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Impact Of Federally Qualified Health Centers (Fqhc) And Look-Alikes (Fqhc Lal) Participating In The 340B Drug Pricing Program

Shannon Burger
University of Alabama at Birmingham

IMPACT OF FEDERALLY QUALIFIED HEALTH CENTERS (FQHC) AND LOOK-ALIKES (FQHC LAL) PARTICIPATING IN THE 340B DRUG PRICING PROGRAM

by

SHANNON MARIE BURGER

ALLYSON G. HALL, COMMITTEE CHAIR
GANISHER DAVLYATOV
PATRICK GRUSENMEYER
BISAKHA SEN

A DISSERTATION

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IMPACT OF FEDERALLY QUALIFIED HEALTH CENTERS LOOK-ALIKES (FQHC LAL) PARTICIPATING IN THE 340B DRUG PRICING PROGRAM

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HEALTHCARE LEADERSHIP

ABSTRACT

The 340B Drug Pricing Program intends to enable community health providers to deliver care more easily to vulnerable populations. Safety net providers were designated as eligible entities through an act of Congress and were allowed access to prescription drug savings. Existing studies have focused on hospital participation in the program, overlooking the impact of Federally Qualified Health Centers (FQHC) and FQHC Look-alikes (FQHC LAL) and legislative intent. This study aimed to fill this gap by comparing the effectiveness of FQHCs and FQHC LALs participating in the 340B Drug Pricing Program. Specifically, the study examined the influence of the status of FQHC and FQHC LAL on comprehensive service provision and primary care provider (PCP) performance, focusing on diabetes and hypertension control performance. Data for the present study were sourced from the Office of Pharmacy Information Systems, the Bureau of Primary Health Care database, and the Uniform Data System (UDS) Clinical Quality Measures. The data were analyzed using a Mann-Whitney U test and a one-way ANCOVA. This study provides a conceptual framework and application of the Resource Dependence Theory (RDT) and Chronic Care Model (CCM) to provide research that will

inform stakeholders about comprehensive services and PCP performance, focusing on diabetes and hypertension control performance for FQHCs and FQHC LALs participating in the 340B Drug Pricing Program. The combination of the RDT and CCM complement and provides the theoretical foundation for understanding the impact of FQHC and FQHC LAL status on comprehensive service provision and primary care performance. RDT underscores the role of the resources provided by the participation status in the 340B Drug Pricing Program, while the CCM highlights the elements at work in effective chronic care management at FQHCs and FQHC LALs. The integrated framework sheds light on the multifaceted mechanisms of how organizational status may impact patient care and health outcomes. The results of this study provide evidence to support that FQHCs and FQHC LALs participating in the 340B Drug Pricing Program are valuable, difficult to imitate, and critical to the coordinated care of vulnerable populations throughout our country.

Keywords: 340B Drug Pricing Program, Federally Qualified Health Centers (FQHC), FQHC Look-alikes (FQHC LAL), Medicaid Drug Rebate Program, Affordable Care Act.

DEDICATION

This study and completion of my education are dedicated to several individuals who paved the way before me or supported me during the most challenging years of my life.

To my late maternal grandfather, Dr. Robert Wade Walker, who taught me to be strong during tough times and always cheer on the Big Orange, but first pray for both teams to be safe and have fun.

To my father, thank you for believing in the value of education, always being there for me in times of need, and helping me find the humor in life. I will still try to follow your guidance to play, learn, and play some more.

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LIST OF ABBREVIATIONS

ACA	Affordable Care Act
BPHC	Bureau of Primary Health Care
CCM	Chronic Care Model
CDC	Centers for Disease Control and Preventions
CHC	Community Health Center
CPCRN	Cancer Prevention and Control Research Network
DSH	Disproportionate Share Hospital
FQHC	Federally Qualified Health Center
FQHC LAL	Federally Qualified Health Center Look-alike
HHS	United States Department of Health and Human Services
HRSA	Health Resources and Services Administration
LHD	Local Health Department
NCHS	National Center for Health Statistics
OBRA	Omnibus Budget Reconciliation Act
OPA	Office of Pharmacy Affairs
OPAIS	Office of Pharmacy Affairs Information System
PCP	primary care provider
PHS	Public Health Service
PHSA	Public Health Service Act
PLWHIV	Persons Living with HIV

PPS	Prospective Payment System
RHC	Rural Health Clinic
RWHAP	Ryan White HIV/AIDS Program
U.S. GAO	United States Government Accountability Office
UAB	University of Alabama at Birmingham
UDS	Uniform Data System

CHAPTER 1

INTRODUCTION

Background

Over the last three decades, the 340B Drug Pricing Program has provided financial assistance to healthcare organizations serving vulnerable populations. The program mandates pharmaceutical manufacturers participating in Medicaid to offer discounted drugs to specific healthcare organizations, often termed "covered entities" (von Oehsen et al., 2012). The status of covered entities allows certain public hospitals and clinics to use their savings to extend their reach to more eligible patients and provide more comprehensive services (Chapman, 2014).

The legislative framework of the 340B Drug Pricing Program has evolved over the last 30 years. In 1990, after evaluating the rising cost of prescription drug prices in the United States for each state participating in Medicaid, Congress proposed the Medicaid Drug Rebate Program. Before this, Congress' involvement in healthcare was to assist citizens with healthcare gaps. The first Congressional program, dated 1918, created the Chamberlain-Kahn Act, covering venereal diseases. The next was the Sheppard-Towner Act of 1921, which provided grants and covered maternal and infant health. The next significant expansion was the Social Security Act of 1935, which expanded to children and blind people. The Kerr-Mills Act of 1960 expanded previous acts by including the

aging population and disabled. In 1965, Medicaid expansion allowed states to purchase coverage through private parties (Oliver et al., 2004).

The Medicaid Drug Rebate Program of 1990 was authorized in the Public Health Service Act (PHSA) and ensured that pharmaceutical manufacturers would provide states with a rebate for prescriptions dispensed to Medicaid beneficiaries as a requirement for reimbursement by the state. The calculated rebate ignored the discount given to public hospitals and other clinics serving the most uninsured and low-income patient populations, thus causing prescription drug prices to increase for these facilities and threatening their existing services (Haeder & Weimer, 2015).

In November 1992, pharmaceutical manufacturers stopped voluntary discounts to facilities providing care to uninsured and low-income populations to address certain providers experiencing increased drug costs because of the 1990 law giving discounts directly to the states. A bipartisan effort led to Section 340B of the Public Health Service Act (PHSA) in 1992, requiring pharmaceutical manufacturers to extend discounts on eligible drugs to providers to participate in Medicaid (von Oehsen et al., 2012). The law allows eligible hospitals and clinics serving uninsured and low-income populations to be called "covered entities," giving them access to reduced pharmaceutical drug pricing and preventing price increases on covered outpatient drugs. Covered entities can use the savings to "stretch scarce federal resources as far as possible, reaching more eligible patients and providing comprehensive services" (Chapman, 2014).

The prescription drugs purchased through the 340B Drug Pricing Program cover patients with Medicare, private insurance, and no insurance. The reimbursement to the covered entity is at the total charge for Medicare and private insurance patients.

Therefore, the program provides savings, which average around 20–30%, and covers the cost of providing more services and discounts to uninsured patients (Conti & Bach, 2013).

Section 340B of the PHSA names specific healthcare organizations that receive discounted prescription drugs through the 340B Drug Pricing Program, often grouped into two general categories: hospitals and grantees. Upon enrollment, these entities may purchase prescription drugs for their eligible patients at a discounted rate and bill the patients' third-party insurers. Any difference between the discounted purchase and third-party reimbursement allows them to provide additional services (McCaughan, 2017). Pharmaceutical manufacturers in Medicare and Medicaid must discount prescription drugs to covered entities. Congress specified values from the average manufacturer price ranging from 13% for eligible outpatient generic drugs to 23.1% for brand-name drugs (Gellad & James, 2018). A particular clause in the statute extends discounts even further when manufacturers raise their prices faster than the inflation rate.

The 340B Drug Pricing Program's hospital participants included narrow criteria for the eligible public or nonprofit organizations or organizations that contract with the government to provide care to patients under a certain federal poverty level. Hospital participants must be nonprofit, public, or contract with the state or local government to provide care to low-income patients. These participants include rural hospitals, typically with 25 beds or fewer; DSH Hospitals— traditional acute care hospitals that can demonstrate a DSH Adjustment Factor greater than 11.75% on the most recently filed Medicare Cost Report; Children's Hospitals—pediatric hospitals with a 3300-series Medicare provider number that can perform a DSH calculation based on worksheet S-3

and demonstrate a result more significant than 11.75%; Sole Community Hospitals—hospitals with Sole Community designation that can display a DSH Adjustment Factor greater than 8.0% on the most recently filed Medicare Cost Report; Rural Referral Centers—hospitals with Rural Referral Center designation that can demonstrate a DSH Adjustment Factor greater than 8.0% on the most recently filed Medicare Cost Report; and Critical Access Hospitals (Nikpay, Buntin, & Conti, 2020). Hospitals are not limited in how they spend savings earned from the 340B Drug Pricing Program, nor are they required to report whether savings are spent directly on patient care (Gellad and James, 2018).

Grantee participants of the 340B Drug Pricing Program refer to all non-hospital entities. The grantee-covered entities qualify because of a grant to provide care to medically underserved populations. These include Ryan White HIV/AIDS Program (RWHAP) Grantees; Specialized Clinics—Black Lung Clinics, Hemophilia Diagnostic Treatment Centers, Title X Family Planning Clinics, Sexually Transmitted Disease Clinics, Tuberculosis Clinics; Community Health Centers—Federally Qualified Health Centers (FQHC), Federally Qualified Health Center Look-alikes (FQHC LAL), Native Hawaiian Health Centers, and Tribal/Urban Health Centers. Unlike hospitals, grantees are eligible as 340B Drug Pricing Program-covered entities because of their grant award. They are subject to federal or state regulations restricting their grant funds and related program income. Grantees are limited to expending program income within the scope of their grant project, and they have other limitations, such as the restriction of executive compensation levels for salaried employees.

RWHAP clinics are limited to using savings from the 340B Drug Pricing Program for Persons Living with HIV (PLWH) by expanding "core medical and support services, clinical quality management, and administrative expenses (including planning and evaluation) as part of a comprehensive system of care for low-income individuals living with HIV" (HHS, 2015). Section 330 of the PHSA establishes eligibility, grant funding opportunities, and services that must be provided and requires that FQHC and FQHC LAL health centers reinvest any savings to promote the purpose of the Health Resources and Services Administration (HRSA) and the Bureau of Primary Health Care (BPHC) Scope of Project that provides care to medically underserved populations.

The 340B Drug Pricing Program has experienced scrutiny as the number of entities participating in the 340B Drug Pricing Program has increased since 2010 (Conti et al., 2020). Martin et al. (2017) go on to say that critics have questioned the connection between a covered entity's use of the 340B program and a direct patient benefit, given that some covered entities have used the program to pass on discounted drugs to patients, while other covered entities use the program to generate a high margin on drug sales. In contrast, supporters of the program argue that participation in this program covers the cost of serving vulnerable patients without further burdening taxpayers. Considering that the overall healthcare spending projections show a continued increase as a share of the overall economy, the 340B Drug Pricing Program should assist in providing care to low-income populations and ultimately save taxpayers money (Martin et al., 2017).

In 2010, the Affordable Care Act (ACA) enactment expanded the 340B Drug Pricing Program. This expansion included critical access hospitals and rural referral centers. Mulligan (2021) found a limitation in the oversight of the 340B Drug Pricing

Program for hospitals and added that the U.S. GAO suggests additional reporting and oversight due to the expansion of the ACA (Mulligan et al., 2021). Fein (2022) found that the share of purchases by percentage and the changes in percentage from the prior year highlighted the increase in hospital purchases (Fein, 2022).

FQHC and FQHC Look-alikes (FQHC LAL)

An eligible community health center must apply through a competitive application with announced deadlines to become an FQHC or FQHC LAL. If awarded FQHC status, the entity receives Section 330 grant funding to provide those services to patients, regardless of ability to pay and is awarded every three years. Currently, funded FQHCs must compete to continue receiving a Section 330 grant. If awarded FQHC LAL status, the entity must provide the exact scope of services, but they do not receive any grant funding. Congress has provided mandatory grant funding for FQHCs because a large portion of funding varies based on their patients' low-income status (MedPac 2011). FQHC and FQHC LAL grantee designation offers several benefits, such as enrolling in the 340B Drug Pricing Program, which incentivizes community health centers to apply to become an FQHC and FQHC LAL. For FQHC LAL, participation in the 340B Drug Pricing Program is critical since the entity must provide the exact scope of services, but they do not receive any grant funding.

To expand services to much-needed communities, FQHC LAL was established through the Omnibus Budget Reconciliation Act (OBRA) 1990 to expand services without increasing grant funding (US GAO, 2010). FQHC LAL does not receive grant funding but must provide and operate as a fully funded FQHC. The main differences are:

(1) no grant funding under section 330 of the Public Health Services Act; (2) ineligibility for medical malpractice insurance coverage provided through the Federal Tort Claims Act; and (3) a rolling, non-competitive application process. Rosenbaum et al. (2019) point out that, in addition to operating and providing services consistent with all statutory, regulatory, and policy requirements, to be eligible for designation as a Look-alike, entities must:

- Be public or private and nonprofit, including tribal, faith-based, and community-based;
- Be independently owned, controlled, and operated (added in 1997);
- Provide comprehensive primary medical care as its primary purpose, and
- Be operational and compliant with all Health Center Program requirements for at least six months.

Problem Statement and Gap in Literature

There has been an increase in the 340B Drug Pricing Program participation over the years in FQHCs and FQHC LALs. While both entities are eligible for discounted prescription drugs, only the FQHC receives grant funding. Despite this, both entities must meet the same operation and clinical performance measures.

Although research has been conducted on entities participating in the 340B Drug Pricing Program, there is still limited information on FQHC and FQHC LAL. Past studies focused mainly on hospital programs, with little attention given to grantee participants such as FQHC or FQHC LAL. The present study evaluated whether the status of FQHC or FQHC LAL affects the number of comprehensive services provided and select primary

care performance measures, given their participation in the 340B Drug Pricing Program. Findings from this study could provide valuable insight into the effectiveness and potential improvements of the program.

