

ABSTRACT

Title of Dissertation: CONNECTING THE DOTS ACROSS THE
CARE CONTINUUM: ADDRESSING
BEHAVIORAL HEALTH IN ACO
NETWORKS

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Philosophy, 2019

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Accountable Care Organizations (ACOs) represent a shift from traditional fee-for-service payment systems that reward volume to payment models that reward providers for value (e.g. quality improvement and cost reduction). Hospitals that lead or participate in ACOs have the potential to work with other providers to bridge the gap between traditional medical and behavioral health services. The goal of this dissertation was to examine the structures, processes, and outcomes of care for hospitals that lead or participate in ACO networks. The overarching hypothesis was that ACO-affiliated hospitals provide better behavioral health care due to increased care coordination and increased connections to behavioral health providers.

This dissertation had three aims: 1) compare the implementation of care coordination strategies between ACO affiliated hospitals and unaffiliated hospitals and examine whether the implementation of care coordination strategies varies by hospital payment model types; 2) compare the use of care coordination strategies between ACO-affiliated hospitals with and without in-network behavioral health providers; and 3) compare rates of follow-up after a hospitalization for mental illness between ACO-affiliated and unaffiliated hospitals. These aims build on each other to illustrate how hospitals that participate in ACOs are improving care coordination and the provision of behavioral health services.

There were several meaningful findings. ACO-affiliated hospitals were more likely to use care coordination strategies compared to unaffiliated hospitals. Participation in global capitation and shared savings models was associated with greater use of care coordination strategies. Nearly two-thirds of ACO-affiliated hospitals did not have in-network behavioral health providers. ACO-affiliated hospitals had a significantly higher average unadjusted rates of follow-up after a hospitalization for mental illness at 7 days and 30 days post-discharge compared to unaffiliated hospitals.

Hospitals are important components of the care continuum and will play a critical role in improving outcomes for patients with behavioral health conditions. Policy makers should include behavioral health related performance measures tied to performance-based payment arrangements in ACO programs. ACOs can be used as way to bridge behavioral, clinical, and social services to address the unique needs of individuals with behavioral health conditions.

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BEHAVIORAL HEALTH IN ACO NETWORKS

by

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Dissertation submitted to the Faculty of the Graduate School of the
University of Maryland, College Park, in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
2019

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Acknowledgements

This work would not have been possible without the mentorship and support of faculty members at the University of Maryland and many others. Thanks to my advisor, Dr. Luisa Franzini, you were a source of encouragement and unwavering support throughout my studies and this dissertation. Dr. Jie Chen, I feel so fortunate to have worked under your tutelage through numerous research projects. I will take those lessons with me throughout my career. Thanks to Dr. Andrew Fenelon for helping me think out outside of the box and being sounding board when I needed it the most. Thanks to Dr. Eva DuGoff for your thoughtful questions and constructive feedback that challenged to me look again and apply more rigor to my work.

I would also like to thank the Robert Wood Johnson Foundation Health Policy Researchers Scholars (HPRS) program for supporting me throughout my graduate studies and providing funding for this dissertation. The colleagues and friends I've made through HPRS will undoubtedly be lifelong and continue to offer me a source of camaraderie and inspiration. I'm eternally grateful for the mentorship and training I received through HPRS. I privileged to be apart of the RWJF family and a coalition of individuals fighting to create healthier, safer, and more equitable society.

Lastly, I'm grateful for National Committee for Quality Assurance Phyllis Torda Health Care Quality Research Fellowship. Dr. Sarah Scholle, your enthusiasm and guidance helped me stay focused and was consistent reminder of the importance of this work. As a fellow, I received protected time, continuous encouragement, and a platform to publicize my work. The fellowship is in honor of Phyllis Torda who

dedicated her life to improving the national health care system. I hope to honor her legacy by continuing her work.

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List of Abbreviations

Accountable Care Organization	ACO
Pioneer Accountable Care Organization	PAM
Advance Payment ACO Model	APAM
Medicare Shared Savings Program	MSSP
Affordable Care Act	ACA
Fee-for-service	FFS
Diagnostic Related Groups	DRG
Hospital Referral Region	HRR
Hospital Service Area	HSA
Care Coordination Index	CCI
Follow-up After a Hospitalization for Mental Illness	FUH

Chapter 1: Introduction

Accountable Care Organizations (ACOs) are among the most widely adopted integrated care models. ACOs connect providers along the care continuum (e.g. hospitals, primary care providers, and allied health professionals) through formal agreements for collaboration and information sharing (Chee, Ryan, Wasfy, & Borden, 2016). Many providers are participating in ACOs through the Medicare Shared Savings Program (MSSP). However, although patients with behavioral health needs are likely to benefit from the coordinated high-quality care that ACOs are designed to provide, ACOs are not required to include behavioral health care providers in their networks as a condition of participation in the MSSP or other ACO programs.

In 2013, behavioral health disorders were the costliest conditions in the United States, with spending at \$201 billion (Roehrig, 2016). Untreated behavioral health conditions (e.g. depression, bipolar disorder, anxiety disorders, schizophrenia, and substance abuse disorders) are associated with a higher incidence of disability and increased health care costs (Bartels, Gill, & Naslund, 2015; Maust, Oslin, & Marcus, 2013). Nationally, individuals with behavioral health conditions use one-third of all health care resources and three-fourths receive care in medical settings (Kathol, Patel, Sacks, Sargent, & Melek, 2015). As a result, the Department of Health and Human Services (HHS) prioritized improving behavioral health care in its Healthy People 2020 goals (Office of Disease Prevention and Health Promotion, 2014). Despite this commitment, the majority of ACOs programs have not meaningfully incentivized improvements in outcomes associated with behavioral health care.

Emerging health care delivery models often fail to meet the physical health needs of individuals with mental illness, do not adequately measure the quality of mental health services, and do not routinely connect patients with unmet need to behavioral health providers (Kathol et al., 2015; McGinty, Baller, Azrin, Juliano-Bult, & Daumit, 2015). A qualitative study of 90 organizations participating in ACOs found that one of the primary challenges to including behavioral health providers in ACO networks is the lack of sustainable financing models (Fullerton, Henke, Crable, Hohlbauch, & Cummings, 2016).

Most ACOs do not report or assume financial risk for behavioral health outcomes or behavioral health related measures of care coordination (e.g. readmissions and timely follow-up). For example, ACOs participating in the MSSP are only required to report the extent to which they screen for depression (Center for Medicare and Medicaid Services, 2017). Future ACO risk sharing and measurement approaches will need to better account for behavioral health needs to maximize the goal of cost reduction and quality improvement.

Studies suggest ACOs have had little to no impact on mental health spending, utilization, or quality of care, but most have focused on the early years of implementation (Cantor et al., 2014; Stuart et al., 2017). Establishing systems for enhanced information sharing and care coordination requires considerable time and resources. Providers are unlikely to reap the rewards of (e.g. shared savings) until year after joining an ACO. However, ACOs are increasingly including behavioral health providers, improving connections with community resources, partnering with

behavioral health facilities, and reorganizing their resources to improve access to behavioral health care (Driessen & Zhang, 2017).

Over half of ACOs now include hospitals in their networks. ACO-affiliated hospitals often have advanced data sharing, engage with providers across the care continuum, and offer more services (Fullerton et al., 2016). Hospitals that use ACO networks to better coordinate care with primary and behavioral health providers have the potential to bridge the gap between medical and behavioral health services (Klein & Hostetter, 2014). The goal of this dissertation was to examine the structures, processes, and outcomes of care for hospitals that lead or participate in ACO networks. The overarching hypothesis of this dissertation was ACO-affiliated hospitals provide better behavioral health care due to increased care coordination and increased connections to behavioral health providers.

Overview

Chapter 2 describes the proliferation of both public and private accountable care arrangements during the implementation of the Affordable Care Act. It explains the goal of ACO programs, their characteristics, and types of ACO risk sharing arrangements. The chapter also reviews the evidence describing the extent to which ACOs have improved quality and generated savings. In addition, chapter 2 presents a review of the literature that explored whether ACOs exacerbate racial and ethnic disparities. Policymakers and researchers have expressed concerns that ACOs are more likely to serve individuals who have higher incomes, are white, and live in urban areas. Disparities may widen if minorities have less access to better quality

coordinated care. Lastly, the chapter discusses the current state and future role of ACOs in the US healthcare system.

Chapter 3 describes a study that explored the association between ACO affiliation and the use of care coordination strategies among a national sample of US community hospitals. The study also examined the types of payment models (e.g. bundled payment, shared savings, global payment) associated with the use of care coordination strategies. It is the first study to examine the use of care coordination strategies among ACO-affiliated hospitals. The study found ACO-affiliated hospitals were more likely to use care coordination strategies compared to hospitals outside of ACO networks (i.e. unaffiliated hospitals). It also found that participation in global capitation and shared savings models were associated with greater use of care coordination strategies.

Chapter 4 describes a study that explored the structural and service area characteristics of a national sample of ACO-affiliated hospitals with in-network behavioral health providers. The study found nearly two-thirds of ACO-affiliated hospitals did not have in-network behavioral health providers. ACO-affiliated hospitals with in-network behavioral health providers reported wider use of care coordination strategies. They also reported a higher percentage of net-patient revenue attributed to shared savings payment models. The study suggests many ACO-affiliated hospitals, likely participating in the Medicare Shared Savings Program, have in-network behavioral health providers.

Chapter 5 describes a study that compared rates of follow-up after a hospitalization for mental illness at 7- days (FUH-7) and 30-days (FUH-30) post-

discharge between ACO-affiliated and unaffiliated hospitals that participate in the Inpatient Psychiatric Facility Quality Reporting program. Timely follow-up can improve continuity of care and reduce unnecessary gaps in the receipt of psychiatric services. ACO-affiliated hospitals have the potential to improve rates of follow-up due to increased linkages to outpatient care and better care coordination. ACOs inherently have an incentive to improve follow-up to reduce costs associated with psychiatric readmissions and other poor outcomes. The study found ACO-affiliated hospitals had a significantly higher average unadjusted FUH-7 and FUH-30 rates compared to unaffiliated hospitals.

Chapter 6 synthesizes the evidence across all four studies, discusses the policy implications, and provides suggestions for future research.

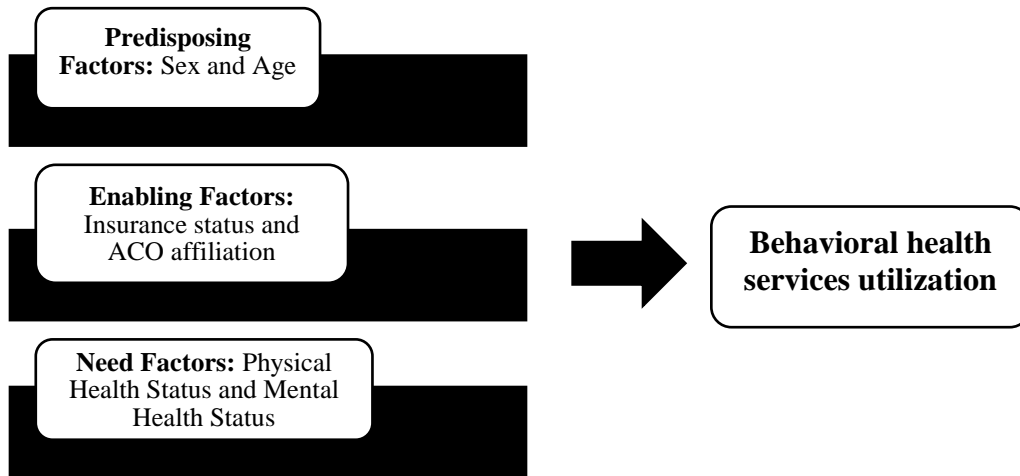
Theoretical Framework

Chapter 5 uses the Andersen Behavioral Model of Health Services Use for Vulnerable Populations as the conceptual framework for selecting predictor variables for follow-up and readmissions. The traditional model of health services utilization developed and refined by Ronald Andersen describes domains of predisposing, enabling, and need factors that influence the extent to which individuals use health services (Andersen, 1968; Andersen, 1995). It is the most widely used model of health services use (Babitsch, Gohl, & von Lengerke, 2012). The model was later revised to include domains specific to understanding the health and health seeking behavior of vulnerable populations. The revised model has a specific focus on the effects of mental health, substance abuse, residential history, competing needs, and victimization (Gelberg, Andersen, & Leake, 2000).

