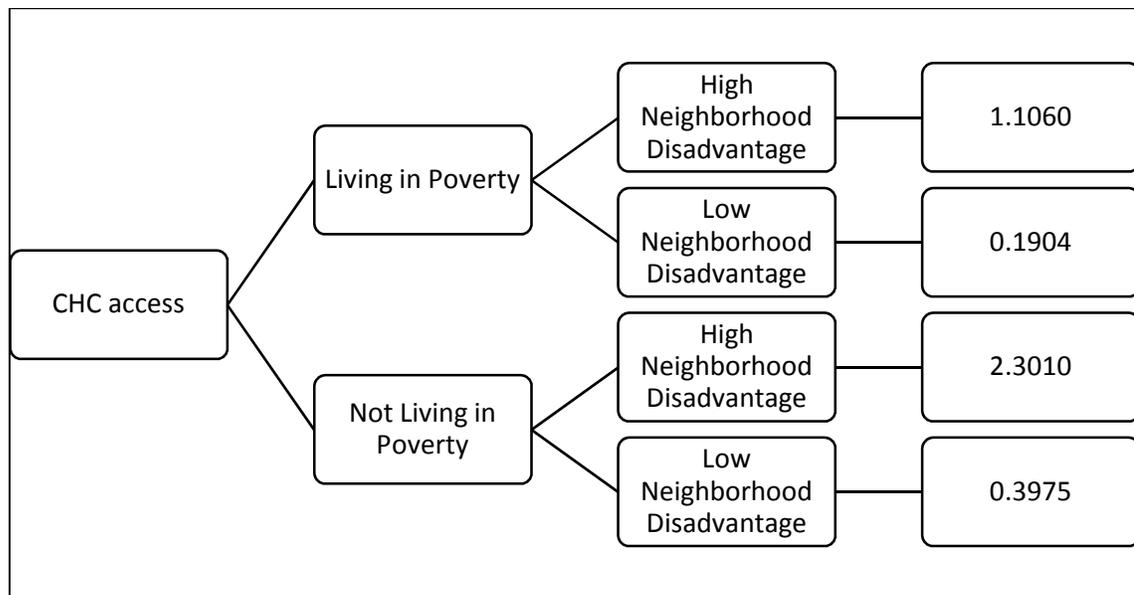
Figure 3. Various Conditional Effects of CHC Access on the Likelihood of Reporting Pain (Odds Ratios)

Specifically, for poor people living in low neighborhood disadvantage situations, having access to a CHC decreases the likelihood of reporting pain by 81%, holding all else constant. For the non-poor group, CHC access decreases the likelihood of reporting pain by 60% for those living in areas of low disadvantage, holding all else constant.

However, for those living in poverty in neighborhoods of high disadvantage, the effect of CHC access is reversed. In high disadvantage neighborhoods, access to a CHC actually increases the likelihood for a poor person of reporting pain lasting six months or more by 11%, holding all else constant. Moreover, for those that are not poor but living in areas of high disadvantage, access to a CHC is associated with a more than two-fold

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increase in the likelihood of reporting pain lasting six month or more, holding all else constant.

Personal Disadvantage

Like the self-reported health model, the category of personal disadvantage in the pain model is comprised of four separate predictors: poverty status, race, education, and primary language. Poverty status is part of an interaction term; therefore in the full model the interpretation of its main effect on the likelihood of reporting pain lasting six month or more is restricted to individuals without CHC access. The education and language effects and the main effect of poverty are positive and significant. More specifically, looking at the full model, those with less than a college degree are 31% more likely to report having pain lasting six months or more, holding all else constant, as compared to those with at least a college degree. Those who speak a language other than English at home are 22% more likely to report having pain lasting six months or more, holding all else constant. Poor people without CHC access are 88% more likely than non-poor people without CHC access to report having pain lasting six months or more, holding all else constant.

Personal Disadvantage – Conditional Effects

Table 9 displays the conditional effect of poverty on the likelihood of reporting pain lasting six months or more, depending on the level of access to a CHC.

Table 9	
Conditional Effect of Poverty on the Likelihood of Pain (Odds Ratios)	
Variable	Odds Ratio
CHC Access	0.9015
No CHC Access	1.8826

The table suggests that the effect of poverty on the likelihood of reporting pain is beneficial for populations with access to a CHC and detrimental for those without access, holding all else constant. As previously discussed, for those without access to a CHC, being poor increases the likelihood of reporting pain by 88% as compared to non-poor people, holding all else constant. However, for those with access to a CHC, being poor decreases the likelihood of reporting pain by 10% as compared to non-poor people holding all else constant.

Social Capital

This full model introduces two predictors testing the effect of social capital on the likelihood of reporting pain lasting six months or more: participation in neighborhood organizations and a sense of belonging in one's neighborhood. The coefficient for participation in neighborhood organizations is insignificant. The coefficient for sense of belonging is significant and negative. The model suggests that people with a sense of belonging in their neighborhood are 35% less likely than those without a sense of belonging in their neighborhood to report pain lasting six months or more, holding all else constant.

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Neighborhood Disadvantage

The data suggests that there is both a main effect and interaction effect of neighborhood disadvantage on the likelihood of reporting pain lasting six months or more. The main effect of neighborhood disadvantage on pain is restricted to those without access to a CHC and is both significant and positive, holding all else constant. More specifically, for those without access to a CHC, a one standard deviation increase in neighborhood disadvantage increases the likelihood of reporting pain by 9%, holding all else constant.

Neighborhood Disadvantage – Conditional Effects

Table 10 displays the effect of neighborhood disadvantage conditioned by CHC Access on the likelihood of reporting pain lasting six months or more.

Table 10 *Conditional Effect of Neighborhood Disadvantage (standardized) on the Likelihood of Pain (Odds Ratios)*	
Variable	Odds Ratio
CHC Access	1.4607
No CHC Access	1.0894

For those with access to a CHC, as neighborhood disadvantage increases by one standard deviation, the likelihood of pain increases by 46%, holding all else constant. The detrimental effect of neighborhood disadvantage is less severe for those without access precipitating a 9% increase in the likelihood of reporting pain, holding all else constant.

To further explore the suggested detrimental effect of neighborhood disadvantage as conditioned on CHC Access, I plotted the odds ratio of pain at varying levels of

neighborhood disadvantage and CHC access for disadvantaged females. I specifically selected disadvantaged females for this analysis, because their likelihood of pain was higher than advantaged males. I then calculated the odds ratio of pain for the following groups:

- disadvantaged females with CHC access
- disadvantaged females without CHC access

To define disadvantage, I coded all dummy variables in the model to be consistent with their socially disadvantaged dimension, with the exception of age which is coded with the sample's mean age of 52 years old. Neighborhood disadvantage, which is a z-standardized index, is measured at intervals from negative three (representing low neighborhood disadvantage) and positive three (representing high neighborhood disadvantage). The results of this analysis are displayed in the chart in Figure 4.

The trend lines in the above chart suggest that disadvantaged women without CHC access have a consistently higher likelihood of reporting pain lasting six months or more across all levels of neighborhood disadvantage. In comparison, disadvantaged females with CHC access have a consistently lower likelihood of reporting pain at all levels of neighborhood disadvantage relative to disadvantaged females without CHC access. It is also important to point out that for the disadvantaged females with CHC access, the progression of the likelihood of pain across all levels of neighborhood advantage is non-linear.
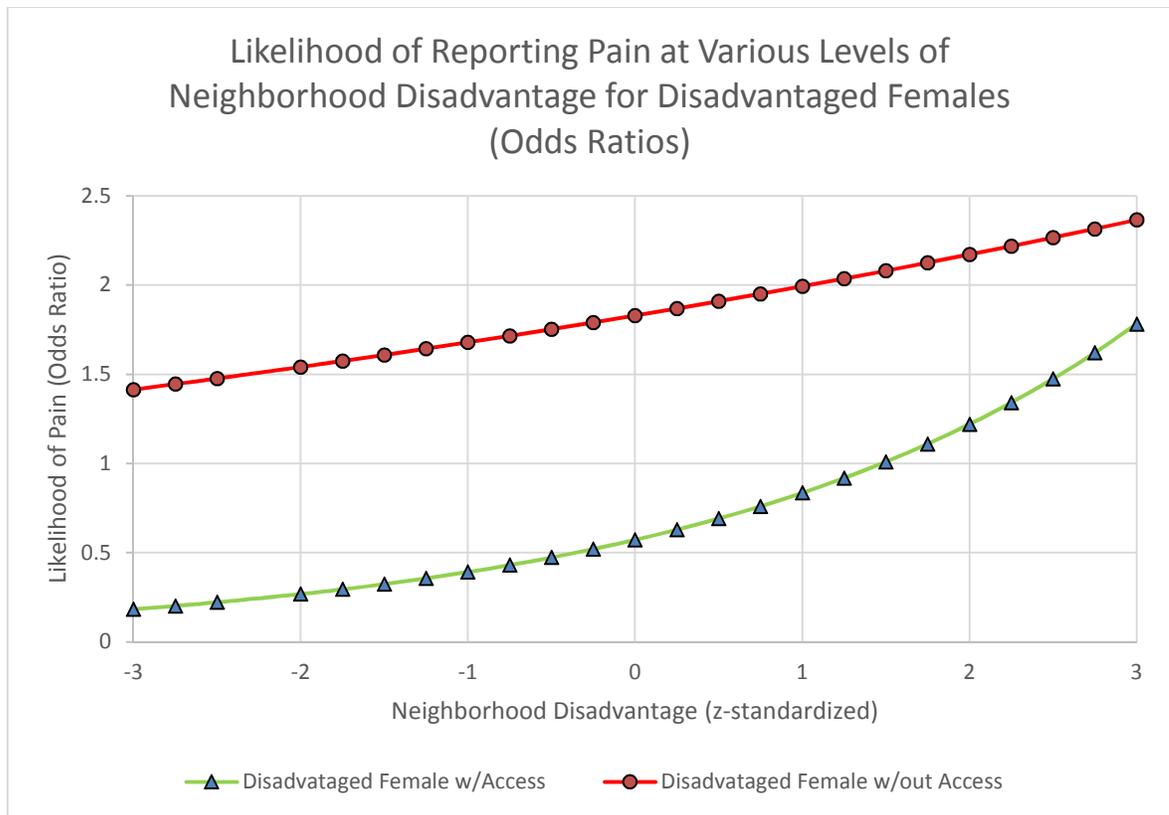
Figure 4. The Likelihood of Reporting Pain Lasting Six Month or More for Selected Levels of Neighborhood Disadvantage and Personal Disadvantage

