
[All ETDs from UAB](#)

[UAB Theses & Dissertations](#)

2012

Are Enabling Services in Federally Qualified Health Centers Associated With Women Receiving Prenatal Care in the First Trimester?

Forrest A. Daniels
University of Alabama at Birmingham

Follow this and additional works at: <https://digitalcommons.library.uab.edu/etd-collection>

Recommended Citation

Daniels, Forrest A., "Are Enabling Services in Federally Qualified Health Centers Associated With Women Receiving Prenatal Care in the First Trimester?" (2012). *All ETDs from UAB*. 1471.
<https://digitalcommons.library.uab.edu/etd-collection/1471>

This content has been accepted for inclusion by an authorized administrator of the UAB Digital Commons, and is provided as a free open access item. All inquiries regarding this item or the UAB Digital Commons should be directed to the [UAB Libraries Office of Scholarly Communication](#).

ARE ENABLING SERVICES IN FEDERALLY QUALIFIED HEALTH CENTERS
ASSOCIATED WITH WOMEN RECEIVING PRENATAL CARE IN THE
FIRST TRIMESTER?

by

Forrest A. Daniels

ROBERT WEECH-MALDONADO, COMMITTEE CHAIR
AMY Y. LANDRY, COMMITTEE MEMBER
M. PAIGE POWELL, COMMITTEE MEMBER
JEFFREY M. SZYCHOWSKI, COMMITTEE MEMBER
REBECCA S. WELLS, COMMITTEE MEMBER

Submitted in partial fulfillment of the requirements
for the degree of Doctor of Science in
Administration-Health Services
School of Health Professions
University of Alabama at Birmingham

BIRMINGHAM, ALABAMA

2012

**ARE ENABLING SERVICES IN FEDERALLY QUALIFIED HEALTH
CENTERS ASSOCIATED WITH WOMEN RECEIVING PRENATAL CARE IN
THE
FIRST TRIMESTER?**

FORREST A. DANIELS

D.Sc. PROGRAM IN ADMINISTRATION-HEALTH SERVICES

ABSTRACT

The purpose of this study was to examine whether enabling services in federally qualified health centers (FQHCs) were associated with women receiving prenatal care services in the first trimester. The population for this study included FQHCs providing prenatal care services for the years 2008, 2009, and 2010. Data for this study were derived from two sources: Uniform Data System (UDS) and the Area Resource File (ARF).

This study adopted the Andersen's (1973) Behavioral Model of Health Services Use. The study consisted of longitudinal panel data analysis. Univariate and bivariate statistics were calculated using PASW/SPSS statistical software, version 18. For the multivariate analysis, generalized linear mixed models were used using SAS PROC Glimmix. The dependent variable consisted of the number of women receiving prenatal care in the first trimester in the FQHC. Independent variables included measures of enabling services provided by the FQHC, such as total enabling services, transportation services, and interpreter services, in addition to multiple control variables. Due to the dependent variable being measured as a count, Poisson regression was determined to be the most appropriate analysis.

There are several key findings in this study. First results suggest that the number of FQHC staff members providing enabling services per 100 patients is not significantly associated with the number of women receiving prenatal care in the first trimester. Second, transportation FTEs per 100 patients was positively associated with women receiving prenatal care services in the first trimester. However, transportation services did not have a differential effect on rural communities as we had hypothesized. Third, the higher the ratio of interpretation staff FTEs to non-English speaking patients at FQHCs, the higher the number of women receiving prenatal care in the first trimester. However, when the model was run to explore the effect of the squared variable, there was a statistically significant negative association. Interpretation services had an increasing effect until an FQHC reached 36.3 FTEs. Finally, we further found that enabling services had a positive effect on the number of women receiving prenatal care services in the first trimester for FQHCs with a higher proportion of minorities. This effect was higher for FQHCs with a higher proportion of African Americans.

Keywords: enabling services, Federally Qualified Health Centers (FQHCs), race/ethnicity, prenatal care, outcomes

DEDICATION

To God – for allowing me to be alive and healthy to fulfill a lifelong goal. O.C. Bobby Daniels, Ed.D., and the late Shirley Jones Daniels, Esq. (my father and step-mother) – without their vision, support, and belief in my abilities, none of this would be possible. Lonely Lou Daniels (my mother) – for providing the love and support that only a mother can give. Cassandra and Christian Daniels (my sister and nephew) – As John Legend sings, “...we’re the generation, can’t afford to wait; the future started yesterday, we’re already late...” T.H.I.N.K. B.I.G., nephew!

To “Aunt B,” Lula Bea McWilliams; “Granda,” Forest Daniels; “Gram,” Susan Jones DaCosta; Yvonne John; Armon Gilliam; “Uncle Ralph” Cornell Jenkins Ed.D.; “Cousin Daisy” Bunkley; “Cousin Angel” Donya Brown; “Cousin Wennell” Palmer, and a host of others who have always loved and encouraged me in the past but have transitioned from this life.

To relatives in Gary, IN (Mattie Pugh, Roberta Wesson, Tommie “Punch” and Doris Brown) Camilla, GA (Uncle Rob and Aunt Doris), and others.

To my Big Brothers and Sisters: Ronald Conyers, Jerry and Delphine Quarles, David and Carol Bousquet, Lynne Foster, Debbie Jackson, Karyn Thomas and Darwin Davis, Jr., Steven John and Michael “Grits” Jones.

Lastly, to my Principessa, Gladys, and “mini-me”, Isabel – life has been so much better now that I found you. You ARE the definition and embodiment of LOVE!

ACKNOWLEDGEMENTS

I would like to first thank members of my dissertation committee who agreed to provide their time and expertise in assisting me on this journey: Dr. Rebecca S. Wells, Dr. Jeffrey M. Szychowski, Dr. M. Paige Powell, Dr. Amy Yarbrough Landry and last, but most notably, my chair, Dr. Robert Weech-Maldonado. When asked for the name of my chair by UAB residential doctoral students and I replied, Dr. Weech-Maldonado, they expressed how lucky I was citing his many positive attributes. I can now personally testify to his greatness. As brilliant a scholar as he is, Dr. Weech-Maldonado is also a gifted teacher, mentor, and human being. He provided critical leadership by guiding me through the entire dissertation process. From helping me refine my chosen topic, identifying and linking me with valuable external resources, to collaborating with others on my behalf while out-of-town at a conference and convening a call on a Sunday night, Dr. Weech-Maldonado did what was necessary to help me fulfill my goal. The reality is, Dr. Weech-Maldonado did not have to devote the countless hours to assist and support me in completing this research project, but he did. For believing in me, supporting the research topic, and for being who he is, I am eternally grateful.

I would also like to acknowledge Dr. Rebecca Wells who graciously agreed to serve on my committee. Dr. Wells serves as an associate professor at the University of North Carolina-Chapel Hill Gillings School of Global Public Health and was introduced to me by my chair, Dr. Weech-Maldonado. From the first day we met, Dr. Wells shared her wealth of knowledge on community health centers and made her resources available to me. This included allowing UNC doctoral student, Monica Perez Jolles, to review

some preliminary analysis with me on enabling services in federally qualified health centers that they had conducted. Thanks to you both.

The breadth of my research could not have been made possible without the generosity of the leadership in the Office of Quality and Data, a branch of the Health Resources and Service Administration (HRSA) Bureau of Primary Health Care. I would like to specifically acknowledge Dr. Quyen Ngo-Metzger, Chief, Data Branch, and Dr. Ravi Sharma, Program Analyst. This introduction was made possible by my committee chair, Dr. Weech-Maldonado.

A special acknowledgement and thank you to UAB doctoral candidate, Calvin Elam, Jr., for performing the extremely important task of data management and for running additional analysis on SAS. Throughout the process, Calvin displayed patience, poise, and a keen understanding of the task he was charged with assisting.

I would like to acknowledge and thank the entire UAB School of Health Professions, Dean Harold Jones, faculty (Dr. S. Robert Hernandez, Dr. Gerry Glandon, et al.) and staff (Leandra Celaya and Martha Hilley) for their vision, perseverance, and patience in launching the executive doctoral program.

Lastly, I would like to acknowledge my fellow classmates and now graduates of Cohort 1. We individually and collectively ventured out into new and uncharted territory. Along with the faculty and staff of the SHP, we are trailblazers. I learned from each and every one of you and trust you did from me, as well. Thank you for your contributions to my educational experience and for being a part of this journey.

TABLE OF CONTENTS

ABSTRACT	iii
DEDICATION	v
ACKNOWLEDGEMENTS	vi
LIST OF TABLES	x
LIST OF FIGURES	xi
CHAPTER 1	1
INTRODUCTION	1
What are FQHCs and What are Their Roles in the U.S. Health Care System?	2
Enabling Services in Federally Qualified Health Centers	5
Enabling Services, Prenatal Care, and Health Disparities in Birth Outcomes	6
Study Purpose and Research Question	8
Contribution to the Literature	9
CHAPTER 2	10
LITERATURE REVIEW	10
Barriers to Prenatal Care	10
Enabling Services	12
Conceptual Framework	15
Rationale for the Andersen Model	16
Hypotheses	19
CHAPTER 3	23
METHODOLOGY	23
Study Population	23
Data Sources	23
Dependent (Outcome) Variable	24
Independent Variables	24
Control Variables	25
Predisposing	25
Other Enabling	26
Data Analysis	26
CHAPTER 4	29
Results and Findings	29
Appropriateness of Model and Data Cleaning	29
Descriptive Statistics	30
Poisson Regression Results	32
Hypothesis 1	32
Hypothesis 2	33
Hypothesis 3	35

Hypothesis 4.....	36
Summary	38
CHAPTER 5	40
Summary and Conclusions.....	40
Conclusions and Implications	40
Contributions of the Study	43
Limitations of the Study	44
Recommendations for Future Research	44
LIST OF REFERENCES	45

LIST OF TABLES

<i>Table</i>	<i>Page</i>
1 FQHC Demographics Compared to U.S. Demographics - 2009	4
2 Goldenberg's Variables	19
3 Community Health Center Characteristics	31
4 Regression Results of Women Receiving Prenatal Care in First Trimester with Total Enabling Services and Control Variables	33
5 Regression Results of Women Receiving Prenatal Care in First Trimester with Transportation Enabling Services and Control Variables	34
6 Regression Results of Women Receiving Prenatal Care in First Trimester with Enabling Services (Interpreter Services) and Control Variables	36
7 Regression Results of Women Receiving Prenatal Care in First Trimester with Total Enabling Services and Control Variables	37
8 Regression Results of Women Receiving Prenatal Care in First Trimester with Total Enabling Services and Control Variables	38

LIST OF FIGURES

<i>Figure</i>	<i>Page</i>
1 Andersen's (1973) Behavioral Model of Health Services Use	17

Chapter 1

Introduction

Low birthweight (LBW) is among the leading causes of infant mortality (Centers for Disease Control and Prevention, 2007). In 2009, there were over 4 million live births reported in the United States and 8% of these infants were born with LBW (Centers for Disease Control and Prevention, 2011). Researchers have indicated that hospitalization of LBW infants is projected to cost approximately \$6 billion annually (Lewitt, Baker, Corman, & Shiono, 1995; Russell et al., 2007). Generally, as women's socio-economic status decreases, the incidence of low birthweight (LBW) babies increases (Foster, Wu, Bracken, Semanya, Thomas, & Thomas, 2000). An examination of racial disparities in LBW among White and African Americans demonstrated that regardless of race, infants born into poverty have higher LBW rates as well as mortality rates (Rowley, 1995).