Traditional *predisposing* domains include demographic characteristics like age, sex, occupation, beliefs, attitudes, and values. Vulnerable domains include factors like acculturation, immigration status, mental illness, and substance abuse. Traditional *enabling* domains include financing and organizational supports. At the individual level, these factors include income, insurance, and/or wealth to pay for health services. At the organizational level, the enabling domain includes a usual source of care, travel time, and delay in obtaining care. Enabling factors can also include resources available in a community for health services (e.g. per capita community income, rate of insurance coverage, and relative price of goods and services). Vulnerable domains include receipt of public benefits, competing needs, and community crime rates.

Traditional need domains include both perceived need (i.e. self-rated) and evaluated need (i.e. professional assessment or objective measurement). Vulnerable need domains include need related to conditions that are prevalent among vulnerable groups (e.g. HIV/AIDS and premature or low birth weight). The Behavioral Model of Health Services Use for Vulnerable Populations specifies that mental illness is a part of the need domain rather than the predisposing domain when predicting use of mental health or substance abuse services (Gelberg et al., 2000). Figure 2 describes the types of factors that will be used to test the hypotheses described in the specific aims.

Figure 1.1: Behavioral Model of Health Services Use for Vulnerable Populations



Defining Hospital Catchment Areas for ACO-affiliated hospitals

Each study described in this dissertation examined hospital structural characteristics as well as the demographic characteristics of their catchment areas (i.e. patients living in each focal hospital's service area). There are multiple approaches to define a hospital catchment area. Determining a hospital's catchment area using geospatial and geopolitical boundaries often involves a tradeoff between creating an area wide enough to capture patients seeking care at focal hospital but narrow enough avoid capturing patients that seek care at other hospitals. In other words, large geographic areas tend to have more internal variation that limits an analyst's ability to attribute patients to focal hospitals and small areas have too much movement outside of boundaries to match patients to focal hospitals.

Researchers often use patient zip codes which can cover large areas with hospitals at varying distances from a patient's home. Hospitals also serve patients in multiple zip codes with varying caseloads from each zip code. Counties have also been used to determine catchment areas because they have the advantage of being

relatively small. However, they rarely capture all of the actual patients served by a focal hospital (Wilson & Tedeschi, 1984).

The Dartmouth Atlas Project developed catchment designations, using Medicare claims data, that have been widely accepted and consistently used in the literature. Catchment areas are defined as health service areas (HSAs) and hospital referral regions (HRR). HSAs and HRRs have an advantage over geopolitical boundaries because they are based on the administrative claims of hospitals. There are 3,436 HSAs, however, they are so small that they often capture less than half of a focal hospital actual patient population (Falster, Jorm, & Leyland, 2018). One study found HSAs catchment areas were similar to counties in the percentage of a hospital's actual patient population captured (Kilaru et al., 2015).

There 306 HRRs that comprise many HSAs. The size of HRRs limits attribution because of the number of hospitals and patients within each region. However, patients rarely move outside the boundaries of HRRs, while patient frequently move across HSAs (Kilaru et al., 2015). As a result, HRRs are much more likely to include a focal hospital's actual patient population and is often a better link between a patient's residence and treatment area. However, the HRR is so large it often includes the catchment areas of many hospitals which makes it difficult to detect variation in demographic characteristics between hospitals.

Another option is to calculate hospital areas using distance measures (5 miles, 15 miles) which provides a narrower catchment area. The disadvantage is that fixed mile parameters tend to overestimate the number of patients attributed to a focal hospital in urban areas and underestimate the number in rural areas (Phibbs &

Robinson, 1993). Finally, a more precise method is to calculate the demographic composition based on complete hospital discharges. This method is often infeasible. To conduct a national study, an analyst would need an all payer database which is not available for all states nationwide. In addition, Medicare discharge data would limit the analyst to only a subset of a hospital's patient population.

Previous studies have primarily examined catchment areas for general medical or surgical inpatient care. It is unclear whether these catchment areas also reflect patterns in seeking behavioral health services. Patients may choose different hospitals to seek behavioral health care than they would choose other forms of care. For the purpose of this dissertation, smaller geographic units were selected to increase the likelihood that the catchment area reflects each focal hospital's true patient population. The study described in chapter 3 uses geospatial measures (5-miles and 15-miles) calculated using ArcGIS. The studies described in chapter's 4 and 5 use the hospital service areas developed by the Dartmouth Atlas Project (Kilaru et al., 2015).

Chapter 2: The Rise of Accountable Care Organizations

An Accountable Care Organization (ACO) is a legal entity comprised of various health care providers (hospitals, doctors, and allied health professionals) that collaborate to deliver high quality, coordinated care (CMS, 2017). The number of ACOs continue to grow each year with more than 923 private and public ACOs across the country (De Lisle, 2017). The most common are Medicare ACOs. The Affordable Care Act led to the establishment of four Medicare ACO programs, the Pioneer ACO model (PAM), the Advance Payment ACO Model (APAM), the Medicare Shared Savings Program (MSSP), and the Next Generation ACO Model. Each initiative differs based on their participation requirements, benefits, and risk sharing arrangements (Damberg et al., 2014).

CMS designed the PAM for health care organizations with demonstrated experience delivering coordinated health care and the MSSP for organizations that are beginning to invest in better care coordination. The PAM began in 2012 and concluded in 2016. The PAM had higher levels of shared savings and risk than the MSSP. The MSSP began in 2013 and is ongoing (CMS, 2016). CMS created the APAM, which had fewer requirements for participation, to support small practice and rural providers that had fewer resources to invest in the infrastructure needed to participate in an ACO. The program helped several small ACOs participate between 2012 and 2015.

Most ACOs participate in the MSSP, which has three tracks with varying levels of pay for performance and/or reporting arrangements. ACOs that participate in

track one (one-sided) can receive up to 50 percent of all savings, whereas ACOs that participate in track two (two-sided) and three (three-sided) have a maximum-shared savings of 60 and 70 percent. ACOs in the one-sided track 1 program do not share losses but are rewarded for improved quality and reduced cost. CMS caps shared losses based on the ACOs quality performance score at 5 to 10 percent for track 2 and 15 percent for track 3. About 561 ACOs participate in the MSSP with over 90 percent participating in track 1 serving over 10.5 million beneficiaries (CMS, 2018). The Next Generation ACO Model builds on the PAM and MSSP by offering enhanced benefits through waivers (e.g. telehealth expansion waiver, post-discharge home visit waiver, and three-day skilled nursing facility waiver) that allow ACOs that meet certain eligibility requirements to experiment with new ways of providing care (CMS, 2018).

The performance of ACOs in each program is measured by nationally recognized measures many of which are endorsed by the National Quality Forum (NQF) and developed by the National Committee for Quality Assurance (NCQA). The MSSP requires reporting of measures in four domains which include patient/caregiver experience (eight measures), care coordination/patient safety (10 measures), and clinical care for at-risk populations (i.e. diabetes, hypertension, heart failure, coronary artery disease, and depression). Data are collected through administrative claims and patient experience of care surveys. CMS sets benchmarks that each ACO must meet to qualify for shared savings.

Characteristics of Accountable Care Organizations

Nationally, over 20 percent of hospitals participate in ACOs (Colla et al., 2016). Urban non-profit hospitals often care for a smaller share of Medicare recipients than for-profit or government owned hospitals. Both public and private ACOs seek outside help to manage their patient populations. Over 80 percent of ACOs partner with external organizations (i.e. management partners) for data analytics, care coordination, and administrative services (Lewis, Tierney, Colla, & Shortell, 2017). Without the resources to collaborate with external organizations, some ACOs may be less able to compete in pay-for-performance programs.

One of the earliest evaluations of ACOs found that providers participating Medicare ACOs were mostly indistinguishable from providers not participating in ACOs – though providers participating in ACOs tended to serve fewer minority patients (Epstein et al., 2014). The findings suggested a low likelihood that providers differentially select to participate in an ACO based on their patient, hospital, and market characteristics. However, when ACOs were first established they were slightly less likely to serve African Americans, Medicaid recipients, and individuals who are disabled (Epstein et al., 2014). One criticism of ACOs is that they have the potential to widen disparities because minorities may not have equal access (Pollack & Armstrong, 2011).

ACOs may be able to bridge the access gap by including more safety-net providers in their networks as they mature. In 2014, over 25 percent of ACOs have included safety-net community health centers in their networks (V. Lewis, Colla, Schoenherr, Shortell, & Fisher, 2014). Moreover, ACOs are beginning to increase the

integration of behavioral health providers, which could also increase access to mental health services (Fullerton et al., 2016). In addition, since the majority of the US population live in areas where ACOs have been established, minorities might now have increased access (Lewis, Colla, Carluzzo, Kler, & Fisher, 2013). Further, ACOs are also increasingly adopting patient activation and engagement strategies (PAES) which have been shown to improve minority health and reduce disparities (Chen, Mullins, Novak, & Thomas, 2016; Shortell et al., 2015).

Quality and Spending Among Accountable Care Organizations

Most studies have examined the effectiveness of the PAM program because it was the first to be implemented after the ACA. The PAM recruited ACOs that served at least 15,000 Medicare beneficiaries. There were only nine organizations participating by 2015. Many of these ACOs had already demonstrated years of cost reduction and improved quality prior to joining the program. The PAM program emphasized improvements in beneficiary's experiences with the care they receive as demonstrated by a set of patient-reported outcome measures. Organizations that participated in the PAM took on the risk of losing funds if they do not meet predetermined benchmarks but received a bonus if they did.

Nyweide et al. (2015) conducted the most comprehensive study to examine the effectiveness of the ACOs in the PAM program (Nyweide et al., 2015). The authors estimated beneficiary cost and quality of care, including experiences with care, during the first two years of the program (i.e. 2012-2013). They confirmed the Epstein et al. (2014) findings that beneficiaries served by PAMs were similar to comparable populations not served by ACOs across baseline performance years.

After entering the PAM program, ACOs had significantly smaller increases in adjusted expenditures estimated at around \$183 million in savings to the Medicare program. ACOs in the PAM program also improved their mean clinical quality scores from 70.8 percent to 84 percent. However, a later analysis found no association between changes in mental health spending, readmissions, outpatient follow-up after mental health admissions, or patient mental health status for providers participating in the PAM (Busch, Huskamp, & McWilliams, 2016).

McWilliams et al. (2013) examined changes in beneficiary experiences in ACOs participating in the PAM and the MSSP using data collected from the Consumer Assessment of Healthcare Providers and Systems (CAHPS) between 2010 and 2013. The authors attempted to address a concern that ACOs may reduce readmissions, mortality, hospital acquired infection rates, and costs but it may worsen patient experience. They found that the experience of Medicare beneficiary did not deteriorate over time and improved in several areas. Unlike ACOs in the PAM, very few ACOs in the MSSP face penalties for not reaching benchmarks set by the PAM program. A later study that examined patient outcomes and costs of care from 2009 to 2013 found very small differences in cost reduction between organizations that chose to join ACOs and comparable organizations that did not join ACOs (McWilliams, Hatfield, Chernew, Landon, & Schwartz, 2016a). Most savings came from ACOs that were integrated primary care groups rather than hospital integrated groups.

