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Consolidation Trends In California's Health Care System: Impacts On ACA Premiums And Outpatient Visit Prices

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ABSTRACT California has heavily concentrated hospital, physician, and health insurance markets, but their current structure and functioning is not well understood. We assessed consolidation trends and performed an analysis of “hot spots”—markets that potentially warrant concern and scrutiny by regulators in terms of both horizontal concentration (such as hospital-hospital mergers) and vertical integration (hospitals’ acquisition of physician practices). In 2016, seven counties were high on all six measures used in our hot-spot analysis (four horizontal concentration and two vertical integration measures), and five counties were high on five. The percentage of physicians in practices owned by a hospital increased from about 25 percent in 2010 to more than 40 percent in 2016. The estimated impact of the increase in vertical integration from 2013 to 2016 in highly concentrated hospital markets was found to be associated with a 12 percent increase in Marketplace premiums. For physician outpatient services, the increase in vertical integration was also associated with a 9 percent increase in specialist prices and a 5 percent increase in primary care prices. Legislative proposals, actions by the state’s attorney general, and other regulatory changes are suggested.

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Increases in the market concentration of health care providers and insurers have been examined nationally.^{1–3} Studies suggest that increases in market concentration are associated with increases in prices and premiums.^{2–12} However, we also know that the local markets for health care differ dramatically. At the state level, laws and regulations, as well as the mix of providers and insurers, make markets in each state vastly different.

The health care system in California has several characteristics that distinguish it from the rest of the country.¹³ The state contains some of the nation’s most densely populated urban areas, but it is mostly rural. Its health care system has a high level of integration and managed care. More than 60 percent of care is provided through a fully or highly integrated care system.^{14–16} The

supply of doctors and nurses in California is slightly above national averages. For example, California has 380 physicians per 100,000 population, whereas the US has 295 per 100,000.¹⁷ Although per capita health care spending in California was the fifteenth-lowest in the US in 2014,¹⁸ it has been increasing—in large part because of the successful implementation of the Affordable Care Act (ACA) in California.¹⁵

This article explores three features of California health care markets. First, we measure trends from 2010 to 2016 in the horizontal concentration of insurers and providers (such as hospital-hospital mergers and acquisitions) and vertical integration—particularly, ownership of physician practices by hospitals. Second, we estimate the association of market concentration and vertical integration with ACA Marketplace premi-

ums and outpatient office visit prices. Finally, we discuss policy implications for California's Office of the Attorney General, the legislature, and other regulators in the state.

Study Data And Methods

DEFINING MARKET CONCENTRATION AND MARKET SHARE

We measured market concentration by computing Herfindahl-Hirschman Indices (HHIs) for insurance, hospitals, primary care physicians, and specialist physicians in California. For each measure, we calculated these HHIs by summing the squared market shares of firms. For example, if a market included two firms, one with 80 percent of the market and the other with 20 percent, the HHI of the market would be 6,800 (or 80^2 plus 20^2). The Horizontal Merger Guidelines of the Department of Justice (DOJ) and Federal Trade Commission (FTC) consider markets with HHIs below 1,500 to be unconcentrated, those with HHIs of 1,500–2,500 to be moderately concentrated, and those with HHIs above 2,500 to be highly concentrated.¹⁹ In the context of mergers, the DOJ/FTC guidelines state, “Mergers resulting in highly concentrated markets that involve an increase in the HHI of more than 200 points will be presumed to be likely to enhance market power.”¹⁹ Both mergers in moderately concentrated markets that would lead to an increase in the HHI of more than 100 points and mergers in highly concentrated markets resulting in an increase in the HHI of 100–200 points “potentially raise significant competitive concerns and often warrant scrutiny,” according to the guidelines.¹⁹