Among the causes of pregnancy-related complications, such as LBW, is the mother's inability to access adequate healthcare in her first trimester of pregnancy (Braveman, Marchi, Egerter, Pearl, & Neuhaus, 2000; Cook, Selig, Wedge, & Gohn-Baube, 1999; Daniels, Fuji Noe, & Mayberry, 2006). Limited English proficiency (LEP), inadequate housing and insufficient transportation are a few examples of barriers to care (Goldenberg, Patterson, & Freese, 1992). Living in poverty and lacking health insurance are also strongly associated with seeking late or no prenatal care (Kalmuss & Fennelly, 1990). Removing barriers so that pregnant women of low socio-economic status can access timely prenatal care can potentially decrease the incidence of LBW infants and reduce healthcare cost.

Based on reports from the Institute of Medicine (1994), for every \$1.00 spent on prenatal care approximately \$3.40 can be saved in medical costs for LBW infants in the first year of birth (Institute of Medicine, 1994). Healthy People 2010 established a goal that 90% of women delivering a live birth will receive prenatal care within the first trimester. In 2011, the national baseline was 70.8%; 76.2 % of non-Latino Whites, 59.2% of African Americans, and 65% of Latino mothers received prenatal care within the first trimester (U.S. Department of Health and Human Services, 2011). Compared to their White counterparts, African American women are more likely to initiate prenatal care after their first trimester (Cook et al., 1999).

What are FQHCs and What are Their Roles in the U.S. Health Care System?

Federally qualified health centers (FQHCs) have evolved over the past five decades. FQHCs began as an experiment in social policy in the early 1960s as part of the nation's War on Poverty initiative. FQHCs were initially associated with the neighborhood health center program, which was later renamed the community health center program in 1975 (Sardell, 1988). From their inception in the 1960s, health centers were intended to provide high-quality health care to low-income populations lacking access to care (Sardell, 1988). Importantly, not every community health center is a FQHC. In order to qualify as a FQHC, a community health center must satisfy specific requirements as established under Section 330(e) of the Public Health Service Act as well as certain criteria under the Medicare and Medicaid Programs. Among them, the health center must:

- Provide comprehensive primary care;
- Provide services to all persons, regardless of their ability to pay;

- Be located in a medically underserved rural or urban community;
- Help patients access healthcare by offering enabling services such as health education, case management, translation and transportation;
- Be governed by a board which is comprised by at least 51% health center users;
- Meet other performance and accountability requirements (Health Resources and Services Administration, 2011).

The benefits of securing FQHC designation are numerous. In addition to receiving federal grant funding, FQHCs:

- Receive enhanced Medicare and Medicaid reimbursement;
- Receive medical malpractice coverage through the Federal Tort Claims Act;
- Are eligible to purchase prescription and non-prescription medications for outpatients at reduced cost through the 340B Drug Pricing Program;
- Are eligible for various other federal grants and programs (Rural Assistance Center, 2011).

Based on 2009 data from the National Association of Community Health Centers (NACHC), there were 1,200 FQHCs providing healthcare through more than 8,000 delivery sites in every state and territory. These sites collectively served over 20 million people (National Association of Community Health Centers, 2011). As noted in Table 1, more than 70% of FQHC patients had family incomes at or below the Federal Poverty Level, 38% were uninsured, 37% were recipients of Medicaid, and 48% were considered to be from a rural area. FQHCs also served a high proportion of racial/ethnic minorities; most notably, twice as many African American and Latinos were served as compared to their respective proportion of the U.S. population. Approximately half of FQHC patients

resided in rural areas while the other half most often lived in economically depressed inner city communities (National Association of Community Health Centers, 2011).

Table 1.

FQHC Demographics Compared to U.S. Demographics - 2009

	Health Center Population	US Population
Percent at or Below 100% of Poverty	71%	20%
Percent Under 200% of Poverty	93%	39%
Percent Uninsured	38%	17%
Percent Medicaid	37%	16%
Percent Medicare	7%	12%
Percent Hispanic/Latino	35%	16%
Percent African American	27%	12%
Percent Asian/Pacific Islander	5%	5%
Percent American Indian/Alaska Native	1%	1%
Percent White	62%	65%
Percent Rural	48%	16%

Race/Ethnicity may not sum to 100% due to rounding and non-inclusion of two or more races. Race data is inclusive of Hispanic/Latino population. 0% may indicate <0.5%. Rural data from 2009.

Source: (National Association of Community Health Centers, 2010)

There are four types of Section 330 supported FQHCs:

1. *Community Health Centers* – serve a variety of underserved populations;
2. *Migrant Health Centers* – serve migrant and seasonal agricultural workers;
3. *Healthcare for the Homeless Programs* – reach out to homeless persons and families and provide primary care and substance abuse services;
4. *Public Housing Primary Care Programs* – serve residents of public housing and are located in or adjacent to the communities they serve (U.S. Department of Health and Human Services, 2011).

FQHCs, along with the nation's public hospitals, are among the core healthcare safety net providers (Forrest & Whelan, 2000; Institute of Medicine, 2000). As such, they each play

a distinct and critical role in the U.S. healthcare system. Core healthcare safety net providers have two distinguishing characteristics: (1) either by legal mandate or explicitly adopted mission they provide an ‘open door,’ offering access to services for patients regardless of their ability to pay; and (2) a substantial share of their case mix is uninsured, Medicaid, and other vulnerable patients. (Institute of Medicine, 2000, p. 4)

Enabling Services in Federally Qualified Health Centers

Commonly referred to in the aggregate as “enabling services,” these non-clinical services were designed to remove societal barriers and improve access to care for the at-risk populations that might not otherwise receive it (Beyers, Brown, Cho, Desautels, Gaska, & Horsley, 2008; Politzer, Schempf, Starfield, & Shi, 2003; Shi, Stevens, & Politzer, 2007). Unlike other healthcare provider organizations, FQHCs are mandated to provide enabling services (Bureau of Primary Health Care, 1998). However, even when mandated, there are variations in the scope of enabling services provided by individual FQHCs (Wells, Punekar, & Vasey, 2009). Health centers with more managed care contracts and larger staffs generally provide broader scope of enabling services and experience a higher number of patient encounters for these services (Wells et al., 2009). The Health Resources and Services Administration (HRSA) (2009, 2010) has determined that enabling services include the following:

- Transportation – pick-up and delivery of patients to and from the health center;
- Translation/interpretation – a communication service to aid non-English speaking patients;

- Eligibility assistance – help for patients to secure access to financial assistance such as Medicaid, Women, Infant and Children (WIC), and food stamps, for which they may qualify;
- Health education – instruction for patients and the community about disease awareness, prevention, or control;
- Case management - services designed to aid patients in the coordination of their health and social needs;
- Outreach – immersion into the community to identify potential clients and/or facilitate access and referral of clients to available services;
- Other enabling services – clinical referrals and initiatives to reduce environmental health risk.

Enabling services may facilitate the delivery of care in culturally and linguistically appropriate areas (Weir & Proser, 2010). These services are particularly significant since racial/ethnic and linguistic minorities have faced access to care barriers and lower quality of care, even after access has been assured by Medicaid (Weech-Maldonado, Morales, Elliot, Spritzer, Marshall, & Hays, 2003). According to McAlearney (2002), FQHCs that experience a significant increase in the number of uninsured patients are more likely to add rather than discontinue enabling services.

Enabling Services, Prenatal Care, and Health Disparities in Birth Outcomes

By offering various enabling services, FQHCs continue to play a significant role in removing economic and other access barriers to healthcare; this is particularly apparent in the area of prenatal care services. Prenatal care, or “antenatal care” as defined by the World Health Organization (WHO) (2005) is designed to:

assist women to remain healthy, finding and correcting adverse conditions when present, and thus aid the health of the unborn. Antenatal care should also provide guidance to the woman and her partner or family, to help them in their transition to parenthood. (p. 7)

As previously noted, women who do not receive early and adequate prenatal care are more likely to deliver premature or LBW infants, resulting in an increase in infant mortality. The initial prenatal care visit will ideally occur within the first trimester of a woman's pregnancy. According to the Centers for Disease Control and Prevention (CDC) (1994), a trimester is defined as a term of three months in the prenatal gestational period with the trimesters expressed as follows:

1. First Trimester: 0-13 weeks
2. Second Trimester: 14-26 weeks
3. Third Trimester: 27-40 weeks

Sixty-one percent of pregnant women served by FQHCs received prenatal care during their first trimester (Shi, Stevens, Wulu, Politzer, & Xu, 2004). Minority women of low socio-economic status who were patients of FQHCs were less likely to give birth to a LBW infant compared to non-minorities, nationally (Shi et al., 2004). Had enabling services not been available for the pregnant women of low socio-economic status, the rate of individuals receiving prenatal care within the first trimester could be lower, resulting in an increase in infant mortality. A report of pregnant health center users noted that enabling services were associated with more timely receipt of perinatal care (Lewis-Idema, Wiaczek, Falik, & Bryant, 1999). As a result of its unique healthcare delivery model, FQHCs have been "proven effective not only in increasing access to care, but in

improving health outcomes for the often higher-risk populations they serve” (Institute of Medicine, 2002, p. 112).

Among the nation’s healthcare providers, FQHCs have often been looked upon as the vanguard in addressing racial/ethnic healthcare disparities and consequently, frequently cited both in the literature and government reports. A review of the literature indicates that health centers improve access to preventive services and health outcomes and have been successful in eliminating health disparities (Politzer, Yoon, Shi, Regan, & Gaston, 2001). In one study, researchers concluded that as the proportion of a state’s low income population served by health centers grew, the African American/white and Latino/white health gap narrowed (i.e., declined) in key areas such as infant mortality and prenatal care, among others (Shin, Jones, & Rosenbaum, 2003). In a report to congressional leaders, the General Accounting Office recognized the role that FQHCs play in targeting health disparities (General Accounting Office, 2003). FQHCs continue to fulfill their mission to improve health outcomes for each patient while improving the overall health of the community it serves.