As neighborhood disadvantage increases for disadvantaged females with access to a

CHC, the slope for neighborhood disadvantage and the likelihood of reporting pain

becomes much steeper, first with a lower odds of reporting pain than not reporting pain

when neighborhood advantage is relatively low, then becoming increasingly higher and

ultimately reversing to a higher odds of reporting pain than not reporting pain once the

neighborhood disadvantage index exceeds 1.5 standard deviations above the mean.

Control Variables

The effect of age on the likelihood of pain is insignificant in the baseline and full models. Being a female has a significant and positive association with the likelihood of reporting pain in both the baseline and full models. In the full model, females are 17% more likely than males to report pain lasting six months or more, holding all else constant. The effect of being uninsured on the likelihood of pain is significant and positive in the baseline, with those that are uninsured being 53% more likely to report pain lasing six months or more than insured individuals. But its effect is insignificant in the full model. Finally, having a chronic disease condition is positively associated with the likelihood or reporting pain in both the baseline and full models. The full model suggests that those with a chronic disease are more than four times as likely as those without a chronic disease to report pain lasting six months or more, holding all else constant.

Model III: Regular Source of Care

Model III tests the effect of CHC Access on the likelihood of having a regular source of health care, controlling for personal disadvantage, social capital, and neighborhood disadvantage using logistic regression. As discussed in the introduction to this chapter, the full set of results for this model consists of four nested sub-models. For the sake of simplicity, only sub-models A (the baseline model) and D (the full model) are presented in this section. The full versions of all four sub-models for the regular source of care model are included in Appendix I. The odds ratio for the baseline and full models are presented below in Table 11.

CHC Access

In this model, the effect of CHC Access on the likelihood of having a regular source of care is captured in two ways: the main effect of CHC Access and the interactive effect of CHC Access and race. In the baseline model, the effect of CHC Access is insignificant; however, when including all of the predictors in the model and restricting the effect of access to whites, the effect of CHC Access becomes negative and significant. More specifically, whites with access to a CHC are 63% less likely than whites without CHC access to have a regular source of care, holding all else constant.

Table 11

Odds Ratios for the Likelihood of Having a Regular Source of Care by CHC Proximity, Personal Characteristics, Social Capital, and Neighborhood

Variables	Baseline Model	Full Model
CHC Proximity		
Access (No Access)	0.7212	0.3741 **
Access*Racial Minority		2.3899 **
Personal Characteristics		
Living in Poverty (Not Living in Poverty)		0.7648 **
Racial/Ethnic Minority (non-Hispanic White)		1.0177
Less than College Degree (College Degree)		1.1379
English not Primary Language (English Primary)		0.8970
Social Capital		
Sense of Belonging (No Sense of Belonging)		1.4526 **
Participation in Neighborhood Orgs (No Participation)		1.2827 **
Neighborhood Disadvantage		
Neighborhood Disadvantage Index (standardized)		1.0654
Control Variables		
Age	1.0178 **	1.0162 **
Female (Male)	1.7708 **	1.7840 **
Uninsured (Insured)	0.2231 **	0.2421 **
Chronic Disease (No Chronic Disease)	1.8724 **	1.9216 **
Constant	3.1306	2.1311
R2	0.0926	0.1005

N= 8786 (981 census tracts)

*=p<.05 **=p<.01

While the main effect of CHC Access on the likelihood of having a regular source of care is significant and negative for whites, there is a significant interaction effect of

CHC Access for racial/ethnic minorities as compared to whites. For the model as a whole, the inclusion of the interaction term slightly improves the fit of the model as measured by McFadden's adjusted R^2 statistic. McFadden's adjusted R^2 increases from 0.094 for the full model without the interaction term, to 0.095 for the full model including the interaction terms (McFadden's R^2 stays the same at 0.100 for both models). The p-value of the difference in the likelihood ratio index is equal to 0.001 further suggesting that the difference in the models is significant. Table 12 summarizes the conditional effects of CHC Access on the likelihood of having a regular source of care.

Table 12	
Conditional Effect of CHC Access on the Likelihood of Having a Regular Source of Care (Odds Ratios)	
Variable	Odds Ratio
Minority	0.8941
Non-Minority	0.3741

The odds ratio coefficients suggest that the effect of CHC Access on the likelihood of having a regular source of care is negative in general, but less detrimental for minorities than for whites. As discussed in the previous paragraph, for whites, having access to a CHC decreases the likelihood of having a regular source of care by 63%, holding all else constant. For minorities, having access to a CHC decreases the likelihood of having a regular source of care by just 11%, holding all else constant. The overall interactive effect of CHC Access as conditioned by Minority is insignificant (chi^2=0.24, p= 0.628).

Personal Disadvantage

Like Models I and II, the category of personal disadvantage in this model is comprised of four separate predictors: poverty status, race, education, and primary language. The main effect of race (restricted to those without access to a CHC) and the effects of education and primary language are all insignificant in the full model. The effect of poverty on the likelihood of having a regular source of care is negative and significant. The full model suggests that poor people are 24% less likely than non-poor people to have a regular source of care, holding all else constant.

Personal Disadvantage – Conditional Effects

While the main effect of race on the likelihood of having a regular source of care was insignificant, in the full model the interaction effect of race conditioned on CHC Access is significant and positive. Table 13 displays the interaction effect of being a minority on the likelihood of having a regular source of care, depending on the level of access to a CHC.

Table 13
Conditional Effect of Racial/Ethnic Minority Status on the
Likelihood of Having a Regular Source of Care (Odds Ratios)

Variable	Odds Ratio
CHC Access	2.4321
No CHC Access	1.0177

For those with access to a CHC, racial/ethnic minorities are 2.4 times as likely as non-Hispanic Whites to have a regular source of health care, holding all else constant. For those without access to a CHC, being a minority increases the likelihood of having a

regular source of care by just 2%, holding all else constant. The overall interactive effect of Minority as conditioned by CHC Access is significant (chi^2=7.92, p=0.005).

Social Capital

This model includes two measures of social capital: participation in neighborhood organizations and a sense of belonging in one's neighborhood. In the full model, both measures of social capital are significant and positively associated with having a regular source of care. Participating in neighborhood organizations increases the likelihood of having a regular source of care by 28%, holding all else constant. Having a sense of belonging in one's neighborhood increases the likelihood of having a regular source of care by 45%, holding all else constant.

Neighborhood Disadvantage

The effect of neighborhood disadvantage is insignificant in the regular source of care model.

Control Variables

The effect of age on the likelihood of having a regular source of care is significant and positive in both the baseline and full models. In the full model, for each year increase in age, the likelihood of having a regular source of care increases by 2%, holding all else constant. For every ten year increase in age, the likelihood of having a regular source of care increases by 17%. Being a female has a significant and positive effect on the

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likelihood of having a regular source of care. In the full model, females are 78% more likely than males to have a regular source of care, holding all else constant. Being uninsured is significantly and negatively associated with having a regular source of care. In the full model, those that are uninsured are 76% less likely to have a regular source of care than those that are insured, holding all else constants. Finally, the model suggests that those with a chronic condition are more likely to have a regular source of care than those without a chronic condition. In the full model, having a chronic condition is associated with a 92% increase in the likelihood of having a regular source of care, holding all else constant.