Our market shares for hospitals included only short-term general hospitals.²⁰ Additionally, we treated hospital systems as a single firm because they bargain with insurers as a single unit.²¹ We calculated the market share of hospitals and health insurers using inpatient admissions and commercial enrollment (for both fully and self-insured employer groups), respectively. For specialist and primary care groups, we calculated market shares using the number of physicians in each group. Physician organizations owned by a group medical practice, hospital, or health care system (which always included at least one hospital) were treated as a single firm. Our measure of specialist market share included four specialties—cardiology, hematology/oncology, orthopedics, and radiology. These four specialties were chosen because the sample sizes were sufficiently large (at least 10,000 physicians nationally) in our physician data source. Data sources used to calculate these measures included the American Hospital Association (AHA) Annual Survey Database, for hospitals; the Man-

aged Market Surveyor provided by Decision Resources Group (formerly HealthLeaders-Interstudy), for health insurers; and the SK&A Office Based Physicians Database provided by QuintilesIMS, for physicians (this data source is now known as IQVIA). We measured the level of vertical integration as the percentage of physicians in practices owned by hospitals.²² We chose to use the SK&A database instead of the AHA database to measure the level of vertical integration because the former provides a more conservative estimate (by 4 percentage points) of the number of physicians in hospital-owned practices, according to a recent study.²³

ANALYSIS Using multivariate linear regression, we estimated the association between Marketplace premiums and our measures of horizontal concentration and vertical integration in the market, using data for 2014–17 on premiums from the Covered California website.²⁴ We analyzed the benchmark premiums—those for the second-lowest-cost silver plan in each rating area—for a forty-year-old person. Rating areas are counties or combinations of counties in California through which Covered California sells health insurance. There were nineteen rating areas established by the California State Legislature in September 2013. Because the premiums available were at the rating area level, we correlated them with rating area-level HHIs (that is, we used rating area-level market shares in HHI calculations) rather than county-level HHIs.

The dependent variable in our model was the benchmark premium for a forty-year-old person in a rating area for a particular year. The independent variables in the model were the natural log of hospital HHI (mean centered), the percentage of all physicians in practices owned by hospitals (mean centered), an interaction term between these two measures, the natural log of insurer HHI, the natural log of the average weekly wage in rating areas, and year dummy variables to control for secular trends. All market concentration measures were lagged by one year because Marketplace premiums are set prospectively. There were seventy-six observations in the regression (nineteen rating areas multiplied by four years, 2014–17).

In separate regressions, we also estimated the association between market concentration and physician prices, separately for primary care physicians and specialists. The physician prices we analyzed came from medical claims data for 2011–16 collected from self-insured employers from multiple industries, including professional services, retail, local government, technology, and manufacturing. The database we used contained 70.9 million California claims for 2011–16 and included data for every county in the state.

From the claims data, we identified all procedures performed in an office-based setting by primary care physicians and specialists. For each procedure, identified by *Current Procedural Terminology* (CPT) codes, we calculated the mean price per procedure in each county and year. These prices represented the market-level prices used as the dependent variable in our model.

We then examined the association between market concentration and office visit prices using the log-transformed county-level price for each procedure and year, which allows for a percentage interpretation of our results. To measure market concentration, we used the log-transformed primary care physician or specialist HHI, the log-transformed insurer HHI, and the percentage of physicians (either primary care or specialists) in practices owned by a hospital. All market concentration measures were lagged by one year. We included fixed effects for CPT code, county, and year.

LIMITATIONS The study had several limitations. First, we could not rule out potential endogeneity or omitted variable bias between concentration/integration and prices/premiums. While our price regressions used CPT code, county, and year fixed effects to ameliorate concerns of omitted variable bias, our Marketplace premium model included year fixed effects only. And while lagging our concentration measures by a year should have helped reduce the concern of endogeneity, it did not eliminate the possibility.

Second, we report results for a single state. As

we stated above, California's health care market differs from those of other states in a number of ways. Hence, our results might not be generalizable to other states. Finally, we did not measure the effects of integration on quality and utilization.²⁵ If care were more expensive while also more comprehensive, overall utilization and spending could decrease as prices increase.

