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Community social capital or health needs: What is driving hospital-community partnerships to address social determinants of health?

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ABSTRACT

Social determinants of health (SDOH) are strongly linked to individual and population health outcomes. Hospitals and health systems are in a unique position to initiate or partner on community-wide efforts address SDOH. However, such efforts typically require collaboration with other healthcare and local community organizations since SDOH affect more than just medical care. Despite studies that have identified specific organizational and environmental factors associated with hospital-community partnerships, the role of social capital and community health needs as drivers of such partnerships remains unexplored. This study examines whether hospital partnerships with community organizations in the United States are driven predominantly by community social capital or the prevailing health needs of the community, and whether these drivers are similar for overall partnerships as well as for partnerships with individual organizations. We use 2020 data from the American Hospital Association, US County Health Rankings, and Social Capital Project and employ ordinary least-squares (OLS) regression and logit models to assess the relationship between social capital, community health needs and hospital-community partnerships to address SDOH. Our results indicate that for community social capital was significantly and positively associated with total hospital partnerships ($\beta = 0.05$, $p = 0.01$). We also found that community social capital was significantly more likely to be associated with hospitals' partnerships with local/state public health agencies, schools, law enforcement agencies, other healthcare providers, and organizations that assist with food insecurity. On the other hand, community health needs were not associated with total partnerships and had limited associations with hospital partnerships with individual organizations. Overall, this research suggests that social capital is a critical determinant of hospital partnerships with community organizations, and hospitals may seek partnerships with organizations that allow them to address community health issues outside of their own expertise since such partnerships and collaborative efforts can help address SDOH and manage population health.

1. Introduction

Social determinants of health (SDOH) have been defined as "the conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life" (Organization, 2008). The Centers for Disease Control and Prevention (CDC) categorize SDOH into five key domains: economic stability, education access and quality, healthcare access and quality, neighborhood and built environment, and social and community context (HHS, 2021). SDOH play a critical role in determining individual and population health outcomes and several studies have attributed variations in health outcomes to SDOH (Chetty et al., 2016). Given the important role of SDOH on health outcomes, many community and healthcare provider organizations are developing strategies to address patients' physical and social needs more effectively. Despite the emphasis on the importance of SDOH, public health professionals have struggled to quantify the influence of individual factors on SDOH, largely due to the numerous complex and interconnected interrelationships of these factors (Figueroa et al., 2020). Nevertheless, efforts to examine how SDOH affect the health of populations are ongoing and much needed since addressing SDOH can be one of many critical ways in which population health can be improved (Alderwick & Gottlieb, 2019; Kindig, 2007).

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The idea of population health management has gained significant traction among policymakers and healthcare leaders since the implementation of the Affordable Care Act in 2010 (Jha, 2019). In particular, research in the past decade has shown that there has been growing recognition on the role of hospitals in improving population health as they are tasked with greater accountability for improving individual and population health outcomes (Asch & Volpp, 2012; Chaiyachati et al., 2016). Hospitals can influence health of communities through various efforts such as activities that benefit individuals (e.g., screening patients for social needs), activities that benefit the community (e.g., initiatives to address SDOH), or a combination of the two (Rosenbaum et al., 2016). From an institutional perspective, addressing SDOH and other complex health challenges requires hospitals to actively participate in cross-sector partnerships with diverse organizations within and across communities like food banks, organizations addressing housing insecurity, not-for-profit organizations, educational institutions, local and public health departments, social services agencies, and other healthcare organizations (Park et al., 2020). Prior studies that have examined these cross-sector hospital partnerships have found that characteristics like hospital size, not-for-profit ownership, system membership, and urban location were positively associated with greater hospital-community organization partnerships (Hilts et al., 2021; Park et al., 2020). Likewise, a recent study by Cheon et al. (2020) found that safety net hospitals tend to be more engaged in hospital-community partnerships to improve population health (Cheon et al., 2020). These findings suggest that hospitals often take active part in fostering collaborations with community organizations in an effort to benefit the community at large. At the state level, civic participation has been positively associated with hospital-community partnerships (Cronin et al., 2021). Despite these and other studies examining such partnerships, one area that remains relatively underexplored is whether a hospital's efforts to partner with other organizations to address SDOH (breadth of the partnerships) and patterns of those partnerships are largely driven by a community's structural factors such as social capital or the existing health needs of the community.

The concept of hospital partnerships with community organizations, although not new, has gathered renewed attention in light of the recognition of the importance of SDOH in influencing health outcomes. One recent study that examined hospital partnerships with community organizations quantified the dollar amount invested by health systems specifically to address SDOH (Horwitz et al., 2020). This study found that health systems across the U.S. had invested nearly $2.5 billion of which over half ($1.6 billion) was specifically committed to programs and organizations that play a critical role in addressing SDOH, e.g., transportation assistance, food insecurity, employment, etc. These partnerships took on different forms such as monetary investments in housing assistance programs, partnerships with private rideshare programs to provide subsidized or free transportation to appointments, and expanding access to nutrient-dense foods to patient and community members. Likewise, another study proposed a model for medical-legal partnerships to address SDOH (Regenstein et al., 2018). Some of these models are currently underway and have shown benefits in addressing SDOH and promoting health equity. These studies indicate that hospital-community partnerships can look different depending on the type of community structures-especially health needs of the community, and also commitment of the health system to invest in such partnerships, but preliminary results show that such partnerships benefit the communities and health systems in the long run. In this study, we explore which community factor-social capital or health needs is associated more with hospital-community partnerships.