Study Purpose and Research Question

The purpose of this study was to examine whether enabling services in FQHCs were associated with women receiving prenatal care services in the first trimester. The research question was:

Are enabling services in FQHCs associated with women receiving prenatal care services in the first trimester?

Contribution to the Literature

While FQHCs play a vital role as one of the nation's safety net providers, there is a dearth of information on the role that enabling services play in fulfilling their mission. Previously, Wells et al. (2009) studied why some community health centers offer more enabling services than others. Additionally, Weir et al. (2010) examined the utilization and impact of enabling services, such as interpretation and eligibility assistance, among underserved Asian American, Native Hawaiian and other Pacific Islander (AANHOP) patients served at four community health centers. Finally, Weir and Proser (2010) prepared a white paper highlighting the role of enabling services at community health centers. The authors noted that there was limited information on the scope of enabling services in FQHCs.

A review of the literature revealed that no studies have been conducted to explore the association between enabling services in FQHCs and receipt of prenatal care services. Consequently, the purpose of this study will be to determine if such a relationship exists, and if so, to what degree. By using Andersen's Behavioral Model of Health Services Use (1973), this study provides timely analysis to complement existing literature on the impact that enabling services may have on access to care and health outcomes.

Chapter 2

Literature Review

The purpose of Chapter 2 is to provide a review of the literature on enabling services in FQHCs and to describe the role enabling services play in delivering prenatal care services to low income minority women. The review of the literature specifically highlights the ways in which enabling services address barriers to prenatal care for low income minority women. For the purposes of this research, barriers are defined as any state, condition, or event that makes it difficult or prevents a woman from successfully obtaining prenatal care (Johnson et al., 2003). This review concludes with an overview of enabling services in FQHCs and their role in health outcomes followed by a conceptual framework based on Andersen's Behavioral Model of Health Services Use.

Barriers to Prenatal Care

Factors that impede a woman's ability to seek prenatal care fall into three general categories: (a) demographic variables, (b) situational variables, and (c) psychosocial variables (Braveman et al., 2000; Goldenberg et al., 1992; Johnson et al., 2003).

Goldenberg et al. (1992) identified maternal demographic variables, such as age, family income, race, education, parity, and marital status as factors explaining why women may not seek and obtain adequate prenatal care. Parity refers to the number of previous pregnancies of greater-than 20 weeks (Bai, Wong, Bauman, & Mohsin, 2002). Bai et al. (2002) stated that parity is often classified into three groups: nulliparity, multiparity, and grand parity; the lattermost is often defined as five or more previous deliveries. After adjusting for demographic and socioeconomic factors, Tossounian, Schoendorf, and

Kiely (1997) noted that African American women were still less likely to report barriers to prenatal care. Bloom et al. (2004) noted that barriers to prenatal care for homeless women generally included lack of or reduced access to healthcare and perceived cost impediments.

Transportation challenges, poverty, language barriers, financial impediments, and lack of childcare are examples of situational variables that have been shown to influence daily decision-making with regards to a woman's utilization of prenatal care and other healthcare services (Braveman et al., 2000; Cook et al., 1999; Juarbe, 1995; Lia-Hoagberg et al., 1990; Phillippi, 2009). Braveman et al. (2000) asserted that assistance with transportation could contribute to more timely prenatal care for some women. As reported in the literature, many women have difficulty securing a ride from family members or friends to take them to a health center. For those who rely on a local transit system, oftentimes they cited a lack of funds as a barrier to access transportation (Lia-Hoagberg et al., 1990). Despite having prenatal costs covered, Cook et al. (1999) documented that low income, inner-city women still experienced barriers to care. According to Phillippi (2009), a major deterrent to prenatal care for pregnant women included speaking a language different from the language spoken by the clinic staff. In a study of Latino and Asian/Pacific Islander (API) health plan members, Morales, Elliott, Weech-Maldonado, and Hays (2006) indicated that individuals who needed and always used an interpreter reported significantly better access to care than members who did not need and/or use interpreters. Timmins (2002) concluded that Latinos with limited proficiency in English were at risk for experiencing decreased access to healthcare.

Finally, psychosocial barriers describe women's feelings about their pregnancy, motivators, and decision-making related to topics such as abortion and other considerations (Goldenberg et al., 1992; Johnson et al., 2003). Daniels et al. (2006) studied attitudinal and psychosocial determinants of early prenatal care among African American women of low socio-economic status (SES). Of the two groups of women, identified as early initiators and late initiators of prenatal care, the authors reported that both groups indicated prenatal care as important although the early initiator group sought prenatal care within their first trimester of pregnancy while the late initiators did not. Daniels et al. (2006) also noted that the early initiators of prenatal care were older, had more education and income and had well defined living arrangements. Phillippi (2009) noted, however, that even when women were motivated to obtain prenatal care they reported challenges with transportation and finances.

Enabling Services

In a report by the New York Academy of Medicine, Park (2006) concluded that while enabling services are essential to access and quality care for health center patients, few studies have been conducted to examine and quantify the impact and utilization of enabling services in the healthcare industry. Further, little is known about the impact that enabling services have on health outcomes (Swider, 2002; Weir & Proser, 2010). The Association of Asian Pacific Community Health Organizations (AAPCHO) posted findings on its website from a non-randomized controlled study which assessed the impact of enabling services utilization on health outcomes (Association of Asian Pacific Community Health Organizations, 2009). The authors found that patients utilizing enabling services were more likely to have their hemoglobin A1c levels under control

and received appropriate child immunizations compared to non-users of enabling services. This is the only study in the literature that describes the impact of enabling services on health outcomes and it is limited in both scope and scientific rigor.

McCormick et al. (1989) explored the effectiveness of outreach to pregnant women and discovered that contact with a community health worker yielded no impact on women receiving prenatal care. Weir et al. (2010) examined the utilization and impact of enabling services, such as interpretation and eligibility assistance, among underserved Asian American, Native Hawaiian, and other Pacific Islander (AANHOPi) patients at four community health centers. According to the authors, this empirical study is noteworthy because it is “among the first to examine uniform enabling services data across CHCs in multiple states and was the first such study to examine the impact of enabling services on medically underserved AANHOPi patients” (Weir et al., 2010, p. 2203). Despite its potential value to the literature, this study presented characteristics of patients who used enabling services rather than the impact of these services on underserved populations.

Wells et al. (2009) examined the differences in the provision of enabling services among health centers and identified organizational and patient population characteristics that were provided by community health centers and funded by the Health Resources and Services Administration (HRSA). Among the findings, health centers with more managed care contracts and larger staffs provided a broader scope of enabling services and higher volume of services. However, staff caseload was negatively associated with the scope and volume of enabling services. The authors noted that, on average, every additional set of 143 patients per staff member per year were associated with provision of one fewer type

of enabling service and every additional patient per staff member per year was associated with 1 percent fewer enabling encounters during the year. While this study was one of the few that utilized data from the Uniform Data System (UDS), the national dataset to which all federally funded health centers submit their data, it did not address the impact of enabling services on outcomes.

The Bureau of Primary Health Care (BPHC) (2006) noted that one in 10 health center's Full Time Equivalent (FTE) staff members is an enabling service provider, such as case managers, interpreters, and insurance enrollment workers. An FTE is defined as the total number of straight-time hours (i.e., not including overtime or holiday hours) worked by employees divided by the number of compensable hours applicable to each fiscal year (Office of Management and Budget, 2012). One (1) FTE denotes a full-time employee while 0.5 denotes part-time.

One important enabling service is the use of interpreters for patients with limited English proficiency (LEP). A Commonwealth Fund report explored the presence of language interpretation services and programs in various healthcare settings, and it described best practices that could be adapted or replicated by other health care organizations (Youdelman & Perkins, 2002). Programs profiled in the report included those supported by state and local governments, managed care organizations, hospitals, community-based organizations, and educators (Youdelman & Perkins, 2002); FQHCs were not among the entities profiled.

Jacobs et al. (2004) assessed the impact of interpreter services on the cost and the utilization of healthcare services among LEP patients. The study was conducted at multiple health facilities which were affiliated with a large Massachusetts health

maintenance organization (HMO). The authors concluded that providing interpreter services was a financially viable method for enhancing delivery of healthcare to LEP patients (Jacobs et al., 2004). Jacobs, Leos, Rathouz, and Fu Jr. (2011) conducted an observational study to calculate the costs incurred by a group of California public hospitals that formed a network to make trained interpreters available via videoconference and telephone. The authors found that encounters in the network where interpreters helped patients and providers communicate lasted an average of 10.6 minutes and cost an average of \$24.86 per encounter. Jacobs et al. (2011) further noted that these costs should be weighed against the likely alternatives, such as the opportunity costs of having other hospital staff act as ad hoc interpreters; medical errors that could result from inadequate interpretation; and the fact that not providing such services may leave providers out of compliance with federal law. Additionally, Ku and Flores (2005) investigated and summarized the scientific evidence as related to medical interpretation services. The authors specifically examined selected demographics of the population with limited English proficiency (LEP), policy ramifications for insurance coverage, and options for financing interpretation services. Although Title VI of the Civil Rights Act requires medical caregivers to provide interpretation and translation services to LEP patients, Ku and Flores (2005) determined that this often does not occur. When it does occur, services are rarely reimbursed by most public and private insurers.

Conceptual Framework

The Andersen Behavioral Model of Health Services Use (Andersen Model) was originally designed to describe the utilization of formal personal health services. It did not, however, take into consideration other salient interactions such as persons receiving

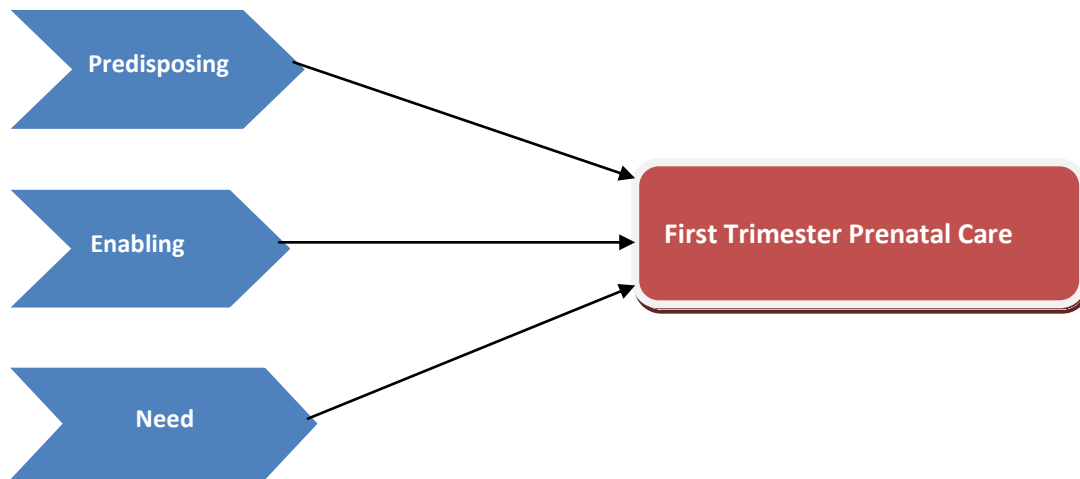
care or reporting health outcomes (Andersen, 1995). Historically, the desire to analyze the societal determinants of healthcare utilization began to garner much attention as individual values and opinions began to change (Andersen & Newman, 1973). In the 1970s, response from a national sample of heads of households revealed that there was a strong sentiment that all people had a right to medical care, regardless of their ability to pay (Andersen & Newman, 1973). Further, Andersen and Newman (1973) noted there was a general belief that compared to the majority population, the poor, African Americans, Spanish-speaking Americans, American Indians, and inner-city and rural residents, were not receiving equitable medical care in terms of quality and quantity. According to Andersen and Newman (1973), the majority of empirical studies and theories addressing health services utilization emphasized individual characteristics rather than societal effects. To address this deficit, the authors outlined a framework for viewing health services utilization which also accounted for societal and individual determinants (Andersen & Newman, 1973). As the Andersen Model evolved, an emphasis on health status outcomes was incorporated and used in developing future conceptual frameworks for topics such as oral health and the homeless (Andersen, 1995; Andersen & Davidson, 1997; Gelberg, Andersen, & Leake, 2000).

