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Association of Informal Clinical Integration of Physicians With Cardiac Surgery Payments

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Invited Commentary page 453

Supplemental content

IMPORTANCE To reduce inefficiency and waste associated with care fragmentation, many current programs target greater clinical integration among physicians. However, these programs have led to only modest Medicare spending reductions. Most programs focus on formal integration, which often bears little resemblance to actual physician interaction patterns.

OBJECTIVES To examine how physician interaction patterns vary between health systems and to assess whether variation in informal integration is associated with care delivery payments.

DESIGN, SETTING, AND PARTICIPANTS National Medicare data from January 1, 2008, through December 31, 2011, identified 253 545 Medicare beneficiaries (aged ≥66 years) from 1186 health systems where Medicare beneficiaries underwent coronary artery bypass grafting (CABG) procedures. Interactions were mapped between all physicians who treated these patients—including primary care physicians and surgical and medical specialists—within a health system during their surgical episode. The level of informal integration was measured in these networks of interacting physicians. Multivariate regression models were fitted to evaluate associations between payments for each surgical episode made on a beneficiary's behalf and the level of informal integration in the health system where the patient was treated.

EXPOSURES The informal integration level of a health system.

MAIN OUTCOMES AND MEASURES Price-standardized total surgical episode and component payments.

RESULTS The total 253 545 study participants included 175 520 men (69.2%; mean [SD] age, 74.51 [5.75] years) and 78 024 women (34.3%; 75.67 [5.91] years). One beneficiary of the 253 545 participants did not have sex information. The low level of informal clinical integration included 84 598 patients (33.4%; mean [SD] age, 75.00 [5.93] years); medium level, 84 442 (33.30%; 74.94 [5.87] years); and high level, 84 505 (33.34%; 74.66 [5.72] years) ($P < .001$). Informal integration levels varied across health systems. After adjusting for patient, health-system, and community factors, higher levels of informal integration were associated with significantly lower total episode and component payments (β coefficients for informal integration were −365.87 [95% CI, −451.08 to −280.67] for total episode payments, −182.63 [−239.80 to −125.46] for index hospitalization, −43.13 [−55.53 to −30.72] for physician services, −74.48 [−103.45 to −45.51] for hospital readmissions, and −62.04 [−88.00 to −36.07] for postacute care; $P < .001$ for each association). When beneficiaries were treated in health systems with higher informal integration, the greatest savings of lower estimated payments were from hospital readmissions (13.0%) and postacute care services (5.8%).

CONCLUSIONS AND RELEVANCE Informal integration is associated with lower spending. Although most programs that seek to promote clinical integration are focused on health systems' formal structures, policy makers may also want to address informal integration.

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Inpatient surgery costs vary widely across health systems. Many observers point to the fragmented nature of surgical care delivery as a driver of this variation. Suboptimal coordination among clinicians around the time of the surgical episode can affect health care spending by increasing the likelihood that clinical care team members provide duplicate tests, treatments, or services. Fragmentation also impedes the ability of physicians to identify imminent postoperative needs of patients after hospital discharge, resulting in emergency department visits and readmissions to the hospital. To address care fragmentation, payers and policy makers launched reforms such as accountable care organizations (ACOs) and the patient-centered medical home, which aim to improve clinical integration among physicians.[1,2]

However, the effects of ACOs and the patient-centered medical home on health spending have been modest. Although some evaluations demonstrate decreases in costs, others report no effect or even increases.[3-6] A weakness of these programs and their evaluations is the focus on formal integration, understood as organizational structure, rules, and regulations.[7] Studies of social networks in organizations suggest that informal physician interaction patterns—relationships arising from the shared care of multiple patients over time—may be more consequential than formal structure for health system performance.[8-10] Because formal designs of health care reforms often fail to transfer to actual practice, examining informal physician interaction patterns may help clarify the potential value of improved clinical integration.

