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Financial Integration's Impact On Care Delivery And Payment Reforms: A Survey Of Hospitals And Physician Practices

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Abstract

Health care systems continue to grow in size. Financial integration—the ownership of hospitals or physician practices—often has anticompetitive effects that contribute to the higher prices for health care seen in the US. To determine whether the potential harms of financial integration are counterbalanced by improvements in quality, we surveyed nationally representative samples of hospitals (n = 739) and physician practices (n = 2,189), stratified according to whether they were independent or were owned by complex systems, simple systems, or medical groups. The surveys included nine scales measuring the level of adoption of diverse, quality-focused care delivery and payment reforms. Scores varied widely across hospitals and practices, but little of this variation was explained by ownership status. Quality scores favored financially integrated systems for four of nine hospital and one of nine practice measures, but in no case favored complex systems. Greater financial integration was generally not associated with better quality.

More than twenty-five years after two landmark reports called for national attention to a crisis in health care quality in the United States,[1,2] serious problems with the performance of the US health care system persist. Health care costs continue to rise,[3] the quality of care is uneven,[4] and safety remains a serious concern.[5] Although many patients still fail to receive needed evidence-based care,[6] waste and overuse are also widespread.[7,8] Care coordination remains problematic,[9] and the prevalence of burnout among physicians is increasing.[10] The COVID-19 epidemic has only added to these challenges.

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Diverse approaches to improving health system performance have been implemented,[11] and one of the most widely advocated has been the development of more integrated delivery systems.[12-16] Although uncertainty surrounds the drivers of recent organizational changes,[17] health care organizations are becoming larger and more financially integrated,[18] with hospital and health care system ownership of medical practices rising sharply in recent years[19]—a trend that is now likely to accelerate. A majority of all hospitals and nearly half of all physicians are now in financially integrated delivery systems.[20] The evidence is clear that consolidation often leads to decreased competition and higher prices,[21-26] one of the major reasons that US health care costs exceed those elsewhere.[27]

Whether these potential harms are outweighed by meaningful improvements in quality is less certain. Studies of hospital acquisitions have generally found no improvements, with a recent article finding no difference in thirty-day readmission rates or thirty-day mortality—and worse patient experience—after a merger.[28] Although improvement in process measures occurred, it could not be directly attributed to the change in ownership.[28] Studies of physician practices also give mixed results. Three studies have found no evidence that hospital ownership of physician practices was associated with better quality, whether examining readmissions,[29-31] mortality,[31] or selected claims-based quality measures.[29,30] Two other studies found mixed results. One reported that purchased practices had improved rates of screening and more appropriate emergency department use, but had higher ambulatory care sensitive admission rates.[32] The other found that practices acquired by hospitals had greater improvements in five care management processes but no greater use of promising health information technologies than independent practices.[33]

Largely missing from the existing literature are national data on what different types of health care organizations are actually doing to improve care. The current article addresses this knowledge gap by providing baseline data assessing the degree to which hospitals and physician practices that are under several different ownership structures have adopted more care delivery and payment reforms intended to improve quality than their financially independent counterparts. This information is directly relevant to current policy concerns about the impact of payment reforms and the potential harms of increasing consolidation.

Study Data And Methods

Overview

We analyzed data from the National Survey of Healthcare Organizations and Systems, a set of surveys fielded in 2017 and 2018 to a nationally representative sample of physician practices, hospitals, and health care systems. Analyses consider hospitals and, separately, physician practices. Primary outcomes are scales that measure the degree to which hospitals and physician practices report the adoption of care delivery and payment reforms where evidence or current beliefs support their association with better quality. We compared scores on these measures across different categories of organizations, defined by their structure and degree of financial integration (defined based on ownership). The study was approved by the Dartmouth College Committee for the Protection of Human Subjects.

