Fall 2022

Bridging the Gaps: Exploring Factors Associated With Goal Achievement Within an Accountable Care Organization Care Coordination Program

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Recommended Citation
Polk, Jessica L., "Bridging the Gaps: Exploring Factors Associated With Goal Achievement Within an Accountable Care Organization Care Coordination Program" (2022). *Electronic Theses and Dissertations*. 2499.
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BRIDGING THE GAPS: EXPLORING FACTORS ASSOCIATED WITH GOAL ACHIEVEMENT WITHIN AN ACCOUNTABLE CARE ORGANIZATION CARE COORDINATION PROGRAM

by

JESSICA LORRE POLK

(Under the Direction of William Mase)

ABSTRACT

Healthcare cost in the U.S. has been increasing at an unsustainable rate due to the growing population diagnosed with multiple chronic conditions and a fragmented healthcare system. The high-risk patient population includes persons who over utilize the healthcare system with frequent avoidable hospitalizations, emergency room visits, and exacerbations of their chronic conditions. This high-risk population makes up five percent of the U.S. but accounts for over fifty percent of all healthcare spending. Care coordination models have emerged to focus proactive health interventions for the highest-risk patient populations to reduce overutilization and empower patients to improve long-term health. Evidence has shown care coordination models are essential for achieving quality and safety outcomes for patients and their families, but first, the patient must agree to enroll in the care coordination program to receive the support provided by the care coordination services.

A retrospective secondary data study design was used from Emory Healthcare Ambulatory Care Coordination Department. Multivariate logistic regressions were conducted to examine whether race, age, sex, and primary insurance type significantly predicted enrollment and achievement of the program care plan goals. A multivariate logistic regression was also conducted to examine if the average communication time significantly affected the patient's achievement of their care plan goals.

The overall models demonstrated that race, age, sex, and primary insurance type were significant predictors of patient enrollment and achievement of care plan goals ($p < .001$). The average communication between the care coordinator and the patient also significantly predicted the patient achieving care plan goals ($p < .001$), but there was no significance for average talk times over 90 minutes.

The study results will serve as a benchmark for the Emory Healthcare Care Coordination Department and create a foundation for further research to inform effective strategies to utilize proactive outreach and promote the enrollment of a diverse patient population. It will be essential to continue longitudinal studies of the enrolled patient population further to inform the long-term cost savings effects of the program.

INDEX WORDS: Chronic Disease, Chronic Illness, Care Coordination and Transition Care Management, Coordination of Care, Transition of Care, Ambulatory Care Coordination, Ambulatory Nursing, Accountable Care Organization, Shared Savings, Complex Care

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by

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DOCTOR OF PUBLIC HEALTH

JIANN-PING HSU, COLLEGE OF PUBLIC HEALTH

BRIDGING THE GAPS: EXPLORING FACTORS ASSOCIATED WITH GOAL ACHIEVEMENT WITHIN AN ACCOUNTABLE CARE ORGANIZATION CARE COORDINATION PROGRAM

by

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Electronic Version Approved:
December 2022

DEDICATION

I dedicate this dissertation to my family, those ancestors who came before me, and the family legacy who will come after me. I am the first in my family to receive a Doctorate Degree, but this is not because I do not come from a family lineage of academics. It is because of structural barriers that prevented the opportunity for my relatives to showcase their academic intelligence. So as the great author and poet Maya Angelou once said, "I come as one, but stand as ten thousand." I have completed this dissertation because of my family and friend’s everlasting support, prayers, and love. When I did not feel strong enough, they continued to keep me lifted.

I lost my Papi (Dad) at the beginning of my doctoral journey in 2019, but I know he would be so proud of his baby. He always said, "God and education; anything else is a distraction," and I never truly understood those words until this dissertation journey. One of my Papi's favorite scriptures of encouragement was Ephesians 3:20, "Now unto him, that is able to do exceeding abundantly above all we ask or think according to the power that worketh in us." Now Look at God; He showed out with this blessing! Papi, we did it!

Mommy, all your sacrifices and hard work with us have paid off. Thank you for your endless support, love, prayers, and meals that kept me fed during those long hours of writing this dissertation. Josie, my hype-woman for life. Thank you for always believing in me and cheering me on. Please continue to tell Jaylen and Jordyn they, too, can become Doctors. Little Bro, (Cedric Jr.), you are almost done with your Master's Degree but do not stop there... Dr. Cedric Polk has a nice ring to it! Lastly, to my beloved dog Polo. Thank you for keeping me company in all the late nights and early mornings during my research and writing. Your unconditional love and company supported me, and we can finally go on longer leisure walks!

ACKNOWLEDGEMENTS

First, I acknowledge all the exceptional faculty and staff I had the privilege to learn from and work with at JPHCOPH! Thank you all for sharing your knowledge and encouraging me and my cohort through one of the most trying times in our academic journeys, all while experiencing a global pandemic!

To my dissertation chair, Dr. William Mase. Thank you for your words of encouragement from the very beginning to the end of this Doctor of Public Health journey. I'll never forget one of my first classes with you; you had us all close our eyes as you took us through mindful meditation. I knew from that moment I needed your calming support and encouragement on my dissertation journey, and I am so thankful you agreed to serve as my dissertation chair. Aside from you sharing your knowledge and expertise, you always made sure to check on my mental health, and that extra support made all the difference in this dissertation journey!

To my esteemed and incredible committee, thank you! Dr. Linda Kimsey, your knowledge and guidance on this journey has been instrumental! Thank you for discussing tough challenges and offering your suggestions and support as I revised key components of this dissertation. To Dr. Samuel Opoku, thank you for sharing your expertise and experience with me, especially for ensuring I had sound research methods and statistical analysis. Your encouragement allowed me to not only complete this dissertation but to have a dissertation I am proud of and could take actionable steps within my organization.

Next, to the one who believed in my magic from the very first day we met my dearest friend, Marcus Stallworth. Thank you for encouraging me to apply to this doctorate program and reading countless papers from my applications to this dissertation. You have truly been with me on every step of this journey. Thank you for learning with me and delivering food to my door when I was locked inside writing. I could not have achieved this doctorate without you sharing your magic with me, praying for me, and supplying me with your intentional support during some of my most challenging times.

Lastly, to all my friends and colleagues in this program at JPHCOPH, Emory Healthcare, and beyond! Thank you all for believing in me and encouraging me to complete this journey.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Page

CHAPTER 1

INTRODUCTION

Significance

The United States (US) spends about $3.8 Trillion annually in health care expenditures, with 90% consumed by people with chronic and mental health conditions (Martin et al., 2021; CDC, 2021). Healthcare costs in the US have been on a relentless upward trend and are expected to rise higher than the economy's growth as the prevalence of chronic conditions increases (Pritchard et al., 2016). A chronic disease is defined as a health condition that lasts a year or more, is rarely cured, and requires ongoing medical attention and/or limits activities of daily living (Parekh et al., 2011; CDC, 2021). An estimated six in ten American adults have been diagnosed with at least one chronic disease condition, and four in ten adults have been diagnosed with multiple chronic conditions (MCC) (CDC, 2021; Ward et al., 2014). Patients with MCC cost up to seven times as much as those with only one chronic condition (Stanton, 2006). Several factors contribute to the rising cost of healthcare for people with MCC, including significant financial obligations for various doctor's visits, higher prices for prescription drugs, functional limitations leading to additional costs spent on durable medical equipment (DME), higher hospital readmission rates, and frequent emergency room visits (Parekh et al., 2011). Furthermore, people with MCC often receive active outpatient care from many providers who solely treat one disease or condition and function independently in unintegrated silos (Clarke et al., 2017). Specialty provider's expertise in collaborating patient care is often necessary to achieve optimal treatment and medication management. However, the lack of proper communication between care providers can lead to fragmented care, lack of coordination, variability in quality and health outcomes, inconsistent and incomplete information, and unnecessary or repetitive testing and procedures that continue to drive up the cost of healthcare spending (Smith et al., 2005; Cebul et al., 2008). Bridging the gaps of the fragmented healthcare system through

Ambulatory Care Coordination is one way to reconstruct healthcare delivery and reduce healthcare costs. Effective Care Coordination and Transition Management (CCTM) has been proven to reduce the length of stay, decrease unnecessary hospital readmissions, prevent avoidable emergency room visits, reduce medication errors, and decrease functional decline for patients with chronic illness (Naylor et al., 2004, Hong, Melnyk, & McCann, 2004, Improving Chronic Illness Care, 2007).

Care Coordination and Transition Management (CCTM) supports patients through self-management, advocacy, education, communication, coaching, the nursing process, population health management, collaboration, and care planning in the primary care providers' ambulatory care setting (AAACN, 2016). The Agency for Healthcare Research and Quality systematically reviewed and integrated over forty definitions to define care coordination as "the deliberate organization of patient care activities between two or more participants (including the patient) involved in a patient's care to facilitate the appropriate delivery of health care services. Organizing care involves the marshaling of personnel and other resources needed to carry out all required patient care activities and is often managed by the exchange of information among participants responsible for different aspects of care" (AHRQ, 2014). Transition Care Management (TCM) is defined as the movement of patients between health care locations, providers, or levels of care as their conditions and care need change; it includes a set of actions designed to ensure coordination and continuity. Effective TCM can prevent medical errors, identify issues for early intervention, avert unnecessary hospitalizations and readmissions, support consumers' preferences and choices, and avoid duplication of services, thereby improving the quality of care while utilizing resources more effectively (Clarke et al., 2017). CCTM programs support patients and families by matching them with a care coordinator, who provides education about a disease process, tests, procedures, medications, follow-up care, specialists, and appointments that help the patient get the proper care, at the right time, by the right provider (Haynes, Swan, & Haas 2014).

Background

Historically, the US healthcare system was not designed to prevent health problems; instead, its primary focus was on treating acute care conditions (Haas, Swan, & Haynes, 2013; Institute for Healthcare Improvement, 2016; McCarthy & Klein, 2010). Acute care services are provided in clinical care settings such as emergency rooms, trauma centers, critical care, and inpatient surgical or medical care units (World Health Organization, 2013). In 1990, the Institute of Medicine (IOM) published their first report on the quality of healthcare in the United States and uncovered an increasing number of preventable medical errors contributed to an increased number of patients with multiple chronic conditions seeing numerous providers in multiple locations working in silos leading to an increased potential for mixed messages, duplication of care, increased costs, and increased confusion for the patient (Institute of Medicine, 1999). In their second report, *Crossing the Quality Chasm*, the IOM found the need to redesign care for chronically ill patients to ensure seamless care across healthcare settings, focusing on team effectiveness and collaboration rather than individual healthcare silos (Institute of Medicine, 2001). The rising number of specialist providers created more fragmented health care in which no individual provider assumed the responsibility of coordinating the care of the whole patient, which could lead to poor patient outcomes and increasing preventable healthcare costs (Calsyn & Lee, 2012; Chernys et al., 2013; Stange, 2009). The IOM report distinguished care coordination as a critical strategy in providing effective, efficient care (AHRQ, 2014).

The first Transitional Care Coordination Models emerged in the 1990s as a solution to better manage and coordinate care for the increasing number of people with chronic illness in the US (Institute of Medicine, 2001). Since the 1990s, there has been growing evidence supporting transitional care coordination models, but 1990s-style managed care plans lacked integrated data on patient performance outcomes, healthcare utilization, and timely analytical claims data technology. Due to the inability to align incentives, garner capitation contracts, and develop the infrastructure to manage patient risk, healthcare organizations moved away from the managed care plan model and back to the traditional fee-for-service model which allowed providers to be reimbursed for the number of services provided rather than the quality of care delivered (CMS, 2021). As a result, healthcare costs more than doubled between 1999-2010 (Burns & Pauly, 2012; Pritchard et al., 2016).

In 2010, the redesign of the US healthcare system through the Patient Protection and Affordable Care Act (ACA) focused on the need for increased health promotion efforts to provide a higher quality of healthcare at lower costs and encouraged interprofessional care coordination programs (Henry J. Kaiser Family Foundation, 2013; Kaiser Family Foundation, 2011; Congress.gov, 2010). The ACA provided funding and incentives for transitional care coordination for high-risk Medicare participants and encouraged interprofessional care coordination by funding 10 billion dollars in Centers for Medicare & Medicaid Services (CMS) projects aimed at improving quality and reducing costs for chronically ill patients enrolled in Medicare and Medicaid programs (Henry J. Kaiser Family Foundation, 2013; Congress.gov, 2010). In addition, the ACA legislation moved away from financing using the traditional fee-for-service payment model and toward payment reform measures, including Accountable Care Organizations, bundled payments, and penalties for hospital readmissions (Henry J. Kaiser Family Foundation, 2013; Congress.gov, 2010). The ACA's health care reforms provide a new opportunity to develop and implement multidisciplinary models of collaborative care coordination and have become one of the most popularized trends in healthcare reform and reconstruction of the past decade.

With the enactment of the Affordable Care Act of 2010 (ACA), the Centers for Medicare and Medicaid Services (CMS) launched several initiatives to improve care coordination and dismantle the silos by offering health care organization's financial incentives for effectively coordinating care, providing appropriate levels of care and executing safe transitions between care providers through the creation of Accountable Care Organizations (ACOs) and Patient-Centered Medical Homes (PCMH) (Haas et al., 2013; Clarke et al., 2017). The improvement of population health through care coordination is the fundamental element of both the PCMH and ACO (Burton, 2012). Despite the momentum provided by the ACA healthcare reform initiatives, care coordination processes continue to be slow in the US when compared to other industrialized healthcare nations; the US remains last in healthcare performance and first place in cost (Davis, Abrams, & Stremikis, 2011; Tikkanen & Abrams, 2020).

The Commonwealth Fund 2017 update report called *Mirror Mirror* compared the quality of healthcare in industrialized nations and uncovered despite continuing to spend more than any of the other ten high-income countries, the US made no progress in their ranking on coordinated care or overall care, which includes four subdomains: coordination, safety, prevention, and engagement (Schneider et al., 2017). According to the report, the US ranked fifth out of eleven in overall care processes and sixth in the subdomain of coordinated care (Schneider et al., 2017). Although healthcare system reform does not come quickly or easily, healthcare redesign models that focus on coordinating care, increased collaboration, and partnering with patients and families have proven to be key elements to improve patient safety and provide the best care to patients with chronic health needs (National Patient Safety Foundation, 2015).

Statement of the Problem

Healthcare cost in the US has been growing at an unsustainable rate over the past several years due to the growing number of the population diagnosed with multiple chronic conditions, an aging population, and a fragmented healthcare system (Martin et al., 2021; Ward et al., 2014; CDC, 2021). The passage of the ACA healthcare legislation reframed the healthcare system from focusing on acute, episodic care to focusing on prevention by emphasizing population health through accountability of quality outcomes, care coordination, care transitions, disease prevention, and health promotion (Bartels, Gill, & Naslund 2015; Naylor et al., 2011; Chee et al., 2016). As a result, numerous care coordination models have emerged in an effort to bridge the gaps and move patients toward a more efficient system with improved health outcomes. Evidence has shown care coordination models are essential for achieving quality and safety outcomes for patients and their families (Hass & Swan, 2014). Care coordinators function as a communication hub for providers, delivering evidence-based education and interventions to patients and families, providing medication reconciliation, and delivering timely and comprehensive transitional care after hospitalization to help bridge the gap between inpatient and outpatient care (Brown et al., 2012). Ambulatory CCTM has proven effective in reducing healthcare costs, and spending, but not all CCTM models are one size fits all due to a diverse array of patient populations across the US.

Allocating limited health care resources to the highest risk patient population can help tailor care to mitigate risk and improve patient outcomes by reducing disease exacerbations and lowering emergency room visits and hospital stays (Dorr et al., 2021). Studies have shown improvement of outpatient care management services requires matching program services to reach high-risk individuals who would benefit the most from care management programs (Benzo et al., 2013; Berry et al., 2013; Johnson et al., 2015). However, identifying high-risk patient populations is not enough. Many researchers provide evidence care coordination programs decrease cost utilization and prevent unnecessary hospital admissions among patients 65 and older receiving Medicare and Medicaid benefits, but this limits generalizability to other patient populations and demographics (Parry et al., 2009; Marek et al., 2010; Atherly & Thorpe, 2011; Coleman et al., 2006; Verhaegh et al., 2014, Budde et al., 2021). As more Commercial health insurance payors are entering cost savings contracts with Accountable Care Organizations, it is vital to determine the characteristics of patients enrolling and completing CCTM programs. Another gap in the literature is the length of communication time spent with a patient, which some researchers contribute to the specific patient and caregiver needs (Coleman et al., 2006; Parry et al., 2009; Verhaegh et al., 2014). However, it is necessary to estimate how long nurse care coordinators are spending speaking to patients to provide further insight for healthcare organizations to evaluate the capacity of their CCTM program and create an effective care delivery model for the population served. With limited funding and resources, it is crucial to understand which patient characteristic demographics are taking part and completing the care coordination program and estimate a patient's average talk time. This study will contribute to the gap in the literature through the following research aims and questions.

Research Questions

The research aims and questions for this study are as follows:

Aim 1: To examine if patient characteristics significantly predict agreement to enroll in the CCTM program.

Research question 1: Does race, age, sex, case type, enrollment year, and primary insurance type significantly predict enrollment in the CCTM program?

Aim 2: To examine if patient characteristics significantly predict achieving care plan goals.

Research question 2: Does race, age, sex, case type, enrollment year, and primary insurance type significantly predict achieving care plan goals?

Aim 3: To examine if communication duration significantly predicts achieving care plan goals.

Research Question 3: Does communication duration significantly predict achieving care plan goals?