Among private ACOs, most studies have examined outcomes for providers that participated in the Blue Cross Blue Shield Alternative Quality Contract (AQC). The AQC has demonstrated modest slowing of spending and improved quality of care

(McWilliams, Landon, & Chernew, 2013; Song et al., 2011). Yet patients whose care was attributed to an AQC were less likely to use mental health services (Barry et al., 2015). Even patients that face behavioral health risk, have experienced no change in the probability of using services and have not experienced improved outcomes (Stuart et al., 2017).

Nevertheless, some private ACOs have been successful in integrating and improving behavioral health outcomes. For example, UCLA Health's ACO model has tripled the number of patients receiving behavioral health services and reduced mental health related emergency department use by 13 percent through an all-payer program that used an enterprise-wide electronic health record for behavioral health referrals and documentation. UCLA Health also embedded behavioral health providers in primary care practices throughout the UCLA health system. (Clarke et al., 2016). These strategies are promising and demonstrate how ACOs can begin to enhance the coordination of care for behavioral health services.

Racial and Ethnic Disparities within Accountable Care Organizations

Few studies have examined racial and ethnic disparities within ACOs. One study found that larger provider group size to be associated with better performance on quality measures but had a mixed effect on disparities depending on the measure (R. Anderson, Ayanian, Zaslavsky, & McWilliams, 2014). Physicians participating in ACOs are less likely to practice in areas that have a higher percentage of individuals who are African American, uninsured, low socioeconomic status, and disabled (Yasaitis, Pajerowski, Polsky, & Werner, 2016).

Studies have called for payment arrangements that incentivize disparities reduction. ACOs that serve a higher proportion of minorities have reported spending more on care management, health information technology, and administration (Hartzman & Rhodes, 2017). Another study found that ACOs serving a higher proportion of minority patients perform worse on 25 of the 33 performance measures required to be reported for participation in the MSSP (Lewis, Frazee, Fisher, Shortell, & Colla, 2017). However, the study looked at ACO-level performance and noted the need for future analyses that focus on how ACOs affect disparities at the patient level.

The Present and Future of ACOs

ACOs now serve over 32 million individuals in the United States (Briggs, Alderwick, & Fisher, 2018). Recent evidence suggests that ACOs are improving quality beyond care coordination and reducing costs. ACOs that participated in the Medicare Shared Savings Program (MSSP) reported on 31 quality measures between 2015 and 2016. The results of these measures indicate that patients are benefiting from improved quality and ACOs are saving money for organizations within their networks and for the Center for Medicare and Medicaid Services (CMS). (Dawe, 2017)

Despite these improvements, many ACOs are not joining higher risk models that could lead to greater savings for CMS and payment bonuses for their network providers. The lack of participation may be due to the structure of current payment models in higher risk arrangements. Nearly 80 percent of Medicare ACOs are participating in one-sided arrangements, which allow ACOs to share in savings but does not require them to repay costs in excess of spending targets. In 2016, two-sided

risk models generated over three and half times greater savings than one-sided risk models for the Medicare program. The long-term goal is for Medicare ACOs to move to two-sided risk models as they become more proficient at care coordination. Many Medicare ACOs are uncertain whether the potential savings and improvements are worth participating in two-sided risk models (McClellan & Kocot, 2015). Future efforts will need to consider other payment models that may increase buy-in for higher risk arrangements.

The Creating High-Quality Results and Outcomes Necessary to Improve Chronic (CHRONIC) Care Act of 2018 created new opportunities to support ACOs in implementing care coordination strategies. The CHRONIC Care Act includes provisions to provide timely data on clinical and non-medical needs that affect health and create new payment models to support shared accountability for high-needs patients (Chernof, 2018). Moreover, in August 2018, CMS announced a proposed rule to encourage providers to participate in higher risk ACO models. The rule intends to strengthen patient engagement and increase payment type flexibility for ACOs participating in higher risk models.

Chapter 3: ACO Affiliated Hospitals Increase Implementation of Care Coordination Strategies

Background

Hospitals throughout the United States have significantly reduced medical errors and improved health care outcomes overtime (Trivedi et al., 2014; Williams, Schmaltz, Morton, Koss, & Loeb, 2005). Despite these improvements, many hospitals continue to face high rates of readmissions and emergency department misuse (De Regge et al., 2017; Epstein et al., 2014). Patients still face obstacles navigating the health care system and often delay or forgo seeking care due to high costs (Laura Lessard & Julie Solomon, 2017). Many consider Accountable Care Organizations (ACOs), which are comprised of various health care providers that collaborate to deliver high quality care, as an approach to fostering health system integration and improved care coordination.

ACOs vary in their network composition, risk sharing arrangements, and payment models. More than half include a hospital and most use risk-based or fee-for-service (FFS) shared savings payment models (Barnes, Unruh, Chukmaitov, & van Ginneken, 2014). ACO-affiliated hospitals often have more advanced data sharing and better engage with providers across the care continuum to coordinate care (Colla, Lewis, Tierney, & Muhlestein, 2016). Care coordination has been associated with better patient experiences, fewer readmissions, increased odds of appropriate health care utilization, and improved health outcomes, particularly for patients with

complex health care needs (De Regge et al., 2017; Gorin et al., 2017; Goyal et al., 2016; Kroll-Desrosiers, Crawford, Moore Simas, Rosen, & Mattocks, 2016).

Recent evidence suggests ACO-affiliated hospitals reduce rehospitalization from skilled nursing facilities and lower the risk of readmissions (McWilliams, Chernew, & Landon, 2017; R. E. Mechanic & Altman, 2009). These improvements may be explained by the increased use of care coordination strategies. However, there is no evidence that describes the extent to which ACO-affiliated hospitals implement evidence-based care coordination strategies. The aim of this study is to: 1) compare the implementation of care coordination strategies between ACO affiliated hospitals and unaffiliated hospitals, and 2) examine whether payment model type (e.g. fee-for-service, shared savings and bundled payment) influences the adoption of care coordination strategies among ACO-affiliated hospitals.

Methods

This study used data from the 2015 American Hospital Association (AHA) Annual Survey and 2015 AHA Survey of Care Systems and Payment to assess the types of care coordination strategies and payment models used by ACO affiliated and unaffiliated hospitals. The surveys were administered to all U.S. community hospitals, regardless of AHA membership. A qualified staff member from each hospital reported and confirmed data on behalf of each institution. We used data from the 2015 American Community Survey (ACS) and the 2015 Area Health Resources Files (AHRF) to assess each hospital's county-level and geographic relevant service area characteristics.

Dependent Variables

We constructed a care coordination index (CCI) comprised of 12 indicators that assess dimensions of care coordination such as prospective management of high-risk patients, chronic care management processes or programs, and the use of post-discharge continuity of care plans. Each indicator measures a single dimension of care coordination and is measured on a 5-point Likert scale from 1= “not used at all” to 5= “used widely”. The CCI aggregates scores from each of the 12 individual indicators to a single summary score for each hospital, with a score of 12 corresponding to the lowest and 60 the highest use of care coordination strategies. A full description of each CCI indicator is included in Appendix A.

Independent Variables

Hospitals that had established a separate legal entity for an ACO, were a part of an ACO, or were actively working to establish an ACO in the future were given a value of 1 (ACO affiliated) and a value of 0 if they were not (unaffiliated with an ACO). Each hospital reported the percentage of net-patient revenue attributed to FFS diagnostic related groups (DRGs), FFS per diem, and FFS shared savings, as well as bundled and partial or global capitation payment models. We identified hospitals as participating in a payment model if they had any revenue attributed to any of the reported payment model types. We also included an “other” category, which comprises more complex or less common payment models (e.g. Merit-Based Incentive Program and other alternative payment models).

We selected variables that describe hospital characteristics such as ownership, size, and safety-net status. We examined demographic characteristics (e.g. percent non-white) of geographic relevant service areas for each focal hospital using geographic coordinates derived from hospital addresses. We used ArcGIS 10.3 to create a circular boundary with a radius of 15-miles around each focal hospital. We then defined the zip code tabulation areas that were spatiality within or overlapped with each hospital's boundary area. For counties that located on the boundaries of the 15-mile radius, we weighted the county resources by the overlapping area. We also examined the level of access to primary care providers and federally qualified health centers in counties of each hospital.

Analysis

We used t-tests to compare the use of payment model types and care coordination strategies as well as the structural, geographic service area, county-level characteristics among ACO-affiliated and unaffiliated hospitals. We used state-fixed effects multivariable linear regression models to estimate the extent to which ACO-affiliated and unaffiliated hospitals implement care coordination strategies using the CCI summary scores, controlling for hospital, county-level, and geographic service area characteristics (Model 1). We then assessed whether the use of care coordination strategies vary by ACO-affiliation and payment model type controlling for the same factors (Model 2). We conducted sensitivity analyses by using various model specifications and narrowing the geographic relevant service area to a 5-mile radius. Our findings were consistent with the primary results of the study and are available

upon request. We had a sample of 994 hospitals that provided information on ACO affiliation, however, 24% did not have complete data on care coordination and payment. Our final sample included 771 hospitals, among them 269 affiliated with an ACO. All analyses were conducted in STATA 14.0 and we defined $p < 0.05$ as the level of significance a priori.

Results

Table 2.1 describes the differences between ACO-affiliated and unaffiliated hospitals based on their structural, county-level, geographic service area characteristics. A higher percentage of hospitals affiliated with ACOs were not-for-profit (83%, $p < 0.001$) and a higher percentage of hospitals unaffiliated with ACOs were for-profit (28 %, $p = 0.04$) or government owned (63 %, $p < 0.001$). Hospitals affiliated with an ACO tended to be larger (> 200 beds) than hospitals not affiliated with an ACO (57 % vs. 28 %, $p < 0.001$) and a higher percentage were teaching hospitals (12 % vs. 5 %, $p < 0.001$). There was a higher percentage of ACO-affiliated hospitals ranked in medium Medicaid related discharges (58% vs. 50%, $p = 0.02$). ACO-affiliated hospitals had a greater number of primary care providers per 1,000 (24 vs. 20, $p < 0.001$), but fewer FQHCs per 1,000 (0.59 vs. 0.92, $p < 0.001$) within a 15-mile radius on average compared to hospitals unaffiliated with ACO. ACO-affiliated hospitals also had a higher percentage of the total population who are non-white (13 percent vs. 10 percent, $p = 0.023$) in their geographic service area compared to hospitals not affiliated with an ACO.