CHAPTER 6

DISCUSSION & CONCLUSION

Introduction

The goal of this dissertation project has been to better understand and isolate the effect of CHC access on various measures of health, which I argue is an important step in the evaluation of the efficacy of the federal CHC program. As a public program charged with addressing the primary care needs for the most vulnerable populations in our society, it is critical to understand whether geographic access is an effective means for addressing health disparities, and whether this effect is the same for all social groups. Access is an important concept as it eventually became the cornerstone of the modern CHC program after its beginnings in the 1960s as a poverty program rooted in community empowerment. The historical review offered in the second chapter of this manuscript traces the beginnings of the program as a War on Poverty effort to its current role in the fortification of the national health care system. Along with this transition has come an ineffective shift away from community-focused healthcare to a more individualized and streamlined provision of health using a one-size fits all model of eliminating the risk factor of barriers of geographic access to quality healthcare for medically-vulnerable populations. A critical factor fueling this philosophy has been the need for program supporters and administrators to exhibit flexibility in order to maintain and grow funding across presidential administrations and through changes in public perceptions about how health care should be provided to indigent populations in the

United States. In this sense, the program uses access in a benign and relatively hands-off "build it and they shall come" approach, which heavily relies on the agency of potential patients to actively seek out care when they are sick, instead of pulling the most vulnerable patients into care. The approach is problematic because it is not only based on socially-constructed views of how sick individuals should act, but on an even more practical level, the program is highly funded with public dollars, but relatively few members of their target populations are regular users of the services. As a result, the program reaches a very small portion of the population that they are entrusted to help, leaving the marginalized populations even fewer options for care as they are overlooked for more socially-compliant participants in the medical model.

Through this project I attempt to test the potential benefits of the CHC program beyond that of regular use; I argue that as a safety-net provider, there should also be a measurable health benefit to individuals of having low-cost quality health care *options* for urgent and emergency care. In this sense we are working from a model where just by putting a facility in a needy neighborhood that the access alone should be enough to make a difference in the fight against health disparities. If this is the case, we need a way to measure this outcome distinct from the comparison of users versus non-users. Another important factor addressed through my research is the issue of reporting and standardization. Because of the increased scrutiny of programs utilizing public dollars to provide public services, CHCs like many other non-profits are required to do more with less, and to make their operations as efficient and transparent as possible (Salamon 2015). This is a far cry from the early days of the CHC program in the 1960s, where there was

more of an activist mindset prompting communities to set the agendas for the work of non-profits including CHCs, with success being measured by the positive outcome for the individual and the transformation of community health, not how much money is saved by eliminating the need for hospitals to provide emergency uncompensated care to uninsured individuals.

Noting this increased emphasis on access in the contemporary iteration of the CHC program, the goal of my research is to better understand whether access significantly affects self-reported measures of health for individuals, and whether social factors moderate this primary relationship. Current CHC efficacy studies often compare specific measures of health for CHC patients as compared to similar patients receiving services at traditional health care facilities. The literature consistently finds that CHCs reduce or eliminate disparate health outcomes for their patients. The assessed outcome measures in these studies are usually clinical in nature and consistent with the annual reporting measures already required by the federal government as a CHC funding requirement. These measures include the reporting of the percentage of patients receiving diagnostic and/or preventative tests as it relates to specific disease states including breast cancer, cervical cancer, obesity, asthma, diabetes, and healthy prenatal care for pregnant patients. To the extent that CHCs provide these required services to their patients more often than traditional providers, CHCs are found to provide superior care for their patients.

My research expands current efficacy literature in two ways. First, instead of comparing non-CHC patients to traditional patients, I compare individuals living in close proximity to health centers to those without proximal access, regardless of actual utilization levels. This is an important distinction, because as previously discussed, only about 20% of medically-vulnerable populations routinely use CHC services. As a result, a vast majority of individuals do not use CHCs on a routine basis. Therefore, it is critical to understand how CHC availability affects the health of individuals regardless of whether they are regular users of the services and to illuminate how social and structural factors impacting the individual can affect this primary relationship.

Second, I use self-reported measures of health as opposed to objective health measures in an effort to take advantage of the connection between self-reported health measures and mortality and to expand the definition of health outcomes beyond what is required by the federal government. To this end, the three outcome variables in this analysis are self-reported health, which serves as a proxy for an individual's general health state, the prevalence of chronic pain which is closely related to perceptions of health and is hypothesized to be less prevalent for individuals with better access to medical interventions, and having a regular source of care, as a measure of perceived health care access.

Hypothesis Testing Results

In this study, there are four hypotheses that shaped my statistical analysis. **First, I hypothesized that the main association between CHC access and each of the health outcomes would be positive but insignificant, holding all else constant**. The analysis presented limited evidence to support this hypothesis. Once all the personal disadvantage, social capital, and neighborhood disadvantage variables were included in the final nested models, the association between CHC access and self-reported health and CHC access and the likelihood of reporting pain lasting six months or more were insignificant. This finding supported part of this hypotheses in that the association between CHC access and health was expected to be insignificant. However, the main effect of CHC access on the likelihood of having a regular source of care was significant holding all else constant; but the hypothesized direction of the association was incorrect. The regular source of care model suggested that although the main effect of CHC access on the likelihood of having a regular source of care is significant, it is also negative. This finding suggests that in general, having CHC access is not beneficial for one's health as individuals living close to CHCs are generally less likely to have a regular source of care. A possible explanation for this finding could be that because CHCs are located in areas with a limited supply to doctors by design, and CHC utilization tends to be low in general, individuals living near CHCs are less likely to have a regular doctor than those living in neighborhoods with more options for care.

In the pain model, the association between pain and the main effect CHC access was negative but insignificant, suggesting that the observed negative association between

pain and CHC access is likely due to chance. The association between the main effect of CHC access and self-reported health is also insignificant but positive for the moderate versus poor comparison, and negative for the better versus poor comparison, holding all else constant. **Overall, with the significant variation of findings across all three models, the first hypothesis was only minimally supported by the analysis, suggesting that access alone is not enough to improve health outcomes equally for all members of a community.**

My second hypothesis was that the association between CHC access and health would be significant and positive for members of socially disadvantaged groups including racial minorities and the poor, holding all else constant. Support for this hypothesis was also mixed. In the self-reported health model, the interactive effect of CHC access and living in poverty was positive and significant. The pain model followed a similar pattern in that there was a lower likelihood of reporting pain lasting six months or more for poor populations with access to a CHC. These two findings clearly suggest that CHCs have a beneficial effect on health outcomes for those living in poverty, the primary target group for CHC services. While there was no interactive effect of CHC access for the poor in the regular source of care model, the data suggested that there was a positive interaction effect for racial/ethnic minorities. Being a racial/ethnic minority with access to a CHC increases one's likelihood of having a regular source of health care, as compared to non-Hispanic whites. This may be because CHC have a disproportionate percentage of racial/ethnic minority patients as compared to traditional healthcare providers, potentially due to a CHCs historically being viewed as spaces for minority

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health care. Therefore, non-minorities may have less comfort in claiming regular use of CHCs where the doctors, staff, and other patients that reflect a different social group due to concerns about stigma.

However, in the self-reported health model, the interactive effect of CHC access and being a racial/ethnic minority was negative and significant, suggesting that having access to a CHC has a negative impact on the self-reported health for racial/ethnic minorities as compared to non-Hispanic whites. More specifically, the beneficial effect of CHC access on self-reported health was strongest for poor non-Hispanic whites with a strong sense of belonging in their neighborhoods. There was also an observable positive interaction effect of CHC access for racial minorities living in poverty with a strong sense of belonging, but it was very small in comparison to the effect for non-Hispanic whites. This finding points to a clear benefit of CHC access for those that are poor, white, and socially connected. The distinction here is that although racial/ethnic minorities are more likely to consider a CHC their medical home when they live close to one, this does not translate into better perceptions of their health. An explanation may lie in the nature of the interactions that individuals from each group have at the facility. For non-Hispanic whites who do not consider CHCs as a realistic option for their regular source of care, CHC visits may be for meeting urgent care needs such as flu shots, STD testing, or cold symptoms. Once their episodic needs are met through treatment or medication, the acute need is resolved, restoring the individual to relatively good health. For racial/ethnic minorities who use CHC service more regularly, these patients may present for more chronic concerns (such as asthma, diabetes, and hypertension) which may be controlled

but not "cured" with a singular visit. Additional research in the area of CHC utilization as it relates to self-assessments of health would help to confirm this assumption.

In general, although there is some variation in the groups that benefit the most from CHC access, the data does support the hypothesis that although the main effect of CHC access may be insignificant, there is a significant interaction effect of access on health for some social groups, but the direction of the association is variable.

My third hypothesis was that the association between CHC access and health will be positive and significant for individuals living in areas of high disadvantage, holding all else constant. I found very little evidence to support this hypothesis. In fact, my data suggests that access to a CHC has a negative impact on the association between neighborhood disadvantage and health, in that health is worse for individuals with CHC access and living in neighborhoods of high disadvantage. In the self-reported health model and the regular source of care model, the interactive effects of CHC access and neighborhood disadvantage were insignificant. In the pain model, the interaction of CHC access and neighborhood disadvantage was significant, but surprisingly positive. This finding suggests that having access to a CHC and living in a neighborhood of high disadvantage increases the likelihood of reporting pain lasting six months or more. When we take a closer look at this association, it appears that having CHC access is beneficial as long as neighborhood disadvantage is relatively low. Therefore, CHCs appear to be more beneficial for those living in areas of moderate to low disadvantage, but when neighborhood disadvantage is high, CHCs do not offset the negative environmental factors impacting individuals living in those neighborhoods. The damaging effect of CHC

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access may also be a reflection of the government's identification of the community's dire needs for services, resulting in the placement of one or two health centers in the area. However, as previously suggested by the outcome of this research project, access alone is not enough to move the needle of health disparities and we can see the damaging effects of this faulty assumption in the outcome of the pain model. If a community is particularly disadvantaged the CHC is likely one of very few sources of care in the community, which leaves residents with limited options for managing their chronic pain.

