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Comparing Health Care System and Physician Practice Influences on Social Risk Screening

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Abstract

Background: Health care systems can support dissemination of innovations, such as social risk screening in physician practices, but to date, no studies have examined the association of health system characteristics and practice-level adoption of social risk screening.

Purpose: The aim of the study was to examine the association of multilevel organizational capabilities and adoption of social risk screening among system-owned physician practices.

Methodology: Secondary analyses of the 2018 National Survey of Healthcare Organizations and Systems were conducted. Multilevel linear regression models examined physician practice and system characteristics associated with practice adoption of screening for five social risks (food insecurity, housing instability, utility needs, interpersonal violence, and transportation needs), accounting for clustering of practices within systems using random effects.

Results: System-owned practices screened for an average of 1.7 of the five social risks assessed. The intraclass correlation indicated 16% of practice variation in social risk screening was attributable to differences between their health systems owners, with 84% attributable to differences between individual practices. Practices owned by systems with multiple hospitals screened for an additional 0.44 social risks ($p = .046$) relative to practices of systems without hospitals. Practice characteristics associated with social risk screening included health information technology capacity ($\beta = 0.20$, $p = .005$), innovation culture ($\beta = 0.26$, $p < .001$), and patient engagement strategies ($\beta = 0.57$, $p < .001$).

Conclusions: Health care system capabilities account for less variation in physician practice adoption of social risk screening compared to practice-level capabilities.

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Practice Implications: Efforts to expand social risk screening among system-owned physician practices should focus on supporting practice capabilities, including enhancing health information technology, promoting an innovative organizational culture, and advancing patient engagement strategies.

Keywords

social risk screening; social needs; organizational behavior; multilevel modeling

INTRODUCTION

Social determinants of health, defined as “the conditions in which people are born, grow, work, live and age,” are strong predictors of poor health outcomes (Kondo, 2012; Marmot et al., 2008; World Health Organization, 2019). Social risk factors, such as low income, education, and living conditions, are correlated with premature death, increased rates of chronic disease, and cognitive decline (Braveman & Gottlieb, 2014; Daniel et al., 2018; Marmot et al., 2008; McGinnis & Foege, 1993). Recognizing the importance of social determinants, institutions such as the World Health Organization and the National Academy of Medicine have called for primary care physicians to address social determinants of health (Adler et al., 2016; Committee on Integrating Primary Care and Public Health et al., 2012; Marmot et al., 2008).

One important way for primary care physicians to assist in addressing social determinants is to screen their patients for social risk. Screening for social risk can have numerous benefits, including (a) informing medical care decisions, (b) helping the health care team understand root cause issues that impact the patient’s health and ability to adhere to a care plan, (c) detecting which patients may benefit from a referral to community resources, and (d) informing broader efforts to understand unmet needs in the community (DeVoe et al., 2016; Garg et al., 2015; Gottlieb et al., 2013; LaForge et al., 2018). Early evidence about the prevalence of screening for social risk among physician practices in the United States indicates screening is still uncommon, with only 15.6% of practices screening for social risk factors in each of the five social risk domains prioritized by the National Academy of Medicine (Fraze et al., 2019). Prior research comparing physician practices has found social risk screening to be associated with practices having high innovation capacity and a focus on low-income populations (Brewster et al., 2020; Fraze et al., 2019), but little is known about how the health systems that often own practices may be influencing adoption of this emerging innovation.

Increasingly, physician practices are being acquired by health systems, as systems address the challenges of new value-based payment models. From 2012 to 2018, the number of physician practices owned by hospitals or health systems increased by 124%, resulting in nearly one in three medical practices being owned by hospitals (Physicians Advocacy Institute, 2019). System-level policies, resources, and learning can support dissemination of innovations, such as screening for social risk, but further evidence is needed to understand the extent to which practice innovation adoption is explained by health system ownership. Currently, no studies examine associations between organizational factors at multiple levels

and the use of social risk screening. This study addresses this gap by examining associations between multilevel organizational factors—such as organization size, culture, and resources—and social risk screening among system-owned physician practices. This can help those seeking to increase social risk screening understand at what level of intervention—the local practice level versus the broader health care systems level—may be most effective in furthering adoption of screening.

THEORY

This study uses frameworks and research on adoption of innovation in health care to formulate hypotheses about relationships between multilevel organizational factors and adoption of social risk screening. Greenhalgh et al.'s (2004) model of determinants of innovations and the Consolidated Framework for Implementation Research serve as helpful guides that outline influences at different levels and stages (Damschroder et al., 2009; Greenhalgh et al., 2004). We focus on organizational factors relevant to the beginning of the innovation diffusion process—adoption, which fall into two categories: (a) inner and outer context characteristics and (b) compatibility characteristics.

Inner and outer context characteristics are antecedents for innovation—features of organizations that past research has shown increase the likelihood an innovation will be adopted (Greenhalgh et al., 2004). Characteristics of inner context describe aspects inside an organization, including structural determinants such as size and degree of decentralization. Outer context characteristics reflect the environment in which an organization is situated, such as environmental uncertainty and competition.