Social capital has broadly been described as the resources – tangible and intangible – that members of a community may accrue as a result of interconnected social interactions and networks (Cohen & Prusak, 2002; Pitkin Derose and Varda, 2009). These resources are often an asset that can be "called upon in a crisis, enjoyed for its own sake, and/or leveraged for material gain." (Woolcock, 2001). Across different disciplines, social capital has been defined differently (Coleman, 1994; Pitkin Derose and Varda, 2009); however, the common theme across these definitions is the presence and strength of social networks and relationships between people or groups, and the resources obtained through these relationships. Social capital has been measured using several structural, behavioral, and cognitive indicators including trust in individuals and organizations within the community, number and strength of ties to the neighborhood and community organizations, extent of civic engagement, voting patterns, trust in healthcare providers, etc. Given these varied descriptions, we define social capital broadly as the norms and networks that facilitate collective action. This definition captures the idea that areas with higher social capital encourage cooperative norms such as altruism and denser social and community network (Jha & Cox, 2015; Kitzmueller & Shimshack, 2012). Because of the challenge in disentangling the distinction between norms and networks, we focus on the broader relationship between social capital and altruism. In general, greater social capital can increase the responsiveness of provider organizations, e.g., hospitals, to the health needs within their communities (Derose, 2008; Derose & Varda, 2009). This responsiveness may manifest in the form of greater accountability to local communities, prompting hospitals to be more proactive in establishing and maintaining organizational partnerships and spend more on community benefits to improve population health. Likewise, communities with higher social capital are also more likely to be invested in their collective welfare such as improving health outcomes (Ko et al., 2014; Lee et al., 2004). Limited prior research has examined whether social capital may be a critical factor influencing healthcare organizations and providers to improve population health, and one study (Ko et al., 2014) found that community social capital had a protective effect on public hospitals on the verge of closure, an outcome previously found to be negatively associated with community health outcomes (Buchmueller et al., 2006). Similarly, other studies have found that social capital was positively associated with provision of community-oriented health services, improvement in hospitals' community accountability, and quality of care (Brewster et al., 2019; Lee et al., 2004). These findings reinforce the premise that social capital is an important factor that may influence hospitals to establish critical partnerships with one or more community organizations to address SDOH in an effort to improve health outcomes in their communities.

The health needs of a community are often dependent on structural factors that lie beyond the control of individuals. While traditional studies attributed health outcomes largely to poor lifestyle choices, recent evidence points towards the more substantial role of social and physical environmental factors in influencing health outcomes within a community (Buckner-Brown et al., 2011). One study by Managan et al. (2012) found that social and economic factors and the physical environment contributed a greater proportion to overall health outcomes than access to and quality of healthcare, reinforcing the critical role of SDOH in determining population health (Magnan, 2017). Health needs of the community have been associated with hospitals' expenditures on community benefits, a part of which goes towards addressing SDOH (Singh et al., 2015). However, little is known about the extent and patterns of hospital-community partnerships to address SDOH based on health needs of a community, i.e., the physical, social, and behavioral needs of the community that can affect health outcomes and not just medical care needs. Specifically, it is still unknown whether and to what extent hospitals respond to greater community health needs by partnering with local organizations to address SDOH.

Despite the numerous studies that have identified the role of social capital and the health needs in addressing SDOH, to our knowledge, no studies have explored the key driver of hospital partnerships to specifically address SDOH. Our study fills this essential gap by addressing the following research question: Are hospital-community partnerships to address SDOH primarily driven by community social capital or prevailing health needs of the county? The findings of this study will provide critical insights into environmental factors that may influence or

impede formation of cross-sector partnerships for hospitals to address SDOH. These findings will also be beneficial to policymakers and hospital administrators, particularly those leading efforts to promote health equity by addressing SDOH, and to healthcare researchers interested in identifying the key drivers of population health.

2. Methods

2.1. Data sources

Data for this study were obtained from multiple secondary data sources listed in Table 1. Data pertaining to hospital partnerships with local organizations and other hospital characteristics (ownership, size, system membership, etc.) were obtained from the 2020 American Hospital Association (AHA) Annual Survey. The AHA survey collects self-reported data by surveying over 6200 hospitals annually and produces the most comprehensive dataset related to the characteristics of hospitals and health systems within the US. The survey also collects information on 14 types of partnerships that hospitals form with local agencies to address SDOH.

Social capital index data were obtained from the Geography of Social Capital, a component of the Social Capital Project, which tracks measures of associational relationships of families and communities. Although a potential limitation of this index is that it uses data collected between 2013 and 2016, it also represents the most recent compilation of indicators measuring social capital at the county level and has been used in several recent studies (Ding et al., 2020; Ferwana & Varshney, 2021; Wu et al., 2020). Additionally, social capital has been found to remain relatively stable over time and less likely to be significantly affected by individual attributes or other economic factors, therefore, we relied on the present index despite the older data used in generating it (Clark, 2015).

Data related to health needs of the community were obtained from County Health Rankings, a comprehensive set of community health status indicators (UWPHI, 2021). We also included a dummy indicator for the state governor's party affiliation in 2018 since political landscape within the state may contribute to social inequalities in health (Dawes, 2020; Montez, 2020) which could further influence hospital-community partnerships. These data were obtained from Ballotpedia.org.

Table 1
Variables and Data sources.