Finally, my fourth hypothesis was that the association between CHC access and health will vary based on the individual's level of social capital, holding all else constant. Again, my data provided some support for this hypothesis, but not very much. The interaction effects of social capital and CHC access for the pain and regular source of care models were insignificant. There was some evidence of a significant interaction effect of social capital and access in the self-reported health model, but only for one outcome comparison (moderate versus poor health) and one measure of social capital (sense of belonging). The model suggests that being connected to one's neighborhood and having CHC access is associated with better health. A reason for this association might be the increased likelihood that one knows about and uses a community health center for acute needs when they are socially connected. This interactive effect was insignificant for the better versus poor comparison, supporting the previous supposition that many patients may use CHC services for acute urgent needs which decreases the likelihood of poor health, for those without chronic health needs and/or those at the extremes of the social-disadvantage scale.

Conclusion

A cornerstone of the modern CHC program has been the belief that barrier-free access to quality health services is the key to reducing health disparities in the United States. While efficacy studies tout the benefits of the CHC program and cite its record of financial efficiency, increased diagnostic screenings for traditionally underserved communities, and the reduction of uncompensated care in the traditional healthcare market, overall health disparities in the United States have persisted over the past five decades. Through this analysis, I have attempted to lay a preliminary framework for the argument that because of the CHC program's laser focus on the risk factor of access, it fails to address and/or leverage some of the more fundamental causes of health outcomes. My research suggests that the isolated effect of access on individual health varies depending on the social position of the individual. Furthermore, the effect is strongest for individuals who are within the target population (such as individuals living in poverty), but still having some social advantage (such as whites, those living in relatively better neighborhoods, and those with strong social connections). Conversely, the individuals standing on the very bottom rungs of the social stratification ladder enjoy relatively little benefit from CHC access alone. In other words, the most vulnerable individuals may not be getting "caught" by the medical safety net, which in turn further worsens health disparities by failing to pull particularly vulnerable patients into care leaving and them more even more marginalized without a source for addressing their health needs.

The historical component of this analysis suggests that due to a heavy dependence on advocacy and legislative support in the decades since its implementation in the 1960s,

the emphasis of the CHC program has shifted from empowerment and the eradication of poverty, to the fortification of the health care structure as it relates to the efficient management of the medical safety-net. As illustrated by the variation in federal support over numerous administrations, CHCs have successfully adapted to the social-political forces that shape their role in the larger healthcare structure. As with many social programs, CHC funding has not kept pace with demand, requiring the program to be more sensitive to the requirements of congressional supporters to the detriment of the communities that they serve. Moreover, reporting and standardization have become more of a priority as centers must prove their worth as efficient contributors to the health care system. As previously suggested, this approach is a far cry from the early days of the program, where communities set the agendas and success was measured on a community level, as opposed to the health care records of individual compliant patients.

It is a testament to the adaptability of the program that for the past fifty years it has enjoyed relatively strong support on a legislative level and advocacy with little criticism from academic and policy experts. However, the necessary effort to manage stakeholder expectations and maintain general likability has overshadowed the purpose of the program which was to be a part of a larger effort to eradicate poverty through empowerment. I argue that the implication of this transition from community-centric empowerment efforts to a "one size fits all" approach to access has diminished the importance of identifying and addressing community-specific causes of health disparities. Instead, we see health centers placed in high need areas, but with little effort to tailor the services to the specific needs of the community and/or to pull the most vulnerable

patients into care. As a result, contemporary CHCs are less synchronized with the need of

their communities, offering a narrow set of services to an even narrower base of

constituents who are defined by their ability to proactively learn about CHC services and

have the desire and means to seek care. This is evidenced by both the low utilization rates

of CHCs as identified in previous studies of CHC efficacy, and also by the results of the

current study which suggests that in general, living near a CHC makes little consistent

impact on self-reported measures of individual health across all social statuses, and in

some instances is associated with worse reported health for individuals.

Analysis Implications

The goal of this research project has been to understand how to quantify the

effect of CHC access on various individual health outcomes. To this end, I offer four

major takeaways from this analysis:

1. *Overtime, there has been a transition in the focus of the CHC program from the*
   community-centered eradication of the "causes and consequences" of poverty to
   the fortification of the health care system. As previously discussed, this is a
   potentially double-edged sword as the willingness of the CHC programs to be
   flexible to meet the needs of Congress in order to maintain their funding has
   meant that communities have suffered as they are no longer the focus of the
   program.

2. *Although it is a cornerstone of the CHC program, access alone is not enough to combat health disparities.* The findings of this analysis support the assertion that access alone is not enough. Putting a CHC in a neighborhood does not automatically transform the health of those living with that neighborhood. Adjusting to the needs of the community, pulling patients into care, and getting the word out about the availability of services would go a long way in starting to combat the issue of the health disparities for disadvantaged individuals.

3. *The effect of CHC access varies by social group.* Again, by knowing which groups benefit the most from access and which do not, an effort can be made to focus more on pulling marginalized populations into care. This tactic alone could help to raise the overall health of communities as we raise the level of health for everyone living in a community, not just a small subset of the population.

4. *Those at the very bottom of the social stratification ladder see the least benefits from having a CHC in their neighborhood.* As safety-net providers, one of the main responsibilities of CHCs is to help those members of the community that are most in need. The more disadvantaged the individual and/or his community, the less likely that access alone will make a difference in improving health outcomes. As a result, CHCs need to break from the "one size fits all model' and pay closer attention to the unique needs of their communities. CHCs in highly disadvantaged neighborhoods must look very different and offer different services than those in less disadvantaged neighborhoods – and this is okay as long as the unique needs of each community is being met.

Final Thoughts

Throughout this manuscript, I have argued that by primarily focusing on the risk factor of access, the concern for the more fundamental social factors impacting community health are overshadowed and the fundamental causes of health remain generally unaddressed. The CHC program's superficial approach to the issue of the social-structural factors influencing health does little to advance the effort to eliminate disparities on a larger scale, and it is most effective for groups with relatively low levels of disadvantage such as poor whites and individuals living in relatively advantaged neighborhoods.

The findings of my analysis support the idea that access alone is not enough to transform individual and community health, especially in communities where personal and neighborhood disadvantage is concentrated. As previously discussed, overcoming this hurdle requires a multi-pronged approach to strengthening and expanding the CHC safety net while leveraging networks of like-minded community-based organizations that are already in place to pull more patients into care, and to systematically focus on community building – an original goal of the larger War on Poverty effort. To reiterate the conclusion of Lefkowitz's text:

> We are constantly admonished to learn from history, but as I have traveled around the country I've also seen a jarring disconnect between the rich, emotional legacy of health centers and their need to compete in a modern marketplace as sophisticated providers. (2007, 135)

I argue that now is the time to take a closer look at the issue of health disparities and recognize that the provision of access is not enough. CHC administrators, and more importantly the federal program administrators, must recognize that there is not a "one-size fits all" approach to community health care. Understanding the disparate effect of access in communities, and having an understanding of and plan for which social groups benefit and which groups are left out, would contribute to a rising tide of positive health outcomes for individuals. As the safety-net for the larger medical system, CHCs have a critical role in making sure that no one in their community falls through the cracks. As such, they must widen their view beyond their regular and compliant patients and take a closer look at their immediate neighbors that may not be using services because they think the center is not "for them" or that the centers are only good enough for acute emergencies, but not regular preventative care.

Limitations & Future Expansions

This analysis has a number of limitations for consideration. One of the fundamental assumptions of my analysis is that individuals only utilize health services available in their immediate home community. In reality, it is reasonable to assume that people not only travel considerable distances to seek the health care provider of their choice, but they may also find it convenient to use health services far from home but close to their school or workplace. For the sake of simplicity, my definition of access is restricted to a catchment area around the individual's residential census tract. This

approach may be seriously problematic noting the aforementioned patterns in health seeking behaviors.

Another limitation of my analysis is that I do not assess actual utilization of CHC services of individuals, nor do I track the availability of other health care services in the individuals' communities. These are two factors that I plan to incorporate in future versions of this analysis. Because of this limitation, I do not have a good sense of how close individuals live to other potential sources of care such as hospitals and private physicians providing charity care and/or predominately serving Medicaid patients. This is a problem because I don't have a full picture of the options available to patients. I am only focusing on the availability of CHC facilities, which are non-existent in some census tracts or even entire counties such as Bucks County, Pennsylvania. It is conceivable that individuals needing subsidized or charity care but living far outside the city might have alternate health seeking patterns such as making the effort to travel to facilities far from their home. I do not have a way to assess these behaviors in the present version of my analysis.

Third, my analysis is based on a cross-sectional survey, but it may be more useful to look at how health measures have changed before and after the introduction of a CHC in the community. Having a temporal aspect to my analysis would help to strengthen my argument about causality. In further iterations of this analysis, it would be a meaningful exercise to see how measures of self-reported health outcomes change for individuals before they had a community health center in their neighborhood and afterwards. By

using cross-sectional data, it is nearly impossible for me to make a causal argument about the effect of CHC access on health; I can only comment about the observed association between variables.

Finally, I acknowledge that one of the best ways to understand the mechanisms behind the association between CHC access and health is to ask people. Incorporating a qualitative component to my research could add additional depth to the analysis and provide some context and explanation for the observed patterns in the quantitative analysis. It would be fascinating to speak with members of a community that live right next to a CHC but never use it, and compare their responses to patients that take three buses to travel to CHC facilities on a routine basis. Qualitative analysis could also help to explain some the racial differences in the utilization of CHC services and some of my assumptions about the stigma of space.