Greenhalgh et al. (2004) also discuss how innovations that are compatible with an organization's existing "values, norms, strategies, goals, skill mix, supporting technologies and ways of working" (p. 108) are more likely to be adopted. For social risk screening, compatibility factors would include characteristics that signal an organization has an interest in addressing upstream factors, either out of strategic necessity or alignment of values.

In our conceptual model (Figure 1), a practice's adoption and implementation of social risk screening is influenced by the inner and outer context and organization–innovation compatibility at both the system and practice levels. For example, a practice may benefit from its own information technology capacity that can assist in efforts to build social risk data collection tools, or the practice may benefit from the technology capacity of the system it belongs to through availability of enterprise-wide tools for documenting and using social risk data.

STUDY AIMS AND HYPOTHESES

Aim 1

This study first examines the extent to which a practice's screening for social risk is associated with practice-level characteristics versus system-level characteristics. In previous studies examining the variation in patient experience measures at multiple organizational levels, the greatest share of variation was explained by the lowest organizational levels of

units examined (Rodriguez et al., 2009; Safran et al., 2006; Solomon et al., 2002). For example, in a study examining ambulatory care experience measures at each of four levels —physician, care site, medical group, and primary care service areas—the largest share in variation was explained by the physician and care site levels (Rodriguez et al., 2009). One possible explanation was that activities that affected the measures, such as appointment scheduling and patient follow-up activities, were mainly organized and implemented at the practice site level. The uptake of screening for social risk may follow a similar pattern, as it is likely that both the reasons for screening (e.g., to help address the needs of vulnerable populations) as well as the capabilities and contexts that would enable adoption of screening (e.g., technology capacity and innovation culture) depend on local circumstances, which vary across the practices in each system. Therefore, we hypothesize:

Hypothesis 1: Practice-level characteristics will explain more of the variance in a practice's screening for social risk than will system-level characteristics.

Aim 2

This study also examines characteristics at the system and practice levels as they relate to practice social risk screening. Though it is expected that practice-level characteristics will be more strongly associated with practice-level screening, we predict that certain types of systems will be more likely to have a significant association with practice-level screening than others. Based on the literature for each of these characteristics (outlined below) we hypothesize:

Hypothesis 2: Practices that belong to systems that have greater information technology capacity, innovation culture, and competition; are larger; have lower centralization; and have activities or needs that signal compatibility with social risk screening will be more likely to screen for social risk than practices in systems without these characteristics.

ANTICIPATED IMPACTS OF SPECIFIC PRACTICE AND SYSTEM CHARACTERISTICS

Information technology capacity

Information technology capacity (heretofore referred to as technology capacity) is defined as technical knowledge and resources that reflect an organization's ability to leverage information technology, which has been positively associated with innovation (Damanpour, 1991). Technical knowledge and resources of either the practice itself or the practice's health system owner could support deployment of tools that enable the practice to screen for social risk in ways that minimize the potential burden that screening may pose for the staff or the patients.

Innovation culture

The competing values framework of organizational culture purports that a culture will be dominant in one of four types: group/team culture, hierarchical culture, rational culture, or entrepreneurial culture. The last culture type—entrepreneurial—emphasizes flexibility and an external focus, one that prioritizes growth and change (Quinn & Rohrbaugh, 1983). A

prior study examining both independent and system-owned physician practices found that greater innovative culture in practices was associated with practices screening for a broader range of social risks (Brewster et al., 2020). Therefore, it is likely that organizations with entrepreneurial cultures will be more open to adopting and implementing innovations.

Size

With some exceptions, larger organization size is usually positively and significantly associated with innovative behavior (Damanpour, 1991; Greenhalgh et al., 2004; Rye & Kimberly, 2007). Size has also served as a proxy for organizational resources. In a related study examining both independent and system-owned physician practices, barriers such as insufficient financial resources were negatively associated with the adoption of social risk screening (Brewster et al., 2020). We anticipate that practices that are themselves large and/or belong to large health systems may have access to resources and other support that would make adopting social risk screening an easier endeavor.

Centralization

Centralization is an organization's locus of authority, described by Damanpour (1991, p. 589) as "the extent to which decision-making autonomy is dispersed or concentrated in an organization" (Damanpour, 1991; Pfeffer, 1981). A meta-analysis suggests that greater centralization may be negatively associated with innovative behavior (Rye & Kimberly, 2007); as the concentration of power narrows, there may be less potential for new ideas to circulate (Hage & Dewar, 1973). A health care system where decision-making is highly centralized may therefore lag in adopting emerging and innovative practices such as screening for social risk.

Competition

Competition can have both positive and negative influences on adoption of innovation, though a systematic review found that competition tends to be positively associated with innovative behavior (Rye & Kimberly, 2007). A health care system or physician practice facing a competitive market may seek to differentiate itself from others in its market by understanding more about its patient population and their needs through screening for social risk.