Variable	Data sources	Type
Dependent variable		
Hospital partnerships with community organizations (total)	2020 AHA Survey	Binary
Hospital partnerships with other/local organizations (individual):		
(1) Other healthcare providers	2020 AHA Survey	Binary
(2) Insurance providers	2020 AHA Survey	Binary
(3) Local/state public health agency	2020 AHA Survey	Binary
(4) Social service agency	2020 AHA Survey	Binary
(5) Faith-based organizations	2020 AHA Survey	Binary
(6) Addressing food insecurity	2020 AHA Survey	Binary
(7) Addressing transportation needs	2020 AHA Survey	Binary
(8) Addressing housing insecurity	2020 AHA Survey	Binary
(9) Providing legal assistance	2020 AHA Survey	Binary
(10) Other nonprofit organizations	2020 AHA Survey	Binary
(11) Local schools	2020 AHA Survey	Binary
(12) Colleges or universities	2020 AHA Survey	Binary
(13) Local Business	2020 AHA Survey	Binary
(14) Law enforcement/ safety services.	2020 AHA Survey	Binary
Independent variables		
Community social capital	The Geography of Social Capital in America (https://www.jec.senate.gov/public/index.cfm/republicans/analysis/?id=2A6AFA60-B7F1-4083-B445-79E0C2979BC4&wpisrc=nl_health202&wpmm=1)	Continuous
Community health needs	County Health Rankings and Roadmap	Categorical
Control variables		
Hospital size	2020 AHA Survey	Categorical
Community outreach status	2020 AHA Survey	Binary
Rural status	2020 AHA Survey	Binary
Ownership status	2020 AHA Survey	Binary
System membership	2020 AHA Survey	Binary
Teaching status	2020 AHA Survey	Binary
Governor political party	Ballotpedia (https://ballotpedia.org/Main_Page)	Binary

2.2. Measures

The dependent variables for this study include the 14 types of hospital-community partnerships: partnerships with (1) other health care providers, (2) insurance providers (3) local/state public health agency, (4) social service agency, (5) faith-based organizations (6) local organizations addressing food insecurity, (7) local organizations addressing transportation needs, 8) local organizations addressing housing insecurity, 9) local organizations providing legal assistance for individuals, 10) other nonprofit organizations, (11) local schools, (12) colleges or universities, (13) local businesses, 14) law enforcement and safety services. We coded individual hospital-community partnerships to address SDOH as a series of 14 binary variables (yes/no). Following the study by Cheon et al. (2020), we conducted a polychoric principal component analysis (PCA) to draw a single common component among the 14 types of partnerships. This common component represents a measure of total hospital-community partnerships and is represented as a continuous variable.

The key independent variable in this study is a social capital index calculated at the county level. This index allows for the comparison of relative levels of social capital across different communities in the US through four sub-indices: (i) family unit sub-index (ii) community health sub-index, (iii) institutional health sub-index, and (iv) collective efficacy. A detailed description of the measures and sub-indices used in the social capital index are presented in Appendix A Table 1. The four sub-indices capture perceptions of trust, social control, civic participation, as well as frequency of network interaction, which form the overall collective action.

To determine county health needs, we focused on the measures contained within the County Health Rankings' health factor ranks. These include 30 measures that contribute to a community's health behaviors (30%), clinical care (20%), socioeconomic factors (40%), and physical environment (10%). The counties are divided into quartiles based on their rankings with 1st quartile leading in health rankings. The counties are divided into quartiles based on their rankings with 1st quartile leading in health rankings. Detailed measures of the county health factor ranks are provided in Appendix A, Table 2.

2.3. Sample

The 2020 AHA dataset included 6165 hospitals. We merged the three datasets using county codes to obtain a sample of 6078 hospitals, of which 4487 were general medical hospitals. However, between 25% and 33% of the hospitals did not respond to the full range of questions regarding each category of partnerships. Therefore, we excluded hospitals with missing data, i.e., hospitals that did not provide responses for all categories (2000 hospitals) and another 190 federal hospitals, resulting in a final analytic sample of 2297 hospitals. A *t*-test analysis of

Table 2
Descriptive statistics.

	Full sample (all hospitals)			Analytic sample (general medical centers, excluding federal hospitals)	
	N	*%*	*Missing*	*N*	*%*
U·S. Hospitals	6078			2297	100
General medical hospitals	4487	73.82	0	2297	
Total hospital community partnerships	2878	47.35	3200	2297	100
Hospital Partnerships with other/local organizations					
Other health care providers	3265	53.71	2813	2297	100
Insurance providers	3176	52.25	2902	2297	100
Local/state public health agency	3255	53.55	2823	2297	100
Local service agency	3231	53.15	2847	2297	100
Faith-based organizations	3202	52.68	2876	2297	100
Addressing food insecurity		53.07	2852	2297	100
Addressing transportation needs	3204	52.71	2874	2297	100
Addressing housing insecurity	3197	52.60	2881	2297	100
Providing legal assistance	3143	51.71	2935	2297	100
Other nonprofit organizations	3199	52.63	2879	2297	100
Local schools	3187	52.43	2891	2297	100
Colleges or universities	3142	51.69	2936	2297	100
Local businesses	3182	52.35	2896	2297	100
Law enforcement/safety services	3200	52.64	2878	2297	100
Hospital Organizational Characteristics					
Hospital size					
<50 beds	2247	36.97	0	781	34.00
50–199 beds	2349	38.65	0	754	32.83
200–399 beds	957	15.75	0	445	19.37
>400 beds	525	8.64	0	317	13.80
Community outreach status	4059	66.78	2019	1892	82.37
Rural status	1934	31.82	0	854	37.18
Not-for-profit ownership	3102	51.03	0	1638	71.31
Multihospital system membership	4086	67.22	0	1629	70.92
Teaching status	2567	42.23	0	1129	49.15
County/Community Characteristics					
County health ranking quartiles					
Q1	2297	37.79	0	832	36.24
Q2	1457	23.97	0	555	24.16
Q3	1296	21.32	0	512	22.30
Q4	1028	16.91	0	398	17.33
Governor party affiliation (Democrat)	2861	47.18%	0	1071	46.64
Governor party affiliation (Republican)	3203	52.82%	0	1226	53.37
	Mean	***S.D.***	***Missing***	***Mean***	***S.D.***
Community Social Capital Index	−0.36	1.03	72	−0.16	0.99