Study Results

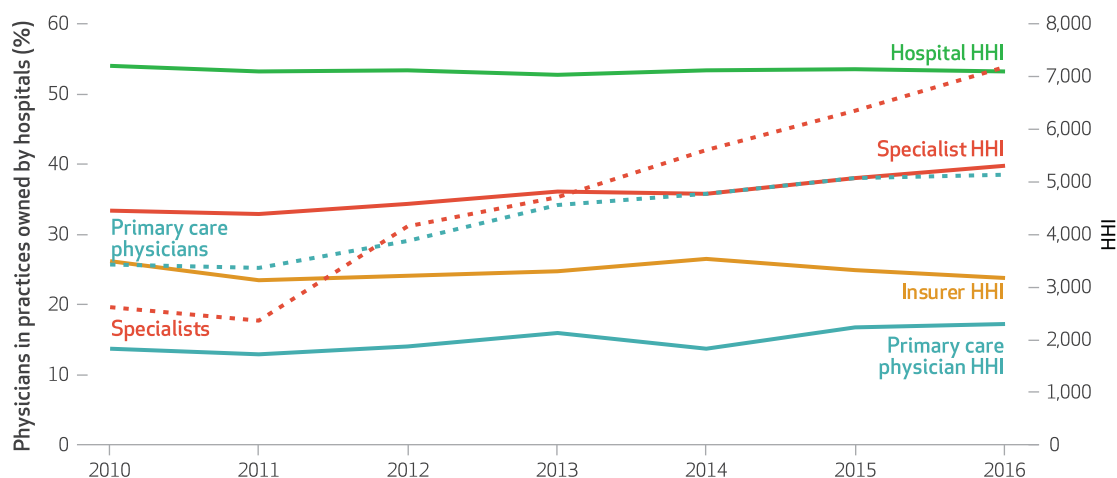
Hospitals in the forty-one counties with populations of less than 500,000 were highly concentrated during the entire study period (exhibit 1), with an average HHI of more than 7,000. (See online appendix figures A2–A4 for results for other counties.)²⁶ The insurer market was also highly concentrated, with an average HHI of more than 3,000 during the study period. For physician markets, the specialist HHI was more than 5,000, while the primary care physician HHI was just under 2,300 (exhibit 1).

There was a dramatic increase in vertical integration, with the percentage of physicians in practices owned by hospitals increasing from about 25 percent in 2010 to more than 40 percent by 2016 (data not shown). The percentage of primary care physicians in practices owned by hospitals increased from 26 percent to 38 percent in this time period, while the percentage of specialists in such practices increased from 20 percent to 54 percent (exhibit 1).

We also examined the average trends in hori-

EXHIBIT 1

Horizontal concentration and vertical integration in selected California counties, 2010–16



SOURCE Authors' analysis of data for health insurers from the Managed Market Surveyor provided by Decision Resources Group (formerly HealthLeaders-Interstudy), for hospitals from the American Hospital Association Annual Survey Database, and for physicians from the SK&A Office Based Physicians Database provided by QuintilesIMS. **NOTES** Herfindahl-Hirschman Indices (HHIs) indicate market concentration and are explained in the text. The figure shows unweighted data for forty-one California counties with populations of less than 500,000. Specialists include physicians in the fields of cardiology, oncology, radiology, and orthopedics. The dashed lines refer to percentages of primary care physicians and specialists in practices owned by hospitals.

zontal concentration and vertical integration for all counties, calculated at the county level and weighted by the population of each county to produce a statewide weighted average (appendix figure A1).²⁶ The population-weighted HHI for insurers was the highest among all of the horizontal measures (about 2,400), with virtually no change over the study period. The population-weighted HHI for hospitals was slightly lower and also showed little change. Most of the hospital and insurer consolidation in California took place before our study period.²⁷ The population-weighted HHIs for specialists and primary care physicians increased by 17 percent and 19 percent, respectively, in the period but remained below 1,500. The statewide average level of vertical integration, as measured by the percentages of physicians in practices owned by hospitals, increased at a rate similar to that for the forty-one counties with populations of less than 500,000.