Compatibility

An innovation is considered compatible if it fits with an organization's values, norms, and perceived needs. Research indicates that in settings where there was a strong match between an innovation and the interests and values of an organization, innovations are adopted, but not in settings where there is not a match between the innovation and organizational values (Denis et al., 2002). Therefore, compatibility of social risk screening with the priorities or needs of the system or practice would be expected to increase social risk screening. Three factors can signal that social risk screening is compatible with the priorities or needs of the system or practice: (a) having higher proportions of low-income patients, who are likely to experience more social risks; (b) having made other investments in population health management; and (c) having made other investments in patient-centered care.

METHODS

Data

The 2018 National Survey of Healthcare Organizations and Systems (NSHOS) data were analyzed. NSHOS is a nationally representative sample of physician practices (N = 2,190, response rate = 47%) and health care systems (N = 325, response rate = 60%) that owned or managed at least two primary care multispecialty physician practices or acute care hospitals (Center of Excellence, 2018). The survey was completed by an organizational leader on behalf of the system or practice. NSHOS survey items were developed based on recommendations of one or more organizational leaders in clinical care whom the survey authors interviewed while developing the survey, as well as based on published articles documenting their effectiveness in clinical practice (Fisher et al., 2020). The survey was extensively pretested and piloted, including cognitive feedback, to ensure the questions were being understood as intended.

We utilized a subset of the sample where we could link practice surveys (N = 820) with the surveys of their parent health system (N = 253). Survey responses were also linked with IQVIA OneKey data on health systems and physician practice characteristics. Our analytic sample included 781 physician practices nested in 243 health systems (96% of respondents) after excluding systems and practices that had data missing for key covariates.

Measures

Dependent variable: The dependent variable, practice-level social risk screening, was measured as the number of social risks for which a practice reported having a system in place to routinely screen patients. Practices could screen for a maximum of five social risks: food insecurity, housing instability, utility needs, interpersonal violence, and transportation needs.

Independent variables: Below are summary descriptions of the independent variables. A full description is found in Supplemental Digital Content 1.

Inner context characteristics

Technology capacity.: Technology capacity—in this study, health information technology capacity specifically—was measured at the system level by a five-item composite score of the share of the medical groups in the health system that had specific health information systems capabilities. Four of these capabilities (patients' access to their electronic medical records, patients' ability to input information in their medical records, physicians' and patients' ability to communicate with each other via e-mail, and physicians' ability to know whether patients have filled prescriptions) are required capabilities for the Certified Electronic Health Record Technology designation ("Electronic prescribing," n.d.), and the fifth, advanced analytics systems, has been identified in past research as an important component of care management for complex patients (Bates et al., 2014).

At the practice level, technology capacity was measured by an index (range: 0–7) that included whether or not the practice's health information system allowed for the five

capabilities included in the system-level measure (described above), as well as how often clinicians had access to the following when they needed it: (a) information from groups that are not using their electronic health record and (b) information from local public social service agencies.

Innovation culture.: Survey questions for innovation culture were developed using the competing values framework, which classifies organizations based on four corporate cultures, which indicate how an organization operates, how employees collaborate, and what the organization's values are (Helfrich et al., 2007). At the system level, culture was measured by asking respondents to allocate 100 points across four organizational culture statements using an ipsative scale. System innovation culture specifically was measured by the number of points allocated to the statement, "Our system is a very dynamic and entrepreneurial place. People are willing to try new things to see if they work." At the practice level, innovation culture was measured using responses to five questions assessing how often different innovation-supportive activities happened in the practice, such as there being protected time given to generate new ideas and innovations.

Size.: Size was measured at the system level by the number of practices and hospitals owned by the system and at the practice level by the number of physicians in the practice.

Centralization.: We used four measures of centralization at the system level: (a) a composite measure of questions that asked at what level (local, regional/divisional, systems) the activities of a health care system, such as strategic planning, were primarily conducted; (b) whether the system had a system-wide approach for keeping up with new evidence; (c) how often the system approached clinical care as a single, integrated group; and (d) whether frontline care clinicians had significant involvement in setting clinical performance improvement priorities.

Outer context characteristic

Competition.: Competition was measured by the system or practice informant's perception of the intensity of competition for patients in the outpatient setting in the system's largest market or in the practice's market, respectively.

1. Having patients likely to be experiencing higher levels of social risk. At the system level, this was measured by whether or not the system included Federally Qualified Health Centers (FQHC) or FQHC look-alikes. At the practice level, this was measured by whether or not the practice was an FQHC or an FQHC look-alike, as well as the practice's percentage of revenue that was from Medicaid.
2. Investment in population health. This was measured by whether or not the system participates in population health collaboratives.
3. Investment in patient-centered care. At the system and practice levels, this was measured by whether or not the system/practice had a method for identifying complex high-need patients. At the practice level, we also included a measure of the practice's score on the Patient Engagement Scale, made up of 30

patient engagement capabilities that fall into four categories: shared medical appointments, motivational interviewing, shared decision-making and provision of decision aids, and collection of patient-reported outcomes. Systemic reviews find that these patient engagement activities improve factors such as chronic disease outcomes and medication adherence (Edelman et al., 2015; Palacio et al., 2016; Shay & Lafata, 2015).

