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Screening For And Addressing Social Determinants Of Health In Hospitals Participating In Accountable Care Organizations

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SCREENING FOR AND ADDRESSING SOCIAL DETERMINANTS OF HEALTH IN HOSPITALS PARTICIPATING IN ACCOUNTABLE CARE ORGANIZATIONS

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A DISSERTATION

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HEALTH CARE ORGANIZATION AND POLICY

ABSTRACT

There is a growing recognition among hospitals, payers, and policymakers in the United States that addressing social needs of patients is important to improving quality of care, patient outcomes, and lowering health care spending. Accountable care organizations (ACOs) may be especially incentivized to address social needs of patients to meet population health goals related to patient outcomes and costs. This cross-sectional study used data from the American Hospital Association Annual Survey to explore to explore how hospitals participating in or leading ACOs are screening for and addressing individual-level HRSNs of patients and to understand the extent to which ACOs are collaborating with external partners to address HRSNs and community-level SDOH. Overall, this study found hospitals participating in or leading ACOs reported higher rates of external partnerships to address social needs of patients and community level SDOH compared to non-ACO hospitals, which suggests hospitals participating in ACOs seek external partners with expertise or resources to address social needs of their patients. However, only hospitals leading ACOs reported engaging in higher rates of screening and internal strategies compared to non-ACO hospitals. This nuanced finding suggests hospitals leading ACOs may be better positioned to engage in these activities due to existing population health management infrastructure and financial incentives to meet ACO goals.

Keywords: population health; value-based care; social determinants of health; accountable care organizations

DEDICATION

To the teachers and mentors who saw something special in me. Never underestimate the impact you can have on someone's life.

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LIST OF ABBREVIATIONS

ACA	Patient Protection and Affordable Care Act of 2010 (ACA)
ACO	Accountable Care Organization
CMS	Centers for Medicare and Medicaid Services
HRSN	Health-Related Social Needs
NEMT	Nonemergency Medical Transportation
PSH	Permanent Supportive Housing
SDOH	Social Determinants of Health

CHAPTER 1

INTRODUCTION

Despite spending more on health care per person than any other country, the United States lags behind other high-income countries in key health outcomes such as life expectancy, infant mortality, and other health measures (OECD, 2022). In a comparison of health system performance of eleven high-income countries, a Commonwealth Fund report (Schneider, et al., 2021) found the United States ranked last on access to care, administrative efficiency, equity, health care outcomes, and overall performance. Furthermore, health disparities persist among socially and economically disadvantaged groups in the United States, resulting in an estimated economic burden of $1.03 trillion per year (LaViest et al., 2023).

There is widespread agreement that much of what influences health and health outcomes lies outside of the health care system (Braveman & Gottilieb, 2014; McGinnis, et al., 2002; Chetty et al., 2016). As such, there is a growing recognition among hospitals, payers, and policymakers in the United States that addressing health-related social needs of patients is important to improving patient outcomes and lowering health care spending. Accountable care organizations (ACOs) are an example of one value-based health care delivery and payment system reform introduced to lower health care costs and improve quality of care. Because ACOs are accountable for cost and quality outcomes of patient populations, some have theorized ACOs are especially incentivized to address health-

related social needs of patients to meet population health goals related to patient outcomes and costs (Alley et al., 2016; Hacker & Walker, 2013; Fraze et al., 2016).

Background

The Role of Health-Related Social Needs and Social Determinants of Health

While access to health care services is important to health status, there is a strong base of evidence indicating that a range of factors beyond the health care system heavily influence patient outcomes and contribute to health disparities (McGinnis, et al., 2002; Braveman & Gottilieb, 2014; Chetty et al., 2016). These broad factors, commonly referred to as the social determinants of health (SDOH), are the conditions in which "people are born, live, learn, work, play, worship, and age" (Office of Disease Prevention and Health Promotion [ODPHP], n.d.). Examples of social determinants of health include socioeconomic status, food insecurity, transportation, education, neighborhood environments, employment, housing, and the policies and systems that influence those conditions.

Though sometimes used interchangeably with SDOH, health-related social need (HRSN) is a distinct concept that describes the social and economic needs of an individual patient such as housing stability, employment, personal safety, lack of transportation, etc. (Alderwick & Gottlieb, 2019; Green & Zook, 2019). There is general agreement unmet social needs significantly impact an individual's ability to maintain health and well-being. Studies have found that patients with unmet HRSNs report higher rates of depression, diabetes, hypertension, and chronic stress (Berkowitz et al., 2016; Heller et al., 2021), and are more likely to be high utilizers of the ED, readmitted to the

hospital, and frequent no-shows to clinic appointments (McQueen, et al., 2021 & Fiori et al., 2020).

In recent years, there has been a far greater emphasis on addressing HRSNs and SDOH among policymakers, health care leaders, and the largest payer for health care in the United States, the Centers for Medicare and Medicaid Services (CMS). A survey of 300 hospitals found that 80% of respondents stated leadership was committed to addressing HRSNs of patients. Though 88% of respondents reported screening patients, most were not systematically screening and instead had ad hoc processes or were only targeting high utilizer populations. Almost 40% reported having no mechanism to measure the effectiveness and impact of their activities. Hospitals with more experience in value-based care models reported greater levels of investment, activities to address HRSNs and were more likely to measure the effectiveness and impact of their efforts (Lee & Korba, 2017). In a separate analysis of spending on screening for HRSNs and referrals from 2017-19, researchers found that 57 health systems (a total of 917 hospitals) invested over $2.5 billion in programs to address HRSNs and SDOH such as housing, employment and food security and nutrition (Horwitz et al., 2020).

There are two primary ways health care organizations can address the HRSNs and SDOH of their patient populations. The first is by addressing individual level health-related social needs (HRSN) of patients, which contribute to poor patient outcomes and are a result of underlying social determinants of health at the community-level (U.S. Department of Health and Human Services, 2023). To address HRSNs of patients, health care organizations have introduced processes to screen for and address unmet HRSNs through direct service provision or referrals for social services. Efforts to screen for and

address HRSNs will likely continue to expand with a new CMS rule going into effect in 2024 that will require hospitals to report social-risk screening rates and the number of patients identified as having one or more social risk factors as part of the Hospital Inpatient Quality Reporting program (CMS, 2022). The second approach is to address social determinants of health at the community-level (NASEM, 2019). To date, most efforts undertaken by hospitals and health systems have focused on screening and addressing HRSNs of patients at the individual level; however, hospitals are increasingly engaging in activities to address SDOH at the community-level (Allen, et al., 2022).

The Shift from Fee for Service to Value-Based Care

Historically, hospitals and health systems in the United States have been reimbursed under a fee-for-service model that incentivizes providing a higher volume of services without any accountability for outcomes. The fee-for-service model is widely considered a contributor to the inefficiency, high cost, and variability of quality in the U.S. health system (Laugesen & Glied, 2011; Schroeder et al., 2013). The passage of the Patient Protection and Affordable Care Act of 2010 (ACA) established several value-based payment models to shift from exclusively reimbursing volume of services to rewarding providers for delivering coordinated, high-quality care (Patient Protection and Affordable Care Act, 2010).

One example of a value-based care payment model is the Accountable Care Organization (ACO), in which physicians, hospitals, and other health care providers voluntarily agree to assume responsibility for the cost and quality of care for a defined population of patients through an integrated network. The typical payment model for ACOs is shared savings, with an ACO receiving an additional payment if spending for

attributed patients is lower than the established benchmark for cost of care. If an ACO generates savings, the ACO can "share" the savings with the payer assuming the ACO also meets quality performance measures, which ensures the ACO is not withholding services to generate the savings (National Association of ACOs [NAACOS], n.d.-a). Considering the impact of SDOH on health outcomes and costs, ACOs may be especially motivated to address patients' HRSN in an effort to meet ACO related goals.

Types of ACO Models

Three major types of ACO models have emerged in the United States: Medicare Shared Savings Program (MSSP), commercial ACOs, and Medicaid ACOs. ACOs experienced a rapid growth from 2011-2018, but growth among Medicare ACOs has plateaued in large part due to increased downside risk requirements in the MSSP. However, given the Centers for Medicare and Medicaid Services (CMS) established a goal to have all traditional Medicare beneficiaries and half of Medicaid beneficiaries in an ACO by 2030 (CMS, 2023a), it is likely that ACOs will continue to be an important value-based payment model for the foreseeable future. Furthermore, commercial ACOs have continued to steadily grow, with commercial ACOs comprising the largest share of all ACO contracts (Muhlestein et al., 2021).

Medicare Shared Savings Program (MSSP)

The Medicare Shared Savings Program (MSSP) was established in 2012 as part of the ACA to encourage development of ACOs, with the goal of reducing health care costs and encouraging the provision of high quality, coordinated care for Medicare beneficiaries. A variety of providers may choose to form an ACO to participate in the MSSP, including providers in group practice arrangements, partnerships or joint ventures

between hospitals and providers, providers employed by hospitals, certain critical access hospitals, federally qualified health centers, and rural health clinics. To participate in the MSSP as an ACO, providers must serve a minimum of 5,000 Medicare beneficiaries, and the ACO must be a separate legal entity from the providers/organizations that founded it and have its own tax identification number (MedPAC, 2021).

Typically, ACOs participating in the MSSP continue to be paid on a fee for service basis with the opportunity to receive bonus payments based on whether total spending for the assigned beneficiaries is less than the target spending at the end of the year. To determine the target spending for assigned beneficiaries, CMS calculates a benchmark using the average of total spending for a 3-year baseline period prior to the start of the ACO contract. The historical baseline spending is then combined with the average regional spending in the ACO's market for fee for service beneficiaries that would have been eligible for ACO assignment. Expenditures each year are then compared to benchmark, and any savings are then shared between Medicare and the ACO at the defined shared savings rate. Additionally, ACOs must also meet quality performance goals to share in the savings. Conversely, if an ACO is in a two-sided risk model, any losses will be shared between the ACO and Medicare (MedPAC, 2021). For example, if an ACO with a shared savings rate of 50% outperforms the benchmark by 5%, the ACO would keep 2.5% of the savings.

Originally, the MSSP had 4 tracks (1, 1+, 2, 3) with each track corresponding to higher levels of risk and rewards for participants. In 2019, CMS overhauled the MSSP and replaced the prior tracks with the BASIC and ENHANCED tracks (See Table 1). In the BASIC glide path, ACOs incrementally transition to higher levels of risk and reward

with most ACOs limited to the upside risk only model (Levels A& B) for a period of two years. If the ACO previously participated in the Track 1 model, they are limited to one year in the upside risk only model, and low revenue ACOs are allowed to remain in upside risk only model for up to three years. Generally, ACOs in the BASIC glide path will automatically advance at the beginning of each performance year to the next level or could elect to move more quickly to a higher level over the course of their agreement period (CMS, 2018). Both the BASIC and ENHANCED tracks allow ACOs to choose between prospective and retrospective beneficiary assignment each year.

Table 1. Medicare Shared Shaving Program Options (developed from CMS, 2023b)

MSSP Tracks	Level of Risk	Shared Savings	Shared Losses	Loss Sharing Limit	Annual option to enter higher risk
BASIC- Level A & B	Upside risk only	1st dollar savings at a rate of up to 40%	N/A	N/A	New ACOs may elect to remain at Level A for 1st agreement period.
BASIC- Level C	Two-sided risk	1st dollar savings at a rate of up to 50%	1st dollar losses at a rate of 30%	2% of ACO revenue capped at 1% of benchmark	Yes
BASIC- Level D	Two-sided risk	1st dollar savings at a rate of up to 50%	1st dollar losses at a rate of 30%	4% of ACO participant revenue capped at 2% of benchmark	Automatically to Level E next year.
BASIC- Level E	Two-sided risk	1st dollar savings at a rate of up to 50%	1st dollar losses at a rate of 30%	8% of ACO revenue capped at 4% of benchmark	No. May participate indefinitely under Level E.
ENHANCED	Two-sided risk	1st dollar savings at a rate of up to 75%	1st dollar losses (determined by sliding scale) at a rate of 75%	15% of ACO participant revenue	Participation is optional and represents highest level of risk sharing in MSSP.

As of January 2023, there were 456 Shared Savings Program ACOs, covering approximately 10.9 million beneficiaries. From 2012-2021, it is estimated that ACOs participating in the MSSP generated $9.6 billion in total earned shared savings, $17.2 billion in gross saving and $6.5 billion in net savings. Importantly, 99% of ACOs met the quality standards required to share in savings, marking the fifth consecutive year of generating overall saving and meeting quality performance measures (CMS, 2023c; NAACOS, n.d.-b).

Commercial ACOs

As the ACO concept was being developed and implemented in the public sector, the commercial sector was also rolling out ACO models. In Massachusetts, provider organizations started entering the Blue Cross Blue Shield Alternative Quality Contract in 2009 followed by similar arrangements in other Blue Cross Blue Shield associations. This ACO model is based on a global budget model with pay-for-performance incentives for achieving cost and quality benchmarks, while also placing providers at risk for excessive spending (Song et al., 2012). At the same time, CIGNA rolled out its Collaborative Accountable Care (CAC) model, which is comprised of either a large primary care physician group, multi-specialty group, integrated delivery system or physician-hospital organization. CIGNA's advanced health informatics and clinical health coaching capabilities allows for collaboration directly with providers beyond what a governmental payer may be able to do (CIGNA, 2011). Unlike the MSSP, which has clearly defined quality and cost benchmarks established by Medicare, commercial ACOs have more variability in shared savings and risk agreements, making it difficult to compare across commercial ACOs. However, commercial ACOs are an important piece

of the puzzle as they account for a significant portion of patients covered by an ACO in the United States, with 23 of the 25 largest ACOs by patient population being commercial ACOs (Definitive Healthcare, 2022).