In addition to addressing the aforementioned short-comings of this analysis, future expansions of this analysis will include the replication of my analysis in other U.S. locations. In particular, I would like to study another city that is different from Philadelphia, perhaps a Southern or Mid-Western city, to see if my findings remain consistent. This dissertation project is a preliminary assessment of whether there is a significant association between CHC access and health. While the findings are mixed, there is a clear association between the variables for some social groups. It would be worthwhile to find out whether these same social groups continue to benefit from CHC access in different geographic locations, or whether the findings are unique to the Philadelphia metropolitan area. As previously mentioned, incorporating ways to address

the issues of utilization, health seeking patterns, temporal comparisons and a qualitative

analysis would add further strength to the analysis and paint a fuller picture of the

mechanisms behind the observed associations.

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CHC EXCLUSION LIST AND KEY

Table 14

CHC Exclusion List and Key

Exclusion Code	Site Name	Grantee Name	Site Address	Site City	Site State
N-ADMIN	ChesPenn Health Services	CHESPENN HEALTH SERVICES	2600 W 9th St	CHESTER	PA
N-ADMIN	Delaware Valley Community Health, Inc.	DELAWARE VALLEY COMMUNITY HEALTH, INC.	1412-20 Fairmount Ave	PHILADELPHIA	PA
N-ADMIN	Greater Philadelphia Health Action	GREATER PHILADELPHIA HEALTH ACTION, INCORPORATED	432 N 6th St	PHILADELPHIA	PA
N-ADMIN	Public Health Management Corporation	PUBLIC HEALTH MANAGEMENT CORPORATION	Centre Square East 1500 Market Street	PHILADELPHIA	PA
N-CLOSED	Norristown Regional Health Center	DELAWARE VALLEY COMMUNITY HEALTH, INC.	133 W Main St	NORRISTOWN	PA
N-DATE	Community Health & Dental Care	COMMUNITY HEALTH AND DENTAL CARE, INC.	700 Heritage Dr Ste 701	POTTSTOWN	PA
N-DATE	Hub of Hope	Project H.O.M.E.	2 Penn Center - Concourse Level 20	PHILADELPHIA	PA
N-DATE	Pathways to Housing - PA	Project H.O.M.E.	5201 Old York Rd	PHILADELPHIA	PA
N-DATE	St. Elizabeth's Wellness Center	Project H.O.M.E.	1845 N 23rd St	PHILADELPHIA	PA
N-DATE	Congreso Health Center - Main Site	PUBLIC HEALTH MANAGEMENT CORPORATION	216 W Somerset St	PHILADELPHIA	PA
N-DATE	PHMC health Connection	PUBLIC HEALTH MANAGEMENT CORPORATION	1900 N 9th St	PHILADELPHIA	PA
N-DATE	Rising Sun Health Center	PUBLIC HEALTH MANAGEMENT CORPORATION	5675 N Front St	PHILADELPHIA	PA
N-DATE	FPCN Q Care	RESOURCES FOR HUMAN DEVELOPMENT, INC.	2800 Fox St Unit A	PHILADELPHIA	PA
N-DATE	Rochelle Center for Children's Clinical Services	RESOURCES FOR HUMAN DEVELOPMENT, INC.	90 Rochelle Ave	PHILADELPHIA	PA
N-DATE	Spectrum Community Health Center	SPECTRUM HEALTH SERVICES, INC.	5201 Haverford Ave	PHILADELPHIA	PA
N-DATE	Philadelphia District HC #2 Temporary		1930 S Broad St Unit 14	PHILADELPHIA	PA
N-DUP	ChesPenn Health Services	CHESPENN HEALTH SERVICES	2602 W 9th St	CHESTER	PA
N-DUP	ChesPenn Health Services	PUBLIC HEALTH MANAGEMENT CORPORATION	2600 W 9th St	CHESTER	PA
N-SERVCS	Parkview Ob/Gyn Health Center	DELAWARE VALLEY COMMUNITY HEALTH, INC.	841 E Hunting Park Ave	PHILADELPHIA	PA
N-SERVCS	Greater Philadelphia Health Action, Inc. Dental and Behavioral Healthcare	GREATER PHILADELPHIA HEALTH ACTION, INCORPORATED	5501 Woodland Ave	PHILADELPHIA	PA
N-SERVCS	Snyder Avenue Dental Center	GREATER PHILADELPHIA HEALTH ACTION, INCORPORATED	640 Snyder Ave	PHILADELPHIA	PA
N-SERVCS	Chester County Community Dental Center	LA COMUNIDAD HISPANIA, INC	744 E Lincoln Hwy Ste 120	COATESVILLE	PA
N-SERVCS	Interim House West	PUBLIC HEALTH MANAGEMENT CORPORATION	4108 Parkside Ave	PHILADELPHIA	PA
N-SPECPOP	Kelly Kids Health Center	COVENANT HOUSE INC	5116 Pulaski Ave	PHILADELPHIA	PA
N-SPECPOP	Martin Luther King HS Resource Center	COVENANT HOUSE INC	6100 Stenton Ave	PHILADELPHIA	PA
N-SPECPOP	Al-Assist Behavioral Health Care	GREATER PHILADELPHIA HEALTH ACTION, INCORPORATED	1401 S 4th St	PHILADELPHIA	PA
N-SPECPOP	Philadelphia FIGHT Jonathan Lax Treatment Center	PHILADELPHIA FIGHT	1233 Locust St	PHILADELPHIA	PA
N-SPECPOP	Philadelphia FIGHT Youth Health Empowerment Project	PHILADELPHIA FIGHT	1417 Locust St	PHILADELPHIA	PA
N-SPECPOP	HIV Site - Es Fuerzo	PUBLIC HEALTH MANAGEMENT CORPORATION	3439 N Hutchinson St	PHILADELPHIA	PA
N-SPECPOP	MARY HOWARD HEALTH CENTER	PUBLIC HEALTH MANAGEMENT CORPORATION	125 S 9th St	PHILADELPHIA	PA
N-SPECPOP	Our Brother's Place	PUBLIC HEALTH MANAGEMENT CORPORATION	907 Hamilton St	PHILADELPHIA	PA
N-SPECPOP	Outley House	PUBLIC HEALTH MANAGEMENT CORPORATION	6901 Woodland Ave	PHILADELPHIA	PA
N-SPECPOP	PEC Nursing Center	PUBLIC HEALTH MANAGEMENT CORPORATION	325 N 39th St	PHILADELPHIA	PA
N-SPECPOP	Ridge Avenue Shelter	PUBLIC HEALTH MANAGEMENT CORPORATION	1360 Ridge Ave	PHILADELPHIA	PA
N-SPECPOP	Sheila Dennis House Homeless Shelter	PUBLIC HEALTH MANAGEMENT CORPORATION	2601 N Broad St	PHILADELPHIA	PA
N-SPECPOP	Stenton Family Manor	PUBLIC HEALTH MANAGEMENT CORPORATION	1300 E Tulpehocken St	PHILADELPHIA	PA
N-SPECPOP	Philadelphia FIGHT Jonathan Lax Treatment Center		1233 Locust St	PHILADELPHIA	PA
N-SPECPOP	Philadelphia FIGHT Youth Health Empowerment Project		1417 Locust St	PHILADELPHIA	PA

Key: N-ADMIN (Administrative Site Only), N-CLOSED (Site Closed at Time of Survey), N-DATE (Site Established after Time of Survey), N-DUP (Duplicate Site), N-SERVCS (Predominantly Offers Non-Primary Care Services), N-SPECPOP (Restricts Access to Certain Populations)