Table 2.1: Characteristics of ACO-Affiliated and Unaffiliated Hospitals

	ACO Affiliated Hospitals		Unaffiliated Hospitals		
	N=269		N=502		
	Mean	SE	Mean	SE	P-value
Hospital Characteristics					
Hospital ownership					
For profit	5% (13)	0.14	9 % (65)	0.13	0.04
Not-for-profit	83% (223)	0.38	63 % (241)	0.48	<0.001
Government owned	12% (32)	0.32	28 % (226)	0.45	<0.001
Bed size					
Small (1-49 beds)	12 % (32)	0.02	36% (10)	0.02	<0.001
Medium (50-199 beds)	32 % (86)	0.47	36 % (241)	0.48	0.256
Large (>200 beds)	57 % (153)	0.50	28 % (226)	0.45	<0.001
Rural or Urban	18 % (48)	0.38	46% (251)	0.50	<0.001
Teaching or Non-Teaching	12 % (32)	0.32	5% (115)	0.23	<0.001
Ratio of Medicaid Inpatient days to total inpatient days					
Lower than 25 th percentile	19%	0.02	25%	0.02	0.054
Middle 25 th -75 th percentile	58%	0.03	50%	0.02	0.023
Higher than 75 th percentile	22%	0.03	25%	0.02	0.458
Geographic Relevant Service Area					
Percent non-white	13 %	0.18	10 %	0.17	0.023
Percent uninsured	11 %	6.11	13%	5.84	<0.001
Percent 100% < Federal Poverty Line	12 %	8.51	13 %	7.52	0.15
County Level Characteristics					
Number of Primary Care Providers (per 1,000)	24.048	0.04	19.555	1.16	0.039
Number of Federally Qualified Health Centers (per 1,000)	0.585	0.08	0.916	0.11	0.040

Data Source: 2015 American Hospital Association (AHA) Survey of Care Systems and Payment™, the 2015 AHA annual survey, the 2015 Area Health Resource Files, and the 2015 American Community Survey.

Note 1: Teaching vs. non-Teaching was defined as whether each hospital was a member of the Association of American Medical Colleges. The ratio of Medicaid Inpatient days to total inpatient days was used as a proxy for safety-net status. We created three categories describe as: low (<25th percentile), medium (25 to 75) and high (75th percentile) Medicaid related discharges. We defined geographic relevant service areas as a 15-mile radius from each focal hospital using ArcGIS 10.3. For counties that located on the boundaries of the 15-mile radius, we weighted the county resources by the overlapping area.

Table 2.2 describes the differences between ACO-affiliated and unaffiliated hospitals based on the implementation of care coordination strategies and payment

models. Hospitals affiliated with an ACO had a higher average CCI summary score than hospitals not affiliated with an ACO (43.00 vs. 35.35 $p<0.001$). There were significant differences between ACO-affiliated and unaffiliated hospitals for every indicator of the CCI. We also found significant differences in the types of payment models used by ACO-affiliated and unaffiliated hospitals. A higher percentage of ACO-affiliated hospitals use FFS DRGs (54.95% vs. 47.47%, $p=0.002$) and a higher percentage of unaffiliated hospitals use FFS shared savings payment models (11% vs. 39%, $p<0.001$).

Table 2.2: The Use of Care Coordination Strategies between ACO-Affiliated and Unaffiliated Hospitals

	ACO Affiliated Hospitals		Unaffiliated Hospitals		
	N=269		N=502		
	Mean	SE	Mean	SE	p-value
Care Coordination Index	43.00	9.22	35.35	9.33	<0.001
Chronic Care Management	3.56	1.15	2.75	1.21	<0.001
Predictive Analytics	3.07	1.26	2.25	1.25	<0.001
Prospective Patient Management	3.25	1.13	2.67	1.30	<0.001
Outpatient Follow-up	3.33	1.21	2.53	1.32	<0.001
Medication Reconciliation	4.62	0.67	4.40	0.94	<0.001
Visit Summaries	3.82	1.18	3.23	1.33	<0.001
Discharge Care Plans	3.13	1.27	2.41	1.27	<0.001
Home Visits	2.88	1.38	2.41	1.36	<0.001
Nurse Case Manager	3.13	1.23	2.42	1.31	<0.001
Disease Management Programs	3.52	1.17	2.71	1.28	<0.001
Hospitalists	4.60	0.97	3.85	1.62	<0.001
Outreach after Discharge	4.07	1.02	3.70	1.23	<0.001
Payment Model Type					
Fee-for-service DRG	55%	30.54	47%	34.16	0.0027
Fee-for-service Per Diem	14%	19.69	23%	28.70	<0.001
Fee-for-service Shared Savings	11%	19.23	39%	13.48	<0.001
Bundled Payment	6%	4.30	16%	8.64	0.08
Partial or Global Payments	18%	5.58	16%	7.41	0.617
Other	18%	26.75	23%	31.71	0.038

Data Source: 2015 American Hospital Association (AHA) Survey of Care Systems and Payment™

Note 1: Table 2 describes mean differences in the use of care coordination strategies and the percentage of net-patient revenue attributed to each payment model type between ACO affiliated and unaffiliated hospitals using two sample t-tests. Qualified representatives from each hospital were asked to rate the extent to which their hospital uses each care coordination strategy on a scale of 1-5. The Care Coordination Index (CCI) aggregates scores from each of the 12 indicators to a single summary score for each hospital, with a score of 12 corresponding to the lowest and 60 the highest use of care coordination strategies. Appendix A includes definitions for each care coordination indicator that comprises the care coordination index.

Table 2.3 describes the relationship between the use of care coordination strategies between ACO affiliated and unaffiliated hospitals (Model 1). It also describes the use of care coordination strategies by ACO-affiliated hospitals based on their payment model types (Model 2). Overall, hospitals affiliated with an ACO reported greater use of care coordination strategies (coef. =4.37, p=0.03) compared to unaffiliated hospitals, are controlling for structural, county-level, and geographic service area characteristics. ACO-affiliated hospitals that used fee-for-service shared savings payment models (coef. =0.12 p=0.01) and partial or global capitation payments (coef. =0.25, p=0.04) were more likely to report wider implementation of care coordination strategies.

Table 2.3: State Fixed Effects Regression Model of Use of Care Coordination Strategies between ACO-Affiliated and Unaffiliated Hospitals

	Model 1: CCI Between ACO Affiliated and Unaffiliated Hospitals				Model 2: CCI Between ACO Affiliated Hospitals by Payment Model Type			
	Coef .	95%CI		p-value	Coef .	95%CI		p-value
ACO Affiliation	4.30	2.82	5.78	0.00	4.37	0.34	8.39	0.03
ACO* Fee for service - DRG	*	*	*	*	-0.02	-0.07	0.03	0.36
ACO* Fee for service - Per Diem	*	*	*	*	-0.02	-0.08	0.05	0.64
ACO* Fee for service - Plus Shared Savings	*	*	*	*	0.12	0.03	0.20	0.01
ACO* Bundled payment	*	*	*	*	-0.12	-0.41	0.16	0.40
ACO* Partial or global capitation payments	*	*	*	*	0.25	0.02	0.48	0.04
Fee for service - DRG	*	*	*	*	0.01	-0.02	0.03	0.68
Fee for service - - Per Diem	*	*	*	*	-0.01	-0.05	0.02	0.37

Fee for service - plus shared savings	*	*	*	*	-0.03	-0.09	0.03	0.32
Bundled payment	*	*	*	*	-0.02	-0.11	0.07	0.65
Partial and global capitation payments	*	*	*	*	0.06	-0.05	0.17	0.30
Hospital characteristics								
For profit (ref)								
Not for profit	-0.64	-3.15	1.88	0.62	-1.15	-3.64	1.35	0.37
Government	-3.65	-6.46	-0.83	0.01	-3.84	-6.64	-1.05	0.01
Bed size								
Small (1-49 beds) (ref)								
Medium (50-199 beds)	4.26	2.49	6.04	0.00	4.08	2.24	5.92	0.00
Large (>200 beds)	4.55	2.32	6.79	0.00	4.45	2.17	6.73	0.00
Rural	-0.74	-2.46	0.99	0.40	-0.56	-2.29	1.16	0.52
Teaching or Non-Teaching	1.82	-0.94	4.59	0.20	2.12	-0.63	4.86	0.13
Medicaid days (unit 1,000)	0.03	-0.02	0.07	0.20	0.03	-0.02	0.07	0.24
Geographic Relevant Service Area								
Percent Non-White	-1.00	-6.83	4.83	0.74	-1.18	-6.93	4.57	0.69
Percent Uninsured	-0.03	-0.20	0.13	0.70	-0.03	-0.19	0.14	0.73
Percent 100% < Federal Poverty Line	-0.01	-0.14	0.12	0.85	0.00	-0.12	0.13	0.94
County Level Characteristics								
Number of Primary Care Providers (per 1,000)	1.35	-0.15	2.84	0.08	1.73	0.25	3.21	0.02
Number of Federally Qualified Health Centers	-0.04	-0.10	0.03	0.27	-0.06	-0.12	0.01	0.10

Data Source: 2015 American Hospital Association (AHA) Survey of Care Systems and Payment™, the 2015 AHA annual survey, the 2015 Area Health Resource Files, and the 2015 American Community Survey.

Note: Model 1 describes the association between ACO affiliation (unaffiliated vs. affiliated) and the use care coordination strategies based on their care coordination index (CCI) summary scores using a state-fixed effect multivariable regression model while holding hospital-, county-level-, geographic service area characteristics constant. Geographic market area was defined as demographic characteristics within a 15-mile radius of each hospital.

Note: Model 2 describes the association between ACO affiliation (unaffiliated vs. affiliated) and the use of care coordination strategies based on their care coordination index (CCI) summary scores while hospital-, county-level-, geographic service area characteristics constant with payment model type and ACO affiliation as the primary predictor variables using interaction terms.

Discussion

Our findings suggest that ACO affiliation and payment model type are associated with the use of evidence-based care coordination strategies. These findings contextualize previous studies, which found ACOs that participate in shared savings payment models reduce emergency department use, hospitalizations, and

readmissions (McWilliams et al., 2017; Nyweide et al., 2015; Winblad, Mor, McHugh, & Rahman, 2017). We also found ACO affiliated hospitals tend to be larger, not-for-profit, in urban areas, with a greater number of primary care providers in their service areas. The findings are consistent with previous studies that have examined the structural and geographic service area characteristics of ACOs and their hospital affiliates (Goyal et al., 2016; Salerno et al., 2017; Trivedi et al., 2014). These characteristics may increase an organization's capacity for care coordination. However, even after controlling for structural, community-level, and service area factors, we found significant differences in the use of care coordination strategies between ACO-affiliated and unaffiliated hospitals.

We found that both shared savings and global or partial capitation payments were associated with increased use of care coordination strategies. The finding suggests that there may not be a one-size fits all payment approach that will achieve national quality and spending goals in the current healthcare environment. Hospitals affiliated with an ACO may use a combination of bundled payments, FFS, and global payment based on the unique composition of the ACO network. An ACO may also participate in higher risk payment models but choose to fully assume the downside risk and only share savings or bonuses with their providers (R. E. Mechanic & Altman, 2009). Policy makers will need to design flexible payment options, given the diversity of ACOs and multiple means of supporting the use of care coordination strategies.

Limitations

This study only examined one dimension of health care quality (i.e. care coordination) and did not assess other important dimensions like patient/caregiver experience or preventative health, which determine payment in several ACO programs. We only explored associations given the cross-sectional study design. Still, our findings are important to understand factors that are associated with the implementation of hospital-based care coordination strategies. Further, our measure of whether a hospital was affiliated with an ACO was binary and did not capture the granular differences between ACO sub-types (e.g. Medicare, Medicaid, and commercial), which could potentially have different influences on the implementation of care coordination strategies. However, there may be more difference within than between ACO sub-types given the wide variation in the composition of ACO networks and payment model types.

Moreover, the CCI has not yet been psychometrically evaluated, but it includes evidence-based indicators of care coordination recommended by the Agency for Healthcare Research and Quality and other leading quality organizations. Finally, our sample only included ACO-affiliated and unaffiliated hospitals that had complete data describing their care coordination strategies (i.e. answered all questions that make up the CCI) and attributed net-patient revenue. Compared to the full sample of 994 hospitals, the final sample of 771 hospitals were 6 % more likely to be an ACO, 5% less likely to be small and 11% more likely to be in urban areas with higher numbers of primary care physicians and FQHCs, compared to hospitals with missing values.

