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Is a Shortage of Specialist Physicians Disproportionately Affecting Access to Care in Rural Counties with Federally Qualified Health Centers: Trends in Texas from 2012 & 2017?

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IS A SHORTAGE OF SPECIALIST PHYSICIANS DISPROPORTIONATELY AFFECTING ACCESS TO CARE IN RURAL COUNTIES WITH FEDERALLY QUALIFIED HEALTH CENTERS: TRENDS IN TEXAS FROM 2012 & 2017?

BY

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Objective: This study utilized Medicare 5% limited Data sets to compare total specialty care referral consultations for Medicare patients seen at FQHCs in Harris County to those seen at FQHCs in rural Texas counties. Currently, no published data is examining the changes in specialty referral rates for FQHC patients in the state of Texas. Evaluating these trends will allow system executives, public health officials, and patients alike to understand the magnitude of differences in specialty provider coverage in Texas.

Methods: A retrospective cross-sectional study was conducted using CPT codes for patients living in selected rural and urban counties across Texas who have completed visit (s) with a specialist provider between 2012-2017. The primary aim of the study is to describe the population health impact of changes in specialty referral practices across the state of Texas. The selected CPT codes measured all defined specialty visits across the state of Texas.

Results: The study found a change in the use of specialty referral consultations when comparing the two data years. Study results showed a significant reduction in the usage of specialty services for patients living in rural counties. The reduction may be attributed to a few changes currently

happening in the state. Several researchers have indicated that the state is not producing or recruiting enough residents and practicing physicians to meet the growing population demand (Merrit Hawkins, 2018).

Conclusion: The population in Texas continues to grow at one of the fastest paces in the U.S. As the population grows, residency programs in the state will need to adapt by creating more spots for residents. More focus will need to be placed in rural settings, possibly offering providers more incentives to work in these environments. As it stands today, many Texas counties have less than two specialists living in them. Hospital systems in these rural counties will also benefit by partnering with FQHCs in the area to ensure that specialty services are rendered by the FQHCs within the communities they serve. Lastly, The Resident Physician Shortage Act, if passed, will provide a much-needed boost of new physicians to the workforce. A boost of physicians in underserved areas, such as the rural counties in Texas, may provide a solution to the physician shortages in these areas.

Key Words: Retrospective study, retrospective cross-sectional analysis, Texas, specialist provider shortage, federally qualified health centers,

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CHAPTER I

INTRODUCTION

Background and Need

The unfortunate reality is that access to specialty care across the nation is scarce for many patients in the U.S. health care system. The scarcity of specialists providers is being experienced to varying degrees across the U.S. historically, U.S. citizens have enjoyed an unmitigated level of access to care to specialists providers (Kassirer, 1994). However, in recent years, general access to specialist providers has become more limited, especially in densely populated states like Texas. Limited access to specialty services is even more evident in Texas' rural counties. From the Texas panhandle to the North Cascades of Washington state, accessing specialty services is more complicated than accessing primary care (Bhavaraju et al. 2016).

The number of primary care physicians in the U.S. far outnumber the specialists (Bristol-Myers Squibb Foundation, n.d.). However, there are fewer providers for each specialty category than primary care providers (Bristol-Myers Squibb Foundation, n.d.). The limited number of providers per specialty yields a limited patient capacity as well (Kaiser Foundation, 2016). The limited visit capacity affects the general population in several ways. However, these limits are felt to a greater extent by rural and low-income patients, low-income, and rural patients (Bhavaraju et al. 2016). These two patient groups are accustomed to delays in receiving care, which have a negative impact on health outcomes (Bhavaraju et al. 2016). The limited availability of specialists has driven inequitable care due to delayed care, transportation time, cost, and disparity in the care environment and quality (Bhavaraju et al. 2016).

These barriers adversely affect health outcomes and have implications for health systems costs (Bhavaraju et al. 2016). The lack of timely access to specialty services is one of the primary drivers behind Medicaid and uninsured patients seeking care in urgent care and emergency departments (Bhavaraju et al. 2016). Emergency departments across the country have voiced concerns over rising due to the patient's inability to receive the specialty care they need (Armour, 2015). Emergency rooms are increasingly becoming known to uninsured patients as an easier way for patients to get specialty care due to access (Gorman, 2012).

Some scientists have argued that the public demands require more specialist providers to adequately address the needs of the increasing population (Goodman & Fisher, 2008). Scientists have also argued that there is currently a shortage of providers and that the shortages will only worsen with time (Goodman & Fisher, 2008). Researchers have stated that better information is needed regarding the care specialists are currently providing to patients to give credence to the arguments regarding the shortage (Starfield, Lemke, Herbert & Pavlovich, 2005). The purposes of patients visiting PCPs are fully understood and acknowledged throughout the health care industry (Valderas et al. 2009). According to Valders et al. (2009), "primary care comprises of first-contact care, continuity with the same provider over time, delivery of a comprehensive range of services, and coordination of care (pg.104)." Primary care visits are considered to be the most effective when received regularly from a singular provider. (Grumbach & Bodenheimer, 2002). On the other hand, specialists physicians are needed to address conditions requiring a higher level of expertise than what is required of a primary care physician in a visit (Valderas et al. 2009). Limited access to specialist providers is even more prevalent for patients who utilize community health centers from a safety net organization for their care (Valderas et al. 2009).

The remainder of this chapter will provide a brief background on each of the major subject matter areas that will be found throughout this paper. Brief descriptions of referral to specialty services, the physician shortage, Medicaid patient access issues, and the importance of Federally Qualified Health Centers to this study will be provided in upcoming sections.

Referral to Specialty Services

Before a patient can visit a specialist provider, a referral must first be entered from a primary care provider. As stated by Greenwood-Lee & Marshall, 2015, these "referrals provide a critical link between primary and specialty care, with a significant impact at the patient, provider, and system levels (p.161)." The growing demand for specialty services has started to create issues for many organizations across the country, as they struggle to cope with growing demand (Imison & Naylor, 2010). Many organizations implemented alternative options to manage the large numbers of specialty referrals being received (Imison & Naylor, 2010).

The referral to a specialist provider is a very simple yet intricate piece of a patient receiving needed care. The effectiveness of specialty care requires adequate interaction from the PCP and specialist providers involved with the referral. (Kim-Hwang et al., 2010). Some of the main issues affecting adequate referrals are ambiguous consultation questions, insufficient pre-referral investigations, and untimely communication (Imison & Naylor, 2010). As stated by Kim-Hwang et al. (2010), "effective communication may reduce unnecessary or premature referrals, and poor communication contributes to physician dissatisfaction, ambiguous expectations, delayed diagnosis, duplication of testing, and fragmented care and adverse outcomes (pg.1123)."

Physician Shortage

One of the primary findings and areas of research covered in the following chapter is the proposed physician shortage. Several publications have been written on the United States' physician shortage, many of which have painted it as a simple issue. However, statistics provided by the Association of American Medical Colleges (AAMC) display the projected shortage of primary care providers to present a greater issue to the health care industry than initially predicted (FQHC, 2017). Many researchers also believe that the shortage is approaching faster than initially anticipated (FQHC, 2017). The Association of American Medical College has predicted the demand for physicians will surpass supply by 46,000 to 90,000 by 2025 (Association of American Medical Colleges, 2015).

The shortage of providers is exacerbated by the relative scarcity of residency opportunities throughout the country. In 2019, Texas filled a mere 1,983 residency positions (Residency Program List, 2020). A mere 911 out of the total 1,983 students matched into specialty programs (Residency Program List, 2020). These numbers of providers matching do not sound sufficient to serve the State of Texas' population, which was estimated to be 28,995,88 as of July 1, 2019 (Census.gov, 2020). On a national level, residency programs usually have an average of 30,000 residency positions per year (Residency Program List, 2020). In 2015, the National Resident Match program was inundated with 41,334 medical student applicants but had a disproportionate 30,212 positions available. (National Residency Matching Program, 2015). The statistics mentioned above show that many qualified applicants are left scrambling for positions and unable to procure the clinical experience needed to become certified practitioners(National Residency Matching Program, 2015).

The projected shortage of physicians is almost unanimously agreed upon by scientists across the U.S. (Merrit Hawkins, 2017). However, the shortage of specialist providers has been overlooked as a challenge of the United States healthcare system's ability to provide patients with timely, appropriate care (Merrit Hawkins, 2017). Patient demographics are the primary drivers behind the current demand and supply of specialist providers (Merrit Hawkins, 2017). Patients over the age of 65 represent nearly 14 percent of the population in the U.S., however, they generate 34 percent of inpatient services (Merrit Hawkins, 2017). The increased growth can be attributed to the senior populations as another element leading to an increased need for additional specialist providers (Merrit Hawkins, 2018).

Medicaid Patient Access Issues

As enrollment has grown for patients in Medicaid managed care programs, the overall assessment of access to care has a heightened importance (DHHS, 2014). Given the literature presented on this topic, access to care for patients seeking specialist care is a growing area of concern. Many patients who receive Medicaid and Medicare struggle to locate specialist providers to treat them in a timely fashion (Felland, Lechner & Sommers, 2013). Studies have found that some of the main barriers to specialty care for Medicaid & Medicare patients are low payment rates, administrative burdens, and patients' nonmedical challenges with keeping appointments (Felland, Lechner & Sommers, 2013). Ultimately, adverse outcomes, along with higher costs for the patient, are imminent when specialty care is not accessible (Felland, Lechner & Sommers, 2013). In recent years many health care organizations, along with Medicaid programs, have joined forces and increased the accessibility of specialty services (Felland, Lechner, Sommers, 2013). Only time will tell how well these efforts have worked to increase access for this patient population.

Traditionally, Medicaid patients have experienced increased barriers to medical care that are virtually nonexistent for insured patients (Hsiang et al. 2019). Today, PCPs for Medicaid patients typically foster relationships with specialists to assist their patients with getting appointments scheduled (Felland, Lechner, Sommers, 2013). These relationships are typically created by the PCP negotiating on behalf of their patient (Neuhausen et al. 2012). This method is not full proof and has often led to patients not receiving the care needed. Specialty services provided for Medicaid patients in several communities across the U.S. are provided at safety-net hospital systems (Doly et al. 2010). Even though this method has helped somewhat bridge the gap, demand has generally exceeded supply (Doty et al. 2010).

Federally Qualified Health Centers

According to the Center of Medicare and Medicaid Services (2019), "FQHCs are safety net providers that provide services typically given in an outpatient clinic, which can be a community health center, migrant health center, health care for the homeless center, public housing center, or an outpatient health program operated by an Indian tribe (pg.3)." FQHCs receive funding through several sources, however, the primary source of funding is federal funding (Lavelle et al. 2018). (Lavelle et al. 2018). Nearly three-quarters of the ten million patients seen at FQHCs throughout the year live below the poverty level, and most of these patients are also ethnic minorities (National Association of Community Health Centers, 2016). Many patients who receive care at FQHCs are uninsured, while the other segment patients have Medicare or Medicaid (National Association of Community Health Centers, 2016).

To meet these challenges, FQHC leaders have been tasked with thinking of creative ways to facilitate care for their patients (Postman, 2017). In recent years, many health centers have started participating in various initiatives whose payment and care delivery models have influenced patients' access to care, including specialty care (Postman, 2017). Therefore, communities with FQHCs will play a vital role in the population selection for this study. Additional details regarding the population selection for the study will be provided in this paper's population section.