To analyze levels of and changes in market concentration, we constructed a map of “hot spots”—markets that potentially warrant concern and scrutiny by regulators in terms of both

horizontal concentration and vertical integration (exhibit 2). It should be noted that our vertical integration threshold is not codified in the DOJ/FTC guidelines, as the horizontal concentration threshold is.

Only two counties had a market concentration score (or “hot spot rating”) of 6 in 2010. This increased to seven counties in 2016 (see appendix table A1 for a list of all counties and appendix figure A5 for a map of counties by name).²⁶ Similarly, only two counties had a score of 5 in 2010, compared to five counties in 2016.

We measured increases in the horizontal concentration and vertical integration scores. (Appendix figure A6 summarizes and displays the changes in our hot-spot map.)²⁶ For horizontal concentration, an increase in the score was recorded if the county had an HHI above 2,500 and a change in HHI that was greater than 200 points—in line with the DOJ/FTC Horizontal Merger Guidelines. For vertical integration, an increase in the score was recorded if the county went from below the median value in 2010 to above it in 2016.²⁸ During this period, out of a maximum score of 6, the highest score was 4. This indicates that the county’s horizontal concentration or level of vertical integration increased on four of the six measures.

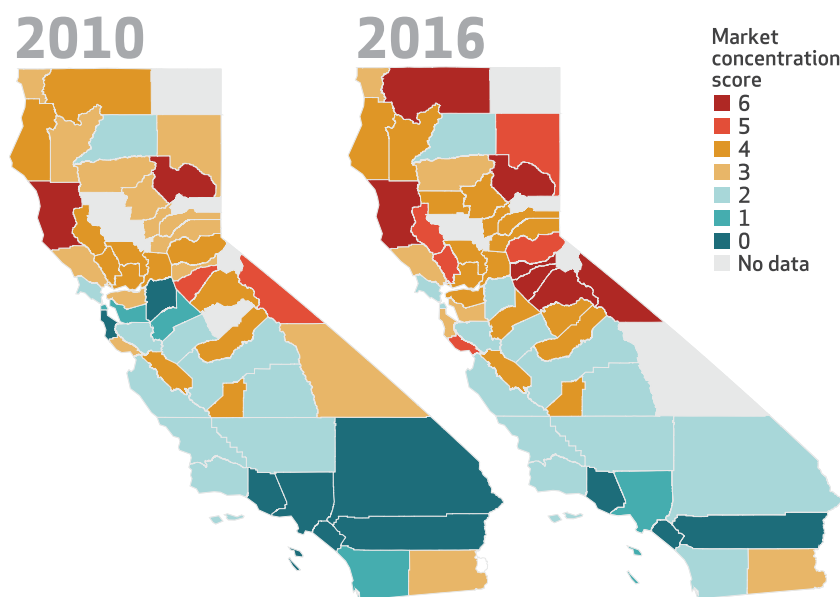
Four counties—Amador, El Dorado, Santa Cruz, and Siskiyou—each had a score of 4, which indicates that they had had the greatest change in terms of our six measures (appendix figure A6).²⁶ Of additional concern are the six counties—Calaveras, Humboldt, Kings, San Mateo, Stanislaus, and Tuolumne—that had a score of 3.

Appendix table A2²⁶ reports the results of our analysis of the relationship between benchmark Marketplace premiums and our measures of horizontal concentration and vertical integration. Our results suggest that hospital concentration was positively associated with Marketplace premiums. A 10 percent increase in the market concentration of hospitals was associated with a 1.8 percent increase in premiums; this is expressed as an elasticity of 0.182. Our measure of insurer concentration was also positively associated with premiums. The elasticity of 0.204 indicates that a 10 percent increase in insurer concentration was associated with a 2.0 percent increase in premiums. Importantly, the interaction term between hospital concentration and the level of vertical integration was positive and significant ($p < 0.05$). This means that the association between hospital concentration and premiums was larger when a high percentage of the physicians in a rating area were working in practices owned by hospitals.