Purpose Statement

The purpose of this study is to predict patient characteristics that are most likely to enroll and complete care plan goals in the CCTM program. Patient characteristics in this study include race, age range, sex, case type, year of enrollment, and primary insurance type. Next, the study will examine if patient characteristics along with average communication duration significantly predict the patient achieving care plan goals in the CCTM program. The results of this dissertation will inform care coordination programs to create strategies to effectively promote outreach and enroll a diverse patient population and provide equitable care coordination resources to improve health outcomes for all.

Delimitations

The study sample utilized the Emory Healthcare Ambulatory Care Coordination and Transition Management (CCTM) program data from all patients who had a care coordination encounter between January 2019 through December 2021. The study includes all patients identified in the electronic health record as having a Care Coordination encounter regardless of whether the patient was attributed to the healthcare organization through an Accountable Care Organization (ACO) shared savings contract or if the patient was not attributed.

Critical Terms

The following definition of terms were used:

1. Centers for Medicare and Medicaid Services (CMS): A United States federal agency within the Department of Health and Human Services (HHS) that administers the Medicare program and works in partnership with state governments to administer Medicaid, the Children's Health Insurance Program (CHIP), and health insurance portability standards. Medicare provides health insurance benefits for people 65 and older, people younger than age 65 with certain disabilities, or people of any age with End Stage Renal Disease (ESRD). Medicaid services provide health insurance to low-income individuals who meet eligibility requirements, resource limits, and State rules. Eligibility and benefits vary from State to State. (CMS, 2021; U.S. Department of Health and Human Services, 2021).
2. Care Coordination: The deliberate organization of patient care activities between two or more participants (including the patient) involved in a patient’s care to facilitate the appropriate delivery of healthcare services. Organizing care involves the marshaling of personnel and other resources needed to carry out all required patient care activities and is often managed by the exchange of information among participants responsible for different aspects of care (McDonald et al., 2007).
3. Transition Care Management (TCM): Refers to the movement of patients—between health care locations, providers, or levels of care as their conditions and care needs change—and the set of actions designed to ensure coordination and continuity. Effective TCM can prevent medical errors, identify issues for early intervention, avert unnecessary hospitalizations and readmissions, support consumers' preferences and choices, and avoid duplication of services, thereby improving the quality of care while utilizing resources more effectively (Clarke et al., 2017).

4. Chronic Condition: A health condition that last a year or more and requires ongoing medical attention and/or limit activities of daily living include a broad array of physical illnesses, such as arthritis, asthma, chronic respiratory conditions, diabetes and its complications, heart disease, human immunodeficiency virus infection, and hypertension. Also included are the panoply of behavioral conditions, such as substance use and addiction disorders, mental illnesses, dementia and other cognitive impairment disorders, and developmental disabilities (Parekh et al., 2011).
5. 30-day Readmission: A subsequent inpatient admission to any acute care facility which occurs within 30 days of the discharge date of an initial inpatient admission. Any readmission is eligible to be counted as an outcome except those that are considered planned (CMS, 2021; Al-Amin, 2016).
6. Fee-For-Service (FFS): Traditional healthcare reimbursement model that bills based on individual services rendered. In this model, healthcare providers are paid based on the number of tests, procedures, or office visits (CMS, 2021)
7. Value Based Care (VBC): A reimbursement model based on the quality of care provided instead of the quantity of services provided. VBC model rewards care providers with incentive payments based on the overall quality of care rendered, patient improvement, and cost-efficiency. (CMS, 2021)
8. Accountable Care Organization (ACO): ACOs are groups of doctors, hospitals, and other health care providers, who come together voluntarily to give coordinated high-quality care to their attributed patients. The goal of coordinated care is to ensure that patients get the right care at the right time, while avoiding unnecessary duplication of services and preventing medical errors. When an ACO succeeds both in delivering high-quality care and spending health care dollars more wisely, the ACO will share in the savings it achieves (CMS, 2021).
9. Attributed Patient: A patient who received primary care services from a primary care physician (PCP), nurse practitioners (NPs), physician assistants (PA), and clinical nurse specialists (CNSs) during the performance period of the ACOs Shared Saving Contract. Primary care services

include evaluation and management of services provided in office or other non-inpatient and non-emergency-room settings, as well as physicals and wellness visits. If two ACOs tie for the largest share of a patient's primary care services, then the patient is assigned to the ACO that provided care services most recently (CMS, 2021).

10. Milliman Advanced Risk Adjusters (MARA): A software platform that utilizes claims data, diagnosis, and conditions for commercial, Medicaid, and Medicare payers to analyze concurrent and predictive risk scoring models to help healthcare organizations identify rising risk, assess and plan before risk rises, improve health outcomes, and reduce costs (Milliman Inc., 2018)
11. Patient Centered Home (PCMH): A care delivery model whereby patient treatment is coordinated through their primary care physician to ensure they receive the necessary care when and where they need it, in a manner they can understand (American College of Physicians, 2005).
12. Bundled Payments: Combining the payments for physician, hospital, and other health care provider services into a single bundled payment amount. This amount is calculated based on the expected costs of all items and services furnished to a patient during an episode of care. Payment models that provide a single bundled payment to health care providers can motivate health care providers to furnish services efficiently, to better coordinate care, and to improve the quality of care (CMS, 2021).
13. Patient Engagement: A concept that combines patient activation (patient's knowledge, skills, ability, and willingness to manage his or her own health and care) with interventions designed to increase activation and promote positive patient behavior, such as obtaining preventive care or exercising regularly. Patient engagement is one strategy to achieve the "triple aim" of improved health outcomes, better patient care, and lower costs (James, 2013).
14. Health Care Utilization: The quantification or description of the use of services by persons for the purpose of preventing and curing health problems, promoting maintenance of health and well-being, or obtaining information about one's health status and prognosis (Carrasquillo, 2013).

CHAPTER 2

LITERATURE REVIEW

In the United States (US), it is estimated that 35% of patients with chronic conditions or serious illness have experienced a failure in the coordination of their health care between healthcare providers and settings (Osborn et al., 2016). Fragmented healthcare can contribute to preventable hospitalizations, duplicative testing, and an increase in morbidity, which is estimated to cost the U.S healthcare system an additional $25 to $45 billion in healthcare spending (Nembhard et al., 2020). To improve care coordination and reduce unnecessary spending on healthcare expenditures, the federal government set value-based reimbursement models for quality care at the forefront of reimbursement models with the implementation of the Patient Protection and Affordable Care Act (ACA) of 2010.

Policy Implementation & Efforts to Reduce Healthcare Expenditures

Patient Protection and Affordable Care Act (ACA)

The ACA is the most significant legislative change in the U.S. healthcare system in nearly half a century and catapulted unprecedented reforms to improve healthcare based on the quality of care and value versus the traditional fee for service payment model (Bartels, Gill, & Naslund, 2015; Chee et al., 2016). The ACA established value-based incentive programs to reduce hospital readmissions, decrease healthcare utilization, and increase health promotion with greater emphasis on preventive health care (Bartels, Gill, & Naslund, 2015). ACA provisions included legislation for multiple incentives and rewards for value-based reimbursement such as accountable care organizations, bundled payments, and patient-centered medical homes with reimbursement adjustments varying based on performance value metrics (Chee et al., 2016).

Accountable Care Organization (ACO)

Originally, ACOs were established as a Medicare payment model, but there has been significant growth of ACO contracts among private payer settings across the healthcare continuum (Song, 2014).

ACOs are groups of providers who voluntarily accept joint responsibility for the quality and cost of patients they treat and share in the savings they generate as they engage in value-based payment models (Biles et al., 2012). ACOs must report yearly quality measures to be eligible to earn shared savings. ACO's quality performance measures span four standard domains: patient/caregiver experience, care coordination/patient safety, preventive care coordination, and at-risk populations (CMS, 2021).

Accountable Care Organizations (ACOs) are a crucial strategy for reforming health care delivery by giving providers more significant financial and quality accountability for their patients' healthcare and outcomes through better coordination and preventive care (Bleser et al., 2019). ACOs are voluntary collaborations among physicians, hospitals, and health insurance companies that work together to align care for their patients with the goal of coordinated care to ensure that patients get the right care at the right time while avoiding unnecessary duplication of services and preventing medical errors (CMS, 2021; Bleser et al., 2019; Yeung, Burns, & Loiacono, 2011). The goal of an ACO is to help the healthcare system reduce its overall spending by rewarding value instead of volume through creating an effective system of care coordination that links reimbursement directly to measures of quality outcomes and spending health care dollars more wisely (Bartels, Gill, & Naslund 2015; CMS 2021).

Medicare Shared Savings Program

Section 3022 of the ACA established the Medicare Shared Savings Program (MSSP) for ACOs intending to reduce fragmentation, improve population health, and lower overall costs on healthcare expenditures (CMS, 2020). The MSSP vision is that ACOs will promote the delivery of seamless, coordinated care that advances improved care and health while lowering expenditures (CMS, 2020). An ACO is required to demonstrate they are providing appropriate high-quality care while reducing costs by reporting specific federal required cost-savings benchmarks and high-quality measures to satisfy minimum levels of quality measures set by CMS (CMS, 2020). CMS will then assess the ACO’s overall quality performance to calculate the ACOs earned savings (CMS, 2020). In turn, the ACO will share the extra savings with participating providers based on different risk-sharing options (Yeung, Burns, &

Loiacono, 2011). The ACO collaboration encourages shared responsibility for quality care, patient satisfaction, and costs related to health care and is designed to improve patient care coordination and delivery, leading to a better patient experience and outcomes (Song, 2014; Yeung, Burns, & Loiacono, 2011).

Although ACOs Shared Savings Contracts were originally formed for Medicare Beneficiaries, the concept quickly grew in popularity with commercial payors entering into similar ACO shared saving contracts to improve quality care and reduce healthcare spending (Song, 2014). Benchmarks for reimbursement under commercial ACO contracts vary, but most rely upon the overall quality rating (STARS) achieved within each payer plan. The Star Rating Program is a measurement system created by CMS to rate healthcare organizations on more than 40 quality measures and assigns an overall quality score on a scale of 1 to 5, with 5 being the highest quality ratings (CMS, 2020). STARS quality ratings are dependent on various quality components such as care coordination as it relates to cost reduction, annual care visits, pre-visit planning, care gap closure rates, and medication adherence rates and often overlap with other programs, surveys, and initiatives that have a significant impact on measuring performance and quality care (CMS, 2020).

Patient Centered Medical Home (PCMH)

The ACA also encouraged the widespread adoption of the Patient-Centered Medical Home (PCMH) with ten provisions within the ACA explicitly mentioning “health home” or “medical homes” and offering states the option to increase reimbursement to primary care sites designated as health homes for Medicaid patients with chronic conditions (Davis, Abrams, & Stremikis, 2011; CMS, 2021). The PCMH is a care delivery model whereby patient treatment is coordinated through their primary care physician to ensure they receive the necessary care when and where they need it, in a manner they can understand (American College of Physicians, 2005). This model focuses patient-centered care on the successful coordination and delivery of accessible, comprehensive, and core primary care functions ensuring quality and safety (Bell, 2020). The core principles of the PCMH include a team-based comprehensive approach, access to care, accessibility of services, a holistic approach, optimal quality and safety outcomes, an ongoing partnership with the patient over time, and coordination of care across hospitals, specialist providers, and community-based services (Jackson et al., 2013). Although similar to the ACO model, PCMHs differ on the premises a primary care practice can decide on its own to adopt the PCMH model, whereas an ACO requires a network of providers and could include several medical homes (Edwards et al., 2014). ACOs are often referred to as a medical neighborhood that includes primary care providers, specialists, and hospitals who agree to keep the costs to a minimum while improving health outcomes during the continuum of a patient's medical care (Foreman, 2012).

Bundled Payment

Another value-based reimbursement model created under the ACA by the Center for Medicare and Medicaid Services (CMS) Innovation in 2013 was developing the Bundled Payments for Care Improvements (BPCI). This model was one of the first CMS single episode bundled payment options to allocate a fixed payment that includes financial and performance accountability for an episode of care and aimed to increase quality and care coordination (CMS.gov, 2018). Under the bundled payment contract, an estimated payment amount is calculated based on the expected costs of all items and services furnished to a patient during an episode of care (Siddiqi et al., 2017; Engelman, 2017; Barinaga, 2016, CMS.gov, 2018). If the cost of the care episode is less than the bundled payment amount, the providers (hospital and physicians) can keep the difference, but if the cost exceeds the bundled payment amount, the providers endure financial liability (Engelmanm, 2017). This value-based payment model methodology incentivizes healthcare providers to improve management of resources and coordinate care to reduce expenditures while improving the quality of care (Engelman 2017; CMS 2018).

Hospital Readmission Reduction Program (HRRP)

According to the National Institute for Health Care Reform, one in every twelve adults being discharged from a hospital will be readmitted within thirty days, and the highest readmission rates occur in patients with public coverage, mainly Medicare or Medicaid (Sommers & Cunningham, 2011). The patient characteristic of Medicare and Medicaid beneficiaries are often the elderly, disabled, and those from low socioeconomic status who often have various social and economic factors that affect them, causing a disproportionately higher rate of hospital readmission and missed outpatient providers appointments (Desai & Stevenson, 2010). A critical transition point across the healthcare continuum is discharging from the hospital, where research data has shown that 47% of hospital readmissions were potentially preventable (National Committee for Quality Assurance, 2021). Miscommunication, lack of care coordination, poor management of chronic conditions, lack of proper follow-up care, and medication errors are described as preventable consequences of hospital readmissions within thirty days of discharge (National Committee for Quality Assurance, 2021; Jencks, Williams, & Coleman, 2009). Improved care coordination in the discharge and post-discharge period can prevent avoidable hospital readmissions and improve quality healthcare outcomes (National Committee for Quality Assurance, 2021)

The ACA established the Hospital Readmission Reduction Program (HRRP), which made hospitals with unacceptably high readmission rates for Medicare and Medicaid patients face financial penalties as part of their value-based programs designed for better care for individuals, better health for populations, and lower costs (CMS.gov, 2020). The HRRP targets six specific conditions or procedure-specific measures, which include acute myocardial infarction (AMI), chronic obstructive pulmonary disease (COPD), heart failure (HF), pneumonia, coronary artery bypass graft (CABG) surgery, and elective primary total hip arthroplasty and/or total knee arthroplasty (THA/TKA) (Gai & Pachamanova, 2019). The National Committee for Quality Assurance (NCQA) established Healthcare Effectiveness Data and Information Set (HEDIS) comprehensive performance measures, including the rate of unplanned acute readmission for any diagnosis within 30 days (NCQA, 2012). This standardized set of standards impacts the organization's accreditation by NCQA and ultimately influences purchaser's and consumer's choices of health plans and providers by producing the information they need for reliable comparison (NCQA, 2012).

The policy reform implemented by the HHRP's main objective was to encourage hospitals to improve care coordination to better engage patients and caregivers in discharge plans and, in turn, reduce avoidable readmissions, improve quality care, and lower healthcare costs (Lee, 2013). Since the HHRP went into law, there have been statistically significant reductions in readmission rates in hospitals serving the largest percentage of low-income patients and high-risk patients, as well as evidence of hospital admission reduction for non-targeted conditions (Gai & Pachamanova, 2019).

Triple Aim Framework

The ACA healthcare reform focuses on the Triple Aim: access, quality, and cost (Bleich, 2013). Developed in 2007 by the Institute for Health care Improvement (IHI), the Triple Aim Framework describes an approach for optimizing performance, reducing costs, and improving patient care through various interventions and metrics (Institute for Healthcare Improvement 2007, Block; 2014). The approach simultaneously pursues three dimensions, which include (1) improving the patient experience of care, (2) improving the health of populations, and (3) reducing the per capita cost of health care (Institute for Healthcare Improvement, 2016). Achieving the triple aim has broad bi-partisan political support and has been a national priority (McClellan & Leavitt, 2016). Healthcare organizations utilize many methodologies to achieve the Triple Aim of healthcare (Block, 2014). The structure most identified with managing a defined population's health is the Accountable Care Organization (ACO), with a specific focus on care coordination teams and transition care management to achieve the Triple Aim goals (Block, 2014; Berwick, Nolan, & Whittington, 2008).

Data Sharing

Patients with multiple chronic conditions usually visit many providers across several healthcare settings, often in an uncoordinated manner, which could lead to primary care providers not receiving proper or timely access to patient medical records to manage and coordinate complex patients with multiple health problems (Clark, 2017; Smith et al., 2005; Cebul et al., 2008). Electronic Health Records (EHRs) frequently lack interoperability across healthcare organizations, and providers often lack necessary patient information, placing patients at increased risk of poorer health outcomes (Kruse et al., 2018). This lack of healthcare data sharing can lead to a fragmented picture of a patient's care and put patients at higher risks of delayed diagnosis and treatment, medication errors, and increased healthcare utilization and spending. One key benefit of ACOs Shared Savings Program is insurance claims data from all patient claims is shared with health care providers to help break down unintegrated healthcare silos and coordinate patient care (CMS, 2020).

Insurance payors provide ACOs with information on their attributed patient population based on monthly claims data and diagnosis codes as well as financial performance metrics at the start of the agreement period and routinely during the performance year (CMS, 2020). Data sharing allows healthcare organizations to connect the fragmented care services and provides insight to a more complete and up-to-date view of the patient's health (Mookencherry, 2012; CMS, 2021). Synergy among care providers improves health care by delivering higher quality care and lower costs (Clarke et al., 2017; CMS, 2021). Data sharing is a critical step in understanding the complex patient needs, but raw data must be utilized in a meaningful way to go even further.