the hospitals with missing data did show some significant differences from the analytic sample. The hospitals in the full sample tended to be significantly smaller (average bed size of 168 compared to 196), with lower social capital scores (−0.24 compared to −0.16). They were also significantly less likely to be not-for-profit (60.8% not-for-profit compared to 70%); less likely to be a system member (68.04% compared to 71%); and more likely to be rural (40.45% compared to 37.2%).

2.4. Statistical analysis

After computing the total hospital-community partnerships factor, we investigated determinants of partnerships. We employed an ordinary least squares (OLS) regression model due to the cross-sectional nature of data and the continuous dependent variable. In addition, an OLS model was deemed appropriate since the study sought to only establish an association between total hospital-community partnerships and county- and hospital-level factors instead of a causal relationship. Variance inflation factors (VIFs) were employed to test for multicollinearity, whereby values less than 10 suggested absence of multicollinearity (Aiken et al., 1991). Results of the VIF tests for multicollinearity are provided in Appendix B. To ensure that the standard errors were corrected for heteroscedasticity, we estimated the OLS regression using the "robust" command. Finally, we analyzed logit models to test the factors associated with individual hospital-community partnerships. We assessed each partnership in a separate model with appropriate county- and hospital-level controls. All statistical analysis were conducted using Stata 17 (StataCorp. 2021) and results are reported at 0.05 and 0.01 significance levels.

3. Results

Descriptive statistics for the entire sample of hospitals (N = 2297) are presented in Table 2. The mean community social capital index was −0.16. Over a third of all hospitals in the sample (36.2%) fell in the first quartile of health factor rankings, followed by the second (24.1% of sample), third (22.3%) and fourth quartiles (17.3%). More than 70% of hospitals were affiliated with a health system and had not-for-profit ownership. Over 65% of the total sample were smaller hospitals with up to 199 beds and hospitals had an average of 195 beds staffed for use. A little over a third, 37%, of the hospitals were located in rural areas.

To check for correlation, we ran a correlation matrix (Table 3) and found that none of the variables had correlation greater than 0.7.

The results of our OLS model are presented in Table 4. Our results indicate that overall greater community social capital was associated with more hospital-community partnerships to address SDOH ($p < 0.05$). On the other hand, community health needs did not show any significant associations with total partnerships. We also found that several hospital-level factors such as size, system membership, ownership, community outreach status, etc. were significantly associated with total hospital-community partnerships.

Logistic models for hospital partnerships with individual community organizations are presented in Table 5. Our findings suggest that greater community social capital was more likely to be associated with hospital partnerships with local schools (OR = 1.16, $p < 0.01$), law enforcement agencies (OR = 1.20, $p < 0.01$), local/state public health agencies (OR = 1.12, $p < 0.05$), and organizations that assist with food insecurity (OR = 1.12, $p < 0.05$). We found that hospitals in counties in the fourth quartile of health rankings had lower odds of forming partnerships with other healthcare providers (OR = 0.74, $p < 0.05$) and organizations that address food insecurity (OR = 0.69, $p < 0.05$). We also found significant positive associations between hospital partnerships and organizational controls such as teaching status, community outreach status, non-profit ownership, and health system membership. Our results also indicate that hospitals in states with Democratic governors, relative to states with Republican governors, were more likely to form partnerships with other healthcare providers, local agencies, nonprofit organizations and organizations addressing food insecurity. Detailed results are presented in Tables 4 and 5

4. Discussion

The purpose of this study was to examine whether hospital partnerships with community organizations to address SDOH are driven primarily by social capital or the prevailing health needs of the community. The results of our study indicate that social capital was associated with greater overall hospital partnerships and with individual organizations, often with both public health agencies and social services, independent of other institutional and community-level factors. On the other hand, we found limited support to suggest that hospital partnerships are driven by health needs of the community. This detailed examination of the drivers of hospital partnership with organizations

Table 3
Correlation matrix.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Community social capital index	1.000								
(2) County health rankings	−0.237	1.000							
(3) Hospital size	−0.353	−0.200	1.000						
(4) Community outreach status	−0.025	−0.075	0.233	1.000					
(5) Rural status	0.286	0.313	−0.537	−0.148	1.000				
(6) Not-for-profit ownership	0.051	−0.047	0.160	0.229	−0.163	1.000			
(7) Multihospital system membership	−0.110	−0.090	0.193	0.141	−0.261	0.304	1.000		
(8) Teaching status	−0.244	−0.172	0.612	0.208	−0.464	0.210	0.192	1.000	
(9) Democrat Governor	0.121	0.046	0.106	0.084	−0.103	0.176	0.085	0.132	1.000

Table 4
Association between community social capital and health needs on total hospital-community partnerships.