Purpose of the Research

The purpose of the present study was to evaluate whether the status of FQHC or FQHC LAL affects the number of comprehensive services provided and select primary care performance measures, given their participation in the 340B Drug Pricing Program. Findings from this study could provide valuable insight into the effectiveness and potential improvements of the program. The following research questions guided the study:

1. How does the status of FQHC and FQHC LAL affect comprehensive service provision among health centers participating in the 340B Drug Pricing Program?
2. How does the status of FQHC and FQHC LAL influence primary care provider (PCP) performance, specifically in diabetes and hypertension control, among health centers participating in the 340B Drug Pricing Program?

CHAPTER 2

LITERATURE REVIEW

The Health Resources and Services Administration (HRSA) oversees the 340B Drug Pricing Program. The Office of Pharmacy Affairs (OPA), an office within HRSA, administers the 340B Drug Pricing Program. The literature review began with Google Scholar, the Health Resources and Services Administration (HRSA), the Office of Pharmacy Affairs Information System (OPAIS), the Centers for Disease Control and Preventions (CDC), the National Center for Health Statistics (NCHS), and the University of Alabama at Birmingham (UAB) online library. The UAB library allows ProQuest, PubMed, and other peer-reviewed journals. The search was limited to U.S. sources, beginning with the 1992 enactment of the 340B Drug Pricing Program and continuing to examine the literature through 2022. Initial search criteria included “340B” and “340B Drug Pricing Program”. The search then expanded to “Federally Qualified Health Center,” “FQHC,” “Federally Qualified Health Center Look-Alike,” “FQHC LAL,” and community health centers. Further publications should be reviewed and included for further abstraction based on the initial "340B" search criteria.

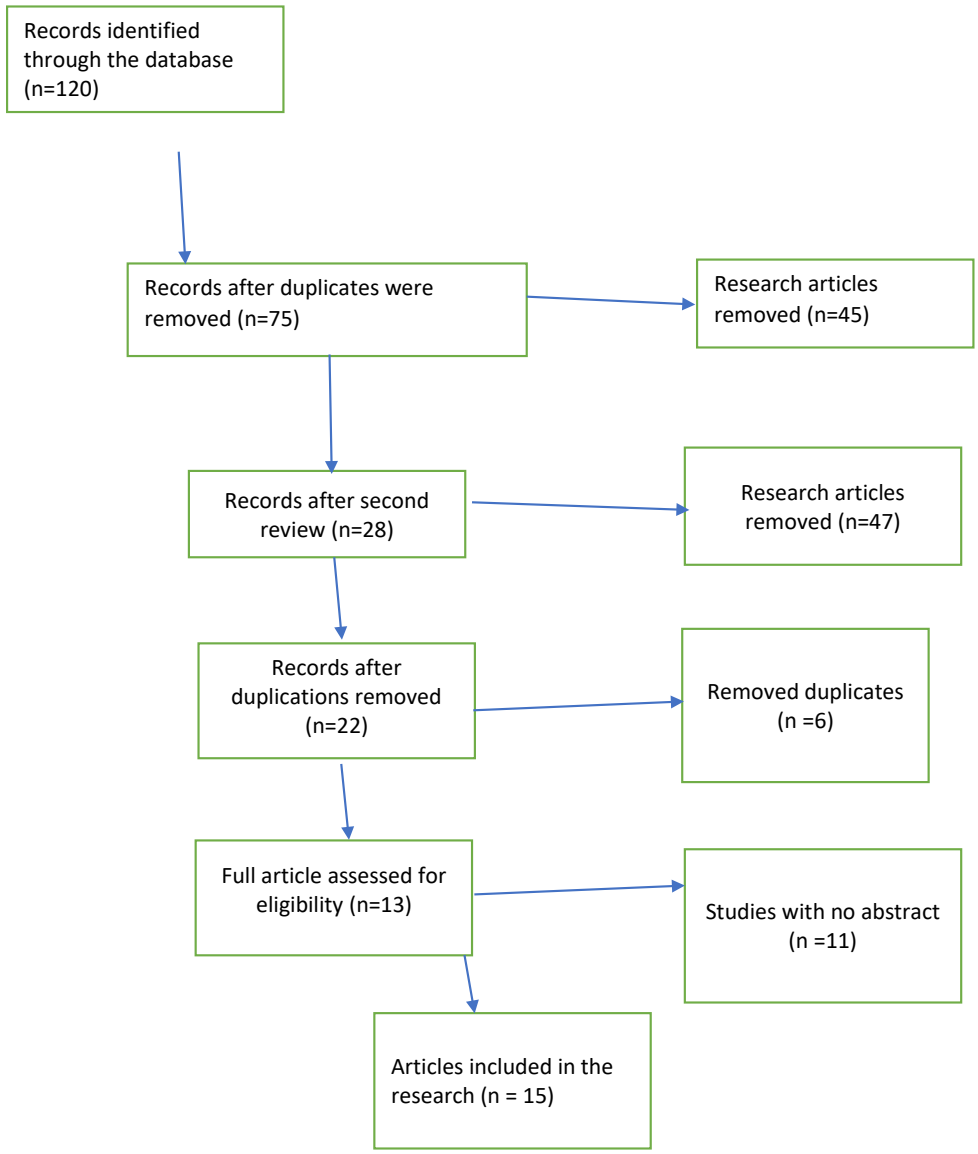
Considering the availability of literature sources platforms such as the UAB library and the qualitative nature of the study, the researcher conducted a systematic literature review. It involved a review of previous literature research studies, publications articles, news journals, and books. It focused on academically peer-reviewed articles

whose scope was within the United States. The choice to focus on studies within the United States was because of the frequent use of community health centers as representatives of the primary healthcare clinics in the United States and because the 340B Drug Pricing Program is exclusive to the United States. A systematic literature review was conducted using a three-step guide or selection technique. The first step was conducting a title and abstract search using keywords essential or related to FQHC regarding its comprehensive services, strategies, and results. The subsequent step was to search for keywords using three primary database platforms: PubMed, ABI/INFORM, and Business Source Premier. Using the latter databases, the research identified scholarly articles published between 2016 and 2022. There was an interchangeable use of the term community health center and Federally Qualified Health Centers to identify many research articles.

After the search of the terms, the research process was followed by a review of the 120 articles identified in the literature search. An examination of the research articles which matched the search criteria and were considered worthwhile was conducted. Based on the selection of relevant articles, 45 research articles were removed from the list of credible studies after being deemed unrelated to the 340B Drug Pricing Program or FQHC's comprehensive services, strategies, and performance. Another 47 research articles were removed, being considered non-empirical. The deletion of 6 research articles was because they lacked an abstract or a full text. After reviewing all the research articles, 13 publications were considered fit for the systematic review during the first two steps of the literature review. After repeating the same procedure, 15 research articles were identified as fit for the final systematic literature review.

Review of the Literature with Synthesis and PRISMA Diagram

Figure 1. PRISMA Diagram



Note. Illustrates the PRISMA flow chart of the article selections.

In synthesizing the literature, two main themes emerged: hospitals participating in the 340B Drug Pricing Program and FQHC and FQHC LAL services provided. No existing literature, however, explicitly focuses on FQHC LAL participation in the 340B Drug Pricing Program.

In reviewing the historical literature on the 340B Drug Pricing Program, the range of literature started in the late 1990s and early 2000s by governmental agencies focused on participation in the program, and by 2011, 340B Drug Pricing Program stakeholders focused on program impact. The selected literature includes peer-reviewed articles, briefs, and reports by government agencies and opinion papers by recognized health and policy experts.

Several articles established that vulnerable populations have more access to health care because of the 340B Drug Pricing Program. In 1998, the Office of the Inspector General (OIG) conducted an audit on Public Health Service (PHS) grantees who participated in the 340B Drug Pricing Program and found that approximately 66% of eligible HRSA grantees did not participate in the program (HRSA, 1998). The study found that many grantees did not request to participate or meet the extensive guidelines. Based on the review, the authors suggested that enrollment in the 340B Drug Pricing Program should be required, as federal dollars should be a last-resort payment. HRSA then requested comments on a proposal requiring grant recipients to participate in the 340B Drug Pricing Program. However, HRSA did not implement a policy requiring grantees to participate in the program. In 1999, Cook and Dong reviewed the Mathematica Policy Research study, which surveyed eligible entities participating in the 340B Drug Pricing Program. Cook and Dong's review of Mathematica's study found that

the participation rate of eligible entities was 39%. The survey found that many participants did not understand how the 340B Drug Pricing Program works, and some shared that the start-up costs for participation were unrealistic for the entities to participate. Cook and Dong's review of Mathematica's study found that a survey sampled 474 organizations from a pool of 1,794 participating in the 340B Drug Pricing Program and 462 from a collection of 3,123 entities not participating in the 340B Drug Pricing Program. Several entities had never heard of the program; 131 were not participating, and 56 participated. Comparing participants versus non-participants, Cook and Dong focused on how the entities qualified for the 340B Drug Pricing Program, the delivery of pharmacy services, and the usage of income earned from the 340B Drug Pricing Program. For participants who completed the survey compared to non-participants, Cook and Dong found that 23.6% increased the number of patients, 18% offset losses, 16% provided co-pay assistance, 15% increased quality, 12% improved the facility, and 6% reduced the prices paid by third parties (Cook and Dong, 1999).

Schmitz et al. (2004) published an article on a new survey of 558 entities currently enrolled in the 340B Drug Pricing Program, making up 384 participants and 174 non-participants. They found that 35% of those listed by HRSA as participants of the 340B Drug Pricing Program were not using the program, while 39% listed as nonparticipating were using it. Like the previous study, many entities cited not participating in the 340B Drug Pricing Program because of the high cost and not having an in-house pharmacy. There were similarities in how entities used their savings. The report further stated that Section 340B of the PHS Act does not require any specific use and that "all entities are free to allocate savings in whatever manner they choose." The

authors concluded that if the 340B Drug Pricing Program were not available, safety net providers would serve fewer patients, and patients would see increased costs for prescription drugs (Schmitz et al., 2004).

In 2011, the U.S. Government Accountability Office (U.S. GAO) published a report highlighting the benefits of the 340B Drug Pricing Program and the need for increased oversight (GAO, 2011). The 2011 report created interest from industry stakeholders, and publications from relevant parties started to surface. Wallack et al. (2012) published the value of the 340B Drug Pricing Program from a survey of 600 participating hospitals commissioned by the Safety Net Hospitals for Pharmaceutical Access and focused on how the hospitals could use savings from the program to help low-income patients. Results illustrated that safety-net hospitals used their program savings to expand services and improve care. Many hospitals would close their doors without the 340B Drug Pricing Program (Wallack et al., 2012). von Oehsen et al. (2012) expanded on the discussion of how hospitals benefit from the program and the risk of reducing overall services to the community without the 340B Drug Pricing Program. Further findings from van Oehsen et al.'s study explained how entities comply with patient definition, shared a brief history of the 340B Drug Pricing Program, and expanded on aspects of the 340B Drug Pricing Program scrutinized in the 2011 GAO report.

Conti and Bach (2013) published a highly criticized article about hospitals, focusing on the financial consequences of participation in the 340B Drug Pricing Program. They highlighted the lack of requirements to ensure entities share drug savings with patients or payers. Further, their article highlighted ways the 340B Drug Pricing Program makes the hospital more profitable than helping the uninsured and underinsured.

Several program critics commissioned a research analysis proving that low-income patients did not benefit from the program in the same year the study was conducted. Those hospitals absorbed oncology practices to drive 340B Drug Pricing Program earnings (Avalere, 2013).

A 2017 study commissioned by 340B Health, a coalition of participating 340B hospitals, found that the impact of the 340B Drug Pricing Program is equal to 1% of total drug purchases in the United States (Dobson et al., 2017). Again, this study focused only on hospital participation in the program. This illustration shows how a small percentage of overall drug spending can increase and expand access to many populations. Additionally, Dobson et al.'s findings combat any argument that the 340B Drug Pricing Program is too large and needs to shrink.

FQHC and FQHC Look-alikes (FQHC LAL)

The remaining literature includes expanding a scoping review to evaluate the comprehensive services of all FQHC, including FQHC LAL. FQHCs receiving grants under Section 330 of the Public Health Service Act (PHS) qualify for enhanced reimbursement from Medicare and Medicaid under the Prospective Payment System (PPS) and other benefits. Under the PPS, as established by Congress in 2000, FQHCs are reimbursed by Medicaid based on a fixed payment per visit using the average cost per visit over the 1999-2000 period as a base and adjusting after that using the Medicare Economic Index for inflation (Jones & Ku, 2015).

FQHC must serve an underserved area or population, offer a sliding fee scale, provide comprehensive services, and oversee a quality management program. A sliding

fee scale is a payment strategy providers employ to care for patients who cannot afford care. The Centers for Medicare and Medicaid Services (CMS) consider each site operated by an FQHC grantee to be a separate FQHC. Therefore, each FQHC grantee may have multiple FQHCs because of multiple service delivery sites (Sardell, 1988). Consequently, each FQHC site must register as a 340B Drug Pricing Program-covered entity. Additionally, the FQHC must adhere to annual data reporting requirements through the Uniform Data System, such as patient demographics, services provided, professionals employed, and grants dollars received and spent.

FQHCs have a board of directors, most of whom must be Community Health Center (CHC) patients. Patients from the health center who serve on FQHC boards are crucial because board members understand the patient's needs. Medicare and Medicaid provide special reimbursement rates to all FQHC to help defray the costs of caring for community health centers with medical, dental, and mental or behavioral health services. In a community-based context, it provides primary and preventative care. It employs skilled and compassionate physicians to help regional residents achieve their health and wellness goals. FQHCs are focused on boosting patient/family involvement, improving access, and coordinating treatment.

Miller et al. (2021) look at trends among FQHCs and Rural Health Clinics (RHCs) before and after hospital closure, specifically in rural areas. According to their findings, new FQHC service-delivery sites are more likely to open when a rural hospital closes in areas where the hospital was previously open. FQHCs may be able to fill some gaps in access to crucial preventative and diagnostic treatments. However, many rural

populations may have a continuous unmet need for preventative and therapeutic treatment.

Lavelle et al. (2018) review the healthcare utilization patterns of Medicare beneficiaries who receive primary care from non-FQHC and Medicare beneficiaries receiving primary care from FQHC. The researchers assessed how many hospitalizations, emergency room, and ambulatory visits occurred among Medicare beneficiaries who received primary care with an established FQHC in 2013 compared to those who saw a different type of primary care provider. When comparing FQHC users to the reference group of those who receive primary care from another provider, the report shows statistical significance for FQHC patients having fewer ambulatory visits and more visits to the emergency department.