Patient Risk Identification Technology

Risk stratification software takes raw data and generates data enrichment through algorithms, data models, or other methodologies to deliver data in a more meaningful and insightful approach. Risk stratification is a process by which risks to the health and well-being of a population of patients are quantified, and patients are grouped by risk level, typically high risk, medium risk, and low-risk subpopulations (Dorr et al., 2021). Risk stratification can be used to tailor proactive clinical care, provide preventive measures, and allocate resources more appropriately to improve the quality of care and reduce healthcare expenditures (Haas et al., 2013; Johnson et al., 2015; Girwar et al., 2021) Risk stratification software enables ACOs to get a clearer representation of their attributed patient population and predict patients susceptible to adverse outcomes and mitigate the risk outcomes.

Value Based Impact of Care Coordination Programs

Ambulatory Care Coordination and Transition Management (CCTM) effectively deliver value-based care to the most vulnerable patient populations (Brown et al., 2012). CCTM program outcomes include achieving quality and financial goals, reducing readmission rates, decreasing duplication of services, and increasing awareness from patients and family caregivers to provide more effective care from home (Salmond & Echevarria, 2017). Care coordination activities include establishing provider accountability for the patient, communicating healthcare information, assisting with transitions of care throughout the healthcare continuum, assessing patient and family needs and goals, developing a patient-centered care plan, following-up and responding to patient needs, providing patient support and education for self-management goals, providing and aligning patient needs and community resources (AHRQ, 2014). The overall goal of CCTM is to improve healthcare utilization by improving care coordination through chronic disease management and effectively transitioning patients between different healthcare settings (Naylor, 2011; Naylor, 2004; World Health Organization, 2016).

Research shows outpatient care coordination improves the health outcomes of patients with multiple chronic diseases (MacPhail et al., 2009). Care coordination improves the quality, appropriateness, timeliness, and efficiency of clinical decisions and care, thereby improving the quality, value, and efficiency of health care overall (Meyers et al., 2010). Care coordination has been linked to increased use of preventative health services, increased access to care resulting in decreased hospitalizations, and overall positive health outcomes (Hwang et al., 2009). Numerous studies and systematic reviews have found the implementation of CCTM models results in improved health outcomes and lower healthcare utilization costs for complex chronically ill patients (Grady & Gough, 2014; Marek et al., 2010; Reynolds et al., 2018; Schulman-Green et al., 2012; Smith et al., 2017; De Regge et al., 2017; Van Eeghe, Littenberg, & Kessler, 2018).

Research also demonstrates how the lack of care coordination can have negative consequences on patients' health outcomes (Hwang et al., 2009; Weeks et al., 2013). Fragmented care and improper coordination can lead to confusion, worry, and unnecessary strain on patients and their families (Hwang et al., 2009). Poor health outcomes, medication errors, duplicate testing, hospital readmissions, preventable emergency room visits, and uncontrolled disease progression are adverse outcomes of the lack of care coordination (Weeks et al., 2013). CCTM models may include a variety of components, but the two main parts include Chronic Disease Management for high-risk patient populations and Transition Care Management for recently discharged hospitalized patients. Care Coordination and Transition Management are integrated functions that may occur simultaneously or separately (Haynes, Swan, & Haas, 2014).

Chronic Disease Management

Chronic Disease Management is one critical component of care coordination for high-risk patient populations. Patients diagnosed with chronic diseases require greater levels of chronic care management services and support for managing their conditions, improving quality of life, and lowering health care costs (Benzo et al., 2013). Chronic disease conditions can negatively impact a person’s overall quality of life and affect their physical, mental, emotional, and social well-being (Grady & Gough, 2014). One out of four patients have at least three different specialists treating their chronic disease conditions, highlighting the significance of implementing an effective care coordination program (Ward, Schiller, & Goodman, 2014). Care coordination programs manage healthcare costs and disease by converting high-risk patients into lower-risk patients through various interventions and management strategies (Nembhard et al., 2020). Interventions and management strategies may include assisting patients in managing symptoms, ensuring medication adherence, providing self-management tools to minimize disease exacerbations, and reducing unnecessary healthcare utilization of non-emergency calls, ED visits, hospital admissions (Clarke et al., 2016; Davis et al., 2019; Jubelt et al., 2015). Boyd and colleagues demonstrated this by enhancing the Chronic Care Model utilizing nurse care coordinators for a panel of 50-60 high-risk older adults (2009). The nurses used interventions to improve patient decision-making, self-management, and access to resources for chronic illness and complex needs (Boyd et al.,2009). The researchers found patients in the intervention group reported their quality of care higher, providing evidence of the value of care coordination for patients with chronic conditions (Boyd et al.,2009). Research has proven active care coordination can provide a complete view of a patient allowing providers to decrease barriers and connect patients to community support and resources to avoid diversions that delay necessary care while improving quality and cost outcomes (Clarke et al., 2016; Nembhard, 2020). The Gundersen Lutheran Health System's Care Coordination model demonstrated significant cost reduction results by targeting the sickest top 1-2% of the health system (Berry et al., 2013). The team of nurses and social workers managed patient care in the ambulatory setting as much as possible and identified a cost savings of $6.5 million in the first year and an additional $3 million saved in the second year of the implementation of the program (Berry et al., 2013).

Similarly, Laughlin and Biesel utilized the Chronic Care Model and conducted several pilot projects for RNs to improve the care of chronically ill patients in ambulatory care settings (2010). The researchers' analyses documented a six-month telephone outreach program that promoted patient self-management skills and helped decrease self-care barriers (Laughlin & Biesel, 2010). Another randomized control study of 174,120 participants of a telephone-based care management program analysis resulted in reduced costs and resource utilization (Wennberg et al., 2010). Wennberg and colleagues provided evidence of an $8.48 lower per-person cost in one year, which translates into a 4.4% reduction in cost reduction in overall healthcare expenditures (2010). Atherly and Thorpe demonstrated even more savings, calculating a 15.7% lower annual spending in their high cost chronically ill Medicare patient group utilizing an inter-professional nurse-led care coordination program (2011). Patients with chronic conditions have complex health needs and are at risk for adverse outcomes due to fragmented and delayed care that contributes to rising health care costs and lower quality of life (Dorr, 2021). The literature reveals that chronic care management models that aim to provide comprehensive care for patients with chronic conditions improve quality of care and reduce healthcare costs (Boehmer et al., 2018).

Transition Care Management (TCM)

The second critical component of care coordination is transition management, defined as the ongoing support of patients and their families as they navigate care among healthcare providers and across the healthcare continuum (AAACN, 2016). The time right after a patient discharges from the hospital can be a critical transition point for the patient as well as the family and caregivers. Transitional care programs aim to harmonize primary care in disease management, discharge planning, or case management by educating patients with chronic disease and their caregivers to avoid preventable poor outcomes and avoidable hospital readmissions (Whitaker-Brown et al., 2017; Naylor, 2008; Naylor, 2004). CCTM interventions encompass a broad range of health services, including patient or caregiver education on self-management of chronic conditions, discharge planning, structured follow-up, and coordination among health care professionals involved in the transition, including primary care physicians and other medical specialists (Vedel & Khanassov, 2015). Effective TCM can prevent medical errors, identify issues for early intervention, avert unnecessary hospitalizations and readmissions, support consumers' preferences and choices, and avoid duplication of services, thereby improving the quality of care while utilizing resources more effectively (Clarke et al., 2017).

Many researchers suggest care coordination is most effective in older adult populations when transitioning from one level of care to another, such as a discharge from the hospital to home (ANA, 2012). Transitional care coordination models in the acute care setting improve patient quality of care through decreasing emergency room visits and preventing of unnecessary hospital readmissions in the 30 days post-hospitalization (Naylor et al., 1994; Naylor et al., 1999; Naylor et al., 2004; Naylor et al., 2011; Robinson, 2010). The literature further demonstrates care transitions can decrease hospitalizations beyond the 30-day timeframe, with studies showing the lasting effects at 90 days and 180 days post-hospitalization (Parry et al., 2009; Coleman et al., 2006). Naylor and colleagues conducted a randomized control trial of an advanced practice nurse-led hospital transition care program that followed hospitalized heart failure patients from admission to three months post-discharge (2004). The study results estimated $4,845 average cost savings per patient over three months with a significant increase in survival and reduction in hospital readmissions (Naylor et al., 2004). Coleman and colleagues demonstrated similar cost savings with their randomized controlled trial of 750 participants of the Care Transitions program led by a team of APRNs and RNs (2006). The participants were hospital discharge patients 65 years or older enrolled in a four-week program comprising one home visit within 48-72 hours post-hospitalization and three follow-up phone calls during the 28 days after hospital discharge (Coleman et al., 2006). The study results demonstrated improved quality of care, self-reported confidence in self-management skills, and an estimated cost savings of more than $295,000 (Coleman et al., 2006). However, cost savings and the cost associated with implementing and maintaining care coordination programs have had mixed outcomes in the literature (Magill, 2015). For comparison, a review of fifteen randomized control trials revealed only nine examined the effects of hospitalizations and healthcare expenditures; furthermore, only two of the nine programs demonstrated a significant decrease in hospitalizations, and none of the programs in the study generated net savings (Peikes et al., 2009).

Nurse-Led Care Coordination Team

Care coordinators are often referred to as case managers or health navigators and assist patients in communicating to various providers, educating and promoting self-management skills through creating and implementing care plans, and accessing community resources (Scholz Mellum et al., 2018; Ghaffari et al., 2020). The AAACN identifies the registered nurse as the pivotal agent to lead CCTM, citing the knowledge and expertise required to collaborate with the internal team members, lead teams, educate patients and caregivers, and communicate with stakeholders within the health system and across the care continuum (2016). The American Nurses Association contributes to this notion expressing RNs are significant partakers of patient care coordination efforts for patients with complex medical needs (ANA, 2012). Nurse care coordinators must have a defined role separate from ambulatory office settings distractions so they can focus solely on proactive care coordination functions for high-risk patients (Laughlin & Biesel, 2010).

Research findings suggest that a nurse-led care coordination model can provide a range of positive coordinated health care outcomes and improvement in crucial value-based performance metrics (Nembhard et al., 2020; Davis et al., 2019). Many research studies have documented the effectiveness of nurse-led and patient-centered care coordination programs and services (Boyd et al., 2009; Coleman et al., 2006; Naylor et al., 1999; Naylor et al., 2010; Naylor et al., 2011). One multisite study found nurse care coordination for children and youth in an ambulatory care coordination setting reduced emergency room visits by 81% and decreased unnecessary office visits by 63% providing clear evidence nurse care coordinators save money for the patients and the healthcare system (Antonelli R.C., Stille, C. J., & Antonelli, D.M., 2008). Nurse-led care coordination models also have lasting positive effects on the healthcare system. Kansagra and colleagues conducted a systematic review of the literature and found nurse-led transition care programs demonstrate significant reductions in hospital readmissions for up to one-year post-discharge (2016). Swan and colleagues further explain nurses as pivotal in connecting puzzle pieces of fragmented care and looking at the whole person to deliver needed care in a timely and quality manner while working to the top of their license and full potential as an integral part of the interprofessional team (2019).

Teamwork and collaboration with primary care physicians, specialists' providers, social workers, and other healthcare professionals is critical for CCTM success. The Institute of Medicine (IOM) reports that nurses must serve as "full partners with physicians and other health professionals in redesigning health care in the United States" (IOM, 2011). A collaborative team-based approach reduces preventable admissions to the emergency department, and hospital stays by improved resource utilization (Edwards & Landon, 2014; Garwood et al., 2016; Lovelace et al., 2016). Berry and colleagues emphasize the importance of creating teams that include nurses and social workers, noting capitalizing on specific training and collaborating their skills and knowledge with the patient and family (2013). The researchers further describe care coordination social workers' influence on patients with complex social and behavioral factors and how the community network of contacts can eliminate healthcare barriers (Berry et al., 2013). Utilizing a nurse care coordination and interprofessional clinical team approach has demonstrated significant cost reductions among high-cost chronically ill patients (Atherly & Thorpe, 2011). Nurses play a key role not just as members of interprofessional clinical teams, but leaders within those teams (IOM, 2010).

Nursing Process for Monitoring and Evaluation of CCTM Care Plan Goals

Creating a patient and family-centered care plan is one of the most common activities to implement when coordinating care across settings to ensure patient goals and preferences are documented and communicated among all healthcare providers (Duan-Porter et al., 2020). Care plans are written documents that include goals, interventions, and outcomes and are essential for managing chronic disease and improving patient outcomes (Reeves et al., 2014; Burt et al., 2014; Adams et al., 2013). The care coordinator must collaborate with the informed patient and involve family members to review, discuss, and agree upon interventions to achieve the care plan goals that are most important to the patient (Burt et al., 2014; Lhussier et al., 2015). Nurse care coordinators promote adherence to clinical care plans by educating and empowering patients and their caregivers to engage in self-care management activities (Atherly & Thorpe, 2011). Nurses apply the nursing process to determine if patient care plan goals are achieved to empower the patient and family to be involved in assessments, planning, interventions, and evaluation of effectiveness pertaining to the management of the patient's care plan (Haynes, Swan, & Haas 2014). The nursing process is a systematic critical-thinking approach that includes assessment, nursing diagnosis, planning, implementation, and evaluation, which nurses use to guide patient-centered care (ANA, 2014). Evaluation of care coordination goals is an ongoing process, and goals can be altered based on the patient's response and satisfaction with the plan of care. The registered nurse will continue all steps of the nursing process until all patient goals and outcomes are met to the nurse and patient satisfaction (Haynes, Swan, & Haas 2014).

The literature reveals several methods health care systems measure care coordination outcomes. Veet and colleagues conducted a systematic review of sixty-four studies and found costs, utilization, and patient-reported outcomes to be the primary ways to measure program success (2020). The researchers noted 80% of studies utilized clinical outcomes as measurement and only 9% utilized patient experience and patient satisfaction as outcome measurements (Veet et al., 2020). Other methods used to evaluate the success of care coordination models include findings from focus groups, site visits, trending performance on expenditures, utilization, and quality of care monitoring projects (Greenwald, 2015). Limited and conflicting performance data related to costs, quality, and patient satisfaction of care coordination programs have led to inconsistent literature relating to the quality, overall costs, and healthcare utilization (Friedberg et al., 2014; Hasselt et al., 2015). Additionally, capturing and analyzing care coordination activities for effectiveness across health systems is a challenge due to the lack of a unified standard of measure between organizations using different performance measurement techniques (Coleman et al., 2004; Kind et al., 2007; Pollack et al., 2013).

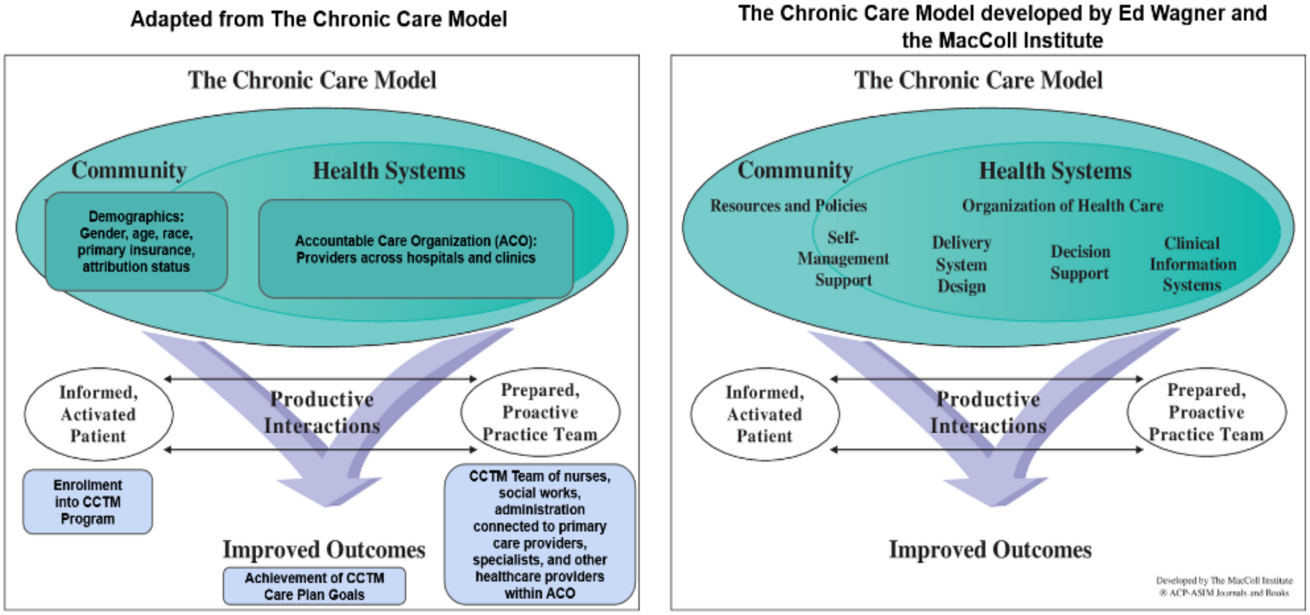
Care Coordination Participant Demographics

Patient enrollment patterns into CCTM programs vary among the literature across patient demographics such as age, sex, race, and insurance type (Parry et al., 2009; Verhaegh et al., 2014; Budde et al., 2021). Age is linked to rising financial costs as elderly populations utilize more healthcare, have more chronic conditions, higher rates of readmissions, and more difficulties navigating the fragmented healthcare system (Mariner, 2014; Budde et al., 2021). Many studies in the literature only include Medicare and Medicaid insured patient populations, while others go even further limiting inclusion to patients 65 years and older (Parry et al., 2009; Marek et al., 2010; Atherly & Thorpe, 2011; Coleman et al., 2006; Verhaegh et al., 2014, Budde et al., 2021). CCTM programs can have various effects on healthcare utilization and cost savings when age is factored into the equation. For example, a meta-analysis of twenty-six transitional care interventions revealed a reduced rate of readmission in patients 60 and older in the short term (30 days post-hospital) but a higher reduction in the long term (180 days post-discharge) for patients ages 18-25 years of age (Verhaegh et al., 2014). Exclusions of a certain age and insurance types affect the generalizability of the CCTM program outcomes.