	Total Hospital Community Partnerships (n = 2297)		
	FGLS β (SE)	p-value	95% CI
Community social capital index	0.038 (0.019)	0.046**	(0.01,0.07)
County health ranking quartiles			
Q1	Referent	Referent	Referent
Q2	−0.003 (0.043)	0.941	(-0.08,0.08)
Q3	−0.007 (0.047)	0.884	(-0.10,0.08)
Q4	−0.088 (0.053)	0.098	(-0.19,0.016)
Hospital Size			
<50 beds	Referent	Referent	Referent
50–199 beds	0.101 (0.043)	0.019**	(0.01,0.18)
200–399 beds	0.110 (0.059)	0.064*	(-0.006,0.22)
>400 beds	0.245 (0.067)	0.000***	(0.11, 0.37)
Community outreach status	0.162 (0.042)	0.000***	(0.07, 0.24)
Rural status	−0.017 (0.042)	0.682	(-0.10, 0.06)
Not-for-profit ownership	0.387 (0.037)	0.000***	(0.31, 0.46)
Multihospital system membership	0.247 (0.035)	0.000***	(0.17, 0.31)
Teaching status	0.136 (0.042)	0.001***	(0.05, 0.21)
Democrat Governor	0.085 (0.034)	0.013**	(0.01, 0.15)

***p < 0.01, **p < 0.05, *p < 0.1.

within the community provides additional insight into how hospitals can facilitate greater involvement in population health management efforts, especially since such partnerships and alliances may be critical to help break down “silos among health care organizations, public health agencies, and social services agencies, as no single entity can tackle the upstream social conditions on its own” (Green & Zook, 2019).

Prior studies have suggested that hospital partnerships with organizations in the community are driven largely by prevailing health needs of the community, as determined by comprehensive community health needs assessments (CHNAs) (Franz et al., 2020; Mays et al., 2016). However, our results indicate that community social capital may be a stronger predictor of hospital partnerships than community health needs. Hospitals have historically invested little in efforts to address SDOH (Leider et al., 2017) and more on efforts to directly address patient care needs (Singh et al., 2015). The ongoing COVID-19 pandemic and the ensuing financial strain on hospitals has likely worsened this situation and hospitals are functioning with lower operating margins and fewer financial resources (Puro & Kelly, 2021; Khullar et al., 2020). Given these constraints, hospitals may not have the needed financial capabilities to invest in developing or maintaining robust partnerships with community organizations. Furthermore, a partnership with a community organization requires considerable commitment of time and resources from the hospital before measurable results are seen, and hospitals may be wary of engaging in such commitments under existing financial constraints or without assurance of a substantial benefits to such investments (Siegel et al., 2018).

Our findings suggest that hospitals may seek out partnerships with agencies and organizations that would allow them to address community health issues that are outside of their traditional expertise, such as mental health and other SDOH. For instance, we found that hospitals were more likely to partner with local schools and organizations addressing food insecurity, allowing them to go beyond addressing just the medical needs of the community. Given that hospitals do not uniformly engage in efforts to address SDOH in their communities and some hospitals face significant barriers (size, geographic location, teaching status, system membership, etc.) in such efforts (Begun & Potthoff, 2017), the role of community social capital in fostering partnerships is further underscored. In communities with lower social capital, there may be opportunities in improving cross-sector collaboration among different types of organizations to address SDOH by providing support to strengthen social networks. Some state and national policies that support rural and low-volume hospitals to build partnership networks in underserved areas have been proposed (Park et al., 2020) and providing support to strengthen social networks in such areas where social bonds are not as strong may help these hospitals identify suitable external organizations for longer term collaboration. Previous studies have suggested that local community initiatives represented an effective approach to bringing health care organizations together to address local health care issue (Steinberg & Baxter, 1998). Our analysis of US acute care hospitals in urban and rural counties furthered their argument and identified conditions under which local communities might have an impact on hospital activities. We found social capital and not community health needs to influence hospital behavior in forming cross-sector partnerships to address SDOH. These findings suggest that policymakers who wants to increase collaboration between hospitals and communities should find alternate regulative mechanisms in the short term and improving social capital in the long term to foster these partnerships.

We also found that political factors may have a role to play in hospital partnerships with community organizations. For instance, we found no significant association between the political party affiliation of the state governor and total hospital-community partnerships. However, we found that hospitals in states run by Democratic governors were more likely to partner with other healthcare providers, local or state public health agencies, local service agencies and organizations that address food insecurity. One explanation for these findings may be that states with a Democratic party leadership are more likely to focus on health and social inequities (Zhu & Clark, 2015) and may be more supportive of facilitating hospital partnerships with community organizations.

When examining the relationship of specific hospital-level characteristics in the context of hospital partnerships, our findings were similar to those reported in earlier studies (Begun & Potthoff, 2017). In general, we found that not-for-profit ownership and larger hospital size were both associated with a greater likelihood to engage in partnerships. Hospital size is an indicator of general capacity and resource availability and the economies of scale and wider markets may allow such hospitals to develop and maintain more partnerships within the community (Begun & Potthoff, 2017; Park et al., 2020). Although small hospitals may benefit considerably from partnerships, they may not have the physical and financial resources required to sustain such partnerships. Not-for-profit status of hospitals may also allow for greater breadth of partnerships owing to the community benefit requirement in exchange

Table 5
Association between community social capital and health needs on individual hospital-community partnership.