Medicaid ACOs

Compared to Medicare ACOs, Medicaid ACOs have experienced slower growth and vary widely in terms of program structure. Since 2011, 14 states have developed an ACO type model with significant variability in approaches among states (Kaiser Family Foundation, 2023). One reason for the variability is the flexibility a state Medicaid agency has to design a Medicaid ACO program by using different statutory or regulatory authority such as 1115 demonstration waivers, managed care authority, and state plan amendments (Rosenthal et al., 2023).

While there is variability among Medicaid ACOs, programs typically fall within one of three models. The most predominant model is similar to a Medicare ACO with a hospital, integrated health system, and/or a physician group as the organization that is responsible for the ACO contract. Minnesota's Integrated Health Partnerships and Maine's Accountable Communities are two examples of provider led Medicaid ACOs. The second model is driven by managed care organizations (MCOs) that maintain financial risk but implement new payment models with providers and community members having more involvement in the leadership structure compared to traditional MCOs. Oregon's Coordinated Care Organizations (CCO) model is one of the most notable Medicaid ACOs that uses a managed care approach. The final model is the regional/partnership driven model where regional and community organizations form care teams and are responsible for coordinating care. In Colorado, Medicaid ACOs are

responsible for a particular region of the state and in New Jersey, the organizations are responsible for the total cost of care of beneficiaries in specified zip codes (Mautilus & Lloyd, 2018).

Hospital Participation in ACOs

Organizational and payment structures for hospitals engaged in ACOs varies significantly based on factors such as location, size, previous experience with risk-based models and organizational readiness (Chukmaitov et al., 2019; Merrill et al., 2015; Colla et al., 2016; Muhlestein et al., 2020). Hospitals have typically partnered with other health care organizations in ACOs in two ways: leading the ACO or participating in the ACO without a leadership role (Colla et al., 2016). Examples of hospital led ACOs include integrated delivery systems with employed physicians and contracts with independent physicians as well as joint led ventures between independent hospitals and physician groups. Initially, hospitals were early adopters of the ACO model and sponsored the majority of new ACOs. Even though physician led ACOs have proliferated in recent years, hospitals still comprise over half of all ACOs, with hospital-led ACOs accounting for approximately 25% and joint-led ACOs between hospitals and providers representing 30% of all ACOs (Muhlestein et al., 2020).

Hospitals may also participate in ACOs without taking a leadership role, which can take the form of a physician led ACO contracting with a hospital or participating in an ACO as a member of a coalition of health care organizations (Shortell et al., 2014). For example, the Camden Coalition ACO brought hospitals, providers, community-based organizations, and behavioral health providers together as part of New Jersey's Medicaid ACO Demonstration Project (Truchil et al., 2018). In terms of payment structures, many

hospitals participate in an ACO under a shared savings arrangement with some opting for fully capitated payments and others entering joint ventures with health insurers (Merrill et al., 2015).

Problem Statement

As ACOs continue to transition into two-sided risk models and assume more responsibility for their patient population, effective population health management will be essential to meeting cost benchmarks and achieving quality performance goals. Given the significant contribution of HRSNs and SDOH to health outcomes, assessing and addressing HRSNs of individual patients and the broader community-level SDOH is important to meeting ACO goals. The purpose of this study is two-fold: 1) explore how hospitals participating in or leading ACOs are screening for and addressing HRSNs and 2) understand the extent to which hospitals participating in or leading ACOs are collaborating with external organizations to address HRSNs of patients and community-level SDOH.

CHAPTER 2

LITERATURE REVIEW

The purpose of this chapter is to review the literature on how health care organizations are assessing and addressing patients' HRSNs and the broader community-level SDOH. There is a growing body of literature assessing the impact of investments in strategies to address HRSNs on health outcomes, utilization, and health care costs, and though there are still significant gaps, the rigor and number of studies continues to increase. However, literature on how ACOs are engaging in activities to assess and address HRSNs and SDOH, particularly hospitals participating in or leading ACOs, is nascent. Furthermore, studies evaluating the impact of going beyond meeting individual HRSNs to also address community-level SDOH is lacking.

Screening Patients for Health-Related Social Needs

Though still an underdeveloped area of knowledge, several studies have examined social needs screening practices and associated challenges. A systematic review of social needs screening in clinical settings found most of the 28 included studies were health care organizations serving a large number of low-income populations, such as community health centers, primary care practices, safety net hospitals and Federally Qualified Health Centers. All studies included some information on screening practices, yet very few described the clinical flow for screening and integration into the EMR. None of the studies described a process for universal screening of patients. Additionally, screening tools varied widely, with many of the studies only assessing certain patient populations

for specific HRSNs such as food insecurity (Yan et al., 2022). Housing, food insecurity, transportation, and interpersonal violence were the most common HRSNs screened for across studies reporting screening practices, (Fraze et al., 2019; Yan et al., 2022; Fraze et al., 2016).

Among studies examining perceptions of screening for HRSNs, health care providers consistently report positive feelings towards screening patients and note the importance of HRSNs to health outcomes, yet providers also report low screening rates (Kostelanetz et al., 2022; Schickedanz et al., 2019; Bleacher et al., 2019). The most common perceived barriers to screening identified by hospital-based providers include a lack of resources or knowledge of how to address patients' HRSNs once identified, a lack of time, and limited support staff (Eder et al., 2021; Trochez et al., 2023; Kostelanetz et al., 2022)

Impact of Strategies on Health Outcomes, Utilization, and Health Care Costs

Most of the extant literature on how health care organizations are addressing HRSNs focuses on the impact of interventions to address housing, nutrition, transportation, and care management on health outcomes, utilization, and health care costs. Some of the most promising results indicate targeted programs to provide housing support for at-risk populations (McCarthy et al., 2022), and increase access to healthy foods, especially for the most vulnerable patients (Berkowitz et al., 2018; Berkowitz et al., 2019), can reduce health care utilization and costs. Furthermore, there is encouraging evidence that care management programs assessing and referring medically complex patients for social services and community-based resources may reduce health care costs

(McCarthy et al., 2022; Vasan et al., 2020). Studies evaluating the impact of interventions to address other HRSNs is still very limited.

Housing Support Programs

Most of the studies in the existing literature evaluate the impact of providing housing support to those that are homeless or at high risk of becoming homeless. Individuals facing housing instability and homelessness frequently live with chronic illnesses which are often exacerbated by mental health and/or substance abuse disorders in addition to other unmet HRSNs. As a result, these individuals are at much higher risk for repeated hospital stays and frequent ED visits, resulting in high health costs and poor health outcomes (NASEM, 2018).

There is promising evidence that programs providing transitional or permanent housing to homeless or at-risk homeless individuals can decrease unnecessary utilization of expensive forms of care. Among 8 studies comparing Permanent Supportive Housing (PSH) or transitional housing to control groups, a review found that ED visits decreased by a range of 14% to 52% in 6 of the studies, hospital admission rates were 15% to 42% lower in 5 studies, and health care costs were lower in 2 of the studies but not significant in 5 of the studies (McCarthy et al., 2022). However, there is mixed evidence cost savings are enough to pay for PSH programs.

One particularly promising study evaluated a pilot program targeting dually eligible Medicare and Medicaid beneficiaries that were in either long term care settings but suitable for return to a community setting, in acute care settings and being recommended for long term care, and those at imminent risk of long-term care placement. A health plan partnered with two local organizations specializing in

transitional case management and affordable supportive housing to identify beneficiaries with the best chance of long-term success and made a referral for affordable housing, assisted living, or individual home support. On average, the intervention cost $2,750 PMPM; however, there was a net program savings of $4,334 due to the reduction in costs related to skilled nursing and long-term care facilities (Van Beek, 2018).

Nutrition and Food Support Programs

The negative impacts of food insecurity and poor nutritional intake on physical and mental health outcomes have been well documented (Olson, 1999; Gundersen & Ziliak, 2015). Those experiencing food insecurity are more likely to experience chronic diseases and incur higher health care utilization. For individuals with a medical condition, limited access to a healthy diet can slow recovery and contribute to complications (FRAC, 2017). Though the evidence is not as strong as it is for housing-based interventions, there are promising results that interventions designed to increase access to healthy foods, especially for the most vulnerable patients, can reduce health care utilization and costs. Nutrition and food security related interventions have typically either focused on home delivered meals (medically tailored or non-tailored meals) and non-delivered food support programs such as food pharmacies or other food support programs like the national Supplemental Nutritional Assistance Program (SNAP) (McCarthy et al., 2022).

Evidence indicates that home delivered meals may be an important strategy to pursue for patients that are at risk nutritionally, suffer from chronic conditions, or have other significant health needs. A review of 8 studies examining the impact of home delivered meals found that participation in one of these programs reduced rates of ED

visits, inpatient admissions, and skilled nursing facility admissions (McCarthy et al., 2022). Though more expensive, there is emerging evidence that medically tailored meals can reduce ED visits, lower inpatient admission rates, and lower spending on medical services compared to delivery of non-tailored meals (Berkowitz et al., 2018; Berkowitz et al., 2019).

While there are promising results for other food support programs beyond home delivered meals, most of the studies had small sample sizes. One study found that health care costs for patients with poorly controlled diabetes who were given a "prescription" to Geisinger's Fresh Food Farmacy decreased from an average of $240,000 PPPY to $48,000 PPPY. However, it is not clear the reduction in health care costs was a result of the food support program or the diabetes coaching (Feinberg et al., 2018). A program at ProMedica Health System screened and referred Medicaid beneficiaries with food insecurity and chronic illness to one of their food pharmacies. Of the 2,243 patients referred, 1,100 became clients of the food pharmacies and those referred experienced a 3% decrease in ED visits, a 53% reduction in readmissions, and 4% increase in primary care visits after screening (AHA, 2017). Larger scale and more methodologically rigorous studies are needed to understand the impact of food support programs like food pharmacies on health care utilization and costs.

Transportation Assistance

A conservative estimate indicates that 3.6 million Americans miss appointments or delay care due to transportation related issues each year, putting them at risk for poor health outcomes (NASEM, 2005). Medicaid beneficiaries tend to be at higher risk for transportation related barriers due to being low income. In 2017, approximately 2 million

Medicaid beneficiaries (4% of all enrollees) reported delaying care due to a lack of transportation (MedPAC, 2019). In an effort to increase access to health care for those with transportation barriers, health care organizations and payers are increasingly investing in nonemergency medical transportation (NEMT) programs, particularly ridesharing services like Lyft and Uber. A recent systematic review found moderate evidence that NEMT reduced the number of missed appointments; however, the review also found a lack of robust evidence on the impact on health care utilization and cost savings making it unclear what the return on investment is for NEMT programs (Shekelle et al., 2022).

Care Management Programs

Much of the literature review thus far has focused on addressing one social need yet most high-risk patients have multiple and complex HRSNs. Though still limited, there is encouraging evidence suggesting care management models linking patients with medical and non-medical community-based resources can reduce health care utilizations and health care costs. Care management models include multidisciplinary team approaches in which a team of physicians, social workers, nurses and others work together to coordinate care for patients with complex needs. A Medicare ACO model utilizing the multidisciplinary team model targeted the top 5% highest risk patients, resulting in a reduction in ED visits and hospital admissions that contributed $21.8 million in Medicare savings over 2 years (Hostetter et al., 2016).

In social worker led models, needs are assessed, patients are connected to the resources that are needed, and social workers follow up to ensure needs have been met. One example is the Geriatric Resources for Assessment and Care of Elders (GRACE),

which utilizes social workers and nurse practitioners to provide in home and telephonic care management for geriatric patients with complex needs. The social workers also address HRSNs and link patients with community-based resources such as food security programs. In a randomized controlled trial of the original GRACE program at Eskenazi Health, Counsell and colleagues (2007) found that high-risk patients had 35% and 44% reductions in rates of ED visits and hospital admissions reported enhanced quality of life compared to the control group. A later cost analysis found that during the two-year trial, the program was cost neutral but achieved net savings of $1,487 per patient on average in the post intervention year (Counsell et al., 2009). Other health care organizations replicating the GRACE model across a variety of setting in states like Michigan, Indiana, and California reported similar results of reduced inpatient admissions, ED visits, cost savings and patients reporting higher quality of life (McCarthy et al., 2021).

Employing community health workers (CHWs), navigators and coaches to connect patients with social services is another approach being taken by many health care organizations (McCarthy et al., 2022). The Individualized Management for Patient-Centered Targets (IMPaCT), has demonstrated to be particularly effective in reducing hospitalizations and total hospital days across multiple settings. This model deployed community health workers (CHWs) to provide predominantly Medicaid patients in a high poverty area of Philadelphia with tailored social support, health behavior coaching, connection to resources and assistance with navigating the health system. A pooled analysis of three clinical trials evaluating the IMPaCT model found the total number of days spent in the hospital per patient was 34% lower with 21% fewer hospitalizations per patient and 15% shorter average length of stay for program participants compared to the

control group. To date, this study is one of the largest analyses of randomized controlled data demonstrating that a health system led social intervention can significantly decrease hospitalization rates (Vasan et al., 2020).