Race is another significant demographic when seeking to understand care coordination models and their impact on health equity. Healthcare inequities exist most among African Americans, Hispanics, and Asian populations and are still a significant issue of concern within the U.S. Healthcare system (AHRQ, 2010). Budde and colleagues completed an overview of eleven systematic reviews and found nine tailored services specifically to ethnic minorities and disadvantaged patient populations (2021). Further stratification by sex and race can also reveal varying results of care coordination gaps and outcomes. Kern and colleagues conducted a national survey of 15,817 participants aged 65 and older and found self-selected respondents were 55% female and 34% African American (2020). In the literature, females appear to be more receptive to enrolling in care coordination services. For instance, a retrospective evaluation study of the relationship between costs and a nurse-led care coordination program found that 74% of females agreed to enroll in the program (Marek et al., 2010). But still, some research is limited by the unique study population served. This limitation is illustrated in one Veteran Hospital randomized control trial of a nurse-led telephone care coordination model (Connor et al., 2020). The study demographics comprised 95% men, 76.4% Caucasians, and an average age of 69.4 (Connor et al., 2020). Stratifying patient enrollment patterns based on demographics such as age, sex, race, and insurance type is an interest of many healthcare organizations with care coordination programs that serve a diverse population.

Theoretical Framework

Wagner Care Model



Adapted from The Chronic Care Model

The Chronic Care Model developed by Ed Wagner and the MacColl Institute

Figure 1: The Chronic Care Model Adapted from the Chronic Care Model: Developed by the ACT Center, Formerly Known as the MacColl Center for Health Care Innovation

Wagner's Care Model will be used as the overarching theoretical framework for this dissertation. In 1998, Dr. Edward Wagner and the MacColl Center for Healthcare Innovation developed, The Chronic Care Model (CCM) to overcome the insufficiencies that existed in the management of chronic diseases (Wagner, 1998). Wagner's original Chronic Care model was based on several assumptions: highest cost chronically ill patients benefit most from a collaborative approach directed by primary care providers, care management is ideally guided by a lead care manager or patient advocate, and improved patient outcomes are linked with health savings (Wagner, 1998). Wagner's Care Model has been recognized for shifting focus from acute care to a population health approach that illustrated the connection between health systems and communities to support patients in managing their chronic illnesses (Cramm & Nieboer, 2013). The Care Model includes four primary hierarchical constructs that illustrate the interplays of healthcare and the chronically ill patient: (1) Community/Health Systems, (2) Services, (3) Productive Interactions, and (4) Improved Outcomes (Improving Chronic Illness Care, 2015).

Community/Health Systems

Community and Health Systems represent the green oval at the top of the Care Model where these two co-dependent systems blend together to form the environment that supports the chronically ill patient (MacColl Center, 2016). The community represents where the patient lives and often obtains resources, services and support through programs, partnerships, advocacy agencies, and policies such as disability and civil rights legislation that protect and support the patient (MacColl Center, 2016). The Health system represents health care services available to the patient and the culture, leadership, structures, and mechanisms that promote safe and quality care (Improving Chronic Illness, 2015). The health system exists within the community through an active relationship to ensure appropriate access to resources to enhance the health and support the patient through his or her chronic disease (MacColl Center, 2016).

Community & Health system in this dissertation

The community in this dissertation is represented by a racially diverse population of Metro-Atlanta, Georgia residents. The race distribution is 51% Black, 40.9% White, 4% Asian, and 4% Hispanic (Census, 2019). According to the CDC, the three leading causes of poor health in Georgia are Heart Disease, Cancer, Chronic Lower Respiratory Disease (2018). The Health System is Emory Healthcare (EHC), an integrated academic health care system that includes 250 locations, 11 hospitals, including primary care, urgent care, and Minute Clinics. Emory Healthcare is an Accountable Care Organization with five shared savings contracts. The community and health system are synergistically linked through underlying concepts as illustrated in the Wagner Care Model: (1) Self-management support, (2) Delivery System Design, (3) Decision Support, and (4) Clinical Information Systems. The following sections describe each concept and sub-concept and detail how it relates to the study.

Self-Management Support

Self-management support represents empowerment and prepares the patient to manage their health and care. The patient has the fundamental role of managing their care, participating in goal setting, problem-solving, action planning, and formulating a care plan with frequent interactions and follow-up with their healthcare team (Wagner et al., 2001). Self-management indicates that patients control their choices and behaviors that may impact their ability to manage and control their chronic illness and overall health (Improving Chronic Illness Care, 2016). Patients with chronic conditions must understand how to manage and live with their illness and successfully navigate the community and the health system efficiently. Self-management support strategies include assessment, goal setting, action planning, problem-solving, and follow-up. (MacColl Center, 2016). Therefore, the health care team's role is to provide the support and education needed and equip the patient with the services and tools to manage their own health (Improving Chronic Illness Care, 2016). The health care provider organizes internal and community resources to provide ongoing self-management support to help guide and support the patient, but ultimately the patient is responsible for navigating the health care system (MacColl Center, 2016).

Self-Management Support in this dissertation

The nurse care coordinator initiates proactive telephonic outreach to discuss care coordination with the patient or primary caregiver. Communication care strategies include telephone and patient portal outreach. The patient must agree to enroll in the care coordination program and receive education, self-management skills, referrals, and other support provided by the care coordination services. Together with the patient and primary care provider, the care coordinator develops a mutually agreeable patient-centered care plan. The nurse care coordinator performs a comprehensive assessment with the patient and connects the patient with necessary referrals, appointment scheduling, resources, healthcare agencies, or health team members such as a social worker for additional resources. The nurse care coordination follows up with the patient to ensure those connections were completed successfully and identify any further gaps in the care plan. This coordinated support structure empowers patients with self-management skills and assists them in achieving health goals (Burkhart et al., 2019).

Delivery System Design

The Delivery System design assures a structure for delivering effective, efficient clinical care designed to support and manage the patient. The Care Model emphasizes a Delivery System transformation from reactive healthcare to one that centers on being proactive by sustaining optimal health (MacColl Center, 2016). This proactive delivery system defines roles and distributes tasks among team members, plans interactions to support evidence-based care, delivers care that patients understand and suit their cultural background, and implements coordinated care for complex care patients, including regular follow-up (MacColl Center, 2016). The care team utilizes this proactive approach by anticipating risks and planning action rather than responding when a patient is acutely sick. Research shows patients with chronic conditions may require more health management to optimize their ability to self-manage their conditions (MacColl Center, 2016).

Delivery System Design in this dissertation

The delivery system design will be operationalized by the Care Coordination team in this dissertation. The team is a collaborative interprofessional team of registered nurses, social workers, and care coordinator associates who work alongside the ambulatory primary care clinic team. The registered nurse functions as care coordinators and team leaders, completing proactive outreach to the patient, developing and coordinating the care plan, empowering patients/families to be active participants in the care, connecting patients to services, and proactively engaging with patients to meet their care plan goals. The care coordinator associates assist the nurse care coordinators in scheduling patient appointments, connecting patients to specialists' referrals, and scheduling care gap appointments. The social workers complete the team and provide education and community resources for this high-risk, complex patient population

Decision Support

In the Care Model, Decision Support describes the clinical care processes to support patient care based on innovative, evidence-based methods, highest quality medical research, and integrated specialist expertise, along with the patient preference for care (Improving Chronic Illness Care, 2016). Healthcare providers utilize proven provider education tools such as timely reminder systems for needed services, standing orders, and protocols to tailor care for individual patients requiring more concentrated care. Decision support tools provide both patient and population-specific data to identify groups of patients requiring additional support and measure the performance and quality of the care efforts (MacColl Center, 2016).

Decision Support in this dissertation

Decision support is operationalized in this study by the Emory Healthcare Shared Savings Contracts with the Medicare and Commercial insurance payors. As an Accountable Care Organization, Emory Healthcare is held responsible for providing care coordination services to their attributed patient population. Patients become attributed to Emory Healthcare when they establish care with a primary care provider within the Emory Healthcare organization. The entire attributed patient population is then risk-stratified to identify the highest risk patient population. The care coordinators then actively outreach to the high-risk patient population to offer care coordination services.

Clinical Information Systems

Clinical Information Systems (CIS) are the systems within the environment that collect and organize patient and population data to facilitate timely and effective care (MacColl Center, 2016). The CIS should have data sharing capabilities to coordinate individual patient care between care team members, different healthcare settings, and providers (MacColl Center, 2016). The CIS should have disease management information and recommendations for providers to monitor preventative screenings, quality care gaps, and testing recommendations based on the patient diagnosis (Improving Chronic Illness Care, 2016). The CIS should have interoperability to share data electronically, monitor patient outcomes, and evaluate the performance of the practice team and care system (MacColl Center, 2016).

Clinical Information Systems in this dissertation

All clinics and hospitals within the Emory healthcare system use Cerner's Power Chart and/or Power Works Electronic Medical Record (EMR) as the clinical information system. Within this EMR, the system is integrated with Georgia Health Information Exchange and the Georgia Registry of Immunization Transactions and Services (GRITS) system to share data among healthcare providers on other EMR systems for better-coordinated health care. The Georgia Health Information Network (GaHIN) facilitates the use and exchange of secure restricted access to electronic health information across a network of participating doctors, hospitals, and other healthcare facilities throughout Georgia (Emory Healthcare HIE, n.d.). Patients are able to opt out of the Emory HIE, but information can be shared via previously established methods such as phone, fax, mail or through an existing electronic medical record (Emory Healthcare HIE, n.d.). In addition, the GRITS integrations allow providers quick and easy access to immunization records on individuals and generate immunization status with the goal to assure that all persons in Georgia receive appropriate, timely immunizations and avoid duplicate immunizations (Georgia Immunization Registry 2021).

Wagner's Care Model illustrates the interconnectedness of the Community and the Health System's capacity collectively. The large green oval at the top of the model demonstrates the Health Systems impact on the Delivery System Design, Decision Support, and Clinical Information Systems as the inner circle darkens under it. The lighter fade under Community displays the impact under Self-Management Support. The entire green oval exhibits the partnership of the Community and the Health System and how they must work collectively to support and care for the chronically ill patient.

Services

The second construct in the Wagner Care Model is the smaller lavender oval that represents Services. Services are activities or interventions provided to the patient by a health care system within the Community and Health System. The expanded Wagner Model includes service characteristics to be effective in producing both an informed, empowered patient and to be a prepared, proactive clinical team described in the Institute of Medicine Crossing the Quality Chasm report (2016). The service characteristics include (1) Patient-Centered, (2) Timely and Efficient, (3) Evidence-Based and Safe, and (4) Coordinated (MacColl Center, 2002). The following sections describe each sub-concept of Services and detail how the sub-concept relates to the study.

Patient-Centered Services

Patient-centered care makes the patient the center of the care team, placing the informed patient in control of their health and respecting their cultural beliefs, preferences, lifestyle, and values (Institute of Healthcare Improvement, 2016). Holistic, individualized, respectful, and empowering are four key attributes demonstrating patient-centered care (Morgan & Yoder, 2012). Supporting, encouraging, and collaborating with the patient and their family is essential to allowing patients to manage their care plan, goals, solutions, and follow-up treatment.

Patient Centered Services in this dissertation

Patient-centered is applied to the standard practice and culture at Emory Healthcare Care and is a significant construct on the Emory Care Transformation Model developed in 2008 (Care Transformation Model at Emory Healthcare, 2008.). This model was developed to improve and embrace patient and family-centered care as a guiding principle to provide care with patients and their family members instead of doing things to and for patients and their families (Care Transformation Model at Emory Healthcare, 2008.). The Emory Care Coordination team holds this principle true as they proactively outreach to patients and their families to provide care coordination and collaboratively develop a patient-centered care plan to guide their care coordination efforts. On the initial call with the patient, the care coordinator offers information about resources and services available through care coordination and works together with the patient to understand the patient’s current social, emotional, physical, and cognitive needs. The care plan is fluid and can change throughout the patient’s enrollment with the care coordination team as the patient's needs, goals, and desires change. Consistent support, education, and follow-up help empower the patient to take control of their own health and care plan to achieve their set goals and become less risky for poor health outcomes.

Figure 2: Emory Healthcare Care Transformation Model, 2008.

Timely and efficient services

Timely and efficient health care is provided at the right time with the right amount of resources (Institute of Healthcare Improvement, 2016). Timely care is care provided promptly and without delay for those who receive care and those who give care (Institute of Medicine, 2001). Waiting on the phone to discuss symptoms, waiting to schedule appointments, waiting for test results, or even waiting in a doctor's office can take an unnecessary emotional toll on patients, especially those with chronic illnesses who need more frequent healthcare visits. Reducing wait times and increasing patient access is essential to promptly assess patient's medical concerns and minimizing disease exacerbations that lead to emergent situations in the emergency room or hospital settings. Efficient care is another strategy that is important in the management of patients with chronic conditions. Efficiency in healthcare provides care that reduces waste by eliminating unnecessary repetition of services (Institute of Medicine, 2001). The complex, fragmented

U.S. healthcare system is criticized for its wastefulness and overuse of healthcare resources (Institute of Healthcare Improvement, 2016). To provide timely and efficient care, one healthcare team must assume the responsibility for ensuring care is holistic and coordinated among all specialty services and providers.

Timely and efficient services in this dissertation

The Care Coordination team provides timely and efficient care to the patient. Rather than waiting for the patient to contact the primary care clinic, the nurse care coordination makes proactive telephonic outreach to assess the patient's healthcare needs or concerns. The nurse care coordinator then sets goals with the patients and provides education to prevent any disease exacerbations that may lead to poor health outcomes or costly healthcare utilization. The nurse care coordinator also completes medication reconciliation with the patient to ensure medications are taken as prescribed and answer any medication-related questions or concerns. In addition, the nurse care coordinator sends appointment requests to care coordinator associates to ensure patients are scheduled with internal specialty referrals as advised to prevent any potential gaps in care. The nurse care coordinator also makes social work referrals for patients who need additional assistance with community resources. Lastly, patients are provided the direct contact information to their nurse care coordinator. Patients are encouraged to reach out directly for any issues or concerns to ensure healthcare needs are met in a timely, efficient manner to minimize urgent care, emergency care, and hospitalizations.

Evidence-based and safe services

Evidence-based practice is clinical activities grounded in the most reliable current evidence from rigorous research findings combined with clinical expertise to reduce the risk of harm (Institute of Healthcare Improvement, 2016). As new medical knowledge and advances are presented, clinical processes and technology must adjust to implement the best evidence-based approach. Safety is another vital component of patient care. Providing safe care suggests patient care is rendered in a way that is free from unintended injury (Institute of Medicine, 2001). Standardization is an essential component of providing safe care (Haas, Swan, & Haynes, 2014). Developing an organizational culture where mistakes are seen as opportunities to improve systems and processes is an effective strategy to impact healthcare safety (Institute of Healthcare Improvement, 2016).

Evidence-based and safe services in this dissertation

The nurse care coordinators provide evidence-based interventions and practices to patients through consistent patient engagement, motivational interviewing, and teach-back techniques to help guide patient education and interactions. Motivational interviewing is defined as "a client-centered, directive method for enhancing intrinsic motivation to change by exploring and resolving ambivalence" (Miller, Rollnick, & Conforti, 2002). Motivational interviewing has been shown to enhance care management strategies through the use of open-ended questions, affirmations, reflective listening, and support statements to assist patients in living with and treating chronic conditions (Phillips, Hogden, & Greenfield, 2017). The nurse care coordinators also implement the evidence-based teach-back method to verify patients and their caregivers understand their health information. The teach-back strategy demonstrates patients' understanding of their health information by asking them to repeat instructions or information they received from their health care provider so the provider can assess the patient's understanding and reteach or modify teaching if comprehension is not demonstrated (Yen & Leasure, 2019). The use of motivational interviewing and the teach-back method help the nurse care coordinator provide evidence-based and safe care.

Coordinated Services

Coordinated care is defined as forming connections between providers and healthcare settings by aligning quality processes through policies, procedures, systems, and leadership so that patients receive appropriate and optimal health care services (Institute of Healthcare Improvement, 2016f, 2016i). Coordinating healthcare entails effective and efficient communication between the patient and all healthcare providers to minimize waste and redundancy of care. The proactive communication between providers across systems and settings can help chronic disease patients prevent adverse outcomes of fragmented care (Institute of Healthcare Improvement, 2016).

Coordinated Services in this dissertation

The nurse care coordinator effectively coordinates all health care needs with all team members and the patient. The development of the patient-centered care plan is based on physician recommendations, quality gaps, and patient and family member decisions. The registered nurse works to the full capacity of their nursing license to coordinate the care of the complex patient effectively and provide recommendations and communication back to the entire healthcare team.

Productive interactions

The third construct in the Wagner Care Model is an informed, empowered patient and family connected to a prepared, proactive practice team through productive interactions. Productive interactions are the synergies between providers and the patient through the communication of shared understanding of the individual's self-management skills and confidence, tailoring specific interventions to patient's needs and values, collaborating in goal setting, and continuing to follow up on outcomes (Improving Chronic Illness Care, 2015). Productive interactions result in improved functional and clinical outcomes for chronic disease management (Barr et al., 2003). Productive interactions place the patient in the center of their health and provide techniques that empower them to manage and set the course of their chronic disease journey.

Productive interactions in this dissertation

The nurse care coordination uses productive interactions by identifying patient and caregiver-specific health goals and providing resources and interventions to help them achieve their goals. Motivational interviewing helps the patient recognize their own health goals and allows the nurse care coordinator to guide the patient in ways to achieve their goals. The nurse care coordinator answers patient and family questions, coordinates care, and places referrals if social work or other psychological needs are identified. These productive interactions are accomplished through telephone calls and portal messages until patients have achieved their goals or maximum benefit has been achieved.