Study Populations

We used the OneKey healthcare industry databases, maintained by the health care analytics firm IQVIA, to identify and define our study population. IQVIA uses the American Medical Association's Physician Masterfile, publicly available sources, and proprietary data collection strategies and periodic telephone verification to develop and continuously update the OneKey databases. These databases indicate whether each physician practice and hospital is owned by a medical group or health care system and whether that organization was in turn owned by another entity. OneKey also lists the specialty and practice locations for each physician, as well as their hospital affiliations. Detailed descriptions of these databases are provided in recent publications from the Agency for Healthcare Research and Quality.[34]

Our primary analysis compares hospitals with hospitals and physician practices with physician practices across the following ownership categories: independent hospitals and practices (no ownership relationship), medical groups (organizations that own practices only and are not owned by a larger health care system), simple integrated delivery systems (organizations that own at least one hospital and one practice and are not owned by a larger health care system), and complex integrated delivery systems (health care systems with at least one hospital and practice that also have an "owner subsidiary" that includes another financially integrated delivery system or medical group). These categories are also illustrated in online appendix exhibit 2.1.[35] We excluded physician practices with two or fewer primary care physicians from the sample frame because of survey costs. The proportion of physicians practicing in financially integrated systems (that is, practices owned by larger entities) was similar to that seen in other studies.[20,36]

Our sample frame represents 99 percent of nonfederal acute care or critical access hospitals and 62 percent of all physicians in practices with at least one primary care physician serving adult, fee-for-service Medicare beneficiaries in the OneKey database. These physicians served 57 percent (11.5 million) of adult, fee-for-service Medicare beneficiaries receiving ambulatory care from such primary care–focused physician practices in 2015.

Sampling Methodology

We used a stratified-cluster sampling design to select samples of health care systems, hospitals, and practices according to their complexity (that is, whether there were multiple layers of ownership and the size of the organization). To ensure that sampled health care systems had responses from their hospitals and practices, the sampling designs for all three surveys were coupled using a Monte Carlo algorithm to solve the implied system of mathematical equations. Additional details are provided in appendix section 3.1.[35]

Developing And Fielding The Surveys

The primary outcomes are multi-item scales that measure the degree to which organizations (hospitals and, in separate analyses, physician practices) report the adoption of care delivery and payment reforms hypothesized or shown to be associated with better performance. We selected items on the basis of the recommendations of one or more organizational leaders whom we interviewed as we developed the surveys and published articles documenting their

effectiveness in clinical practice. Details on the items included in each scale, the evidence underlying them, and relevant citations are provided in appendix section 1.[35] We included the following scales: care of complex, high-need patients; participation in quality-focused payment programs; screening for clinical conditions; screening for social needs; use of evidence-based guidelines; use of electronic health record–based decision support; use of patient engagement strategies; use of quality-focused information management; support for care transitions (hospitals only); and use of registries (practices only). The reliability of the scales is shown in appendix exhibit 1.3.[35] For hospitals, mean Cronbach's α values were above 0.70 for five of the scales, between 0.60 and 0.70 for one scale, and between 0.50 and 0.60 for the remaining three scales. For the physician scales, all values were 0.60 or higher, with eight of nine values being 0.70 or higher.

We contacted up to three individuals at each sampled organization, each of whom would be expected to have firsthand knowledge of the hospital's (for example, chief medical officer, chief clinical officer) or practice's (for example, chief physician, practice manager) participation in payment reforms and use of quality-focused care delivery processes. We used multiple communication modes (mail, telephone, web) to contact respondents, with the following final response rates: health care systems had a response rate of 59.8 percent (325 completed surveys), hospitals had a response rate of 46.5 percent (739 completed surveys), and practices had a response rate of 46.9 percent (2,189 completed surveys) (data not shown).

Statistical Analysis

All analyses used probability weights that reflected the likelihood a given organization was sampled and responded to the survey so that estimated means and other inferences corresponded to the US population of organizations included in our sample frame. For the descriptive analyses comparing the characteristics of hospitals, practices(see below), and health care systems (appendix exhibit 2.2)[35] in different ownership categories, the significance tests are weighted chi-square tests for categorical characteristics and one-way analysis of variance F-tests for interval-valued characteristics.