Significance

Several studies have found that The U.S. safety-net struggling to provide adequate specialty care services for its patients (Lena et al. 2019). Safety-net hospital systems and outpatient organizations provide an insurmountable amount of much-needed services to uninsured patients with no other options (Lena et al. 2019). The services provided by these safety net organizations include specialty services, which has seen an increased demand from patients over the years. The demand for specialty care has grown exponentially over the years, almost in direct response to the rapid growth of primary care services (Lena et al. 2019). In a study referenced by Lena et al. 2019, twenty-five percent of PCP appointments resulted in referrals requests (Lena et al. 2019). However, there has been a minimal effort to ensure that safety-net patients have adequate access to specialty services, especially in Texas (Lena et al. 2019).

A large number of Americans who were previously unemployed have gained insurance under the Patient Protection and Affordable Care Act (Lena et al. 2019). The Medicaid program has provided coverage to nearly 18 million, many of which have received care with a safety net provider (Lena et al. 2019). These issues, coupled with the challenges of the currently turbulent health care environment, have created an increasingly urgent situation (Lena et al. 2019). This study will provide a glimpse into Texas's current state of specialty consultations by looking at completed referrals in its most populous counties, compared to some of the states' least populated counties. The following section will describe the problem this study is seeking to examine.

Conclusion

The U.S. and state of Texas, in particular, is experiencing a shortage of physician (Merrit Hawkins, 2018). Primary care and specialty services across the country have experienced disruptions due to an inadequate workforce (Merrit Hawkins, 2018). The problem has been described as worsening in densely populated states such as Texas. As a result, many Medicare and Medicaid patients are experiencing delays or interruptions in their care (Merrit Hawkins, 2018). This study seeks to investigate this issue by examining recent trends, from 2012 and 2017, in specialty referrals in Texas by looking at referrals in rural versus urban counties.

The remainder of this chapter will provide a general overview of the study's problem statement, research question, and study population. These sections will be expanded on in greater detail in chapter three of this study.

Problem Statement

The objective of this study is to compare total specialty care referral consultations for Medicare patients seen at FQHCs in Harris County to those seen at FQHCs in rural Texas counties. Currently, no published data is examining the changes in specialty referral rates for FQHC patients in the state of Texas. Evaluating these trends will allow system executives, public health officials, and patients alike to understand the magnitude of differences in specialty provider coverage in Texas.

Research Question

This study will provide a glimpse into the current state of specialty consultations in the state of Texas by looking at referral visits in a Medicare population. This study aims to describe the population health impact of changes in specialty referral practices across the state of Texas. The population health impact of specialty referrals in the State of Texas has not been well defined in the literature. Several studies have focused on the count of specialist providers per population, but not on the number or rate of referrals completed. An analysis of the referral rate completion in Texas will provide a novel perspective into the proposed specialty provider shortage in the State of Texas. This study will use the Medicare 5% limited Data sets from 2012 and 2017 for Texas (Tx) to answer the following research question:

> What are the changes over time in the rate of specialty referral consultations for Medicare patients in rural (non-metropolitan) counties with FQHCs in Texas, quarterly from 2012 and 2017, compared to metropolitan counties in the state with FQHCs?

Population

Medicare claims data will be utilized to examine the comparisons of specialty referrals rates on a retrospective basis over time. This study will use the Medicare 5% sample limited Data sets from 2012-2017 for the state of Texas (Tx). All Texas counties containing at least one or more FQHCs will be used for this study. Out of Texas' 254 counties, 131 of them have at least one FQHC in their territory. Eighty-two out of the 131 counties are designated as the rural group of interest. The remaining 49 urban counties will constitute the comparison group.

CHAPTER II

LITERATURE REVIEW

Physician Supply

In chapter one, the specialist and primary care provider proposed shortages were introduced. Many studies have presented different theories on the severity of the shortage, and some have questioned whether a shortage truly exists. This section will aim to fill the gaps in the knowledge base regarding the physician shortage, its effect on specialists, and the current state of the shortage in Texas.

As demand for qualified specialists continues to increase, the supply is likely to remain constrained due to several factors. One of the factors touched on in chapter one was the aging population, and the more complex care needs this group will have. The aging population has been provided as an ongoing example of the physician shortage throughout several journal articles. However, one of the often-overlooked factors that have inhibited specialist supply is the cap on the number of medical students allowed to match to residencies in a calendar year (Merrit Hawkins, 2018). The cap was instituted by Congress in 1997 and has arguably been a major contributor to hindering the appropriate amount of physicians from joining the workforce (Merrit Hawkins, 2018). Additionally, as medical schools have increased student enrollment, residency programs have kept the same capacity (Merrit Hawkins, 2018). The inadequate number of residency positions has prevented many graduates from achieving their goals and matching to the residency program of their choice (Merrit Hawkins, 2018).

In 1997, the number of medical residents was capped by the Balanced Budget Act. This act effectively capped the number of residents and fellows a program was allowed by the federal Medicare program. The Medicare program is the largest source for the funding of Graduate Medical Education (Salsberg et al. 2008). The number of physicians training in medical residencies was increasing every year before the 1997 cap (Salsberg et al. 2008). The medicare GME program subsidizes teaching hospitals for training medical residents (Salsberg et al. 2008). The subsidy has aided in training a majority of the physicians in the workforce to date (Salsberg et al. 2008). Prior to 1997, the program was seen to be working well by many in the industry, however, some felt that it was creating a budget issue (Mullan, Chen & Steinmetz, 2013). At the time, several people felt that the U.S. had an oversupply of physicians. This feeling led Congress to choose a tough approach to combat the issue (Mullan, Chen & Steinmetz, 2013).

The residency cap allowed teaching hospitals to train the number of patients that chose, however, it only allowed them to be reimbursed a certain portion based on the cap (Mullan, Chen & Steinmetz, 2013). Therefore, many hospitals are still adding positions that are not entirely covered, leading to other financial issues within organizations (Mullan, Chen & Steinmetz, 2013). Even with the additional positions, the number of residency programs are not meeting the U.S. population's demands (Mullan, Chen & Steinmetz, 2013).

As the number of residency positions remains relatively constant, many medical school graduates are having difficulties finding training to complete their education. As a requirement, practicing medical physicians must be trained in a residency program (Mullan, Chen & Steinmetz, 2013). As seen in Figure 1, the number of medical students unable to match into a residency program increases every year. Physicians, health care executives, and legislators all

agree that the current trajectory is not sustainable. Therefore, legislation has been created to correct these issues potentially.

The Resident Physician Shortage Act of 2019 was bipartisan legislation created to address the shortfall of resident physicians created by the Balanced Budget Act of 1997 (House, 2019). U.S. Representative Terry Swell, Democrat from Alabama, and John Katco Republican from New York introduced this legislation and received significant buy-in (House, 2019). The legislation proposes that an additional 3,000 residency positions would be phased in over the next five years for a total of 15,000 more slots (House, 2019). The increase in slots will allow many medical students currently caught in the residency match cycle.

Figure 1. Medical Graduates not Matching During Match Period

Figure 1. Adapted from the Medical Graduates Struggle to Find Training in the U.S. National Residency Match Program, 2017

The Association of American Colleges projected demand for different specialties between 2017 to 2032. In their estimation, the projected demand for specialty services will exceeds supply (Figure 2). The projected shortfall range for 2032 is between 20,600 to 39,100 specialist physicians (Figure 3) (Association of American Medical Colleges, 2019). If this projection comes true, many patients will be affected. One of the ways teaching institutions help combat the inadequate physician supply is to work on grooming physicians within their organizations (Association of American Medical Colleges, 2019). The process of grooming providers in-house has, however, been costly for developing institutions. Many programs can receive Graduate Medical Education (GME) funding, which ultimately helps in their quest to develop more providers in-house (Association of American Medical Colleges, 2019).

Figure 2. Projected Supply and Demand for Other Specialties, 2017-2032

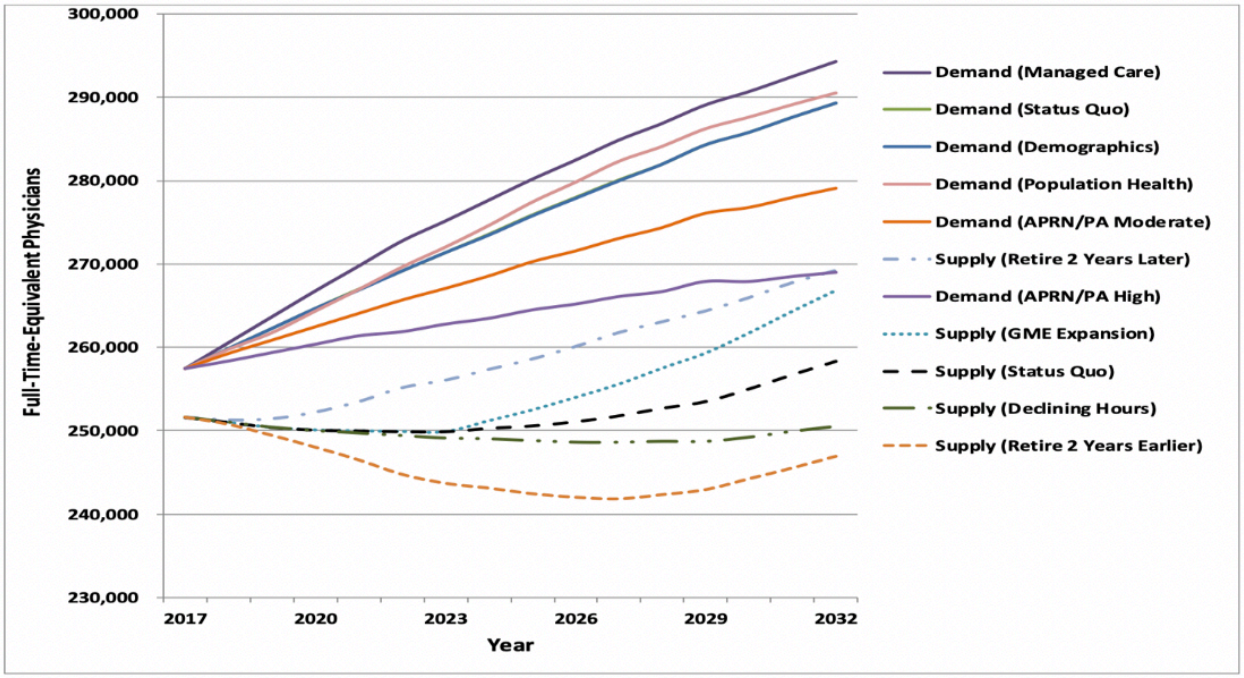


Figure 2. Adapted from the Projected Supply and Demand for Other Specialties, 2017-2032. Association of American Medical Colleges, 2019