Informed, empowered patient and family

An informed, empowered patient and family have the motivation, knowledge, tools, and confidence to make healthcare decisions to manage their chronic disease condition (Improving Chronic Illness Care, 2016). The patient and family are knowledgeable in recognizing signs and symptoms of their disease process and know when to alert health care providers or seek emergency services. The informed, empowered patient and family understand the individual care plan. They possess the health literacy to make informed decisions that guide lifestyle changes and utilize community services and health care interventions that drive optimal health.

Informed, empowered patient and family in this dissertation

The Care Coordination team proactively reaches out to patients and has regular follow-up calls with patients based on the patient's needs and to ensure all goals are being met. Through telephone contact, the care coordinator helps the patient and their identified support system identify healthcare goals and interventions to meet those goals. The consistent telephone interactions help inform and empower the patient and family through education, support, and connecting them to needed services. Ongoing communication between the patient and caregivers allows the care coordinator the opportunity to assess health literacy and provide additional teaching or clarification of care plan goals. The informed, empowered patient and family consistently interact with the prepared, proactive practice team.

Prepared, proactive practice team

In Wagner's Care Model, the prepared, proactive practice team optimizes the delivery system to coordinate care and make evidence-based decisions utilizing all clinical information to help patients manage their health (Improving Chronic Illness Care, 2016). The team encompasses all persons involved in the patient's care, including but not limited to caregivers, nursing staff, care managers, physicians, administrative staff, social workers, dietitians, specialty clinicians, pharmacists, and physical and occupational therapists needed to support the individual patient's needs. The team is prepared and united to help the patient achieve health outcomes, and they are proactive in preventing adverse health outcomes of the patient. The practice team proactively utilizes evidence-based tools to identify high-risk patient populations engaging and guiding the patient through preventative interventions (Improving Chronic Illness Care, 2016). The prepared, proactive practice team is invested in collaborating to help inform, educate, and support the patient to achieve the highest outcomes.

Prepared, proactive practice team in this dissertation

The Prepared, Proactive Practice Team is applied to the Ambulatory Care Coordination team serving as the communication hub between the patient and all care providers on the team. The nurse care coordinator proactively outreaches to the identified high-risk patient population from the MARA risk identification tool. The nurse care coordinator proactively outreaches to the patient via telephone and uses motivational interviewing to determine the patient's needs, progress, and care plan goals. The nurse care coordinator also communicates with other care providers on the patient's care team to collaborate and discuss specific patient needs. The continuous telephone follow-up with the patient and family assures progress, evaluation, and eventual achievement of care plan goals.

Improved Outcomes

Improved outcomes represent the fourth and final construct of the Care Model and the ultimate goal of meeting the triple aim of healthier patients, improved satisfaction, and reducing healthcare costs (Improving Chronic Illness Care, 2015). Outcomes are the Community, Healthcare System, and Services results through Productive Interactions between the Prepared, Proactive Practice Team and the Informed and Empowered Patient and Family. Outcomes can be measures of a short time period consisting of one to three years or long-term measures within a more extended period, customarily four to six years (W.K.

Kellogg Foundation, 2004). Short-term and long-term outcome measures are utilized to determine if the patient’s chronic disease trajectory has improved and if the model is delivering quality patient care.

Improved Outcomes in this dissertation

This study measures short term outcomes of the Ambulatory Care Coordination Department. These outcomes are represented by the dependent variables and include patient enrollment and patient’s achievement of CCTM care plan goals as evaluated by the nurse care coordinator.

Summary

Healthcare costs continue to rise in the United States, with the sickest 5% of the population contributing to 50% of total health care costs (Stanton, 2006, Pritchard et al., 2016). The ACA created numerous healthcare reform policies and shifted focus from acute episodic care to a proactive prevention of chronic disease exacerbations and complications in an effort to decrease healthcare expenditures (Bartels, Gill, & Naslund 2015, Chee et al., 2016). Healthcare redesign is not a quick fix and will take systematic changes, but focusing care reform through the Triple Aim, reducing fragmentation, increasing care coordination, and placing patients and families in the driver's seat of their own health are key components to improving health outcomes (Block, 2014; National Patient Safety Foundation, 2015). Ambulatory care coordination services in the primary care setting can effectively assist patients with managing chronic conditions (Holtrop et al., 2016). Research has demonstrated that care coordination services improved patient health outcomes and lowered healthcare costs (Grady & Gough, 2014; Reynolds et al., 2018; Schulman-Green et al., 2012; Smith et al., 2017; Van Eeghe, Littenberg, & Kessler, 2018). Cost savings have also resulted from care coordination services, with research indicating a decreased utilization of hospital services among Medicare beneficiaries (Edwards & Landon, 2014; Garwood et al., 2016; Lovelace et al., 2016). The literature is clear on the effectiveness of nurse-led care coordination programs in reducing costs and improving patient outcomes, but there are still gaps that need to be further studied.

Gaps in the Literature

Gap 1: Few studies have evaluated patient’s agreement to enroll in Ambulatory Care Coordination Services by characteristics such as race, age, sex, and primary insurance type.

Care coordination programs target high utilizers due to costs, but the literature is limited in providing evidence that the high-risk patient population agrees to enroll in CCTM programs. Patients who are identified as high risk or high cost must decide to enroll in Care Coordination services to receive the benefit of interventions. Patient satisfaction has been associated with care coordination, such as higher patient adherence to the care plan, improved health outcomes, decreased health utilization, and patient safety (Anhang-Price et al., 2014). Patients receiving care coordination described their care to be organized with the availability of test results and medical records, proper follow-up on testing, and felt their physicians were coordinated and sharing their care information accurately (Dot et al., 2012). Patient perceptions after completing care coordination may be positive, but some studies have found barriers to initial enrollment in the program. A qualitative study of an insurance carrier's telephone care management program found two primary obstacles to patient agreement: a lack of perceived need for the program and distrust of the program and staff (Jubelt et al., 2015).

Similarly, O'Malley et al. found patients may be skeptical or believe that care coordination services are not needed (2017). Further research is necessary to understand population-specific care coordination enrollment rates and characteristics among the patients who agree to enroll, such as sex, age, race, and insurance type. Several studies in the literature have revealed the effectiveness of CCTM for patients with specific disease conditions, patients 65 years and older, female patients, and patients with primary Medicare and Medicaid beneficiaries, but these studies are not generalizable to other groups (Parry et al., 2009, Marek et al., 2010; Atherly & Thorpe, 2011; Coleman et al., 2006; Verhaegh et al., 2014, Budde et al., 2021). As more commercial payors enter shared savings contracts, it is essential to understand program effectiveness in enrolling patients for the entire Accountable Care Organization and population served. Evaluating enrollment rates and the relationship between characteristic demographics may provide additional insight into understanding patient enrollment patterns in this population and allow care coordination programs to tailor their outreach most efficiently.

Gap 2: Few studies have evaluated patient's achievement of CCTM Care Plan Goals by characteristics such as race, age, sex, and primary insurance type.

Studies have shown a variety of CCTM program evaluation metrics, but with varying outcomes reported, it is challenging to generalize data across healthcare organizations (Veet et al., 2020, Greenwald, 2015). One critical component of CCTM programs is the patient and family-centered care plan (Haynes, Swan, & Haas 2014). Nurse care coordinators collaboratively create the care plan with the patient and implement interventions to help the patient manage their chronic disease conditions, decrease utilization, and improve their health outcomes. Nurse care coordinators assist patients in creating care plan goals during the initial contact with the patient and utilize the nursing process to assess for completion of the care plan goals on each follow-up call (Haynes, Swan, & Haas 2014). Evaluating a patient's achievement of patient-centered care plan goals is essential for a healthcare organization to demonstrate the overall success of the CCTM program's objective, improving health outcomes. Additional analysis is necessary to understand the population-specific achievement of care coordination goals across sex, age, race, and insurance type. Filling this gap in the literature may assist healthcare organizations in understanding any health inequities that may hinder specific patient populations from achieving their CCTM care plan goals.

Summary

The literature review provides supportive evidence of the impact of care coordination programs on patient health outcomes. This dissertation will focus on filling the above gaps in the literature. First, this dissertation will add to the literature by measuring high-risk patient enrollment rates in care coordination by demographic characteristics. It will analyze patient characteristics, including race, age, sex, case type, enrollment year, and primary insurance type, to determine which patient populations are most likely to enroll in the CCTM program. Lastly, it will examine all the patients who agreed to enroll and completed their care plan goals. It will then analyze patient characteristics by race, age, sex, case type, enrollment year, and primary insurance type to determine any statistical differences among the patient population and the achievement of care plan goals. The outcome of this study will inform healthcare organizations about the implementation of effective care coordination programs that are tailored to meet the needs of their complex patient populations.

CHAPTER 3

METHODOLOGY

Purpose Statement

The purpose of this study is to predict patient characteristics that are most likely to enroll in the CCTM program and complete CCTM program goals. The results of this dissertation will inform care coordination programs to create strategies to effectively promote outreach and enroll a diverse patient population and provide equitable care coordination resources to improve health outcomes for all.

Research Aims & Questions

The research aims and questions for this study are as follows:

Aim 1: To examine if patient characteristics significantly predict agreement to enroll in the CCTM program.

Research question 1: Do race, age, sex, case type, enrollment year, and primary insurance type significantly predict enrollment in the CCTM program?

Aim 2: To examine if patient characteristics significantly predict the achievement of care plan goals.

Research question 2: Do race, age, sex, case type, enrollment year, and primary insurance type significantly predict the achievement of care plan goals?

Aim 3: To examine if communication duration significantly predicts achievement of care plan goals.

Research Question 3: Does communication duration significantly predict the achievement of care plan goals?

Introduction

This study utilizes a quantitative approach to analyze data collected to answer the stated aims and research questions. This chapter presents the study design, data collection, study population, measures, and analytical approach employed.

Study Design

This study uses a retrospective study design using secondary data. A retrospective case control study design allows researchers to look to the past to examine medical events or outcomes, as well as develop ideas and assess possible associations or relationships between study variables (Song & Chung, 2010). This study design is determined to be the best to answer the research questions for the evaluation of the Emory Healthcare Ambulatory Care Coordination Department. It is a retrospective cohort study examining patients who had a Care Coordination encounter from January 2019 through December 2021. The study uses secondary data in that the data is already collected for another purpose and then de-identified data is extracted based on specific data needs of this study to insure privacy and compliance with the Health Insurance Portability and Accountability Act (HIPAA). Before data extraction began, Emory University Institutional Review Board (IRB) provided full approval for this study to ensure ethical integrity and the protection of human rights. Georgia Southern University approved a written Reliance Agreement to delegate Emory University IRB as the external IRB of record.

Care Coordination and Transition Care Management (CCTM) Program

The Emory Healthcare Ambulatory CCTM Department is a multidisciplinary team made of sixteen Registered Nurse Care Coordinators (RNCC), three Licensed Medical Social Workers (LMSW), two Care Coordinator Associates (CCA), one Care Coordination Clinical Leader, and one Operations Leader. The RNCCs make initial telephonic outreach to patients and will make interdepartmental referrals to the LMSW as needed for psychosocial concerns identified during the initial assessment and follow-up calls. Social workers are a vital part of the Care Coordination team because of their expertise in working with families, communities, and healthcare services, making them well equipped for care coordination tasks (Stanhope et al., 2015). Emory Primary Care Physicians also make direct LMSW referrals for patients requiring post-acute care networking such as transportation, safety screenings and assessment, utilization management, and referral management. RNCCs make interdepartmental referrals to the CCAs to assist with in-network appointment scheduling within the Emory Healthcare Network, quality gap closure scheduling, referral tracking, and administrative functions. The Care Coordination Clinical Leader is a Registered Nurse who provides the Care Coordination Department team clinical oversight. The Business Operations Leader helps with the Care Coordination Business operations, such as the reporting outcomes dashboard and budget management. The patient population targeted for CCTM is high-risk patients within 55 of the Emory Healthcare Network (EHN) Primary Care Clinic locations assisting 157 individual primary care physicians. The CCTM department documents within the Electronic Health Record (EHR) each outreach telephone encounter including time spent on the telephone with the patient and/or patient caregivers and family members involved in patient care.

Identification of Patients for Proactive CCTM Program Outreach

The CCTM program at Emory Healthcare has two main components: Chronic Disease Management of high-risk patient populations and Transition Care Management. Patients are identified and proactively outreached by telephone calls from the nurse care coordinator. The patients to receive Ambulatory Care Coordination services are identified primarily in three ways: (1) the high-risk high-cost payor attribution data, (2) the Emory Discharge Data Warehouse Report, (3) primary care provider referral, each of which is described below. (1) The first and primary way the CCTM team identifies patients is through the insurance payor attributed shared savings contracts. The ACO shared savings contracts payor sends a quarterly patient attribution list to Emory Health for the Nurse Care Coordinator to attempt outreach to the identified high-risk patient population. The patients identified are deemed high risk or high cost due to data claims provided by the instance company calculated by the number of chronic disease conditions, pharmaceutical claims, and healthcare utilization claims such as a frequent emergency room or hospital admissions. (2) The second way a patient is identified for care coordination services is through Emory Healthcare Discharge Data Warehouse Report. These patients are identified for transitional care management, and the report includes a daily discharge list for all patients discharged from one of the eleven Emory Healthcare Hospitals. The nurse care coordinators review the daily list for Hospital Discharges attributed to the employed primary care physicians and attempt to reach the patient by telephone within 48 business hours for Transition Care Management. Some patients are excluded based on the following rationale. Planned surgical procedures and obstetrics patients are excluded due to the bundled payment reimbursement. Patients with an active cancer diagnosis are excluded because they receive tailored cancer-related care coordination through their specialty center. Patients that are discharged to inpatient rehabilitation, long-term care homes, hospice, or subacute rehabilitation services are excluded since these patient populations will have a covering physician and care team while in these settings. All adult patients age 18 and older with any diagnoses are included if the patient discharges to a home setting such as a home, nursing home, or another permanent residence and if they have an Emory Healthcare PCP that is part of the ACO contract. (3) The last way a patient is identified for CCTM at Emory Healthcare is through a primary care physician referral for Ambulatory Care Coordination. A PCP can refer a patient for CCTM services if they deem the high patient risk (4 or more chronic conditions), high cost (>$100,000 claims), transition care management, vulnerable complex care coordination, or a patient requiring preventive screenings regardless of patient attribution status.

Transition Care Management:

Transition Care Management (TCM) for discharged hospital patients consists of a telephone call within 48 business hours of discharge from an RNCC who:

1. Reviews the discharge instructions and medication reconciliation with the patient to verify adherence.
2. Completes an initial nurse assessment to identify risks
3. Creates a patient and family-centered care plan
4. Educate the patient and caregiver on the expected disease process and notify the provider of worsening or unexpected symptoms.

5. Assist the patient in scheduling a follow-up appointment with a primary care physician within 1-2 weeks of discharge and other specialists' providers in the needed time frame per the discharge report.
6. Schedules a plan with the patient for weekly phone calls for four weeks post-hospital discharge and provides the direct number of the RNCC to call with any needs or concerns prior to the subsequent follow-up call.

The following exclusion criteria are applied:

(1) Patients who are transferred to another acute care hospital, inpatient rehabilitation unit, long-term acute care facility, or hospice care upon discharge

(2) Patient who are planned admission to the hospital such as a scheduled elective surgery

(3) Patients who left against medical advice at the time of discharge.

Patients are contacted by telephone for a minimum of three times within 48 business hours for initial TCM outreach. If an RNCC cannot reach a patient within three attempts, the RNCC will close the case as "Unable to Reach." If a patient was reached but declined TCM services, the RNCC will close their case as "Declined/ Not or No Longer Interested." If a patient is reached on initial contact and cannot be reached for follow-up after three different attempts, the RNCC will close the case as "Unable to Reach." Similarly, if the patient agrees to initial enrollment but declines ongoing services upon weekly follow-up calls, the RNCC will close the case as "Declined/ Not or No Longer Interested." A patient completes Care Coordination TCM interventions after a minimum of weekly follow-up calls for four weeks and no hospital readmission within 30 days of discharge. Once the TCM care plan goals are achieved, the RNCC will close the patient's case as "Achieved Outcomes/ Maximum Benefits Reached."

Chronic Disease Management

Care Coordination for chronic disease management consists of a proactive telephone call to a high-risk attributed patient from an RNCC who:

1. Reviews the electronic health records for past office notes, labs, and clinical documentation

2. Reviews the current active medication list with the patient and caregiver
3. Completes an initial nurse assessment to identify risks or social needs
4. Educates the patient and caregiver on the expected chronic disease process and when to notify the provider of worsening or unexpected symptoms.
5. Creates a patient and family-centered care plan
6. Schedules a plan with the patient for follow-up phone calls to assess progress towards healthcare goals and outcomes and provides the direct number of the RNCC to call with any needs or concerns prior to the subsequent follow-up call.

Patients are called for a minimum of three times within a two-week timeframe for initial care coordination enrollment. If an RNCC is unable to reach a patient for initial contact or for follow-up calls within three consecutive telephone calls over a two-week period, the RNCC will close the case as “Unable to Reach”. If a patient was reached but declined the RNCC Care Coordination services on the initial contact or subsequent contact the case will be closed as “Declined/ Not or No Longer Interested”. When a patient successfully completes the CCTM Care Plan the RNCC will close the patient's case as “Achieved Outcomes/ Maximum Benefits Reached”.

Sample

The sample is described consistent with Wagner's Care Model regarding the Community/ Health System and patient sample.