The association between hospital concentra-

EXHIBIT 2

Horizontal concentration and vertical integration scores for selected California counties, 2010 and 2016



SOURCE Authors’ analysis of data sources provided in exhibit 1. **NOTES** Each county has a market concentration score based on six measures: the average Herfindahl-Hirschman Indices (HHIs) (explained in the text) for hospitals, insurers, primary care physicians, and specialists; and the percentages of primary care physicians and specialists (explained in the notes to exhibit 1) working in practices owned by hospitals. Higher index values indicate greater concentration. Counties are assigned one point for each HHI greater than 2,500 and for the percentage of primary care and specialist ownership greater than 33.23 percent and 32.35 percent, respectively (the medians for the period 2010–16). Higher scores indicate greater market concentration. The scores can also be interpreted as a thermal gradient, with the cool colors indicating counties that warrant lower concern and scrutiny by regulators and the hotter colors indicating counties that warrant increasingly more.

tion, the level of vertical integration, and Marketplace premiums is highlighted in exhibit 3. At a hospital HHI of 3,500, the predicted average monthly Marketplace premium for a forty-year-old person was about \$375 in 2017. When the hospital HHI increased to 5,000, the predicted premium rose to about \$400 (a 7 percent increase) if the percentage of physicians in practices owned by hospitals was 35 percent (the sample mean). If this percentage was 55 percent (the sample maximum), the predicted average monthly premium increased by even more—to about \$419 (a 12 percent increase). This suggests that the association between hospital HHI and premiums varies with the percentage of physicians in practices owned by hospitals (an interaction effect) and that the impact of hospital concentration on premiums becomes larger as vertical integration increases.

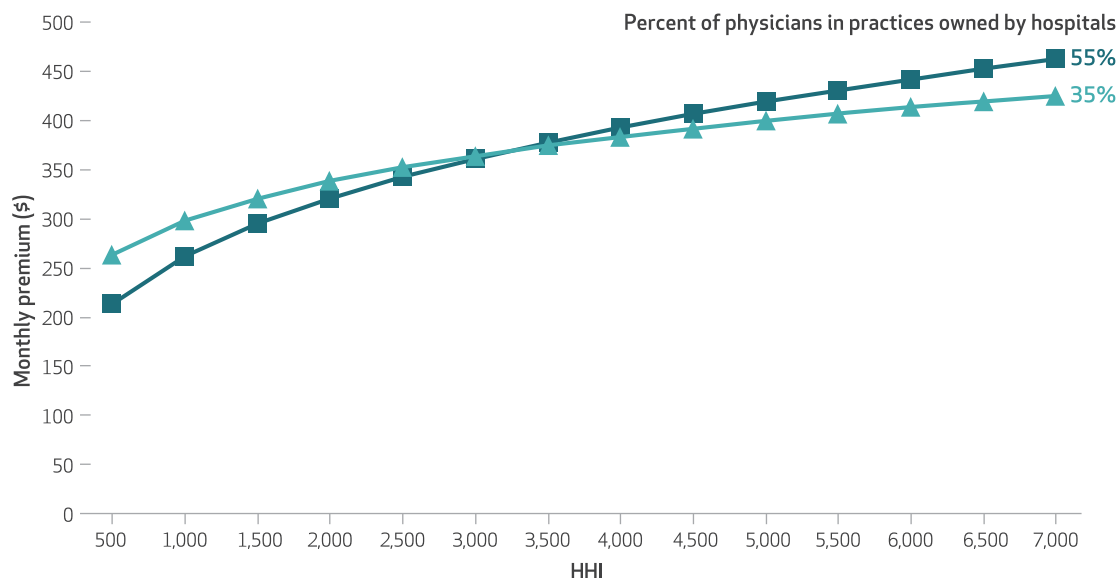
Turning to the association between market concentration and physician prices, we found that higher levels of insurer concentration were associated with lower primary care prices (see appendix table A3 for the regression output).²⁶ Primary care physician concentration, however, was positively associated with prices. Most important, we found a positive and highly significant ($p < 0.01$) relationship between the level of