Snider et al. (2017) studied the relationship between FQHC service levels in areas and the availability of local health department (LHD) therapeutic services between 2010 and 2013. They discovered that as FQHCs provide more services, LHDs provide fewer clinical services, reflecting a replacement effect. The study suggests that prenatal care may complement more significant public health goals, and LHDs should be strategically positioned to provide these services in the future.

Erica (2021) reviewed the impact of the Affordable Care Act (ACA) on Federally Qualified Health Centers (FQHC) and the people they serve. According to the article, FQHC administrators stated uninsured patients were likelier to have Medicaid coverage than private health insurance. Furthermore, insured people had a better time getting access to healthcare services. However, they were more reliant on their plan's covered services, the ability of FQHC to meet demand, and the willingness of specialist providers

to accept their coverage type. FQHCs are essential to the United States safety net system, delivering primary care to vulnerable and neglected people.

According to Sodhi (2020), one out of every five Americans seeks primary care, preventative care, and community health services from a federally qualified health center (FQHC). For more than 50 years, FQHCs have been at the forefront of addressing community health needs. Amid COVID-19, FQHCs ensure rural patients' access to care by providing non-emergency medical transportation (NEMT).

According to Wenzel and Riley (2021), FQHCs have aided in providing critical services to vulnerable communities, and approximately 45% of pregnancies in the United States are unplanned. Some people, particularly low-income, uninsured, minority, or younger women, may find it difficult to obtain effective contraception, especially in rural areas. This study examined how an FQHC in a rural area responded to its culturally conservative environment by offering contraceptive counseling, complete birth control education, and direct contraceptive access through primary care.

Colorectal cancer (CRC) screening is one of the essential services provided by health centers, according to Leeman et al. (2020). The study aimed to determine how FQHC staff choose and administer CRC screening treatments so that capacity-building strategies could be established. Even though colorectal cancer (CRC) screening reduces CRC-related morbidity and mortality, screening rates remain low, particularly in underserved areas. The Cancer Prevention and Control Research Network (CPCRN) formed a workgroup to study CRC screening interventions within FQHCs because FQHCs have a broad reach to underserved populations, and less than 40% of the patient population is currently within the recommended CRC screening. FQHCs are making

significant progress in lowering CRC screening rates using a combination of internal Q.I. studies, external resources, and help.

FQHCs incentivize their patients to use their facilities by offering discounted services on a sliding price scale based on their family size and income. They also provide patients with high-quality, complete general and preventative care, regardless of whether they are insured (Hams, 2017). In addition, patients will be more likely to obtain care at their facility if they provide support services such as health education, language translation, and transportation. Furthermore, FQHC must provide services to people who cannot pay. They are also free to provide services to those who live outside of their service territory, which is a motivator for the less fortunate in society.

Description of Gaps in the Literature

The literature review suggests a gap in 340B Drug Pricing Program research for non-hospital participation, particularly FQHC and FQHC LAL. However, the 340B-focused literature does highlight the need for increased oversight and tying success with transparency for hospital participants. The 340B Drug Pricing Program literature is concentrated on hospital participation and focuses on two key themes: participation in the program and program impact, defined as expanding services and improving care (Wallack et al., 2012). The literature is focused on hospital participation in the 340B Drug Pricing program, and there is a gap in understanding the impact of the 340B Drug Pricing Program for FQHC LALs that participate in the program and, if it does, enable organizations to reach more eligible patients and provide more comprehensive services. Most FQHCs and FQHC LALs continue hampered by a funding structure that inhibits

their capacity to tailor care to their patients' unique medical and social needs. As the country moves toward value-based payment (VBP), significant progress toward health equity would require successfully incorporating FQHC and other outpatient safety-net providers and health institutions in such models (Nava et al., 2022). FQHCs have repeatedly delivered quality primary care in studies. However, the research outcomes analyzing FQHC consumers' total healthcare use patterns have been inconsistent. Other research could expand the scope of understanding of the use of primary care and its impact on hospitalization visits.

Conclusion

The FQHC initiative is a health center network aiming to increase primary and preventative care access. Patients from low-income communities who are uninsured or underinsured, have poor mobility, or cannot communicate in English are targeted. FQHCs receive federal grant monies from the Health Resources and Services Administration's Bureau of Primary Health Care (BPHC) to support the health center's operation and services while assisting the underserved population. Additional state and federal grants, local help such as foundations and community funds, and patient self-payment or insurance-based medical coverage are all possible funding sources for FQHC. Furthermore, FQHCs provide financial incentives to patients to use their facilities by offering discounted services on a sliding fee scale based on income and family size. As a result, FQHCs are referred to as community clinics because they are frequently the first point of contact for patients. The FQHC LAL program was established to expand services

to much-needed communities without increasing grant funding. FQHC LALs do not receive grant funding but must provide and operate as fully funded FQHC.

According to this review of studies on FQHC, community health centers are a cost-effective and high-quality approach to providing health care to the underserved. Furthermore, community health centers provide more services than a typical primary care practitioner because of their broad patient base and the complexity of health and social challenges they face. Case management, translation, transportation, outreach, eligibility assistance, and health education are just a few services they provide to their patients. As a result, they can achieve outcomes for this population comparable to or better than other primary care facilities while maintaining sufficient levels of patient satisfaction, making them a valuable federal investment.

This research provides insight into the number of comprehensive services offered and the impact of select primary care performance measures by FQHCs and FQHC LALs participating in the 340B Drug Pricing Program by comparing the number of patients per capita and achievement of clinical quality measures standards reported through Uniform Data System (UDS) measures. There is evidence from the literature that these issues have not been studied.

Theoretical Framework

The present study evaluates how the status of Federally Qualified Health Centers (FQHCs) and FQHC Look-Alikes (FQHC LALs) impacts comprehensive service provision and primary care provider (PCP) performance within the context of the 340B Drug Pricing Program. To address this issue, the researcher used a theoretical framework

drawn from two theories: the Resource Dependence Theory (RDT) and the Chronic Care Model (CCM). The integrated theory would help in understanding the findings of this study.

The Resource Dependence Theory (RDT)

The Resource dependency theory is based on the principle that organizations such as healthcare institutions engage in transactions in their environments to acquire necessary resources and that without these resources, the organization would lack sustainability and growth (Droll, 2013; Pfeffer & Salancik, 1978). It focuses on the interconnectedness of an organization's internal resources and capabilities. Health centers rely on interactions with various entities, such as healthcare insurers and pharmaceutical companies, to secure the needed resources. This condition creates cycles of resource dependency, enabling healthcare organizations to meet the needs of their patients.

The RDT theory provides the direction for understanding the relationship between health center status and outcomes of interest in the present study. The 340B Drug Pricing Program enables FQHCs to purchase pharmaceuticals at a significantly discounted price, offering a competitive advantage for participating FQHCs, as the discount afforded through participation is valuable, rare, and hard to imitate or substitute (Holdford, 2018). While FQHCs can receive grant funding, it is often limited, and the 340B Drug Pricing Program allows the entity to reduce spending on essential pharmaceuticals and generate additional profits through insured patients.

As a result, the sustainability of internal resources is founded on the need to source from external parties. FQHCs work with healthcare insurance, pharmaceutical,

and transaction firms that act as a resource source. The condition creates a cycle of resource dependency among organizations, enabling them to meet the needs of their consumers (Pless, 2012). When FQHCs can get the proper resources, they can handle their clinical facilities' functioning and address their patient's health issues.

RDT aligns with the ability of nonprofit healthcare organizations, such as FQHC, to function without more government grants and subsidies but instead utilize other resources to remain competitive and operate as a business. The 340B Drug Pricing Program was started to help stretch scarce federal resources so that organizations serving the most vulnerable and poor would have the ability to continue doing so without the need for more government assistance.

The Chronic Care Model (CCM)

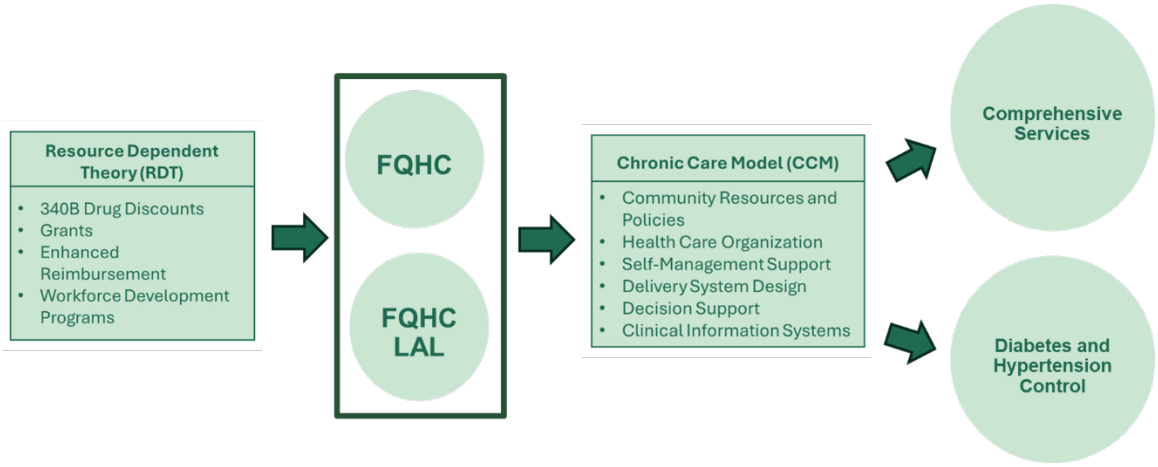
The Chronic Care Model (CCM) is an evidence-based model highlighting the importance of integrating multiple elements in a primary care setting to ensure high-quality chronic disease care services (Wagner et al., 2001). This model comprises several vital elements to ensure the success of caring for patients with chronic conditions: community resources and policies, health care organization, self-management support, delivery system design, decision support, and clinical information systems (Yeoh et al., 2018). The integration of the elements provides a foundation for an effective model of caring for chronic diseases, including diabetes and hypertension, the diseases assessed in the present study. It provides a framework to evaluate the capacity and effectiveness of health centers' performance, particularly in diabetes and hypertension control. By comparing the structures and processes of FQHCs and FQHC LALs against the CCM

framework, this study can identify specific areas where status-driven resource disparities might hinder or enhance optimal chronic care delivery.

Integrated Theoretical Framework

The combination of the Resource Dependence Theory (RDT) and Chronic Care Model (CCM) complement and provide the theoretical foundation for understanding the impact of FQHC and FQHC LAL status on comprehensive service provision and primary care performance. RDT underscores the role of the resources provided by the status, while the CCM highlights the elements at work in effective chronic care management at a health center. The integrated framework sheds light on the multifaceted mechanisms of how organizational status may impact patient care and health outcomes. Figure 2 provides a diagram of the theoretical framework.

Figure 2. Theoretical Framework



Conceptual Framework and Hypothesis Development

The primary construct of this research is whether a health center has the official designation of a Federally Qualified Health Center (FQHC) or is a FQHC Look-Alike (FQHC LAL). This status determines the potential differences in resource access and its impact on the outcomes of interest: comprehensive service provision and PCP performance in diabetes and hypertension control. Understanding this impact will provide information on how FQHCs and FQHC LALs participating in the 340B Drug Pricing Program may influence the ability of safety-net providers to deliver quality care to underserved populations.

FQHCs and FQHC LALs share a common mission to provide essential healthcare services, particularly to vulnerable populations, including those with low Poverty status, minority ethnic groups, uninsured or underinsured individuals, those with poor mobility, and individuals with English as a second language. Both types of centers participate in the 340B Drug Pricing Program. However, FQHCs receive a broader range of benefits than FQHC LALs. The condition leads to greater resource availability for FQHCs than for FQHC LALs.

Research Hypothesis

H1: Among entities participating in the 340B Drug Pricing Program, FQHCs will provide more comprehensive services than FQHC LALs.

H2a: Among entities participating in the 340B Drug Pricing Program, FQHCs will have a more significant percentage of patients with diabetes control.

H2b: Among entities participating in the 340B Drug Pricing Program, FQHCs will have a more significant percentage of patients with hypertension control.

CHAPTER 3

METHODOLOGY

Introduction

This Chapter provides comprehensive information on how the present study was conducted. The Chapter begins with an introduction, followed by a discussion of the research questions, hypotheses, and variables. Subsequently, the Chapter delves into the population and the study sample. The data sources used for the study are then addressed. This Chapter continues with details on the data collection and analysis procedures. After that, the assumptions and limitations of the study are also discussed. Chapter 3 concludes with a summary.

Research Questions, Hypotheses, and Research Variables

Research Questions and Hypotheses

The purpose of the present study was to evaluate whether the status of FQHC or FQHC LAL affects the number of comprehensive services provided and select primary care performance measures, given their participation in the 340B Drug Pricing Program. The following research questions guided the present study:

RQ1. How does the status of FQHC and FQHC LAL affect comprehensive service provision among health centers participating in the 340B Drug Pricing Program?

H_1: Among entities participating in the 340B Drug Pricing Program, FQHCs will provide more comprehensive services than FQHC LALs.

RQ2. How does the status of FQHC and FQHC LAL influence primary care provider (PCP) performance, specifically in diabetes and hypertension control, among health centers participating in the 340B Drug Pricing Program?

H_{2a}: Among entities participating in the 340B Drug Pricing Program, FQHCs will have a more significant percentage of patients with diabetes control.

H_{2b}: Among entities participating in the 340B Drug Pricing Program, FQHCs will have a more significant percentage of patients with hypertension control.

Research Variables

The following are the research variables for RQ1:

- Dependent variable: Comprehensive Service Provision
- Independent variable: Program Type (FQHC or FQHC LAL)
- Control variables: Years of Participation in the 340B Drug Pricing Program, Medicaid Expansion, Payer Mix, Income-Based Poverty Status, pharmacy cost per patient, and Number of Patients Aged 65 and Older.

The following are the research variables for RQ2:

- Dependent variable: Diabetes Control Performance and Hypertension Control Performance
- Independent variable: Program Type (FQHC or FQHC LAL)

- Control variables: Years of Participation in the 340B Drug Pricing Program, Medicaid Expansion, Payer Mix, Income-Based Poverty Status, pharmacy cost per patient, and Number of Patients Aged 65 and Older.