Community / Health System

The community served is Atlanta, Georgia, and its surrounding counties. Metro Atlanta comprises ten counties with an estimated population of 4.6 million (Atlanta Regional Commission, 2021). The Emory Healthcare (EHC) system is an Accountable Care Organization serving as the most comprehensive health system in Georgia (EHC, 2019). Emory Healthcare employs an estimated 2,800 doctors in 250 locations, including 11 hospital campuses as well as primary care, urgent care, and Minute Clinics (EHC 2019). In 2019, Emory Healthcare's Community Health Needs Assessment defined the Primary Service

Area (PSA) to include the contiguous six-county area in Atlanta, from which approximately 70% of the inpatient admissions originate (2019). The EHC PSA is younger than the population of Georgia, with an estimate of 12% of the population over the age of 65 compared to the state's 14.3% (EHC 2019). The EHC PSA is predicted to have the most significant population increase among persons aged 55-64 and 65 and older between 2019-2024 (EHC 2019). Sex is evenly distributed within the PSA, with approximately 52% female persons, comparable to 51.4% female persons in Georgia as a whole (EHC 2019, Census.gov, 2020). Georgia’s race and ethnicity are made up of 60.2% White, 32.6% Black, 4.4% Asian, and 9.9% Hispanic. In comparison, the race distribution between the EHC PSA is approximately 40% Black, 37% White, and 12% Hispanic (EHC, 2019). Educationally, 14% of the population in Georgia does not hold a high school degree compared to 11% in the EHC PSA (EHC 2019). Georgians reported that 21% of households' annual income is less than $25,000 compared to 17% of the EHC PSA (EHC 2019). In Georgia, 17% of the total population is uninsured compared to 14% of the EHC PSA.

In 2017, the top three highest reported age-adjusted death rates per 100,000 people were the same for Georgia and the EHC PSA: major cardiovascular disease, cancers, and nervous system disease (EHC 2019). Community stakeholders identified the most significant health challenges as diabetes, obesity, asthma, chronic obstructive pulmonary disease, infectious diseases, sexually transmitted diseases, infant mortality, cardiovascular disease, hypertension, stroke, cancer, and kidney disease (EHC 2019). Other significant health challenges noted include behavioral health challenges, overutilization of the emergency room, undocumented women in labor without receiving prenatal care, poor dental health among the uninsured, disparities for Black and Latino residents, high rates of teen pregnancy, and smoking (EHC 2019). The 2019 Emory Healthcare Community Health Needs assessment findings identified three priority health needs of the community across the health system:

(1) Access to care and community collaboration

(2) Health education and community awareness

3) Preventative care, and chronic disease management

These findings are consistent with the interplay of the Community and Health Systems constructs of The Wagner Care Model theoretical framework guiding this study.

Patient Sample

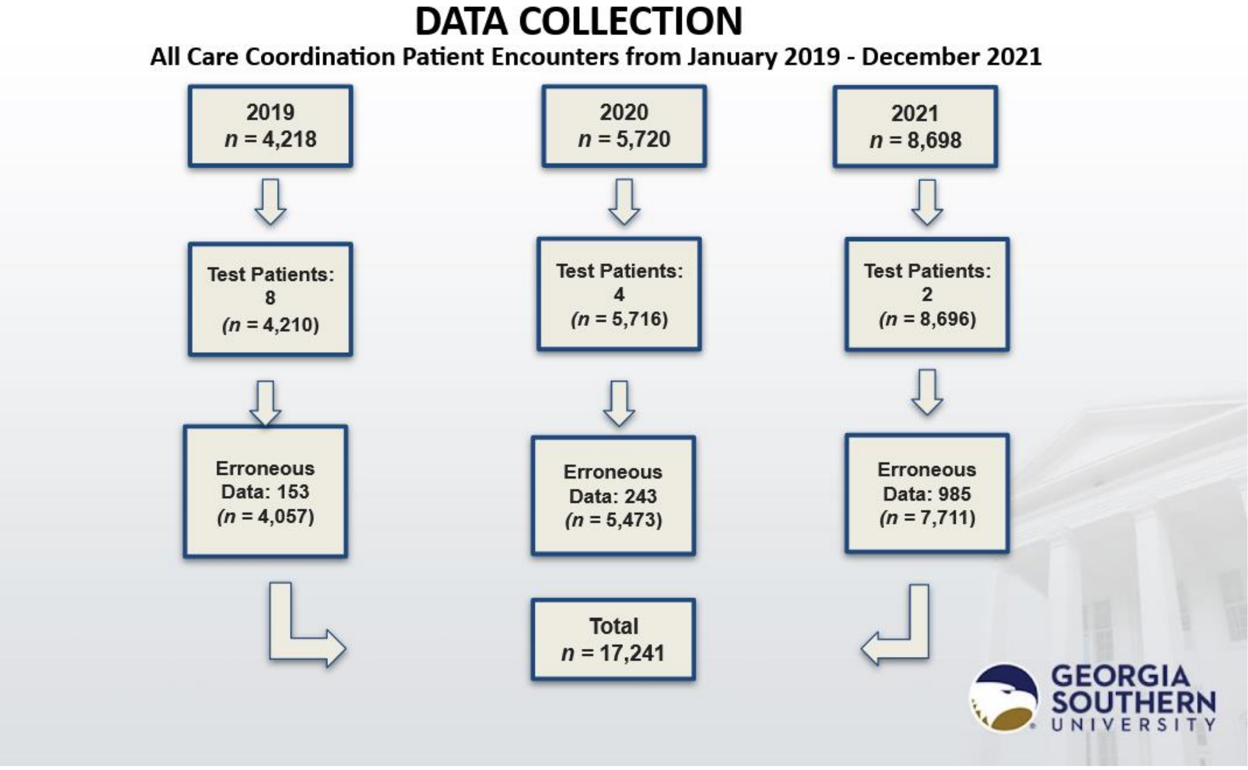
The patient sample is from the Emory Healthcare patient population. The Emory Healthcare Ambulatory Care Coordination department currently serves 157 individual Primary Care Physicians (PCPs) within 55 Emory Healthcare Network (EHN) Primary Care Clinic locations. The care coordination team primarily supports the EHN-attributed patients through Accountable Care Organization Shared Savings Contracts which is responsible for approximately 200,000 attributed patient lives. At the time of this study, EHN has five ACO attributed lives contracts, including Medicare Shared Savings Program (MSSP), Medicare Advantage Value-Based, and three Commercial payor contracts.

Study Population

This population includes all of Emory Healthcare patients who had a care coordination encounter between January 2019 through December 2021.

Data Source

The study uses secondary data collection from Emory Healthcare Network Ambulatory Care Coordination Department. Data is collected from the patient electronic health records (EHR) from patients who had a Care Coordination encounter in their chart from January 2019 through December 2021. The Chief Medical & Quality Officer at Emory Healthcare strategically performed data pulls to avoid manual medical record review. The data extracted included patient characteristics, including date of birth, sex, race, ethnicity, primary insurance type, and patient’s attribution status to Emory Healthcare Network. Additional data included communication event outcome, communication type, communication duration , date of communication, case start date, and case closure reason. The extracted data were then aggregated into an encrypted Microsoft Excel file for data cleaning. Test patients are not actual patient data and are used for staff training; therefore, these patients were excluded from the data set. Data cleaning was conducted by analyzing frequency distributions of all variables and descriptive statistics. The extracted data set was analyzed for any outliers that could indicate erroneous data. If erroneous data was found, it was not replaced, but rather, the patient was excluded from the data set. This approach was considered the most effective with an extensive data set where chart mining would be inefficient. The original data set included 18,636 patients. Below is the data extraction table with exclusion by category.



DATA COLLECTION

All Care Coordination Patient Encounters from January 2019 - December 2021

2019
n **= 4,218**

Test Patients:
8
(*n* = 4,210)

Erroneous
Data: 153
(*n* = 4,057)

2020
n **= 5,720**

Test Patients:
4
(*n* = 5,716)

Erroneous
Data: 243
(*n* = 5,473)

2021
n **= 8,698**

Test Patients:
2
(*n* = 8,696)

Erroneous
Data: 985
(*n* = 7,711)

Total
n **= 17,241**

Figure 3: Data Extraction Table with Exclusion by Category

Study Variables

In this study, the independent variables are the patient characteristics in the Care Coordination and Transition Management (CCTM) program, including race, age, sex, case type, enrollment year, primary insurance type, and average communication duration. The dependent variables are binary variables representing enrollment and completion of care plan goals. Dependent variables are operationalized and defined below.

Dependent variables

Dependent variables are listed and defined with data collection methods below.

Patient enrollment: In this study, patient enrollment is operationalized by the patient's agreement to enroll in the CCTM program. By agreement to enroll in the CCTM program, patients received RNCC support, education, patient-centered care planning, and interventions such as reminders to schedule preventive care, healthcare advice, and regular follow-up to evaluate patient health outcomes. Data collected on patient enrollment involves a chart review of a CCTM encounter within the patient's EHR and documentation of the patient's agreement to enroll in the CCTM program.

Achieved CCTM Care Plan Goals: In this study, a patient achieving CCTM Care Plan Goals is operationalized by the patient's CCTM case being closed as "Achieved Outcomes/ Maximum Benefits Reached." Nurse care coordinators will apply the nursing process of assessing, planning, interventions, and evaluating during each contact with the patient. The nurse care coordinators will work with the patient and the family to empower the patient to achieve the care plan goals. Determining the success of Care Plan goals is a continuous approach that will be carried out until the patient's goals and outcomes are met to the patient and nurse's satisfaction. Data collected on the patient's case closure reason will be collected and evaluated to examine the number of CCTM cases that were closed as "Achieved Outcomes/ Maximum Benefits Reached."

Independent variables

All independent variables, including the patient's characteristics are listed and defined with data collection methods below. In this study, patient characteristics include race, age, sex, case type, enrollment year, and insurance type. Communication duration was also analyzed to predict a patient's likelihood to achieve care plan goals based on the average talk time spent with the nurse care coordinator over the entire length of the CCTM program.

Race: The first study variable of interest was race. The original data sample included the following races: Black or African American, Caucasian or White, Asian, Native Hawaiian or Other Pacific Islander, American Indian or Alaska Native, and Unreported Race. For comparability to other research studies in the literature, the patient's race was categorized by the variables Caucasian race or non-Caucasian race. Patients in the data set with a Caucasian or White race were coded as Caucasian, and all other races in the data set were coded as non-Caucasian.

Age: The next variable of interest in this study was age. The continuous variable of age was categorized into an ordinal age range: 18-39 adults, 40-64 adults, and 65 or older. The program outreaches exclusively to patients 18 and older thus, no patients under 18 were in the study data set.

Sex: The subsequent variable of interest was the patient's sex. The study data only included male and female sex categories; therefore, male and female were the two variables included in this study.

Case Type: Case type was the next variable of interest in the data sample. There were two categories of case types in this study: high-risk/high-cost (HR/HC) patients and transition care management (TCM) patients. HR/HC patients have more than two chronic conditions and are classified as high utilizers of the healthcare system. TCM patients are the category recently discharged from an inpatient hospital stay and are transitioning back to their home setting.

Enrollment Year: The enrollment year included the year the patient was contacted to enroll in the CCTM program. If the patient had a subsequent enrollment, the patient was counted as a new case for that initial encounter year. The years observed in the study data were from January 2019 - December 2021.

Primary Insurance Type: Primary insurance types included Commercial plans and Medicare insurance plans. This study included Medicare Advantage plans as a Commercial Plan since a Commercial payor is the primary insurance type. Of note, Medicaid and non-insured patient populations were not included in the data sample because, at the time of this study, Medicaid and non-insured patients were not a part of any Accountable Care Organization Shared Savings Program, so there was no available data on these populations of patients.

Communication Duration: Aim 3 of this study included communication duration for each successful encounter for further analysis. An average of each successful communication with the patient over the length of the program was calculated. Failed communication encounters such as no contact number, phone disconnected, unable to reach the patient, voicemail message, message left with a person, and line busy were omitted from the communication duration variable. The continuous variable of communication duration was categorized into an ordinal variable range, including less than 20 minutes, 20 minutes - 59 minutes, 60 minutes - 89 minutes, and greater than 90 minutes. The variables were categorized in this manner to align with current Centers for Medicare and Medicaid Service (CMS) billing guidelines for Chronic Care Management communication time. CMS will pay a monthly fee for each chronic disease communication greater than 20 minutes with a healthcare professional up to 59 minutes (CMS, 2021). Any talk time greater than 60 minutes and again greater than 90 minutes will allow for additional billing codes to be utilized for reimbursement (CMS, 2021).

Analytical Approach

SPSS Software was used to generate both descriptive summary statistics (i.e., frequencies, percentages, and standard deviations) and data analysis to answer research questions for this study. Excel is used for additional data analysis. Analysis is further described in the table below.

Data Analysis Table

Research Question	Dependent Variable	Statistical Analysis
Aim 1: To examine if patient characteristics significantly predict agreement to enroll in the CCTM program.		
Does race, age, sex, case type, enrollment year, and primary insurance type significantly predict enrollment in the CCTM program?	Categorical variable Enrollment: Yes/ No	Multivariate Logistic Regression
Aim 2: To examine if patient characteristics significantly predict achieving care plan goals.		
Does race, age, sex, case type, enrollment year, and primary insurance type significantly predict achieving care plan goals?	Categorical variable Achievement of CCTM Goals: Yes/ No	Multivariate Logistic Regression
Aim 3: To examine if patient characteristics and communication duration significantly predicts achieving care plan goals.		

Does average communication duration, race, age, sex, case type, enrollment year, and primary insurance type significantly predict achieving care plan goals?	Categorical variable Achievement of CCTM Goals: Yes/ No	Multivariate Logistic Regression

CHAPTER 4

RESULTS

This study has three primary aims. Aim 1 is to examine if patient characteristics significantly predict agreement to enroll in the CCTM program. Aim 2 is to examine if patient characteristics significantly predict achieving care plan goals in the CCTM program. Patient characteristics in this study include Caucasian race or non-Caucasian race, age range, sex, case type, year of enrollment, and primary insurance type. Aim 3 is to examine if the average communication duration significantly predicts the patient achieving their care plan goals. This chapter describes the findings of all the statistical analysis and explores the testing of each research question.

Descriptive Statistics

The final sample consisted of a total of 17,241 individual patients that had a Care Coordination encounter from January 2019 through December 2021. As shown in Table 1, the majority of patients were non-Caucasian race (*n* = 11,347, 66%), females (*n* = 10,437, 61%), 65 years and older (*n* = 8,949, 52%), and had a primary insurance type of Commercial coverage (*n* = 12,041, 70%). Of note, Medicare Advantage plans were coded as a Commercial Plan since a Commercial payor is the primary insurance for this type of plan and Medicare is a secondary coverage. Overall, the majority of patients agreed to enrollment (*n* = 9,201, 53%), and 2021 had the highest number of enrolled patients of the three-year period (*n* =7,711, 45%).

Table 1. Frequency Table of Data Set Variables for Each Individual Attempt to Contact the Patient for the CCTM Program

Variable	*n*	%
Race Caucasian and Non-Caucasian		
Non-Caucasian	11347	65.81
Caucasian	5894	34.19
Sex		
Female	10437	60.54
Male	6804	39.46
Age		
18 - 39 years of age	1124	6.52
40 - 64 years of age	7158	41.58
65 and older	8949	51.91
Primary Insurance Type		
Commercial	12041	69.84
Medicare	5200	30.16
Case Type		
High Risk / High Costs (HR/HC)	13033	75.59
Transition Care Management (TCM)	4208	24.41
Communication Attempt Outcome		
Failed Encounter	7380	42.80
Discussion about care plan	9779	56.72
Rescheduled	82	0.48
Enrollment Status		
Agreed to Enrollment	9201	53.37
Declined Enrollment	8040	46.63
Year of Enrollment		
2019	4057	23.53
2020	5473	31.74
2021	7711	44.72

Note: Due to rounding errors, percentages may not equal 100%

Findings per Research Question

The following describes the findings per research question.

Research Question 1:

Does race, age, sex, case type, enrollment year, and primary insurance type significantly predict enrollment in the CCTM program?

To answer research question 1, data from all Care Coordination patient encounters from January 2019 – December 2021 was analyzed for a total of 17,241 patients. These encounters included all patient outreaches whether or not the patient agreed to enrollment.

Assumptions:

The assumption of the absence of multicollinearity was examined using variance inflation factors (VIFs). Multicollinearity is a correlation between predictors in a model, which can adversely affect the results (Menard, 2009). The VIFs were calculated to detect the presence of multicollinearity between the predictors. High VIFs indicate increased effects of multicollinearity in the model. VIFs greater than 5 are cause for concern, whereas VIFs of 10 should be considered the maximum upper limit (Menard, 2009). All predictors in the regression model have VIFs less than 10. The results Table 2 includes the VIF for each predictor in the model.

Results:

A multivariate logistic regression model was utilized to examine whether race, age, sex, case type, enrollment year, and primary insurance type had a significant effect on observing the odds of the patient’s agreement to enroll in the CCTM program. The model was evaluated based on an alpha of .05. The overall model was significant, $\chi 2(8) = 2{,}262.23$, $p < .001$, suggesting that race, age, sex, and primary insurance type had a significant effect on observing the odds of the patient agreeing to enroll in the program. The Caucasian race was associated with a 21% decrease (p = <.001) in patient enrollment compared to non-Caucasian patients. Patients 40- 64 years old decreased the odds of patient enrollment by 37% (p = <.001) when compared to the reference group of 18-39 years of age; additionally, patients 65 and older decreased the odds of patient enrollment by 43% (p = <.001) compared to patients 18 - 39 years of age. Interestingly, males were found to be 21% more likely (p = <.001) to agree to enrollment when compared to female patients. Patient enrollment for Transition Care Management increased the odds of the patient enrolling into the CCTM program by 184% (*p* = <.001) compared to patients enrolling for High Risk / High-Cost Chronic Disease Management. Enrollment also increased significantly from 2019 to 2021, with patients 334% more likely (*p* = <.001) to enroll in the program in 2021 than in 2019. Lastly, patients with Medicare insurance were 77% more likely (*p* = <.001) to agree to enrollment into the program compared to patients with a commercial insurance plan. Table 2 summarizes the regression analysis results with the VIF for each predictor in the model.