Rationale for the Andersen Model

The primary question that this study sought to address was whether enabling services in FQHCs were associated with prenatal care services. As previously defined in Chapter 1, enabling services are non-clinical services that are designed to remove societal barriers and improve access to care for at-risk populations that might otherwise not receive it (Beyers et al., 2008; Shi et al., 2007; Politzer et al., 2003). The Andersen model

(1973) below states that an individual's healthcare use is dependent on three conditions: (1) *predisposing* – the predisposition of the person to use services; (2) *enabling* – a person's ability to secure services; and (3) *need* – a person's perceived or evaluated level of illness (see Figure 1).

Figure 1. Andersen's (1973) Behavioral Model of Health Services Use



The predisposing component recognizes that some individuals are more inclined to use services than others and that one's propensity towards utilization can be predicted by individual characteristics which exist prior to the onset of a specific episode of illness (Andersen & Newman, 1973). These characteristics include demographic, social structure, and attitudinal-belief variables (Andersen & Newman, 1973).

The enabling component is defined as a condition that allows an individual or family to act on a value or satisfy a need regarding health services (Andersen & Newman, 1973). Enabling conditions can be measured by income, health insurance, and whether or not an individual has a regular source of healthcare (Andersen & Newman, 1973). Enabling characteristics of the community in which an individual or family resides can

also play a role in the utilization of services, such as the number of health facilities and medical personnel in a community, the region of the country, and rural or urban setting (Andersen & Newman, 1973). HRSA's Shortage Designation Branch uses these data to assist in developing shortage designation criteria and to determine whether or not a geographic area, population group is a: (1) Health Professional Shortage Area (HPSA); (2) Medically Underserved Area (MUA); or (3) Medically Underserved Population (MUP) (U.S. Department of Health and Human Services, 2011). While both designations are used to define underserved communities eligible for federal aid, HPSA and MUA/MUP are distinct from each other. The former relies heavily on measures of physician supply and number of healthcare facilities relative to the size of a local population to assess geographically available care whereas MUA/MUP addresses financial, racial, linguistic, and cultural barriers to healthcare services (National Health Policy Forum, 2010). Another key distinction between HPSA and MUA/P is the update requirement regarding the review and renewal of designation status (National Health Policy Forum, 2010). HPSAs are reviewed annually while MUA/Ps receive their designations into perpetuity (National Health Policy Forum, 2010). If a geographic area, population group, or facility receives a HPSA or MUA/P designation, it may be eligible to receive federal grant support for the following: (1) primary care services; (2) training and recruitment of health professionals; (3) enhanced payment through Medicare and Medicaid; and (4) providing J-1 visa immigration waivers to foreign medical graduates to serve in a HPSA or MUA/P (National Health Policy Forum, 2010). Community health centers, migrant health centers, and health centers for the homeless and public housing primary care programs frequently satisfy one or more of these designations.

The need component is defined by one's perceived illness and evaluated illness factors as determined by a health professional (Andersen, 1995). The concept of perceived illness attempts to measure how well one views his or her own health. However, if a woman has been previously diagnosed with diabetes, it is important for her to control her blood sugar before and during pregnancy to mitigate the risk of birth defects and other poor birth outcomes, such as miscarriage (Centers for Disease Control and Prevention, 2011). Similar proactive approaches should occur in the event that a woman has other pre-existing chronic conditions or is at high risk for developing an illness due to her pregnancy, risks such as gestational hypertension or diabetes.

As stated by Goldenberg et al. (1992), the following six demographic variables are related to inadequate prenatal care: (a) family income, (b) marital status, (c) parity, (d) maternal education, (e) maternal age, and (f) race. When viewed through the Andersen framework, the Goldenberg (1992) variables can be seen in Table 2:

Table 2

Goldenberg's Variables

Predisposing	Enabling	Need
(1) Marital Status	(1) Family Income	(1) Parity
(2) Maternal Age		(2) Maternal Education
(3) Race		

Hypotheses

Wells et al. (2009) demonstrated that health centers with larger staffs provided a broader range of enabling services and experienced higher patient utilization of services.

Pursuant to the review of literature, and despite the paucity of research addressing an association between enabling services and prenatal outcomes, it is suggested that there would be a positive correlation between the provision of enabling services and the number of women receiving prenatal care in their first trimester. The following hypothesis is designed to test the assumption of staffing:

Hypothesis #1: The larger the staff providing enabling services in FQHCs, the higher the number of pregnant women receiving prenatal care in their first trimester.

As noted in the literature, rural locations typically have little to no public transportation; this frequently creates a barrier to access adequate healthcare (National Rural Health Association, 2011). Additionally, rural residents generally must travel great distances to reach a doctor or hospital. If a woman has her own vehicle and can afford fuel, she may be more inclined to seek prenatal care within the first trimester. However, if a woman must rely on others for transportation, she may perceive transportation as a barrier and delay accessing timely prenatal care. The second hypothesis is designed to test the assumption of transportation:

Hypothesis #2: The effect of *Transportation Services FTEs* on the number of women receiving prenatal care in the first trimester will be greater for FQHCs in rural counties than for FQHCs in urban counties.

Phillippi (2009) noted that if a pregnant woman spoke a language different from the language spoken by the clinic staff, she may be less inclined to seek prenatal care. For pregnant Latino women living in the United States, the abilities of healthcare providers to communicate in Spanish as well as provide culturally appropriate prenatal care were found to be the primary factors which determined women's willingness to access prenatal care (Shaffer, 2002). Mexican immigrant women stated that language barriers and/or inadequate communication resulted in decreased access to prenatal care (Sherraden & Barrera, 1996). Although Spanish is the predominant non-English language spoken by patients served by FQHCs, there are dozens of other languages spoken in FQHCs as well (National Association of Community Health Centers, 2008). NACHC (2008) reported that nearly one in three patients seen by member health centers was best served by a language other than English. The third hypothesis is designed to test the assumption of interpretation:

Hypothesis #3: The higher the ratio of *Interpretation Service FTEs* to non-English speaking patients the higher the number of women receiving prenatal care in the first trimester.

Based on an exhaustive review of the literature, there were no empirical studies which addressed the effects of enabling services on prenatal care outcomes among racial/ethnic minorities. Several studies, however, addressed racial and ethnic differences for various clinical outcomes (Alexander, Kogan, & Nabukera, 2002; Harris, 2001; Park, Vincent, & Hastings-Tolsma, 2007). Park et al. (2007) explored the disparity in prenatal

care among women of color. Their investigation indicated that the timing of initiation of prenatal care showed significant differences in race and education. Therefore, the final hypothesis is designed to test the effect of total enabling services FTEs for low income minority women.

Hypothesis #4: The effect of *Total Enabling Services FTEs* on the number of women receiving prenatal care in the first trimester will be greater among FQHCs with a higher proportion of racial/ethnic minorities.

Chapter 3

Methodology

Chapter three describes the study design and population as well as data sources used for the study, followed by a description of the independent and dependent variables. The chapter concludes with a review of the data analysis plan.

Study Population

The population for this study included pregnant women enrolled in federally qualified health centers (FQHCs) for the years 2008, 2009, and 2010.

Data Sources

Data for this study were derived from two sources: Uniform Data System (UDS) and the Area Resource File (ARF). UDS is an integrated reporting system that is maintained by the Bureau of Primary Health Care (BPHC). Introduced to health centers in 1996, UDS is a reporting requirement for all FQHCs. UDS compiles information on grantees, including: patient demographics, services provided, staffing and clinical indicators, among other salient characteristics. Data from UDS are also reported for health centers at the state and national levels (Health Resources and Services Administration, 2011). Data for this study were secured through the Freedom of Information Act (FOIA) and a National Cooperative Agreement with BPHC. UDS data were obtained for the years 2008 through 2010 and contained representative non-proprietary and proprietary data on a health center level from the majority of FQHCs in the United States (i.e., Community Health Centers, Migrant Health Centers, Healthcare for the Homeless, and Public Housing Primary Care). Approximately 1,000 FQHCs annually were included in the analysis (1,080 FQHCs in 2008; 1,131 in 2009; and 1,124

in 2010). The Area Resource File (ARF) is a database containing more than 6,000 variables for each of the nation's counties (Health Resources and Services Administration, 2011). ARF is comprised of county-level data on the population, including demographic and socio-economic characteristics.

UDS data, proprietary data, and ARF data were merged using two separate merging IDs. First, the 2008 UDS data were merged with the 2008 proprietary data using a unique-by-year internal ID - resulting in a UDS-proprietary data set. Second, the UDS-proprietary data set was merged with the 2008 ARF data using assigned UDS Grantee IDs and matched by county with the ARF data. This process was repeated for years 2009 and 2010 - resulting in three data sets. These three data sets were then merged by year and by UDS ID - resulting in the final data set.

Dependent (Outcome) Variable

The purpose of this study was to determine whether or not enabling services in FQHCs were associated with women receiving first trimester prenatal care services. Consequently, the dependent variable for hypotheses 1 thru 4 was the count of pregnant women receiving prenatal care in the first trimester from the FQHC, among those eligible to receive prenatal care. This variable was calculated for each health center by taking the number of women receiving first trimester prenatal care of entry with the FQHC.

Independent Variables

The independent variable for hypothesis 1 and hypothesis 4 was Enabling Service Full-Time Equivalents (FTE) per 100 patients. As a continuous variable, FTE reflects the total number of FTEs employed within the FQHC and was derived by taking the clinic's total enabling service FTE divided by the total clinic patients, multiplied by 100.