For the analyses comparing scales across ownership categories, the dependent variables for the analysis are the scores representing the level of adoption of each of the nine hospital and nine physician practice scales, as described in appendix section 1.[35] Unadjusted analyses are presented in appendix exhibits 1.4 and 1.5, which illustrate the distribution of scores within each ownership category.[35] We also compute an approximate measure of the percentage of the true variation between hospitals and practices that is unexplained by ownership category. See appendix exhibit 1.6.[35]

For the adjusted comparisons of scale scores (see below), we first compared independent hospitals and practices with all hospitals or practices within financially integrated systems. We then tested whether there are significant differences among practices or hospitals in the different ownership categories of financially integrated systems (excluding independent hospitals or practices from this analysis). We did not adjust significance tests to account for multiple comparisons because this would have biased us against finding significant differences across ownership categories, and thus made our many important findings that are

of no statistical significance less meaningful. The adjustments for covariates were performed using hierarchical linear regression-based comparisons of the scales across the different ownership categories that adjusted for potential confounding variables and accounted for the clustering of multiple observations made on the same health system. Covariates were selected as potential confounding variables for inclusion in the models on the basis of prior research suggesting their association with quality and their availability in the OneKey database. The resulting set of covariates consisted of census region, hospital or practice size (beds or number of physicians), and urbanicity (and, for hospitals, whether it was part of an academic medical center). We also ran models to determine whether health care system size was independently associated with better quality (using the total number of beds in the system for the hospital models and total number of physicians for the practice models). Appendix section 3.2 presents the regression model estimates.[35]

To consider the impact of response rates, appendix section 4 presents analyses to evaluate the plausibility of the results being overturned under a hypothetical 100 percent response rate.[35] We derived a statistic to estimate the differences in mean outcomes for nonrespondents versus respondents that would be required for the results to change such that organizations owned by complex integrated delivery systems would be found to be significantly better than a given comparator organization.

Limitations

This study has several potential limitations. First, although we adjusted for nonresponse along many dimensions, the possibility of nonresponse bias remains. This is an important concern, but it cannot be adequately addressed by achieving a specific cutoff point for response rates. The association between nonresponse and nonresponse bias is recognized to be weak and item-specific: high response rates are no guarantee that bias will be absent, and low response rates do not necessarily imply significant bias.[37] To address this concern, we developed an approach to estimating the impact of a potential nonresponse bias that is analogous to the E-value, developed to calculate the sensitivity of the results of an analysis to an unmeasured confounder.[38] Appendix section 4 estimates what nonrespondents' average scores would have to be for complex integrated delivery systems to be significantly and meaningfully better than other types of organizations, choosing both a zero- and a ten-point difference in scores as thresholds for meaningful differences (on a 0–100 scale).[35] Nonrespondents' scores would have to differ dramatically and, we believe, implausibly to reverse our main finding that organizations differ little across ownership categories in the use of quality-focused care delivery and payment reforms.

Second, we excluded physician practices with only one or two primary care physicians because of cost constraints. Such small independent practices would be less likely to have the resources to invest in most of the care delivery reforms we evaluate. The question of primary interest, however, is whether independent practices can deliver care of equal or better quality as practices in financially integrated systems. Our findings suggest they can.

Third, the broad range of quality measures we included reflects domains of care that would be difficult to measure on a national scale in any other way than through surveys of

knowledgeable, site-specific respondents. We were unable, however, to address the actual degree of implementation or the quality of implementation of these activities.

Fourth, we did not include measures of the actual degree of concentration in the markets where the hospitals and practices were located. Whether hospitals or practices in more or less concentrated markets adopt more or fewer quality-focused care delivery and payment processes is an important area for further investigation.

Finally, cross-sectional studies such as ours reveal associations, not causation. How generalizable our findings will be to the post-COVID 19 health care system is also uncertain.