Hospital Based Approaches to Address SDOH at the Community-Level

There is sparse research examining how hospitals, much less those participating in ACOs, are addressing SDOH at the community-level. These "upstream" factors include neighborhood conditions (level of pollution, availability of safe housing, green space, etc.), employment opportunities and quality of the education system (Bharmal et al., 2015; Castrucci & Auerbach, 2019; NASEM, 2019). The most notable efforts to address these upstream factors at the community-level are by hospitals deploying "anchor mission" strategies to leverage employment, purchasing, investment and other placed based practices to improve the conditions of the communities they serve (Allen et al., 2023; Gusoff et al., 2023). To date, much of the existing literature is comprised of case studies, with virtually no studies assessing the impact of anchor mission strategies on health outcomes.

Recognizing the lack of existing research, Allen and colleagues (2022) developed a typology to serve as a framework for future research on the types of activities hospitals in at the community-level to address SDOH. The typology organizes key strategies into three categories: leveraging business operations, improving availability of social services, and advancing systems and policy changes. Hospitals can wield significant economic influence in a community by leveraging business operations to improve economic aspects of the community through hiring practices, procurement strategies, and investment in the community. Examples of strategies include workforce development programs to create

pipelines for hospitals to train and hire residents in the low-income communities they serve (Allen et al., 2022; Ansell et al., 2023). A notable example of how an anchor institution can leverage purchasing power to create jobs and build wealth in the communities they serve is the relationship between Cleveland Clinic and Evergreen Cooperative Initiative. In 2018, Evergreen Cooperative Laundry, an employee-owned commercial laundry cooperative, was awarded a contract to take over laundry and linen management for all Cleveland Clinic facilities in Northeast Ohio creating 150 new jobs (Duong, 2021).

Another way hospitals can engage in community-level actions is by directly improving availability of social services by funding services directly or with grants and providing other non-financial support. This could include activities such as using community benefits to provide grants to community-based organizations or directly providing social services. For example, Our Lady of the Lake (OLOL) Regional Medical Center in Baton Rouge, Louisiana established a community owned micro-loan fund to support employees that otherwise might seek a predatory pay day loan, which has since been expanded to serve outside community members. ProMedica, a system with hospitals in Michigan and Ohio, opened a grocery store in a food desert to offer affordable and healthy food (Allen et al., 2022).

The final category of community-level actions to address SDOH at the community-level is by advancing systems and policy change through multi-sector collaborations and engaging in advocacy. For example, hospitals have engaged in with community partners to advocate for policies to increase affordable housing and enforce healthy housing ordinances. Hospitals have also formed multisector coalitions to address

social determinants of health at the community-level. West Side United, a multisector coalition focused on improving the health of communities on Chicago's West Side, is comprised of six health systems, community members, non-profit organizations, businesses, and governmental partners. The coalition categorizes their efforts in four areas: economic vitality, education, health and healthcare, and neighborhood and physical environment. Examples of programs and strategies the hospitals in this coalition are undertaking include developing workforce programs for community members, contracting with local businesses for supplies and materials, contributing to an investment fund for healthy housing and food access, and serving as an advocate for the West Side communities among city officials, funders, and businesses. Notably, the coalition has also developed a publicly available metrics dashboard to track progress and impact on a set of community-level metrics (Thometz, 2018 & West Side United, n.d.).

ACOs Activities to Screen and Address Health-Related Social Needs of Patients

Though there is limited data available on how ACOs are addressing HRSNs of patients, there is an emerging body of qualitative studies describing strategies and activities ACOs are undertaking. A study that interviewed leaders from 32 ACOs found transportation, food and housing were the most common HRSNs being addressed. Leaders reported utilizing both internal resources (e.g. staff), and external resources from community partners and public health organizations, to meet HRSNs among patients. Approaches to addressing HRSNs ranged from individualized plans to meet HRSNs of a specific patient to population-based approaches to address a specific need such as transportation (Fraze et al., 2016).

A qualitative study of 22 ACOs that were early adopters in addressing HRSNs and SDOH found that despite a high level of interest among the organizations, several barriers were frequently encountered. Many of the organizations reported having limited data on individual patient HRSNs, with only half of the ACOs conducting standardized screening and less than half using standard documentation. There were also challenges with developing partnerships with community-based organizations and establishing a robust referral system to social services and limited capabilities of community-based organizations overall. Financial constraints and uncertainty of how Medicaid funds could be spent on nonmedical services and programs were also identified as barriers. Finally, early adopters also noted the difficulty in calculating return on investment for these activities as it may take more than three years to see an impact (Murray et al., 2020).

A later qualitative study conducted with leaders from 15 ACOs found many of the challenges noted by Murray (2020) persisted. Four primary lessons were identified by the ACO leaders from their respective organizational efforts to integrate social and medical care (Mechanic & Fitch, 2023). The first lesson was the need for ACOs to collect information on their patients' HRSNs in a systematic and culturally competent manner. Ideally, organizations should select one screening tool to use across the entire organization with the screening information integrated into the electronic health record. Organizations should also consider where and how to screen patients in a culturally appropriate manner and provide an option for a patient to decline providing that information. Additionally, staff will need training and guidelines to collect this information in a respectful manner. Both patients and staff should be involved in the development of these tools and organizational policies (Mechanic & Fitch, 2023).

The importance of developing relationships with local community-based organizations and creating referral processes for social services was another lesson learned. To effectively do this, ACOs need to understand not only service offerings of community-based organizations, but also the capacity to collaborate. Mount Sinai, one of the participants in the learning collaborative, brought community-based organizations into its clinically integrated network, potentially allowing for direct reimbursement of services, and sharing of savings. Other ACOs are investing in community resource referral platforms to provide a closed loop referral system to allow for documentation of services provided and to record outcomes. Notably, these systems require a substantial financial investment and modifications to clinical workflows and staff training. Given how costly it is for both ACOs and community-based organizations to address patients' HRSNs, direct payment methods and incentives for the integration of social services were noted as being important (Mechanic & Fitch, 2023).

Medicaid ACOs

Among the different ACO models, the literature describing activities to assess and address HRSNs of patients was largely focused on Medicaid ACOs. This isn't surprising considering that in 2022 over half of states required social risk screening and social service referrals of enrollees in Medicaid managed care contracts (Hinton & Raphael, 2023). A qualitative study conducted with community health centers and hospitals at a large integrated health system participating in a Medicaid ACO found the most common activities undertaken were related to housing and food. Staff assisted patients with applying for government food assistance programs such as SNAP and WIC, referred patients to other places in the community to get free or low-cost food, and provided one-

time emergency food assistance in the form of gift cards. Assistance with housing needs included connecting patients to community-based organizations that specialize in housing, legal aid, help with applying to housing assistance programs, and referring patients to a specialized housing coordinator. However, staff expressed difficulty helping patients with housing due to the limited availability and long waiting lists for housing (Browne et al., 2021).

In terms of facilitators and barriers of effective HRSN referrals, the study identified knowledge of resources available in the community, positive relationships with patients, leadership buy-in, and effective collaboration and communication with community-based organizations as important factors. Barriers included limited community resources, high caseloads, and difficulty in following up with patients due to inefficiencies in the electronic medical record. Certain patient characteristics also served as a barrier to effective referrals, particularly among those with complex medical needs, patients with mental health challenges, the elderly, and patients with limited English (Browne et al., 2021).

Screening for and Addressing HRSNs to Meet Population Health Goals

Population health management is an important strategy for ACOs to reduce costs and improve health outcomes of patients. Considering the significant contribution of unmet health-related social needs on patient outcomes, understanding and addressing the HRSNs of patients is important for effective population health management. Given the complex nature of social determinants of health and the myriad of interventions and stakeholders involved in addressing HRSNs, a logic model (See Figure 1) was created to explain which inputs, outputs, outcomes, and conditions are needed ideally for ACOs to

meet population health management goals. The development of the model was informed by the current literature on this topic which was presented above.

For an ACO to screen and address HRSNs effectively, significant investments must be made in staff training, technological infrastructure to support screening and data analytics, and the development of referral networks. A clinical workflow should be created to hardwire processes, which requires training staff to screen patients in a culturally appropriate and sensitive manner and record the data in the electronic medical record (EMR). Staff should also be trained to analyze the data to identify high need/risk patients. Once patients have been identified as having HRSNs, a closed loop referral system should be utilized to refer patients for appropriate services and to track whether patients receive needed services. To develop a referral network, ACOs must identify potential community partners that are willing to partner to provide direct services. Given the impact on case load and resources, community-based organizations will likely require additional funding to hire and train staff and reimbursement mechanisms for direct service provision to address non-medical needs.

If implemented under the ideal conditions described above, an ACO may realize a number of desired outcomes. In the short term, these include improved referral processes with community partners and increased enrollment in public assistance programs. It may also result in better data sharing between ACO hospital and community partners, leading to more effective management of the health of the assigned population. This theoretically would result in generating higher savings in the ACO contract. Long term, a fully integrated system between ACOs and community-based organizations would lead to

improvement in patient and community-level outcomes and continue to generate savings as the ACO enters into more risk sharing contracts with payers.

Figure 1. Logic Model for Screening and Addressing HRSNs to meet ACO Goals

PROCESS			OUTCOMES	
Inputs	Activities	Outputs	Short 1-3 years	Long Term 4+ years
• Community partners • Staff from health care organization and external partners • Funding mechanisms • Standardized screening tool • EMR capabilities to capture HRSN data and track outcomes	*Screening for HRSNs* • Develop clinical workflows to capture HRSN data • Train staff for screening *Addressing HRSNs* • Develop and implement referral processes with community partners	*Screening for HRSN* • Clinical and operational workflows to screen for HRSNs • Hospitals have capacity to capture and analyze data sets on HRSNs • Staff trained to screen for HRSNs in a culturally competent manner *Addressing HRSNs* • Closed loop referral and care management integrated across systems	• Improved referral processes with partners • Increased referrals to other social services and enrollment in public assistance programs • Share data with partners to better manage pop. health efforts • Generate shared savings from ACO contract	• Improvement in individual patient outcomes and social needs • Continue to generate shared savings in more risk bearing contracts • Marked improvement in community health outcomes • Fully integrated systems
ASSUMPTIONS • Financing to expand workforce to screen and refer patients as needed. • Availability of external organizations to develop referral network. • Willingness of external organizations to enter partnerships with hospitals. • Funding from payers (Medicare, Medicaid, commercial, etc.) for non-medical services needed to address individual patient needs. • Continued emphasis at highest levels of policymaking to screen and address HRSN.				

Theoretical Framework

ACOs are complex organizational structures and using more than one theory may better explain different aspects of organizational behavior. This study utilizes two organizational theories, Structural Contingency Theory and Resource Dependency Theory, to understand different organizational aspects of hospitals participating in or leadings ACOs. Structural Contingency Theory may help explain why hospitals

participating in or leading ACOs change organizational structure to fit its contingencies, and Resource Dependency Theory considers the influence of the external environment on behaviors of hospitals participating in or leading ACOs.

Structural Contingency Theory

Structural Contingency Theory (SCT) posits there is no one best way to organize and that organizational structure is contingent upon internal and external factors. Organizations that best fit organizational structure with the contingencies facing the organization will be most effective. In SCT, contingencies are defined as contextual factors that influence the environment or work in which organizations operate (Burns and Stalker, 1961 & Donaldson, 2001). Examples of contingencies include task interdependence, size, technology (Donaldson, 2001), strategy (Child, 1972), and uncertainty (Burns & Stalker, 1961). In the context of ACOs, SCT provides a theoretical lens to analyze how contingencies influence structural characteristics. Though SCT has not been used as much to analyze ACO structures compared to other organizational theories, there are examples in the literature. Chukmaitov and colleagues (2015) used SCT to examine the impact of ACO competencies, market characteristics and hospital characteristics on 30-day all-cause mortality rates and inpatient costs and identified task interdependency as an important contingency due to the fragmented nature of the US health care system.

Uncertainty. One of the most studied contingencies in the SCT literature is uncertainty, which has been defined as the unknown in the context of an organizational task or the environment. SCT literature suggests that there are two types of environments: mechanistic and organic. In a mechanistic environment, structure is typically rigid,

formalized, and hierarchical, leading to low uncertainty. In contrast, organic environments tend to be more decentralized and experience frequent change, leading to higher levels of uncertainty (Burns and Stalker, 1961). ACOs operate in organic environments, which have high levels of uncertainty and change due to ever changing regulations and uncertainty of patient outcomes, thus requiring a flexible structure to respond effectively. To mitigate risks associated with uncertainty in the environment, ACOs may develop and implement internal strategies to address patients' HRSNs and community-level SDOH to lower costs and unnecessary utilization of health care services.