Both research questions have Years of Participation in the 340B Drug Pricing Program, Payer Mix, Income-Based Poverty Status, pharmacy cost per patient, and Number of Patients Aged 65 and Older. Studies have shown these variables to be significantly associated with healthcare quality (Cole et al., 2021; Davlyatov et al., 2023; Jiao et al., 2022; Jung et al., 2022; Mosadeghrad, 2014; Rieselbach et al., 2019). By including the control variables, the present study was able to present more accurate information about the relationships between the variables being studied. The summary of the research variables is presented in Table 1.

Table 1

Research Variables for the Present Study

Variable	Operational Definition	Variable Type	Measurement Level	Data Source
Program Type	Whether a health center is receiving federal grant funding (FQHC) or not (FQHC LAL) as reported by the Bureau of Primary Health Care database.	Independent Variable for RQ1 and RQ2	Dichotomy (0 = FQHC, 1 = FQHC LAL)	Office of Pharmacy Information Systems, the Bureau of Primary Health Care database, and the Uniform Data System (UDS) Clinical Quality Measures
Comprehensive Service Provision	The number of services provided by a health center in addition to medical and dental services includes mental health services, substance abuse services, other professional services, and enabling services, as reported by the Bureau of Primary Health Care database.	Dependent Variable for RQ1	Ratio Each service was scored as 0 for unavailable and 1 for available. The comprehensive service provision score was calculated by summing the number of services provided	
Diabetes Control Performance	Estimated percentage of patients with controlled Hemoglobin A1c levels among patients with diabetes as reported by the Bureau of Primary Health Care database.	Dependent Variable for RQ2	Ratio	
Hypertension Control Performance	Estimated percentage of patients with controlled blood pressure as reported by the Bureau of Primary Health Care database.	Dependent Variable for RQ2	Ratio	
Years of Participation	The number of years a health center has participated in the 340B Drug Pricing Program.	Control Variable for RQ2	Ordinal (1 = ≤ 5 years, 2 = 6-10 years, 3 = 11-15 years, 4 = 16-20 years, 5 = 21-25 years, 6 = ≥ 26 years)	

Payer Mix	The percentage of patients covered by different payers, such as commercial insurance, Medicare, Medicaid, and uninsured.	Control Variable for RQ2	Ratio
Income-Based Poverty Status	The proportion of patients served by a health center with an income below 100% of the federal poverty level (Ku, 2011).	Control Variable for RQ2	Ratio
Pharmacy Cost per Patient	The total cost of medications dispensed to patients over a specific period is divided by the total number of patients served during that period.	Control Variable for RQ2	Ratio
Number of Patients Aged 65 and Older	The proportion of patients served by a health center with limited English proficiency (Kovar et al., 2020).	Control Variable for RQ2	Ratio
Medicaid Expansion	The implementation status of Medicaid expansion under the Affordable Care Act (ACA) within the state where a health center operates.	Additional analysis	Nominal

Program Type

Program type refers to whether a health center receives federal grant funding. Health centers awarded FQHC status receive Section 330 grant funding to provide those services to patients regardless of their ability to pay. Health centers awarded FQHC LAL status do not receive grant funding but must provide a similar scope of services. The information on program type is publicly available on the Bureau of Primary Health Care database. For data analysis in the present study, FQHC was coded as 1, while FQHC LAL was coded as 0. Program Type was the independent variable for both research questions (RQ1 and RQ2).

Comprehensive Service Provision

Comprehensive Service Provision is defined as the number of services provided by a health center in addition to medical and dental services, which includes mental health services, substance abuse services, other professional services, and enabling services, as reported by the Bureau of Primary Health Care database. Similarly, the service data were retrieved from the Bureau of Primary Health Care database. Each service was scored as 0 for unavailable and 1 for available. The comprehensive service provision score was calculated by summing the services provided. Comprehensive Service Provision was the dependent variable for RQ1.

Diabetes Control Performance

This variable was one of the indicators selected to evaluate the primary care provider's (PCP) performance for the present study. Diabetes Control Performance refers

to the estimated percentage of patients with controlled Hemoglobin A1c levels among patients with diabetes as reported by the Bureau of Primary Health Care database. This study analyzed the data from the 2021 period, which is available in the Bureau of Primary Health Care database. This variable was the dependent or outcome variable for RQ2.

Hypertension Control Performance

This variable was the second performance indicator selected to assess PCP performance. Hypertension Control Performance is the estimated percentage of patients with controlled blood pressure. This study analyzed the data from the 2021 period, which is available in the Bureau of Primary Health Care database. The variable was the outcome or dependent variable for RQ2.

Control Variables

The control variables for RQ2 were Years of Participation, Payer Mix, Income-Based Poverty Status, Pharmacy Cost per Patient, and Number of Patients Aged 65 and Older. *Years of Participation* refers to the number of years the health center had participated in the 340B Drug Pricing Program. *Medicaid Expansion* is defined as the implementation status of Medicaid expansion under the Affordable Care Act (ACA) within the state where a health center operates. *Payer Mix* is defined as the proportion of patients served by a health center covered by insurance other than federal health insurance. *Income-Based Poverty Status* refers to the proportion of patients served by a health center with an income of 100% and below (Ku, 2011). *Pharmacy Cost per Patient* refers to the total cost of medications dispensed to patients over a specific period divided

by the total number of patients served during that period. Lastly, the *Patients Aged 65 and Older* refers to the proportion of patients served by a health center who were 65 and older.

Population and Data Sources

The present study evaluated the effect of FQHC and FQHC LAL statuses on comprehensive service provision and primary care provider (PCP) performance, focusing on diabetes and hypertension control among health centers partaking in the 340B Drug Pricing Program. The target population for this study included all FQHC and FQHC LAL entities across the United States participating in the 340B Drug Pricing Program. The data sources used to gather information on these healthcare facilities included the Office of Pharmacy Information Systems, the Bureau of Primary Health Care database, and the Uniform Data System (UDS) Clinical Quality Measures. By evaluating these data, the present study aimed to shed light on the provision of services and PCP performance between FQHC and FQHC LAL. This information could inform policy decisions and improve the effectiveness of the 340B Drug Pricing Program in providing healthcare services for vulnerable populations.

Data Collection Procedures

The present study used secondary data from various reliable resources to study the differences in comprehensive service provision and PCP performance between FQHC and FQHC LAL. Data were collected from the Office of Pharmacy Information Systems, the Bureau of Primary Health Care database, and the Uniform Data System (UDS)

Clinical Quality Measures. This study was conducted by following the steps discussed below.

Data Identification

The researcher began by identifying potential data sources for the study. As previously mentioned, several reliable resources have been identified, which include These resources included the Office of Pharmacy Information Systems, the Bureau of Primary Health Care database, and the Uniform Data System (UDS) Clinical Quality Measures. The resources provided a wealth of information on FQHC and FQHC LAL entities. This information included the total cost of medications dispensed to patients over a specific period, the total number of patients served during that period, patient characteristics, the services provided, clinical data, and cost data. Only service and clinical data relevant to the research questions were extracted for the study. This data included the Program Type, comprehensive services in addition to medical and dental services (mental health services, substance abuse services, other professional services, and enabling services), and percentages of patients with controlled Hemoglobin A1c levels and blood pressure.

Data Extraction

Following data identification, the researcher extracted data from the sources. This information is publicly available and can be accessed from the provided sources. Using the download links provided by the sources, the researcher downloaded relevant data in a spreadsheet format (.xlsx format). Once downloaded, the data were carefully inspected

for errors, inconsistencies, and missing values. The datasets were then organized to make it easy to analyze.

Data Cleaning and Coding

In this step, the researcher focused on the data used to answer the research questions. Irrelevant data embedded in the spreadsheet were removed. Categorical variables were coded into a format suitable for statistical analysis. For example, Program Type was coded into 1 for FQHC and 2 for FQHC LAL. Medical Services availability was coded as 0 for "unavailable" and 1 for "available." The same coding was applied to other services. Each code was noted in a separate code book.

Data Analysis Procedures

Statistical Analysis for RQ1

The Mann-Whitney U test was conducted to compare whether the distributions of comprehensive service provision differ between FQHC and FQHC LAL. The test was selected because the data for both groups did not meet the assumption of normal distribution, $p < .05$. The Mann-Whitney U test is appropriate for analyzing non-parametric data or data that are not normally distributed (Field, 2017). The independent variable for the analysis was Program Type (FQHC or FQHC LAL), while the dependent variable was the Number Of Services offered by a healthcare center. Following the Shapiro-Wilk test, a series of chi-square tests were conducted to compare the availability of each service between FQHC and FQHC LAL to provide a detailed picture of the differences in service provision.

Statistical Analysis for RQ2

The Mann-Whitney U test was performed to compare diabetes control performance and hypertension control performance between FQHC and FQHC LAL. The dependent variables were Diabetes Control Performance and Hypertension Control Performance and were analyzed separately. Subsequently, an ANCOVA was also performed to consider the aforementioned control variables. This analysis would allow the study to evaluate the relationship of program types (FQHC or FQHC LAL) on each dependent variable while considering the control variables.

Assumptions and Delimitations

Several assumptions have been accepted for the present study. The first assumption is that the data from the selected sources are accurate and reliable and reflect the actual services and performance of FQHC and FQHC LAL participating in the 340B Drug Pricing Program. Secondly, the 2022 period data is assumed to be sufficient to provide a snapshot of the FQHC and FQHC LAL service provision and performance. The 2022 data is available to the researcher and does not include COVID-19 years, which may provide inaccuracies. The researcher excludes COVID-19 years due to the significant changes in grant funding and the health center's ability to provide in-person visits, as the findings may not apply to the current conditions. By relying on these two assumptions, there may be limitations on the generalizability and applicability of the findings.

Additionally, several delimitations were identified for the study. The present study focuses entirely on comparing the comprehensive service provision and PCP

performance between FQHC and FQHC LAL. This is necessary to maintain the study focus and scope to understand the impact of the 340B Drug Pricing Program on non-hospital entities such as FQHC and FQHC LAL. Secondly, the present study uses secondary data sources. These data sources provide comprehensive information needed to answer the research questions. Due to these delimitations, the findings may not apply to other entities not participating in the 340B Drug Pricing Program. Lastly, secondary data sources may limit the researcher from analyzing other aspects of service provision and performance not captured in the reports.

Summary

Chapter 3 provided an in-depth discussion of the methodology for the study. This study aims to evaluate whether the status of FQHC or FQHC LAL affects the number of comprehensive services provided and select primary care performance measures, given their participation in the 340B Drug Pricing Program. Data for this study will be collected from several reliable sources, and various statistical analyses have been described for analyzing the data. The next Chapter presents the results of the data analysis, highlighting the differences between FQHC and FQHC LAL.

CHAPTER 4

RESULTS

Introduction

This Chapter reports the results of the data analyzed in the present study. The chapter begins by reprising the research questions and presenting the data's descriptive statistics. Subsequently, the results of the data analysis are presented and organized based on the research question. Lastly, the Chapter concludes with a summary.

Descriptive Statistics

Most variables in the dataset were complete; however, some had missing values (see Table 2). While imputation could replace the missing values, doing so could affect data accuracy and integrity. For this reason, the missing observations were excluded, instead of the imputation of manual data, to maintain the dataset's originality and authenticity, recognizing that the missing data could lead to potential bias in the subsequent analyses.

Table 2

Number of Valid Cases and Missing Values for Each Variable in the Dataset

	N	
	Valid	Missing
Program Type	846	0
Mental Health Services	846	0

Substance Use Services	846	0
Vision Services	846	0
Other Professional Services	846	0
Other Enabling Services	846	0
Total Comprehensive Services	846	0
Percent Controlled Hypertension	846	0
Percent Diabetes Controlled	840	6
Years Participation in 340B	720	126
Payer Mix	833	13
Poverty Level 100% and below	842	4
Pharmaceutical Cost Per Patient	727	119
Number of Patients 65 and Older	777	69

Data from 846 health centers participating in the 340B Drug Pricing Program were analyzed. Of these, 786 (92.6%) were FQHC, and 63 (7.4%) were FQHC LAL (Table 3). The availability of services was also tabulated. Regarding mental Health Services, most service centers (n = 810, 95.4%) provided them. However, less than half of the centers provided Substance Use Services (*n* = 418, 49.20%). Furthermore, fewer centers provided Vision services (*n* = 223, 26.3%). Additionally, nearly half of the centers (*n* = 393, 46.3%) offered other professional services, and about two-thirds provided other enabling services (*n* = 565, 66.5%).

Table 3

Services Provided by Health Centers Participating in the 340B Drug Pricing Program (N = 846)

Variable	*n*	%
Program Type		
FQHC	786	92.58
FQHC LAL	63	7.42

Mental Health Services		
no	36	4.26
yes	810	95.74
Substance Use Services		
no	428	50.59
yes	418	49.41
Vision Services		
no	623	73.73
yes	223	26.27
Other Professional Services		
no	453	53.55
yes	393	46.45
Other Enabling Services		
no	281	33.22
yes	565	66.78

The study also evaluated the data based on comprehensive service provision or the total number of services offered in addition to medical and dental services. These services include mental health, substance abuse, other professional, and enabling services, as reported by the Bureau of Primary Health Care database. On average, an FQHC offers 2.93 (S = 1.21) services compared to an FQHC LAL, which offers 1.73 (S = 1.21) services (Table 4). Table 5 breaks down the number for each service based on the program type of the health centers.

Table 4

Total Comprehensive Services Offered Based on The Program Type

	Total Comprehensive Services	
	$\bar{x}$	SD
FQHC	2.94	1.20

FQHC LAL	1.73	1.21

Table 5

The Number of Services Provided Based on The Program Type

		Program Type			
		FQHC		FQHC LAL	
		n	%	*n*	%
Mental Health Services	no	21	2.68%	15	23.81%
	yes	762	97.32%	48	76.19%
Substance Use Services	no	380	48.53%	48	76.19%
	yes	403	51.47%	15	23.81%
Vision Services	no	568	72.54%	55	87.30%
	yes	215	27.46%	8	12.70%
Other Professional Services	no	404	51.60%	49	77.78%
	yes	379	48.40%	14	22.22%
Other Enabling Services	no	242	30.91%	39	61.90%
	yes	541	69.09%	24	38.10%

The study also examined the percentages of hypertension and diabetes cases that were well-controlled based on the program type. The findings are reported as mean ± standard deviation in Table 6. The average percentages of patients with controlled hypertension were 62.25 ± 10.55 in FQHC and 57.90 ± 12.38 in FQHC LAL. Meanwhile, the average percentages of patients with controlled diabetes were 69.66 ± 9.49 in FQHC and 67.80 ± 11.84 in FQHC LAL.