APPENDIX B

IN-SCOPE CHC SERVICE SITES

Table 15

In-Scope CHC Sites

Site Name	Grantee Name	Site Address	Site City	Site State
ChesPenn Center for Family Health	CHESPENN HEALTH SERVICES	2600 W 9th St	CHESTER	PA
ChesPenn Eastside Health Center	CHESPENN HEALTH SERVICES	125 E 9th St	CHESTER	PA
Center for Family Health - Upper Darby	CHESPENN HEALTH SERVICES	1 S State Rd	UPPER DARBY	PA
ChesPenn Family Health Center at Coatesville	CHESPENN HEALTH SERVICES	744 E Lincoln Hwy	COATESVILLE	PA
Community Health and Dental Care	COMMUNITY HEALTH AND DENTAL CARE, INC.	11 Robinson St Ste 100	POTTSTOWN	PA
Mt. Pleasant Medical Center	COVENANT HOUSE INC	8125-27 Stenton Ave	PHILADELPHIA	PA
Covenant House, Inc.	COVENANT HOUSE INC	251 E Bringhurst St	PHILADELPHIA	PA
Covenant House Health & Dental Center	COVENANT HOUSE INC	138 W Chelten Ave	PHILADELPHIA	PA
Norristown Regional Health Center	DELAWARE VALLEY COMMUNITY HEALTH, INC.	1401 Dekalb St	NORRISTOWN	PA
Fairmount Primary Care Center at Horizon House	DELAWARE VALLEY COMMUNITY HEALTH, INC.	120 S 30th St	PHILADELPHIA	PA
Maria De Los Santos Health Center	DELAWARE VALLEY COMMUNITY HEALTH, INC.	401-55 W Allegheny Ave	PHILADELPHIA	PA
Fairmount Primary Care Center at St. Joseph's Hospital	DELAWARE VALLEY COMMUNITY HEALTH, INC.	1600 W Girard Ave	PHILADELPHIA	PA
Fairmount Primary Care Center	DELAWARE VALLEY COMMUNITY HEALTH, INC.	1412-22 Fairmount Ave	PHILADELPHIA	PA
Esperanza Health Center	Esperanza Health Center, Inc.	4417 N 6th St	PHILADELPHIA	PA
Esperanza Health Center	Esperanza Health Center, Inc.	3156 Kensington Ave	PHILADELPHIA	PA
Esperanza Health Center	Esperanza Health Center, Inc.	2940 N 5th St	PHILADELPHIA	PA
Frankford Avenue Health Center	GREATER PHILADELPHIA HEALTH ACTION, INCORPORATED	4510 Frankford Ave	PHILADELPHIA	PA
Hunting Park Health Center	GREATER PHILADELPHIA HEALTH ACTION, INCORPORATED	1999 W Hunting Park Ave	PHILADELPHIA	PA
Woodland Avenue Health Center	GREATER PHILADELPHIA HEALTH ACTION, INCORPORATED	5000 Woodland Ave	PHILADELPHIA	PA
Wilson Park Medical Center	GREATER PHILADELPHIA HEALTH ACTION, INCORPORATED	2520 Snyder Ave	PHILADELPHIA	PA
Chinatown Medical Services	GREATER PHILADELPHIA HEALTH ACTION, INCORPORATED	930 Washington Ave	PHILADELPHIA	PA
Southeast Health Center	GREATER PHILADELPHIA HEALTH ACTION, INCORPORATED	800 Washington Ave	PHILADELPHIA	PA
La Comunidad Hispana	LA COMUNIDAD HISPANIA, INC	731 W Cypress St	KENNETT SQUARE	PA
PHMC Health Connection	PUBLIC HEALTH MANAGEMENT CORPORATION	1035 W Berks St	PHILADELPHIA	PA
PHMC Care Clinic	PUBLIC HEALTH MANAGEMENT CORPORATION	1200 Callowhill St	PHILADELPHIA	PA
Rising Sun Health Center	PUBLIC HEALTH MANAGEMENT CORPORATION	500 Adams Ave	PHILADELPHIA	PA
Cooke Family Health Center	QUALITY COMMUNITY HEALTH CARE, INC.	1300 W Louden St	PHILADELPHIA	PA
Quality Community Health Care	QUALITY COMMUNITY HEALTH CARE, INC.	2501 W Lehigh Ave	PHILADELPHIA	PA
Finley Family Health Center	QUALITY COMMUNITY HEALTH CARE, INC.	2813 W Diamond St	PHILADELPHIA	PA
Meade Family Health Center	QUALITY COMMUNITY HEALTH CARE, INC.	18th And Oxford Streets	PHILADELPHIA	PA
Vaux Family Health Center	QUALITY COMMUNITY HEALTH CARE, INC.	2300 W Master St	PHILADELPHIA	PA

Table 15				
In-Scope CHC Sites (continued)				
Site Name	**Grantee Name**	**Site Address**	**Site City**	**Site State**
Abbottsford Falls FP & Counseling	RESOURCES FOR HUMAN DEVELOPMENT, INC.	4700 Wissahickon Bldg D 118	PHILADELPHIA	PA
11th Street Fam Hlth Svcs Drexel	RESOURCES FOR HUMAN DEVELOPMENT, INC.	850 N 11th St	PHILADELPHIA	PA
The Health Annex	RESOURCES FOR HUMAN DEVELOPMENT, INC.	6120-B Woodland Ave Fl 2	PHILADELPHIA	PA
The Sayre Health Center	SAYRE HEALTH CENTER	5800 Walnut St Ste 121	PHILADELPHIA	PA
Broad Street Health Center	SPECTRUM HEALTH SERVICES, INC.	1415 N Broad St Ste 224	PHILADELPHIA	PA
Philadelphia District Health Center #10		2230 Cottman Ave	PHILADELPHIA	PA
Philadelphia District Health Center #9		131 E Chelten Ave	PHILADELPHIA	PA
Strawberry Mansion Health Center		2840 W Dauphin St	PHILADELPHIA	PA
Philadelphia District Health Center #5		1900 N 20th St	PHILADELPHIA	PA
Philadelphia District Health Center #6		321 W Girard Ave	PHILADELPHIA	PA
Philadelphia District Health Center #4		4400 Haverford Ave	PHILADELPHIA	PA
Philadelphia District Health Center #3		555 S 43rd St	PHILADELPHIA	PA
Urban Health Initiatives		1408 S Broad St	PHILADELPHIA	PA
Philadelphia District Health Center #2		1720 S Broad St	PHILADELPHIA	PA

OPERATIONALIZATION OF VARIABLES AND DESCRIPTIVE STATISTICS

Table 16

Operationalization of Variables and Descriptive Statistics

Variable	Definition	Percent	Mean	Std. Deviation	Range
Predictor Variable					
CHC Access	Indicator of whether respondent has proximal access to a CHC				
	1 = Access	4.20%	-	-	-
	0 = No Access	95.80%	-	-	-
Outcomes Variables					
Self-Reported Health	Respondent's self-reported health status				
	3= Very Good or Excellent	54.87%	-	-	-
	2= Fair or Good	40.45%	-	-	-
	1= Poor	4.68%	-	-	-
Regular Source of Care	Indicator of whether the respondent has a regular source of				
	1= Yes (Has a Regular Source of Care)	91.90%	-	-	-
	0= No (Does not Have a Regular Source of Care)	8.10%	-	-	-
Chronic Pain	Indicator of whether the respondent currently has pain lasting six months or longer				
	1= No (No Chronic Pain)	74.02%	-	-	-
	0= Yes (Chronic Pain)	25.98%	-	-	-
Secondary Independent Variables					
Poverty Status	Imputed indicator of whether the respondent's household income is below 200% of poverty				
	1= Yes (Living in Poverty)	25.07%	-	-	-
	0= No (Not Living in Poverty)	74.93%	-	-	-
Race	Respondent's race/ethnicity				
	1= Racial/Ethnic Minority	28.98%	-	-	-
	0 = Non-Latino White	71.02%	-	-	-
Education	Respondent's Education Level				
	1= No College Degree	59.09%	-	-	-
	0= College Degree	40.91%	-	-	-
Home Language	Indicator of whether the respondent speaks a language other than English at home				
	1= Yes (English not Primary Language)	10.77%	-	-	-
	0= No (English Primary Language)	89.23%	-	-	-
Neighborhood Disadvantage (standardized)	Index of relative disadvantage of respondent's Census Tract	-	-0.004	0.998	-1.705 - 2.782
Social Capital					
Does Not Participate (Participates)	Indicator of whether the respondent participates in neighborhood organizations				
	1= Participates in zero organizations (Does not Participate)	44.06%	-	-	-
	0= Participates in one or more organizations (Participates)	55.94%	-	-	-
Sense of Belonging	Indicator of whether the respondent feels a sense of belonging in her/his neighborhood				
	1= Strongly Disagree or Disagree (No Sense of Belonging)	13.76%	-	-	-
	0 = Strongly Agree or Agree (Sense of Belonging)	86.24%	-	-	-

N = 8,786

Table 16

Operationalization of Variables and Descriptive Statistics (continued)

Variable	Definition	Percent	Mean	Std. Deviation	Range
Control Variables					
Age	Age of respondent	-	52.926	16.03	18 - 100
Gender	Respondent's gender				
	1= Male	37.08%	-	-	-
	0= Female	62.92%	-	-	-
Insurance Status	Respondent's insurance status				
	1= No (Uninsured)	92.78%	-	-	-
	0= Yes (Insured)	7.22%	-	-	-
Prevalence of Chronic Disease	Indicator of whether or not the respondent has a chronic disease condition				
	1= Reports at least one Chronic Disease Condition (Chronic Disease)	57.93%	-	-	-
	0= Does not report any Chronic Disease Conditions (No Chronic Disease Condition)	42.07%	-	-	-