The independent variables for hypothesis 2 were Transportation Staff FTEs per 100 patients and Region. As a continuous variable, Transportation Staff FTEs per 100 patients represented van drivers who pick up and deliver patients to and from the health center. The Region variable was derived by using the 2003 Rural-Urban Continuum Code and represented a dummy variable (0=urban; 1= rural) (United States Department of Agriculture, 2003). The Rural-Urban Continuum Codes form a classification scheme that distinguishes metropolitan counties by size and nonmetropolitan counties by degree of urbanization and proximity to metro areas (United States Department of Agriculture, 2003). The independent variable for hypothesis 3 was Interpretation Staff FTEs per 100 Non-English speaking patients. This continuous variable represented the proportion of interpretation staff each FQHC devoted to its non-English speaking patients. This new variable was created for each FQHC by taking the total interpretation staff FTEs divided by the total number of clinic patients best served in a language other than English and multiplied by 100.

Control Variables

Additional variables were included to control for predisposing and enabling factors from the Andersen (1973) framework:

Predisposing. Age, race/ethnicity and proportion of non-English patients were the predisposing factors used as control variables. Age was measured at the organizational/health center level and was reflected as the percent of clinic prenatal patients less than 25 years of age. Race/ethnicity was measured as a continuous variable that represented each FQHC's proportion of African American, Asian/Hawaiian/Pacific Islander, American Indian/Alaskan Native and Latino patients divided by the total clinic

patient population. Finally, the proportion of non-English speaking patients was included as a controlling factor.

Other Enabling. As previously noted, certain enabling characteristics of the community in which an individual or family lives can also play a role in the utilization of services (Andersen & Newman, 1973). As such, the enabling factors used as control variables for this analysis included: the type of health care facility, number of medical personnel, family income and rural-urban place of residence. The types of health care facilities were reflected by their FQHC designation as a Healthcare for the Homeless program or Migrant Health Center, and are entered in the model as two dummy variables (0=no; 1=yes). The number of medical personnel was measured at both the health center and county levels; log of total clinic FTEs, and the number of OBGyn physicians per 100 woman of child bearing age (15 thru 44), respectively. Family income was captured by the percentage of clinic patients served at or below poverty. Lastly, additional enabling factors controlled for at a county level included: per capita income and unemployment rate. Characteristics of the most rural counties of residence were captured using the rural-urban continuum code. Finally, variations in year were controlled for within this investigation.

Data Analysis

The focus of this investigation was to assess whether or not enabling services in FQHCs were associated with women receiving prenatal care in the first trimester. Univariate and bivariate statistics were calculated using PASW/SPSS statistical software, version 18. For the multivariate analysis, SAS PROC Glimmix was used. UDS data for years 2008 thru 2010 and most current ARF data of the tested variables were merged to

create the panel data. The final data set contained 89 variables and 2,128 observations. SAS version 9.2 was used to construct the data set and perform the statistical analysis.

A random effects model was incorporated to control for unobserved facility differences (Allison, 2006). In the random effects model, variations across entities were assumed to be random and uncorrelated with the predictor or independent variables. Year fixed effects were included in all models to control for national changes over time. Since this study had multiple independent or predictor variables in addition to multiple control variables, it was longitudinal and contained three years of panel data a multivariate regression analysis with random effects was used. The general random effects model was expressed as follows:

$$y_{it} = \mu_t + \beta x_{it} + \gamma z_i + \alpha_i + \varepsilon_{it}$$

y_{it} = the outcome (proportion of eligible women with prenatal care) at center i and time t

μ_t = the mean outcome (proportion of eligible women with prenatal care) at time t

x_{it} = a vector of independent variables at center i and time t that vary over time

β = a vector of coefficients corresponding to the values of x_{it}

z_i = a vector of independent variables at center i that do not vary over time

γ = a vector of coefficients corresponding to the values of z_i

α_i = represents unobserved heterogeneity between individuals

ε_{it} = random error term

Due to the dependent variable being measured as a count, Poisson regression was determined to be the most appropriate analysis. For the Poisson outcome, the following random effects model was used:

$$\log(\lambda_{it}) = \mu_t + \beta x_{it} + \gamma z_i + \alpha_i + \varepsilon_{it}$$

λ_{it} = the expected mean (number of eligible women with prenatal care) at center i and time t

μ_t = the mean outcome (number of eligible women with prenatal care) at time t

x_{it} = a vector of independent variables at center i and time t that vary over time

β = a vector of coefficients corresponding to the values of x_{it}

z_i = a vector of independent variables at center i that do not vary over time

γ = a vector of coefficients corresponding to the values of z_i

α_i = represents unobserved heterogeneity between individuals

ε_{it} = random error term

The model above was amended to incorporate the number of women eligible for prenatal care at each center. This was accomplished with the addition of an *offset* term on the right hand side of the equation, where the offset is computed by the logarithm of the total number of eligible women at each center.

Chapter 4

Results and Findings

The purpose of this study was to examine whether enabling services in FQHCs were associated with women receiving prenatal care services in the first trimester. The research question was:

Are enabling services in FQHCs associated with women receiving prenatal care services in the first trimester?

A review of the literature revealed that no studies had been conducted to explore the association between enabling services in FQHCs and receipt of prenatal care services. By using Andersen's Behavioral Model of Health Services Use (1973), this study provides timely analysis to complement existing literature on the impact that enabling services may have on access to care and health outcomes. Chapter 4 outlines the process used to assess the appropriateness of the chosen model and examines results of the analysis used to answer the research question and hypotheses.

Appropriateness of Model and Data Cleaning

The merged data set contained 3,309 observations and 89 variables. To test for normality in the initial survey of the data, the log transformed and untransformed distributions of all variables were explored. The researcher determined that the log transformation of the dependent variable (DV) was necessary. The DV in this analysis was the count or number of women receiving prenatal care in the first trimester. Thus, observations in which no prenatal services were available to women were excluded from the data. Since 1,181 observations were identified in which no prenatal care services were

available to women, these observations were deleted from the data. Therefore, the total number of observations used in this investigation was 2,128 observations and 89 variables.

Descriptive Statistics

Descriptive statistics for health center level demographic, county, and regional information are presented in Table 3. Fifty percent or more of patients served by FQHCs in the sample years were minority. By comparison, the U.S. Census Bureau reported that in 2011, 36.6% of individuals in the U.S. population were minorities (U.S. Census Bureau, 2012). The vast majority of patients served by FQHCs were low-income, as evidenced by over 73% reporting family income at or below the poverty level. The percentage of women who received prenatal care in their first trimester at FQHCs increased over the three-year period. Less than 6% of FQHCs were located in a rural county over each year of the study sample.

Table 3

Community Health Center Characteristics for Study Sample (2008-2010)

CHC Characteristics	2008	2009	2010
#CHCs Reporting (N)	691	700	737
Race/Ethnicity			
Asian/Pacific Islander	4.0%	3.0%	4.0%
American Indian/Alaskan Native	3.0%	3.0%	3.0%
African American	21.0%	20.0%	20.0%
Latino (all races)	30.0%	31.0%	30.0%
Living in Poverty	73.0%	73.0%	74.0%
Maternal Age (yrs)			
<25	52.0%	51.0%	49.0%
Prenatal Care Trimester			
First trimester	63.0%	66.0%	67.0%
Total Clinic FTEs¹	138 (139)	144 (149)	150 (157)
County Prenatal Capacity			
OBGYN per 100,000 ¹	145 (264)	145 (266)	146 (266)
Unemployment Rate 16+	14.8%	14.7%	14.7%
Center Geographic Region			
Metro	74.4%	75.3%	75.6%
Non-Metro Urban	20.1%	19.9%	19.8%
Non-Metro Rural	5.5%	4.9%	4.6%

¹ = Mean (SD)

Poisson Regression Results

Results of the generalized linear mixed models are presented in this section.

Hypothesis #1: The larger the staff providing enabling services in FQHCs, the higher the number of pregnant women receiving prenatal care in their first trimester.

The hypothesis was not supported. Neither the regular term nor the squared terms of enabling services were statistically significant (Table 4). Therefore, our results suggest that the number of FQHC staff members providing enabling services per 100 patients is not significantly associated with the number of women receiving prenatal care in the first trimester. With respect to control variables, higher proportions of non-English speaking patients were associated with more women receiving prenatal care in the first trimester, whereas higher per capita income and higher unemployment rate in the FQHC county was associated with less women receiving prenatal care in the first trimester. Similarly, a higher proportion of FQHC women patients less than 25 years old and a higher proportion of minority patients were associated with less women receiving prenatal care in the first trimester. Finally, compared to the 2010 reference year, 2008 and 2009 were 0.95 and 0.98 the number of women receiving first trimester prenatal care, respectively.

Table 4

*Regression Results of Women Receiving Prenatal Care in First Trimester
With Total Enabling Services and Control Variables*

Effect	β eta	Standard Error	t Value	Pr > t
Intercept	-0.27	0.05	-4.91	<0.0001
Total Enabling Services	-0.03	0.03	-1.19	0.2334
Total Enabling Services (squared)	0.01	0.02	0.66	0.5099
Migrant Health Center	0.00	0.00	1.26	0.2067
Health Care for Homeless	0.00	0.00	1.28	0.2009
Per Capita Income	<0.01	0.00	<-999.99	<0.0001
Unemployment Rate, 16+	-0.00	0.00	<-999.99	<0.0001
Rural	0.03	0.05	0.55	0.5807
% OB GYN per 100,000	4.42	31.79	0.14	0.8895
Log (Clinic FTE)	0.03	0.02	1.77	0.0772
% Women under 25 years	-0.29	0.03	-8.25	<0.0001
% Clinic Patients in Poverty	-0.00	0.01	-0.57	0.5661
% Asian/Pacific Islander	-0.24	0.08	-3.07	0.0022
% African American	-0.11	0.03	-3.47	0.0005
% Latino	-0.05	0.02	-2.13	0.0334
% American Indian	0.10	0.08	1.38	0.1680
% Non-English Speaking Pts	0.03	0.00	5.40	<0.0001
2008	-0.05	0.00	<-999.99	<0.0001
2009	-0.02	0.00	<-999.99	<0.0001

Hypothesis #2: The effect of *Transportation Services* on the number of women receiving prenatal care in the first trimester will be greater for FQHCs in rural counties than for FQHCs in urban counties.