Table 6

The Mean Percentages of Controlled Hypertension and Diabetes Cases Based on The Program Type

	Program Type	
	FQHC ($\bar{x}$ ± SD)	FQHC LAL ($\bar{x}$ ± SD)
% Controlled Hypertension	62.25 ± 10.55	57.90 ± 12.38
% Controlled Diabetes	69.66 ± 9.49	67.80 ± 11.84

The data were further evaluated based on several control variables. These variables were Years of Participation in the 340B Drug Pricing Program, Payer Mix, Income-Based Poverty Status, pharmacy cost per patient, and Number of Patients Aged 65 and Older. Years of participation in 340B for FQHC and FQHC LAL are reported in Table 7. Regarding this, the averages for FQHC and FQHC LAL were 16.55 ± 8.24 and 4.45 ± 4.77, respectively. The means of patients served by a health center covered by different types of insurance, excluding Unknown/Uninsured (Payer Mix), were 9793.12 ± 13517.19 in FQHC and 5015.27 ± 6488.93 in FQHC LAL. The mean proportions of patients served by a health center with an income of 100% and below (Poverty Level 100% and below) were 46.15 ± 63.42 in FQHC and 38.35 ± 24.90 in FQHC LAL. The pharmaceutical cost per patient was also calculated by dividing the total cost of medications dispensed to patients over a specific period by the total number of patients served during that period. The pharmaceutical average costs per patient were 126.12 ± 306.77 for FQHC and 292.68 ± 669.63 for FQHC LAL. Lastly, the average proportions of patients 65 and older were 13.96 ± 14.99 for FQHC and 11.06 ± 7.31 for FQHC LAL (Table 8).

Table 7

Years of Participation in 340B for FQHC and FQHC LAL

	FQHC		FQHC LAL	
	N	Column N %	N	Column N %
< 5 years	56	8.3%	38	80.9%
6-10 years	150	22.3%	4	8.5%
11-15 years	67	10.0%	4	8.5%
16-20 years	109	16.2%	0	0.0%
21-25 years	177	26.3%	0	0.0%
> 25 years	114	16.9%	1	2.1%

Table 8

Control Variables by The Program Type

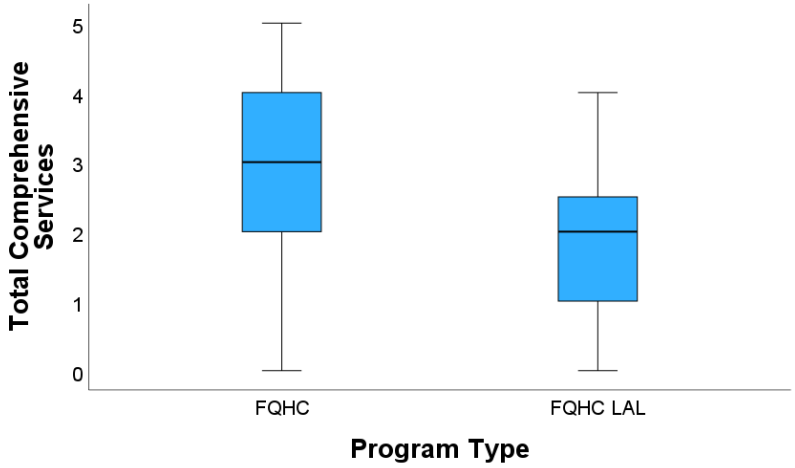
	Program Type	
	FQHC ($\bar{x} \pm SD$)	FQHC LAL ($\bar{x} \pm SD$)
Patients with Payer (Medicaid, Public, Private, Medicare)	9793.12 ± 13517.19	5015.27 ± 6488.93
Proportion of Patients with Income of 100% and Below	46.15 ± 63.42	38.35 ± 24.90
Pharmaceutical Cost Per Patient	126.12 ± 306.77	292.68 ± 669.63
Proportion of Patients 65 and Older	13.96 ± 14.99	11.06 ± 7.31

Q1. How does the status of FQHC and FQHC LAL affect comprehensive service provision among health centers participating in the 340B Drug Pricing Program?

To answer this question, the total number of medical and dental services offered was compared between the two program types – FQHC and FQHC LAL. Before conducting the statistical analysis, the data were tested for the assumptions of no outliers

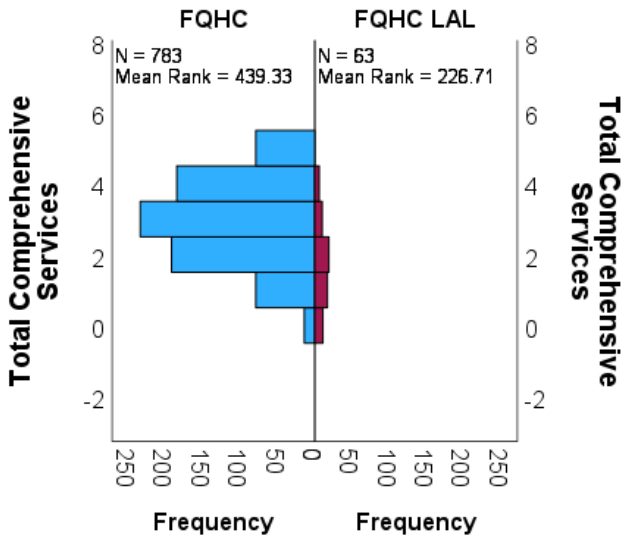
and normality of distribution. A visual inspection of the boxplot did not show any outliers (Figure 4). However, the normality of distribution test using the Shapiro-Wilk test showed that the data for both groups did not meet the assumption of normal distribution, $p < .05$. For this reason, the Mann-Whitney U test was selected to compare the services between the groups.

Figure 3. Boxplot of Total Comprehensive Services by The Program Type



Mann-Whitney U test was chosen to determine if there were differences in comprehensive service provision between FQHC and FQHC LAL (Figure 5). The test showed a statistically significant difference in comprehensive service provision between FQHC ($n = 783$, mean rank = 439.33) and cc ($n = 63$, mean rank = 226.71), $U = 12266$, $z = -6.83$, $p < .001$. The results indicated a notable difference between the two groups, with FQHC providing a higher level of service than FQHC LAL. Following the test, a series of chi-square tests were conducted to compare the availability of each service between FQHC and FQHC LAL to provide a detailed picture of the differences in service provision.

Figure 4. Independent-Samples Mann-Whitney U Test of FQHC and FQHC LAL (Dependent Variable: Total Comprehensive Services)



Mental Health Services by The Program Type

A chi-square test of independence was conducted to determine whether there is a difference in mental health service provision between FQHC and FQHC LAL. The expected counts for all cells were more than five and met the assumption to conduct a chi-square analysis. The chi-square test showed a statistically significant difference in mental health service provision between FQHC and FQHC LAL, χ^2 (1) = 63.88, $p <$ .001. The findings suggested that the type of healthcare center is associated with differences in mental health service provision. Furthermore, Cramer's V of .28 suggests a small association between the type of healthcare center and mental health service provision.

Table 9 further elucidates these findings through a crosstabulation that shows the number of each type of healthcare center providing or not providing mental health services. The adjusted residuals, shown in parentheses, indicate the discrepancy between

observed and expected frequencies. Positive residuals suggest more observed cases than expected, while negative residuals suggest fewer observed cases than expected. The data showed that FQHCs had a positive residual for providing mental health services and a negative residual for not providing these services. Conversely, FQHC LALs showed a negative residual for providing mental health services and a positive one for not providing them. These residuals further support the chi-square test results, confirming a difference in mental health service provision between the two types of healthcare centers.

Table 9

Crosstabulation of Program Type and Mental Health Services

Program Type	Mental Health Services	
	no	yes
FQHC	21	762
	(-8.0)	(8.0)
FQHC LAL	15	48
	(8.0)	(-8.0)

Note. Observed frequencies are followed by adjusted residuals, which are presented in parentheses.

Substance Use Services by The Program Type

A chi-square test of independence was conducted to determine whether there is a difference in substance use service provision between FQHC and FQHC LAL. The expected counts for all cells were more than five and met the assumption to conduct a chi-square analysis. The chi-square test resulted in a statistically significant difference in substance use service provision between FQHC and FQHC LAL, $\chi^2(1) = 17.85$, $p < .001$. The findings suggested that the type of healthcare center is associated with differences in substance use service provision. Also, Cramer's V of .15 suggests a small association between the type of healthcare center and substance use provision.

Furthermore, the findings showed that FQHCs had a positive residual for providing substance use services and a negative residual for not providing these services (Table 10). Conversely, FQHC LALs showed a negative residual for providing substance use services and a positive one for not providing them. These residuals further support the chi-square test results, confirming a difference in substance use service provision between the two types of healthcare centers.

Table 10

Crosstabulation of Program Type and Substance Use Services

Program Type	Substance Use Services	
	no	yes
FQHC	380	403
	(-4.2)	(4.2)
FQHC LAL	48	15
	(4.2)	(-4.2)

Note. Observed frequencies are followed by adjusted residuals, which are presented in parentheses.

Vision Services by The Program Type

A chi-square test of independence was conducted to determine whether there is a difference in vision service provision between FQHC and FQHC LAL. The expected counts for all cells were more than five and met the assumption to conduct a chi-square analysis. The chi-square test resulted in a statistically significant difference in vision service provision between FQHC and FQHC LAL, χ^2 (1) = 6.54, p = .011. The findings suggested that the type of healthcare center is associated with differences in vision service provision. However, Cramer's V of .09 suggests a relatively small association between the type of healthcare center and vision provision.

Furthermore, the findings showed that FQHCs had a positive residual for providing vision services and a negative residual for not providing these services (Table 11). Conversely, FQHC LALs showed a negative residual for providing vision services and a positive one for not providing them. These residuals further support the chi-square test results, confirming a difference in vision service provision between the two types of healthcare centers.

Table 11

Crosstabulation of Program Type and Vision Services

Program Type	Vision Services	
	no	yes
FQHC	568	215
	(-2.6)	(2.6)
FQHC LAL	55	8
	(2.6)	(-2.6)

Note. Observed frequencies are followed by adjusted residuals, which are presented in parentheses.

Other Professional Services by The Program Type

A chi-square test of independence was conducted to determine whether there is a difference in other professional service provisions between FQHC and FQHC LAL. The expected counts for all cells were more than five and met the assumption to conduct a chi-square analysis. The chi-square test resulted in a statistically significant difference in other professional service provisions between FQHC and FQHC LAL, $\chi^2(1) = 16.07$, $p < .001$. The findings suggested that the type of healthcare center is associated with differences in other professional service provisions. However, Cramer's V of .14 suggests a small association between the type of healthcare center and other professional service provisions.

Furthermore, the findings showed that FQHCs had a positive residual for providing other professional services and a negative residual for not providing these services (Table 12). Conversely, FQHC LALs showed a negative residual for providing other professional services and a positive one for not providing them. These residuals further support the chi-square test results, confirming a difference in other professional service provisions between the two types of healthcare centers.

Table 12

Crosstabulation of Program Type and Other Professional Services

Program Type	Other Professional Services	
	no	yes
FQHC	404	379
	(-4.0)	(4.0)
FQHC LAL	49	14
	(4.0)	(-4.0)

Note. Observed frequencies are followed by adjusted residuals, which are presented in parentheses.

Other Enabling Services by The Program Type

A chi-square test of independence was conducted to determine whether there is a difference in other enabling service provisions between FQHC and FQHC LAL. The expected counts for all cells were more than five and met the assumption to conduct a chi-square analysis. The chi-square test resulted in a statistically significant difference in other enabling service provisions between FQHC and FQHC LAL, χ^2 (1) = 25.26, $p <$ .001. The findings suggested that the type of healthcare center is associated with differences in other enabling service provisions. However, Cramer's V of .17 suggests a small association between the type of healthcare center and other enabling service provisions.

Furthermore, the findings showed that FQHCs had a positive residual for providing other enabling services and a negative residual for not providing these services (Table 13). Conversely, FQHC LALs showed a negative residual for providing other enabling services and a positive one for not providing them. These residuals further support the chi-square test results, confirming a difference in other enabling service provisions between the two types of healthcare centers.

Table 13

Crosstabulation of Program Type and Other Enabling Services

Program Type	Other Enabling Services	
	no	yes
FQHC	242	541
	(-5.0)	(5.0)
FQHC LAL	39	24
	(5.0)	(-5.0)

Note. Observed frequencies are followed by adjusted residuals, which are presented in parentheses.

RQ2. How does the status of FQHC and FQHC LAL influence primary care provider (PCP) performance, specifically in diabetes and hypertension control, among health centers participating in the 340B Drug Pricing Program?

Diabetes Control Performance Between FQHC and FQHC LAL

Mann-Whitney U test comparing diabetes control performance between FQHC and FQHC LAL. Before conducting the statistical analysis, the data were tested for the assumptions of no outliers and normality of distribution. Visual inspection of the boxplot showed several extreme outliers in both groups (Figure 6). The Shapiro-Wilk test also showed that the data for the FQHC group was not normally distributed. Due to these

findings, the Mann-Whitney U test was chosen since the test is more robust for datasets with outliers and when the assumption of normality of distribution is not met.

The Mann-Whitney U test showed no statistically significant differences between FQHC (n = 777, mean rank = 424.64) and FQHC LAL (n = 63, mean rank = 369.48) in diabetes control, U = 21261.50, z = -1.74, p = .083 (Figure 7). The results indicated no significant difference in diabetes control performance between the FQHC and FQHC LAL groups.