	Hospital Partnerships with other/local organizations				
	Other health care providers	Insurance providers	Local/state public health agency	Local service agency	Faith-based organizations
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Community social capital index	1.10* (0.99,1.23)	0.94 (0.83, 1.06)	1.12**(1.01,1.25)	1.08 (0.97,1.20)	1.05 (0.94,1.17)
County health ranking quartiles					
Q1	Referent	Referent	Referent	Referent	Referent
Q2	0.95 (0.75,1.21)	0.91 (0.70,1.16)	0.89 (0.70,1.13)	1.03 (0.81,1.31)	0.96 (0.75,1.23)
Q3	0.87 (0.68,1.12)	0.71** (0.54,0.95)	0.87 (0.68,1.13)	0.99 (0.77,1.28)	1.12 (0.87,1.45)
Q4	0.74** (0.55,0.99)	0.74* (0.52,1.03)	0.75* (0.56,1.00)	0.88 (0.65,1.18)	0.88 (0.65,1.20)
Hospital Size					
<50 beds	Referent	Referent	Referent	Referent	Referent
50–199 beds	1.20 (0.94,1.53)	1.21 (0.91,1.60)	1.14 (0.90,1.44)	1.24* (0.97,1.57)	1.33**(1.03,1.72)
200–399 beds	1.29 (0.94,1.78)	1.00 (0.70,1.44)	1.13 (0.82,1.55)	1.26 (0.91,1.73)	1.50**(1.08, 2.08)
>400 beds	1.69***(1.17, 2.43)	1.29 (0.87, 1.93)	1.52** (1.04, 2.20)	1.60** (1.11, 2.30)	1.59** (1.09,2.31)
Community outreach status	1.45***(1.12, 1.88)	1.18 (0.87, 1.60)	1.82***(1.43, 2.32)	1.46*** (1.13, 1.87)	1.24 (0.95, 1.63)
Rural status	0.99 (0.77, 1.25)	0.88 (0.66, 1.15)	1.01 (0.80, 1.28)	0.87 (0.69, 1.10)	0.93 (0.72,1.19)
Not-for-profit ownership	2.08***(1.67, 2.58)	2.68***(2.03, 3.55)	2.20***(1.79, 2.71)	2.38***(1.92, 2.95)	3.10***(2.43,3.39)
Multihospital system membership	1.79***(1.45, 2.22)	2.06***(1.58, 2.69)	1.60***(1.30, 1.96)	1.71***(1.39, 2.11)	2.01***(1.60,2.53)
Teaching status	1.48***(1.18, 1.85)	1.37** (1.06, 1.76)	1.39*** (1.11, 1.75)	1.38*** (1.10, 1.73)	1.29** (1.02,1.63)
Democrat Governor	1.22** (1.02, 1.47)	1.17 (0.95, 1.44)	1.27*** (1.06, 1.53)	1.32*** (1.10, 1.59)	1.00 (0.83, 1.21)
N	2297	2297	2297	2297	2297

	Hospital Partnerships with other/local organizations				
	Addressing food insecurity	Addressing transportation needs	Addressing housing insecurity	Providing legal assistance	Other nonprofit organizations
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Community social capital index	1.11** (1.00,1.24)	1.11*(0.99,1.25)	1.03 (0.92,1.16)	1.12 (0.97,1.29)	1.04 (0.93,1.15)
County health ranking quartiles					
Q1	Referent	Referent	Referent	Referent	Referent
Q2	1.00(0.78,1.27)	1.08 (0.85,1.38)	1.02 (0.80,1.31)	1.15 (0.84,1.55)	1.01 (0.80,1.29)
Q3	1.00(0.77,1.29)	0.96 (0.74,1.25)	0.84 (0.64,1.10)	1.18 (0.85,1.63)	0.87 (0.67,1.12)
Q4	0.69** (0.51,0.94)	0.87 (0.63,1.19)	0.75* (0.55,1.04)	1.05 (0.71,1.57)	0.71 (0.53,0.96)
Hospital Size					
<50 beds	Referent	Referent	Referent	Referent	Referent
50–199 beds	1.27*(0.99,1.62)	1.39**(1.07,1.80)	1.19 (0.91,1.55)	1.02(0.73,1.44)	1.18 (0.92,1.50)
200–399 beds	1.51**(1.09,2.10)	1.52** (1.08,2.13)	1.12 (0.79,1.58)	1.13 (0.74,1.72)	1.23 (0.89, 1.70)
>400 beds	2.23*** (1.53,3.25)	1.75***(1.20,2.56)	1.63**(1.11,2.40)	1.47 (0.92,2.33)	1.60**(1.11, 2.31)
Community outreach status	1.41**(1.08,1.84)	1.73***(1.29,2.32)	1.58***(1.18,2.12)	1.84***(1.22,2.76)	1.56***(1.20, 2.02)
Rural status	1.02 (0.80,1.30)	1.24* (0.96,1.60)	1.14 (0.88,1.48)	0.91 (0.65,1.26)	0.87 (0.68,1.10)
Not-for-profit ownership	3.06*** (2.42,3.85)	2.61***(2.03,3.35)	3.08***(2.37,4.01)	2.40***(1.70,3.39)	2.61***(2.09, 3.26)
Multihospital system membership	1.94*** (1.56,2.42)	1.86***(1.47,2.35)	1.48***(1.17,1.88)	2.02***(1.46,2.80)	1.83***(1.48,2.27)
Teaching status	1.34**(1.06,1.68)	1.26**(1.00, 1.60)	1.45***(1.14,1.85)	1.49**(1.10,2.01)	1.27*(1.01, 1.59)
Democrat Governor	1.31***(1.09, 1.58)	1.17(0.96, 1.42)	1.11(0.91, 1.35)	1.10(0.87, 1.40)	1.25**(1.04, 1.51)
N	2297	2297	2297	2297	2297