Resource Dependency Theory

Applying the lens of resource dependency theory (RDT) can help describe the organizational and environmental factors that influence hospitals participating in an ACO to develop external partnerships and referral networks to address HRSNs of patients and community-level SDOH. RDT is a "power-based" explanation of why organizations do what they do (Scott & Davis, 2007). Under RDT, organizations seek resources to develop its power base and reduce uncertainty. In many cases, resources are financial, but power can also be reputation, knowledge, recognition, status, and legitimacy. Hospitals operate in frequently changing and uncertain environments regarding regulations and payment models. In response, RDT suggests hospitals will seek resources to increase power and reduce uncertainty by engaging in a variety of actions with the environment such as alliances, partnerships, joint ventures, etc. (Pfeffer & Salancik, 1978).

Application of Resource Dependency Theory in Prior Studies. Resource Dependency Theory has been frequently applied to understand hospital participation in

ACOs. Yeager and colleagues (2015) used RDT to examine environmental and organizational characteristics of hospitals participating in Medicare ACOs and found hospitals operating in a more munificent environment, defined as environments with higher levels of physician supply and income per capita, were more likely to participate in an ACO. The study also found hospitals operating in environments that were more competitive, as measured by health maintenance organization penetration, were more likely to participate in ACOs. There was less support for dynamism, the third construct of RDT, in predicting ACO participation. The study also found that a number of organizational characteristics such as hospital ownership, type, system affiliation, EMR implementation, non-rural location, and number of Medicaid discharges were related to ACO participation (Yeager et al., 2015).

There are three primary constructs of RDT that have been operationalized in other studies examining the external environments of organizations: munificence, dynamism and competition (Pfeffer & Salancik, 1978). Of the three constructs, munificence is the most applicable to this study. Munificence refers to the availability of resources in the external environment. For example, a hospital operating in a community with limited financial resources and access to health care professionals would be considered a low munificent environment whereas a hospital operating a more munificent environment has access to more financial and other resources (Yeager, et al., 2014). Hospitals choosing to participate in an ACO represents a significant investment in resources to establish the initial ACO structure, coordinate services among members of the ACO, and technology to support population health management (Fisher et al., 2012). Similarly, systematically screening for individual patients' HRSNs and addressing SDOH at the community-level

requires a tremendous investment by hospitals in terms of workforce, technology, and the development of referral networks to link patients with needed social services.

Hospital Leadership of ACOs. Resource dependency theory can also help explain why hospitals leading ACOs are more likely to engage in external partnerships. Hospitals may choose to lead an ACO to gain greater control and access to resources to reduce uncertainty and reduce dependencies. Engaging in external partnerships is one strategy hospital led ACOs may pursue to control costs and increased shared savings by expanding the availability of services to meet HRSNs of patients. Additionally, leading an ACO may increase the legitimacy of a hospital in the community through its efforts to improve population health. (Scott and Davis 2015).

To our knowledge, only one study has examined hospital leadership of ACOs in the context of RDT. Kim and Thompson (2023) hypothesized that due to increasing emphasis on population health management and pressure to control costs, hospitals choose to lead ACOs in order to gain access to needed resources and reduce uncertainty. Findings from the study suggest hospitals choose to lead ACOs to gain resources to build infrastructure for population health services. Similar to findings from Yeager and colleagues (2015), this study also found that hospitals in more munificent environments, those located in areas with higher per capita income and also non-rural, were more likely to lead an ACO. However, unlike the prior findings, this study found a significant negative association with leading an ACO and the proportion of population aged 65 and over and percentage of Medicare advantage penetration (Kim & Thompson, 2023).

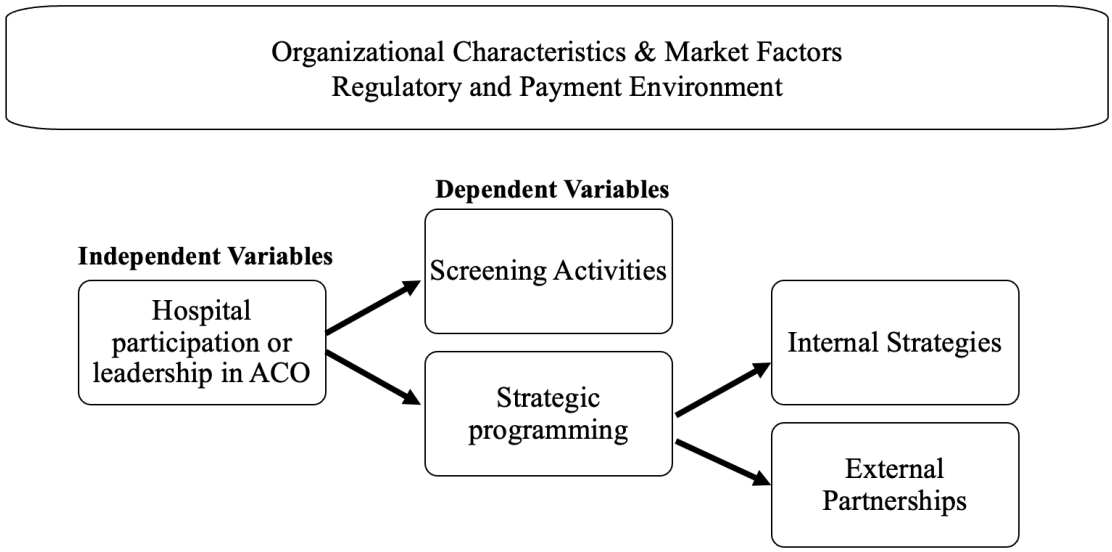
Conceptual Framework

The conceptual framework presented in Figure 2 was influenced by the study's theoretical framework and literature review. The relationship between variables and the factors influencing those variables is illustrated in the conceptual framework. Hospitals participating in or leading an ACO may be more incentivized to screen for and address HRSNs and SDOH to control costs and improve health outcomes of patients compared to hospitals not engaged in payment models with accountability for outcomes. Applying a Structural Contingency Theory perspective suggests hospitals leading or participating in ACOs may be more likely to develop and implement internal strategies to address patients' HRSNs and community-level SDOH in an effort to reduce uncertainty from changes in the regulatory and payment environment and uncertainty related to patient outcomes.

As discussed in the theoretical framework, Resource Dependency Theory may help explain organizational and environmental factors that influence hospitals participating or leading an ACO to develop external partnerships to address HRSNs and community-level SDOH. In response to these factors, RDT suggests hospitals will seek resources to increase power and reduce uncertainty by engaging in a variety of actions with the environment such as alliances, partnerships, joint ventures, etc. (Pfeffer & Salancik, 1978). Though limited, prior research indicates two primary reasons ACOs partner with external organizations are for resource complementarity and to reduce risk, which is consistent with RDT (Lewis et al., 2017). Hospitals leading ACOs may feel even greater pressure from organizational and environmental factors and subsequently

seek greater control and access to resources through external partnerships to reduce uncertainty.

Figure 2: Conceptual Framework



Hypotheses

Joining an ACO requires significant investments in population health management infrastructure related to data analytics and care coordination, which may better position hospitals participating in or leading ACOs to assess HRSNs of patients. Furthermore, assessing patients' HRSNs is essential to effective population health management as it provides data to identify high need, high-cost patients to better manage care and inform the development of strategies to address HRSNs.

- **H1:** Hospitals participating in ACOs will report higher levels of screening for patients' health-related social needs compared to non-ACO hospitals.

- **H1a:** Hospitals participating in an ACO will have greater odds of screening patients for HRSNs compared to non-ACO hospitals.

- **H1b:** Hospitals participating in an ACO will report screening a higher rate of HRSNs compared to non-ACO hospitals.

The crux of an ACO is accountability for cost and quality outcomes of an assigned patient population. Considering the importance of SDOH to patient outcomes, it seems reasonable to hypothesize hospitals participating in an ACO will report a higher number of internal strategic programs to meet HRSNs of patients to reduce uncertainty of patient outcomes.

- **H2**: Hospitals participating in an ACO will report a higher rate of internal strategic programs to address patient/community social determinants of health compared to non-ACO hospitals.

Addressing patients' HRSNs and community-level SDOH requires a significant investment of resources by hospitals. Developing external partnerships may be an important strategy to maximize resources and enhance population health efforts by collaborating with external partners specializing in providing social services.

- **H3**: Hospitals participating in an ACO will report a higher rate of external partnerships compared to non-ACO hospitals.
- **H3a**: Hospitals participating in an ACO will report a higher rate of external partnerships to meet HRSNs compared to non-ACO hospitals.
- **H3b**: Hospitals participating in an ACO will report a higher rate of external partnerships to address SDOH compared to non-ACO hospitals.

Prior research indicates early adopters of ACO models were hospital-led, with common organizational characteristics such as greater access to capital, prior experience with risk-based contracts, established infrastructure health IT infrastructure, and advanced data analytics capabilities (Muhlestein et al., 2020). These organizational

characteristics are also needed to properly screen for and address HRSNs of patients. Therefore, hospitals leading an ACO may be better positioned to engage in these activities compared to hospitals not participating in an ACO.

- **H4:** Hospitals leading an ACO will report higher rates of screening, internal strategic programs, and external partnerships to address patients' health-related social needs and SDOH compared to non-ACO hospitals.

- **H4a**: Hospitals leading an ACO will report screening for a higher rate of health-related social needs compared to non-ACO hospitals.

- **H4b**: Hospitals leading an ACO will report a higher rate of strategic programs to address HRSNs and SDOH compared to non-ACO hospitals.

- **H4c**: Hospitals leading an ACO will report a higher rate of partnerships with external organizations to meet HRSNs compared to non-ACO hospitals.

- **H4d**: Hospitals leading an ACO will report a higher rate of partnerships with external organizations to implement community-level initiatives to address SDOH compared to non-ACO hospitals.

CHAPTER 3

RESEARCH METHODS

While there is a growing body of literature on both ACOs and strategies to address health-related social needs of patients and social determinants of health, there is very little research examining how hospitals participating in or leading ACOs screen for and address HRSNs and (SDOH) at the community-level. The purpose of this cross-sectional study is two-fold: 1) to explore how hospitals participating in or leading ACOs are screening for and addressing individual-level HRSNs of patients and 2) to understand the extent to which ACOs are collaborating with external partners to address HRSNs and community-level SDOH. The primary research questions this study seeks to answer are:

- Does participation in an ACO influence hospital-based practices to screen and address patients' HRSNs and community-level SDOH through internal strategies and external partnerships?
- Does leading an ACO influence hospital-based screening activities, internal strategies, and external partnerships to address patients' HRSNs and community-level SDOH?

Data Sources

The primary data sources for this study are the American Hospital Association (AHA) Annual Survey of Hospitals and the Area Health Resource File (AHRF). The AHA Annual Survey is the most comprehensive and credible data source for hospitals and health systems, representing more than 6,200 hospitals and 400 health care systems in the United States with a historical response rate of over 75%. The AHA annual survey

collects information on hospital demographics and characteristics, staffing, ownership structure, etc. In 2020, questions were added to capture hospitals' screening activities for social determinants of health (SDOH) among patients, strategies to address SDOH, and partnerships with community-based organizations to address SDOH (AHA, n.d.). The AHRF consists of more than 6,000 variables at the county, state and national level on health facilities, resource scarcity, population health status, and other socioeconomic and environmental characteristics. Data from the AHRF is being used in this study to provide context to the external environment in which the hospital operates.

Data on general acute care hospitals in the United States were obtained from the AHA survey described above and merged with the AHRF data by FIPS county code. Other types of hospitals such as federally owned, specialty, and pediatric hospitals as well as hospitals located in US territories were excluded from the study. After applying the exclusion criteria described above, there were 4,306 hospitals in the sample. Hospitals that did not answer both sets of the supplemental questions regarding participation in accountable care organizations and/or activities relating to social determinants of health were also excluded. Table 2 displays characteristics of acute care hospitals that responded to both sets of supplemental questions compared to hospitals that did not. The final sample included a total of 2,775 hospitals. Of the included hospitals, 1,684 hospitals had some level of participation in an ACO, and 1,091 hospitals reported no participation in an ACO. Variables, measures, and data sources are summarized in Table 3.

Table 2. Characteristics of Hospitals Not-Responding to Supplement Questions

Variables	Respondents (n=2775)	Non-Respondents (n=1531)	*p* value
Size			
Large	595 (21.4%)	155 (10.1%)	.0000
Medium	1229 (44.3%)	724 (47.3%)	
Small	951 (34.3%)	652 (42.6%)	
Hospital Ownership			
Nonprofit	1975 (71.1%)	780 (50.9%)	.0000
For profit	254 (9.2%)	363 (23.7%)	
Public (non-federal)	546 (19.7%)	388 (25.4%)	
Teaching Hospital	203 (7.3%)	24 (1.6%)	.0000
US Region			
Midwest	909 (32.8%)	397 (25.9%)	.0000
Northeast	383 (13.8%)	134 (8.7%)	
South	992 (35.7%)	618 (40.4%)	
West	491 (17.7%)	382 (25.0%)	
Location			
Metropolitan	1711 (61.7%)	798 (52.1%)	.0000
Micropolitan	486 (17.5%)	249 (16.3%)	
Rural	578 (20.8%)	484 (31.6%)	
Critical Access Hospital	772 (27.8%)	575 (37.5%)	.0000
Environmental Factors			
% <65 without health insurance	11.3%	11.2%	.515
% of persons in poverty	12.4%	13.7%	.0000
% of 65+ population	18.3%	19.3%	.0000

Variables

Dependent variables

The dependent variables used in this study include screening activities, hospital-based strategies/programs, and external partnerships for individual HRSNs and community-level social determinants of health. The construction of the dependent variables described below is consistent with two other recent studies examining screening, strategies, and partnerships among hospitals responding to the AHA Annual Survey (Ashe et al., 2023 & Duggan et al., 2022)

There are two dependent variables for screening activities. The first screening variable is dichotomous and coded as 0=hospital screens no patients, 1=screens patients. The second screening variable was constructed by counting how many HRSNs the hospital reported screening for, which included the following domains: housing, food/hunger insecurity, transportation inaccessibility, utility needs, social isolation, interpersonal violence, employment and income, and education. Similarly, the dependent variable for strategies/programs was constructed by counting how many strategies/programs to address HRSNs were reported by the hospital for the same domains as the second screening variable.