Study Results

Exhibit 1 describes the characteristics of hospitals by ownership category. Hospitals in complex systems (those with owner subsidiaries) are larger (mean, 242 beds) compared with those in simple systems (mean, 180 beds) or independent hospitals (mean, sixty-seven beds), and complex systems have more hospitals than simple systems (median, six hospitals versus one hospital). Hospitals in complex and simple systems are more likely to be in metropolitan areas (62 percent and 54 percent respectively) than independent hospitals (20 percent), whereas independent hospitals are more likely to be in small towns (39 percent) or isolated locations (22 percent) compared with those in complex systems (14 percent and 5 percent, respectively) or simple systems (18 percent and 10 percent, respectively). Hospitals in complex systems are more likely to be for-profit hospitals (21 percent versus 5 percent for hospitals in simple systems and 6 percent for independent hospitals), whereas independent hospitals are more likely to be government-owned (47 percent versus less than 10 percent for hospitals in complex and simple systems). Hospitals in complex and simple systems are equally likely to be teaching hospitals (about 45 percent each), whereas 89 percent of independent hospitals are nonteaching. The majority of hospitals reported participating in payment reform initiatives (82 percent for those in complex systems, 83 percent for those in simple systems, and 62 percent for independent hospitals).

Exhibit 2 compares physician practices and their composition according to the ownership categories used in this analysis. Complex systems owned more practices (median, eighty practices) than either simple systems (median, thirteen practices) or medical groups (median, nine practices). Physician practices owned by complex systems, simple systems, and medical groups were larger (median number of physicians was six in each case) than independent practices (median number of physicians was four). The composition of the practices also differed, with a higher proportion of specialists in the practices in complex systems (70 percent) and simple systems (65 percent) than in practices in medical groups (40 percent) or independent practices (13 percent). Differences by urban or rural location and region of the country were small across ownership categories. More than 80 percent of practices reported participating in at least one payment reform model, and a majority of practices were involved in an accountable care organization. Less than 30 percent of practices of any type reported that they were located in a very competitive market; this differed little by ownership status.

Appendix exhibit 2.2 provides several additional details of the differences between complex and simple systems.[35] Complex systems were more likely to describe their largest market as very competitive than were simple systems; this was true for inpatient services (65 percent versus 37 percent) and outpatient services (65 percent versus 46 percent). Complex systems were more likely to report purchasing physician practices in the past two years than simple systems (77 percent versus 62 percent), as well as being more likely to report planning to purchase practices in the next two years (78 percent versus 63 percent).

Exhibit 3 (hospitals) and exhibit 4 (physician practices) compare adjusted mean scores across ownership categories for each of the nine care delivery and payment reform scales that serve as the primary quality measures used in this study. Higher scores indicate higher levels of adoption of the specific quality measure. Exhibit 3 compares hospitals according to ownership category, and exhibit 4 does the same for physician practices. Asterisks are used to report tests of significance for each measure on two comparisons: a test of whether independent organizations differ significantly from those owned by systems, and a test of whether there are significant differences among organizations owned by different categories of systems. For hospitals, this test compares those in simple or complex systems; for practices, this test compares those owned by complex systems, simple systems, and medical groups.

Among hospitals (exhibit 3), the differences between independent hospitals and those in financially integrated delivery systems are significant ($p < 0.10$) for four of nine measures: independent hospitals had lower (worse) participation in quality-focused payment programs ($p < 0.05$), screening for social needs ($p < 0.10$), use of electronic health record–based decision support ($p < 0.10$), and support for care transitions ($p < 0.01$). There were no significant differences in scores comparing hospitals in complex systems with those in simple systems.

For physician practices (exhibit 4), significant differences between independent practices and those in financially integrated systems were found for three of nine measures. Independent practices had lower (worse) scores for participation in quality-focused payment programs ($p < 0.001$). However, independent practices had significantly higher (better) mean scores on screening for clinical conditions ($p < 0.01$) and screening for social needs ($p < 0.05$). Comparing physician practices across different types of financially integrated systems, significant differences were found for only two of nine measures (participation in quality-focused payment programs and use of electronic health record–based decision support), but neither favored complex integrated delivery systems (exhibit 4).