Figure 3. Projected Supply and Demand for Other Specialties

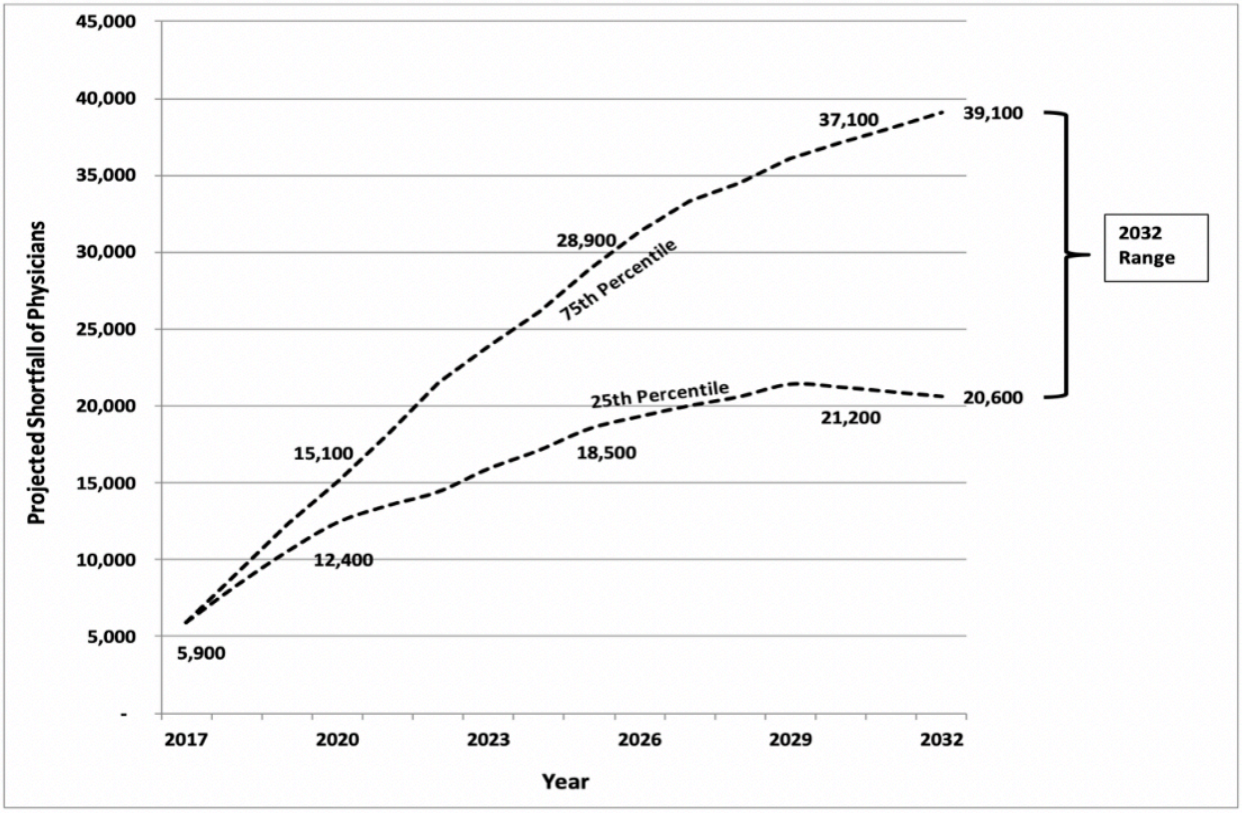


Figure 3. Adapted from the Projected Supply and Demand for Other Specialties, 2017-2032. Association of American Medical Colleges, 2019

As stated briefly in chapter one, most efforts to grow the physician pool has been geared towards primary care, without much focus on specialists (Merrit Hawkins, 2018). As stated by Merrit Hawkins (2018), “there is a prevailing notion in some policymaking circles that the number of specialists should not be increased.” This point is, however, not as universally accepted as the need for additional primary care physicians. The literature points to several policies that have been established over the years that ultimately make it harder to groom additional specialist providers (Merrit Hawkins, 2018). Therefore, regardless of the differing opinions, the reported issues regarding specialist supply will likely continue for the foreseeable future.

Care Coordination

Specialty care continues to grow as an essential element of outpatient care in the United States (Vimalananda et al. 2018). Between 1999-2009, referrals for specialty services increased exponentially from 41 million to 105 million (Barnett, Song & Landon, 2012). Increased referrals have often resulted in more health care fragmentation across providers (Barnett, Song & Landon, 2012). Health systems are now looking into unique ways to improve fragmentation in response to the increasing number of specialty referrals (Vimalananda et al. 2018). The increased fragmentation has been associated with several issues that have led to sentinel events across the country (Vimalananda et al. 2018). Risks increase exponentially with more medical care sources, which ultimately puts patients with the highest acuity at a greater danger (Vimalananda et al. 2018). The current state of specialty care referrals presents an obstacle for achieving high-quality, high-value care for patients (Vimalananda et al. 2018).

Health Equity In Specialty Care

According to the Centers for Disease Control and Prevention (2020), "Health equity is achieved when every person can attain their full health potential, and no one is disadvantaged from achieving this potential because of social position or other socially determined circumstances." Health inequities are displayed in several ways and ultimately address the dissimilarities with patient health statuses (Centers for Disease Control and Prevention, 2020). Significant advances in medical treatment have been achieved in healthcare to combat these disparities (Smith, 2016). Access to the advances, as mentioned above, is limited due to the structure of the U.S. health care system (Smith, 2016). One of the CDC's National Center for Chronic Disease Prevention and Health Promotion's primary goals is to achieve health equity by eliminating health disparities and achieving optimal health for all Americans (Centers for

Disease Control and Prevention, 2020). However, patients seeking specialty services across the nation are painting a different picture.

Many articles in the literature alluded to patients from low-income zip codes having difficulty finding specialists who will see them (Smith, 2016). The high out of pocket costs associated with medications has made medical care even more challenging to access for many patients (Smith, 2016). Furthermore, several specialty fields have treated illnesses as a singular issue rather than looking at the entire picture (Smith, 2016). As stated by Smith (2016), specialty fields have failed to "recognize fully the powerful impact that social determinants of health care have on a patient's ability to seek care and adhere to recommended treatments (pg. 3)."

Many disparities in health outcomes have resulted from failures in specialty fields across the U.S. (Smith, 2016). Although there have been many advances in medical care in recent years, the number of patients with disparities in underserved communities continues to increase (Smith, 2016). The specialty care platform, as a whole, introduces several medical advancements every year due to the highly technical nature of mast services (Bhavaraju, 2016). Unfortunately, many new advances are not benefiting some of the patients who need them most (Bhavaraju, 2016). According to Bhavaraju (2016), "the same innovations in treatment and practice that help extend the lives of some patients directly drive widening disparities between those who have access to these innovations and those that do not (Bhavaraju, 2016)."

The level of urgency to address health disparities is heightened as the disparity levels increase (Smith, 2016). This heightened urgency is led by the nation's rapidly evolving patient demographic. Resultant of these changes, there is now a renewed focus on this issue resulting from a convergence of several factors (Smith, 2016). These factors include the passage of major policies like the Patient Protection and Affordable Care Act (ACA) (Bristol-Myers Squibb

Foundation, 2016). The policies have helped the industry focus more heavily on quality improvement to ensure that patients receive optimal care (Bristol-Myers Squibb Foundation, 2016). Most research on reducing health disparities has been focused mostly on primary care and prevention of illness (Smith, 2016). As stated by Smith (2016), "prevention and primary care are considered critical components for improving population health outcomes." However, joining the two components has made it clear that an enhanced focus on specialty care is needed (Smith, 2016).

Access to Specialty Providers

Access to medical providers for all citizens regardless of race, sex, or religion remains vital for many patients across the country (Valderas et al. 2009). Specialist providers are limited in their availability, particularly for low-income and rural patients (Valderas et al. 2009). Patients insured through Medicaid historically have encountered specialists who are unwilling or reluctant to see them due to their coverage stipulations (Valderas et al. 2009). According to Hamel et al. (2015), "This stems from inadequate reimbursement; a 2012 study found that Medicaid reimbursed 66 cents for every dollar reimbursed by Medicare, and from additional administrative burden posed by caring for low-income patients, who often require more eligibility paperwork and are more likely to miss appointments." A 2013 study conducted at the Ralph Lauren Cancer Center revealed that commercially insured patients wait far less on average to see a specialist than patients with Medicaid (American Society of Clinical Oncology, 2014). Commercially insured cancer patients waited ten days on average, while patients with Medicaid averaged 53 days to receive the same appointment during the study window(American Society of Clinical Oncology, 2014).

The access issue for patients in rural areas is quite different from those in urban areas (Bhavaraju et al. 2016). Although the U.S. rural footprint represents 20 percent of the country's population, these areas typically have few specialists compared to Urban (Bhavaraju et al. 2016). Therefore, patients seeking specialty services find themselves driving long distances to receive care (Bolgona, Hughes-Cromwick & Wallace, 2005). Many patients are also forced to delay or neglect care due to inadequate transportation to a neighboring city to visit a specialist. The Community Transportation Association reported that an estimated 3.6 million citizens fall in the category every year, and subsequently miss scheduled appointments (Bolgona, Hughes-Cromwick & Wallace, 2005). Patients have missed appointments for critical cancer treatments and other critical visits to specialists across multiple studies in the literature. One study example was conducted in Virginia in 2012, where 19 percent of participants survey experienced issues with transportation (Bhavaraju et al. 2016). The transportation issues for patients in this study ultimately delayed care for cancer patients (Bhavaraju et al. 2016). Each state's Medicaid program offers options to help patients with transportation prevent further the issues encountered in this study, and for many patients across the country. This service has helped numerous patients but has been far from a game-changer, as many patients are still left without transportation.

Specialty Referral Process in the United States

Each year over 30 percent of patients seeking medical care at some point through the year is referred to specialty services (Forrest, Majeed, et al. 2002). This number is even higher for elderly patients who utilize more specialized services per capita than younger patients (Forrest, Majeed, et al. 2002; Shea et al. 1999). According to Machlin & Carper (2007), "Visits to specialist" providers "constitute more than half of outpatient physician visits in the United

States.” Several studies have shown specialists' that patients receive better results with care when their pcps and specialist providers work in unison (Ayanian et al. 2002; Lafata et al. 2001; Wilson et al. 1998).

Physicians have historically been frustrated with the process, as providers and patients alike have complained about issues with referral processes. Looking back to literature for the year 1964, practicing physicians voiced many of the same complaints heard today about the specialty referral process (Kunkle 1964). In 1983 many providers described the process as one that fails to provide patients and providers with sought after results (Lee, Pappius & Goldman, 1983). Finally, in 2000 practicing providers stated their desire for a more efficient specialty referral process (Gandhi et al. 2000). The message has remained mostly the same for over 50 years.

The frustrations mentioned above from many of America's top medical providers have created an avenue for system executives and policymakers to improve the process of submitting specialty-referral (Methrota, Forrest & Lin, 2011). The Managed Care's gatekeeper authorization is one of the best known of these strategies for improving referrals (Methrota, Forrest & Lin, 2011). Additionally, referral guidelines are now standardized for organizations sending or receiving specialty referrals (Bodenheimer, 2008). Referral guidelines are any easy way for an organization to determine the appropriateness for scheduling a referral (Bodenheimer, 2008). According to Rodriguez et al. (2009), “Incentives now ask patients to evaluate the coordination of care between PCPs and specialists (Rodriguez et al. 2009).” This incentive is very advantageous to all as it provides an accurate insight into the patient's perception of the referral process.

Conceptual Framework

Many papers in the literature have thoroughly examined the specialty referral process examined, whereas only a few of these studies were able to provide an adequate description of the process (Mehrotra, Forrest & Lin, 2011). In a study published by Mehorta, Forrest & Lin, this group of researchers created a model based on the works of Forrest (2009), Haggerty, and colleagues (2003). In this model, the team was able to create an adequate description of the specialty referral, which matches the definition provided in an earlier section of this paper. (Mehrotra, Forrest & Lin, 2011). The study's focus was on referrals from PCPs and referrals initiated from specialists, which are known as cross-referrals (Mehrotra, Forrest & Lin, 2011).

In response to the lack of a defined set of responsibilities for all specialists, Forrest generated a means to clearly distinguish the specialists (Mehrotra, Forrest & Lin, 2011). According to Mehrotra, Forrest & Lin (2011), “The distinctions among different types of specialist roles are rarely addressed in the published literature on referrals.” The following chart was developed by the researchers to depict the referral process from primary care to specialty (Figure 4) (Mehrotra, Forrest & Lin, 2011).