The composite scales in this study were scored using Likert scales and had internal consistency reliability scores that were high (range: .71–.92). Specific scores are listed in Supplemental Digital Content 1.

Covariates: This study included a control variable measuring whether the system is a nonprofit, as past research has shown that nonprofit hospitals were more likely to address social determinants than were for-profit hospitals (Begun & Potthoff, 2017; Jennings et al., 2019).

STATISTICAL ANALYSES

Aim 1

To test Hypothesis 1, we examined a variance component model (null model). We determined the proportion of the variance that was accounted for by the system level and the proportion of variance accounted for by the practice level by estimating the intraclass correlation. In order to determine the contributions of the specific system and practice characteristics, a model with only system-level variables was fit, followed by a model with only practice-level variables. We compared the R2 for the model with only practice-level variables to the R2 for the model with only system-level variables to understand whether the system or practice level accounted for more of the variance in social risk screening at the practice level.

Aim 2

To test Hypothesis 2, we regressed the number of social risk factors a practice screens for on a set of practice-level and system-level variables. Variables at both the system and practice levels are system/practice size, competition, technology capacity, innovation culture, and care plans for complex high-need patients. Additional variables at the practice level only are patient engagement, the percentage of revenue that is from Medicaid, and whether or not the practice is an FQHC. Additional variables at the system level only are variables representing system centralization, whether or not the system participates in mutlisector population health collaboratives, whether or not the system has FQHCs, and the nonprofit status of the system. Continuous independent measures were standardized with a mean of 0 and a variance of 1.

SENSITIVITY ANALYSES

It is possible practice participation in payment reform initiatives may provide incentives to commit greater or fewer resources to activities such as social risk screening and that regional variation and system affiliation may influence physician practice operations. To address these possibilities, we conducted sensitivity analysis to identify whether the inclusion

of practice participation in payment and delivery reform initiatives, practice region, and system affiliation as additional covariates in our main regression model altered the main results. To assess potential nonlinear relationships, we also examined quartiles of key continuous variables (technology capacity, innovation culture, and patient engagement) for the multivariable regression model as a sensitivity analysis. Finally, we assessed the robustness of our main results by assessing the odds of screening for each of the five social risks separately using logistic regression.

This study was approved by the institutional review board for the University of California, Berkeley. All analyses were conducted in Stata 15.

RESULTS

Descriptive Statistics

System-owned practices screened for an average of 1.7 (SD = 1.8) of the five social risks assessed. Seventeen percent of practices screened for all five factors, whereas 34% of practices screened for none. Interpersonal violence was the most screened for factor (57%). See Table 1 for a summary of system-owned physician practices' social risk screening activity.

Physician practices had an average technology capacity index score of 3.9 (SD = 1.4), an average innovation culture scale score of 52.6 (SD = 20.7), an average patient engagement scale score of 39.9 (SD = 21.2), and an average percentage of revenue from Medicaid of 19.2 (SD = 17.8).

Health care systems had an average technology capacity scale score of 53.6 (SD = 23.7) and an average innovation culture score of 25.11 (SD = 15.3). A majority (64%) had a method for identifying complex high-need patients. About half (48%) of health care systems owned multiple hospitals, 14% owned one hospital, and 38% owned no hospitals. Characteristics of physician practices and their health system owners are found in Table 2.

Multivariable Regression Results

The intraclass correlation indicated 16% of the variation in practices' screening was attributable to differences among the health systems that owned them, with 84% attributable to differences between practices. The R2 for the model containing only practice variables was more than 10 times larger than the R2 for the model with only system variables (0.26 vs. 0.02).

In the main analyses (Table 3), the only system-level characteristic associated with practice social risk screening was a measure of system size: practices in systems owning multiple hospitals screened for an additional 0.44 social risks ($p = .046$) compared with practices in systems owning no hospitals. Several practice characteristics were significantly associated with social risk screening. Practice-level health information technology capacity ($\beta = 0.20$, $p = .005$), innovation culture ($\beta = 0.26$, $p < .001$), patient engagement strategies ($\beta = 0.57$, $p < .001$), and a percentage of a practice's revenue from Medicaid ($\beta = 0.23$, $p < .001$) were positively associated with the number of social risks a practice screened for. Practices with

a method for identifying complex high-need patients screened for an additional 0.34 social risks (p = .006) compared with practices that did not have this method. Practices that were FQHCs or FQHC lookalikes screened for an additional 0.43 social risks (p = .006) compared with non-FQHC practices.

Sensitivity analysis examining quartiles of technology capacity, innovation culture, and patient engagement revealed associations were driven by the third or fourth quartiles of each. Sensitivity analyses examining additional variables found that system affiliation and practice participation in payment and delivery reform initiatives were not significantly associated with practice social risk screening, but geographic region was: Practices in the Northeast screened for an additional 0.42 and 0.57 social risks (p = .035 and .016) compared with practices in the Midwest and West, respectively. The addition of these variables in sensitivity analyses did not change the practice-level relationships found in the main analysis but did change a system-level relationship: System hospital ownership was no longer significantly related to practice screening.