The hypothesis was partially supported. FQHCs with transportation FTE staff per 100 patients was statistically significant, however, when the model included the interaction between transportation FTEs and rurality, the relationship was non-significant (Table 5). Therefore, our results suggest that transportation FTEs per 100 patients was positively associated with women receiving prenatal care in the first trimester. However,

transportation services did not have a differential effect on rural communities as we had hypothesized. Regarding control variables, higher proportions of non-English speaking patients were associated with more women receiving prenatal care in the first trimester, whereas higher per capita income and higher unemployment rate in the FQHC county was associated with less women receiving prenatal care in the first trimester. Similarly, a higher proportion of FQHC women patients less than 25 years old and a higher proportion of minority patients were associated with less women receiving prenatal care in the first trimester. Finally, compared to the 2010 reference year, 2008 and 2009 were 0.95 and 0.98 the number of women receiving first trimester prenatal care, respectively.

Table 5

*Regression Results of Women Receiving Prenatal Care in First Trimester
With Transportation Enabling Services and Control Variables*

Effect	β	Standard Error	t Value	Pr > t
Intercept	-0.27	0.05	-4.83	<0.0001
Transportation FTE per 100 patients	0.42	0.20	2.05	0.0402
Transportation FTE*Rural	0.17	0.97	0.18	0.8606
Migrant Health Center	0.00	0.00	1.11	0.2655
Health Care for Homeless	0.00	0.00	1.38	0.1669
Per Capita Income	<0.01	0.00	<-999.99	<0.0001
Unemployment Rate, 16+	-0.00	0.00	<-999.99	<0.0001
Rural	0.02	0.05	0.49	0.6245
% OB GYN per 100,000	2.48	32.04	0.08	0.9382
Log (Clinic FTE)	0.03	0.02	1.73	0.0847
% Women under 25 years	-0.30	0.03	-8.33	<0.0001
% Clinic Patients in Poverty	-0.01	0.01	-0.80	0.4261
% Asian/Pacific Islander	-0.24	0.08	-3.12	0.0018
% African American	-0.12	0.03	-3.55	0.0004
% Latino	-0.05	0.02	-2.22	0.0266
% American Indian	0.09	0.08	1.12	0.2625
% Non-English Speaking Patients	0.03	0.00	5.30	<0.0001
2008	-0.05	0.00	<-999.99	<0.0001
2009	-0.02	0.00	<-999.99	<0.0001

Hypothesis #3: The higher the ratio of *Interpretation Service FTEs* to non-English speaking patients the higher the number of women receiving prenatal care in the first trimester.

This hypothesis was supported. Both the regular term and the squared terms of the ratio of interpretation FTEs to non-English speaking patients were statistically significant (Table 6). Our results indicate that the higher the ratio of interpretation staff FTEs to non-English speaking patients at FQHCs, the higher the number of women receiving prenatal care in the first trimester. However, when the model was run to explore the effect of the squared variable, there was a statistically significant negative association. Interpretation services had an increasing effect until an FQHC reached 36.3 FTEs. Over this amount, FQHCs saw the number of women receiving first trimester prenatal care start to decrease. With respect to control variables, higher proportions of non-English speaking patients were associated with more women receiving prenatal care in the first trimester, whereas higher per capita income and higher unemployment rate in the FQHC county was associated with fewer women receiving prenatal care in the first trimester. Similarly, a higher proportion of FQHC women patients less than 25 years old and a higher proportion of minority patients were associated with less women receiving prenatal care in the first trimester. Additionally, compared to the 2010 reference year, 2008 and 2009 were 0.95 and 0.98 the number of women receiving first trimester prenatal care, respectively. The percentage of patients who had incomes at or below the federal poverty line and were served by FQHCs was not statistically significant.

Table 6

*Regression Results of Women Receiving Prenatal Care in First Trimester
With Enabling Services (Interpreter Services) and Control Variables*

Effect	β	Standard Error	t Value	Pr > t
Intercept	-0.26	0.05	-4.64	<0.0001
Interpretation FTE per 100 Pts	0.03	0.01	4.29	<0.0001
Interpretation FTE per 100 Pts (squared)	-0.00	0.00	<-999.99	<0.0001
Migrant Health Center	0.00	0.00	1.28	0.2000
Health Care for Homeless	0.00	0.00	1.23	0.2205
Per Capita Income	<0.01	0.00	<-999.99	<0.0001
Unemployment Rate, 16+	-0.00	0.00	<-999.99	<0.0001
Rural	0.07	0.05	1.48	0.1388
% OB GYN per 100,000	5.59	31.75	0.18	0.8603
Log (Clinic FTE)	0.03	0.02	1.35	0.1775
% Women under 25 years	-0.29	0.03	-8.09	<0.0001
% Clinic Patients in Poverty	-0.01	0.01	-0.94	0.3461
% Asian/Pacific Islander	-0.17	0.08	-2.24	0.0253
% African American	-0.10	0.03	-3.19	0.0014
% Latino	-0.04	0.02	-1.78	0.0756
% American Indian	0.04	0.08	0.54	0.5920
% Non-English Speaking Patients	0.03	0.00	5.62	<0.0001
2008	-0.05	0.00	<-999.99	<0.0001
2009	-0.02	0.00	<-999.99	<0.0001

Hypothesis #4: The effect of *Total Enabling Services* on the number of women receiving prenatal care in the first trimester will be greater among FQHCs with a higher proportion of racial/ethnic minorities.

This hypothesis was supported. The percent of total minority patients and the interaction between FQHCs' total enabling service FTEs per 100 patients and percentage of total minority patients revealed statistical significance (Table 7). Therefore, our results suggest that the positive effect of enabling services on the number of women receiving prenatal care services in the first trimester is greater for FQHCs with a higher proportion of minorities. Regarding control variables, higher proportions of non-English speaking

patients were associated with more women receiving prenatal care in the first trimester, whereas higher per capita income and higher unemployment rate in the FQHC county was associated with less women receiving prenatal care in the first trimester. Similarly, a higher proportion of FQHC women patients less than 25 years old and a higher proportion of minority patients were associated with less women receiving prenatal care in the first trimester. Finally, compared to the 2010 reference year, 2008 and 2009 were 0.95 and 0.98 the number of women receiving first trimester prenatal care, respectively.

Table 7

*Regression Results of Women Receiving Prenatal Care in First Trimester
With Total Enabling Services and Control Variables*

Effect	β	Standard Error	t Value	Pr > t
Intercept	-0.26	0.05	-4.76	<0.0001
Total Enabling Service (ES) FTEs per 100 Pts.	0.07	0.04	1.86	0.0625
Total ES FTEs * % Total Minority Patients	-0.15	0.06	-2.53	0.0114
Migrant Health Center	0.00	0.00	1.30	0.1922
Health Care for Homeless	0.00	0.00	1.20	0.2321
Per Capita Income	<0.01	0.00	<-999.99	<0.0001
Unemployment Rate, 16+	-0.00	0.00	<-999.99	<0.0001
Rural	0.04	0.05	0.81	0.4193
% OB GYN per 100,000	-24.67	31.27	-0.79	0.4303
Log (Clinic FTE)	0.03	0.02	1.75	0.0808
% Women under 25 years	-0.29	0.03	-8.31	<0.0001
% Clinic Patients in Poverty	-0.01	0.01	-0.71	0.4756
% Total Minority Patients	-0.06	0.02	-2.61	0.0092
% Non-English Speaking Patients	0.03	0.00	5.48	<0.0001
2008	-0.05	0.00	<-999.99	<0.0001
2009	-0.02	0.00	<-999.99	<0.0001

Further analysis of interactions between total clinic enabling service FTEs per 100 patients and percentage of African Americans patients and interaction between total clinic enabling service FTEs per 100 patients and percentage of Latino patients was statistically significant (Table 8). Although the effect of enabling services is higher for FQHCs with a higher proportion of minorities, there is a differential effect based on

race/ethnicity. There is a positive association for African Americans, negative association for Latinos and no statistical significance for Asian/Pacific Islanders and American Indians.

Table 8

*Regression Results of Women Receiving Prenatal Care in First Trimester
With Total Enabling Services and Control Variables*

Effect	β	Standard Error	t Value	Pr > t
Intercept	-0.27	0.05	-4.93	<0.0001
Total Enabling Service (ES) FTEs per 100 Pts.	0.07	0.04	1.70	0.0893
Total ES FTEs * % Asian/Pacific Islander	0.03	0.17	0.16	0.8748
Total ES FTEs * % African American	0.20	0.10	2.00	0.0461
Total ES FTEs * % Latino	-0.29	0.07	-4.28	<0.0001
Total ES FTEs * % American Indian	-0.02	0.11	-0.16	0.8737
Migrant Health Center	0.01	0.00	1.56	0.1182
Health Care for Homeless	0.00	0.00	0.87	0.3860
Per Capita Income	<0.01	0.00	<-999.99	<0.0001
Unemployment Rate, 16+	-0.00	0.00	<-999.99	<0.0001
Rural	0.03	0.05	0.56	0.5782
% OB GYN per 100,000	5.10	31.84	0.16	0.8728
Log (Clinic FTE)	0.03	0.02	1.72	0.0850
% Asian/Pacific Islander	-0.26	0.08	-3.13	0.0018
% African American	-0.13	0.03	-3.87	0.0001
% Latino	-0.03	0.02	-1.41	0.1575
% American Indian	0.10	0.08	1.21	0.2281
% Women under 25 years	-0.29	0.03	-8.20	<0.0001
% Clinic Patients in Poverty	-0.01	0.01	-0.71	0.4773
% Non-English Speaking Patients	0.03	0.00	5.69	<0.0001
2008	-0.05	0.00	<-999.99	<0.0001
2009	-0.02	0.00	<-999.99	<0.0001

Summary

While total clinic enabling service FTEs per 100 patients were not significantly associated with women receiving prenatal care in the first trimester, analysis of specific enabling service FTEs, such as transportation and interpretation services, revealed statistical significance. Transportation FTEs per 100 patients was positively associated

with women receiving prenatal care services in the first trimester. However, transportation services did not have a differential effect on rural communities as we had hypothesized. The higher the ratio of interpretation staff FTEs to non-English speaking patients at FQHCs, the higher the number of women receiving prenatal care in the first trimester. However, when the model was run to explore the effect of the squared variable, there was a statistically significant negative association. Interpretation services had an increasing effect until an FQHC reached 36.3 FTEs. We further found that the positive effect of enabling services on the number of women receiving prenatal care services in the first trimester is greater for FQHCs with a higher proportion of minorities. Over the three-year timeframe, a positive trend regarding the percentage of women receiving prenatal care in the first trimester began to emerge. Other factors such as socio-economic control variables also appeared to have a significant impact on the outcome. The following chapter will provide additional interpretation of findings as well as a discussion of managerial and policy implications.