Figure 3. Referral Coordination and Referral Decision Loop

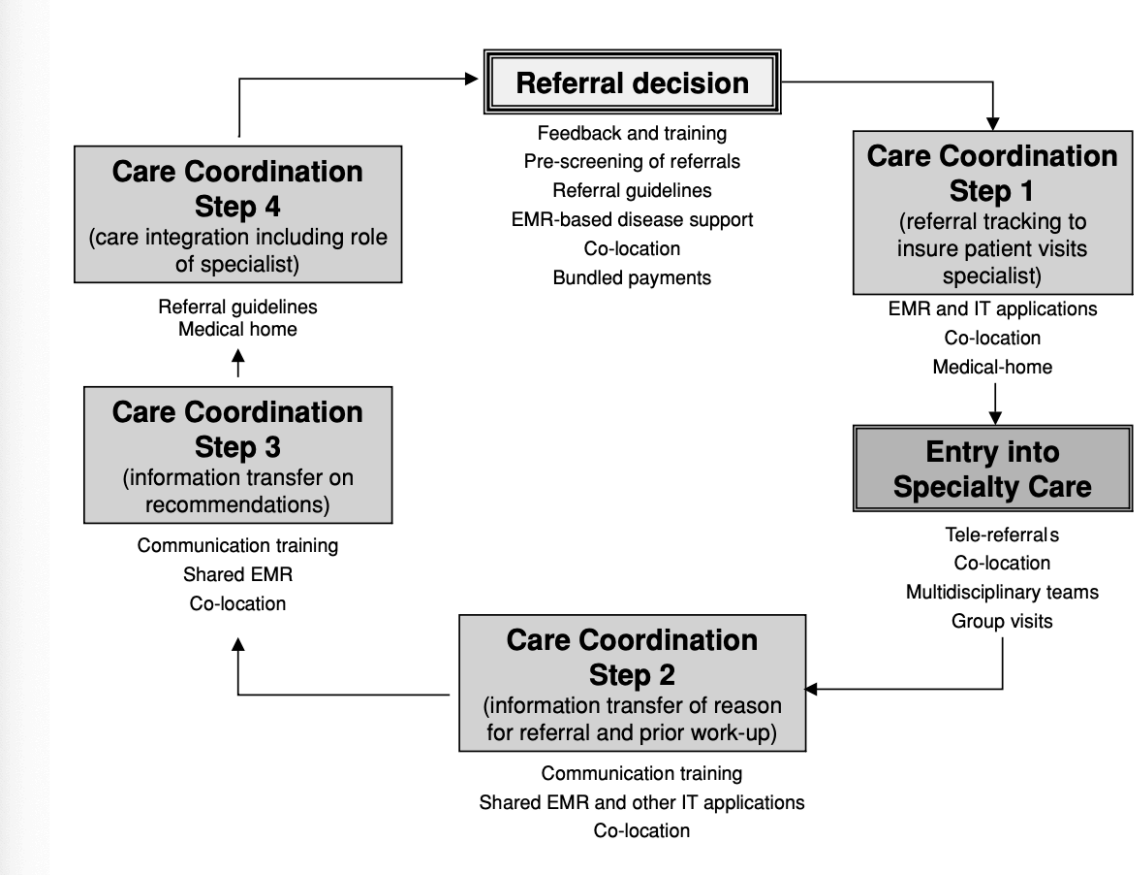


Figure 3. Adapted from Referral Coordination and Referral Decision Loop. Data from Mehrotra, Forrest & Lin, 2011

Process for Referral Loop Completion

The aforementioned conceptual framework is an example of what it takes to close the referral loop. Preferably, referring a patient to specialty services would result in a patient completing a consultation with a specialist provider (CMS, 2014). The referral process is detailed below (Figure 4). The researchers emphasized the importance of completing the referral process due to the vulnerability of an incomplete process (Mehrotra, Forrest & Lin, 2011). In a study completed by Weiner, Perkins & Callahan, the researchers revealed that a substantial

number of referrals for specialty services become fully executed and document appointments (Weiner, Perkins & Callahan, 2010). The referral submission process must be completed in its entirety to prevent the underutilization of critical patient care. (Patel et al. 2017).

Figure 4. Closing the Referral Loop.

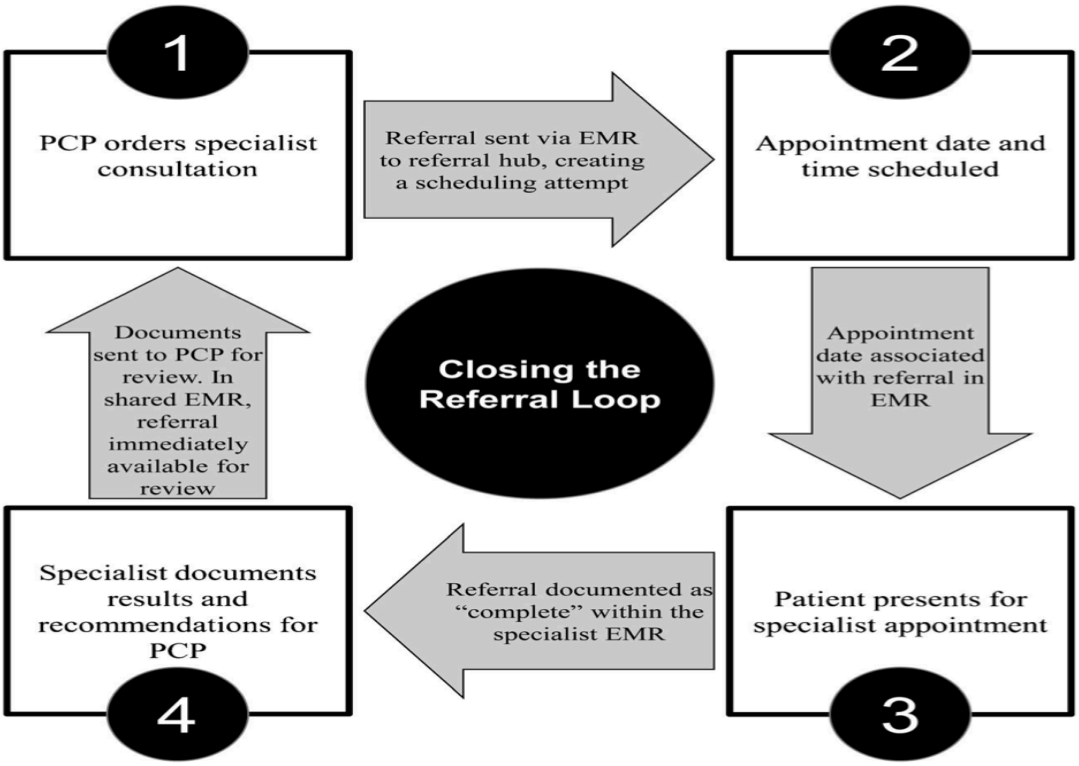


Figure 4. Adapted from Closing the Referral Loop. Data from Patel et al. 2017

Regulatory bodies such as The Joint Commission and the National Committee for Quality Assurance (NCQA) closely examine the processes for completing the referral process at organizations across the country (Patel et al. 2017). Additionally, the Centers for Medicare & Medicaid have made it a requirement of meaningful use to include a process for closing the referral (CMS, 2017). Health systems have been required to create an infrastructure for data

analysis for measuring the processes in place for closing the referral loop due to the current regulatory focus (Patel et al. 2017). Regulatory pressures continue to mount on organizations as patient safety takes center stage (National Patient Saftey Foundation, 2017). Completing the referral process is growing in importance, which has also enhanced regulatory pressures (National Patient Saftey Foundation, 2017).

An organization's inability to close the referral loop will cause further financial stress for the organization. In payment models such as fee-for-service, the overall referral volume drives revenue to an in-network specialist (Patel et al. 2017). This is then influenced by elements such as patient outcomes used to ensure that patients receive optimal care (Fahey et al. 2006; Kinchen et al. 2004). Poor outcomes can cause a PCP to refer patients to specialists out of the network (Patel et al. 2017).

Barriers to Specialty Referral Completion

The quality of referral services provided to patients has been heightened in direct response to the demand for services (Greenwood-Lee, Jewett, Woodhouse & Marshall, 2018). Health systems have been tasked with meeting the increasing demand by coming up with novel procedures to stay ahead. For example, sustaining an efficient information exchange has become a significant priority for organizations in their quest to monitor referrals. Greenwood-Lee, Jewett & Woodhouse completed a study in 2018 to assess referral completions in which they performed a backward extrapolation that assessed faults with specialty and primary care communication and referral protocol (Greenwood-Lee, Jewett, Woodhouse & Marshall, 2018). The study's final result was a report of the four areas where improvements could be made to health delivery services, with the overall intent of improving access to specialty. The researchers ultimately

determined that the quality of care for patients would improve access to care (Greenwood-Lee, Jewett, Woodhouse & Marshall, 2018).

The Texas Perspective

The population in the State of Texas is currently soaring, and a significant segment of its medical workforce, already numerically inadequate, is approaching retirement (Merritt Hawkins, 2015). A review of Texas' ongoing struggle suggests that medical scarcity is a growing public-policy equivalent issue (Merritt Hawkins, 2015). Many studies have discussed the disparities in specialty provider access between lower and higher-income patients (Merritt Hawkins, 2015). However, similar challenges have been expressed in some of the state's highly populated counties as well.

Table 1. Rural and Urban Texas Counties

Anderson	Cass	Erath	Hopkins	Live Oak	Real	Victoria
Angelina	Castro	Fannin	Howard	Lubbock	Robertson	Waller
Atascosa	Chambers	Fayette	Hudspeth	Madison	Rusk	Webb
Austin	Cherokee	Floyd	Hunt	Mason	San Augustine	Wharton
Bailey	Collin	Fort Bend	Jasper	Matagorda	San Particio	Wichita
Bastrop	Colorado	Frio	Jefferson	Maverick	Shackelford	Willacy
Bee	Comal	Galveston	Jim Hogg	McCulloch	Shelby	Williamson
Bell	Comanche	Gillespie	Jim Wells	McLennan	Smith	Wilson
Bexar	Concho	Gonzales	Kames	McMullen	Starr	Zapata
Bowie	Crosby	Gregg	Kaufman	Medina	Stephens	Zavala
Brazoria	Dallas	Grimes	Kendall	Menard	Swisher	
Brazos	Dawson	Guadalupe	Kimble	Midland	Tarrant	
Brewster	Deaf Smith	Hale	Kinney	Montgomery	Taylor	
Brooks	Delta	Hardin	Kleberg	Nacogdoches	Titus	
Brown	Denton	Harris	Lamar	Nueces	Tom Green	
Burleson	Dimmit	Harrison	Lamb	Orange	Travis	
Burnet	Duval	Hays	LaSalle	Parmer	Trinity	
Caldwell	Ector	Henderson	Lavaca	Pecos	Upshur	

Callahan	El Paso	Hidalgo	Lee	Potter	Uvalde
Cameron	Ellis	Hockley	Leon	Presido	Val Verde
Red =Rural County Purple= Urban County					

Table 1. Adapted from Texas County Chart. Data from Texas Association of Community Health Centers, n.d.).

In a study conducted by the National Texas Regional Extension Center, the number of actively practicing physicians was evaluated. The study found that Texas had roughly 63,000 physicians, with 46,953 physicians not actively practicing medicine (Merritt Hawkins, 2015). At the time of the study, the population in Texas was 26, 448,193 residents. The study estimated that it would require an additional 12,819 physicians to ensure that Texas can meet the universal standard of the average physicians per 100,000 population (Merritt Hawkins, 2015).