	Hospital Partnerships with other/local organizations			
	Local schools	Colleges or universities	Local businesses	Law enforcement/safety services
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Community social capital index	1.16*** (1.05,1.29)	0.93(0.83,1.04)	1.03 (0.93,1.15)	1.20*** (1.08,1.33)
County health ranking quartiles				
Q1	Referent	Referent	Referent	Referent
Q2	0.99 (0.78,1.25)	0.87 (0.68,1.12)	0.96 (0.76,1.22)	0.98 (0.77,1.23)
Q3	1.12 (0.87,1.44)	0.98 (0.76,1.27)	1.15 (0.90,1.48)	1.05 (0.82,1.35)
Q4	1.02 (0.76,1.36)	0.86 (0.63,1.17)	0.84 (0.63,1.14)	0.94 (0.70,1.26)
Hospital Size				
<50 beds	Referent	Referent	Referent	Referent
50–199 beds	1.21 (0.95,1.54)	1.74***(1.35,2.24)	1.53*** (1.20,1.95)	1.43***(1.12,1.81)
200–399 beds	1.37*(1.00,1.88)	1.67***(1.20,2.32)	1.27 (0.92,1.76)	1.04 (0.75,1.43)
>400 beds	1.71***(1.19,2.45)	2.37*** (1.63,3.43)	1.59**(1.21,2.29)	1.44**(1.00, 2.06)
Community outreach status	1.31**(1.02,1.68)	1.38**(1.05,1.80)	1.46***(1.13,1.89)	1.37**(1.07,1.77)
Rural status	0.92 (0.73,1.17)	0.93 (0.73,1.20)	1.13 (0.88,1.43)	0.93 (0.73,1.17)
Not-for-profit ownership	2.12***(1.71, 2.64)	2.08***(1.65,2.62)	1.48***(1.19,1.85)	1.64***(1.32,2.04)
Multihospital system membership	1.73***(1.40,2.13)	1.82***(1.45,2.28)	1.39***(1.12,1.72)	1.30**(1.05,1.60)
Teaching status	1.15 (0.92,1.44)	1.25*(0.99,1.58)	1.03 (0.82,1.30)	1.24* (0.99,1.55)
Democrat Governor	1.18* (0.98, 1.41)	1.09 (0.90, 1.32)	1.06 (0.88, 1.27)	1.06 (0.89, 1.27)
N	2297	2297	2297	2297

***p < 0.01, **p < 0.05, *p < 0.1.

for tax exemption.

Limitations: The results of our study should be considered in light of several limitations. First, we rely primarily on 2020 AHA data to elicit hospital-community partnerships since indicators of such partnerships to address SDOH were included only in the most recent survey. This rendered any longitudinal analysis impossible. Furthermore, given the cross-sectional nature of the data, we are only able to state broad associations and cannot make any assumptions about causality. We are also unable to speak to any partnerships that might exist between community organizations where hospitals might be secondary participants since such data are not captured in the AHA survey. Second, to facilitate robust analysis, we excluded 2191 hospitals that failed to complete the questionnaire related to the 14 partnerships on the AHA annual survey. A supplemental analysis indicated that there were significant differences between this sample and the analytic sample and we report these differences in our results. Third, it is also possible that other factors conducive to hospital-community partnerships might exist and were not captured in the present analysis. Fourth, AHA is a self-reported survey and we had to rely on the candid responses of the administrators who fill the survey. Biased responses or non-responses may influence the data, and in turn, our results. Fifth, some hospitals in our sample serve more than one county which adds to the challenge of measuring these environmental variables. Finally, we measure environmental variables (social capital and health needs) at a county level. Using county-level data would mean losing any measure of social capital or health needs for counties that do not have dedicated hospitals serving those counties. We also rely on the social capital index obtained from the Geography of Social Capital in America data and which do not include any economic indicators that might overlap with social capital. Some socioeconomic indicators are included in the county health rankings but there might be other economic indicators related to social capital that are not captured in the present analysis. To our knowledge, this index also includes limited detailed measures of shared networks or norms between individuals in the community. However, these data have been used in prior studies that have examined the role of social capital on health outcomes (Ferwana & Varshney, 2021; Varshney & Socher, 2020). Regardless, our analysis and results should be considered in light of these limitations.

5. Conclusions

SDOH shape individual health, health inequities, and eventually population health and are now front-and-center in mainstream US healthcare with policymakers and providers paying close attention to mechanisms to address SDOH to improve health outcomes (Alderwick & Gottlieb, 2019). Hospitals have a unique role as anchor-med institutions (anchor institutions dedicated to health) to target powerful underlying forces that shape adverse SDOH within their communities (Dave et al., 2021). However, addressing the vast breadth of SDOH exceeds the scope of a single organization and requires organizational cooperation to participate in multi-institutional collaboration. Several factors drive such organizational collaborations and partnerships and our findings suggest that community social capital is associated with greater hospital-community partnerships to address SDOH. These positive findings underscore the importance of factors like active political culture, community engagement, and trust in institutions in influencing hospital behavior, which, in turn, may be a critical factor in holding hospitals accountable for their efforts to address health inequities and improve population health.