Figure 5. Boxplot of Diabetes Control Performance By Program Type

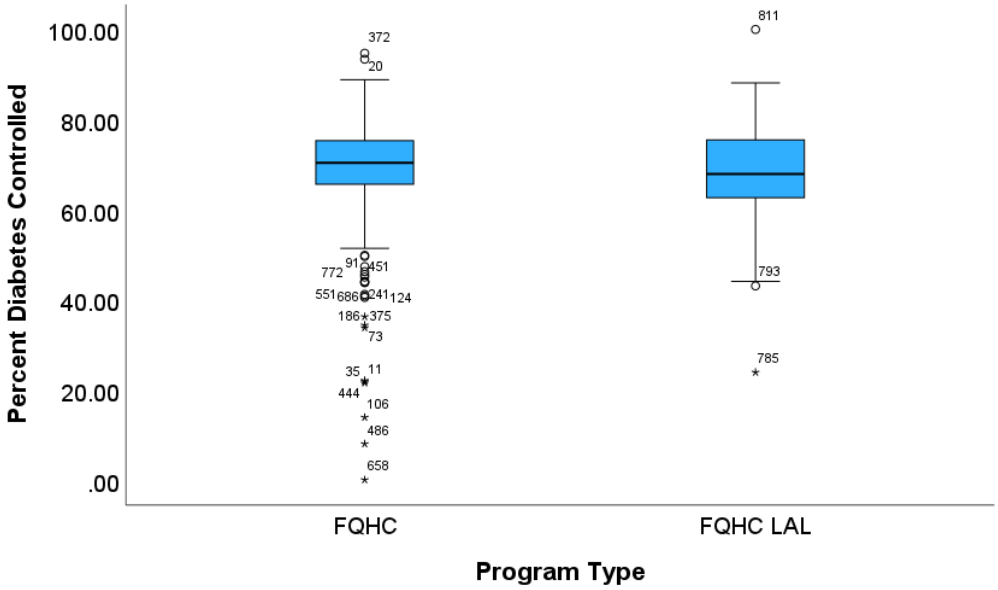
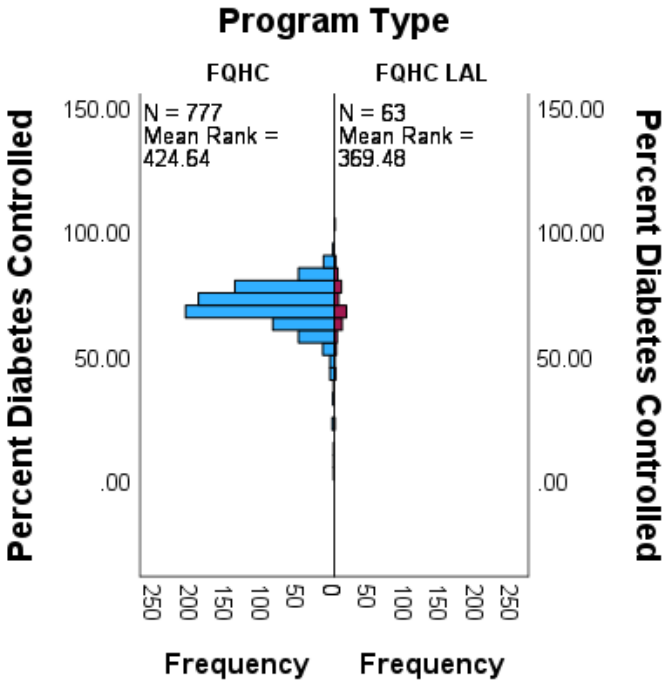


Figure 6. Independent-Samples Mann-Whitney U Test of FQHC and FQHC LAL (Dependent Variable: Diabetes Control Performance)



One-Way ANCOVA comparing diabetes control performance between FQHC and FQHC LAL. The data were also analyzed using an ANCOVA. The test allows us to assess the effect of Program Type on Diabetes Control Performance while controlling the covariates: Years of Participation in the 340B Drug Pricing Program, Payer Mix, Income-Based Poverty Status, pharmacy cost per patient, and Number of Patients Aged 65 and Older. Controlling for these covariates is essential as they potentially confound the relationship between the independent variable (Program Type) and dependent variable (Diabetes Control Performance). Before the analysis, the data were examined for linearity, homogeneity of regression slopes, distribution normality, homoscedasticity, variances homogeneity, and outliers.

The data were tested for homogeneity of regression slopes (Table 14). All interaction terms were more significant than alpha (.05), suggesting that these

interactions met the assumptions of homogeneity of regression slopes. The results indicated that the relationship between the dependent variable and covariates was consistent across the independent variable levels.

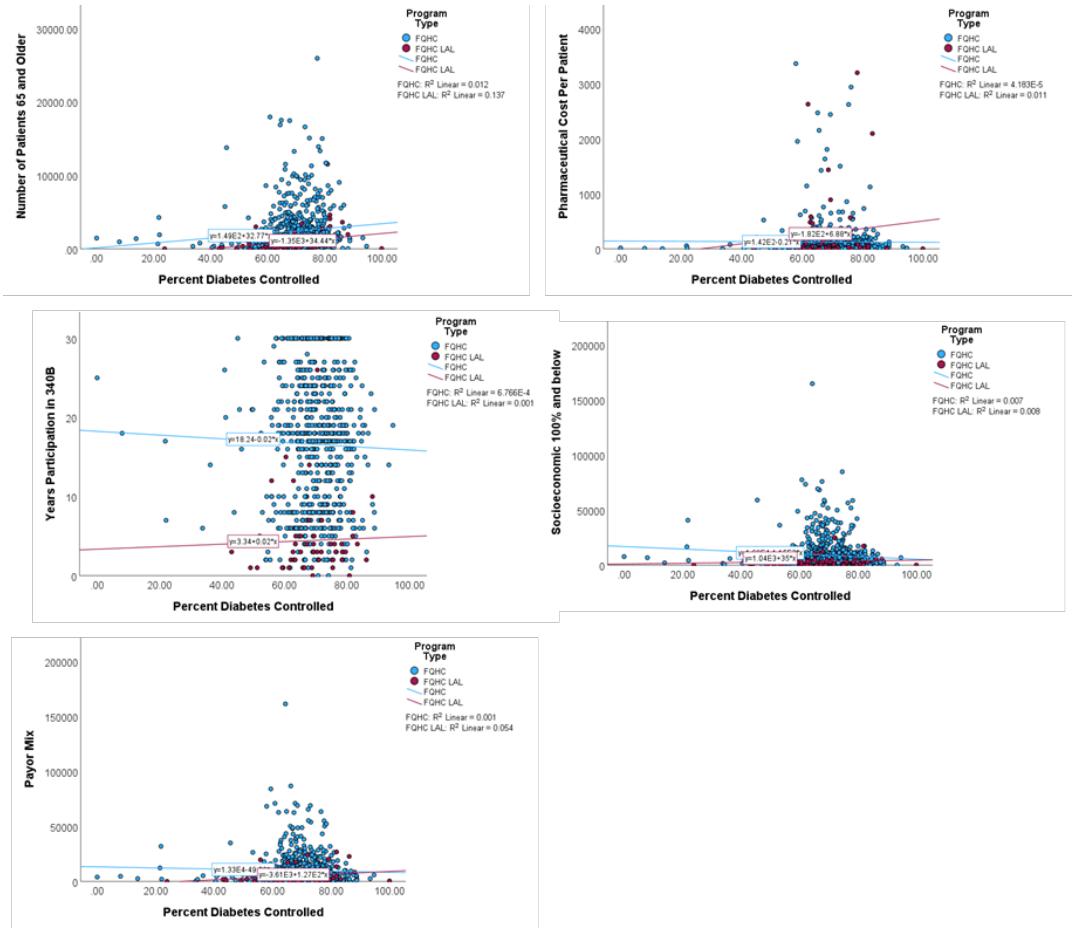
Table 14

Interaction Term Between Program Type and Each Covariate (Dependent Variable: Diabetes Control Performance)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Type * Years	13.360	1	13.360	.175	.676
Type * PayerMix	126.229	1	126.229	1.653	.199
Type * Pover100	235.924	1	235.924	3.089	.079
Type * PharmaceuticalCost	23.026	1	23.026	.301	.583
Type * Patients65	160.153	1	160.153	2.097	.148

The assumption of linearity was assessed using scatterplots (Figure 8). Testing this assumption ensures that the relationships between variables were appropriately modeled. Visual inspection of the scatterplots showed a linear relationship between the Diabetes Control Performance variable and each covariate variable for each Program Type.

Figure 7. Scatterplots of Diabetes Control Performance and Each Covariate for Each Level of Program Type

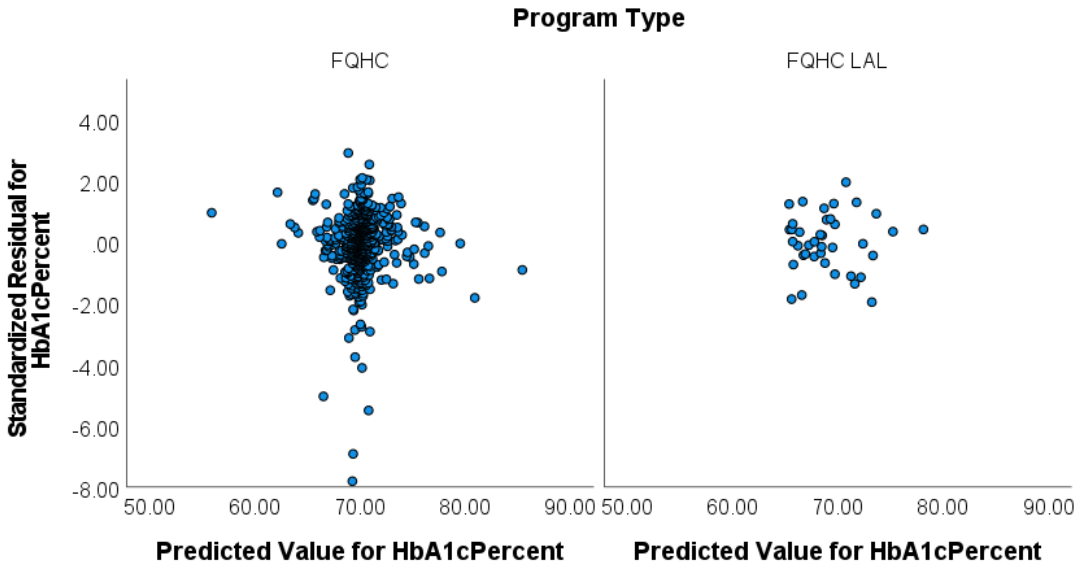


The data were also tested for the assumption of normality of distribution using Shapiro-Wilk's test. The test showed that the standardized residuals for Diabetes Control Performance were not normally distributed for the FQHC group, $p < .05$. Shapiro-Wilk's test on the standardized residuals for the overall model also showed that the data did not meet the assumption of normality of distribution, $p < .05$. Even so, the present study carried on with ANCOVA since the statistical analysis is robust to slight deviations from normality, especially when sample sizes are relatively large.

The data were tested for homoscedasticity using a scatterplot of the standardized residuals and the predicted values (Figure 9). The scatterplot showed that the assumption

of homoscedasticity was met. The test ensures that the variability of the dependent variable is constant across all levels of the independent variable (Program Type).

Figure 8. Scatter Plot of Standardized Residual for HbA1cPercent by Predicted Value for HbA1cPercent by Program Type



The data were tested for homoscedasticity using Levene's test. The test results showed that the data met the assumption, $p = .450$. Meeting the assumption of homogeneity of variances ensures that variances are equal across groups, which is essential for the comparability of group means in ANCOVA.

Lastly, the data were tested for outliers using standardized residuals. There were seven cases with values above ± 3 standard deviations. These data were genuinely original. While outliers can influence statistical results, ANCOVA is relatively robust and can tolerate the outliers, especially when the overall sample size is large. However, the presence of outliers should be noted when interpreting the results.

A one-way ANCOVA analysis was conducted to assess the effect of Program Type on Diabetes Control Performance while controlling the covariates: Years of

Participation in the 340B Drug Pricing Program, Payer Mix, Income-Based Poverty Status, pharmacy cost per patient, and Number of Patients Aged 65 and Older. Adjusted means of the percentages of diabetes cases (Diabetes Control Performance) were 70.03 ± .35 for FFQHC and 67.09 ± 3.57 for FQHC LAL (Table 15). Data are presented as adjusted mean ± standard error. After adjusting for the control variables, no statistically significant difference in diabetes control performance was found between FFQHC and FQHC LAL, $F(1) = .048$, $p = .826$ (Table 16). The partial eta squared indicated that the effect size was $< .001$, denoting a minimal effect.

Table 15

Descriptive Statistics of Adjusted Means (Dependent Variable: Diabetes Control Performance)

			95% Confidence Interval	
Program Type	Mean	Std. Error	Lower Bound	Upper Bound
FQHC	70.03[a]	.35	69.33	70.72
FQHC LAL	67.09[a]	3.57	60.08	74.09

Note. [a] Covariates appearing in the model are evaluated at the following values: Payer Mix = 10401.92, Pharmaceutical Cost Per Patient = 137.27, Proportion of Patients with Poverty Level 100% and below = 42.9202, Proportion of Patients Patients 65 and Older = 13.4300, Years Participation in 340B (Categories) = 3.70.

Table 16

One-Way ANCOVA (Dependent Variable: Diabetes Control Performance)

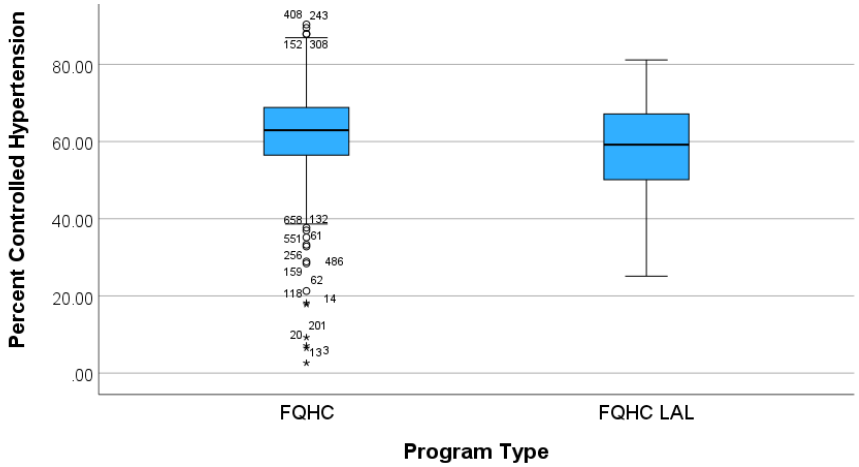
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	4047.065[a]	11	367.915	4.817	.000	.076
Intercept	47549.818	1	47549.818	622.543	.000	.492
Type	362.495	1	362.495	4.746	.030	.007
Years	15.111	1	15.111	.198	.657	.000
PayerMix	107.005	1	107.005	1.401	.237	.002
Pover100	19.594	1	19.594	.257	.613	.000
PharmaceuticalCost	38.941	1	38.941	.510	.475	.001
Patients65	337.330	1	337.330	4.416	.036	.007
Type * Years	13.360	1	13.360	.175	.676	.000
Type * PayerMix	126.229	1	126.229	1.653	.199	.003
Type * Pover100	235.924	1	235.924	3.089	.079	.005
Type * PharmaceuticalCost	23.026	1	23.026	.301	.583	.000
Type * Patients65	160.153	1	160.153	2.097	.148	.003
Error	49188.725	644	76.380			
Total	3269689.918	656				
Corrected Total	53235.790	655				

Note. [a] R Squared = .076 (Adjusted R Squared = .060)

Hypertension Control Performance

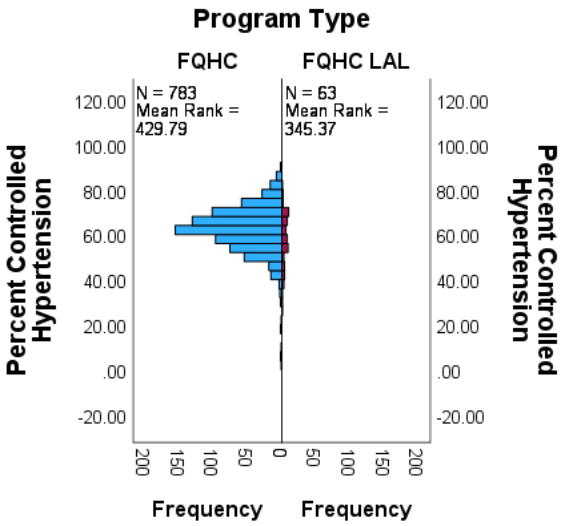
Mann-Whitney U test comparing hypertension control performance between FQHC and FQHC LAL. Before conducting the statistical analysis, the data were tested for the assumptions of no outliers and normality of distribution. Visual inspection of the boxplot showed several extreme outliers in the FQHC group (Figure 10). The Shapiro-Wilk test showed that the data for the FQHC group was not normally distributed. Due to these findings, the Mann-Whitney U test was chosen since the test is more robust for datasets with outliers and when the assumption of normality of distribution is not met.