The study pointed out that several of the 254 counties listed above lack the appropriate physician infrastructure to provide adequate care. A total of Thirty-five counties in the state do not have any physicians, forcing residents to travel for medical services. Eighty counties have five or fewer physicians. One hundred forty-seven counties in the state have no obstetrician or gynecologist. One hundred eighty-five counties have no general psychiatrist. One hundred fifty-eight counties have no surgeon general (Merritt Hawkins, 2015).

The study data revealed that the number of physicians in the state is not equally distributed between rural and urban counties (Merritt Hawkins, 2015). The low population areas in the state have an even harder time attracting or retaining providers (Merritt Hawkins, 2015). In recent years, many physicians have been attracted to practice in Texas, which has led to a growing physician workforce (Merritt Hawkins, 2015). It is also worth mentioning that the rate of uninsured patients is the highest in the U.S, with a population of 4.7 million (Chen,

Madubuonwu, Pecos-Duarte & Sommers 2019). Texas is also on a shrinking list of states that have not expanded Medicaid, which could affect the state's specialty referrals (Buettgens, Blumberg & Pan, 2018).

Patient Population Explored

As stated by Shea et al. 1999, "much of the policy debate over referrals and access to specialist care focused on younger persons in managed care settings." However, populations for older patients, including the Medicare and Medicaid populations, are interesting to study (Shea et al. 1999). Medicare's elderly and disabled beneficiaries include those with the greatest need for specialty care (Shea et al. 1999). The medicare beneficiaries group continues to see annual growth as the baby boomer population ages (Shea et al. 1999). According to Shea et al. (1999), "Medicare remains the only entity of largely unmanaged fee-for-service care in the United States, offering an important benchmark to other sectors (p.332)." Examining current patterns can help lay the foundation for the study of these changes (Shea et al. 1999).

Federally Qualified Health Centers

Community health centers were initially funded in 1965 as a means for President L.B.Johnson to fight against poverty (Wright, 2017). FQHCs are tasked with providing medical services for community residents, irrespective of the person's ability to pay (Burea of Primary Health Care, 2006). Currently, there are over 1,000 FQHCs in the country. Providers see millions of patients at FQHCs annually, out of which many are minorities, impoverished, or do not have insurance (Markus et al. 2000). One of the ways FQHCs receive compensation is for treating patients who receive Medicare or Medicaid (FQHC, 2017). Another source of funding for FQHCs is from the 330 grant funding, which balances uncompensated and poorly compensated

services (FQHC, 2017). In the event, however, that an FQHC does not meet productivity targets, reimbursement could be at risk (FQHC, 2017).

Many people across the country have become concerned that community health centers have inadequate capacity to care for patients beyond primary care services (Gusmano, Fairbrother & Park, 2002). In particular, some studies submit that many of the sicker patients who receive care at FQHCs encounter issues assessing services outside of their home FQHC (Felt-Lisk McHugh & Howell, 2002). The data from these studies have suggested that several FQHC specialists have refused to provide services to patients from a lower economic status (Cook et al. 2007).

Access to Specialty Care at FQHCs

For several years, FQHC has experienced access issues with patients in communities across the U.S (FQHC, 2017). Several studies have suggested that many FQHC patients have experienced access issues with services provided outside of the home the health center (Cook et al., 2007). Data from some of these studies have also suggested that several patients have been denied service from specialists based on their insurance status (Cook et al., 2007). Some providers have also required payment upfront in lieu of not seeing the patient (Cook et al., 2007). A study surveyed several medical directors from FQHCs intending to understand the difficulties typically encountered with scheduling off-campus visits for patients (Cook et al., 2007). The study addressed questions regarding access issues based on insurance status and what effects these issues have had on patients (Cook et al. 2007).

The study data assessed 814 FQHCs across the U.S (Cook et al. 2007). Of these 814 sites, eighty-nine new grantees in the year 2002, and seven hundred twenty-five were granted in previous years (Cook et al. 2007). The study was conducted using surveys, which were sent to the medical directors for the chosen sites. Data collection for the study occurred between March-July 2004 (Cook et al. 2007).

As stated by Cook et al. (2007), the study collected the following information using surveys:

> "The surveys used in the study obtained closed-ended responses on topics related to accessing specialty services. The researchers amended questions from a prior survey of CHCs associated with academic medical centers and created additional items based on discussions with key informants and a review of the literature. The researchers requested information about the centers, such as whether or not the CHC participated in a referral network or had affiliations with a medical school or hospital. Responses were collected on a five-point Likert scale that ranged from never to always. Directors were also asked to rate the extent to which the following six factors served as barriers to referral for patients in each insurance category: distance, wait times, poor quality of specialty providers, the unwillingness of providers to accept patients of certain insurance status, requirements that patients pay upfront at specialty appointments, and insurance plan financial coverage of the needed services. Responses ranged across a five-point scale from "not at all" to "a great deal." Medical directors also answered questions about themselves, including their age, race, sex, ethnicity, profession, years in current position, and hours spent providing patient care (pg.1460)."

Barriers to Specialty Care Access from Cook Study

The most frequent barriers noted in the study were regarding providers outside of FQHCs and their unwillingness to see to patients based on their insurance coverage and ability to pay upfront (Cook et al. 2007). The study ultimately uncovered the depth of the access issues experienced by FQHC patients seeking specialty services (Cook et al. 2007). The study concluded that it will not be alleviated unless special attention and or legislation is put in place to address issues with accessing outside specialty services through referral (Cook et al. 2007).

Specialty Referral Rates

The current study focuses primarily on specialty referral rates and how these rates affect Texas's population. The literature review did not yield many results geared specifically to this topic. Two prominent studies were, however, pertinent to the current study. The first was a study performed in Ontario, Canada, in 2014, which assessed how primary care impacts referrals to specialists (Liddy et al. 2014). A group of researchers performed a study evaluating the effect of primary care on specialist referrals (Liddy et al. 2014). The main similarity between the Canadian study and the current study was the overall structure and data collection method.

Another study, which was conducted in the U.S., focused on increasing specialty services and assessing the subsequent provider shortage (Valderas et al. 2009). The study examined the level of care rendered to patients by specialist providers (Valderas et al., 2009). Visit data was obtained from physician practices for use in the study (Valderas et al. 2009). The data ranged from the years 2002 to 2004. Visits from non-federally employed physicians were utilized, while hospital outpatient departments were excluded from the study (Valderas et al. 2009).

The study found that nearly half of the visits were follow up, while referrals made up another 30 percent (Valderas et al. 2009). As stated by Valderas et al. (2009), “specialists were more likely to report sharing care with other physicians, for referred, compared with not referred patients.” Return visits made up nearly 70 percent of the appointments used for the study (Valderas et al., 2009). The study concluded that many of the services managed by specialists could be managed by primary care physicians instead (Valderas et al. 2009).

Conclusion

The literature has revealed several elements of the physician shortage in the primary and specialty divisions. The literature also revealed that patients, especially those receiving Medicaid or uninsured, have experienced issues receiving much-needed appointments with specialist providers. The current study will be conducted in the State of Texas, which is why the literature provided insight into the states' current outlook with specialists provider capacity and appointment scheduling. There was no literature found on the current state of scheduled and completed referrals in the State of Texas. This study will provide a novel insight into the outlook for patients seeking specialty services. Ultimately, the study will assess the state's current success rate when scheduling specialty referrals. There are programs underway across the state to combat gaps in specialty care, such as those in Harris County. Before the year 2013, primary care was limited as well. However, the Harris Health System decided to expand primary care services by adding ten new health centers and clinics across Harris County. This expansion addressed a significant access issue for patients in Harris County needing primary care services.

CHAPTER III

METHODS

Introduction and Study Objective

The objective of this study is to describe the population health impact of changes in specialty referral practices across the state of Texas. The population health impact of specialty referrals in the State of Texas has not been well defined in the literature. Several studies have focused on the count of specialist providers per population, but not on the number or rate of referrals completed. An analysis of the referral rate completion in Texas will provide a novel perspective into the proposed specialty provider shortage in the State of Texas. This study will use the Medicare 5% limited Data sets from 2012 and 2017 for the state of Texas (Tx) to answer the following research question.

1) What are the changes in the use of specialty referral consultations for Medicare patients in rural (non-metropolitan) counties with FQHCs in Texas, in 2012 & 2017, compared to metropolitan counties in the state?

This chapter will be presented in the following format. The first section will be a description of the research design. In this section, the problem will be restated to lay the foundation for the remaining sections. The following sections will include a description of the population, data set description, and analysis.

Research Design

A retrospective cross-sectional study was conducted using CPT codes for patients living in selected rural and urban counties across the state of Texas, who have completed visit (s) with a specialist provider between 2012 and 2017. As previously stated, the primary aim of the study is to describe the population health impact of changes in specialty referral practices across the state

of Texas. The selected CPT codes will measure all defined specialty visits across the state of Texas.

Population and Sample

All patients over 65 years in the selected counties, who had at least one visit for the defined specialties, between 2012 and 2017 will be utilized for this study. Medicare claims data will be utilized to examine the comparisons of specialty referrals on a retrospective basis. Changes over time in the volume of referrals will be examined by comparing Medicare patients who live in rural counties versus those who do not live in rural counties with FQHCs. Claims data will be examined for Medicare patients seen in counties with FQHCs between 2012 and 2017.

This study will focus on specialty referral consultations in counties across the state of Texas. All Texas counties containing at least one or more FQHCs will be used for this study. Out of Texas' 254 counties, 131 of them have at least one FQHC in their territory. Eighty-two out of the 131 counties are listed as rural. The remaining 49 counties are listed as urban. Find a breakdown of counties in the figure below.

Table 2. Rural and Urban Texas Counties with FQHCs

Texas Counties Selected for Study			
No	**County Name**	**Has an FQHC**	**County Designation (Rural/Urban)**
1	Anderson	Yes	Rural
2	Angelina	Yes	Rural
3	Atascosa	Yes	Rural
4	Austin	Yes	Rural
5	Bailey	Yes	Rural
6	Bastrop	Yes	Urban
7	Bee	Yes	Rural
8	Bell	Yes	Urban
9	Bexar	Yes	Urban
10	Bowie	Yes	Urban
11	Brazoria	Yes	Urban
12	Brazos	Yes	Urban
13	Brewster	Yes	Rural
14	Brooks	Yes	Rural
15	Brown	Yes	Rural
16	Burleson	Yes	Rural
17	Burnet	Yes	Rural
18	Caldwell	Yes	Urban
19	Callahan	Yes	Rural
20	Cameron	Yes	Urban
21	Cass	Yes	Rural
22	Castro	Yes	Rural
23	Chambers	Yes	Urban
24	Cherokee	Yes	Rural
25	Collin	Yes	Urban
26	Colorado	Yes	Rural
27	Comal	Yes	Urban
28	Comanche	Yes	Rural
29	Concho	Yes	Rural
30	Crosby	Yes	Rural
31	Dallas	Yes	Urban
32	Dawson	Yes	Rural

33	Deaf Smith	Yes	Rural
34	Delta	Yes	Rural
35	Denton	Yes	Urban
36	Dimmit	Yes	Rural
37	Duval	Yes	Rural
38	Ector	Yes	Urban
39	El Paso	Yes	Urban
40	Ellis	Yes	Urban
41	Erath	Yes	Rural
42	Fannin	Yes	Rural
43	Fayette	Yes	Rural
44	Floyd	Yes	Rural
45	Fort Bend	Yes	Urban
46	Frio	Yes	Rural
47	Galveston	Yes	Urban
48	Gillespie	Yes	Rural
49	Gonzales	Yes	Rural
50	Gregg	Yes	Urban
51	Grimes	Yes	Rural
52	Guadalupe	Yes	Urban
53	Hale	Yes	Rural
54	Hardin	Yes	Urban
55	Harris	Yes	Urban
56	Harrison	Yes	Urban
57	Hays	Yes	Urban
58	Henderson	Yes	Urban
59	Hidalgo	Yes	Urban
60	Hockley	Yes	Rural
61	Hopkins	Yes	Rural
62	Howard	Yes	Rural
63	Hudspeth	Yes	Rural
64	Hunt	Yes	Urban
65	Jasper	Yes	Rural
66	Jefferson	Yes	Urban
67	Jim Hogg	Yes	Rural
68	Jim Wells	Yes	Rural
69	Kames	Yes	Rural
70	Kaufman	Yes	Urban