There are two dependent variables related to external partnerships. The first dependent variable related to external partnerships was constructed by counting the number of reported partnerships to address individual HRSNs. This variable captures external partnerships that hospital engage in to address an individual patient's need. For example, a patient is food insecure and is referred to a local organization for assistance with acquiring food. The second dependent variable was constructed by counting the number of partnerships with external organizations to implement initiatives at the community-level to address social determinants of health. These types of partnerships are undertaken to address community-level factors. For example, a hospital may partner with an organization to purchase homes in the surrounding area to improve neighborhood conditions and offer affordable housing. Both dependent variables measuring external partnership have a range of 0-14. The types of external partnerships include: 1) health care providers outside of their respective system; 2) health insurance providers outside of their respective system; 3) local or state public health departments/organizations; 4) other

local or state government agencies / social service organizations; 5) faith-based organizations; 6) local organizations addressing food insecurity; 7) local organizations addressing housing insecurity; 8) local organizations addressing transportation needs; 9) local organizations providing legal assistance; 10) community nonprofit organizations; 11) K-12 schools; 12) colleges/universities; 13) local businesses / chambers of commerce; and 14) law enforcement / safety forces.

Independent variables

The independent variable for this study is ACO status, which is categorical and is coded as 0= Does not participate in ACO, 1= Participates in ACO, 2= Leads ACO.

Control variables

Findings from previous studies indicate there are organizational characteristics and environmental factors that may influence hospital participation in ACOs and hospital activities to address population health needs (Yeager, et al., 2015; Shortell, 2016; Chen et al., 2020; Jennings et al., 2019). Therefore, organizational characteristics such as size of the hospital, teaching hospital status, ownership type, location (metropolitan, micropolitan, or rural), region where the hospital is located, and critical access status should be considered. Additionally, hospitals operate in a broader external environment that may influence participation in ACO as well as hospital activities around screening, internal strategies, and external partnerships. The environmental factors were controlled for at the county level and included the percentage of individuals 65 and under, the percentage of people living in poverty, and the percentage of the population 65 and older.

Table 3. Variable Types, Definitions and Sources

Variables	Operationalized Variable	Source	Type
Dependent Variables			
Patients screened for social needs	0= Does not screen patients 1= Screens all or some patients	AHA annual survey, 2021	Dichotomous
Screening for social needs	Number of social needs screened for (range, 0-8)	AHA annual survey, 2021	Discrete
Strategies to address social needs	Number of strategies to address social needs (range, 0-8)	AHA annual survey, 2021	Discrete
Partnerships to address social needs	Number of external partnerships to address social needs (range, 0-14)	AHA annual survey, 2021	Discrete
Partnerships to address SDOH	Number of external partnerships to address SDOH (range, 0-14)	AHA annual survey, 2021	Discrete
Independent Variables			
ACO Status	0= Does not participate in ACO 1= Participates in ACO 2= Leads ACO	AHA annual survey, 2021	Categorical
Control Variables			
Organizational Characteristics			
Hospital type	0= Investor-owned, for-profit 1= Not for profit 2= Government, non-federal	AHA annual survey, 2021	Categorical
Bed size	0=Small (1-49 beds) 1=Medium (50-299 beds) 2=Large- (300+ beds)	AHA annual survey, 2021	Categorical
Teaching status	0= Non-teaching hospital 1= Teaching hospital	AHA annual survey, 2021	Dichotomous
Hospital location, by region	1=Midwest 2=Northeast 3=South 4=West	AHA annual survey, 2021	Categorical
Location, by core-based statistical area	1=Metropolitan 2=Micropolitan 3=Rural	AHRF, 2021	Dichotomous
Critical access hospital	0=No 1= Yes	AHA annual survey, 2021	Dichotomous
Environmental Factors			
% <65 without health insurance	% of population <65 without insurance	AHRF, 2021	Continuous
% of persons in poverty	% of population living in poverty	AHRF, 2021	Continuous
% of 65+ population	% of population 65 and older	AHRF, 2021	Continuous

Statistical Analysis

Data was analyzed using STATA 18. Descriptive statistics were generated to describe organizational and environmental characteristics of hospitals participating in ACOs and activities around screening for and addressing SDOH. For bivariate analysis, t-tests were used for continuous variables and chi-squares were utilized for categorical variables. Logistic regression was used to determine if hospitals participating in and leading ACOs screen patients and utilize outcome measures to assess the effectiveness of interventions to address patients' health-related social needs at a higher rate compared to non-ACO hospitals. Poisson regression was employed to examine the relationships between ACO status, screening activities and hospital strategies. Because the external partnership outcome variables were over dispersed, negative binomial regression was utilized to examine the relationships between ACO status and external partnerships to address HRSNs of individual patients and community-level SDOH. Testing for multicollinearity among independent and control variables was conducted by examining the variance inflation factor (VIF) with none of the values exceeding three. All of the regression models included the full set of organizational characteristics and environmental factors.

CHAPTER 4

RESULTS

Descriptive Analyses

Organizational characteristics and environmental factors of hospitals by ACO status are presented in Table 4. Mean and standard deviation were provided for continuous variables and frequency and percentage are provided for categorical variables. Hospitals leading ACOs were larger, overwhelmingly not for profit, and more likely to be located in metropolitan areas compared to hospitals participating in ACOs and non-ACO hospitals. Compared to hospital led ACOs, hospitals participating in ACOs and non-ACO hospitals were more likely to have critical access status and located in counties with a greater percentage of the population 65 and older. Hospitals not participating in ACOs were more likely to be located in areas with higher poverty and uninsurance rates among those 65 and under compared to hospitals leading or participating in ACOs.

Descriptive data on the type of contracts between hospitals leading ACOs and payers is presented in Table 5. The most common type of ACO contract was Traditional Medicare with approximately 85% of hospital led ACOs reporting a contract, followed by commercial insurance at 66%, and Medicare Advantage at 56%. Medicaid was the least common type with only 29% reporting a contract with Medicaid. Among hospitals participating in the restructured MSSP program (BASIC A-E and ENHANCED tracks), 59.4% were in two-sided risk models with 35.8% in the highest level of risk sharing track. Because the original MSSP tracks were combined in the survey, it was not possible

to determine the level of risk sharing for hospitals still enrolled in the original program. Additionally, most of the hospital led ACOs reported having more than one type of ACO contract, with almost a quarter having an ACO contract with all four types of payers.

Table 4. Organizational Characteristics and Environmental Factors of Respondents by Hospital ACO Status

Variables	Leads (n=1,039)	Participates (n=645)	Does not Participate (n=1091)	*p* value
Size				
Large	324 (31.2%)	101 (15.7%)	170 (15.6%)	p <.0001
Medium	475 (45.7%)	308 (47.8%)	446 (40.9%)	
Small	240 (23.1%)	236 (36.6%)	475 (43.5%)	
Hospital Ownership				
Nonprofit	940 (90.5%)	453 (70.2%)	582 (53.3%)	p <.0001
For profit	25 (2.4%)	45 (7.0%)	184 (16.9%)	
Public (non-federal)	74 (7.1%)	147 (22.8%)	325 (29.8%)	
Teaching Hospital	122 (11.7%)	30 (4.7%)	51 (4.7%)	p <.0001
US Region				
Midwest	360 (34.6%)	252 (39.1%)	297 (27.2%)	p <.0001
Northeast	183 (17.6%)	100 (15.5%)	100 (9.2%)	
South	331 (31.9%)	180 (27.9%)	481 (44.1%)	
West	165 (15.9%)	113 (17.5%)	213 (19.5%)	
Location				
Metropolitan	813 (78.2%)	341 (52.9%)	557 (51%)	p <.0001
Micropolitan	124 (11.9%)	144 (22.3%)	218 (20%)	
Rural	102 (9.8%)	160 (24.8%)	316 (29%)	
Critical Access Hospital	171 (16.5%)	216 (33.5%)	385 (35.3%)	p <.0001
Environmental Factors				
% <65 no health insurance	10.19 (4.66)	10.45 (4.68)	12.83 (6.17)	p <.0001
% of persons in poverty	11.34 (3.90)	12.36 (4.17)	13.43 (4.61)	p <.0001
% of 65+ population	17.42 (3.96)	18.8 (4.13)	18.74 (4.75)	p <.0001

Table 5. ACO Contract Types by Hospital Led ACOs

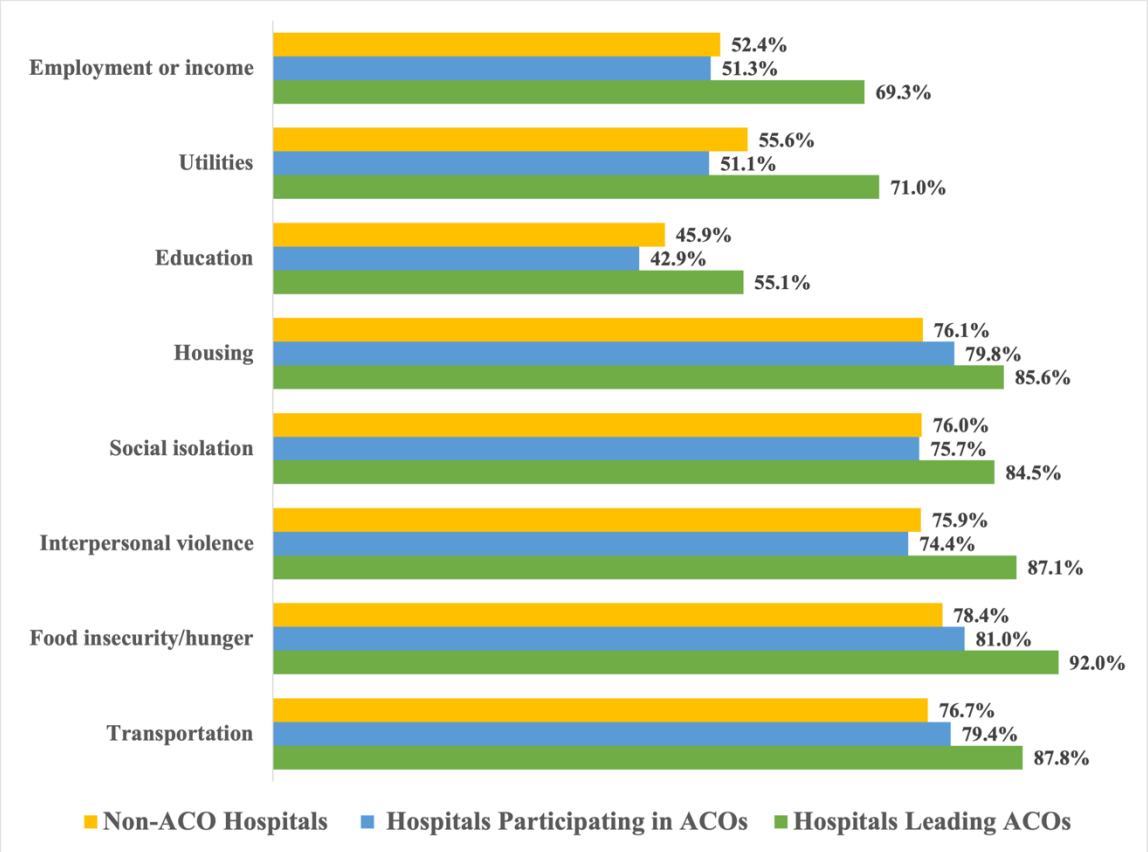
ACO Contracts	Hospital Led ACOs, (n=932)
Type of ACO Contract	
Traditional Medicare	791 (84.87%)
Medicare Advantage	522 (56.01%)
Medicaid	272 (29.18%)
Commercial insurance plan	614 (65.88%)
Traditional Medicare Shared Savings Program (MSSP) Tracks	
MSSP BASIC Track, Level A	102 (15.62%)
MSSP BASIC Track, Level B	121 (17.66%)
MSSP BASIC Track, Level C	26 (3.80%)
MSSP BASIC Track, Level D	15 (2.19%)
MSSP BASIC Track, Level E	89 (12.99%)
MSSP ENHANCED Track	197 (28.76%)
Original MSSP Track Program, all tracks	187 (27.30%)
Comprehensive ESRD Care	2 (0.29%)
Number of ACO Contract per Hospital	
1 Contract	331 (35.52%)
2 Contracts	156 (16.74%)
3 Contracts	224 (24.03%)
4 Contracts	221 (23.71%)
Revenue and ACO Patient Population	
% of hospital revenue from ACO contracts	12.52 (SD=16.81)
% of patients covered by ACO contracts	19.81 (SD=18.07)

Screening

Hospitals leading ACOs reported higher levels of screening patients overall and in each of the screening domains compared to hospitals participating in ACOs and non-ACO hospitals. The average number of reported screening activities for hospital led ACOs was 6.33 compared to 5.36 for hospitals participating in an ACO and 5.37 for non-ACO hospitals. Most hospitals, regardless of ACO status, reported screening patients (Figure 3) with 96.6% of hospital led ACOs, 90.4% of hospitals participating in an ACO, and 81.9% of non-ACO hospitals reporting screening patients. Additionally, over 90% of all hospitals reported that results of screening were recorded in the hospital's electronic health record. Of the 8 different types of screening, food security/hunger was the most

common screening activity followed by transportation, housing, interpersonal violence, and social isolation as the commonly screened HRSNs by hospitals. Utilities, employment/income, and education were less commonly screened for by all types of hospitals.