We analyzed surgical episode payments for Medicare beneficiaries undergoing coronary artery bypass grafting (CABG) procedures. Using ideas from network analysis, we developed a new measure—the informal clinical integration index—that characterized interactions among primary and specialty care physicians and examined how these interactions affected surgical episode payments. We hypothesized that greater informal clinical integration would be associated with lower episode payments. Our findings, which support this hypothesis, serve to inform health system administrators, policy makers, and researchers attempting to understand fragmentation between primary care and specialty care physicians.

Key Points

Question Is informal clinical integration likely to help control spending in surgical care?

Findings In this analysis of 253 545 Medicare beneficiaries from 1186 health systems, the degree of informal primary and specialty care physician interactions among shared patients who underwent coronary artery bypass grafting was associated with lower payments from Medicare. Observed savings were greatest on readmission to the hospital and postacute care.

Meaning In addition to targeting the formal organization of surgical care, delivery reforms may benefit from attempting to foster greater informal clinical integration among primary and specialty physicians.

Methods

Network analysts have developed techniques for characterizing interactions in social groups.[11] Use of these techniques has led to insights about the importance of informal interaction patterns inside formal organizations.[12-14] All networks share 2 building blocks: nodes and ties. Nodes represent people; ties represent interactions among those people. In our study, nodes represent the physicians who care for patients undergoing the CABG procedure (the surgical episode). Ties represent the patients shared between each physician pair. Previous research found that physicians who share patients are also more likely to share information.[15-17] The University of Michigan institutional review board deemed this study, which was based on deidentified data, to be exempt from its oversight.

Study Population

We used the Medicare Provider Analysis and Review (MedPAR) file[18] to identify beneficiaries 66 years or older who underwent CABG procedures between January 1, 2008, and December 31, 2011. This time frame immediately predated several national initiatives aimed at improving physician integration—including the Medicare Pioneer ACO Model, the Medicare Shared Savings Program, and the Center for Medicare and Medicaid Services' Federally Qualified Health Center Advanced Primary Care Practice Demonstration—and allowed us to examine informal integration during a relatively stable period. We excluded beneficiaries who were not continuously enrolled in Medicare for 6 months before and 60 days after hospital discharge. Because of incomplete claims, we also excluded beneficiaries who had insurance through Medicare Advantage. The sample included 253 545 beneficiaries and 1186 health systems after implementing these criteria.

Mapping Physician Networks

Relevant physicians were identified using the Medicare Carrier file.[19] We determined each beneficiary's surgeon by identifying the surgeon who billed Medicare for a CABG procedure closest to the patient's date of surgery. We then identified each beneficiary's primary care physician by using a previously described algorithm.[20] Finally, we located relevant medical and surgical specialists by extracting claims for services 30 days before and 60 days after the hospitalization for surgery.

Within each health system, we recorded an interaction between physicians if they billed for services for the same beneficiary around that beneficiary's CABG episode.[21] We mapped networks separately for each year and health system. Patients undergoing surgery at the same health system but in different years, or in the same year but at different health systems, experience different networks.

Characterizing Informal Clinical Integration

We based our index of informal clinical integration among primary care and specialist physicians on a measure taken from network analysis that is known as *assortativity*. Assortativity captures the degree to which ties occur between nodes with similar properties (ie, physicians of the same specialty).[22] We

used the reverse of assortativity; thus, higher values (multiplied by 100) indicate improved integration, with the resulting coefficient ranging from −100 to 100. A network will have negative index values when physicians share more patients with colleagues in their own specialty; a network will have positive values when physicians share more patients with colleagues in different specialties. Lower connectivity across specialties may mean that communication among physicians overseeing different aspects of surgical care is weaker, possibly resulting in increased spending.

Index calculations require information on physician specialties. We used Medicare specialty codes to categorize physicians as primary care, medical specialty care, or surgical specialty care. Radiologists and other specialists not directly involved with ongoing patient care were excluded. Details on the index are given in eAppendixes 1 and 2 in the Supplement.