In additional analyses, we found that the range of variation in unadjusted scores was substantial (appendix exhibits 1.4 and 1.5),[35] and that little of the variation in scores could be explained by ownership (appendix exhibit 1.6).[35] We also tested whether the size of financially integrated systems was associated with higher levels of adoption of care delivery and payment reforms. Hospitals in larger systems reported significantly lower (worse) scores on one of nine scales: support for care transitions. There were no significant differences across physician practices in systems of different sizes on any of the nine physician practice scales.

Discussion

We found little relationship between financial integration of hospitals and physician practices and better quality, as measured by higher levels of adoption of care delivery and payment reforms. Independent hospitals had lower scores for four of nine measures (marginally so for two of these), but there were no differences between hospitals in simple and complex systems. Independent physician practices were less likely to participate in payment reforms, but more likely to screen patients for clinical conditions or social needs. In no case did physician practices in complex systems have higher scores. Bigger system size was not associated with better scores.

Our findings are consistent with other research. The evidence from earlier studies that financial integration between hospitals and physician groups improves process measures of quality is at best mixed, with only one study finding evidence of improvement on several measures of process quality.[33] We examined a broader range of measures and found no pattern to suggest that financial integration for physician practices was associated with better quality. Our results are also consistent with recent research from the patient's perspective finding that larger medical practices and hospital-owned groups do not provide more coordinated care.[39] There is also some evidence that small physician practices deliver better care on other domains of quality,[40] and physician-led accountable care organizations have been more successful than hospital-integrated accountable care organizations.[41]

Implications For Policy And Practice

Our findings have important implications for current debates about whether the potential benefits of financial integration are sufficient to outweigh the potential harm of reduced competition. The finding of dramatic variations in quality scores across hospitals and practices in each ownership category also argues that financial integration may not be needed to improve care delivery. Given the paucity of evidence of benefit, federal and state efforts to address provider consolidation and monopoly pricing deserve continued attention.[42] Our finding that independent hospitals had somewhat lower scores on several measures could reflect the more limited financial capacity of these hospitals. How to preserve needed access for the communities served by these hospitals without anticompetitive effects also deserves attention.

These findings also raise the question of why financially integrated delivery systems do not do better in adopting such reforms. One possibility is that sufficient conditions do not yet exist to motivate change. The move away from fee-for-service to value-based payment may not yet be at the tipping point for financially integrated systems to "activate" their potentially greater resources and capabilities to implement recommended reforms. This would be consistent with findings from a simulation model that primary care practices must have at least 63 percent of their revenue under capitation to adopt team-based care.[43] Another possibility could be differences in the capacity for innovation in the different organizational forms studied. The assumption that the larger, more financially integrated delivery systems have a greater capacity to innovate by adopting such reforms may not be true. Larger

organizations can experience diseconomies of scale and increased costs of coordination that can be avoided by smaller, more nimble organizations.[44]