Conclusion

Our findings suggest ACO affiliation and multiple payment model types are associated with the increased use of care coordination strategies. The findings inform the ongoing national conversation concerning whether ACOs are effective and worth the system level investment. Policy makers in the public and private sector will need to assess the strengths and weaknesses of different payment model types for achieving their health care improvement goals. Future studies should examine the impact of ACO-affiliated hospital care coordination strategies on the cost and quality of care as well as which strategies are most cost-effective.

Chapter 4: Characteristics of ACO-Affiliated Hospitals with In-Network Behavioral Health Providers

Background

The Affordable Care Act (ACA) created new opportunities for hospitals and health systems to bridge the gap between medical and behavioral health services (D. Mechanic, 2012). It contained several provisions to test health care delivery models designed to reduce costs and improve quality. These care models realign payment incentives to support the coordination of health services and better serve patients with behavioral health conditions (Bao, Casalino, & Pincus, 2013). Among the most ubiquitous are Accountable Care Organizations (ACOs), which are comprised of various health care providers (e.g. hospitals, doctors, and allied health professionals) that collaborate to deliver high quality care. Over half of ACOs now include hospitals in their networks and increasingly include in-network behavioral health providers (Barnes et al., 2014).

Hospitals affiliated with ACOs can foster the integration of behavioral health and clinical services through advanced data sharing and increased engagement of providers across the care continuum (Colla et al., 2016). ACOs are also increasingly accounting for behavioral health costs and outcomes in their payment models. For example, recent data from the National Survey of Accountable Care Organizations show that 88 percent of ACOs include behavioral health in the total costs of care for at least one of their ACO contracts. ACOs and their hospital affiliates are also

increasingly partnering with behavioral health providers and including them in their networks through formal agreements for risk sharing and shared savings (Barnes et al., 2014; Driessen & Zhang, 2017).

Increasing the inclusion of behavioral health providers in ACO networks has the potential to increase access to behavioral health care, particularly for historically disadvantaged groups. However, ACOs affiliated hospitals may choose to partner with providers that serve wealthier patients which tend to be lower risk and lower cost – limiting access for minorities who are disproportionately low-income (Pollack & Armstrong, 2011). Recent evidence supports this proposition showing that racial and ethnic minorities are, in fact, less likely to have access to providers that participate in ACOs (Yasaitis, Pajerowski, Polsky, & Werner, 2016).

Few studies have examined the characteristics of ACO-affiliated hospitals that have in-network behavioral health providers, the types of payment models they use to support health service delivery, and the demographic characteristics of the populations they serve. Therefore, the aim of this descriptive study was to compare ACO-affiliated hospitals with and without in-network behavioral health providers on three characteristics: 1) use of care coordination strategies, 2) payment model types (e.g. fee-for-service, shared savings and bundled payment), and 3) patient demographic characteristics.

Methods

Data

The 2015 American Hospital Association (AHA) Survey of Care Systems and PaymentTM and the 2015 AHA Annual Survey were used to identify the types of care

coordination strategies and payment model types used by ACO affiliated hospitals with and without in-network behavioral health providers. The AHA surveys were administered to all U.S. community hospitals, regardless of AHA membership—totaling over 6,000 hospitals. A qualified staff member from each hospital reported and confirmed all data on behalf of their institution. We used the 2015 CMS Geographic Variation Public Use File to identify the demographic characteristics for each ACO-affiliated hospital’s hospital service area.

Dependent Variables

We constructed a care coordination index (CCI) comprised of 12 indicators that assess dimensions of care coordination such as prospective management of high-risk patients, chronic care management processes or programs, and the use of post-discharge continuity of care plans (Chen, DuGoff, Novak, & Wang, 2018). Each indicator assesses a single dimension of care coordination and is measured on a 5-point Likert Scale from 1= “not used at all” to 5= “used widely”. The CCI aggregates scores from each of the 12 indicators to a single summary score for each hospital, with a score of 12 corresponding to the lowest and 60 the highest use of care coordination strategies. A full description of each CCI indicator is included in [Appendix A](#).

Independent Variables

Hospitals that had established a separate legal entity for an ACO, were a part of an ACO, or were actively working to establish an ACO were given a value of 1 (ACO affiliated) and a value of 0 if they were not (unaffiliated with an ACO). The sample included hospitals participating in both commercial and public ACO

contracts. We categorized ACO-affiliated hospitals as having *in-network* behavioral health if they reported owning or having a behavioral health provider (e.g. providers of psychiatric and/or substance abuse services) through the ACO network, formal arrangement, or joint venture.

We used the percentage of net patient revenue to determine the types of payment models used by each hospital. Each hospital reported the percentage of net-patient revenue attributed to fee-for-service (FFS) diagnostic related groups (DRGs), FFS per diem, and FFS shared savings, as well as bundled payments and partial or global capitation payments. We counted hospitals as participating in a payment model if they had *any* revenue attributed to *any* of the reported payment model types.

We selected variables that describe hospital ownership, type, and size. We defined hospital ownership as government, for-profit, or not-for-profit. We categorized hospitals as teaching or non-teaching, based on whether they were a member of the Association of American Medical Colleges. Hospital size was categorized between 1-49, 50-199, 200-399, and 400+ beds. We used the percentage of inpatient unit days associated with Medicaid as a primary payer out of the total inpatient unit days for each hospital as a proxy for safety-net status. Hospitals were categorized as having an established patient-centered medical home (PCMH) defined as the provision of comprehensive primary care services that facilitates communication and shared decision-making between the patient, his/her primary care providers, other providers, and the patient's family. An established medical home included PCMHs certified and not certified by the National Committee for Quality Assurance and other accrediting entities. We used 2015 hospital service areas (HSA)

developed by the Dartmouth Atlas of Healthcare, which delineates health care markets by grouping zip codes together based on hospital referral patterns (Kilaru et al., 2015).

Analysis

We used t-tests and chi-squared analyses to compare differences in structural and health service area characteristics as well as the use of care coordination strategies and payment model types between ACO affiliated hospitals with and without in-network behavioral health providers. The full sample included 1,821 US community hospitals who reported participating in an ACO. Of those hospitals, 1,041 reported whether they had an in-network behavioral health provider. The final sample included 785 without and 256 with an in-network behavioral health provider. All analyses were conducted in STATA 14.0 and we defined $p < 0.05$ as the level of significance a priori. The University of Maryland's institutional review board reviewed this research and determined that it did not to meet the federal definition of human subjects research.

Results

Table 3.1 describes the differences in structural and market characteristics of ACO-affiliated hospitals with and without in-network behavioral health providers. A higher percentage of ACO-affiliated hospitals with in-network behavioral health providers are not-for-profit (87.11% vs. 71.41%, $p < 0.001$), associated with patient centered medical homes (61.32% vs. 52.08%, $p = 0.015$) and are teaching hospitals (18.04% vs. 8.96%, $p < 0.001$) compared to those without in-network behavioral health providers. There were a lower number of ACO-affiliated hospitals with in-network

behavioral that had more than 60 psychiatric beds (14.45% vs. 27.04%, $p < 0.001$).

ACO-affiliated hospitals had a lower percentage individuals living in their service areas who were uninsured (11.11% vs. 12.94%) or in households with incomes below the poverty line (10.72% vs. 12.05%)

Table 3.1: Structural and Service Area Characteristics of ACO-Affiliated Hospitals with and without Behavioral Health Providers In-Network

	<u>With in-</u> Network Behavioral Health Provider	<u>Without In-</u> Network Behavioral Health Provider	
	n=256	n= 773	
	n (%)	n (%)	P-value
Hospital Characteristics			
Ownership			
Not-for-Profit			
Yes	223 (87.11)	552 (71.41)	
No	33 (12.89)	221 (28.59)	<0.001
For Profit			
Yes	8 (3.13)	46 (5.95)	
No	248 (96.88)	727 (94.05)	0.079
Government			
Yes	25 (9.77)	50 (6.47)	
No	231 (90.23)	723 (93.53)	0.079
Bed Size			
Less than 100 beds			
Yes	48 (18.75)	257 (33.25)	<0.001
No	208 (81.25)	516 (66.75)	
Between 100-399 beds			
Yes	138 (53.91)	278 (35.96)	
No	118 (46.09)	495 (64.04)	<0.001
400 beds or more			
Yes	70 (27.34)	113 (14.62)	
No	186 (72.66)	660 (85.38)	<0.001
Established Medical Home Program			
Yes	149 (61.32)	300 (52.08)	
No	94 (38.68)	276 (47.92)	0.015
Academic Medical Center			

Yes	46 (18.04)	57 (8.96)	
No	209 (81.96)	579 (91.04)	<0.001
Electronic Health Record			
Yes	240 (99.17)	567 (99.65)	
No	2 (0.83)	2 (0.35)	0.377
Rural			
Yes	30 (12.00)	88 (14.52)	
No	220 (88.00)	518 (85.48)	0.331
Psychiatric beds			
Less than 30 beds			
Yes	182 (71.09)	518 (67.01)	
No	74 (28.91)	255 (32.99)	0.225
Between 31-60			
Yes	37 (14.45)	46 (5.95)	<0.001
No	219 (85.55)	727 (94.05)	
60 beds or more			
Yes	37 (14.45)	209 (27.04)	
No	219 (85.55)	564 (72.96)	<0.001
Hospital Service Area	%	%	
Percent White	79.13%	79.60%	0.64
Percent Black	11.13%	11.63%	0.25
Percent Hispanic	10.55%	10.99%	0.47
Percent Uninsured	11.11%	12.94%	<0.001
Percent Under the FPL	10.72%	12.05%	<0.001

*Statistical significance was determined at a 0.05 significance level a priori.

Data Source: American Hospital Association (AHA) 2015 Annual Survey Data linked to 2015 CMS Geographic Variation Public Use File.

Note: We used chi-squared tests to assess the differences in structural characteristics between ACO-affiliated hospitals with and without behavioral health providers in-network. We use two sample t-tests to assess differences in the demographic characteristics of their service regions.

Table 3.2 describes the differences in the use of care coordination strategies and payment model types between ACO-affiliated hospitals with and without behavioral health providers in-network. ACO-affiliated hospitals with behavioral providers included in-network reported significantly greater use of chronic care management (3.70 vs. 3.23, $p<0.001$), prospective patient management (3.40 vs. 2.85,

p<0.001), home visits (2.99 vs. 2.50, p<0.001), nurse care managers (3.63 vs. 2.66, p<0.001), disease management programs (3.63 vs. 3.17, p<0.001), and the use of hospitalists (4.71 vs. 4.35, p<0.001). Overall, the average CCI composite score was significantly higher among ACO-affiliated hospitals with behavioral health providers in-network (43.58 vs. 39.90, p<0.001). ACO-affiliated hospitals with behavioral health providers in-network had a higher proportion of net-patient revenue attributed to FFS shared savings (0.22 vs. 0.06, p<0.001). ACO affiliated hospitals without behavioral health providers in-network reported a higher percentage of net-patient revenue attributed to FFS DRG (0.69 vs. 0.54, p<0.001).