Figure 3. Hospital Reported Screening Activities by Domain

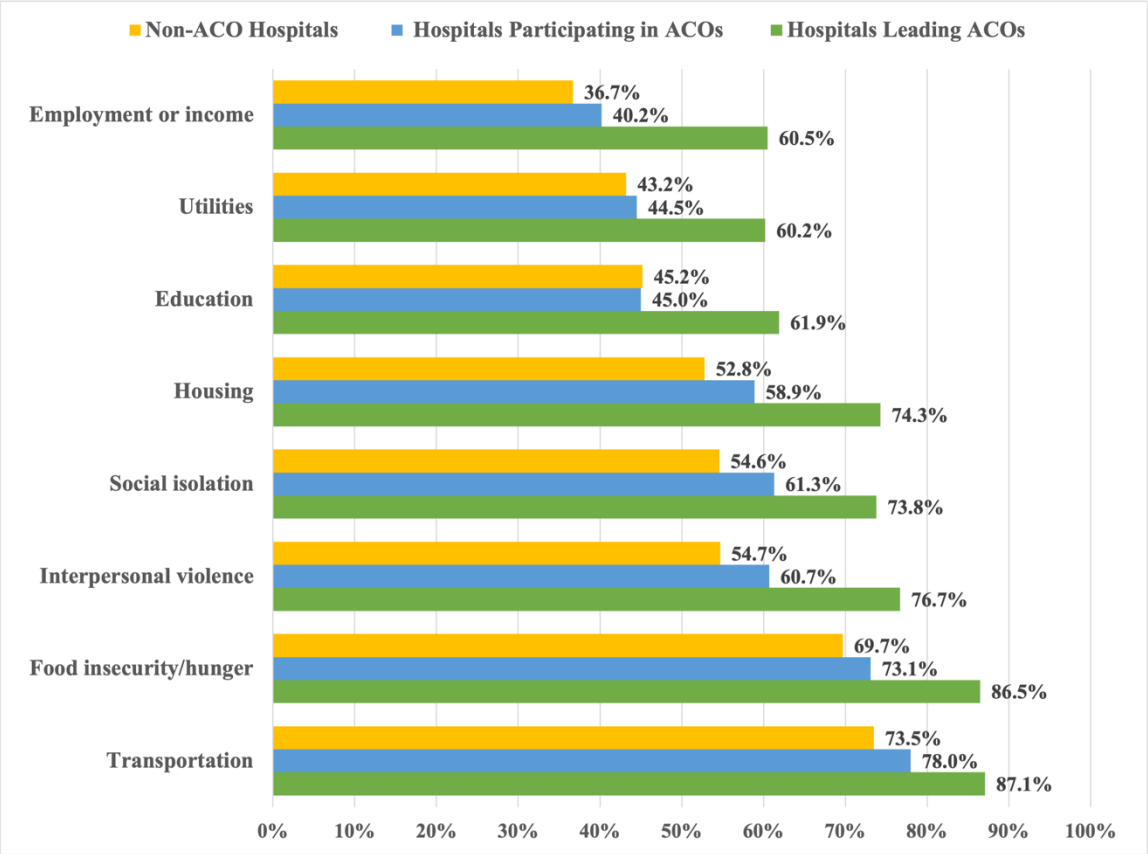


Strategies

Hospitals leading ACOs report having a higher number of strategies to address HRSNs and SDOH, with hospital led ACOs reporting an average of 5.8 strategies compared to 4.6 for hospitals participating in an ACO and 4.3 for non-ACO hospitals. Of the types of strategies reported, food security/hunger, housing, transportation, interpersonal violence, and social isolation were the most common (Figure 4). Among

hospitals leading an ACO, 87.1% reported having a strategy to address transportation, 86.5% had a strategy to address food insecurity/hunger, 76.7% had a strategy to address interpersonal violence, and 74.3% had a strategy to address housing.

Figure 4. Hospital Reported Strategies to Address HRSNs and SDOH



External Partnerships

Hospitals participating in or leading ACOs reported engaging in more external partnership types to address both individual patients' HRSNs and social determinants of health at the community-level (Figure 5 & 6) compared to non-ACO hospitals. An average of 8.8 external partnership types to address HRSNs was reported by hospitals leading an ACO compared to 7.3 for hospitals participating in an ACO, and 6.20 external

partnership types for non-ACO hospitals. Hospitals leading ACOs reported an average of 7.6 external partnership types to address SDOH at the community-level compared to 5.1 for hospitals participating in an ACO and 3.8 among non-ACO hospitals.

Figure 5. External Partnerships to Address Health-Related Social Needs of Patients

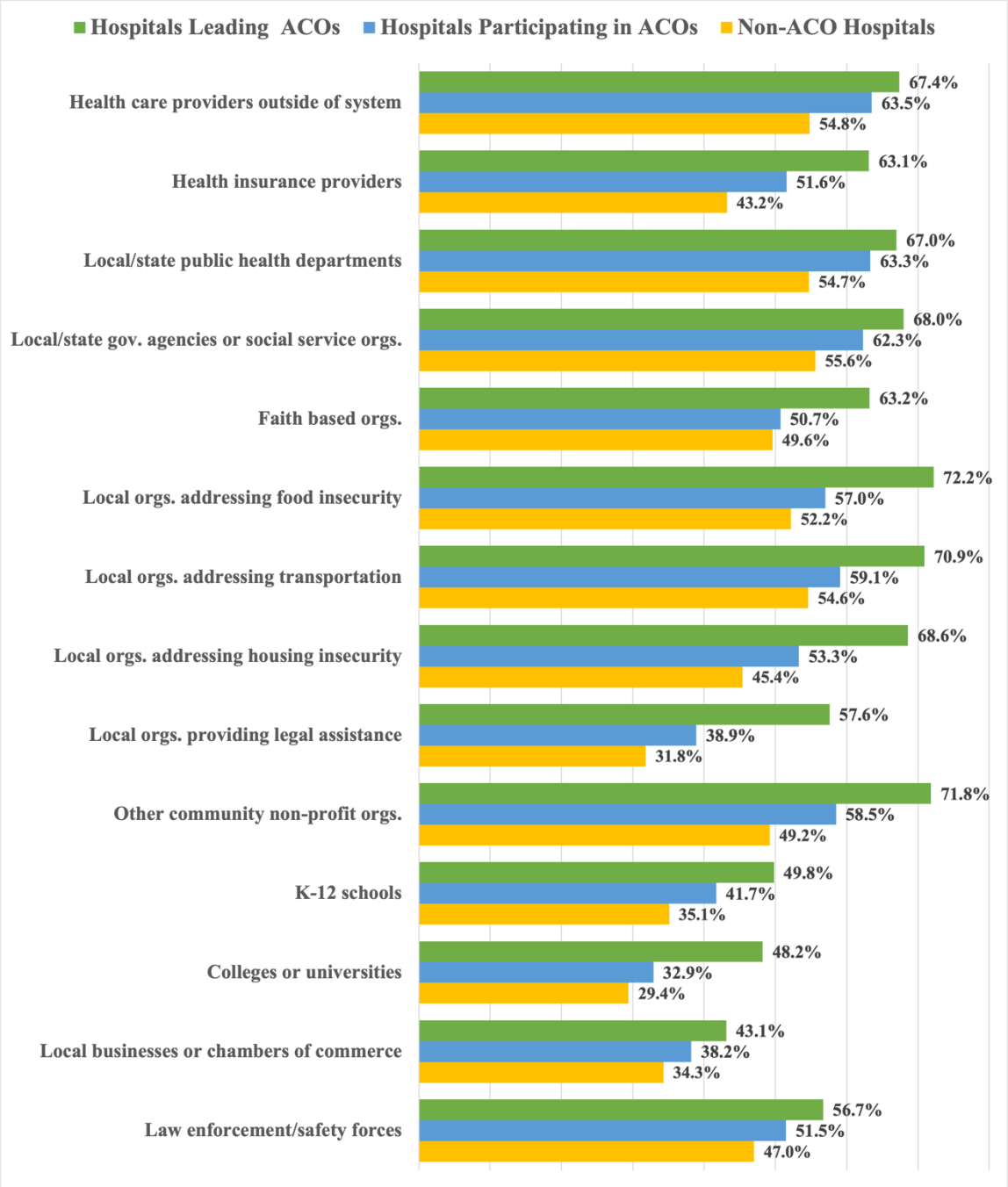
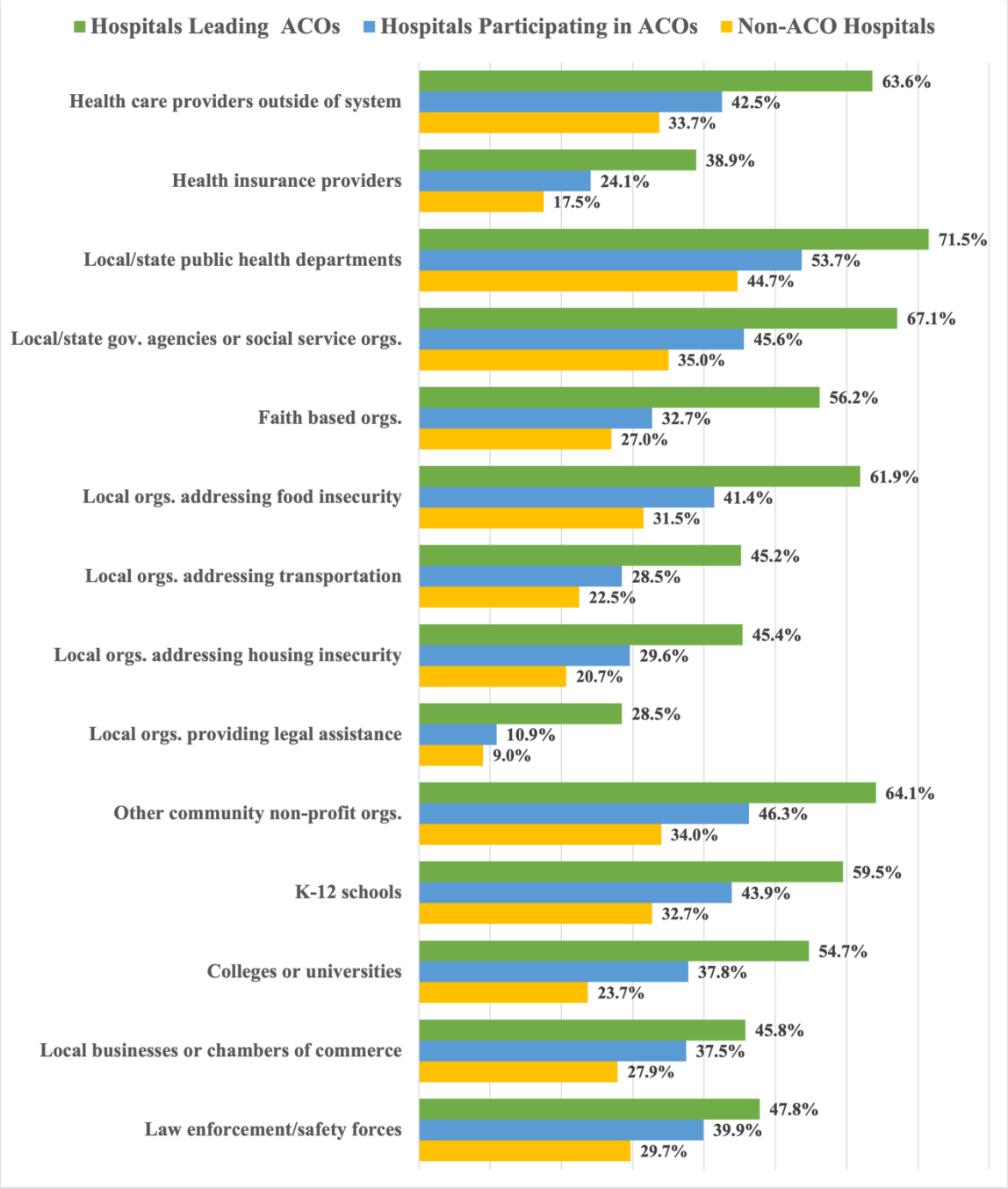


Figure 6. External Partnerships to Address SDOH at Community-Level



The most common types of external partnerships to address individual patient HRSNs were with health care providers outside of their system, local/state public health departments, faith-based organizations, local organizations addressing food insecurity,

transportation, and housing insecurity, and other community based non-profit organizations. External partnerships to address social determinants of health at the community-level were most commonly with local/state public health departments or agencies, community based non-profit organizations, local organizations addressing food security and K-12 schools.