Finally, the magnitude of variation in quality measures within each ownership category highlights the potential for improvement that remains whether the hospital or practice is part of a financially integrated system or not. Much more needs to be learned about how to accelerate improvement. This may be through the expanded adoption of alternative payment models that reward high-value care, the better alignment of payment models across payers to increase the magnitude of incentives, greater transparency of both cost and outcomes data, greater leadership and managerial skills in implementing changes in care redesign and continuous quality improvement, or most likely, all of the above. These findings make clear that higher levels of adoption of quality-focused care delivery and payment reforms can be achieved without greater financial integration.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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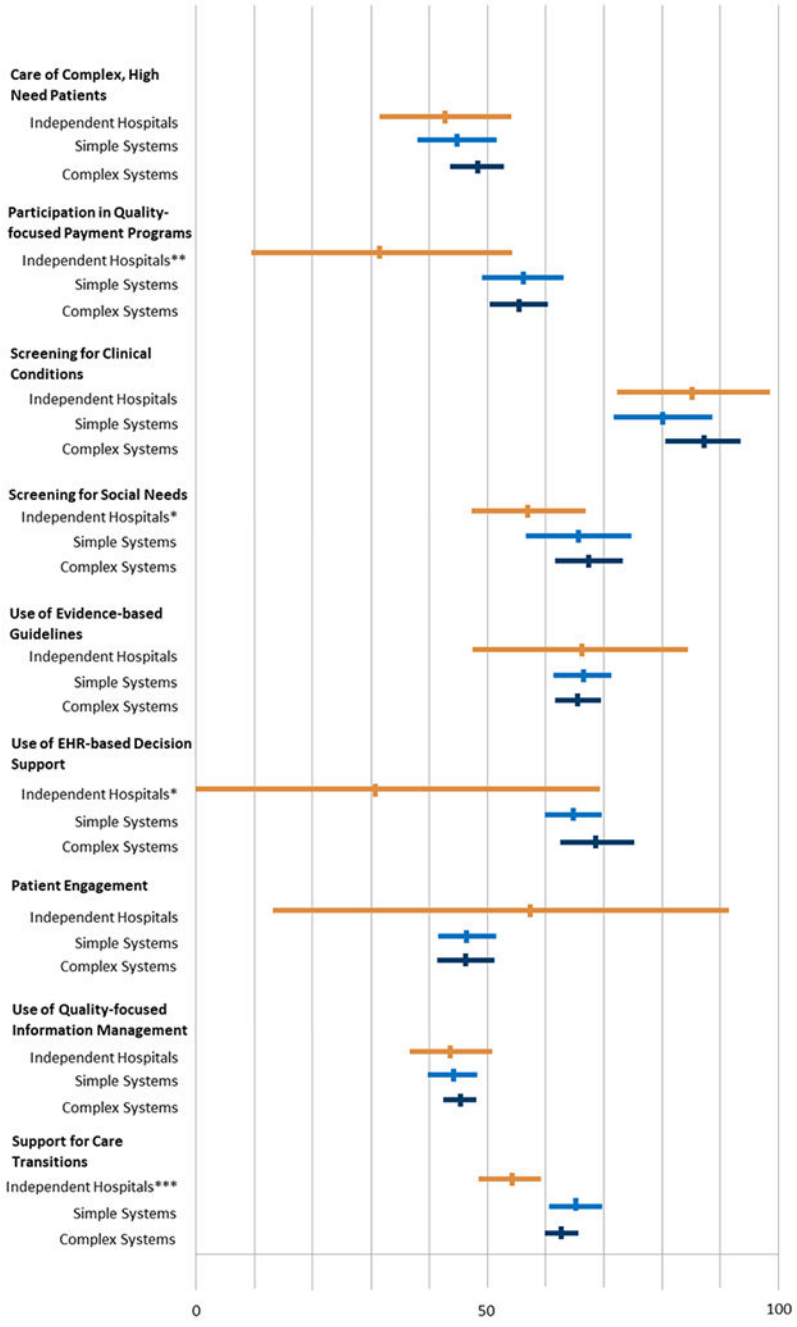

Exhibit 3. Comparison of Care Delivery and Payment Scores for Hospitals in Different Ownership Categories

Source / Note: Source: Authors' analysis of NSHOS Hospital Survey Responses. Note: Exhibit 3 shows estimated scores, adjusted as described in Methods. Vertical lines represent estimated scores; horizontal lines represent 95% confidence intervals for the mean outcome with end-points the 2.5'th and 97.5'th confidence interval limits. Asterisks are used to report tests of significance for each measure on two comparisons: (1) a test of whether independent hospitals differ significantly from all hospitals owned by systems of some type; if significant the asterisk is put next to the label "independent hospitals"; (2) a test of whether there are

significant differences across hospitals owned by systems; if significant, the asterisk is placed next to the label “simple systems”. The following convention is used: * $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$ **** $p < 0.001$