71	Kendall	Yes	Rural
72	Kimble	Yes	Rural
73	Kinney	Yes	Rural
74	Kleberg	Yes	Rural
75	Lamar	Yes	Rural
76	Lamb	Yes	Rural
77	LaSalle	Yes	Rural
78	Lavaca	Yes	Rural
79	Lee	Yes	Rural
80	Leon	Yes	Rural
81	Live Oak	Yes	Rural
82	Lubbock	Yes	Urban
83	Madison	Yes	Rural
84	Mason	Yes	Rural
85	Matagorda	Yes	Rural
86	Maverick	Yes	Rural
87	McCulloch	Yes	Rural
88	McLennan	Yes	Urban
89	McMullen	Yes	Rural
90	Medina	Yes	Rural
91	Menard	Yes	Rural
92	Midland	Yes	Urban
93	Montgomery	Yes	Urban
94	Nacogdoches	Yes	Rural
95	Nueces	Yes	Urban
96	Orange	Yes	Urban
97	Parmer	Yes	Rural
98	Pecos	Yes	Rural
99	Potter	Yes	Urban
100	Presido	Yes	Rural
101	Randall	Yes	Urban
102	Real	Yes	Rural
103	Robertson	Yes	Rural
104	Rusk	Yes	Rural
105	San Augustine	Yes	Rural
106	San Particio	Yes	Urban
107	Shackelford	Yes	Rural
108	Shelby	Yes	Rural

109	Smith	Yes	Urban
110	Starr	Yes	Rural
111	Stephens	Yes	Rural
112	Swisher	Yes	Rural
113	Tarrant	Yes	Urban
114	Taylor	Yes	Urban
115	Titus	Yes	Rural
116	Tom Green	Yes	Urban
117	Travis	Yes	Urban
118	Trinity	Yes	Rural
119	Upshur	Yes	Urban
120	Uvalde	Yes	Rural
121	Val Verde	Yes	Rural
122	Victoria	Yes	Urban
123	Waller	Yes	Urban
124	Webb	Yes	Urban
125	Wharton	Yes	Rural
126	Wichita	Yes	Urban
127	Willacy	Yes	Rural
128	Williamson	Yes	Urban
129	Wilson	Yes	Urban
130	Zapata	Yes	Rural
131	Zavala	Yes	Rural
Red= Rural County Purple= Urban County			
Note: Coryell, Grayson, Hood, Johnson, Liberty, Parker & Rockwall Counties are in metro and do not have an FQHC			

Exclusion criteria were applied to streamline the study's population selection. Adults under the age of 65 were excluded from the study. Medicare claims data were used for this study. The Center for Medicare & Medicaid Services (CMS) has a unique record-keeping system that tabulates Medicare and Medicare claims data "across a variety of categories and years" (HealthData, 2020). Medicare as a service is available to individuals who are 65 years and older

or those permanently disabled or with end-stage renal disease. Because disabled and ESRD patients under the age of 65 are a very different population that would require different care practices, we have included the age requirement for study (CMS, 2020).

Data Set Description

Medicare outpatient claims data was used for this study. Medicare provides claims data "for all Medicare patients across a wide variety of care settings, including outpatient, inpatient, skilled nursing facility, hospice, home health agency, and more (Society of General Internal Medicine, n.d.) (pg.1)." Current Procedural Terminology (CPT) codes for outpatient visits were analyzed to determine those needs. The following codes were determined to be associated with outpatient specialty care visits and were utilized for this study:

Table 3. CPT Codes for Outpatient Speciality Visits

99201	99202	99203
99204	99205	99211
99212	99213	99214
99215	99241	99242
99243	99244	99245

These coding descriptions were used to select the cohort for this study. The CPT codes selected will ensure that the cohort represents the best possible picture of referrals in the state. Additionally, the estimated number of people per county who qualify for the study will be extracted from census data and serve as the study denominator. Primary care was also defined as provider specialty code is primary care family medicine non-specialty or health clinic. The data

also accounted for the percentage of Medicare patients in each county who are of a minority race and the percentage who are 75 years or older.

Independent and Dependent Variables

To estimate the dependent variable, we counted the number of outpatient specialty referral bills for each Texas county in the study for each year.. Primary care visits were determined by a specialist indicator in the bill of primary care, family medicine, nurse practitioner, physicians assistant, non-specialty, or health clinic (Codes: 01, 08, 50, 70, 89, 97, 99). All other outpatient bills were designated as specialty bills. Then the number of bills of each type per county for each year were divided by the number of Medicare Beneficiaries in the county to result in dependent variables of the average number of specialist or primary care bills per person per county.

The primary dependent variables of interest was if the county was rural or non-rural and if the year was in 2012 or in 2017. Additional control variables included to control for confounding included county-level proportion of Medicare beneficiaries who were dually eligible for Medicaid, and proportion over the age of 75 years. These would account for any county differences due to a larger older age population or larger impoverished population.

Data Analysis

Descriptive statistics and trend mapping were used to examine the differences in the rural/urban rates of specialty referrals for 131 counties in Texas. Linear regression was used to examine if there are differences in the referral rate trends between the rural/non-rural counties over time.

Protection of Human Subjects

The Medical University of South Carolina has reviewed the use of the retrospective data to be used in this study, and due to the de-identified nature has deemed this to be non-human research.

CHAPTER IV

RESULTS

Outpatient Visit Data Analysis

Medicare 5% limited Data sets from 2012 and 2017 for the state of Texas (Tx) were analyzed to assess the number of specialty visits for patients in rural communities. We performed a multiple linear regression on the average number of specialty visits per person for each county in Texas with an FQHC within its jurisdiction. The outpatient visits for Medicare beneficiaries in the state were used for this study. The CPT codes from table 3 were entered into SAS, and data were analyzed for the results. The data was pulled from two separate years which were, 2012 and 2017. The year 2017 was selected because this is the most recent Medicare data available. The year 2012 was selected based on it being five years before 2017 which should result in enough time to see a time-related difference if one exists.

This study's overall data included 750,529 outpatient visits in 2012 and 748,364 total outpatient visits in 2017. However, the number of patients counted for the study made up a marginal amount of the total visits for the study. There was a total of 150,443 Medicare beneficiaries eligible to be counted for the study in 2012. Of these 150,443, a total of 17,228 of these patients lived in rural counties, whereas 133,215 of the patients lived in non-rural counties. In 2017, there was a total of 150,443 Medicare beneficiaries eligible to be counted for the study. Of these 181,078, a total of 19,308 of these patients lived in rural counties, whereas 161,770 of them lived in non-rural counties. The raw numbers of patient visits and medicare patients counted for the study did not change much from 2012 to 2017. Table 4 provides a depiction of these elements.

In table 4, the patient county-level characteristics were displayed as well. A portion of the patients eligible for the study were dually eligible for Medicare and Medicaid. In 2012, the proportion of dually eligible were 23.28% for rural counties and 18.54% for non-rural counties. In 2017, the proportion of dually eligible decreased a small amount to 20.82% for rural counties and 17.12% for non-rural counties. The percentages remained nearly the same between the two years. Table 4 also presented data for patients over 75 years old. This age group is important because these patients typically have chronic health issues that require multiple visits. The percentage of patients over 75 years old is roughly 30 percent for rural and non-rural patients during both study years.

Table 4. Unadjusted Descriptive Characteristics of Counties with FQHCs

	2012		**2017**	
	Rural	**Non-Rural**	**Rural**	**Non-Rural**
Number of TX FQHC Counties	80	50	80	50
Medicare Beneficiaries (total)	17,228	133,215	19,308	161,770
All Outpatient Visits (total)	85,544	664,985	85,432	662,932
Patient County-level Characteristics				
Percentage of Dually Eligible	23.28 (SD 11.89)	18.54 (SD 8.04)	20.82 (SD 10.84)	17.12 (SD 7.74)
Percentage over 75 Years of Age	32.66 (SD 6.28)	29.52 (SD 3.11)	30.68 (SD 5.49)	28.16 (SD 3.21)

Primary Care Visits (mean per person)	1.33 (SD 0.66)	1.49 (SD 0.42)	1.30 (SD 0.66)	1.36 (SD 0.40)
Specialty Care Visits (mean per person)	3.41 (SD 0.80)	3.91 (SD 0.71)	2.78 (SD 0.72)	3.13 (SD 0.54)

The main analysis conducted in this study was centered on average visits per year for specialty care visits. Specialty care as the key variable was defined by the visits compiled from the CPT codes in Table 3 as well as provider specialty codes. The average number visits for specialists dropped from a mean of 3.6 visits per person in 2012 to 2.9 visits per person in 2017 (Figure 5). There was no significant change in the number for primary care visits, with an average of 1.39 in 2012 and 1.34 in 2017. The average number of visits decreased for both specialty and primary care visits. The difference in average specialty visits between the two years was statically significant ($p<0.0001$).

The average number of specialty visits per person in the rural counties was significantly lower in 2017 when compared to 2012 ($p<0.0001$). The average for rural visits dropped from 3.41 per person in 2012 to 2.78 in 2017. This was a significant drop attributed to many of the counties reporting between 0-1 visits to specialists for the patient's population. A few counties such as Lamar, Fannin, and Zapata reported an average of over four visits per person in 2017, but they were in the minority.