N = 8,786

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APPENDIX D

CHC CENSUS TRACT DESIGNATIONS

Table 17

CHC Census Tract Designations

Site Name	Census Tract	Contiguous Tracts									
11Th Street Fam Hlth Svcs Drexel	132.00	141.00	131.00	376.00	133.00	140.00					
Abbottsford Falls FP & Counseling	205.00	171.00	202.00	201.02	203.00	204.00	280.00	245.00	244.00	243.00	206.00 170.00
Broad Street Health Center	146.00	377.00	145.00	141.00	140.00	147.00	153.00				
Center for Family Health - Upper Darby	4007.00	4005.00	4004.02	4008.01	4008.02	4009.00	4010.00	4011.01	4006.00		
ChesPenn Center for Family Health	4053.00	4107.00	4052.00	4064.02	4054.00						
ChesPenn Eastside Health Center	4050.00	4047.00	4049.00	4107.00	4051.00	4063.00					
ChesPenn Family Health Center at Coatesville	3053.00	3051.01	3114.03	3055.00	3054.00	3060.00	3073.00				
Chinatown Medical Services	24.00	18.00	17.00	25.00	27.01	28.02	29.00	23.00	22.00	19.00	
Community Health and Dental Care	2090	2092.01	2089.01	2089.04	2088.01	2092.01	3014.01				
Cooke Family Health Center	283.00	282.00	284.00	9805.00	204.00	280.00	281.00				
Covenant House Health & Dental Center	241.00	240.00	242.00	246.00	238.00	239.00					
Covenant House, Inc.	245.00	205.00	280.00	279.02	247.00	246.00	242.00	244.00			
Esperanza Health Center	175.00	199.00	195.02	195.01	176.02	176.01	164.00	165.00	174.00	200.00	383.00
Esperanza Health Center	177.01	192.00	188.00	178.00	177.02						
Esperanza Health Center	197.00	198.00	383.00	287.00	284.00	9805.00					
Fairmount Primary Care Center	133.00	140.00	141.00	132.00	125.00	134.02	135.00				
Fairmount Primary Care Center at Horizon House	369.00	9809.00	33.00	13.00	12.01	8.01	4.01	9800.00	90.00	91.00	88.01 88.02 77.00
Fairmount Primary Care Center at St. Joseph's Hospital	140.00	133.00	132.00	141.00	146.00	147.00	139.00	135.00			
Finley Family Health Center	151.02	169.01	168.00	152.00	149.00	151.01	169.02				
Frankford Avenue Health Center	293.00	301.00	300.00	294.00	382.00	190.00	191.00	292.00			
La Comunidad Hispana	3033.01	3033.02	3034.01	3034.02	3035.01	3035.02	3065.03	3065.04	3065.01		
Maria De Los Santos Health Ctr	195.01	195.02	192.00	177.02	176.02	175.00					
Meade Family Health Center	147.00	153.00	377.00	146.00	140.00	139.00	148.00	152.00			
Mt. Pleasant Medical Center	261.00	254.00	262.00	263.01	260.00	259.00	258.00	256.00	255.00		
Norristown Regional Health Center	2036.02	2033.04	2033.03	2035.00	2036.01	2034.01	2037.00				
Philadelphia District Health Center #10	314.01	335.00	334.00	314.02	313.00	311.01	310.00				
Philadelphia District Health Center #2	30.01	30.02	29.00	39.01	37.01	31.00					
Philadelphia District Health Center #3	77.00	87.01	87.02	88.02	369.00	9809.00	74.00	78.00	79.00		
Philadelphia District Health Center #4	92.00	106.00	108.00	91.00	88.02	87.02	87.01	86.02	105.00		
Philadelphia District Health Center #5	152.00	168.00	167.01	153.00	147.00	148.00	149.00	151.02	169.01		
Philadelphia District Health Center #6	144.00	156.00	157.00	158.00	143.00	142.00	141.00	145.00			
Philadelphia District Health Center #9	246.00	248.00	247.00	245.00	242.00	241.00	238.00	252.00			

Table 17
CHC Census Tract Designations (continued)

Site Name	Census Tract	Contiguous Tracts										
PHMC Care Clinic	376.00	131.00	367.00	1.00	2.00	3.00	125.00	133.00	132.00			
PHMC Health Connection	205.00	244.00	245.00	280.00	204.00	203.00	201.02	202.00	171.00	170.00	206.00	243.00
PHMC Health Connection	377.00	165.00	164.00	162.00	156.00	145.00	146.00	147.00	153.00	167.02	166.00	
Quality Community Health Care, Inc.	172.02	171.00	172.01	169.01	169.02							
Rising Sun Health Center	291.00	305.02	305.01	390.00	292.00	289.02	290.00	273.00	272.00	2022.02		
Southeast Health Center	24.00	18.00	17.00	25.00	27.01	28.02	29.00	23.00	22.00	19.00		
Strawberry Mansion Health Center	169.01	172.02	172.01	168.00	152.00	151.02	169.02					
The Health Annex	66.00	62.00	67.00	69.00	70.00	71.01	65.00	64.00	63.00			
The Sayre Health Center	84.00	94.00	85.00	81.02	83.02	95.00						
Urban Health Initiatives	30.02	30.01	29.00	23.00	22.00	21.00	31.00					
Vaux Family Health Center	138.00	149.00	148.00	139.00	136.02	137.00						
Wilson Park Medical Center	36.00	33.00	32.00	37.01	37.02	38.00	9809.00					
Woodland Avenue Health Center	74.00	78.00	77.00	9809.00	69.00	70.00	71.01	73.00	78.00			

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Estimated coefficients from j-1 binary regressions

	y>1	y>2
access	-.01369886	.10387821
minority	.11902908	-.24811447
college	-.33666138	-.4522575
NPOV200	-1.2089228	-.54428859
homelang_re	-.37963027	-.16253102
nopartic	-.60259568	-.31728332
nd_z	-.09007274	-.27902277
nobelong	-.46535551	-.37301576
RESPAGE	-.00719178	-.01426142
female	.29667288	.07334842
uninsured	.32201055	-.3726238
chronic	-1.4967904	-1.1981768
_cons	5.5077543	2.3347008

Brant Test of Parallel Regression Assumption

Variable	chi2	p>chi2	df
All	66.98	0.000	12
access	0.63	0.427	1
minority	6.48	0.011	1
college	0.62	0.432	1
NPOV200	28.14	0.000	1
homelang_re	1.79	0.180	1
nopartic	6.18	0.013	1
nd_z	6.32	0.012	1
nobelong	0.47	0.494	1
RESPAGE	3.82	0.051	1
female	4.04	0.045	1
uninsured	10.27	0.001	1
chronic	3.22	0.073	1

A significant test statistic provides evidence that the parallel
regression assumption has been violated.

RESULTS OF INTERACTION TERM TESTS

Table 18
Interaction Term Testing: Outcome A - Self-Reported Health

Test	Baseline Predictors	Tested Interaction Term	Model R2	Model Wald χ^2		Interaction Coefficient b	z	Retained?
1	CHC Access, Control Variables, Personal Characteristic Variables	Minority*CHC Access	0.1317	1540.36 (20) [+]	P v. F/G	-1.2552 [*]	-2.16	Y
					P v. VG/E	-1.1951	-1.64	
2		College*CHC Access	0.1321	1555.76 (22) [+]	P v. F/G	0.7491	1.24	Y[1]
					P v. VG/E	1.2815 [*]	2.29	
3		Poverty*CHC Access	0.1328	1575.71 (24) [+]	P v. F/G	0.7772	1.70	Y
					P v. VG/E	1.4272 [*]	2.72	
4		ESL*CHC Access	0.1327	1607.72 (24) [+]	P v. F/G	-0.3160	-0.85	N
					P v. VG/E	-0.4363	-0.77	
5	CHC Access, Control Variables, Personal Characteristic and Social Capital Variables	Participation*CHC Access	0.1411	1749.99 (28) [+]	P v. F/G	0.0705	0.19	N
					P v. VG/E	0.4078	1.08	
6		Belonging*CHC Access	0.1413	1753.22 (28) [+]	P v. F/G	-0.8908 [*]	-2.11	Y
					P v. VG/E	-0.6452	-1.45	
7	CHC Access, Control Variables, Personal Characteristic, Social Capital and Neighborhood Disadvantage	Neighborhood Disadvantage*CHC Access	0.1458	1811.14 (32) [+]	P v. F/G	0.0004	0.00	N
					P v. VG/E	-0.0558	-0.21	

Model test of retained interaction terms is significant ($\chi^2 = 22.75$ (6), p<.05)

[+] p<0.001 for model as a whole

[*] p<.05, two-tailed test of single coefficients

[1] Retained, but later removed due to weakened significance

Table 19
Interaction Term Testing: Outcome B - Pain Lasting Six Months or More

Test	Baseline Predictors	Tested Interaction Term	Model R2	Model Wald χ^2	Interaction Coefficient b	z	Retained?
1	CHC Access, Control Variables, Personal Characteristic Variables	Minority*CHC Access	0.1048	953.26 (10) [+]	0.0067	0.02	N
2		College*CHC Access	0.1048	960.97 (10) [+]	0.1367	0.41	N
3		Poverty*CHC Access	0.1054	955.41 (10) [+]	-0.5768 [*]	2.84	Y
4		ESL*CHC Access	0.1054	957.43 (11) [+]	-0.1473	-0.45	N
5	CHC Access, Control Variables, Personal Characteristic and Social Capital Variables	Participation*CHC Access	0.1096	981.52 (13) [+]	-0.0150	-0.07	N
6		Belonging*CHC Access	0.1096	982.26 (13) [+]	0.1227	0.42	N
7	CHC Access, Control Variables, Personal Characteristic, Social Capital and Neighborhood Disadvantage Variables	Neighborhood Disadvantage*CHC Access	0.1109	995.41 (14) [+]	0.2933 [*]	2.82	Y

Model test of retained interaction terms is significant ($\chi^2 = 12.80$ (2), p<.05)