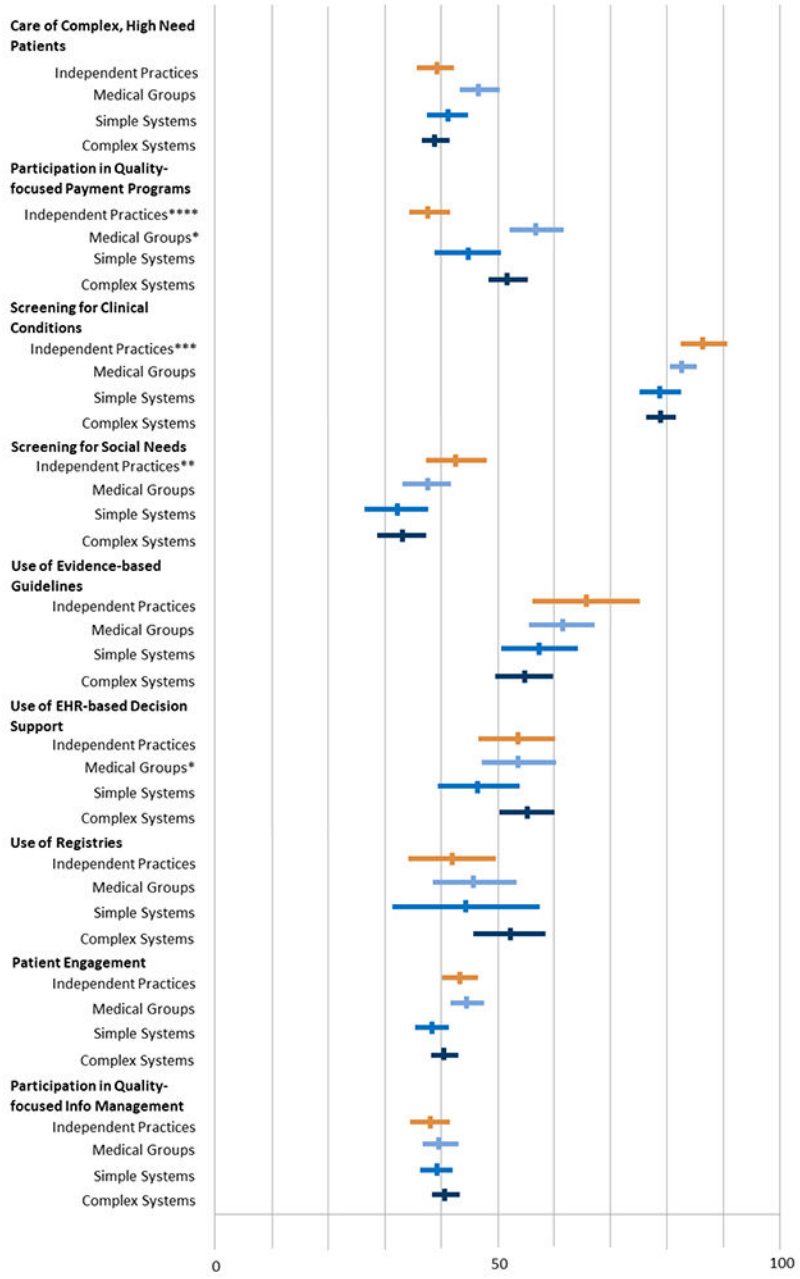

Exhibit 4. Comparison of Care Delivery and Payment Scores for Practices in Different Ownership Categories

Source / Note: Source: Authors' analysis of NSHOS Practice Survey Responses. Note: Exhibit 4 shows estimated scores, adjusted as described in Methods. Vertical lines represent estimated scores; horizontal lines represent 95% confidence intervals for the mean outcome with end-points the 2.5'th and 97.5'th confidence interval limits. Asterisks are used to report tests of significance for each measure on two comparisons: (1) a test of whether independent practices differ significantly from all practices owned by systems of some type; if significant the asterisk is put next to the label "independent practices"; (2) a three-way test of whether there are significant differences among practices owned by different categories of systems; if

significant, the asterisk is placed next to the label “medical groups”. It is possible for individual differences between medical groups and complex systems or between medical groups and simple systems to be statistically significant when the three-way comparison is not significant and vice-versa. The statistical significance of the individual contrasts between medical groups and complex systems and between medical groups and simple systems are given in the tables of the fitted hierarchical regression models in Appendix Table 3.2.b. Although several of these pairwise comparisons were significant, all of these favored medical groups over simple and/or complex systems.