Figure 5. The Average Speciality Visits Per Year, 2012 & 2017

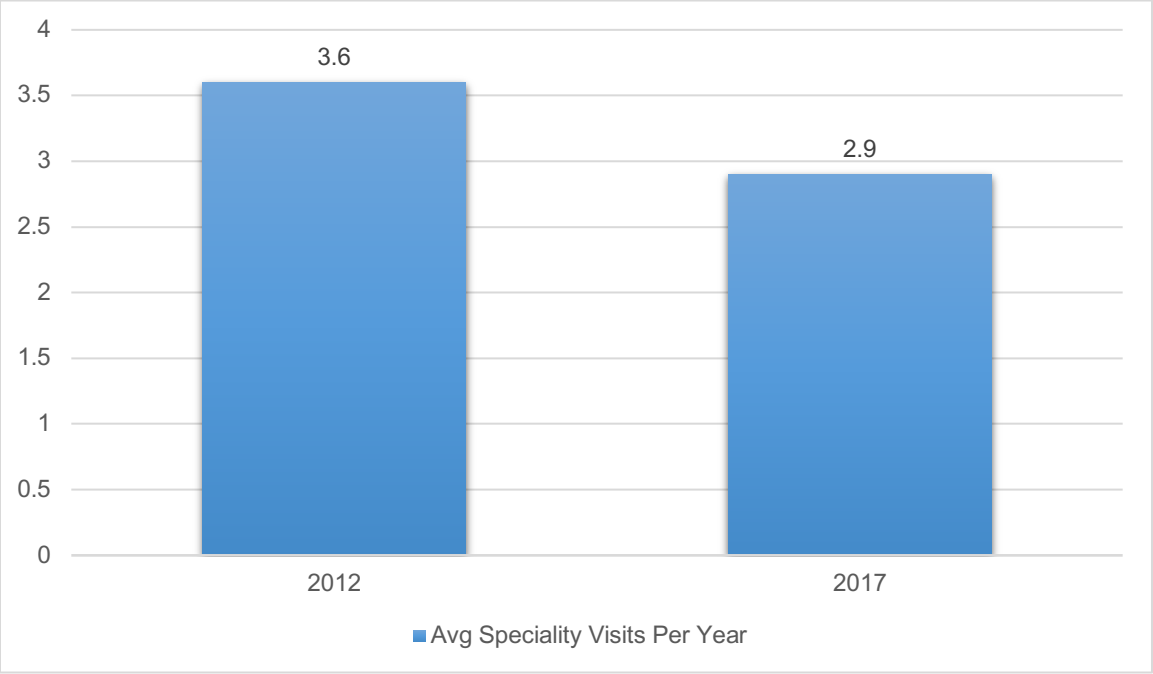
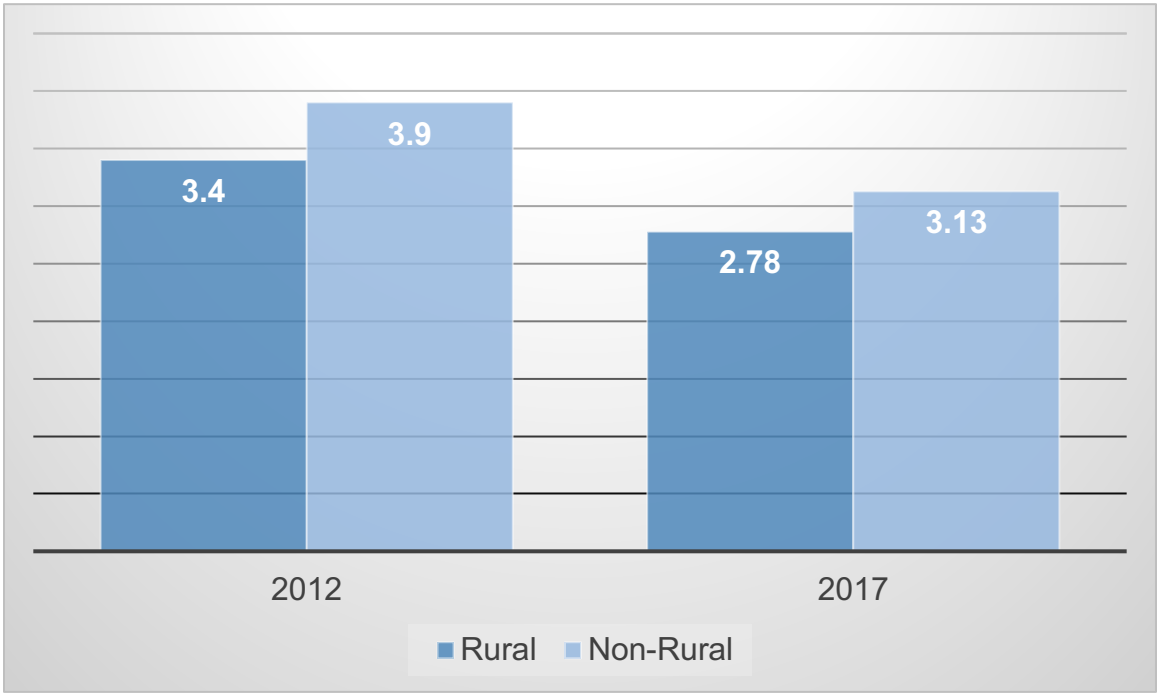


Figure 6. The Average Speciality Visits Per Year at County Level, 2012 & 2017



The average number of primary care visits per year were also calculated. Primary care was defined in the date by examining visits from family medicine physicians, physician's assistants, and nurse practitioners. Unlike specialty visits, there was no significant change in the average number of primary care visits per year. In 2012, there was an average of 1.39 primary care visits per person in the state, compared to 1.34 in 2017. The number of relatively remained the same in both years. The average primary care visits are displayed in Table 6 below.

Figure 7. The Average Primary Care Visits Per Year, 2012 & 2017

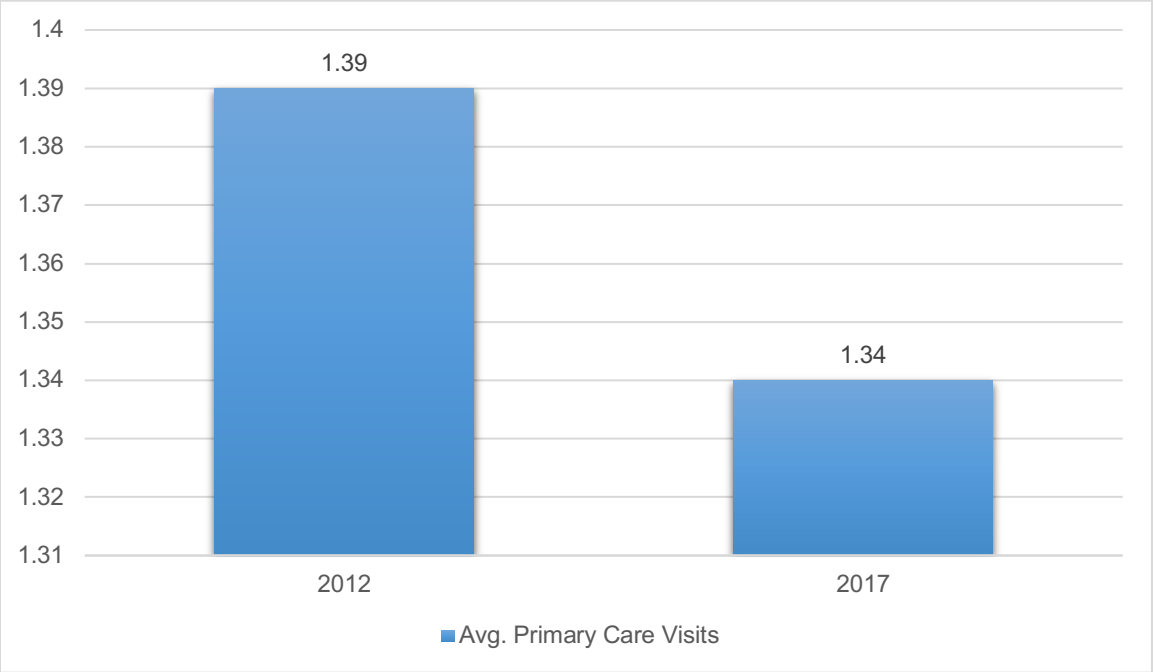
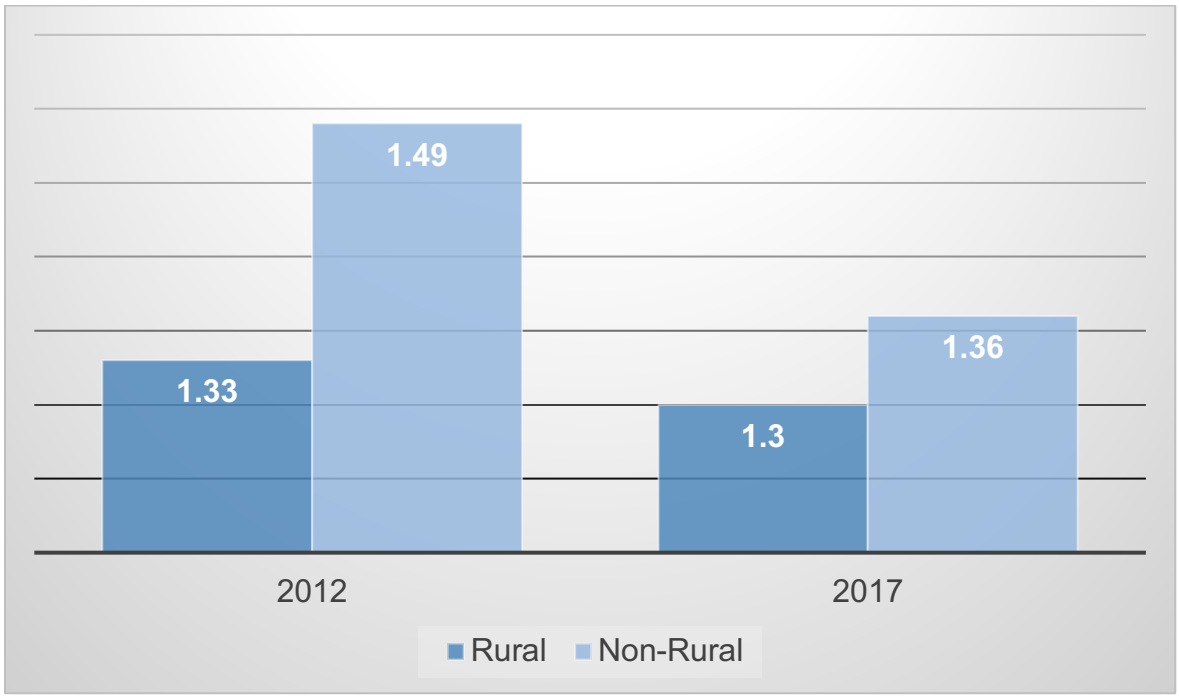


Figure 8. The Average Primary Care Visits at County Level Per Year, 2012 & 2017



County Comparisons

Counties in larger metropolitan areas such as the greater Houston area accounted for higher numbers of the average specialty visits per person in the state. The greater Houston area is made of Brazoria, Chambers, Fort Bend, Galveston, Montgomery, Harris, Waller, and Austin counties. All of the counties have at least 1 FQHC within their jurisdiction. The average number of specialty care visits in the Houston area for 2012 was 3.63 per person, slightly above the overall study average of 3.41 in the same year (Figure 7). For 2017, the average specialty visits per person dropped to 3.15 visits (Figure 8). However, the number was still larger than the study average of 2.78 specialty visits per person in 2017.