Measuring the Efficiency of Surgical Care

To examine whether differences in informal integration may help explain surgical care spending, we extracted data on 60-day episode payments for surgical care of beneficiaries using the MedPAR,[18] Carrier,[19] and Outpatient[23] files. These payments reflect what Medicare actually paid for services rendered around CABG episodes. Although true costs may include more than payments, payments are an informative proxy. Following earlier studies,[24] we decomposed payments into physician services, index hospitalization, hospital readmission, and postacute care components. We standardized payment values to account for regional price differences.[25]

Statistical Analyses

For preliminary analyses, we stratified health systems into 3 equally sized groups (low, medium, and high) based on their level of informal integration. Informal clinical integration index values were (-26.05, 2.24) for 84 598 patients in the low group, (2.25, 4.73) for 84 442 patients in the medium group, and (4.74, 50.00) for 84 505 patients in the high group. We then made comparisons among these groups using Kruskal-Wallis tests. At the patient level, we compared groups on age, sex, race, and level of comorbid illness as measured by the Charlson Comorbidity Index.[26] Patient populations were also evaluated on socioeconomic factors, including income, educational level, and access to care. Comparisons at the health system level focused on size (ie, number of patients and physicians), the proportion of patients undergoing emergency surgery, academic affiliation using American Hospital Association data,[27] and diversity of physician specialties (as measured by a Herfindahl-Hirschman index over the distribution of primary care, medical specialty care, and surgical specialty care physicians, subtracted from 1 to capture diversity). We also compared formal structures of health systems by focusing on factors identified by organizational theorists as likely to influence interaction patterns. These measures captured technologic (ie, electronic health record implementation), institution (ie, government or for-profit control), organization (ie, affiliation with other physician organizations), and geographic (ie, number of physicians in a health system's physician network who practiced outside the region of the health system) structures. Finally, we looked for differences at the community level, defined as the hospital service area of the health system. Using the American Community Survey[28] and Dartmouth Atlas data,[29] we compared surgeon, primary care physician, medical specialist, and hospital bed availability. We also compared communities on the size of their black, Hispanic, and overall populations.

The next analyses used multivariate regression to assess whether payments varied with informal physician integration. The patient was defined as the unit in regressions, but we measured networks at the health system level. Therefore, we estimated multilevel models with health system random effects and clustered standard errors. Models also included year-fixed effects. The outcomes were price-adjusted, episode payment components and the predictor was informal clinical integration. Confounders were controlled at the patient, health system, and community levels using the variables shown in the **Table**. We postulated that our hypothesis would be supported if we found negative and statistically significant associations between informal clinical integration and price-adjusted, episode payment components.

To evaluate the strength of our findings, we performed sensitivity analyses, which are discussed in eAppendix 3 (which references eTables 1-7) in the Supplement. Our analyses were performed using Stata SE, version 13.1 (StataCorp LLC). Statistical tests were 2-tailed and used a 2-sided 0.05 as the type I error probability.

Results

The total 253 545 study participants included 175 520 men (69.2%; mean [SD] age, 74.51 [5.75] years) and 78 024 women (34.3%; 75.67 [5.91] years). One beneficiary of the 253 545 study participants did not have sex information. The low level of informal clinical integration included 84 598 patients ([33.37%], mean [SD] age, 75.00 [5.93] years); medium level, 84 442 (33.30%; 74.94 [5.87] years); and high level, 84 505 (33.34%; 74.66 [5.72] years) ($P < .001$). We found that the informal clinical integration index varied across health systems. The index captures the degree of interaction among primary and specialty care physicians. The lowest value observed on our index was −26.05 (relatively low integration); the highest was 50.00 (improved integration). The mean (SD) was 3.74 (3.13). A histogram is shown in eFigure 1 in the Supplement.

Figure 1 plots relationships among physicians at 2 health systems: A and B. Colored nodes represent physicians and type of medical training. Green nodes are primary care physicians, yellow nodes are medical specialists, and blue nodes are surgical specialists. Red ties indicate relationships across specialties and gray ties indicate relationships within specialties. The health systems serve comparable markets in the Midwestern United States. Similar numbers of physicians (70 physicians in health system A and 89 in health system B) have similar numbers of ties.