[+] p<0.001 for model as a whole

[*] p<.05, two-tailed test of single coefficients

Table 20							
Interaction Term Testing: Outcome C - Regular Source of Care							
				Model	**Interaction Coefficient**		
Test	**Baseline Predictors**	**Tested Interaction Terms**	**R2**	**Wald Chi^2**	**b**	**z**	**Retained?**
1	CHC Access, Control Variables, Personal Characteristic Variables	Minority*CHC Access	0.0954	495.15 (10) [+]	0.9392 [*]	2.84	Y
2		College*CHC Access	0.0955	496.75 (11) [+]	0.1828	0.52	N
3		Poverty*CHC Access	0.0955	494.97 (11) [+]	0.1811	0.61	N
4		ESL*CHC Access	0.0958	496.02 (11) [+]	-0.5972	-1.25	N
5	CHC Access, Control Variables, Personal Characteristic and Social Capital Variables	Participation*CHC Access	0.1002	512.07 (13) [+]	0.0906	0.24	N
6		Belonging*CHC Access	0.1004	511.75 (13) [+]	-0.4029	-1.19	N
7	CHC Access, Control Variables, Personal Characteristic, Social Capital and Neighborhood Disadvantage Variables	Neighborhood Disadvantage*CHC Access	0.1006	519.24 (14) [+]	-0.1641	-0.87	N

Model test of retained interaction terms is significant ($\chi^2 = 6.71$ (1), p<.05)

[+] p<0.001 for model as a whole

[*] p<.05, two-tailed test of single coefficients

SELF-REPORTED HEALTH (FULL MODEL)

Table 21
Relative Risk Ratios for the Likelihood of Reporting Moderate or Best Health as Compared to Poor Health by CHC Proximity, Personal Characteristics, Social Capital and Neighborhood Disadvantage (Full Model)

| | Sub-Model A | | | | Sub-Model B | | | | Sub-Model C | | | | Sub-Model D | | | |
| | Moderate vs. Poor Health | | Best vs. Poor Health | | Moderate vs. Poor Health | | Best vs. Poor Health | | Moderate vs. Poor Health | | Best vs. Poor Health | | Moderate vs. Poor Health | | Best vs. Poor Health | |
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
CHC Proximity																
Access (No Access)	0.7135 *	0.120	0.3348 **	0.069	1.4769	0.902	0.8489	0.590	1.0310	0.687	0.7845	0.543	1.0234	0.688	0.9812	0.695
Access* Living in Poverty					2.3625 *	1.014	4.9460 **	2.343	2.4426 *	1.079	4.9986 **	2.483	2.4230 *	1.079	5.0322 **	2.477
Access*Racial Minority					0.2654 *	0.151	0.2439 *	0.172	0.1909 **	0.108	0.1637 **	0.113	0.1926 **	0.109	0.1584 **	0.111
Access* Sense of Belonging									2.4370 *	1.027	1.9064	0.849	2.4257 *	1.018	1.8738	0.827
Personal Characteristics																
Living in Poverty (Not Living in Poverty)					0.3184 **	0.042	0.1752 **	0.023	0.3349 **	0.044	0.1896 **	0.025	0.3337 **	0.045	0.2068 **	0.028
Racial/Ethnic Minority (non-Hispanic White)					1.3341 *	0.172	0.8059	0.105	1.3075 *	0.169	0.8053	0.106	1.3108	0.186	1.0359	0.150
Less than College Degree (College Degree)					0.8335	0.126	0.4604 **	0.069	0.9124	0.140	0.5320 **	0.082	0.9105	0.143	0.5799 **	0.091
English not Primary Language (English Primary)					0.7289 *	0.112	0.6474 **	0.106	0.7243 *	0.112	0.6481 **	0.107	0.7274 *	0.112	0.6362 **	0.105
Social Capital																
Sense of Belonging (No Sense of Belonging)									1.3200 *	0.184	1.9321 **	0.272	1.3214 *	0.184	1.8790 **	0.264
Participation in Neighborhood Orgs (No Participation)									1.6416 **	0.178	2.2034 **	0.244	1.6417 **	0.178	2.1662 **	0.240
Neighborhood Disadvantage																
Neighborhood Disadvantage Index (standardized)													1.0022	0.069	0.7731 **	0.054
Control Variables																
Age	0.9994	0.003	0.9884 **	0.003	1.0007	0.003	0.9883 **	0.003	0.9983	0.003	0.9847 **	0.004	0.9983	0.003	0.9844 **	0.004
Female (Male)	1.2142	0.129	1.1904	0.127	1.3308 **	0.143	1.4161 **	0.157	1.3362 **	0.145	1.4103 **	0.157	1.3355 **	0.145	1.4118 **	0.158
Uninsured (Insured)	1.1748	0.250	0.4550 **	0.102	1.6068 *	0.355	0.9795	0.230	1.6495 *	0.368	1.0550	0.250	1.6420 *	0.367	1.0851	0.257
Chronic Disease (No Chronic Disease)	0.3759 **	0.060	0.1028 **	0.017	0.3984 **	0.064	0.1238 **	0.020	0.4005 **	0.065	0.1248 **	0.020	0.3994 **	0.065	0.1281 **	0.021
Constant	17.9166		106.4078		26.5654		273.6423		18.0916		115.5631		18.1247		102.3779	
R2	0.0855				0.1327				0.1413				0.1458			

N= 8786 (981 census tracts)
*=p<.05 **=p<.01

PAIN (FULL MODEL)

Table 22

Odds Ratios for the Likelihood of Pain Lasting Six Months or More by CHC Proximity, Personal Characteristics, Social Capital, and Neighborhood Disadvantage (Full Model)

	Sub-Model A		Sub-Model B		Sub-Model C		Sub-Model D	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
CHC Proximity								
Access (No Access)	1.3420 **	0.152	1.4480 *	0.270	1.4282	0.274	0.9582	0.194
Access* Living in Poverty			0.5617 **	0.114	0.5676 **	0.118	0.4788 **	0.110
Access*Neighborhood Disadvantage							1.3408 **	0.139
Personal Characteristics								
Living in Poverty (Not Living in Poverty)			1.9812 **	0.118	1.9322 **	0.115	1.8826 **	0.113
Racial/Ethnic Minority (non-Hispanic White)			0.9891	0.058	0.9804	0.058	0.8915	0.062
Less than College Degree (College Degree)			1.3876 **	0.083	1.3494 **	0.082	1.3087 **	0.081
English not Primary Language (English Primary)			1.2256 *	0.107	1.2199 *	0.106	1.2204 *	0.107
Social Capital								
Sense of Belonging (No Sense of Belonging)					0.6423 **	0.047	0.6477 **	0.048
Participation in Neighborhood Orgs (No Participation)					0.9246	0.049	0.9334	0.050
Neighborhood Disadvantage								
Neighborhood Disadvantage Index (standardized)							1.0894 *	0.039
Control Variables								
Age	0.9997	0.002	0.9990	0.002	1.0002	0.002	1.0003	0.002
Female (Male)	1.2264 **	0.062	1.1691 **	0.061	1.1680 **	0.061	1.1682 **	0.061
Uninsured (Insured)	1.5257 **	0.152	1.1168	0.115	1.0916	0.113	1.0838	0.112
Chronic Disease (No Chronic Disease)	4.7687 **	0.267	4.3559 **	0.276	4.3168 **	0.274	4.2696 **	0.272
Constant	0.1046		0.0807		0.1189		0.1243	
R2	0.0834		0.1054		0.1096		0.1109	

N= 8786 (981 census tracts)

*=p<.05 **=p<.01

REGULAR SOURCE OF CARE (FULL MODEL)

Table 23

Odds Ratios for the Likelihood of Having a Regular Source of Care by CHC Proximity, Personal Characteristics, Social Capital, and Neighborhood Disadvantage (Full Model)

	Sub-Model A		Sub-Model B		Sub-Model C		Sub-Model D	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
CHC Proximity								
Access (No Access)	0.7212	0.132	0.3699 **	0.094	0.3950 **	0.100	0.3741 **	0.093
Access*Racial Minority			2.5579 **	0.845	2.3792 **	0.775	2.3899 **	0.770
Personal Characteristics								
Living in Poverty (Not Living in Poverty)			0.7605 **	0.076	0.7836 *	0.078	0.7648 **	0.079
Racial/Ethnic Minority (non-Hispanic White)			1.0472	0.104	1.0785	0.107	1.0177	0.115
Less than College Degree (College Degree)			1.1110	0.101	1.1618	0.107	1.1379	0.105
English not Primary Language (English Primary)			0.8840	0.112	0.8925	0.113	0.8970	0.113
Social Capital								
Sense of Belonging (No Sense of Belonging)					1.4409 **	0.144	1.4526 **	0.145
Participation in Neighborhood Orgs (No Participation)					1.2791 **	0.112	1.2827 **	0.113
Neighborhood Disadvantage								
Neighborhood Disadvantage Index (standardized)							1.0654	0.059
Control Variables								
Age	1.0178 **	0.003	1.0175 **	0.003	1.0161 **	0.003	1.0162 **	0.003
Female (Male)	1.7708 **	0.142	1.7863 **	0.145	1.7839 **	0.145	1.7840 **	0.145
Uninsured (Insured)	0.2231 **	0.022	0.2358 **	0.025	0.2445 **	0.026	0.2421 **	0.026
Chronic Disease (No Chronic Disease)	1.8724 **	0.160	1.8928 **	0.169	1.9383 **	0.174	1.9216 **	0.173
Constant	3.1306		3.1706		2.0682		2.1311	
R2	0.0926		0.0954		0.1002		0.1005	

N= 8786 (981 census tracts)

*=p<.05 **=p<.01