Figure 9. Average Visits per County in Greater Houston Area- 2012

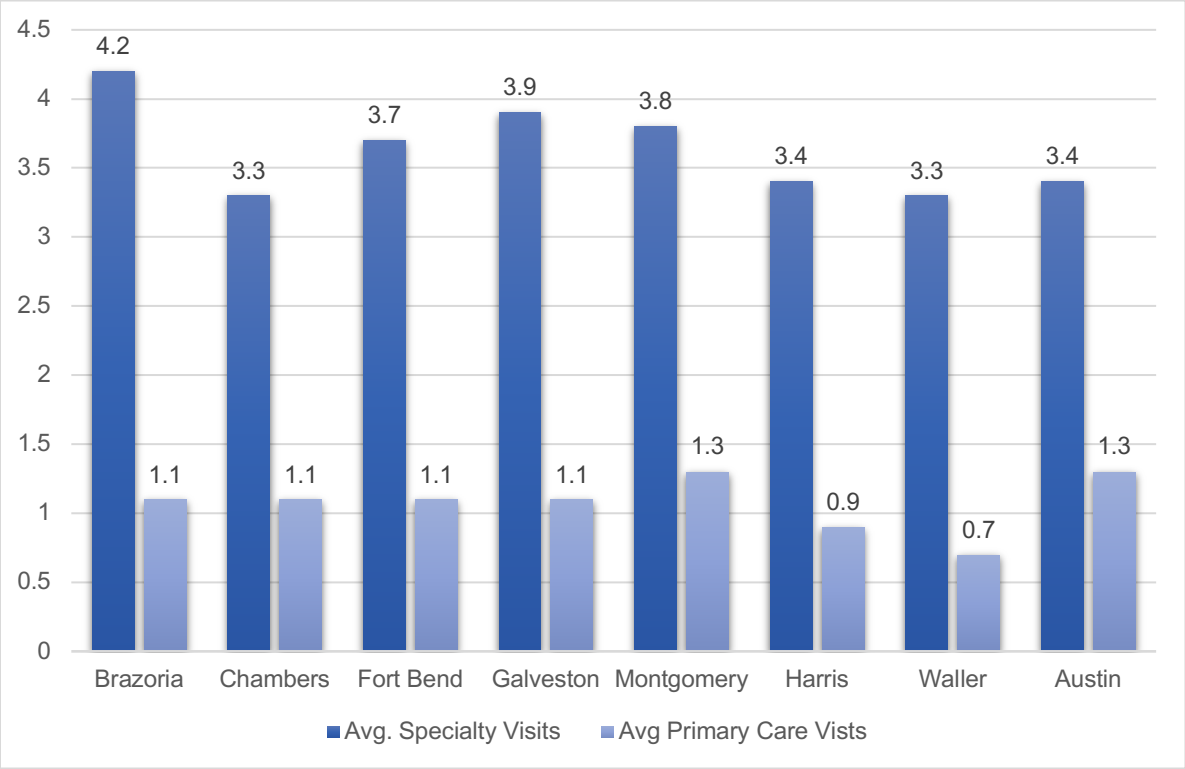
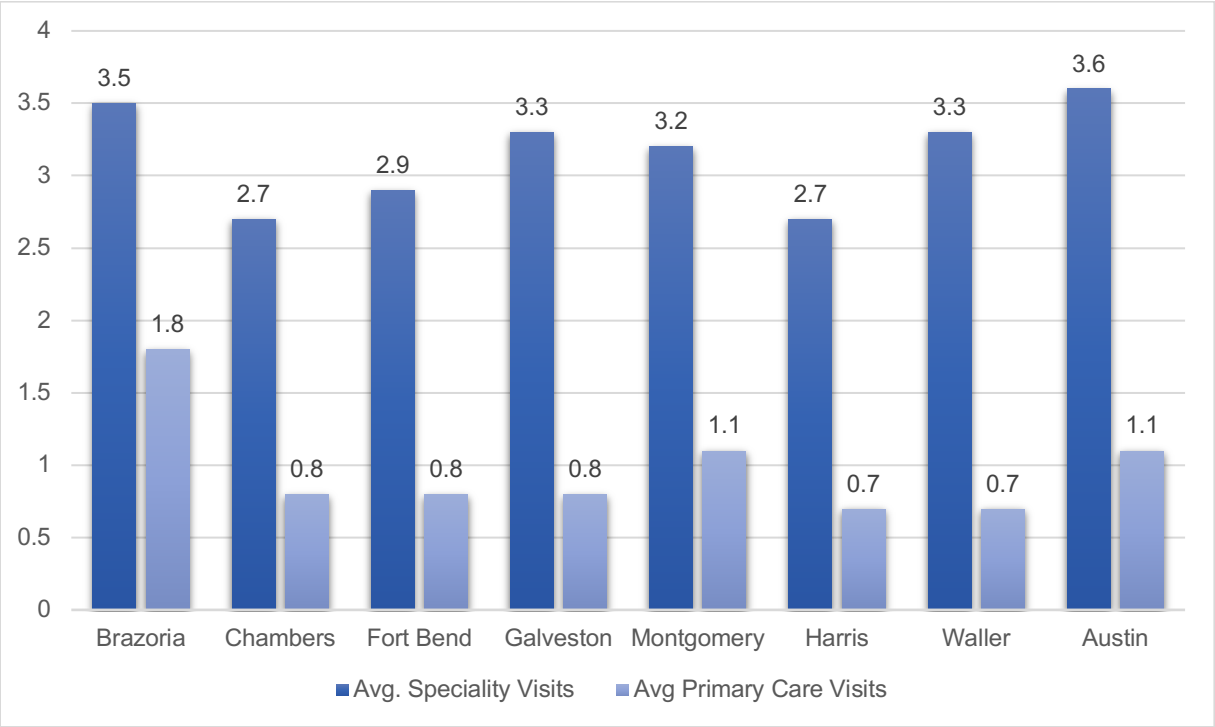


Figure 10. Average Visits per County in Greater Houston Area- 2017



Adjusted Averages

The previous numbers presented above were all raw averages calculated using the Medicare data. There was a need to adjust averages dues to potential confounding due to differences in population demographics between counties. In the original data found in Table 4, the percentages of patients who were dually eligible for Medicare and Medicaid, as well as over 75, were high. Therefore, the data controlled for patients above 75 years old (age), year, and patients with dual Medicare and Medicaid eligibility. Several other elements, such as household income and race, were pulled but did not significanlty contribute to counfounding in the multivariable models.

In Table 5 below, the average per person visits were adjusted to account for potential confounding between comparison groups in the study. After controlling for covariates, there was a slightly higher average number of primary care visits in non-rural (1.45 SE 0.06) versus rural counties (1.30 SE 0.52) overall ($p=0.04$) (Table 8). Non-rural Medicare Beneficiaries also had a higher adjusted average number of specialty care visits (3.49 SE 0.07) compared to those in rural counties (3.11 SE 0.06) ($p<0.0001$) over the full study time period (Table 8). After controlling for rurality, dual eligibility, and age over 75, the average adjusted number of specialty care visits per person, per year, in 2012 was 3.66 (SE 0.06) which was statistically significantly higher than the 2017 adjusted average of 2.95 (SE 0.06) (p-value<0.0001) (Table 8). There was no difference in adjusted average number of primary care visits between the two comparison years 2012 and 2017 (Table 8). The adjusted values show a significantly higher average similar to what was reported in the unadjusted raw means previously reported.

Table 5. Adjusted Number of Visits Per Person

	Rural	Non-rural	p-value	2012	2017	p-value
Primary Care	1.30 (SE 0.52)	1.45 (SE 0.06)	0.04	1.40 (SE 0.05)	1.35 (SE 0.05)	0.54
Specialty Care	3.11 (SE 0.06)	3.49 (SE 0.07)	<0.0001	3.66 (SE 0.06)	2.95 (SE 0.06)	<0.0001

CHAPTER V

DISCUSSION

Summary of Findings

This study aimed to test the overarching research question; are there changes in the use of specialty referral consultations for Medicare patients in rural (non-metropolitan) counties with FQHCs in Texas, between 2012 and 2017, compared to metropolitan counties in the state?

The study found a change in the use of specialty referral consultations when comparing the two data years. Study results showed a significant reduction in the usage of specialty services for patients living in rural counties. The reduction may be attributed to a few changes currently happening in the state. Several researchers have indicated that the state is not producing or recruiting enough residents and practicing physicians to meet the growing population demand (Merrit Hawkins, 2018).

Another potential factor may be the migration of rural residents to non-rural communities, however the analysis did adjust for rurality and some population demographics. Many of Texas' rural counties and subsequent towns have seen a mass exodus over the recent years. Many residents of these communities have gone to the states' bigger cities like Houston, Dallas, San Antonio, and Austin. It is possible that the migration of residents led to decreased Medicare enrollees seeking care from specialists from those zip codes but this should be accounted for in the denominator values of the dependent variables used in this study.

Although the data showed reductions in specialty care visits over time and between rural and non-rural counties, it showed no change in the number of patients seeking primary care between the years and only a small difference between rural and non-rural counties. Many studies have stated that there is a shortage of primary care providers and that patients may have issues securing appointments as a result. There are several differing opinions on the depth of the primary care physician shortage. Some say that the shortage is not as bad, while others have said that the shortage is worse than initially projected. Some studies have stated that the average number of primary care visits per person on a national level is closer to 3 visits per person (Merrit Hawkins, 2018). In that case, Texas is far behind on primary care visits as well.

When we assessed the average visits per year, we looked at the Houston area to compare with the rural counties. The numbers in the Houston area were higher but still decreased along with the state in 2017. The Harris Health System in Houston currently has a program to combat a lack of specialty services for Harris County. Harris County, which is home to Houston, provides outpatient care to residents in the greater Houston areas at Harris Health facilities. The program is in direct response to the system's expansion of primary care services between 2010-2013. During this time, Harris Health constructed several clinics in response to the growing population. Specialty services, however, were not addressed during this initial expansion.

Additional patients from the primary care expansion exponentially increased the number of referrals to specialty services for the system and the greater Houston area. The current specialty expansion program at Harris Health has increased the number of specialist physicians and has begun to clear the backlog of referrals. This program is a single example of what is happening in many health systems across the country. Several systems received Medicaid 1115 Waiver Delivery System Reform Incentive Payments (DSRIP) funds to increase primary care

services, similar to Harris Health. These expansions possibly created backlogs for specialists across the country, similar to what was experienced in Houston.

Conclusions

Texas is the second most populated state in the U.S., with over 28 million residents. Texas is also the second-largest state by landmass. Large swaths of the land are encompassed by rural counties, with large numbers of impoverished individuals. The study's dual high eligibility rates point to that increased poverty levels in rural Texas. Medicare and Medicaid patients have historically had limited options for receiving care.

The population in Texas continues to grow at one of the fastest paces in the U.S. As the population grows, residency programs in the state will need to adapt by creating more spots for residents. More focus will need to be placed in rural settings, possibly offering providers more incentives to work in these environments. As it stands today, many Texas counties have less than two specialists living in them. Hospital systems in these rural counties will also benefit by partnering with FQHCs in the area to ensure that specialty services are rendered by the FQHCs within the communities they serve.

The Resident Physician Shortage Act, if passed into law, will go a long way to fill the resident shortage gaps. The additional 15,000 trained residents over five years will be a good starting point for helping underserved areas (House, 2019). Many of the underserved areas will benefit from these increases. Densely populated states, such as Texas, will surely benefit as well and gain many new physicians. The Resident Physician Shortage Act, if passed, will be a nice start but will still fall short of ending the projected physician shortage. More robust legislation will be needed to end the physician shortage in the U.S.

Lastly, cities in the state, rural and non-rural, may benefit their residents by implementing expansion programs such as the one implemented by Harris Health System. Harris Health's specialty expansion program is still in its infancy but has already reduced waitlists for most divisions. The program has allowed thousands of patients to receive referrals to much-needed specialties, in less time than years before the expansions program. If implemented properly, this model can help many systems and standalone hospitals across the state decrease their backlog of patients.

Study Limitations

The first limitation for this study was the Medicaid enrollment criteria stipulated for all specialty referrals assessed. Limiting visits to Medicare alone removed a large portion of the state's population and thus study results may not be generalizable to other populations. The Texas Medical Association (2020) estimates that 10 percent of Texas' population is enrolled in Medicare. Therefore, a large percentage of the population was excluded from the study. However, Medicare patients have been known to use more services than privately insured patients.

The second limitation was the limited scope of the Medicare data. The most recent year for Medicare data is 2017. Therefore, the study had to stop collecting data in 2017. Having additional data years to assess could have strengthened the study by providing a deeper look into changes over time. The data was also limited to views of the years 2012 and 2017 with nothing in between. Assessing the years in between would have allowed for a deeper assessment of referral consultations' changes over time.

Areas of Further Study

Future study should include additional patients across the state and more information about types of specialists so that specialty types can be further examined. The current study is limited to Medicare patients. Including self-pay, privately insured patients, and patients younger than 65 would strengthen the study by increasing it generalizability, however these data were not currently available to the researchers. Additionally, the study may be strengthened if the years 2013-2016 are assessed as well. This would allow an additional view of any possible changes that occurred in those years. Lastly, an assessment of the years after 2017 would provide more recent information.

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