Chapter 5

Summary and Conclusions

The purpose of this study was to examine if enabling services in FQHCs were associated with women receiving prenatal care in their first trimester. Data from the UDS and ARF were used to identify organizational/health-center level and county-level variables, respectively. Designed as a longitudinal study, the UDS was used for years, 2008 through 2010, and contained representative non-proprietary and proprietary data from the majority of FQHCs across the United States. Various factors, such as a facility residing in a rural/urban setting, the number of non-English speaking patients served, and the proportion of minority patients in each health center were investigated to see what impact, if any, they would have on enabling services. Limited research has been performed on FQHCs and even less, specifically, on enabling services. This study addressed a void in the literature about enabling services in FQHCs and the potential role they play in addressing health outcomes while reducing racial/ethnic health disparities. The analysis also provides information that may be beneficial to policy makers and FQHC governing boards and administrators, among others.

Conclusions and Implications

The research question for this study was:

Are enabling services in FQHCs associated with women receiving prenatal care services in the first trimester?

While results from hypothesis one suggest that the number of FQHC staff members providing enabling services per 100 patients is not significantly associated with the number of women receiving prenatal care in the first trimester, results from

hypotheses two thru four were fully or partially supported. Hypothesis two purported that the impact of transportation services would be greatest for FQHCs in rural counties.

Transportation services had a positive impact on women receiving first trimester prenatal care services; however, there was no differential effect based on rural location. Consistent with Braveman et al. (2000), who stated that assistance with transportation could contribute to more timely prenatal care for some women, this assertion was supported by the findings of this research. The findings of this investigation revealed that the interaction between transportation FTEs and rurality was not significantly associated with the number of women receiving first trimester prenatal care services.

Hypothesis three produced a highly significant and positive association between the number of interpretation FTEs per 100 non-English speaking patients and the number of first trimester prenatal care. Phillippi (2009) established that clinic staff who spoke different languages from the pregnant women served as a deterrent for the prospective mother to seek prenatal care. The findings of this study suggest that the presence of interpretation staff effectively removes a barrier for non-English speaking mothers seeking prenatal care.

Finally, hypothesis four revealed that the interaction between the total minority patients and enabling service FTEs per 100 patients yielded a statistically significant negative association. Further investigation of interactions between individual race and enabling service FTEs per 100 patients indicated that the proportion of African Americans and who had access to enabling services resulted in a significant positive association to the number of women receiving prenatal care in the first trimester whereas

the proportion of Latinos unexpectedly produced a significant yet negative association. The latter result may be attributed to the language barriers and interpreter services.

The statistical significance of multiple control variables was consistent with the literature for all models. Goldenberg et al. (1992) identified maternal age, family income, race, maternal education, parity, and maternal marital status among the demographic variables attributed to why a woman may not seek and obtain adequate prenatal care. In this investigation, FQHC prenatal patients under 25 years of age experienced a highly significant negative association with seeking care in the first trimester. Also significant and negatively associated were the proportion of FQHC patients who self-reported as African American, Latino, and Asian/Native Hawaiian/Pacific Islander. The FQHC county-level factors revealed that per capita income and unemployment rate were highly significant and negatively associated with women receiving prenatal care. This suggests that county socioeconomic indicators have opposite effects on the number of women receiving first trimester prenatal care services. While FQHCs located in counties with higher unemployment rates have less women receiving prenatal care services, similarly, richer counties have less women receiving first trimester prenatal care services.

The results of this study indicated that certain enabling services in FQHCs are associated with the number of women receiving prenatal care in the first trimester. The analysis does not suggest, however, that socio-economic factors played a much greater role. In an evolving, fragile, and contentious healthcare environment, the implications of this study could prove promising for the nation's vulnerable populations and the "safety-net" providers that serve them. Since their inception over 40 years ago, FQHCs have been advocating for various clinical and support services (i.e., enabling services) to best serve

their patient population. Critics will contend that enabling services are of no value, cost too much, and therefore should not receive any funding or reimbursement. This study demonstrates the added value enabling services bring to the nation's healthcare system. For pregnant women of low socio-economic status, the lack of transportation services, interpretation services, case management, and other enabling services could result in high rates of infant mortality and associated emotional and financial costs. The evidence from this study may provide the National Association of Community Health Centers and the Health Resource and Service Administration's Bureau of Primary Health Care an opportunity to report the statistically significant positive association enabling services have on women receiving prenatal care in the first trimester; thus further contributing to reducing the nations' infant mortality rate and racial/ethnic healthcare disparities.

Contributions of the Study

This study contributes to the current body of literature in multiple ways. Most notably, as the first such national study, it highlights the impact enabling services can have on health outcomes (Swider, 2002; Weir, 2010). Further, while enabling services are essential to access and quality care for health center patients (Park, 2006), there are few studies that have been conducted to examine and quantify the impact and utilization of enabling services in the healthcare industry. This study can potentially prompt policymakers, FQHC governing boards, and administrators to require adequate data gathering and encourage more research on the topic while advocating for enabling services to be fully reimbursed. In addition, this study expounds of some preliminary ground-breaking work of the Association of Asian Pacific Community Health Organizations (AAPCHO) and its Enabling Services Accountability Project.

Limitations of the Study

This study had several limitations. First, while the UDS was an extremely useful data source, it was only available at the health center-level and not the patient-level. Data specific to the prenatal patient such as parity (multiple births) or repeat visits over the three-year study period were not available. Additionally, the UDS data did not capture which patients utilized enabling services; therefore, it was difficult to accurately assess the true utilization patterns of the mother seeking prenatal care. Race, as reported in the UDS, was representative of all patients and could not be distinguished by gender. Finally, FQHCs were assessed on a county-level versus a community-level. Consequently, various outcomes could have been understated or overstated, such as the rate of poverty and the number of OBGYNs available per 100,000 women of child bearing age.

Recommendations for Future Research

While this study examined if there was an association between enabling services at FQHCs and the number of women receiving prenatal care in the first trimester, it was primarily measured at a health center-level. Linking multiple SES indicators, such as age; race; education; and other variables, to each patient along with service utilization may have yielded more robust results. One may explore why FQHCs located in counties with higher unemployment rates and are wealthy have fewer women receiving prenatal care services in the first trimester. Lastly, future researchers may also want to explore the availability and utilization of enabling services at Migrant Health Centers and Healthcare for the Homeless sites.

REFERENCES

- Alexander, G. R., Kogan, M. D., & Nabukera, S. (2002). Racial differences in prenatal care use in the United States: Are disparities decreasing? *American Journal of Public Health, 92*(12),1970-1975.
- Allison, P. D. (2006). *Fixed effects regression methods in SAS*. SUGI 31 Proceedings, 184-231.
- Andersen, R. M. (1995). Revisiting the behavioral model and access to medical care: Does it matter? *Journal of Health and Social Behavior, 1*-10.
- Andersen, R., & Davidson, P. (1997). Ethnicity, aging, and oral health outcomes: A conceptual framework. *Advances in Dental Research, 203*-209.
- Andersen, R., & Newman, J. (1973). Societal and individual determinants of medical care utilization in the United States. *Milbank Memorial Fund, 95*-124.
- Association of Asian Pacific Community Health Organizations (2009). *Highlighting the role of enabling services at community health centers: Collecting data to support service expansion & enhanced funding*. Oakland, CA: National Association of Community Health Centers.
- Bai, J., Wong, F., Bauman, A., & Mohsin, M. (2002). Parity and pregnancy outcomes. *American Journal of Obstetrics and Gynecology, 274*-278.
- Beyers, M., Brown, J., Cho, S., Desautels, A., Gaska, K., & Horsley, K. (2008). *Life and death from unnatural causes: Health and social inequity in Alameda County*. Alameda:Alameda County Public Health Department.

- Bloom, K., Bednarzyk, M., Devitt, D., Renault, R., Teaman, V., & Van Loock, D. (2004). Barriers to prenatal care for homeless pregnant women. *Journal of Obstetric, Gynecologic & Neonatal Nursing: Clinical Research*, 428-435.
- Braveman, P., Marchi, K., Egerter, S., Pearl, M., & Neuhaus, J. (2000). Barriers to timely prenatal care among women with insurance: The importance of prepregnancy factors. *Obstetrics & Gynecology*, 874-880.
- Bureau of Primary Health Care (1998). *Policy Information Notice: 98-23 Health Center Program Expectations*. Washington, D.C.: Health Resources and Services Administration.
- Bureau of Primary Health Care (2010). *2010 Uniform Data System Manual*. Rockville: U.S. Department of Health and Human Services.
- Bureau of Primary Health Care, Health Resources and Services Administration. (2006). *Uniform Data System*. Washington, D.C.: U.S. Department of Health and Human Services.
- Centers for Disease Control and Prevention. (1994). *Prenatal Nutrition Surveillance System User's Manual*. Atlanta: Centers for Disease Control and Prevention.
- Centers for Disease Control and Prevention. (2007, October 25). *QuickStats: Infant Mortality Rates for 10 Leading Causes of Infant Death - United States, 2005*. Retrieved from Centers for Disease Control and Prevention:
<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5642a8.htm>
- Centers for Disease Control and Prevention (2011, May 16). *Diabetes and Pregnancy*. Retrieved from Centers for Disease Control and Prevention:
<http://www.cdc.gov/features/diabetespregnancy/>

- Centers for Disease Control and Prevention (2011, August 11). *National Vital Statistics System Birth Data*. Retrieved from Centers for Disease Control and Prevention: <http://www.cdc.gov/nchs/births.htm>
- Cook, C. L., Selig, K. L., Wedge, B. J., & Gohn-Baube, E. A. (1999). Access barriers and the use of prenatal care by low-income, inner-city women. *Social Work*, 129-139.
- Daniels, P., Fuji Noe, G., & Mayberry, R. (2006). Barriers to prenatal care among black women of low socioeconomic status. *American Journal of Health Behavior*, 188-198.
- Di Mario, S., Basevi, V., Gori, G., & Spettoli, D. (2005). *What is the effectiveness of antenatal care? (Supplement)*. Copenhagen: WHO Regional Office for Europe.
- Forrest, C. B., & Whelan, E.-M. (2000). Primary care safety-net delivery sites in the United States. *The Journal of the American Medical Association*, 2077-2083.
- Foster, H. W., Wu, L., Bracken, M. B., Semanya, K., Thomas, J., & Thomas, J. (2000). Intergenerational effects of high socioeconomic status on low birthweight and preterm birth in African Americans. *Journal of the National Medical Association*, 213-221.
- Gelberg, L., Andersen, R. M., & Leake, B. D. (2000). The behavioral model for vulnerable populations: Applications to medical care use and outcomes for homeless people. *Health Services Research*, 1273-1302.
- General Accounting Office. (2003). *Health Care: Approaches to Address Racial and Ethnic Disparities*. Washington, D.C.: General Accounting Officer (GAO).