In sensitivity analyses using logistic regression to model the odds of screening for each of the five social risks separately (Supplemental Digital Content 2, several system variables were significant, which is a divergence from the main analysis where only one system variable was significant. The odds of screening for transportation needs and interpersonal violence were more than twice as high in practices belonging to systems that owned multiple hospitals, compared with practices in systems owning no hospitals. For every 15-point increase in a system's innovation culture, the odds of a practice in that system screening for interpersonal violence decreased by 21%. The odds of screening for food insecurity were 61% lower for practices in systems that reported competition was "somewhat" intense in the system's largest market, compared with practices in systems that reported competition was "not at all" intense.

DISCUSSION

This study generates new evidence on associations between multilevel organizational characteristics and adoption of social risk screening among health system-owned physician practices. Supporting our first hypothesis, system-level capabilities accounted for a smaller amount of the variance in a practice's screening for social risks relative to practice-level capabilities. The fact that at least some (16%) of the variation in practices' screening is attributable to differences among the health systems that own them suggests that system-level capabilities are related in some way to social risk screening adoption, but the specific system capabilities that are important for screening adoption were largely not captured by the measures examined in this study. This points to the need to better understand and measure capabilities at the system level that are related to physician practice adoption of innovations, such as screening for social risk.

The sole system-level factor that was significantly associated with screening in the main analyses—the system owning multiple hospitals—suggests that practices in health systems that are larger and perhaps require care coordination across several integrated organizations either see an advantage to screening for social risks, such as helping to reduce preventable

admissions and readmissions for which hospitals are subject to financial penalties, or have more resources at their disposal to screen than practices belonging to systems without hospitals.

In sensitivity analyses examining each social risk separately, the significant relationship between system-level factors and screening for specific social risks suggests that systems may play a bigger role in a practice's screening—or not screening—for some types of social risks compared to others. There is not yet a standard set of social risks that health care organizations are required to screen for as a package. In the absence of official protocol, systems may exert influence selectively based on their perceptions and needs. A practice in a system owning multiple hospitals had increased odds of screening for transportation needs and interpersonal violence. The relationship for transportation needs screening may be because practices in systems with multiple hospitals have a greater need to ensure their patients are able to arrive to appointments on time at different care facilities. Interpersonal violence was the most screened for factor of the five social risks, which is likely because it has been discussed and recommended for a longer time than screening for the other social risks in this study. As such, systems with multiple hospitals may simply have more documentation or protocol for screening for interpersonal violence that they pass on to the practice.

Interestingly, there was a negative relationship between system innovation culture and practice screening for interpersonal violence, although there was a positive relationship between practice innovation culture and practice screening for interpersonal violence. One reason for this divergence may be differences in measurement. System innovation culture was measured by the number of points allocated to a single statement depicting innovation culture. The practice innovation culture measure was more substantial, using a five-item composite scale. It is possible then that the practice-level measurement captured a fuller set of aspects of organization innovation culture, which translated to a positive relationship with screening for interpersonal violence, whereas a more limited measurement for the system level translated to a negative relationship with screening for the same social risk.

Consistent with predictions for specific capabilities, a practice's technology capacity, innovation culture, and patient engagement strategies were positively associated with practice-level screening for social risks. Based on the sensitivity analysis, it is important to note that these variables were significant at only the higher quartiles, suggesting a practice's increased screening activity does not take place until a practice has high levels of these capabilities.

Along with patient engagement strategies, several other compatibility characteristics at the practice level were associated with screening, including being an FQHC and a practice having a method for identifying complex patients. This supports the notion that when there is a match in an organization's values and/or strategic needs, they will adopt screening for social risk.

Limitations

These results should be interpreted in light of study limitations. The relationships studied are cross-sectional, so this study is not able to determine causality. However, we adjust for several characteristics believed to influence social risk screening, and this study provides the first evidence in multilevel influences of the adoption of social risk screening. This study also examines system-owned practices, which are not necessarily representative of all physician practices. However, system-owned practices are becoming the norm (Medical Economics, 2016). It should also be noted that the outcome variable—whether the practice has a system in place to routinely screen patients for specific social risk factors—is self-reported by the survey respondent and does not capture penetration of screening across patients. However, whether or not screening occurs for each of the social risks is an observable practice, and the survey respondents were those who were expected to be knowledgeable on the physician practice's policies in these matters.

PRACTICE IMPLICATIONS

Practice-level variables account for more of the variance in social risk screening than system-level variables, which suggests that efforts to expand social risk screening among system-owned practices should focus on supporting practice-level capabilities, including enhancing health information technology capacity, promoting an innovative culture, instituting plans for identifying complex high-need patients, and strengthening patient engagement strategies. In the COVID-19 era of practices increased use of telehealth and related innovations in care delivery, developing these capabilities takes on increased importance.

Because this study is cross-sectional, whether each of these capabilities leads to increased screening or whether screening leads to improved practice capabilities remains unclear. In spite of this, the mechanisms connected to social risk screening have high face validity. For example, having access to information from local public social service agencies would give providers confidence they can help address social risks they uncover (Murray et al., 2020), which may make screening for these factors more likely. In addition, if a practice is engaging with patients in a nuanced way, such as through shared decision-making, this might reveal particular social vulnerabilities of their patients, which may prompt the practice to develop a systemized way of tracking and addressing these vulnerabilities through social risk screening.