The health systems differ in terms of informal clinical integration. With an index value of −9.02, physicians are less con-

Table. Patient, Health System, and Community Characteristics Across 3 Levels of Informal Clinical Integration[a]

Characteristic	Proportion by Level of Informal Clinical Integration, Mean (SD)			*P* Value
	Low (n = 84 598)	Medium (n = 84 442)	High (n = 84 505)	
Patient Level				
Charlson Comorbidity Index score	2.01 (1.75)	1.99 (1.73)	1.87 (1.66)	<.001
Age, y	75.00 (5.93)	74.94 (5.87)	74.66 (5.72)	<.001
Race				
White	0.93 (0.26)	0.94 (0.24)	0.95 (0.21)	<.001
Black	0.04 (0.20)	0.03 (0.18)	0.03 (0.16)	<.001
Female	0.31 (0.46)	0.31 (0.46)	0.31 (0.46)	.87
Health System Level				
Patients outside the CBSA	0.60 (0.23)	0.58 (0.21)	0.55 (0.20)	<.001
Patients below poverty line	0.13 (0.04)	0.13 (0.04)	0.14 (0.04)	<.001
Patients with bachelor's degree	0.18 (0.05)	0.17 (0.05)	0.15 (0.04)	<.001
Patients living in a rural area	0.25 (0.19)	0.28 (0.18)	0.36 (0.18)	<.001
Patients with emergency admission	0.45 (0.18)	0.46 (0.18)	0.45 (0.18)	<.001
Academic hospital	0.63 (0.48)	0.59 (0.49)	0.59 (0.49)	<.001
Total patients, No.	107.96 (87.32)	113.74 (90.97)	101.85 (71.91)	<.001
Total physicians, log	5.64 (0.79)	5.57 (0.73)	5.31 (0.70)	<.001
Diversity of physician specialties[b]	0.62 (0.02)	0.62 (0.02)	0.62 (0.03)	<.001
Formal structure of health system				
Technologic (EHR)	0.32 (0.47)	0.32 (0.47)	0.33 (0.47)	<.001
Government institution	0.05 (0.21)	0.05 (0.21)	0.03 (0.18)	<.001
For-profit institution	0.08 (0.27)	0.07 (0.26)	0.07 (0.26)	.09
Organization affiliated	0.44 (0.50)	0.42 (0.49)	0.40 (0.49)	<.001
Geographic, No. of physicians outside CBSA	118.43 (267.90)	80.75 (106.89)	69.29 (66.70)	<.001
Community Level				
Acute care hospital beds, No. per 1000 residents	2.41 (0.62)	2.32 (0.54)	2.32 (0.54)	<.001
PCPs, No. per 100 000 residents	71.78 (19.69)	68.49 (15.80)	66.11 (12.67)	<.001
Medical specialists, No. per 100 000 residents	52.41 (18.82)	48.59 (14.91)	43.23 (10.19)	<.001
Surgeons, No. per 100 000 residents	39.20 (9.86)	38.19 (9.18)	35.89 (7.50)	<.001
Total resident population, log	13.53 (1.15)	13.27 (1.02)	13.03 (0.90)	<.001
Total black population, log	11.35 (1.92)	10.86 (1.81)	10.46 (1.76)	<.001
Total Hispanic population, log	11.20 (1.72)	10.75 (1.62)	10.27 (1.40)	<.001

Abbreviations: CBSA, core based statistical area; EHR, electronic health record; PCP, primary care physician.

[a] Data are proportions unless otherwise indicated.