Table 2. A Multivariate Logistic Regression Results with Race, Age, Sex, Case Type, Year of Enrollment, And Primary Insurance Type Predicting Enrollment

Variable	*B*	*SE*	X^2	*p*	*OR*	95. 00% CI	VIF
(Intercept)	-0.80	0.07	120.49	**<.001**	-	-	-
Caucasian (ref: non-Caucasian)	-0.24	0.04	42.67	**<.001**	0.79	[0.74, 0.85]	1.11
Age Range 40 - 64 years of age (ref 18-39)	-0.46	0.07	43.84	**<.001**	0.63	[0.55, 0.72]	1.96
Age Range 65 and older (ref 18-39)	-0.56	0.07	58.21	**<.001**	0.57	[0.49, 0.66]	1.96
Male (ref female)	0.19	0.03	30.65	**<.001**	1.20	[1.13, 1.29]	1.01
TCM Case Type (ref HR/HC)	1.04	0.04	620.44	**<.001**	2.84	[2.62, 3.08]	1.07
Year of Enrollment 2020 (ref 2019)	1.15	0.05	633.52	**<.001**	3.16	[2.89, 3.45]	1.34
Year of Enrollment 2021 (ref 2019)	1.47	0.05	935.77	**<.001**	4.34	[3.95, 4.77]	1.34
Medicare	0.57	0.05	126.63	**<.001**	1.77	[1.60, 1.95]	1.97

Primary Insurance Type (ref Commercial)							

Note: $\chi 2(8) = 2{,}262.23$, *p* < .001

Research Question 2:

Does race, age, sex, case type, enrollment year, and primary insurance type significantly predict achieving care plan goals?

To answer research question 2, data from all enrolled Care Coordination patients was analyzed for a total of 9,201 patients who agreed to enrollment over the study years. These encounters included all enrolled patients whether or not the patient achieved their care plan goals while enrolled in the study.

Table 3. Frequency Table of Data Set Variables for Each Individual Enrolled Patient Communication

Variable	*n*	%
Race Caucasian and Non-Caucasian		
Non-Caucasian	6013	65.35
Caucasian	3188	34.65
Sex		
Female	5387	58.55
Male	3814	41.45
Age		
18 - 39 years of age	660	7.17
40 - 64 years of age	3269	35.53
65 and older	5272	57.30
Primary Insurance Type		
Commercial	6078	66.06
Medicare	3123	33.94
Case Type		
High Risk / High Costs (HR/HC)	6097	66.26
Transition Care Management (TCM)	3104	33.74
Care Plan Goal Outcomes		
Achieved Care Plan Goals	7054	76.67
Did Not Achieve Care Plan Goals	2147	23.33
Year of Enrollment		
2019	1252	13.61
2020	2996	32.56

2021	4953	53.83

Note: Due to rounding errors, percentages may not equal 100%

Assumptions: The assumption of the absence of multicollinearity was examined and the VIFs are included for each predictor in Table 4 below.

Results:

A multivariate logistic regression model was utilized to examine whether race, age, sex, case type, enrollment year, and primary insurance type had a significant effect on observing the odds of the patient achieving care plan goals. The model was evaluated based on an alpha of .05. The overall model was significant, $\chi2(8) = 774.73$, $p < .001$, suggesting that race, age, sex, and primary insurance type had a significant effect on the odds of observing the patient achieving care plan goals in the CCTM program. First, the Caucasian race category was significant, indicating that being Caucasian is associated with a 19% increase in odds ($p = .003$) of achieving goals as compared to non-Caucasians. Next, both the age categories 40 - 64 and 65 and older decreased the odds of the patient achieving goals by 48% ($p = <.001$) and 40% ($p = <.001$), respectively, compared to the 18 - 39 age range of patients. Male patients were not found to have any statistical significance ($p = .394$) in achieving care plan goals when compared to female patients. Patients enrolled in Transition Care Management were 40% less likely ($p = <.001$) to complete their care plan goals than patients who were enrolled in the program for High Risk / High-Cost Chronic Disease Management. Additionally, there was a positive trend in the patient achievement of care plan goals over the data study years, with patients more likely to achieve their care plan goals in the years 2020 and 2021 compared to 2019. Lastly, patients with Medicare insurance were 17% more likely ($p = .049$) to achieve their care plan goals when compared to patients with Commercial insurance plans. Table 4 summarizes the regression analysis results with the VIF for each predictor in the model.

Table 4. A Multivariate Logistic Regression Results with Race, Age, Sex, Case Type, Year of Enrollment, And Primary Insurance Type Predicting Achievement of Care Plan Goals

Variable	*B*	*SE*	X^2	*p*	*OR*	95. 00% CI	VIF
(Intercept)	0.67	0.14	24.41	**<.001**	-	-	-
Caucasian (ref: Non-Caucasian)	0.18	0.06	8.94	**.003**	1.19	[1.06, 1.34]	1.12
Age Range 40 - 64 years of age (ref 18-39)	-0.66	0.13	27.36	**<.001**	0.52	[0.40, 0.66]	2.17
Age Range 65 and older (ref 18-39)	-0.52	0.13	15.02	**<.001**	0.60	[0.46, 0.77]	2.17
Male (ref female)	-0.05	0.05	0.73	.394	0.96	[0.86, 1.06]	1.04
TCM Case Type (ref HR/HC)	-0.52	0.06	74.98	**<.001**	0.60	[0.53, 0.67]	1.25
Year of Enrollment 2020 (ref 2019)	0.95	0.07	168.26	**<.001**	2.59	[2.24, 2.99]	1.35
Year of Enrollment 2021 (ref 2019)	1.72	0.08	519.62	**<.001**	5.58	[4.81, 6.47]	1.35
Medicare Primary Insurance Type (ref Commercial)	0.16	0.08	3.86	**.049**	1.17	[1.00, 1.37]	2.13

Note: $\chi 2(8) = 774.73$, *p* < .001

Research Question 3:

Does average communication duration, race, age, sex, case type, enrollment year, and primary insurance type significantly predict achieving care plan goals?

To answer research question 3, data from all enrolled Care Coordination patients with 20 minutes or greater of talk time was analyzed for a total of 6,257. Patients with an average communication of fewer than 20 minutes were removed from this analysis due to current CMS Chronic Care Management (CCM) billing guidelines starting billing reimbursement at 20 minutes of communication. Additional codes can be billed for communication over 60 minutes and every 20 minutes of talk time up to 90 minutes. Communication was categorized based on the CMS billing timeframes.

Assumptions: The assumption of the absence of multicollinearity was examined and the VIFs are included for each predictor in table 5 below.

Table 5. Frequency Table of Data Set Variables for Each Individual Enrolled Patient Communication That Was Greater Than 20 Minutes of Talk Time (n = 6,257).

Variable	*n*	%
Race Caucasian and Non-Caucasian		
Non-Caucasian	4171	66.66
Caucasian	2086	33.34
Sex		
Female	3711	59.31
Male	2546	40.69
Age		
18 - 39 years of age	469	7.50
40 - 64 years of age	2207	35.27
65 and older	3581	57.23
Primary Insurance Type		
Commercial	4222	67.48
Medicare	2035	32.52
Case Type		
High Risk / High Costs (HR/HC)	4143	66.21
Transition Care Management (TCM)	2114	33.79
Care Plan Goal Outcomes		
Achieved Care Plan Goals	5135	82.07
Did Not Achieve Care Plan Goals	1122	17.93
Average Length of All Communication Per Patient Encounter		
20 Minutes - 59 Minutes	3701	59.15
60 Minutes - 89 Minutes	1572	25.12
> 90 Minutes	984	15.73
Year of Enrollment		
2019	829	13.25
2020	1760	28.13
2021	3668	58.62

Results:

A multivariate logistic regression was conducted to examine whether average communication time, race, age, sex, case type, year of enrollment, and primary insurance type predicted achievement of care plan goals. The model was evaluated based on an alpha of .05. The overall model was significant, χ2(10) = 764.48, *p* < .001. Caucasian patients were 27% more likely (*p* = <.001) to achieve care plan goals compared to non-Caucasian patients with an average of greater than 20 minutes of communication time. Patients age 65 and older were found to be 45% more likely (*p* = .034) to complete care plan goals than patients 18 - 39. Patients enrolled for Transition Care Management were 64% less likely (*p* = <.001) to achieve care plan goals compared to High Risk and High-Cost patient populations.

Communication duration of 60 – 89 minutes increased the odds of the patient completing care plan goals by 23% (*p* = .003) relative to the 20- to 59-minute category. There was also a statistically significant positive trend in patients' achievement of care plan goals from 2019 to 2021. Table 6 summarizes the regression analysis results with the VIF for each predictor in the model.

Table 6. A Multivariate Logistic Regression Results with Average Communication Time, Race, Age, Sex, Case Type, Year of Enrollment, and Primary Insurance Type, Predicting Achievement of Care Plan Goals

Variable	*B*	*SE*	X^2	*p*	*OR*	95. 00% CI	VIF
(Intercept)	0.75	0.18	17.73	**<.001**	-	-	-
60 minutes - 89 minutes (ref: 20 - 59mins)	0.27	0.09	9.12	**.003**	0.77	[0.64, 0.91]	1.34
> 90 minutes (ref: 20 - 59mins)	0.19	0.10	3.78	.052	0.83	[0.69, 1.00]	1.34
Caucasian (ref: non-Caucasian)	0.32	0.08	15.92	**<.001**	0.73	[0.62, 0.85]	1.13
Age Range 40 - 64 years of age (ref 18-39)	-0.09	0.16	0.31	.576	0.91	[0.67, 1.25]	2.54
Age Range 65 and older (ref 18-39)	0.37	0.18	4.50	**.034**	1.45	[1.03, 2.05]	2.54
Male (ref female)	0.06	0.07	0.60	.440	1.06	[0.92, 1.22]	1.06
TCM Case Type (ref HR/HC)	-1.03	0.09	145.78	**<.001**	0.36	[0.30, 0.42]	1.39
Year of Enrollment	0.66	0.10	47.38	**<.001**	1.93	[1.60, 2.32]	1.68

2020 (ref 2019)							
Year of Enrollment 2021 (ref 2019)	2.03	0.11	339.64	**<.001**	7.60	[6.12, 9.42]	1.68
Medicare Primary Insurance Type (ref Commercial)	0.01	0.12	0.02	.899	1.01	[0.81, 1.27]	2.36

Note: $\chi 2(10) = 764.48$, *p* < .001

CHAPTER 5

DISCUSSION & CONCLUSION

This chapter has been organized into four sections. The first section will discuss the summary of the findings, strengths and limitations, recommendations for future research and conclusion.

Summary of the Findings

The study had three main objectives. The first objective was to determine if the patient characteristics of race, age, sex, case type, enrollment year, and primary insurance type had any statistically significant effect on the patients agreeing to enroll in the Care Coordination and Transition Care Management (CCTM) program. The second objective was to determine if those same patient characteristics had any statistical effect on the patient completing CCTM care plan goals as evaluated by the nurse care coordinator. The final objective was to determine if the average communication duration during the program significantly predicted the patient's achievement of CCTM care plan goals.

Aim 1

The study's first aim was to examine if the patient's race, age, sex, case type, enrollment year, and primary insurance type significantly predict CCTM program enrollment. The overall model was significant, and each study variable of interest was also statistically significant. The results determined that the Caucasian race decreased the odds of the patient enrolling in the program by almost 21% compared to the non-Caucasian race. One explanation for this finding is that Caucasian patients already feel connected to their healthcare providers and are less likely to enroll in a CCTM program than the non-Caucasian patient population. The literature reveals that healthcare inequities exist among non-Caucasian minority populations in America (AHRQ, 2010), so non-Caucasian patients may enroll at a higher rate to feel more connected to their healthcare providers and clinical team. Enrolling all high-risk patient populations is a vital goal of the program. Further investigation should be completed to ensure patients of all races are engaged and enrolled in the CCTM program.

The age range was the next variable of interest for examining the odds of enrollment in the CCTM program. The three categories of age range were 18-39 years of age, 40 - 64 years of age, and 65 and older. The literature shows as Americans age, they are more likely to have multiple chronic health conditions, so it is hypothesized that they would be more willing to enroll in a CCTM program that assists them in managing their health (Prasad, Sung, & Aggarwal, 2012). Interestingly, the study data revealed a decrease in the odds of enrollment as patients aged. The results found a 37% decrease in the odds of enrollment in patients 40 - 64 years old and a 43% decrease in the odds of enrollment of patients 65 and older compared to patients in the 18 - 39 years of age category. One possibility for this finding is that the 18 - 39 age patients are more willing to discuss their healthcare conditions with a provider over the phone when compared to older patients who prefer an in-person discussion about their healthcare concerns. One study found older adults do not feel the quality of healthcare can be provided using a telephone or other telehealth modalities and would rather have an in-person visit by a healthcare provider and do not see the value of a telephone conversation (Ladin et al., 2021). This study finding indicates an opportunity to examine additional modalities a CCTM program could provide for older adult patients, including the possibility of an in-person office visit with the care coordinator.

Sex was the subsequent variable of interest in this study and was represented in the data set as male and female. The study population was 61% female, although the findings revealed males were 21% more likely to enroll in the CCTM program. The CCTM team had more contact with females, but they were not as successful in enrolling them into the program as the male population. Conversely, a similar retrospective study in the literature revealed that 74% of females agreed to enroll in a similar program (Marek et al., 2010). In other studies, the literature was less generalizable due to tailoring CCTM programs to particular individuals, such as a Veteran Hospital system that showed a 95% male population in their program (Connor et al., 2020). At the time of data collection, there were only female care coordinators, which could present an opportunity to explore if male patients were more likely to enroll due to a female nurse reaching out to them.

The next variable of interest was case type which included Transition Care Management (TCM) patients with a recent hospital discharge and Chronic Disease Condition patients categorized as High Risk/ High Costs (HR/HC). Some Care Coordination programs in the literature only focus on TCM while others focus on primarily HR/HC (Davis et al., 2019, Jubelt et al., 2015, Reeves et al., 2014, Vedel & Khanassov 2015, Verhaegh et al., 2014, Weeks et al., 2013, Wennberg et al., 2010). The CCTM program in this study included both TCM and HR/HC management which made case type a key it a variable of interest. Case type was statistically significant and revealed patients whose case type was Transition Care Management were 184% more likely to agree to enrollment than patients whose case type was High Risk / High Cost (HR/HC). This was a revealing finding and indicates that patients with a recent inpatient hospitalization are more likely to accept a care coordinator assisting them with medication management, disease education, and follow-up appointments (Naylor et al., 2011). Patients in the high-risk and high-cost category often are at risk for an adverse event but may feel stable at the time of the care coordinator contact and be less likely to agree to enroll in the program. This finding could reveal that timing program outreach to coincide with the time when a patient perceives they need additional health care assistance could guide the program's success in reaching and enrolling more patients.

The study data for the program was from January 2019 - December 2021. The year of patient enrollment was significant in the study findings. Since the COVID-19 pandemic patients have been more accepting of healthcare through a variety of modalities including telephone and tele-video visits (Hays & Skootsky, 2022). Most in office visits were limited starting in March of 2020 and the study data followed this trend of an increase in telephonic care coordination enrollment. In this study the reference category was 2019, and the odds of enrollment in 2020 was 216% of those for 2019 and 334% for 2021 as compared to 2019. This finding indicates an overall positive enrollment rate trend over the years of program implementation. One possible explanation is the effects of the 2019 Coronavirus pandemic. It is possible that patients were more likely to agree to a telephonic CCTM program to stay connected to their healthcare providers when there were limited in-person visits available. Patients also were increasingly hesitant to go into office visits for routine visits and checkups and may have felt more comfortable speaking to a care coordinator over the phone for healthcare advice and education. This study finding reveals the overall CCTM program is improving at the rates of enrolling patients over the years of the collected study data.

The last study variable analyzed to predict patient enrollment in the CCTM program was insurance type. Insurance type was categorized into traditional Medicare and Commercial payors. Of note, patients in Medicare Advantage plans were coded as Commercial payor patients due to a Commercial payor being the primary insurance type. The overall study population was almost 70% Commercial payor patients and about 30% traditional Medicare patients. Medicaid and non-insured patients were not part of the study data set because these patients were not a part of an Accountable Care Organization Shared Savings Contract at the time of the study. There was a gap in the literature for comparison of insurance types in CCTM programs, perhaps due to the lack of programs that include both Commercial and Medicare patient populations. The study results revealed Medicare insurance type was significant in predicting patient enrollment which increased the odds of the patient agreeing to enrollment by 77% relative to the Commercial category. One explanation for the outcome of results is that Commercial and Medicare Advantage plans often have similar patient care coordination programs, so this population of patients may be less likely to enroll in an additional program because they feel their healthcare needs are already being met. Patients with traditional Medicare do not have other care coordinator outreach and resources based on their insurance plans, so they may be more likely to enroll in a healthcare organization CCTM program. After examining patient characteristics to predict enrollment in the CCTM program, the study explored patient characteristics to predict the achievement of care plan goals.