CONCLUSIONS

Multilevel organizational influences are increasingly important to understand as physician practices continue to be acquired by health care systems, and policymakers and others seek ways to accelerate the adoption of upstream approaches to prevention and chronic care management. This study adds to the limited evidence on multilevel influences of adoption of innovation among system-owned physician practices. Analyses indicate that health care systems do exert some influence on physician practice-level adoption of social risk screening, but targeting support and interventions at the practice level is more likely to accelerate the adoption of social risk screening.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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References

Adler NE, Cutler DM, Fielding JE, Galea S, Glymour MM, Koh HK, & Satcher D. (2016). Addressing Social Determinants of Health and Health Disparities: A Vital Direction for Health and Health Care. NAM Perspectives.

Bates DW, Saria S, Ohno-Machado L, Shah A, & Escobar G. (2014). Big Data In Health Care: Using Analytics To Identify And Manage High-Risk And High-Cost Patients. Health Affairs, 33, 1123–1131. [PubMed: 25006137]

Begun JW, & Potthoff S. (2017). Moving Upstream in U.S. Hospital Care Toward Investments in Population Health. Journal of Healthcare Management / American College of Healthcare Executives, 62, 343–353. [PubMed: 28885536]

Braveman P, & Gottlieb L. (2014). The Social Determinants of Health: It's Time to Consider the Causes of the Causes. Public Health Reports, 129, 19–31.

Brewster A, Fraze T, Gottlieb L, Frehn J, Murray G, & Lewis V. (2020). "The role of value-based payment in promoting innovation to address social risks: A cross-sectional study of social risk screening by US physicians." Milbank (In Press).

Center of Excellence. (2018). About the National Survey of Healthcare Organizations and Systems. Retrieved March 9, 2020, from https://sites.dartmouth.edu/coe/nshos/

Damanpour F. (1991). Organizational Innovation: A Meta-Analysis of Effects of Determinants and Moderators. The Academy of Management Journal, 34, 555.

Damschroder LJ, Aron DC, Keith RE, Kirsh SR, Alexander JA, & Lowery JC (2009). Fostering implementation of health services research findings into practice: A consolidated framework for advancing implementation science. Implementation Science, 4, 50. [PubMed: 19664226]

Daniel H, Bornstein SS, & Kane GC (2018). Addressing Social Determinants to Improve Patient Care and Promote Health Equity: An American College of Physicians Position Paper. Annals of Internal Medicine, 168, 577. [PubMed: 29677265]

Denis J-L, Hébert Y, Langley A, Lozeau D, & Trottier L-H (2002). Explaining diffusion patterns for complex health care innovations. Health Care Management Review, 27, 60–73. [PubMed: 12146784]

DeVoe JE, Bazemore AW, Cottrell EK, Likumahuwa-Ackman S, Grandmont J, Spach N, & Gold R. (2016). Perspectives in Primary Care: A Conceptual Framework and Path for Integrating Social Determinants of Health Into Primary Care Practice. The Annals of Family Medicine, 14, 104–108. [PubMed: 26951584]

Edelman D, Gierisch JM, McDuffie JR, Oddone E, Williams JW Jr. (2015). Shared Medical Appointments for Patients with Diabetes Mellitus: A Systematic Review. Journal of General Internal Medicine, 30, 99. [PubMed: 25107290]

Electronic prescribing. (n.d.). Retrieved September 19, 2020, from HealthIT.gov website: https://www.healthit.gov/test-method/electronic-prescribing

Fisher ES, Shortell SM, O'Malley AJ, Fraze TK, Wood A, Palm M, … Meara E. (2020). Financial Integration's Impact On Care Delivery And Payment Reforms: A Survey Of Hospitals And Physician Practices. Health Affairs, 39, 1302–1311. [PubMed: 32744948]

Fraze TK, Brewster AL, Lewis VA, Beidler LB, Murray GF, & Colla CH (2019). Prevalence of Screening for Food Insecurity, Housing Instability, Utility Needs, Transportation Needs, and Interpersonal Violence by US Physician Practices and Hospitals. JAMA Network Open, 2, e1911514–e1911514.

Garg A, Toy S, Tripodis Y, Silverstein M, & Freeman E. (2015). Addressing Social Determinants of Health at Well Child Care Visits: A Cluster RCT. Pediatrics, peds.2014–2888.

Gottlieb L, Sandel M, & Adler NE (2013). Collecting and Applying Data on Social Determinants of Health in Health Care Settings. JAMA Internal Medicine, 173, 1017–1020. [PubMed: 23699778]

Greenhalgh T, Robert G, Macfarlane F, Bate P, & Kyriakidou O. (2004). Diffusion of Innovations in Service Organizations: Systematic Review and Recommendations. Milbank, 82, 581–629.

Hage J, & Dewar R. (1973). Elite values versus organizational structure in predicting innovation. Administrative Science Quarterly, 18, 279–290.