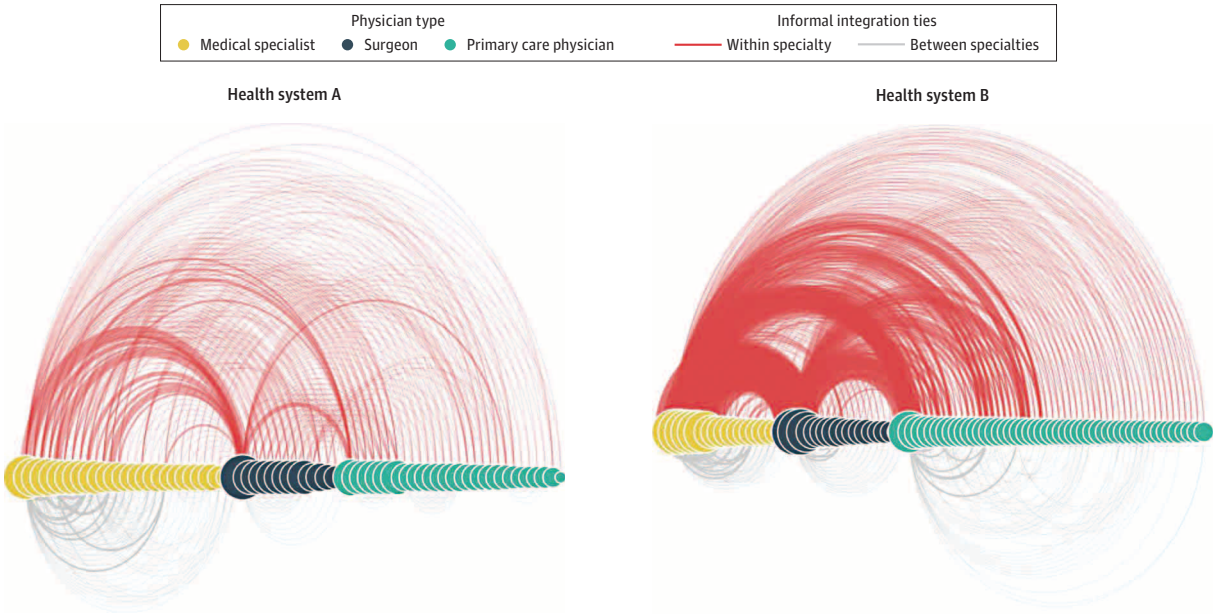
[b] Measured by Herfindahl-Hirschman index over the distribution of primary care, medical specialty care, and surgical specialty care physicians, subtracted from 1 to capture diversity.

nected across specialties in health system A. Approximately 59.1% of the 561 ties between physicians in this health system are cross-specialty. By contrast, with an index value of 10.09, integration is higher at health system B. Approximately 72.7% of ties among physicians are cross-specialty. More information on these cross-specialty ties is given in eFigure 2 in the Supplement.

The Table compares health systems across the 3 levels of integration. Beginning with patient factors, health systems with low and medium informal integration had patients with more comorbid illnesses (mean [SD] Charlson Comorbidity Index: low group, 2.01 [1.75]; high group, 1.87 [1.66]; $P < .001$). These health systems also treated more black patients (mean [SD] black proportion: low group, 0.04 [0.20]; high group, 0.03 [0.16]; $P < .001$) and more patients from urban areas (mean [SD] rural proportion: low group, 0.25 [0.19]; high group, 0.36 [0.18]; $P < .001$). Associations at the health system level are also revealing. Health systems with lower informal integration tended to have more physicians (mean [SD] number of physicians [log]: low group, 5.46 [0.79]; high group, 5.31 [0.70]; $P < .001$), who were geographically dispersed (mean [SD] number of physicians outside core based statistical area: low group, 118.43 [267.90]; high group: 69.29 [66.70]; $P < .001$) and less likely to use an electronic health record (mean [SD] proportion with electronic health record; low group: 0.32 [0.47]; high group: 0.33 [0.47]; $P < .001$). At the community level, health systems with less informal integration tended to be located in more populous regions (mean [SD] population [log]: low group, 13.53 [1.15]; high group, 13.03 [0.90]; $P < .001$), with more Hispanic residents (mean [SD] population [log]: low group, 11.20 [1.72]; high group, 10.27 [1.40]; $P < .001$) and black residents (mean [SD] population [log]: low group, 11.35 [1.92]; high group, 10.46 [1.76]; $P < .001$). These descriptive findings suggest that health systems that treat more disadvantaged populations, particularly urban minority populations, also tend to be less informally integrated.