Table 3.2: Differences in the Use of Coordination Strategies and Payment Model Types between ACO-Affiliated Hospitals with and without Behavioral Health Providers In-Network

	With in-Network Behavioral Health Provider		Without In-Network Behavioral Health Provider		P-value
	n=256		N= 773		
	Mean	SE	Mean	SE	
Care Coordination Strategies					
Chronic Care Management	3.70	0.07	3.23	0.11	<0.001
Predictive Analytics	2.92	0.13	3.10	0.07	0.2164
Prospective Patient Management	3.40	0.07	2.85	0.11	<0.001
Outpatient Follow-up	3.36	0.07	3.09	0.12	0.0466
Medication Reconciliation	4.59	0.04	4.59	0.07	0.9332
Visit Summaries	3.86	0.07	3.77	0.11	0.5202
Discharge Care Plans	3.16	0.08	3.03	0.13	0.3648
Home Visits	2.99	0.09	2.50	0.12	0.0015
Nurse Case Manager	3.36	0.08	2.66	0.11	<0.001
Disease Management Programs	3.63	0.07	3.17	0.12	<0.001
Hospitalists	4.71	0.05	4.35	0.12	<0.001
Outreach after Discharge	3.94	0.06	4.09	0.11	<0.001
Care Coordination Index	43.58	0.55	39.90	0.85	<0.001

Payment Model Type					
Fee-for-service DRG	0.54	1.85	0.69	2.99	<0.001
Fee-for-service Per Diem	0.19	1.54	0.20	2.68	0.8032
Fee-for-service Shared Savings	0.22	2.09	0.06	1.83	<0.001
Bundled Payment (inpatient plus physician)	0.01	0.88	0.04	2.38	0.1938
Bundled payments (inpatient, physician and post-acute)	0.01	0.88	0.04	2.38	0.2011
Partial or Global Payments	0.05	0.70	0.04	1.86	0.4693

*Statistical significance was determined at a 0.05 significance level a priori.

Data Source: American Hospital Association (AHA) 2015 Annual Survey Data linked to 2015 AHA Care Systems and Payment Survey

Discussion

We found that nearly two-thirds of ACO-affiliated hospitals did not have an in-network behavioral health provider. ACO-affiliated hospitals with in-network behavioral health providers were academic, non-for-profit, have established patient centered medical home programs, and had a lower number of beds for psychiatric care. ACO-affiliated hospitals with in-network behavioral health providers also reported greater use of care coordination strategies. The racial HSA demographics ACO-affiliated hospitals with and without behavioral health providers did not meaningfully differ. The composition of the HSAs were consistent with previous analyses that found similar demographic characteristics for ACO-affiliated hospital service areas (Epstein et al., 2014).

ACOs may differ in their readiness to include in-network behavioral health providers or may not yet be adequately incentivized. According to data from the National Survey of Accountable Care Organizations, only 37 percent of ACOs reported having non-provider management partners that delivered care coordination services (Lewis, D'Aunno, Murray, Shortell, & Colla, 2018). Thus, ACO-affiliated

hospitals with in-network behavioral health providers may be better resourced to implement care coordination strategies. For example, the Medicare Shared Savings Program (MSSP), the largest ACO initiative, has only one behavioral health related quality measure (i.e. depression screening and follow-up) tied to incentives for improvement (Maust et al., 2013). Medicare ACO contracts could include additional quality measures specific to behavioral health conditions (e.g. follow-up and readmission after a hospitalization for mental illness) to increase the number of ACOs that include behavioral health. ACO contracts could also incentivize the use of information systems that support referrals to high quality behavioral health care providers outside the ACO network as a step towards integration (Busch et al., 2016).

ACO-affiliated hospitals with in-network behavioral health providers also reported a larger share of net-patient revenue attributed to FFS shared savings. Many of these hospitals may be participating in the MSSP, which are already shouldering the costs of comorbid behavioral health conditions. Behavioral health conditions are associated with higher treatment nonadherence, adverse events, and increased costs that ACOs could benefit from targeting for improvement efforts (Bao et al., 2013).

Limitations

Our analysis was limited to bivariate associations which do not explain, for example, why ACO affiliated hospitals with in-network behavioral health providers have greater use of care coordination strategies. The AHA survey can also be selective with some bias due to missing data, but the response rate was relatively high compared to other national surveys. In addition, our measure of ACO affiliation was

heterogenous and did not capture differences between the different types of ACOs (e.g. Medicare, Medicaid, and commercial). Hospitals participating in ACO models may have very different risk sharing and payment arrangements. Still, ACO programs are designed to improve care coordination and reduce costs. They primarily differ based on the patient populations they serve and the means of achieving those goals (McWilliams, 2016).

Conclusion

Most ACO-affiliated hospitals do not have in-network behavioral health providers. ACO-affiliated hospitals with in-network behavioral health providers in-network reported a significantly greater use of care coordination strategies and net-patient revenue attributed to shared savings. Medicare shared savings ACO programs could begin investing in behavioral health integration starting with providers that have implemented advanced care coordination strategies and have in-network behavioral health providers. Future studies should assess whether the expanded use of care coordination strategies and having behavioral health providers in-network improve behavioral health outcomes.

Chapter 5: Follow-up After Hospitalizations for Mental Illness within 7- and 30- days Post Discharge among ACO-affiliated Hospitals

Background

Mental health disorders are estimated to be responsible for 32 percent of years lived with a disability worldwide (Vigo, Thornicroft, & Atun, 2016). Older adults with mental illness frequently receive psychiatric care through emergency response teams and often do not receive timely follow-up after a hospitalization (Reynolds, Pietrzak, El-Gabalawy, Mackenzie, & Sareen, 2015). Lack of follow-up treatment can increase the risk of relapse and rehospitalization (Lee et al., 2015). Recent evidence suggests nearly one-third of individuals with mental illness that have contact with mental health services without follow-up disengage from care (Kreyenbuhl et al., 2017).

Timely follow-up after discharge is a measure of care coordination that is associated with reduced readmissions and emergency department use (Jackson, Shahsahebi, Wedlake, & DuBard, 2015; Marcus, Chuang, Ng-Mak, & Olfson, 2017; McCullumsmith, Clark, Blair, Cropsey, & Shelton, 2015; Okumura, Sugiyama, & Noda, 2018). Timely follow-up after a hospitalization for mental illness (FUH) can improve continuity of care and reduce unnecessary gaps in the receipt of psychiatric services (Boyer, McAlpine, Pottick, & Olfson, 2000). Individuals discharged from inpatient psychiatric facilities require timely follow-up care to maintain functioning and avoid future hospitalizations (Brown, Blair, & Barry, 2017).

All acute care and critical access hospitals that provide inpatient psychiatric services that receive Medicare payment participate in the Inpatient Psychiatric

Facility Quality Reporting (IPFQR) Program. FUH rates are publicly reported on the Center for Medicare and Medicaid Services (CMS) Hospital Compare website.

Eligible hospitals that do not report FUH rates are subject to financial penalties. FUH has been used as a measure of health plan quality in the National Committee for Quality Assurance's (NCQA) Health Plan Employer and Information Set (HEDIS) since 1999. Although, the measure has been collected and reported for many years it has shown little to no improvement over time. The average rate of 30-day FUH for Medicare Advantage patients was 53.5 percent in 2013 and 52.7 percent in 2017 (NCQA, 2018). Rates of FUH have also been found to be lower among psychiatric specialty hospitals, public hospitals, and hospitals that serve a higher proportion of minority patients (Benjenk & Chen, 2019).

The Affordable Care Act created Accountable Care Organizations (ACO) that have the potential to improve rates of follow-up through better care coordination. More than half of ACO networks include a hospital (Colla et al., 2016). ACO-affiliated hospitals are more likely to use care coordination strategies such as follow-up for patients at-risk for readmission and post-discharge continuity of care plans (A. C. Anderson & Chen, 2019). Many ACOs have financial incentives to reduce readmissions and hospitalizations for ambulatory care sensitive conditions (McWilliams, Hatfield, Chernew, Landon, & Schwartz, 2016b). However, CMS ACO programs only include one measure that assesses the quality of mental health services – depression screening and a follow-up plan. This measure does not focus on care for individuals with more severe mental health conditions (e.g. schizophrenia and

psychosis), who account for a large share of health expenditures, nor does it assess whether follow-up occurs (Seabury et al., 2019).

Moreover, ACOs inherently have an incentive to improve FUH to reduce costs associated with readmissions (Kathol et al., 2015). ACOs are unlikely to meet spending targets and improve on other measures of quality without adequately addressing mental health given the high costs of inpatient psychiatric stays and a disproportionate number of patients with mental illness who are hospitalized for ambulatory sensitive conditions (ACS) (O'Donnell, Williams, Eisenberg, & Kilbourne, 2013). One study found the average inpatient psychiatric stay was highest among Medicare beneficiaries (e.g. schizophrenia treatment averaged \$8,509 for 11.1 days and depression treatment averaged \$6,990 8.4 days) (Stensland, Watson, & Grazier, 2012). Another study that used New York hospital discharge data, found that individuals with mental health disorders were also more likely to be admitted for ACS and had longer lengths of stay (Li, Glance, Cai, & Mukamel, 2008).

The purpose of this study was to compare rates of follow-up after a hospitalization for mental illness within 7-days post-discharge (FUH-7) and at 30-days post-discharge (FUH-30) between ACO-affiliated and unaffiliated hospitals. We also assessed whether rates of follow-up vary by the hospital structural characteristics and the social and demographic characteristics of individuals living within each focal hospital's service area. Our hypothesis was that ACO-affiliated hospitals have higher rates of FUH due to increased use of care coordination strategies compared to unaffiliated hospitals. We assumed ACO-affiliated hospitals address FUH to improve

outcomes and reduce spending, although ACOs rarely have explicit quality or financial incentives for FUH improvement.

Methods

Data

We used data from the American Hospital Association 2015 Annual Survey, which collects data from all US community hospitals regardless of AHA membership. A qualified member of each hospital confirms all data on behalf of their institution. The survey includes descriptive information on hospital characteristics (e.g. size, governance, and use of electronic health records) including whether a hospital participated in or led an ACO in 2015. In addition, we used 2015 CMS Hospital Compare Inpatient Psychiatric Facility quality measure data that includes discharges between July 1, 2014 to June 30, 2015. These data include rates of FUH for hospitals that are psychiatric hospitals or have psychiatric units and receive payment from Medicare (i.e. participation in the IPFQR program). We also used data from the 2015 American Community Survey to examine differences in the demographic characteristics of each hospital's service area. Geographic units that define each HSA were derived from Medicare data and developed by the Dartmouth Atlas Project (Kilaru et al., 2015).

Dependent Variables

The dependent variables of interests were rates of FUH-7 and FUH-30. Variations of the FUH measures are used in public reporting programs including the

Inpatient Psychiatric Facility Quality Reporting and among many states through the CMS Medicaid Adult Core Set. The measure is also endorsed by the National Quality Forum (NQF) as being evidence-based and scientifically acceptable (e.g., valid and reliable). The FUH-7 and FUH-30 measures capture the percentage of discharges for patients who were hospitalized for treatment of selected mental health diagnoses who had an outpatient visit, an intensive outpatient encounter or partial hospitalization with a mental health provider. Only hospitals with twelve or more discharges were included in the measure. Eligible discharges had a primary diagnosis of schizophrenic disorders, mood disorders, psychosis, anxiety, paranoid state, and autistic disorder. We categorized FUH-7 and FUH-30 rates using percentile ranks. Low performing hospitals had rates in the bottom 25th percentile, middle performing hospitals had rates in the middle 26th-75th percentile, and high performing hospitals had rates in the 76th percentile and above.

Independent Variables

Our independent variables included structural characteristics of each hospital and select demographic characteristics of each hospital's service area. We assessed hospital ownership based on whether the hospital was classified as not-for-profit, for-profit, or government owned. We used the number of hospital beds and a proxy for the size of the hospital (e.g. 1-49, 50-199, 200-399, and 400+) and average number of psychiatric beds to approximate the hospital's capacity to provide psychiatric care. We also included whether the hospital reported having an established medical home program. Patient centered medical homes (PCMH) were defined as the provision of

comprehensive primary care serves that facilitates communication and shared decision-making between patients, families, and providers. We defined hospital as academic medical centers if they reported being a member of the Association of American Medical Colleges. We also assessed the extent to which a hospital has an electronic health record (fully or partially implemented vs. not implemented) and whether a hospital participates in a health information exchange (HIE). We then assessed the percent of individuals who were white, black, Hispanic, uninsured, and with incomes under the federal poverty level in each focal hospital's health service area. Hospitals were categorized as rural or urban based on whether they were located within or outside of a Metropolitan Statistical Area.