Regression Analyses

A logistic regression model was utilized to analyze the relationship between ACO status and hospital screening for HRSNs (Table 6). Hospitals leading an ACO have 2.98 times the odds of screening patients (95% CI: 1.97-4.50) for HRSNs compared to hospitals not participating in an ACO. Hospitals participating in an ACO have 1.67 times the odds of screening patients (95% CI: 1.20-2.32) for HRSNs compared to hospitals not participating in an ACO. Compared to small hospitals, large hospitals have 2.18 times the odds (95% CI: 1.13-4.22) of screening patients. Not for profit (OR=2.85, 95% CI: 1.87-4.36) and public, non-federal (OR=1.62, 95% CI: 1.05-2.50) hospitals have greater odds to screen patients compared to for profit hospitals. In terms of region, the Northeast (OR=3.15, 95% CI: 1.48-6.69) and the West (OR=1.71, 95% CI: 1.11-2.65) have greater odds to screen patients compared to the Midwest. Rural hospitals (OR=.618, 95% CI: .403-.948) and those with critical access designation (OR=.534, 95% CI:.362-.788) have decreased odds to screen patients for HRSNs.

Table 6. Logistic Regression Analysis of Screening Status

Variables	Odds Ratio	95% Confidence Interval		*p* value
ACO Participation				
Does not participate in ACO	Reference			
Participates in ACO	1.67	1.20	2.32	.002
Leads ACO	2.98	1.97	4.50	<.0001
Hospital Size, Beds				
Small- 1-49	Reference			
Medium- 50-299	1.07	.76	1.52	.672
Large- 300+	2.18	1.13	4.22	.020
Hospital Ownership				
For profit	Reference			
Nonprofit	2.85	1.87	4.36	<.0001
Public (non-federal)	1.62	1.05	2.50	.027
Teaching				
Nonteaching	Reference			
Teaching	1.21	.393	3.74	.738
US Region				
Midwest	Reference			
Northeast	3.15	1.48	6.69	.003
South	.909	.609	1.36	.641
West	1.71	1.11	2.65	.015
Urbanicity				
Metropolitan	Reference			
Micropolitan	1.02	.679	1.54	.912
Rural	.618	.403	.948	.027
Critical Access Hospital				
No	Reference			
Yes	.534	.362	.788	.002
Environmental Factors				
% <65 without health insurance	.967	.939	.996	.028
% of persons in poverty	1.03	.991	1.06	.147
% of 65+ population	.966	.934	.999	.042

Table 7 displays the results from the Poisson regression model in which the dependent variable was the number of HRSNs screened for by the hospital. Hospitals leading an ACO compared to hospitals not participating in an ACO, while holding the

other variable constant in the model, are expected to have a rate 1.13 times greater for number of HRSNs screened for by the hospital. Other statistically significant variables in the regression model included hospital size, with medium (IRR=1.10, 95% CI:1.04-1.16) and large hospitals (IRR=1.14, 95% CI:1.06-1.21) having a greater rate of HRSN screenings compared to small hospitals. Compared to for profit hospitals, not for profit hospitals have a rate 1.10 greater for number of HRSNs screened. Hospitals in rural locations have a lower screening rate for HRSNs (IRR=.894, 95% CI: .834 -.959) compared to metropolitan areas.

Results from the Poisson regression model in which the dependent variable was the number of internal strategic programs are presented in Table 8. Hospital leadership of an ACO was positively associated with a higher rate of internal strategic programs (IRR= 1.20, 95% CI: 1.15-1.26) compared to non-ACO hospitals. Other statistically significant variables in the regression model included hospital ownership with public, non-federal (IRR=1.18, 95% CI: 1.08-1.30) and not for profit hospitals (IRR=1.28, 95% CI: 1.18-1.39) reporting a higher rate of internal strategic programs compared to for profit hospitals. Compared to non-teaching hospitals, teaching hospitals had a higher rate (IRR=1.12, 95% CI: 1.04-1.20) of internal strategic programs. Hospitals in rural areas (IRR=.870, 95% CI: .809-.937) compared to metropolitan areas, hospitals with a critical access designation (IRR=.870, 95% CI: .814-.929), and hospitals located in the South region of the US as compared to the Midwest (IRR=.932, 95% CI: .882-.985) reported lower rates of having internal strategic programs.

Table 7. Regression Analysis of Screening Practices

Variables	Incidence Rate Ratio	95% CI		*p* value
ACO Participation				
Doesn't participate in ACO	Reference			
Participates in ACO	.977	.933	1.02	.341
Leads ACO	1.13	1.08	1.17	<.0001
Hospital Size, Beds				
Small- 1-49	Reference			
Medium- 50-299	1.10	1.04	1.16	.001
Large- 300+	1.14	1.06	1.21	<.0001
Hospital Ownership				
For profit	Reference			
Nonprofit	1.10	1.02	1.19	.024
Public (non-federal)	1.07	.992	1.15	.078
Teaching				
Nonteaching	Reference			
Teaching	1.06	.990	1.13	.095
US Region				
Midwest	Reference			
Northeast	.993	.942	1.05	.802
South	.950	.902	1.00	.056
West	.978	.930	1.03	.394
Urbanicity				
Metropolitan	Reference			
Micropolitan	1.02	.965	1.07	.534
Rural	.894	.834	.959	.002
Critical Access Hospital				
No	Reference			
Yes	.966	.908	1.03	.272
Environmental Factors				
% <65 without health insurance	.998	.993	1.01	.365
% of persons in poverty	1.00	.996	1.01	.781
% of 65+ population	1.01	1.00	1.01	.019

Table 8. Regression Analysis of Internal Strategic Programs

Variables	Incidence Rate Ratio	95% CI		*p* value
ACO Participation				
Does not participate in ACO	Reference			
Participates in ACO	1.03	.983	1.09	.202
Leads ACO	1.20	1.15	1.26	<.0001
Hospital Size, Beds				
Small- 1-49	Reference			
Medium- 50-299	1.02	.963	1.08	.533
Large- 300+	1.07	.999	1.15	.05
Hospital Ownership				
For profit	Reference			
Nonprofit	1.28	1.18	1.39	<.0001
Public (non-federal)	1.18	1.08	1.30	<.0001
Teaching				
Nonteaching	Reference			
Teaching	1.12	1.04	1.20	.001
US Region				
Midwest	Reference			
Northeast	.995	.942	1.05	.868
South	.932	.882	.985	.013
West	.977	.927	1.03	.397
Urbanicity				
Metropolitan	Reference			
Micropolitan	.956	.904	1.01	.113
Rural	.870	.809	.937	<.0001
Critical Access Hospital				
No	Reference			
Yes	.870	.814	.929	<.0001
Environmental Factors				
% <65 without health insurance	.999	.994	1.00	.759
% of persons in poverty	.999	.994	1.00	.759
% of 65+ population	1.00	.995	1.00	.926

Table 9 displays the results from the negative binomial regression model examining external partnerships to address HRSNs of individual patients. ACO participation (IRR=1.12, 95% CI:1.02-1.23) and leadership (IRR=1.26, 95% CI:1.16-1.37) was positively associated with a higher rate of external partnerships to address

individual social needs compared to non-ACO hospitals. The only other statistically significant variables in the regression model were hospital ownership type. Public, non-federal (IRR=1.18, 95% CI:1.02-1.37) and not for profit hospitals (IRR=1.32, 95% CI: 1.15-1.51) had a higher rate of external partnerships to address HRSNs compared to for profit hospitals.

Table 9. Regression Analysis of External Partnerships to Address HRSNs

Variables	Incidence Rate Ratio	95% Confidence Interval		*p* value
ACO Participation				
Does not participate in ACO	Reference			
Participates in ACO	1.12	1.02	1.23	.017
Leads ACO	1.26	1.16	1.37	<.0001
Hospital Size, Beds				
Small- 1-49	Reference			
Medium- 50-299	1.08	.977	1.20	.128
Large- 300+	1.32	.987	1.29	.078
Hospital Ownership				
For profit	Reference			
Nonprofit	1.32	1.15	1.51	<.0001
Public (non-federal)	1.18	1.02	1.37	.030
Teaching				
Nonteaching	Reference			
Teaching	1.13	.976	1.32	.101
US Region				
Midwest	Reference			
Northeast	1.04	.935	1.17	.439
South	.960	.863	1.07	.450
West	1.04	.936	1.15	.470
Urbanicity				
Metropolitan	Reference			
Micropolitan	1.01	.910	1.12	.833
Rural	1.00	.879	1.14	.983
Critical Access Hospital				
No	Reference			
Yes	.891	.791	1.00	.055
Environmental Factors				
% <65 without health insurance	.995	.986	1.00	.241
% of persons in poverty	.999	.990	1.01	.890
% of 65+ population	1.00	.991	1.01	.847

Results from the negative binomial regression model examining ACO status and external partnerships to address social determinants of health at the community-level are presented in Table 10. Both ACO participation (IRR=1.16, 95% CI: 1.03-1.31) and leadership (IRR=1.52, 95% CI: 1.36-1.70) were positively associated with a higher rate of external partnerships to address social determinants of health at the community-level compared to hospitals not participating in an ACO. Other statistically significant variables in the regression model included hospital ownership type. Compared to for profit hospitals, public, non-federal (IRR=1.75, 95% CI: 1.41-2.17) and not for profit hospitals (IRR=2.52, 95% CI: 2.07-3.07) are expected to have higher rates of external partnerships to address SDOH. Hospitals with critical access designation (IRR=.826, 95% CI: .703-.970) and counties with a greater percentage of uninsured adults aged younger than 65 years (IRR=.979, 95% CI: .967-.990) engage in lower rates of external partnerships to address social determinants of health at the community-level.

Table 10. Regression Analysis of External Partnerships to Address Social Determinants of Health at Community-Level

Variables	Incidence Rate Ratio	95% Confidence Interval		*p* value
ACO Participation				
Does not participate in ACO	Reference			
Participates in ACO	1.16	1.03	1.31	.018
Leads ACO	1.52	1.36	1.70	<.0001
Hospital Size, Beds				
Small- 1-49	Reference			
Medium- 50-299	1.05	.918	1.21	.465
Large- 300+	1.20	1.00	1.43	.047
Hospital Ownership				
For profit	Reference			
Nonprofit	2.52	2.07	3.07	<.0001
Public (non-federal)	1.75	1.41	2.17	<.0001
Teaching				
Nonteaching	Reference			
Teaching	1.12	.918	1.36	.269
US Region				
Midwest	Reference			
Northeast	1.00	.866	1.56	.996
South	.993	.865	1.14	.918
West	1.14	.990	1.30	.070
Urbanicity				
Metropolitan	Reference			
Micropolitan	1.04	.908	1.20	.553
Rural	.873	.734	1.04	.123
Critical Access Hospital				
No	Reference			
Yes	.826	.703	.970	.020
Environmental Factors				
% <65 without health insurance	.979	.967	.990	<.0001
% of persons in poverty	.996	.984	1.01	.540
% of 65+ population	1.00	.992	1.02	.513

CHAPTER 5

DISCUSSION

The purpose of this study was to explore how hospitals participating in or leading ACOs are screening for and addressing patients' health-related social needs and community-level social determinants of health through internal strategic programs and external partnerships. To date, limited research has been conducted on how hospitals participating in or leading ACOs screen for and address HRSNs of patients and SDOH. This study sheds light on which HRSNs are being assessed and how needs are being addressed through direct service provision and external partnerships among hospitals leading or participating in ACOs, which could serve as valuable information for hospital leadership to consider when making decisions about population health strategies and partnerships as they strive to meet cost and quality goals.

The overall findings of this study suggest hospitals leading ACOs are especially well positioned to screen patients and address HRSNs through hospital-based strategies and external partnerships. Hospital led ACOs reported higher rates of screening, internal strategies, and external partnership types compared to non-ACO hospitals. In contrast, there were mixed findings for hospitals participating in ACOs. Compared to non-ACO hospitals, those only participating in ACOs did not report significantly different rates in screening or internal strategies but did report engaging in higher rates of external partnerships to address HRSNs and SDOH. This finding is important because the only

study examining the relationship between hospital ACO status and screening for and addressing HRSNs that is currently published did not differentiate between participation and leadership (Ashe et al., 2023). This study finding offers a new contribution to the current knowledge base by illustrating it is not just hospital participation in an ACO contract but rather leading an ACO that appears to be driving higher rates of screening and internal strategies.

There could be several reasons why hospital led ACOs are more likely to screen and address HRSNs. First, ACOs are responsible for cost and quality of care for their patient populations, which provides a business case to assess and address HRSNs. Hospitals choosing to lead an ACO may also be more likely to have contracts with downside risk, which may provide additional incentive to address HRSNs. This assertion is supported by an analysis of ACO contracts that found hospital led ACOs were more likely to have downside risk contracts compared to other ACO types (Peck et al., 2019).