Our next analyses examined associations between informal integration and payments. After adjusting for patient,

Figure 1. Informal Clinical Integration of Physicians at 2 Health Systems



Health system A included 70 physicians (informal clinical integration index value of −9.02) and B included 89 physicians (index value of 10.09). Physicians had lower integration across specialties in health system A (59.1% are cross-specialty) and higher integration at B (72.7% are cross-specialty).

health system, and community level factors, we found significant associations in support of our hypothesis. Higher levels of informal integration were associated with significantly lower total episode and component payments (β coefficients for informal integration were -365.87 [95% CI, −451.08 to −280.67] for total episode payments, -182.63 [−239.80 to −125.46] for index hospitalization, -43.13 [−55.53 to −30.72] for physician services, -74.48 [−103.45 to −45.51] for hospital readmissions, and -62.04 [−88.00 to −36.07] for postacute care; $P < .001$ for each association). The results are shown in **Figure 2** by the integration tercile groups. **Figure 3** compares estimated payments for the 4 components among health systems with high levels of integration relative to low levels. Regression coefficients are shown in eTable 1 in the Supplement. Although health systems with higher integration have better performance on all 4 components, savings are most pronounced for hospital readmission and postacute care. We observe that health systems in the high integration group have estimated payments that are 13.03% lower for hospital readmission and 5.82% lower for postacute care than the low integration group.

Consider that roughly 250 000 CABG procedures are performed annually in the United States. Assuming these procedures were done by health systems with high informal integration, we would expect savings of $130.5 million on hospital readmissions relative to what we would expect if the procedures were done by health systems with low informal integration. The corresponding expected savings on postacute care is $108.5 million. For total episode payments (not shown in Figures 2 or 3), the expected savings are $640 277 500 annually.

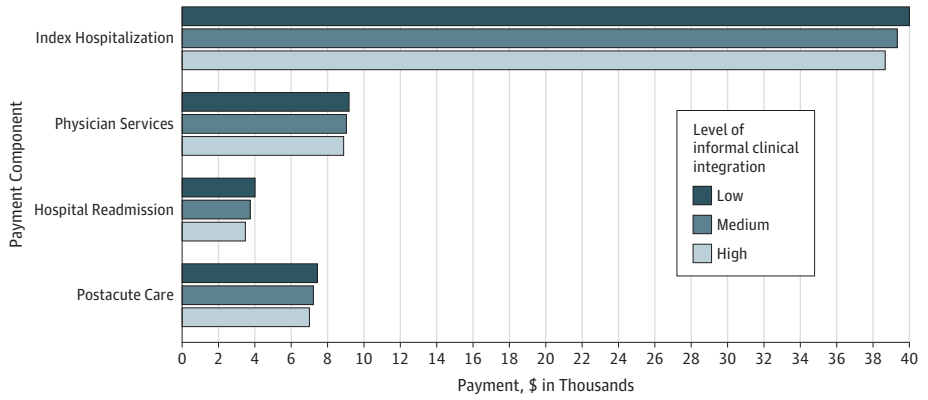
Discussion

Our findings demonstrate variability across health systems regarding how much primary care and specialty physicians interact among shared patients. This variability is associated with surgical care episode payments. In health systems with greater informal integration, we observed lower spending on CABG procedures, with the greatest savings on payments for hospital readmissions and postacute care. These findings held even after accounting for patient, health system, and community differences. These results support the idea that better informal integration of physicians during surgical care may improve patient coordination and lead to greater efficiency.

This study contributes to the understanding of integrated care delivery. To date, research has focused on the associations of formal integration with outcomes; for instance, bringing hospitals and physician groups under the same health system. However, studies of social networks in organizations caution that formal structures often fail to transfer to informal interaction patterns. Although formal organization helps support coordination across groups, there is no guarantee that it will bring people together. Qualitative research on ACOs suggests that understandings of integration vary among early adopters and that, in some cases, adoption appears to have increased informal integration; in others, changes have been minimal.[30] The informal integration index offers a way of differentiating among groups that have adopted similar formal approaches to integration but that may still differ in terms of interaction among specialties.