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Author statement

Neeraj A. Puro: Conceptualization, Data curation, Project administration, Formal analysis, Methodology, Writing – original draft, Writing – review & editing.

Reena J. Kelly: Conceptualization, Project administration, Writing – original draft, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

APPENDIX A

Table 1
Social Capital Index

Family Unit Subindex	Additional description of measure(s)
Share of births in past year to women who were unmarried	
Share of women ages 35–44 years who are currently married (and not separated)	
Share of own children living in a single-parent family	
Community Health Subindex	
Registered non-religious nonprofits per 1000 individuals	
Religious congregations per 1000	
Informal Civil Society Sub-Index	Combination of share who volunteered, who attended a public meeting, who report having worked with neighbors to fix/improve something, who served on a committee or as an officer, who attended a meeting where politics was discussed, and who took part in a demonstration in the past year.
Institutional Health Subindex	
Average (over 2012 and 2016) of votes in the presidential election per citizen aged 18 and over	
Mail-back response rates for 2010 census	
Confidence in Institutions Sub-Index	Combination of share reporting at least some confidence in corporations, in the media, and in public schools
Collective Efficacy Subindex	
Violent crimes per 100,000 population	

Source: (Social Capital Project).

Table 2
Health Factors within County Health Rankings

Focus Area	Measure	Description	Weight
Health Behavior			
Tobacco Use	Adult smoking	Percentage of adults who are current smokers (age-adjusted).	10%
Diet and Exercise	Adult obesity	Percentage of the adult population (age 20 and older) that reports a body mass index (BMI) greater than or equal to 30 kg/m2.	5%
	Food environment index	Index of factors that contribute to a healthy food environment, from 0 (worst) to 10 (best).	2%
	Physical inactivity	Percentage of adults age 20 and over reporting no leisure-time physical activity.	2%
	Access to exercise opportunities	Percentage of population with adequate access to locations for physical activity.	1%
Alcohol and Drug Use	Excessive drinking	Percentage of adults reporting binge or heavy drinking (age-adjusted).	2.5%
	Alcohol-impaired driving deaths	Percentage of driving deaths with alcohol involvement.	2.5%
Sexual Activity	Sexually transmitted infections	Number of newly diagnosed chlamydia cases per 100,000 population.	2.5%
	Teen births	Number of births per 1000 female population ages 15–19.	2.5%
Clinical Care			
Access to Care	Uninsured	Percentage of population under age 65 without health insurance.	5%
	Primary care physicians	Ratio of population to primary care physicians.	3%
	Dentists	Ratio of population to dentists.	1%
	Mental health providers	Ratio of population to mental health providers.	1%
Quality of Care	Preventable hospital stays	Rate of hospital stays for ambulatory-care sensitive conditions per 100,000 Medicare enrollees.	5%
	Mammography screening	Percentage of female Medicare enrollees ages 65–74 that received an annual mammography screening.	2.5%
	Flu vaccinations	Percentage of fee-for-service (FFS) Medicare enrollees that had an annual flu vaccination.	2.5%
Social and Economic Factors			
Education	High school completion	Percentage of adults ages 25 and over with a high school diploma or equivalent.	5%
	Some college	Percentage of adults ages 25–44 with some post-secondary education.	5%
Employment	Unemployment	Percentage of population ages 16 and older unemployed but seeking work.	10%
Income	Children in poverty	Percentage of people under age 18 in poverty.	7.5%
	Income inequality	Ratio of household income at the 80th percentile to income at the 20th percentile.	2.5%
Family and Social Support	Children in single-parent households	Percentage of children that live in a household headed by single parent.	2.5%
	Social associations	Number of membership associations per 10,000 population.	2.5%
Community Safety	Violent crime	Number of reported violent crime offenses per 100,000 population.	2.5%
	Injury deaths	Number of deaths due to injury per 100,000 population.	2.5%
Physical Environment			
Air and Water Quality	Air pollution - particulate matter	Average daily density of fine particulate matter in micrograms per cubic meter (PM2.5).	2.5%
	Drinking water violations	Indicator of the presence of health-related drinking water violations. 'Yes' indicates the presence of a violation, 'No' indicates no violation.	2.5%
Housing and Transit	Severe housing problems	Percentage of households with at least 1 of 4 housing problems: overcrowding, high housing costs, lack of kitchen facilities, or lack of plumbing facilities.	2%
	Driving alone to work	Percentage of the workforce that drives alone to work.	2%
	Long commute - driving alone	Among workers who commute in their car alone, the percentage that commute more than 30 min.	1%

APPENDIX B

Multicollinearity Tests.

	VIF	1/VIF
Community social capital index	1.467	.682
County health ranking quartiles		
Q_1	Referent	
Q_2	1.355	.738
Q_3	1.456	.687
Q_4	1.590	.629
Hospital size		
<50 beds	Referent	
50–199 beds	1.654	.605
200–399 beds	2.138	.468
>400 beds	2.103	.476
Community outreach status	1.113	.899
Rural status	1.728	.579
Not-for-profit ownership	1.212	.825
System membership	1.175	.851
Teaching status	1.733	.577
Democrat Governor	1.106	.904
Mean VIF	1.525	.

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