Additionally, screening and addressing HRSNs of patients requires a significant capital investment to develop the infrastructure needed to carry out those activities. Infrastructure required to start an ACO, such as robust health information systems for quality reporting and sharing patient data with other providers, as well as additional staff to coordinate care, is also needed to screen for and address HRSNs. Hospital led ACOs tend to be large, well-capitalized, located in urban areas, and an established IT structure (Colla et al., 2016). These capabilities may facilitate screening for and addressing HRSNs by providing an electronic platform to capture patient needs, perform data analytics, share data and referrals between hospital led ACOs and community partners. Considering disparities in resources available to hospitals, policymakers should consider additional

initiatives to provide capital for under resourced hospitals to invest in the infrastructure needed to effectively screen and address HRSNs and SDOH.

Study findings support the hypotheses that hospitals leading an ACO will report higher levels of screening for HRSNs compared to non-ACO hospitals. On its face, this makes sense. The first step to addressing HRSNs of patients is to understand what the needs are, which may be especially relevant for hospital led ACOs that have accountability for cost and quality outcomes of their patient population. However, differences in screening between hospitals leading an ACO compared to non-ACO hospitals were smaller compared to differences in strategies and partnerships. One explanation for the smaller difference may be the growing recognition among providers, payers and policymakers of the importance of HRSNs to patient outcomes (Schickedanz et al., 2019; & Daniel et al., 2018). It may also be seen as more feasible compared to addressing HRSNs through direct service provision or external partnerships. With CMS requiring hospitals to reporting screening rates starting in 2024 (CMS, 2022), and the introduction of payment for SDOH risk assessments (CMS, 2023d), it is likely that differences in screening rates will continue to decline.

This study found the most common internal strategies utilized by hospitals participating and leading ACOs were related to housing, transportation, and food. Based on prior research, there appears to be several reasons why these strategies are the most utilized. Findings from prior qualitative studies (Fraze et al., 2016; Murray et al., 2020) suggest that ACOs view housing, transportation, and nutrition/food security as the most common needs among patients. Additionally, a study quantifying health systems' investment on SDOH strategies (Horwitz et al., 2020) found ACOs have a greater ability

to address these HRSNs due to financial investments in those areas. Importantly, ACOs may view these HRSNs as directly limiting a patient's ability to participate in medical care. Housing is a basic need for patients to manage their medical conditions. Nutrition and food security is important to health outcomes, and without transportation, a patient faces significant barriers to accessing care. Taken together, these reasons may help explain this study's findings that housing, transportation and nutrition/food security are the most common strategies utilized by ACO hospitals.

Study findings also support the hypotheses that hospitals participating in and leading ACOs will report a higher number of external partnerships compared to non-ACO hospitals. This finding suggests hospitals participating in ACOs may seek external partners with expertise or resources to address HRSNs of their patients, which is consistent with the extant literature. A prior study examining characteristics and motivation of ACOs engaging in external partnerships found resource complementarity and a desire to reduce risk were the two most common motivations for entering into external partnerships (Lewis et al., 2017).

Some of this study's strongest findings related to differences in external partnerships to address community-level SDOH. Hospitals participating in or leading an ACO were more likely to engage in these types of external partnerships compared to non-ACO hospitals. This may be driven by recognition of the impact upstream factors have on an ACO population health related goals to improve health outcomes and lower costs. Since upstream factors typically fall outside the scope of a hospital and often require a multi-sector approach, external partnerships may best leverage resources and expertise of the hospital and partner organizations to improve the overall health of a community

(Allen et al., 2022). Another possible explanation is that external partnerships to address community-level SDOH are an extension of existing partnerships to address HRSNs of patients. Prior studies have found that most ACO partnerships were formed from existing relationships (Lewis et al., 2014; Lewis et al., 2017) suggesting that as partnerships mature and trust is built, hospitals participating in or leading ACOs may expand the scope of collaboration to larger scale community initiatives.

Similar to other studies, this study found hospitals participating in or leading ACOs are predominantly urban, not for profit, located in more munificent environments (Colla et al., 2016; Yeager et al., 2015; Kim & Thompson, 2023). In addition to ACO status, not-for-profit status was consistently one of the strongest predictors for hospital engagement in screening, strategies, and partnerships to address HRSNs and community-level SDOH. Possible explanations provided in prior studies include the mission of not-for-profit hospitals may be more aligned with population health goals (Begun & Potthoff, 2017; Park et al., 2020) and compliance with the ACA requirement mandating not-for-profit hospitals conduct community health needs assessments to describe the needs of the community and a developing a plan to meet those needs (Carroll-Scott et al., 2017).

Limitations

One of the primary limitations is the lack of granular level data from the AHA survey on hospitals' screening activities, internal strategies, and external partnerships. It was not possible to ascertain how hospitals are screening patients in terms of workflow, whether the same screening tool was used consistently across patients and any related barriers related to screening patients. Additionally, it was not possible to know how patients are selected for screening at hospitals that screen some patients, but not all. The

data on internal strategies was limited to whether they had a program to address a specific social need, but there were no details on what the program activities are, how many patients participate, or any outcomes related to program activities.

Finally, the data related to external partnerships was limited to which types of external organizations hospital partner with to address individual patient HRSNs or social determinants of health at the community-level. However, there was no data available to measure the extent to which they partner, what the partnership entails, or if there are any referral processes or data sharing practices in place between the hospital and external partner. It was also not possible to determine the extent, if any, of the financial relationship between a hospital and external partners and whether the external partners received any shared savings or reimbursement for services provided.

In addition to the lack of granular level detail, there are other limitations. The person responsible for completing the AHA survey on behalf of the hospital may not have complete information regarding the hospital's activities in these areas, and there also may be a social desirability bias, leading to potential inaccuracies in the data. Furthermore, only hospitals that responded to both sets of supplemental questions on ACO participation and activities relating to social determinants of health were included, which limits the ability to generalize to all acute care hospitals in the United States. Finally, the environmental factors included from the AHRF data were at the county level and may not fully describe the patient population being served by the hospital.

Future Research

There are numerous opportunities for future research related to this study's research questions that could help inform health care leaders, payers, and policymakers

on evidence-based practices to screen for and address the HRSNs of patients and SDOH at the community-level. To effectively engage in these activities will require significant investments in technology, staffing, and development of community-based partnerships, all of which require financial resources. However, there is limited research examining these important considerations, especially among hospitals participating or leading ACOs. A mixed methods approach could provide valuable insight and better answer questions related to this study than a quantitative or qualitative study alone could.

Assessing patient needs is essential yet there is limited information on best practices for implementation of screening practices and workflow processes. More research is needed to understand optimal screening criteria for patients, and if it is more effective to use a standardized tool across an organization or have unit specific tools. Systematic screening could have significant impacts on staffing and workflow therefore it is important for organizations to understand staffing needs and establish a workflow with clear processes. It is equally important to understand barriers to effective screening whether it be patient reluctance to disclose HRSNs, lack of a system to record and track needs, insufficient time to collect the information or limited human resources. There are also important research questions related to what happens once a social need has been identified such as referral practices and whether it is a closed loop process.

Addressing patients' HRSNs is a resource intensive activity, and though promising evidence was identified in the literature review, more research is needed on the effectiveness of interventions to improve patient outcomes and lower unnecessary utilization and costs. Health care organizations need evidence to make informed decisions on which strategies to pursue either internally or through an external partnership.

Evidence in the literature on how these strategies and partnerships are implemented in health care organizations in terms of workflow, technological needs, and staffing is scarce. Furthermore, few studies have examined the implementation of strategies to address HRSNs and impact for return on investment (ROI) and shared shavings in ACOs. Despite commitment by ACO leaders to address HRSNs of patients, there are limited financial resources available to do so, and there are often regulatory restrictions on how funds can be spent, particularly for Medicaid ACO contracts (Murray et al., 2020). Strengthening the knowledge base of best practices is important for policymakers and payers as they consider potential financial incentives, reimbursement mechanisms and clearer regulations to support spending on HRSNs of patients.

Understanding how to effectively establish and maintain partnerships with external organizations is one of the greatest opportunities for future research. There is widespread agreement that community partners are important to addressing HRSNs, most of which fall outside of the traditional scope of a hospital. Partnering with a community-based organization specializing in providing services to meet HRSNs seems rational given financial and resource constraints. However, developing these partnerships may be difficult, especially for hospitals without prior relationships. It is reasonable to assume developing new relationships will require staffing and financial resources to evaluate quality and scope of services provided by community-based organizations and to establish the initial connection. Consequently, it will be important to understand the needs before engaging in those efforts.

Additionally, there is limited knowledge on the extent to which partnerships are formalized, intensity of coordination between hospitals and external partners, and level of

effort needed to maintain partnerships. Aside from case studies, it is unclear from existing research to what extent external partners are clinically integrated with hospitals. This is relevant given the pressing question of who should pay for these services and the mechanisms to do so. Though the extant literature is limited, there is evidence some hospitals and community organizations have developed formal, integrated relationships with referral processes and mechanisms to share patient data (Murray et al., 2020; Mechanic & Fitch, 2023). To develop evidence-based practices for external partnerships, further research is needed to understand facilitators and barriers to creating platforms that allow for a closed loop referral system and data sharing between hospitals and community partners.

Furthermore, developing external partnerships and referral processes assumes those resources exist in the community, yet there is very little research on capacity in the community to meet HRSNs. Patients with the most HRSNs, such as those living in low-income and rural communities, are often living in communities with limited in capacity to address HRSNs (Kreuter et al., 2020). This area of research could have significant health policy implications as policymakers consider adjusting Medicare and Medicaid payments to account for patients' social risk factors. As payment adjustments for providers are considered, it will be equally important to understand where the greatest needs are to direct resources and expand the capacity of communities to address HRSNs.

The most understudied area related to this study's research questions is how ACO hospitals are engaging in external partnerships to address social determinants of health at the community-level. While addressing the HRSNs of patients is critical, those efforts do not address the underlying community-level or "upstream" factors contributing to poor

health, which are typically multi-faceted and complex. The typology of community-level actions for hospitals to address SDOH developed by Allen and colleagues (2022) may provide a useful framework for future research studies in this area. For example, the typology could be utilized to help develop measures that evaluate the impact hospitals participating in the Healthcare Anchor Network have on economic development in communities through their efforts to hire, buy, and invest in the under resourced communities they serve. Another area for future research is understanding how ACO hospitals engage with external partners in multisector collaborations as well as advocacy efforts to address the underlying policies and systems that shape SDOH at the community-level.

Conclusion

Hospitals, payers, and policymakers in the United States are increasingly recognizing the importance of addressing health-related social needs of patients and social determinants of health to improve health outcomes and lower health care spending. Accordingly, hospitals and payers are making significant investments to screen and address the HRSNs of patients (Allen, et al., 2022; Houlihan & Leffler, 2019), and state and federal policymakers are introducing delivery and payment reforms through Medicaid and Medicare initiatives (Artiga & Hinton, 2018; CMS, 2022; CMS, 2023d). Value-based payment models, such as the accountable care organization, are predicated upon effectively managing the health of assigned patient populations to improve health outcomes, reduce health care spending and generate shared savings. To meet these population health goals, hospitals affiliated with ACOs may be more likely to engage in activities to assess and address HRSNs of patients.

This purpose of this cross-sectional study was to explore how hospitals participating in or leading ACOs are screening for and addressing HRSNs of patients and SDOH at the community-level. One of the most significant and new contributions of this study is the nuanced finding that participation alone in an ACO contract does not appear to lead to higher rates of screening and internal strategies but rather hospital leadership of an ACO may incentivize screening and the development of internal strategies to address HRSNs. Hospital led ACOs may be better positioned to engage in these activities due to existing population health management infrastructure and financial incentives to meet ACO goals related to cost, quality, and patient outcomes. This study also illustrates the need for additional research to better understand the financial and operational support required to effectively develop and implement programs and partnerships to address HRSNs of patients and community-level SDOH.

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APPENDIX

UNIVERSITY OF ALABAMA AT BIRMINGHAM INSTITUTIONAL REVIEW BOARD APPROVAL LETTER

THE UNIVERSITY OF ALABAMA AT BIRMINGHAM
Office of the Institutional Review Board for Human Use

470 Administration Building
701 20th Street South
Birmingham, AL 35294-0104
205.934.3789 | Fax 205.934.1301 |
irb@uab.edu

NHSR DETERMINATION

TO: Lee, Heather J

FROM: University of Alabama at Birmingham Institutional Review Board
Federalwide Assurance # FWA00005960
IORG Registration # IRB00000196 (IRB 01)
IORG Registration # IRB00000726 (IRB 02)
IORG Registration # IRB00012550 (IRB 03)

DATE: 31-May-2023

RE: IRB-300011283
Screening for and Addressing Social Determinants of Health in Hospitals Participating in Accountable Care Organizations ?

The Office of the IRB has reviewed your Application for Not Human Subjects Research Designation for the above referenced project.

The reviewer has determined this project is not subject to FDA regulations and is not Human Subjects Research. Note that any changes to the project should be resubmitted to the Office of the IRB for determination.

if you have questions or concerns, please contact the Office of the IRB at 205-934-3789.

Additional Comments:

De-identified publicly available data from repositories