This study suggests that health systems may be able to improve their performance through deeper informal integration.

Figure 2. Adjusted Component Payments for Coronary Artery Bypass Grafting Procedure Across 3 Levels of Informal Clinical Integration



The organizational literature offers many examples highlighting the importance of informal interaction patterns. Consulting firms like IDEO[31] and Design Continuum are famous for helping their clients develop innovations. Studies suggest their success is attributed largely to frequent informal knowledge sharing among designers and engineers who specialize in diverse industries.[12] Interventions aimed at promoting informal integration have also been successful in settings where work is more standardized. Call centers, for example, have seen double-digit improvements by making it easier for employees to communicate and share knowledge with their fellow employees.[10]

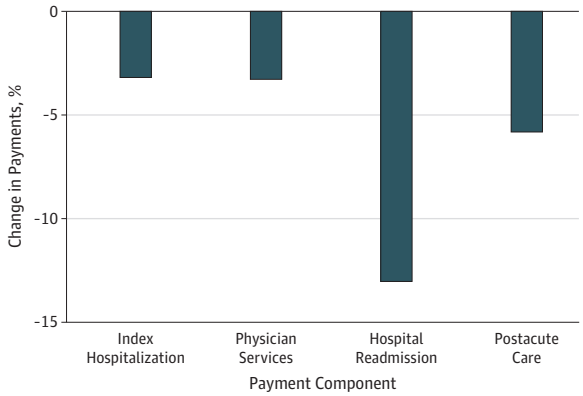
Within the surgical care environment, identifying the best ways to promote informal integration is a promising area for future work. Based on research in other domains, administrators may see benefits by eliminating physical barriers between primary care physicians and medical and surgical specialists (eg, through colocalization of clinics).[32,33] Where these barriers cannot be eliminated, administrators may consider incentivizing physicians to use emerging health information technologies that promote collaboration, or to organize events that bring physicians from different specialties together (eg, multidisciplinary case conferences), thereby growing metaknowledge of "who knows what" within their health systems.

Strengths and Limitations

Readers should view these findings in the context of several limitations. Although our models controlled for many confounders, unmeasured factors may bias the results. Our models may not sufficiently capture differences in the medical condition of patients prior to CABG procedure. In eAppendix 3 in the Supplement, we show that the findings are robust to additional adjustments for patient complexity. However, future work may better measure disease severity by linking Medicare claims data to other sources (eg, the Society of Thoracic Surgeons National Database)[34] with more rigorous risk adjustments. Findings may also be biased if more progressive health systems promote integration around surgical care and take other unmeasured steps to reduce spending.

Administrative data allow us to examine differences across many health systems over time, which would be prohibitive

Figure 3. Relative Change in Component Payments for Coronary Artery Bypass Grafting Procedure, Moving From Low to High Informal Clinical Integration



with other methods. Our reliance on administrative data may have omitted some important relationships (eg, curbside consultations) and health care professionals (eg, advanced practice clinicians) from our maps of health system networks while including others considered less important. Although anesthesiologists are sometimes deeply involved with postoperative management of cardiac surgery patients, we excluded them from our physician networks because we could not distinguish postoperative anesthesiology care from anesthesiology care delivered in the operating room. In eAppendixes 2 and 3 in the Supplement, we address some potential concerns regarding the construction of network maps using statistical methods and simulations; results of which add confidence to the findings. Validation studies also offer support for our approach. In 1 analysis,[15] physicians were surveyed about their professional relationships. Responses from this survey were matched to Medicare claims. Surveyed physicians recognized up to 82% of claims-based relationships. A different study, using a similar approach, found that network measures based on claims were associated with perceptions of care team climate, as reported in surveys.[35] Assuming that the structure of omitted relationships does not vary systematically from

those observed, these findings suggest bias should be minimal in our results.