Sample

The final sample included 696 ACO affiliated (n=258) and unaffiliated (n=438) hospitals that reported FUH-7 and 808 ACO affiliated (n=280) and unaffiliated (n=580) hospitals that reported FUH-30. The total number of hospitals that reported leading or participating in an ACO in the 2015 AHA Annual survey was 4,398 – of these hospitals only 697 (15 percent) reported FUH-7 and 809 (18 percent) reported FUH-30 rates. All analyses were conducted in STATA 14.0. We defined significance at $p < 0.05$. The University of Maryland's institutional review board reviewed determined this research did not meet the federal definition of human subjects research.

Analysis

We used chi-squared and two-sample t-tests to describe the differences in hospital structural and health service area characteristics between ACO affiliated and unaffiliated hospitals that reported FUH-7 and FUH-30. We assessed the distribution of FUH-7 and FUH-30 rates among ACO affiliated and unaffiliated hospitals, which were approximately normally distributed. We also looked at the interquartile range of performance rates to identify low, medium, and high performing hospitals. We then used multivariable linear regression models with state level fixed effects to estimate the adjusted differences in rates of FUH-7 and FUH-30. We adjusted for state effects to account for various state policies (e.g. additional quality reporting or improvement programs) that may influence hospital FUH rates.

Results

Table 3.1 describes the characteristics of ACO-affiliated and unaffiliated hospitals that reported FUH-7 in 2015. ACO-affiliated hospitals had a significantly higher average FUH-7 rate (37.55% vs. 33.42%, $p<0.001$) compared to unaffiliated hospitals (Table 1). A higher percentage ACO-affiliated were considered middle (10.24% vs. 7.48%, $p=0.003$) or high performing (7.15% vs. 2.78%, $p<0.001$) on FUH-7 compared to unaffiliated hospitals. A significantly higher percentage of ACO-affiliated hospitals that reported FUH-7 were not-for-profit (83.40% vs. 51.83%, $p<0.001$), had 400 beds or more (41.70% vs. 19.63%, $p<0.001$), and were academic medical centers (28.19% vs. 10.73%, $p<0.001$). A significantly higher percentage of ACO-affiliated hospitals that reported FUH-7 had an established patient centered medical home program (64.45% vs. 21.63%, $p<0.001$), participated in a

health information exchange (57.14% vs. 40.14%, <0.001), and had a fully or partially implemented electronic health record (99.59% vs. 84.49%, <0.001). ACO-affiliated that reported FUH-7 hospitals were in areas with a lower percentage of individuals who were uninsured (11.11% vs. 12.94%, $p < 0.001$) and below federal poverty level (10.72% vs. 12.05%, $p < 0.001$) compared to unaffiliated hospitals.

Table 4.1: Characteristics of ACO-affiliated and unaffiliated hospitals that reported Follow-up After a Hospitalization for Mental Illness (FUH) at 7-days

	ACO Affiliated Hospitals	Unaffiliated Hospitals	
	n= 229	n= 438	
	N (%)	N (%)	P-value
Performance Rates			
FUH 7-day Performance Rate	37.55%	33.42%	<0.001
FUH 7-day Denominator Volume	135.49	142.92	0.38
Hospital Characteristics			
Ownership			
Not-for-Profit			
Yes	216 (83.40)	227 (51.83)	
No	42 (16.28)	212 (48.29)	<0.001
For Profit			
Yes	13 (5.41)	136 (31.05)	
No	245 (94.96)	302 (68.79)	<0.0001
Government			
Yes	29 (11.20)	75 (17.12)	
No	229 (88.76)	364 (82.92)	0.034
Bed Size			
Less than 100 beds			
Yes	23 (8.88)	100 (22.83)	
No	235 (91.09)	339 (77.22)	<0.001
Between 100-399 beds			
Yes	127 (49.42)	252 (57.53)	
No	131 (50.78)	186 (42.37)	0.038
400 beds or more			
Yes	108 (41.70)	86 (19.63)	
No	150 (58.14)	353 (80.41)	<0.001

Established Medical Home Program			
Yes	165 (64.45)	93 (21.63)	
No	91 (35.55)	337 (78.37)	<0.001
Academic Medical Center			
Yes	73 (28.19)	47 (10.73)	
No	185 (71.71)	392 (89.29)	<0.001
Health Information Exchange			
Yes	147 (56.98)	175 (40.14)	
No	111 (43.02)	261 (59.73)	<0.001
Electronic Health Record			
Yes	241 (99.59)	316 (84.49)	
No	1 (0.41)	58 (15.51)	<0.001
Rural			
Yes	22 (8.53)	55 (12.56)	
No	236 (91.47)	383 (87.44)	0.102
Psychiatric beds			
Less than 30 beds			
Yes	120 (46.51)	214 (48.75)	
No	138 (53.49)	225 (51.25)	0.568
Between 31-60			
Yes	72 (27.91)	89 (20.27)	
No	186 (72.09)	350 (79.73)	0.021
60 beds or more			
Yes	66 (25.58)	136 (30.98)	
No	192 (74.42)	303 (69.02)	0.129
Hospital Service Area	%	%	
Percent White	79.13%	79.60%	0.64
Percent Black	11.13%	11.63%	0.25
Percent Hispanic	10.55%	10.99%	0.47
Percent Uninsured	11.11%	12.94%	<0.001
Percent Under the FPL	10.72%	12.05%	<0.001

Data Source: 2015 American Hospital Association Annual Survey, 2015 CMS Hospital Compare Inpatient Psychiatric Facility quality measure data, and 2015 American Community Survey.

Table 4.2 describes the characteristics of ACO-affiliated and unaffiliated hospitals that reported FUH-30 in 2015. ACO-affiliated hospitals had a significantly higher average FUH-30 rate (59% vs. 55%, $p < 0.001$) compared to unaffiliated

hospitals (Table 2). A significantly higher percentage of ACO-affiliated hospitals that reported FUH-30 were not-for-profit (82.92% vs. 48.48%, $p<0.001$), had 400 beds or more (39.50% vs. 18.18%, <0.001), and were academic medical centers (26.33% vs. 9.47%, $p<0.001$). A significantly higher percentage of ACO-affiliated hospitals that reported FUH-30 had an established patient centered medical home program (63.64% vs. 19.38%, <0.001), participated in a health information exchange (56.23% vs. 38.40%, <0.001), and had a fully or partially implemented electronic health record (99.62% vs. 86.12%, <0.001). A significantly lower percentage of ACO-affiliated hospitals that reported FUH-30 were in rural areas (8.93% vs. 14.20%, $p=0.03$). ACO-affiliated hospitals that reported FUH-30 were in areas with a lower percentage of individuals who were uninsured (11.18% vs. 13.15%, $p<0.001$) and below federal poverty level (10.80% vs. 12.27%, $p<0.001$) compared to unaffiliated hospitals.

Table 4.2: Characteristics of ACO-affiliated and unaffiliated hospitals that reported Follow-up After a Hospitalization for Mental Illness (FUH) at 30-days

	ACO Affiliated Hospitals	Unaffiliated Hospitals	P-value
	n= 280	n= 528	
	N (%)	N (%)	
Performance Rates			
FUH 30-day Performance Rate	59%	55%	<0.001
FUH 30-day Denominator Volume	127.49	124.77	0.73
Hospital Characteristics			
Ownership			
Not-for-Profit			
Yes	233 (82.92)	256 (48.48)	<0.001
No	47 (47)	273 (51.61)	
For Profit			
Yes	14 (5.34)	161 (30.49)	
No	266 (95.00)	367 (69.38)	<0.001
Government			
Yes	33 (11.74)	111 (21.02)	

No	247 (88.21)	418 (79.02)	0.001
Bed Size			
Less than 100 beds			
Yes	28 (9.96)	138 (26.14)	
No	252 (90.00)	391 (73.91)	<0.001
Between 100-399 beds			
Yes	142 (50.53)	294 (55.68)	
No	139 (49.64)	234 (44.23)	0.162
400 beds or more			
Yes	111 (39.50)	96 (18.18)	
No	169 (60.36)	433 (81.85)	<0.001
Established Medical Home Program			
Yes	175 (63.64)	100 (19.38)	
No	100 (36.36)	416 (80.62)	<0.001
Academic Medical Center			
Yes	74 (26.33)	50 (9.47)	
No	206 (73.57)	479 (90.55)	<0.001
Health Information Exchange			
Yes	158 (56.23)	202 (38.40)	
No	123 (43.93)	324 (61.48)	<0.001
Electronic Health Record			
Yes	261 (99.62)	391 (86.12)	
No	1 (0.38)	63 (13.88)	<0.001
Rural			
Yes	25 (8.93)	75 (14.20)	
No	255 (91.07)	453 (85.80)	0.030
Psychiatric beds			
Less than 30 beds			
Yes	135 (48.21)	267 (50.47)	
No	145 (51.79)	262 (49.53)	0.541
Between 31-60			
Yes	77 (27.50)	107 (20.23)	
No	203 (72.50)	422 (79.77)	0.019
60 beds or more			
Yes	68 (24.29)	155 (29.30)	
No	212 (75.71)	374 (70.70)	0.129
Hospital Service Area	%	%	
Percent White	79.08	79.46	0.64
Percent Black	11.12	11.86	0.25
Percent Hispanic	10.56	11.03	0.47
Percent Uninsured	11.18	13.15	<0.001

Percent Under the FPL	10.80	12.27	<0.001
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Data Source: 2015 American Hospital Association Annual Survey, 2015 CMS Hospital Compare Inpatient Psychiatric Facility quality measure data, and 2015 American Community Survey.

We were unable to find statistically significant evidence that FUH-7 or FUH-30 performance rates are associated with ACO affiliation after controlling for hospital structural and service area characteristics (Table 4.3). We found a positive association between not-for-profit status and both FUH-7 (coef. -2.49, $p=0.044$) and FUH-30 rates (coef. 4.04, $p<0.001$). Participation in a health information exchange was associated with higher FUH-7 rates (coef. 2.66, $p=0.005$). The number of psychiatric beds was negatively associated with both FUH-7 (coef. = -0.03, $p=0.002$) and FUH-30 (coef. = -0.04, $p<0.001$) rates. In addition, the percent of individuals living under the federal poverty level within a hospital service area was negatively associated with both FUH-7 (coef. = -1.70, $p<0.001$) and FUH-30 (coef. = -1.63, $p<0.001$) rates.