Helfrich CD, Li Y-F, Mohr DC, Meterko M, & Sales AE (2007). Assessing an organizational culture instrument based on the Competing Values Framework: Exploratory and confirmatory factor analyses. Implementation Science: IS, 2, 13. [PubMed: 17459167]

Institute of Medicine. Primary Care and Public Health: Exploring Integration to Improve Population Health, § Committee on Integrating Primary Care and Public Health (2012). Washington, D.C.: National Academies Press.

Jennings JC, Landry AY, Hearld LR, Weech-Maldonado R, Snyder SW, & Patrician PA (2019). Organizational and environmental factors influencing hospital community orientation. Health Care Management Review, 44, 274–284. [PubMed: 28915164]

Kondo N. (2012). Socioeconomic Disparities and Health: Impacts and Pathways. Journal of Epidemiology, 22, 2–6. [PubMed: 22156290]

LaForge K, Gold R, Cottrell E, Bunce AE, Proser M, Hollombe C, … Clark KD (2018). How 6 Organizations Developed Tools and Processes for Social Determinants of Health Screening in Primary Care: An Overview. The Journal of Ambulatory Care Management, 41, 2–14. [PubMed: 28990990]

Marmot M, Friel S, Bell R, Houweling TA, & Taylor S. (2008). Closing the gap in a generation: Health equity through action on the social determinants of health. The Lancet, 372, 1661–1669.

McGinnis JM, & Foege WH (1993). Actual Causes of Death in the United States. JAMA, 270, 2207–2212. [PubMed: 8411605]

Medical Economics. (2016, September 24). Hospital ownership of physician practices on the rise. Retrieved April 7, 2019, from https://www.medicaleconomics.com/medical-economics/news/hospital-ownership-physician-practices-rise

Murray GF, Rodriguez HP, & Lewis VA (2020). Upstream With A Small Paddle: How ACOs Are Working Against The Current To Meet Patients' Social Needs. Health Affairs, 39, 199–206. [PubMed: 32011930]

Palacio A, Garay D, Langer B, Taylor J, Wood BA, & Tamariz L. (2016). Motivational Interviewing Improves Medication Adherence: A Systematic Review and Meta-analysis. Journal of General Internal Medicine, 31, 929–940. [PubMed: 27160414]

Pfeffer J. (1981). Power in organizations. Pitman Pub.

Physicians Advocacy Institute. (2019, February). Updated Physician Practice Acquisition Study: National and Regional Changes in Physician Employment 2012–2018. Retrieved from http://www.physiciansadvocacyinstitute.org/Portals/0/assets/docs/021919-Avalere-PAI-Physician-Employment-Trends-Study-2018-Update.pdf?ver=2019-02-19-162735-117

Quinn RE, & Rohrbaugh J. (1983). A Spatial Model of Effectiveness Criteria: Towards a Competing Values Approach to Organizational Analysis. Management Science, 29, 363–377.

Rodriguez HP, Scoggins JF, von Glahn T, Zaslavsky AM, & Safran DG (2009). Attributing sources of variation in patients' experiences of ambulatory care. Medical Care, 47, 835–841. [PubMed: 19584765]

Rye CB, & Kimberly JR (2007). The Adoption of Innovations by Provider Organizations in Health Care. Medical Care Research and Review, 64, 235–278. [PubMed: 17507458]

Safran DG, Karp M, Coltin K, Chang H, Li A, Ogren J, & Rogers WH (2006). Measuring patients' experiences with individual primary care physicians. Results of a statewide demonstration project. Journal of General Internal Medicine, 21, 13–21. [PubMed: 16423118]

Shay LA, & Lafata JE (2015). Where is the evidence? A systematic review of shared decision making and patient outcomes. Medical Decision Making : An International Journal of the Society for Medical Decision Making, 35, 114–131. [PubMed: 25351843]

Solomon LS, Zaslavsky AM, Landon BE, & Cleary PD (2002). Variation in Patient-Reported Quality Among Health Care Organizations. Health Care Financing Review, 23, 85–100. [PubMed: 12500472]

World Health Organization. (2019). Social Determinants of Health. Retrieved from https://www.who.int/social_determinants/sdh_definition/en/

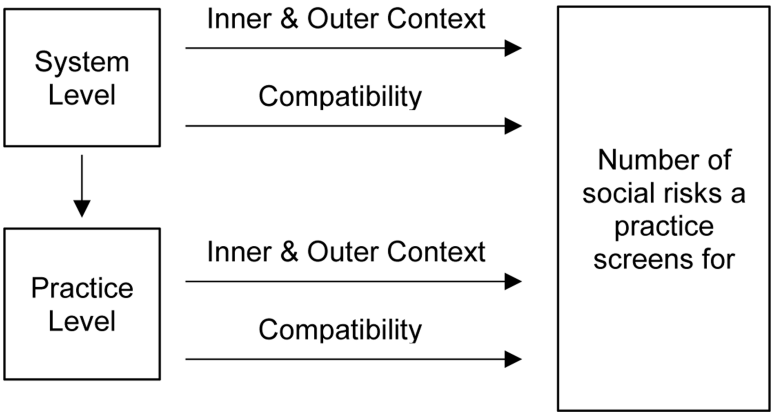

Figure 1.