Figure 9. Boxplot of Hypertence Performance By Program Type



Mann-Whitney U test showed a statistically significant difference between FQHC (n = 783, mean rank = 429.79) and FQHC LAL (n = 63, mean rank = 345.37) in hypertension control, U = 846, z = -2.64, p = .008 (Figure 11). The results indicated a notable difference between the two groups, with FQHC showing a higher level of performance in hypertension control than FQHC LAL.

Figure 10. Independent-Samples Mann-Whitney U Test of FQHC and FQHC LAL (Dependent Variable: Hypertension Performance)



One-Way ANCOVA comparing hypertension control performance between FQHC and FQHC LAL. A one-way ANCOVA was conducted to evaluate the effect of Program Type on Hypertension Control Performance while controlling the covariates: Years of Participation in the 340B Drug Pricing Program, Payer Mix, Income-Based Poverty Status, pharmacy cost per patient, and Number of Patients Aged 65 and Older. Controlling for these covariates is essential as they potentially confound the relationship between Program Type and Hypertension Control Performance. Before the analysis, the data were examined for several assumptions: linearity, homogeneity of regression slopes, distribution normality, homoscedasticity, variances homogeneity, and outliers.

The data had been tested for homogeneity of regression slopes, and the results are shown in Table 17. The interaction term for each covariate was not statistically significant ($p > .05$), suggesting homogeneity of regression slopes.

Table 17

Interaction Term Between Program Type and Each Covariate (Dependent Variable: Hypertension Control Performance)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Type * Years	.111	1	.111	.001	.973
Type * PayerMix	17.319	1	17.319	.176	.675
Type * Pover100	.157	1	.157	.002	.968
Type * PharmaceuticalCost	70.705	1	70.705	.720	.396
Type * Patients65	28.954	1	28.954	.295	.587

The data were tested using scatterplots (Figure 12). Testing this assumption ensures that the relationships between variables were appropriately modeled. Visual inspection of the scatterplots showed a linear relationship between the Hypertension Control Performance variable and each covariate variable for each Program Type.

The data were also tested for the assumption of normality of distribution using Shapiro-Wilk's test. According to the test, the standardized residuals for Hypertension Control Performance did not meet the assumption for the FQHC group, $p < .05$. Shapiro-Wilk's test on the standardized residuals for the overall model also showed that the data did not meet the assumption of normality of distribution, $p < .05$. Nevertheless, the present study carried on with ANCOVA since the statistical analysis is robust to slight deviations from normality, especially when sample sizes are relatively large.

Visual inspection of the scatterplot showed that the assumption of homoscedasticity was met (Figure 13). The test ensures that the variability of the dependent variable is constant across groups.

Figure 11. Scatterplots of Hypertension Control Performance and Each Covariate for Each Level of Program Type

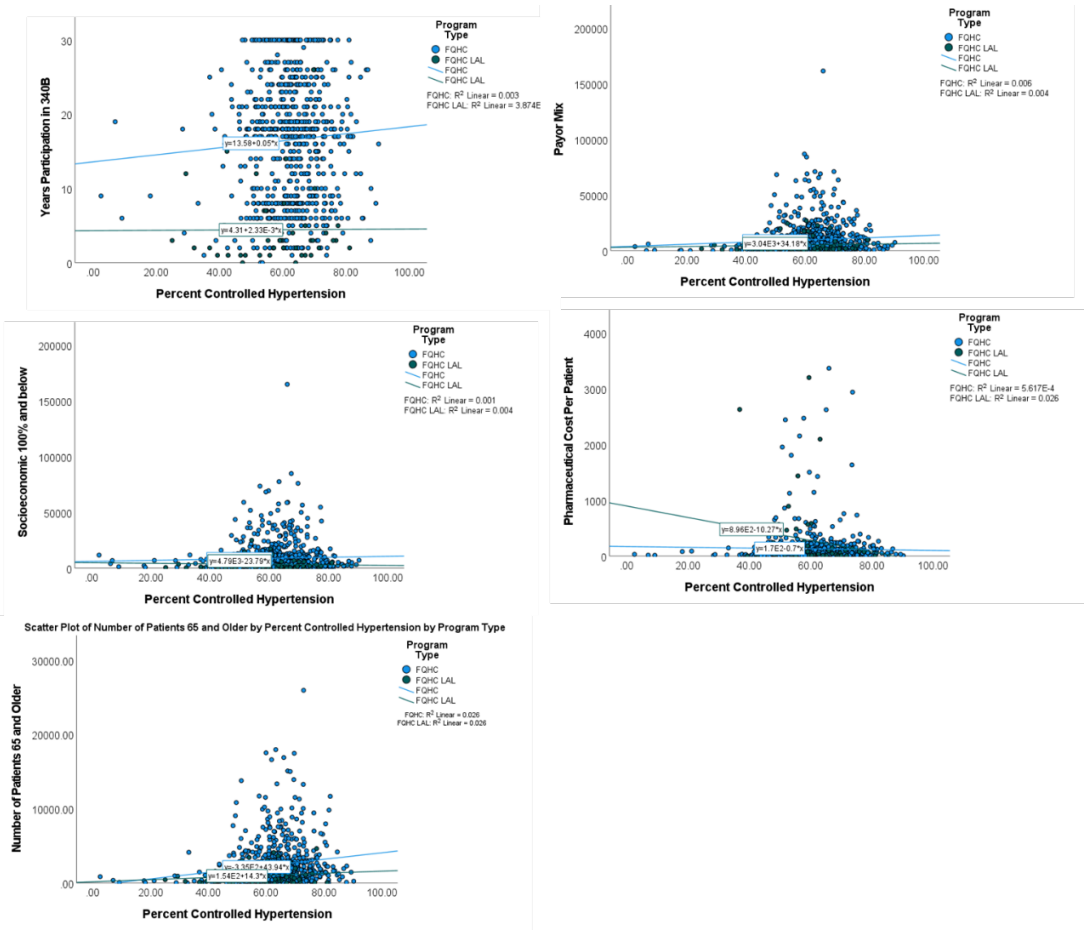
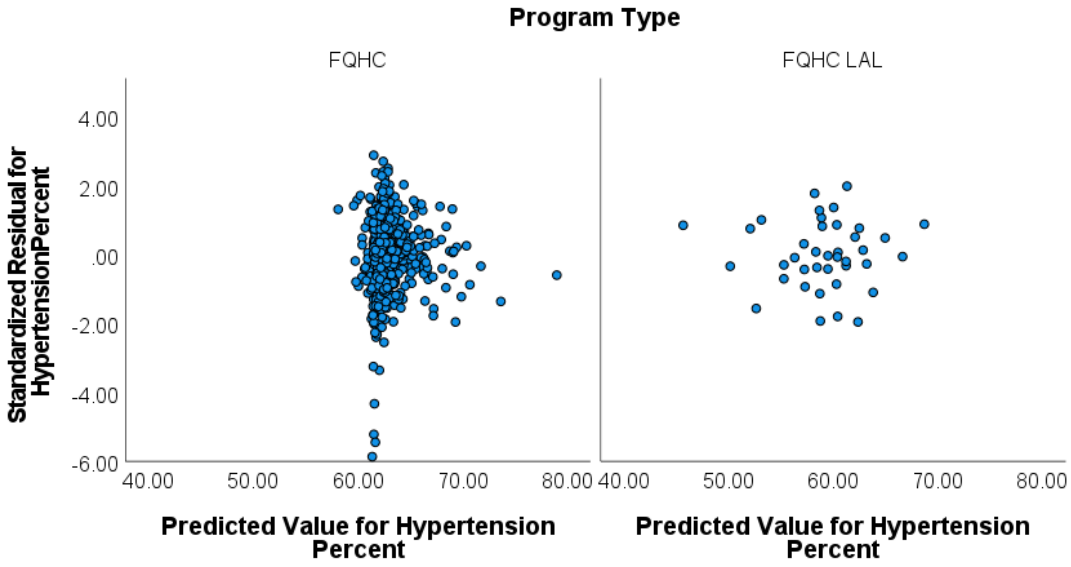


Figure 12. Scatter Plot of Standardized Residual for Hypertension Percent by Predicted Value for Hypertension Percent by Program Type



The data were tested for homoscedasticity using Levene's test. The test results showed that the data met the assumption, $p = .375$. Meeting the assumption of homogeneity of variances ensures that variances are equal across groups, which is essential for the comparability of group means in ANCOVA.

Lastly, the data were tested for outliers using standardized residuals. There were six cases with values above ± 3 standard deviations. However, since these data were genuinely original, the researcher retained them. While outliers can influence statistical results, ANCOVA is relatively robust and can tolerate the outliers, especially when the overall sample size is large. However, the presence of outliers should be noted when interpreting the results.

A one-way ANCOVA analysis was conducted to assess the effect of Program Type on Hypertension Control Performance while controlling the covariates: Years of Participation in the 340B Drug Pricing Program, Payer Mix, Income-Based Poverty Status, pharmacy cost per patient, and Number of Patients Aged 65 and Older. Adjusted

means of the percentages of diabetes cases (Hypertension Control Performance) were 62.82 ± .40 for FFQHC and 59.59 ± 4.37 for FQHC LAL (Table 18). Data are presented as adjusted mean ± standard error. After adjusting for the control variables, no statistically significant difference in hypertension control performance was found between FFQHC and FQHC LAL, F (1) = .405, p = .525 (Table 19). The partial eta squared indicated that the effect size was .001, denoting a minimal effect.

Table 18

Descriptive Statistics of Adjusted Means (Dependent Variable: Hypertension Control Performance)

Program			95% Confidence Interval	
Type	Mean	Std. Error	Lower Bound	Upper Bound
FQHC	62.814[a]	.399	62.030	63.598
FQHC LAL	60.139[a]	4.181	51.929	68.350

Note. [a] Covariates appearing in the model are evaluated at the following values: Payer Mix = 10342.20, Pharmaceutical Cost Per Patient = 136.60, Proportion of Patients with Poverty Level 100% and below = 42.8172, Proportion of Patients Patients 65 and Older = 13.4344, Years Participation in 340B (Categories) = 3.69.

Table 19

One-Way ANCOVA (Dependent Variable: Hypertension Control Performance)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	4689.521a	11	426.320	4.343	.000	.069
Intercept	40460.151	1	40460.151	412.178	.000	.389
Type	22.168	1	22.168	.226	.635	.000
Years	4.870	1	4.870	.050	.824	.000
PayerMix	.140	1	.140	.001	.970	.000
ProportionPoverBelow100	284.874	1	284.874	2.902	.089	.004
PharmaceuticalCost	174.798	1	174.798	1.781	.183	.003

Proportion65Older	165.444	1	165.444	1.685	.195	.003
Type * Years	.111	1	.111	.001	.973	.000
Type * PayerMix	17.319	1	17.319	.176	.675	.000
Type * ProportionPoverBelow100	.157	1	.157	.002	.968	.000
Type * PharmaceuticalCost	70.705	1	70.705	.720	.396	.001
Type * Proportion65Older	28.954	1	28.954	.295	.587	.000
Error	63608.939	648	98.162			
Total	2659407.265	660				
Corrected Total	68298.459	659				

Note. [a] R Squared = .069 (Adjusted R Squared = .053)

Additional Analyses

Is There an Association Between the Number of Comprehensive Services and Diabetes Control Performance?

To answer this question, a Spearman's rho correlation analysis was conducted to assess the relationship between the number of comprehensive services and diabetes control performance. Spearman's rho was selected due to the non-normal distribution of the data for both the number of comprehensive services and diabetes control performance, as assessed by Shapiro-Wilk ($p < .05$). Spearman's rho correlation analysis showed that the number of comprehensive services was not statistically significantly associated with diabetes control performance, $p = .110$, $r_s(845) = -.06$, 95%CI [-.12, .01].

Is There an Association Between the Number of Comprehensive Services and Hypertension Control Performance?

To answer this question, a Spearman's rho correlation analysis was conducted to assess the relationship between the number of comprehensive services and hypertension control performance. Spearman's rho was selected due to the non-normal distribution of

the data for both the number of comprehensive services and diabetes control performance, as assessed by Shapiro-Wilk ($p < .05$). Spearman's rho correlation analysis showed that the number of comprehensive services was not statistically significantly associated with hypertension control performance, $p = .521$, $r_s(845) = -.02$, 95%CI [-.05, .09].

Is There a Difference in the Number of Comprehensive Services Between States With Medicaid Expansion and Those Without?

To address this question, a Mann-Whitney U test was run to compare the number of comprehensive services provided by states with Medicaid expansion and those without. The test was selected because the number of comprehensive services for both groups did not meet the assumption of normality of distribution as assessed by Shapiro-Wilk ($p < .05$). The Mann-Whitney U test showed no statistically significant differences, with mean ranks of 431.38 for states with Medicaid expansion and 395.93 for those without, $p = .071$, $U = 67034.500$, $z = 1.803$. These results suggest that Medicaid expansion does not impact the number of comprehensive services offered.