- Goldenberg, R., Patterson, E., & Freese, M. (1992). Maternal demographic, situational and psychosocial factors and their relationship to enrollment in prenatal care: A review of the literature. *Women and Health*, 133-151.
- Harris, M. I. (2001). Effect of private health insurance on health care access and health status of diabetic patients covered by Medicare. *Diabetes Care*, 25(2), 405-406.
- Health Resources and Services Administration (2011). *Area Resource File*. Retrieved from U.S. Department of Health and Human Services:
<http://art.hrsa.gov/overview.htm>
- Health Resources and Services Administration (2011). *Bureau of Primary Health Care*. Retrieved from U.S. Department of Health and Human Services:
<http://bphc.hrsa.gov/about/index.html>
- Health Resources and Services Administration (2011). *Health Center Data*. Retrieved from U.S. Department of Health and Human Services:
<http://bphc.hrsa.gov/healthcenterdatastatistics/index.html>
- Health Resources and Services Administration (2011). *Prenatal – First Trimester Care Access*. Washington, D.C.: U.S. Department of Health and Human Services.
- Institute of Medicine (1994). *Prenatal Care and Low Birthweight: Effects on Health Expenditures*. Washington, D.C.: National Academy Press.
- Institute of Medicine (2000). *America's Health Care Safety Net: Intact but Endangered*. Washington, D.C.: National Academy Press.
- Institute of Medicine (2002). *Unequal Treatment: Confronting Racial and Ethnic Disparities in Healthcare*. Washington, D.C.: National Academy Press.

- Jacobs, E. A., Leos, G. S., Rathouz, P. J., & Fu, P., Jr. (2011). Shared networks of interpreter services, at relatively low cost, can help providers serve patients with limited English skills. *Health Affairs*, 30(10), 1930-1938.
- Jacobs, E. A., Shepard, D. S., Suaya, J. A., & Stone, E-L. (2004). Overcoming language barriers in health care: Costs and benefits of interpreter services. *American Journal of Public Health*, 94(5), 866-869.
- Johnson, A., El-Khorazaty, M. N., Hatcher, B. J., Wingrove, B., Milligan, R., Harris, C., et al. (2003). Determinants of late prenatal care initiation by African American women in Washington, DC. *Maternal and Child Health Journal*, 103-114.
- Juarbe, T. C. (1995). Access to health care for Hispanic women: A primary health care perspective. *Nursing Outlook*, 23-28.
- Kalmuss, D., & Fennelly, K. (1990). Barriers to prenatal care among low-income women in New York City. *Family Planning Perspectives*, 215-218, 231.
- Ku, L., & Flores, G. (2005). Pay now or pay later: Provider interpreter services in health care. *Health Affairs*, 24(2), 435-444.
- Lewis-Idema, D., Wiaczek, B., Falik, M., & Bryant, S. (1999). *Enabling services and perinatal care: Final report*. Bethesda: Bureau of Primary Health Care.
- Lewitt, E., Baker, L. S., Corman, H., & Shiono, P. (1995). The direct cost of low birth weight. *The Future of Children*, 35-56.
- Lia-Hoagberg, B., Rode, P., Skovholt, C. J., Oberg, C. N., Berg, C., Mullett, S., et al. (1990). Barriers and motivators to prenatal care among low income women. *Social Science Medicine*, 487-495.

- Loveland Cook, C. A., Selig, K. L., Wedge, B. J., & Gohn-Baube, E. A. (1999). Access barriers and the use of prenatal care by low-income, inner-city women. *Social Work*, 129-139.
- McAlearney, J. S. (2002). The financial performance of community health centers, 1996-1999. *Health Affairs*, 219-225.
- McCormick, M., Brooks-Gunn, J., Shorter, T., Holmes, J., Wallace, C., & Heagarty, M. (1989). Outreach as case finding: Its effect on enrollment in prenatal care. *Medical Care*, 103-111.
- Morales, L. S., Elliott, M., Weech-Maldonado, R., & Hays, R. D. (2006). The impact of interpreters on parents' experiences with ambulatory care for their children. *Medical Care Research and Review*, 110-128.
- National Association of Community Health Centers (2008). *Serving Patients with Limited English Proficiency: Results of a Community Health Center Survey*. Washington, D.C.: National Association of Community Health Centers.
- National Association of Community Health Centers (2011, August). *Fact Sheet – America's Health Centers*. Retrieved from National Association of Community Health Centers:
<http://www.nachc.com/client//America's%20Health%20Centers%20Fact%20Sheet%20August%202011.pdf>
- National Rural Health Association (2011). *What's Different about Rural Health Care?* Retrieved from National Rural Health Association:
<http://www.ruralhealthweb.org/go/left/about-rural-health/what-s-different-about-rural-health-care/what-s-different-about-rural-health-care>

Office of Management and Budget (2012). *The president's budget for fiscal year 2013*.

Retrieved from www.whitehouse.gov/omb/budget

Park, H. L. (2006). *Enabling services at health centers: Eliminating disparities and improving quality*. New York: MetLife Foundation.

Park, J. H., Vincent, D., & Hastings-Tolsma, M. (2007). Disparity in prenatal care among women of colour in the USA. *Midwifery*, 23(1), 28-37.

Phillippi, J. (2009). Women's perceptions of access to prenatal care in the United States: A literature review. *Journal of Midwifery & Women's Health*, 219-225.

Politzer, R. M., Schempf, A. H., Starfield, B., & Shi, L. (2003). The future role of health centers in improving national health. *Journal of Public Health Policy*, 296-306.

Politzer, R. M., Yoon, J., Shi, L., Hughes, R. G., Regan, J., & Gaston, M. H. (2001). Inequality in America: The contribution of health centers in reducing and eliminating disparities in access to care. *Medical Care Research and Review*, 234-248.

Rowley, D. L. (1995). Framing the debate: Can prenatal care help to reduce the Black White disparity in infant mortality? *Journal of the American Medical Women's Association*, 187-193.

Rural Assistance Center (2011, August 3). *FQHC Frequently Asked Questions*. Retrieved from Rural Assistance Center:

http://www.raconline.org/info_guides/clinics/fqhcfqa.php

Russell, R. B., Green, N. S., Steiner, C. A., Melkle, S., Howse, J. L., Poschman, K., et al. (2007). Cost of hospitalization for preterm and low birth weight infants in the United States. *Pediatrics*, e1-e9.

- Sardell, A. (1988). *The U.S. experiment in social medicine: The community health center program, 1965-1986*. Pittsburgh: University of Pittsburgh Press.
- Schneider, E., Zaslavsky, A., & Epstein, A. (2002). Racial disparities in the quality of care for enrollees in Medicare managed care. *JAMA*, 1288-1294.
- Shaffer, C. F. (2002). Factors influencing the access to prenatal care by Hispanic pregnant women. *Journal of the American Academy of Nurse Practitioners*, 93-96.
- Sherraden, M., & Barrera, R. (1996). Prenatal care experiences and birth weight among Mexican immigrant women. *Journal of Medical Systems*, 329-350.
- Shi, L., Stevens, G. D., Wulu, J. T., Politzer, R. M., & Xu, J. (2004). America's health centers: Reducing racial and ethnic disparities in perinatal care and birth outcomes. *Health Services Research*, 1881-1901.
- Shi, L., Stevens, G., & Politzer, R. (2007). Access to care for U.S. health center patients and patients nationally: How do the most vulnerable populations fare? *Medical Care*, 206-213.
- Shin, P., Jones, K., & Rosenbaum, S. (2003). *Reducing racial and ethnic health disparities: Estimating the impact of high health center penetration in low-income communities*. Washington, D.C.: The George Washington University Medical Center.
- Swider, S. M. (2002). Outcome effectiveness of community health workers: An Integrative literature review. *Public Health Nursing*, 11-20.

- The Commonwealth Fund (2006). *Prenatal Care in the First Trimester*. Retrieved from The Commonwealth Fund: <http://www.commonwealthfund.org/Performance/Snapshots/Preventive-Health-and-Dental-Care-Visits/Prenatal-Care-in-the-First-Trimester.aspx>
- The Kaiser Commission on Medicaid and the Uninsured (2000). *Enabling Services: A Profile of Medicaid Managed Care Organizations*. Washington, D.C.
- Timmins, C. L. (2002). The impact of language barriers on the health care of Latinos in the United States: A review of the literature and guidelines for practice. *Journal of Midwifery & Women's Health*, 80-96.
- Tossounian, S., Schoendorf, K., & Kiely, J. (1997). Racial differences in perceived barriers to prenatal care. *Maternal and Child Health Journal*, 229-236.
- U.S. Census Bureau (2010, September 16). *Newsroom: U.S. Census Bureau*. Retrieved from U.S. Census Bureau: http://www.census.gov/newsroom/releases/archives/income_wealth/cb10144.html
- U.S. Department of Health and Human Services (2009). *Health Resources and Services Administration*. Retrieved from U.S. Department of Health and Human Services: <http://www.hrsa.gov/grants/technicalassistance/enablingservices.htm>
- U.S. Department of Health and Human Services (2011, September 1). *Maternal, Infant and Child Health*. Retrieved from Healthy People: <http://www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicId=26>

U.S. Department of Health and Human Services (2011, June 22). *Prenatal Care*.

Retrieved from Healthy People 2020:

http://www.healthindicators.gov/Indicators/Prenatalcare_1131/Profile/Data

U.S. Department of Health and Human Services (2011, September 21). *Shortage*

Designation: Health Professional Shortage Areas & Medically Underserved Areas/Populations. Retrieved from Health Resources and Services

Administration: <http://bhpr.hrsa.gov/shortage/>

U.S. Department of Health and Human Services (2011, September). *What is a Health*

Center? Retrieved from Health Resources and Services Administration:

<http://www.bphc.hrsa.gov/about/index.html>

U.S. Department of Agriculture (2003). *Economic Research Service*. Retrieved

from Measuring Rurality: New Definitions in 2003:

<http://www.ers.usda.gov/Briefing/Rurality/Newdefinitions/>

Weech-Maldonado, R., Morales, L. S., Elliot, M., Spritzer, K., Marshall, G., & Hays, R.

D. (2003). Race/ethnicity, language, and patients' assessments of care in Medicaid managed care. *Health Services Research*, 789-808.

Weir, R. C., & Proser, M. (2010). *Highlighting the role of enabling services at community health centers: Collecting data to support service expansion & enhanced funding*. Oakland: Association of Asian Pacific Community Health Organizations.

- Weir, R. C., Emerson, H. P., Tseng, W., Chin, M. H., Caballero, J., Song, H., et al. (2010). Use of enabling services by Asian American, Native Hawaiian, and Other Pacific Islander Patients at 4 community health centers. *American Journal of Public Health*, 2199-2205.
- Wells, R., Punekar, R. S., & Vasey, J. (2009). Why do some health centers provide more enabling services than others? *Journal of Health Care for the Poor and Underserved*, 507-523.
- Youdelman, M., & Perkins, J. (2002). *Providing language interpretation services in health care settings: Examples from the field*. NY: Commonwealth Fund.