The conceptual model focuses on organizational factors relevant to the beginning of the innovation diffusion process – adoption, which fall into two categories: 1) inner and outer context characteristics, and 2) compatibility characteristics. Inner context characteristics describe aspects of the organization itself, such as size and technology capacity. Outer context characteristics are those that describe the environment in which an organization is situated, such as competition. Compatibility characteristics are those that align with an organization's mission, strategies and needs.

Table 1.

Physician Practice Social Risk Screening Activity (N = 781)

		Frequency	%
Number of social risks a practice screens for	0	264	33.8
	1	224	28.7
	2	85	10.9
	3	32	4.1
	4	43	5.5
	5	133	17.0
Number of practices screening for specific social risks	Food Insecurity	230	29.5
	Housing Instability	214	27.4
	Utility Needs	182	23.3
	Interpersonal violence	449	57.5
	Transportation Needs	252	32.3

Source: National Survey of Healthcare Organizations and Systems (NSHOS).

Table 2.

Descriptive Statistics of Physician Practices and Health Care Systems

		Freq/Mean	% / SD
Characteristics of physician-owned practices		**N = 781**	
Intensity of competition	Not at all	181	23.2
	Somewhat	423	54.2
	Very	177	22.7
Has method for ID-ing complex patients		596	76.3
Practice is an FQHC		136	17.4
Technology capacity		3.9	1.4
Innovation culture *		52.6	20.7
Patient engagement *		39.9	21.2
Percent revenue from Medicaid		19.2	17.8
Characteristics of health systems		**N = 243**	
Size: Number of hospitals	No hospitals	92	37.9
	One hospital	34	14.0
	Multiple hospitals	117	48.2
Size: Number of physician practices		63.46	113.25
Intensity of competition	Not at all	18	7.4
	Somewhat	105	43.2
	Very	120	49.4
Centralization: How often system approaches care as an integrated group	Never	2	0.8
	Sometimes	102	42.0
	Most of the time	120	49.4
	Always	19	7.8
Centralization: Has system-wide approach for keeping up with new evidence		137	56.4
Centralization: Frontline staff involved in setting performance improvement priorities		141	58.0
Centralization: Level of Activities *		81.86	31.0
Has method for identifying complex patients		156	64.2
Participation in population health collaboratives		148	60.9
System includes FQHCs		87.00	35.8

	Freq/Mean	% / SD
Characteristics of physician-owned practices	**N = 781**	
Technology capacity *	53.55	23.7
Innovation culture	25.11	15.3

Notes: Data presented as mean and standard error for continuous measures, and frequency and percentage for categorical measures.

* Variables marked with are composite scales calculated from multiple survey items. Scale scores range from 0 – 100. Not shown: physician practice size, practice geographic region, practice participation in payment and delivery reform initiatives, system owner-subsidiary status, and system not-for-profit status.

Source: National Survey of Healthcare Organizations and Systems (NSHOS).

Table 3.

Predictors of number of social risks a system-owned physician practice screens for (N = 781)

		Coefficient	Robust SE
Characteristics of physician-owned practices			
Intensity of competition	Not at all	Ref	
	Somewhat	−0.15	−0.13
	Very	−0.01	−0.16
Has method for ID-ing complex patients		0.34**	−0.12
Practice is an FQHC		0.43**	−0.16
Technology capacity		0.20**	−0.07
Innovation culture		0.26***	−0.07
Patient engagement		0.57***	−0.06
Percent revenue from Medicaid		0.23***	−0.06
Characteristics of health systems			
Size: Number of hospitals	No hospitals	Ref	
	One hospital	0.34	−0.28
	Multiple hospitals	0.44*	−0.22
Size: Number of physician practices		−0.03	−0.09
Intensity of competition	Not at all	Ref	
	Somewhat	−0.38	−0.29
	Very	−0.21	−0.3
Centralization: How often system approaches care as an integrated group	Never	Ref	
	Sometimes	−0.19	−0.36
	Most of the time	−0.17	−0.34
	Always	0.3	−0.38
Centralization: Has system-wide approach for keeping up w/ new evidence		0.1	−0.14
Centralization: Frontline staff involved in setting performance improvement priorities		−0.06	−0.14
Centralization: Level of Activities		−0.06	−0.07
Has method for identifying complex patients		−0.08	−0.15
Participation in population health collaboratives		−0.1	−0.15
System includes FQHCs		0.14	−0.16

		Coefficient	Robust SE
Characteristics of physician-owned practices			
Technology capacity		−0.1	−0.07
Innovation culture		−0.04	−0.07
Constant		1.93***	−0.43
Random Effects Parameters	System Constant	0.22	0.12
	System Residual	2.09	0.15

Notes: Continuous variables standardized for analysis. Not shown: practice size; system not-for-profit status.

Source: National Survey of Healthcare Organizations and Systems (NSHOS).

* p<0.05

** p<0.01

*** p<0.001.