Implications

Our study has several policy implications. The findings suggest that health system administrators and policy makers may benefit from viewing formal and informal clinical integration as 2 distinct phenomena. Although programs such as ACOs and patient-centered medical homes may improve formal coordination, it is possible that their influence over physicians' informal relationships is limited. Put differently, programs that aim to deepen integration through formal means may be acting at the tip of the iceberg while leaving many informal, subsurface connections untouched.

Our findings also suggest the possibility that informal integration may contribute to the success or failure of formal programs aimed at reducing fragmentation. Imagine that health systems A and B in Figure 1 adopted identical programs designed to incentivize coordination among primary and specialty care physicians. One year after implementation, evaluations demonstrated some improvements at health system B but not at health system A. Although we may be surprised to see different outcomes at comparable health systems, these results make sense when we see that informal integration is initially far lower at health system A.

Our index of informal integration may prove useful for health system administrators and researchers. The index can be easily calculated using administrative claims. The index's normalized −100 to 100 range helps facilitate comparisons across health systems. These features suggest that the index may be valuable as a diagnostic tool for identifying clinics, departments, institutions, or partnerships that are ripe for interventions aimed at improving care relations among specialists.

Conclusions

This study drew on insights from network analysis to develop a novel index that characterizes informal integration among primary care and specialty physicians within health systems. Greater informal integration was associated with lower episode payments for CABG procedures. Although most programs that seek to promote clinical integration are focused on health systems' formal structures, policy makers may also want to address informal integration.

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Study concept and design: Funk, Owen-Smith, Hollingsworth.
Acquisition, analysis, or interpretation of data: All authors.
Drafting of the manuscript: Funk, Hollingsworth.
Critical revision of the manuscript for important intellectual content: All authors.
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Invited Commentary

The Value of Established Relationships Between Primary Care Clinicians and Specialists

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The article by Funk and colleagues[1] in this issue of *JAMA Surgery* uses a network analysis to assess informal physician integration that arises from the shared care of multiple patients over time. They hypothesized that higher levels of informal integration would produce price-standardized total episode and component payments that were lower than those observed in health systems with lower indices. Their analysis supported the inference that deeper informal integration is associated with lower spending, specifically when related to readmissions and postacute care services, and that this difference might explain the limited efficacy of formal integration as mandated in accountable care organizations or patient-centered medical homes.

Related article page 446

The authors contend that voluntary collaboration between practitioners of different specialties is more efficacious than mandatory cooperation (accountable care organizations, patient-centered medical homes). This result is not surprising to the experienced clinician. The authors developed an interesting new and measurable performance metric (informal integration) and made a relatively rigorous attempt to provide quantitative support for this intuitive observation. Have they succeeded?

Inherent in this study that uses claims-based data is the inability to correlate the financial with either short-term or long-term clinical outcomes in the patients who were examined. Ironically, the authors chose to examine coronary artery bypass graft surgery, a procedure for which the Society of Thoracic Surgeons Cardiac Surgery Database offers clinical information on millions of patients and that has been cited to illustrate the limitations in measurements based on claims. Perhaps there is an uncomfortable circularity to the reasoning at the heart of this analysis. Specifically, this study depends on claims data to develop a new method for stratifying a group of patients and then uses this stratification to examine differences in claims for the care of this same group of patients. Finally, the authors do not have any data to support the contention that the enhanced integration that was observed in the high-integration/lower-cost group of patients was, in fact, informal. It is conceivable that this result was achieved with formal integration, although at a more local level than is achievable by an accountable care organization or a patient-centered medical home. Care Pathways and their accompanying standardized order sets have been linked to improved outcomes and perhaps shorter lengths of stay.[2] Or perhaps using postdischarge strategies, such as telephone contact or in-home nurse visits, could have resulted in decreased readmissions and use of postacute services. One also must wonder whether the beneficial informal integration as proposed by the authors will persist in the age of hospitalists, intensivists, and the absence of primary care clinicians in hospitals.

ARTICLE INFORMATION

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