Table 4.3: State Fixed Effects Multivariable Linear Regression Model of FUH-7 and FUH-30 by ACO affiliation

	FUH-7 Measure			FUH-30 Measure		
	Coef.	SE	P-value	Coef.	SE	P-value
Hospital Characteristics						
ACO Affiliation	1.74	1.09	0.11	1.87	1.05	0.07
Ownership						
For-profit (reference)						
Not-for-Profit	2.49	1.51	0.04	4.04	1.36	<0.001
Government	2.30	1.75	0.19	3.18	1.52	0.04
Bed Size						
Less than 100 beds						
Between 100-399 beds	-3.34	1.19	0.01	-2.47	1.08	0.02
400 beds or more	-4.65	1.58	0.00	-3.56	1.51	0.02
Established Medical Home Program	0.76	1.12	0.50	-0.28	1.08	0.79

Academic Medical Center	1.76	1.46	0.23	2.41	1.43	0.09
Health Information Exchange	2.66	0.94	0.01	1.73	0.89	0.05
Electronic Health Record	-0.98	1.20	0.42	-1.70	1.10	0.12
Psychiatric Care Beds						
Less than 30 beds (ref.)						
Between 31-60	-2.76	1.06	0.01	-4.01	1.03	<0.001
60 beds or more	-3.73	1.06	<0.001	-3.48	1.04	<0.001
Rural	2.04	1.48	0.17	3.50	1.35	0.01
Hospital Service Area						
Percent White	-1.38	18.86	0.94	6.67	13.84	0.63
Percent Black	-5.97	22.19	0.99	-13.68	17.01	0.42
Percent Hispanic	0.01	12.89	0.56	2.02	9.25	0.84
Percent Uninsured	0.40	0.32	0.56	0.26	0.31	0.41
Percent Under the FPL	-1.53	0.31	<0.001	-1.63	0.29	<0.001

Data Source: 2015 American Hospital Association Annual Survey, 2015 CMS Hospital Compare Inpatient Psychiatric Facility quality measure data, and 2015 American Community Survey.

Discussion

We found higher un-adjusted FUH-7 and FUH-30 average rates among ACO affiliated hospitals. However, there were no significant differences between in FUH rates between ACO-affiliated and unaffiliated hospitals after adjusting for their structural and service area characteristics. The rates of FUH in our sample of hospitals were comparable to nationally reported averages. In 2015, the average rate among all hospitals who reported FUH-7 was 34.27 percent and 55.51 percent for FUH-30. Our findings suggest ACO affiliation may have less of an association with FUH performance rates compared to other factors. Previous studies have found that one of strongest predictors of higher FUH-7 and FUH-30 rates was a recent encounter with outpatient care prior to the hospitalization (Marino et al., 2016; Stein, Kogan, Sorbero, Thompson, & Hutchinson, 2007).

A higher percentage of ACO-affiliated hospitals that reported both FUH-7 and FUH-30 rates were larger, not-for-profit, urban, and academic medical centers compared to unaffiliated hospitals. These findings are consistent with previous studies conducted with ACO-affiliated hospitals and ACO networks (A. C. Anderson & Chen, 2019; Colla et al., 2016; Epstein et al., 2014). ACO-affiliated hospitals also had a lower percentage of individuals who are below the federal poverty level and uninsured in their service areas compared to unaffiliated hospitals. We found the percent of individuals living below the federal poverty level was associated lower rates of both FUH-7 and FUH-30. These findings suggest that differences in unadjusted rates of FUH may be partly due to differences in the demographic characteristics of their patient populations.

We found a positive association between participation in a health information exchange and FUH-7 rates. There were also a higher percentage of ACO-affiliated hospitals participating in HIEs compared to unaffiliated hospitals. Two systematic reviews have found participation HIEs improves ambulatory care outcomes, decreased staff time handling referrals, and better care coordination (Fontaine, Ross, Zink, & Schilling, 2010; Hersh et al., 2015). Overall, adoption of HIEs has been slow and still limited (Devine et al., 2017). The number of HIE efforts have also even begun to decline in recent years (Adler-Milstein, Lin, & Jha, 2016).

There continues to be wide variation in performance between hospitals, ACO-affiliated and unaffiliated, for both FUH-7 and FUH-30. Although rates of follow-up have shown little improvement overtime there are interventions that can be used to improve performance. Collaboration between inpatient staff and outpatient clinicians

about discharge charge plans can increase the rate of follow-up (Boyer et al., 2000; Olfson, Mechanic, Boyer, & Hansell, 1998). Studies also suggest low intensity case management interventions can increase continuity of care (Dixon et al., 2009).

As a pay-for-reporting program, the IPFQR program does not provide financial incentives for performance improvement. CMS should consider including the FUH-7 and FUH-30 measures in ACO programs to provide better incentives through financial risk and shared saving arrangements. Hospitals that participate in both pay-for-reporting and pay-for-performance programs have demonstrated greater improvements in quality than those who participate in pay-for-reporting alone (Lindenauer et al., 2007). Including FUH-7 and FUH-30 in ACO programs would align with CMS efforts to streamline ACO quality measure sets to reduce burden, as these measures are already widely reported by ACO-affiliated hospitals (CMS, 2018). Moreover, the FUH-7 and FUH-30 would address gaps in mental health measures in the current ACO quality measure set (O'Donnell et al., 2013).

Limitations

We used a cross-sectional study design; therefore, we were only able to examine the association between ACO-affiliation and FUH rates. Our sample was limited to hospitals that reported whether they participated in ACOs and reported FUH rates through the CMS IPFQR program. The program uses data from Medicare Part A and B fee-for-service claims. Our findings are not generalizable to FUH rates associated with encounters that were not attributed to Medicare Part A and B (e.g. Medicare Advantage, commercial insurance, and Medicaid). However, the hospitals

in our sample are likely to be representative of ACO-affiliated hospitals that report FUH rates because it is condition of their participation in Medicare.

Conclusion

Outpatient follow-up after a hospitalization for mental illness is an important measure of care coordination that has been understudied in the context of ACO-affiliated hospitals. We found that ACO-affiliated hospitals have higher unadjusted FUH-7 and FUH-30 rates than unaffiliated hospitals, though they are not rewarded for better performance or improvement. Rates of FUH over the last few decades may have remained stagnant on average because they are not included in major pay-for-performance programs. However, FUH remains an important measure of transitions of care for individuals with mental illness.

Chapter 6: Conclusion

Summary of the Evidence

ACOs represent a shift from traditional fee-for-service payment systems that reward volume to payment models that reward providers for value (e.g. quality improvement and cost reduction). Hospitals that lead or participate in ACOs have the potential to work with other providers to bridge the gap between physical and mental health services. The goal of this dissertation was to examine the structures, processes, and outcomes of care for hospitals that lead or participate in ACO networks. The overarching hypothesis was ACO-affiliated hospitals provide better mental health care due to increased care coordination and increased connections to behavioral health providers.

The evidence presented in Chapter 3 and 4 support the overarching hypothesis. The study described in Chapter 2 demonstrated ACO-affiliated hospitals have increased a likelihood of using of care coordination strategies compared to unaffiliated hospitals. In addition, among ACO-affiliated hospitals, shared savings and partial or global capitation payment models are associated with increased use of care coordination strategies. Although we were unable to distinguish between ACO type (Medicare, Medicaid, and commercial), most ACO-affiliated hospitals participate in some form of shared savings payment model like the Medicare Shared Savings Program (MSSP). These results are promising as the Center for Medicare and Medicaid Services (CMS) continues to invest in ACO programs which include shared savings.

Chapter 4 described the characteristics of ACO-affiliated hospitals with in-network behavioral health providers. We found nearly two thirds of ACO-affiliated hospitals did not have an in-network behavioral health provider. Those with in-network behavioral health providers reported increased use of care coordination strategies compared to unaffiliated hospitals. ACO-affiliated hospitals with in-network behavioral health providers also reported a higher percentage of net-patient revenue attributed to shared savings payment models. We suspect many of these hospitals with in-network behavioral health providers participate in the MSSP, though we were not able to confirm. These ACOs should be incentivized to maintain and improve the provision of behavioral health services in their ACO networks.

The MSSP and other ACO programs could link incentives for improvement to existing behavioral health measures that are already included in public reporting or other accountability programs. Follow-up after a hospitalization for mental illness (FUH), examined in Chapter 5, is an example of an important measure that could be included in ACO programs. FUH has been reported for decades by many hospitals that now participate in ACOs. We found ACO-affiliated hospitals had a significantly higher average unadjusted FUH rates at 7-days and 30-days compared to unaffiliated hospitals. ACO-affiliated hospitals should be rewarded for higher performance and incentivized for further improvement.

Policy Implications and Future Research

ACOs have the potential to provide better coordination between behavioral and health care services and hospitals play a key role in that effort. However, some hospitals are hesitant to join ACOs and some ACOs are reluctant to include hospitals

their networks because of the potential for increased financial risk. Hospital care is expensive, and spending is difficult to control. These concerns are compounded as CMS pushes Medicare ACOs to join 2-sided risk models – which exposes ACOs to shared losses. Current evidence shows physician-led ACOs are associated with spending reductions but lower reductions in spending for hospital-integrated ACOs (McWilliams, Hatfield, Landon, Hamed, & Chernew, 2018).

Overall, the evidence presented in this dissertation suggests hospitals that join ACOs may be more productive in their care coordination efforts – with higher use of care coordination strategies. Future studies should assess which care coordination strategies are associated with improved mental health outcomes. They should also investigate which ACO network compositions best support care coordination and reduced spending. Fragmentation in care is associated with worse group-level performance, but there may be various pathways (e.g. network configurations and care coordination strategies) to health care improvement based on the idiosyncrasies of each ACO (Kim, Funk, Daniels, & Zaheer, 2018). ACO programs will need to meaningfully address mental health care to fully recognize their potential to reduce spending and improve quality. Therefore, ACO programs will need include mental health related performance measures in their value-based payment models.

What is more, ACOs offer a window of opportunity to address disparities in the health care system by defining the reduction of disparities as a component of high value care (Anderson et al., 2018). For example, CMS could require ACOs participating in the MSSP to report on a set of mental health related performance measures, such as follow-up after a hospitalization for mental illness, stratified by

race and ethnicity. ACOs could also receive bonus payments or shared savings for reducing disparities in mental health care and mental health outcomes. Moreover, ACOs not only need to integrate mental and clinical services, but also integrate with non-medical community-based organizations that offer social services (e.g. food, housing, and transportation) (Frazee, Lewis, Rodriguez, & Fisher, 2016). ACOs can be used a way to bridge behavioral, clinical, and social services to address the social determinants of health which in turn affect improve outcomes for individuals with mental illness and other conditions that impact functioning and well-being.

Appendix A: Care Coordination Index

The summation of the following 12 indicators comprised the Care Coordination Index (CCI). Responses to each of the following survey question ranged from 1 to 5: 1 = Not used at all, 2 = Used minimally, 3 = Used moderately, 4 = Used widely and 5 = Used hospital-wide. The lowest score is 12 and the highest 60.	
Chronic Care Management	Chronic care management processes or programs to manage patients with high volume, high cost chronic diseases
Predictive Analytics	Use of predictive analytic tools to identify individual patients at high risk for poor outcomes or extraordinary resource use
Prospective Patient Management	Prospective management of patients at high risk for poor outcomes or extraordinary resource use by experienced case managers
Outpatient Follow-up	Assignment of case managers for outpatient follow-up to patients at risk for hospital admission or readmission
Medication Reconciliation	Medication reconciliation as part of an established plan of care
Visit Summaries	Provision of visit summaries to patients as part of all outpatient encounters and scheduling of follow up visit and/or specialty referrals at the time of the initial encounter
Discharge Care Plans	Post-hospital discharge continuity of care program with scaled intensiveness based upon a severity or risk profile for adult medical-surgical patients in defined diagnostic categories or severity profiles
Home Visits	Arrangement of home visits by physicians, advanced practice nurses, or other professionals for homebound and complex patients for whom office visits constitute a physical hardship
Nurse Case Manager	Nurse case managers whose primary job is to improve the quality of outpatient care for patients with chronic diseases (e.g., asthma, CHF, depression, diabetes)
Disease Management Programs	Disease management programs for one or more chronic care conditions (e.g., asthma, diabetes, COPD)
Hospitalists	Hospitalists for medical/surgical inpatients
Outreach after Discharge	Telephonic outreach to discharged patients within 72 hours of discharge

Data Source: 2015 American Hospital Association (AHA) Survey of Care Systems and Payment™

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