Is There a Difference in Diabetes Control Performance Between States With Medicaid Expansion and Those Without?

To address this question, a Mann-Whitney U test was run to compare diabetes control performance between states with Medicaid expansion and those without. The test was selected because the number of comprehensive services for both groups did not meet the assumption of normality of distribution as assessed by Shapiro-Wilk ($p < .05$). The

Mann-Whitney U test showed a statistically significant difference in diabetes control performance between the states with Medicaid expansion (mean rank = 431.54) and those without (mean rank = 381.95), $p = .014$, $U = 68264.500$, $z = 2.464$. These results suggest that states with Medicaid expansion have better diabetes performance than those without.

Is There a Difference in Hypertension Control Performance Between States With Medicaid Expansion and Those Without?

To address this question, a Mann-Whitney U test was run to compare hypertension control performance between states with Medicaid expansion and those without. The test was selected because the number of comprehensive services for both groups did not meet the assumption of normality of distribution as assessed by Shapiro-Wilk ($p < .05$). The Mann-Whitney U test showed a statistically significant difference in hypertension control performance between the states with Medicaid expansion (mean rank = 437.78) and those without (mean rank = 373.52), $p = .001$, $U = 71248.000$, $z = 3.180$. These results suggest that states with Medicaid expansion have better hypertension performance than those without.

Medicaid Expansion State and Program Type

A chi-square test of independence was also run to evaluate whether Medication Expansion State and Program Type (See Table 20). Medication Expansion State refers to whether the institutions are in states that have expanded Medicaid coverage (Yes or No). The expected counts showed that all cells were more than five. The chi-square test showed no statistically significant association between Medicaid state status and program type, χ^2 (1) = .89, p = .345.

Table 20

Crosstabulation of Program Type and Medicaid Expansion State

Program Type	Medicaid Expansion State	
	no	yes
FQHC	117	606
	(.2)	(-.1)
FQHC LAL	11	52
	(-.8)	(.4)

Note. Observed frequencies are followed by adjusted residuals, which are presented in parentheses.

Correlation Analysis for Each Payer Type With Diabetes and Hypertension Control Performance

A series of correlational analyses assessed the association between payer type, diabetes control performance, and hypertension control performance. The statistical analysis method chosen was Spearman's rho because the data for diabetes control performance and hypertension control performance did not meet the assumption of normal distribution, as assessed by the Shapiro-Wilk test ($p < .05$). The crosstabulation matrix of the analysis can be seen in Table 21. Based on the analysis, it can be inferred that:

- There was a statistically significant correlation between Payer Medicare and diabetes control performance, $rs(835) = .22$, $p < .001$. This was a positive correlation, but its strength was negligible. The results suggest that the greater the number of patients with a Medicare payer served by a health center, the better their diabetes control performance was, and vice versa.
- There was a statistically significant correlation between Payer Public/Other and diabetes control performance, $rs(836) = -.08$, $p = .029$. This correlation was negative, with minimal strength. The results suggest that the greater the number of patients with Public payers served by a health center, the lesser their diabetes control performance was, and vice versa.
- There was a statistically significant correlation between Payer Private and diabetes control performance, $rs(834) = .19$, $p < .001$. This was a positive correlation, but its strength was negligible. The results suggest that the greater the number of patients with Private payers served by a health center, the better their diabetes control performance was, and vice versa.
- There was a statistically significant correlation between Payer Uninsured/ Unknown and diabetes control performance, $rs(828) = -.15$, $p < .001$. This was a negative correlation, and its strength was negligible. The results suggest that the greater the number of uninsured patients served by a health center, the lesser their diabetes control performance was, and vice versa.
- There was a statistically significant correlation between Payer Medicaid and hypertension control performance, $rs(832) = .13$, $p < .001$. This was a positive correlation, but its strength was negligible. The results suggest that the greater the

number of patients with mixed payers served by a health center, the better their hypertension control performance was, and vice versa.

- There was a statistically significant correlation between Payer Medicare and hypertension control performance, $rs(841) = .23$, $p < .001$. This was a positive correlation, but its strength was negligible. The results suggest that the greater the number of patients with a Medicare payer served by a health center, the better their hypertension control performance was, and vice versa.
- There was a statistically significant correlation between Payer Public/Other and hypertension control performance, $rs(842) = -.07$, $p = .045$. This was a negative correlation, and its strength was minimal. The results suggest that the greater the number of patients with mixed payers served by a health center, the lesser their hypertension control performance was, and vice versa.
- There was a statistically significant correlation between Payer Private and hypertension control performance, $rs(840) = .20$, $p < .001$. This was a positive correlation, but its strength was negligible. The results suggest that the greater the number of patients with Private payers served by a health center, the better their hypertension control performance was, and vice versa.

Table 21

Spearman's Rho Correlation of Payer Type, Diabetes Control Performance, and Hypertension Control Performance

		Percent Controlled Hypertension	Percent Diabetes Controlled	Payer Medicaid	Payer Medicare	Payer Public/ Other	Payer Private	Payer Uninsured/ Unknown
Percent	r_s	1.00	.44**	.13**	.23**	-.07*	.20**	-.00
Controlled	p	.	<.001	<.001	<.001	.045	<.001	.904
Hypertension	N	846	840	833	842	843	841	835
Percent	r_s		1.00	.01	.22**	-.08*	.19**	-.15**
Diabetes	p		.	.773	<.001	.029	<.001	<.001
Controlled	N		840	827	836	837	835	829
Payer	r_s			1.00	.71**	.12**	.66**	.54**
Medicaid	p			.	<.001	<.001	<.001	<.001
	N			833	832	833	832	832
Payer	r_s				1.00	.03	.78**	.38**
Medicare	p				.	.353	<.001	<.001
	N				842	842	840	831
Payer	r_s					1.00	.21**	-.02
Public/Other	p					.	<.001	.483
	N					843	841	832
Payer Private	r_s						1.00	.34**
	p						.	<.001
	N						841	832
Payer	r_s							1.00
Uninsured/	p							.
Unknown	N							835

Note. **. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).

Summary

The study aimed to investigate whether the status of FQHC or FQHC LAL affects the number of comprehensive services provided and primary care provider (PCP) performance, focusing on diabetes and hypertension control among health centers

partaking in the 340B Drug Pricing Program. Data were analyzed from 846 health centers. Mann-Whitney U test revealed a statistically significant difference in service provision between FQHCs and FQHC LALs, where FQHCs provided more services than FQHC LALs. The test was followed by a series of Chi-square tests for various services, demonstrating differences in service provision between the two types of centers. FQHCs showed a higher level of performance in hypertension control than FQHC LALs. However, no significant difference was found between the FQHC and FQHC LAL groups in diabetes control performance. Additional analyses with Spearman's rho showed no significant association between the number of comprehensive services and diabetes and hypertension control performance. However, Mann-Whitney U tests showed statistically significant differences in diabetes and hypertension control performance between states with and without Medicaid expansion, with better performances in states with expansion.

Further correlational analyses highlighted significant associations between various payer types and control performances. These results provide valuable insights into the influence of payer types and Medicaid expansion on health center performances. The next chapter discusses the present study's findings and their implications for healthcare.

CHAPTER 5

DISCUSSION

Introduction

This Chapter presents a discussion of the study results. It begins with the discussion section, followed by a study of limitations, implications for healthcare, and suggestions for future research. Finally, the Chapter concludes with a conclusion.

Discussion

The study evaluated how Federal Qualified Health Center (FQHC) status, compared to FQHC Look-Alikes (LAL), affects the number of comprehensive services provided and primary care provider (PCP) performance in hypertension and diabetes control. A noteworthy finding from the study was the statistically significant difference in comprehensive services provision between FQHC and FQHC LAL. Data from 846 health centers showed that FQHCs provided a more comprehensive range of services than FQHC LALs. These services include medical, dental, mental health, substance abuse, and other professional services and enabling services.

The finding aligns with prior research (Miller et al., 2021) and can be understood through the Resource Dependence Theory (RDT) lens. According to RDT, health centers with access to both grant funding and the 340B Drug Pricing Program tend to have more resources, enabling them to offer more expansive services (Holdford, 2018). Participation

in the 340B Drug Pricing Program allows FQHCs additional funding, direct grant funding, and enhanced access to discounted pharmaceuticals, giving it a competitive advantage over FQHC LALs.

Initial analysis of hypertension control using the Mann-Whitney U test showed a higher level of performance in hypertension control among FQHCs than in FQHC LALs. The results align with the expectation that FQHCs, with their strategic advantages, would perform better than their FQHC LAL counterparts in chronic disease management like hypertension. However, interestingly, when adjusted for covariates (i.e., Years of Participation in the 340B Drug Pricing Program, Payer Mix, Income-Based Poverty Status, pharmacy cost per patient, and Number of Patients Aged 65 and Older) using ANCOVA, no statistically significant differences between the groups regarding hypertension control. These findings highlight the complexities of healthcare delivery and the multifaceted nature of chronic disease management.

Similarly, results for diabetes control, through the Mann-Whitney U and ANCOVA analyses, found no significant difference between FQHC and FQHC LAL. This finding further emphasizes that program status is not critical in determining the quality-of-care processes in diabetes care. Although resource availability and organizational status are essential in determining healthcare outcomes, other characteristics of the patient population and the health centers (e.g., payer mix, socioeconomic status of the served population, and cost factors) also play a significant role.

Results from the present study also imply that despite being in seemingly less advantageous positions than FQHCs, FQHC LALs can achieve comparable performance

levels in hypertension and diabetes control. This outcome challenges preconceived notions about the relationship between resource abundance and healthcare quality, suggesting that other aspects may affect healthcare quality. Factors like strategic resource utilization, service cost, differences in access to health care, and patient characteristics may also play a role. This finding aligns with what has been reported by the Committee on Health Care Utilization and Adults with Disabilities (2018) on the factors that affect healthcare utilization.

Study Limitations

Several limitations need to be considered when interpreting the findings from this study. The first limitation is the documentation of program savings earned from participation in the 340B Drug Pricing Program. FQHCs and FQHC LALs can report 340B program savings through sections 8 and 9 of the UDS report; however, they are not required to report these savings.

The second limitation is the data source. The study used secondary data from the Office of Pharmacy Information Systems, the Bureau of Primary Health Care database, and the Uniform Data System (UDS) Clinical Quality Measures. While the databases are reliable and offer comprehensive information on FQHCs and FQHC LALs, there is a limitation on the ability to control data collection methods and the accuracy of the information reported. Additionally, the data may not capture all relevant variables or nuances specific to each health center's operational context and may affect the findings' generalizability.

The third limitation is the study design. The study design provides a snapshot of the differences in service provision and PCP performance between FQHCs and FQHC LALs simultaneously. This design does not provide information on the changes in service provision and PCP performance over time. Longitudinal study designs may provide a better understanding of how these differences change over time.

Finally, despite the efforts to control covariates, other unmeasured covariates could influence the study results, particularly in diabetes and hypertension control. For example, factors such as leadership, community engagement strategies, and other support factors available for the patients may influence the study's outcome. Future studies assessing and incorporating these factors may support the results more robustly.

Implications for Healthcare

The observed differences in service provision between FQHCs and FQHC LALs highlight the need for targeted policy interventions and funding strategies to promote excellent healthcare quality and expand services provided by FQHCs and FQHC LALs. Participation in the 340B Drug Pricing Program allows FQHCs additional funding, direct grant funding, and enhanced access to discounted pharmaceuticals, giving it a competitive advantage over FQHC LALs. Policymakers should consider that the 340B Drug Pricing Program bolsters FQHC LALs' ability to provide quality care, but they are still limited in providing a more comprehensive range of services. This approach could help narrow the gap in service provision and improve healthcare access for underserved populations.

Additionally, policymakers should consider offering more resources to FQHCs and FQHC LALs, which provide quality care to our country's most vulnerable patients. By providing high-quality care, FQHCs and FQHC LALs can assist in reducing the need for patients to utilize the emergency room and other high-cost settings. Absent additional funding resources, policymakers could monitor the impact of participation in the 340B Drug Pricing Program by ensuring that program income is reported in the UDS measures. They could also consider having the health center report their other funding to understand better the financial resources utilized.

Suggestions for Future Research

Future studies should consider the reporting structure of income earned from participation in the 340B Drug Pricing Program. FQHCs and FQHC LALs can report 340B program savings through sections 8 and 9 of the UDS report; however, they are not required to report these savings, so some health centers do not report them. Legislators should consider requiring all 340B Drug Pricing Program participants to report these savings, including hospitals participating in the program. Currently, hospitals have no requirements or recommendations to report these savings.

Additionally, further studying grant funding received from HRSA by FQHCs as part of the designation compared to FQHC LALs who do not receive grant funding from HRSA could help determine if the number and types of services offered at FQHCs and FQHC LALs are impacted by grant funding, or correlates with the program income earned from participation in the 340B Drug Pricing Program.

Future studies could also incorporate longitudinal designs to track changes in service provision and chronic disease management outcomes over time. Data from these studies could provide better insights into the long-term effects of policy changes, funding variations, and other essential factors impacting healthcare delivery.

Although this research found no significant difference between FQHC and FQHC LAL in diabetes and hypertension control, future research could include where health centers are located to explore the impact of geographic location. It could be important to note the ability to travel to clinics and pharmacies. For FQHCs and FQHC LALs without an in-house pharmacy, the 340B Drug Pricing Program allows for contract pharmacies, yet many are hard to serve in rural areas. Additionally, researchers could study other types of clinical outcomes to assess the comparative effectiveness of health centers.

Additionally, future studies could also utilize qualitative designs. Qualitative studies exploring the experiences and perceptions of patients, healthcare providers, and administrators in FQHCs and FQHC LALs may offer a better understanding of the factors influencing healthcare quality. These insights could inform the development of targeted interventions and best practices to improve health outcomes.

Conclusion

This study evaluated whether the status of FQHC or FQHC LAL affects the number of comprehensive services provided and select primary care performance measures. Findings from the study suggest that while resource availability and organizational status play significant roles in these outcomes, other factors may also play a role, particularly in chronic disease management. Furthermore, the study also finds that

despite being in seemingly less advantageous positions than FQHCs, FQHC LALs can achieve comparable performance levels in hypertension and diabetes control. These results challenge the conventional notion that superior resources automatically translate to better health outcomes. The findings imply that the efficient use of available resources, potentially supported by innovative care models, may play an equally important role in ensuring quality healthcare.

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