Aim 2

The study's second aim was to examine if the patient characteristics of race, age, sex, case type, enrollment year, and primary insurance type would significantly predict the patient achieving their care plan goals. The overall model was significant. Similar to study aim one, patient race was categorized as Caucasian and non-Caucasian. The study results revealed Caucasian patients were 19% more likely to achieve their care plan goals compared to non-Caucasian patients. Due to varying outcome measurements of care plan goals in the literature, it was difficult to generalize the results of this study to the literature. The program in this study evaluated the achievement of care plan goals based on the nursing process. However, other programs base outcome measures on varying metrics such as healthcare utilization, reduction of hospitalizations, or reduction of risk stratification scores (Budde et al., 2021, De Regge et al., 2017, Jackson et al., 2013, Jubelt et al., 2015., Kern et al., 2020, Parry et al., 2009, Scholz et al., 2018). Further investigation should be conducted to explore why non-Caucasian patients are less likely to achieve their care plan goals when compared to Caucasian patients.

Age range was the next variable of interest of patients achieving their care plan goals in the CCTM program. Again, the three categories of age range were 18-39 years of age, 40 - 64 years of age, and 65 and older. Patients in the 40 - 64 and the 65 and older age categories decreased the odds of the patient achieving care plan goals by about 48% and 40%, respectively, compared to the 18 - 39 years of age category. This was a similar finding to enrollment rates in research aim one. One explanation of this study finding could be explained by the younger age group having less chronic conditions and more achievable care plan goals such as yearly physicals or health screenings rather than more chronic condition goals such as lowering their blood pressure. Further exploration should be conducted on the types of care plan goals the patients are being evaluated for during their time in the CCTM program since the program is tailored to each patient's needs. Since the 18-39 year age group made up about 7% of the study data additional analysis was conducted to the two older age groups.

For further analysis, the 40-64 years of age range and the 65 and older age range were compared. The 65 and older age range was the reference category for this multivariate logistical regression analysis. The results found that the 40-64-year-olds had a 23% decrease in overall enrollment and a 17% decrease in achieving their care plan goals compared to patients 65 and older. No statistical significance was found between these two age groups when >20min communication duration was included as a variable. One possible explanation for this finding is that patients 65 and older are more likely to be retired and at home when the nurse care coordinator reaches out to them telephonically. The 40 - 64-year-olds may still be working, and it could be more challenging to enroll in the program and complete their care plan goals since the nurse care coordinators are calling during office hours. Further exploration should be conducted on the time of patient contact and the encounters when the patients may be unable to reach or request a call back.

Sex was the next variable of interest in predicting the achievement of care plan goals in this study. Study aim one revealed male were 21% more likely to enroll in the CCTM program. Conversely, for study aim two, there were no statistically significant odds of male patients achieving care plan goals compared to the enrolled female patients. Therefore, sex was not an influential variable in predicting the achievement of care plan goals.

The next variable of interest was case type which again included Transition Care Management (TCM) patients and High Risk/ High Costs (HR/HC) Chronic Disease Management patients. For study aim two, case type was statistically significant, but patients whose case type was TCM were 40% less likely to complete their care plan goals than patients whose case type was HR/HC. This was an unexpected finding considering patients in the TCM category were over 100% more likely to enroll in the program from the results of study aim one but were less likely to complete their care plan goals. TCM patients are enrolling in the CCTM program but not achieving their care plan goals while in the program. There are a few explanations that could explain these study results. One is that the care plan goals are too advanced for a patient transitioning out of the hospital; therefore, the care plan goals for TCM patients should be further evaluated. The next explanation is that patients attend office visits with their doctor and specialists and feel they no longer need to communicate with the nurse care coordinator, so they do not answer subsequent calls and are lost to follow-up. Lastly, the patient may feel they have received all the education for their post-hospital discharge during the initial contact with the nurse care coordinator and do not want to continue in the CCTM program. Further investigation into why TCM patients are not achieving their care plan goals is vital to understand barriers preventing the effective transition of patients across healthcare settings.

Achievement of the care plan goals based on the year of enrollment was the next variable of research aim two. Similar to research aim one, the category of reference was 2019, and the patients achieving their care plan goals increased odds by 159% in 2020 and 458% in 2021. This positive relationship between the achievement of care plan goals as the years of the study program could be explained by the impact of the 2019 Coronavirus pandemic on the healthcare system's overall access. Patients were increasingly willing to work on healthcare goals and achieve them while in the CCTM program over the study years of January 2019 - December 2021.

The last study variable for research Aim 2 was insurance type. Medicare category was significant, indicating Medicare insurance increases the odds of the patient achieving care plan goals by approximately 17% relative to the Commercial category. Further research would need to be conducted to understand why Commercial payors patients are not meeting their care plan goals at the same rate as the Medicare patient populations in the same CCTM program. Since the Accountable Care Organization contract started with the Medicare Shared Savings program, most of the studies in the literature only focus on Medicare patient populations (Peikes et al., 2009, Marek et al., 2009, Jencks et al., 2009, Hasselt et al., 2015, Atherly & Thorpe 2011). Since Commercial and Medicare patient populations could be considerably diverse, it would be beneficial to explore this outcome further. Overall, the literature was not generalizable for comparing the achievement of care plan goals due to various outcome measures of similar CCTM programs in the literature. It is essential to understand barriers to patients achieving care plan goals to create a program that effectively coordinates care for the entire healthcare system's population.

Aim 3

The study's third and final aim was to examine if average communication duration significantly predicts the achievement of care plan goals. The communication duration variable was determined by the average talk time of each successful communication with the patient during their enrollment in the CCTM program. Patients with less than 20 minutes of average talk time were omitted from this analysis since the current CMS billing guidelines require a talk time of at least 20 minutes to start billing for chronic disease management. The study sample with 20 minutes or greater of talk time included 6,257 patients for analysis. The communication duration categories had 20 - 59 minutes, 60 - 89 minutes, and greater than 90 minutes of average talk time. The independent variables of race, age, case type, year of enrollment, and primary insurance type were analyzed for consistency between all three research aims. Average communication time between 60 - 89 minutes increased the odds of the patient achieving their care plan goals by 23% compared to the 20- 59-minute average communication category. The study findings revealed average talk time of greater than 90 minutes was not significant in the patient's achievement of care plan goals. There was no current literature of recommended average talk time for patients to enroll or achieve care plan goals. This study finding can inform nurse care coordinators of improved effectiveness and efficiency when speaking to patients to assist them with achieving their care plan goals.

This study's aim also has implications for increasing revenue by billing traditional Medicare beneficiaries for Chronic Care Management (CCM) billing codes. At the time of the study, Medicare reimbursement codes can be billed once a month for Medicare beneficiaries with two or more chronic disease conditions that have talk time with a healthcare provider of greater than 20 minutes. Additional codes can be billed for communication over 60 minutes and every 20 minutes of talk time up to 90 minutes. Currently, the CCTM program at Emory Healthcare does not use the billing codes for Chronic Disease Management, so this could demonstrate a loss of potential revenue for the time the care coordinators are already spending with the patient. In the study results, average communication of 20 - 59 minutes made up 59% of all communication, average communication time of 60 - 89 minutes made up 25% of the communication, and 16% of average talk time was greater than 90 minutes. It may be financially beneficial for the CCTM program to further explore the advantages of billing the traditional Medicare population for the Chronic Disease Management codes since the CCTM team is already completing the billing requirements.

In summary, the study findings produced compelling results. All the study models were significant, indicating that race, age, sex, and primary insurance type significantly predict a patient's enrollment into the CCTM program and achievement of CCTM care plan goals. Caucasian patients are less likely to enroll in the CCTM program but more likely to complete their care plan goals than their non-Caucasian counterparts. Patients 40 and older are less likely to enroll and less likely to achieve their care plan goals compared to younger patients in the 18-39 years of age category. Male patients are more likely to enroll in the CCTM program, but there was no significance in them achieving their care plan goals when compared to female patients. Medicare patients were more likely to enroll and complete their care plan goals compared to the Commercial payor patient population. At the same time, we found Transition Care Management (TCM) patients more likely to enroll but less likely to complete their Care Plan goals. Communication duration also significantly predicted achievement of care plan goals, but there was no significance when average talk time was greater than 90 minutes. The study findings could assist the program's leadership and similar CCTM programs in examining the most effective strategies to enroll patients, assist patients with care plan goals, and deliver effective communication to keep the patient engaged and receive the maximum healthcare benefits of the CCTM program as well as bring in additional revenue for the healthcare system.

Linking the Chronic Care Model

The Wagner Care Model was the guiding theoretical framework for this dissertation study. The Chronic Care Model includes three primary constructs that illustrate the interplays of the healthcare and the chronically ill patient: (1) The Community and Health Systems, (2) Productive Interactions between the informed, activated patient and the prepared, proactive practice team, and (3) Improved Outcomes. The community was represented by patient characteristics, including race, sex, age, and insurance type. The Health System was illustrated by Emory Healthcare (EHC) as an Accountable Care Organization comprising hospital systems and outpatient clinics. Productive interactions were represented by the average communication duration between the patient and the nurse care coordinator. The informed, activated patient, in the Chronic Care Model, was represented in this study by the patient's agreement to enroll in the CCTM program. 53% of the study population agreed to enroll in the CCTM program, while 47% declined to participate. The prepared, proactive practice team was represented by the CCTM care coordinators, who completed proactive outreach to the patient to speak about the care coordination program. Over the three years included in the study data, the CCTM care coordination team outreached to 17,241 individual patients. The last construct of The Chronic Care Model is improved outcomes. This construct was represented by the patient's achievement of care plan goals. Over the three years included in the study data, 77% of the enrolled patients completed their care plan goals compared to 23% that did not achieve their care plan goals during enrollment in the program. Based on this adapted Chronic Care Model, the CCTM team at Emory Healthcare has effectively impacted patients' lives and improved health outcomes at a substantial rate. It will be beneficial to use the results of this dissertation data to benchmark future achievements of the CCTM program's success to ensure increased rates of CCTM enrollment and achievement of care plan goals to improve health outcomes and decrease unnecessary overutilization of the healthcare system.

Limitations:

There were several limitations to this study. First, there are the standard limitations in using secondary data (Anderson et al., 2011). Secondary data offers the ability to use large data sets, but data fields are at risk for missing or incomplete information due to insufficient information within the EHR, human errors, or a variety of other reasons which could have limited validity. Study variables were limited to those captured in the EHR. There is a need to understand how variables could be extracted more easily within EHRs to support the development of comparative and predictive studies. Another limitation is the CCTM program in this study primarily outreached to patients attributed through ACO Shared Savings Contracts, so patients without insurance or on Medicaid plans were not included in this study. In the United States, insurance coverage is typically tied to employment and if a patient is unemployed and not insured, they may be at high risk for adverse health outcomes. The study was also limited due to the inability to receive additional study variables such as the patient’s chronic condition diagnosis and the patient’s healthcare utilization such as the overuse of Emergency Room Visits. The program’s risk scoring system stratified the high risk and high cost patients, but the data set did not provide the metrics to determine this risk scoring. Therefore, the ability to stratify within the data set was a limitation. Additionally, another notable limitation is the study’s timeframe from January 2019 through December 2021 when the novel Coronavirus pandemic was affecting healthcare systems globally. It is unknown if patients were more agreeable to enrollment in telephonic CCTM Services since there were limited in-person clinic visits. Additionally, this program outreach occurs primarily through telephone calls and a lot of patients could be skeptical of a phone call or not comfortable discussing their healthcare over the phone. The quantitative study design is limited in its ability to understand patients' perceptions and reasons for not agreeing to enroll in the telephonic nurse-led care coordination program. Furthermore, nursing narrative notes were not extracted, and additional information could have been missing regarding the patient's enrollment or success of care plan goals. The data extracted only show rates at which patients agreed or declined care coordination services, but not their perceived barriers or perceptions to enrollment. Another major limitation is the lack of national standardized outcome measures for CCTM programs. This made it difficult to compare the CCTM program to similar CCTM programs within the literature. Lastly, this study examined patients within one healthcare system within Metro-Atlanta, so generalizability of the findings to other populations outside this healthcare system must be done with caution.

Strengths

The study had several strengths. First, the size and coverage area of the Emory Healthcare organization includes 11 hospitals and 250 locations, including primary care, urgent care, and Minute Clinics. This led to another strength of the patient data set that included three years of data and a total of 17,241 individual patients that had a Care Coordination encounter. This extensive data was essential in answering the research questions and ensuring the reliability and validity of the analysis. The study is the first known study of its kind to examine patient characteristics, including race, age, sex, case type, enrollment year, primary insurance type, and communication duration to predict patient enrollment and achievement of care plan goals. As more Commercial plans enter into Shared Savings contracts with Accountable Care Organizations, it will be essential to continue evaluating CCTM's effectiveness in engaging and enrolling diverse patient populations. Lastly, this study's ability to numerate average communication time was a strength. During the time of this study, there were no studies found in the literature that included the time the care coordinator spends speaking to each patient. This finding could help drive productivity and create standards of practice that provide effective communication. In addition, Medicare currently provides reimbursement for the duration of communication healthcare providers spend speaking to patients about chronic disease management in non-face-to-face visits. Adequate documentation of talk time could open additional revenue for the healthcare system in a time healthcare system are struggling to sustain profitability.

Recommendations & Implications for Future Research

This study explored race, age, sex, and primary insurance type to determine the predictability of CCTM patient enrollment and the achievement of care plan goals. The study demonstrated all independent variables of race, age, sex, case type, enrollment year, primary insurance type, and communication duration were predictors of enrollment and achieving CCTM Care Plan goals. The current CCTM program at Emory Healthcare does not tailor outreach to ethnic minorities and disadvantaged patient populations, but this could be an area of interest as other programs in the literature have been successful in managing high-risk populations by tailoring program outreach (Budde et al., 2021). Healthcare inequities exist among non-Caucasian minority populations in America, so engaging and enrolling this population is valuable to the entire healthcare system (AHRQ, 2010). Sex was also a variable of interest in this study. The literature revealed a retrospective study of a similar program had a 74% success rate at enrolling females into their CCTM program (Marek et al., 2010). In other studies, the literature was less generalizable due to specific study populations tailoring their CCTM programs to particular individuals, such as a Veteran Hospital system that showed 95% of men in their program (Connor et al., 2020).

Further research is needed to thoroughly investigate why patients choose not to enroll in a CCTM program and do not achieve their care plan goals. One suggestion for future research is to include a qualitative study focused on determining patient’s perceptions of the CCTM program. This qualitative data can help inform the healthcare organization of the needs of the patients and ensure there are supportive strategies in place to meet their needs. Another recommendation is to include nursing notes that may consist of narrative data on why a patient declined enrollment or did not meet their care plan goals. Nursing assessments are not always one size fits all, and it is important to capture information from nursing narratives to help inform the CCTM program goals and overall outcomes. Capturing barriers to enrollment and helping prevent or alleviate some of those barriers should be a goal of all CCTM programs.

Another area for future research is to include diagnosis coding of patients who enroll in the CCTM program. Chronic diseases cover a wide range of disease processes. It is essential to determine if a patient's chronic disease condition is uncontrolled during enrollment or if the patient's chronic illnesses are stable. Collecting diagnosis coding and data such as blood pressure measurements or blood glucose readings will help stratify the patients' risk levels and inform the healthcare system on effective interventions and outcome-specific metrics of the CCTM program. Furthermore, the intensity of program length and talk-time with the care coordinator varies depending on the specific patient's needs. It would be beneficial to collect diagnosis data to evaluate program intensity by disease condition.

Next, the development of a robust integrated IT system with other health systems is another suggestion for future research. One main goal of transition care management is to prevent hospital readmissions. A significant barrier is presented when a patient is readmitted to a hospital outside of the accountable care organization. The insurance payor often has a lag time in providing this information back to the healthcare organization, so it delays interventions the CCTM program could provide in managing the patient's transition of care. A robust integrated IT system would also benefit the collection of the long-term health benefits of the CCTM program, such as controlling blood pressures, A1C measurements and preventing unnecessary healthcare utilization.

Another immediate recommendation for the current CCTM program is to evaluate the benefits of the nurse care coordinator to initiate billing for the traditional Medicare population for the Chronic Care Management (CCM) codes. Per current Centers for Medicare & Medicaid Service (CMS) guidelines, Medicare beneficiaries can be billed monthly for Non-Complex CCM (CPT 99490) as long as the beneficiary has two or more chronic conditions, and the healthcare professional speaks to the patient for a minimum of twenty minutes. Complex CCM (CPT code 99487) can also be billed monthly for at least 60 minutes of talk time. It would be financially beneficial for the CCTM leadership to investigate the billing requirements and educate the staff on documentation requirements for billing these codes.

Lastly, there needs to be a national benchmarking for CCTM program metrics and outcomes. This was a significant limitation in the literature. Most healthcare systems now focus on value-based care and enter into Shared Savings Contracts with insurance payors. Healthcare systems must create a national standard of care to determine if it successfully meets the patient's healthcare needs and prevents adverse healthcare outcomes. Without national benchmarking, it is impossible to create a standard of care for healthcare organizations to determine the effectiveness and value of their CCTM programs.

Conclusion

As of date, this is the first known study of the Ambulatory Care Coordination and Transition Care Management department at Emory Healthcare that measured race, age, sex, and primary insurance type to predict patient enrollment and achievement of care plan goals. It further examined communication during each encounter with the patient to explore the effect of communication duration on care plan goals. This study was guided by The Chronic Care Model and the interplay of the community and the healthcare system to develop productive interactions through the CCTM program to improve health outcomes. The study demonstrated race, age, sex, and primary insurance type as predictors for patient enrollment and achieving care plan goals. The study further demonstrated communication duration significantly predicts the patient achievement of care plan goals. Further research will be needed to evaluate patients' perceptions of the CCTM program and self-perceived barriers to participation in the program. In addition, assessing the CCTM program over time will reveal the sustainability of the patient's behavior and the long-term effects of the CCTM program in managing and preventing chronic diseases.

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