The following convention is used: * $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$ **** $p < 0.001$

Exhibit 1:

Characteristics of hospitals, by ownership category

	Complex integrated delivery systems	Simple integrated delivery systems	Independent hospitals
Characteristics of the systems			
Total number of system respondents	88	126	NA
Total number of hospital respondents	428	253	58
Median number of hospitals per system	6	1	NA
Mean number of beds per hospital	242	180	67
Median number of beds per system	1,058	250	NA
Characteristics of individual hospitals, by ownership category (percent of all hospitals in column)			
Mean number of staffed beds per hospital	197	182	67
Type of community where located (%)			
Metropolitan	62	54	20
Micropolitan	19	19	19
Small town	14	18	39
Isolated	5	10	22
US census division region (%)			
New England	7	7	0
Mid-Atlantic	6	16	6
East North Central	16	14	1
West North Central	12	15	12
South Atlantic	18	15	12
East South Central	6	9	12
West South Central	14	9	27
Mountain	9	6	14
Pacific	12	10	17
Hospital ownership (%)			
Not-for-profit	75	87	47
For-profit	21	5	6
Public (government)	4	8	47
Academic status of hospital (%)			
Member of the Council of Teaching Hospitals	6	8	0
Minor teaching hospital	39	36	11
Nonteaching	55	56	89
Participating in any payment reform initiative (%)	82	83	62

SOURCE Data based on authors' analysis of the OneKey and American Hospital Association databases, weighted to account for sample design and nonresponse to provide national estimates of the characteristics of US nonfederal acute care hospitals. NOTES Tests of significance across all three ownership categories were $p < 0.001$ for all variables with the exception of region ($p = 0.01$) and revenue from payment reform initiatives ($p = 0.001$). NA is not applicable.

Exhibit 2:

Characteristics of physician practices, by ownership category

	Complex integrated delivery systems	Simple integrated delivery systems	Medical groups	Independent practices
Characteristics of the systems, by ownership category				
Total number of system respondents	88	126	111	NA
Total number of practice respondents	873	326	378	612
Median number of practices in system	80	13	9	1
Median number of physicians in the system	922	110	47	4
Primary care and specialist distribution				
Mean percent primary care physicians in system	30	35	60	87
Mean percent specialist physicians in system	70	65	40	13
Characteristics of the individual physician practices, by ownership category (percent of all practices in column)				
Median number of physicians	6	6	6	4
Type of community where located (%)				
Metropolitan	88	71	90	79
Micropolitan	7	15	3	14
Small town	4	9	5	5
Isolated	1	5	2	2
US census division region (%)				
New England	8	11	6	6
Mid-Atlantic	9	15	12	17
East North Central	25	17	14	10
West North Central	11	15	5	7
South Atlantic	15	12	18	20
East South Central	4	7	2	6
West South Central	5	8	7	9
Mountain	8	5	14	8
Pacific	17	10	22	16
Member of an independent practice association (%)	14	15	25	24
FQHC or FQHC look-alike (%)	17	23	33	22
Participating in any payment reform initiative (%)	90	91	94	83
Participating in any accountable care organization model (%)	71	64	70	54
Perceived intensity of competition (%)				
Very competitive	27	20	18	19
Somewhat competitive	48	50	58	50
Not at all competitive	25	30	24	31

SOURCE Data based on authors' analysis of the OneKey and American Hospital Association databases and weighted to account for sample design and nonresponse to provide national estimates for physician practices with two or more primary care physicians. NOTES Tests of significance across all four ownership categories were $p < 0.001$ for all variables with the exception of whether clinic was a FQHC or FQHC look-alike ($p = 0.02$) and perceived intensity of competition ($p = 0.02$). NA is not applicable. FQHC is federally qualified health center