vertical integration and primary care prices. Our results for specialist prices were somewhat different. We found no association between the concentration of insurers or specialists and specialist prices. However, there was again a positive and highly significant ($p < 0.01$) relationship between the level of vertical integration and specialist prices.

The positive relationship we found between vertical integration and physician prices aligns with the findings of other studies.^{3,4} The magnitude of its relationship is shown in exhibit 4. When the percentage of specialists in practices owned by hospitals was 35 percent (the county-level sample mean over our study period), the predicted specialist price in 2017 was about \$110. When the percentage increased to 100 percent (the county-level sample maximum over our study period), the predicted specialist price increased to about \$120—a 9 percent increase. When the percentage of primary care physicians in practices owned by hospitals increased from 33 percent (the county-level sample mean over our study period) to 100 percent (the county-level sample maximum), the predicted primary care price in 2017 increased from about \$80 to \$84—a 5 percent increase.

EXHIBIT 3

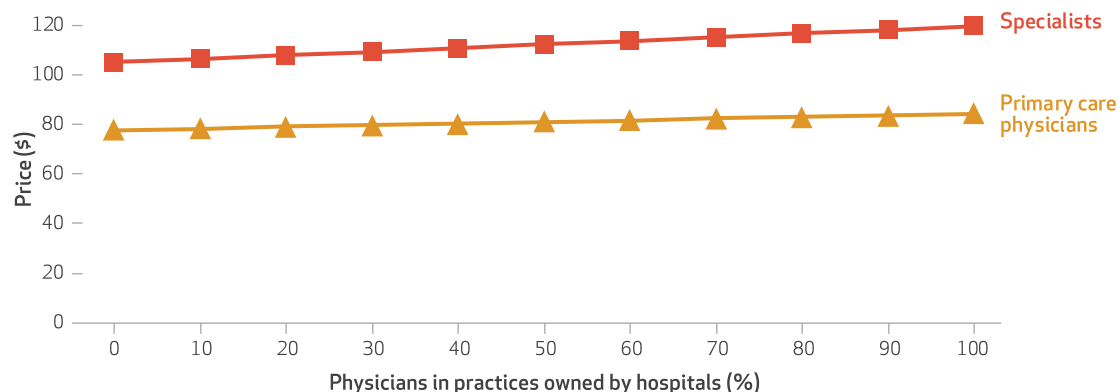
Predicted monthly benchmark premiums in California, by hospital market concentration, and physicians in practices owned by hospitals (maximum and mean), 2017



SOURCE For health insurers, authors' analysis of data sources provided in exhibit 1; for premiums, authors' analysis of data from Covered California. Data and research [Internet]. Sacramento (CA): Covered California; [cited 2018 Aug 21]. Available from: <http://hbex.coveredca.com/data-research/>. **NOTES** The benchmark premium is the premium for the second-lowest-cost silver plan in each rating area (explained in the text) for a forty-year-old person. HHI is Herfindahl-Hirschman Index (explained in the text). The regression coefficients used to produce this exhibit are in appendix table A2 (see note 28 in text). All continuous independent variables not shown in the exhibit were held at their sample means, and the year dummy variable was set to 2017.

EXHIBIT 4

Predicted outpatient office visit prices for primary care and specialist physicians, by percent of physicians in practices owned by hospitals, 2016



SOURCE For health insurers, authors' analysis of data sources provided in exhibit 1; and for prices, data obtained from a large group of self-insured employers. **NOTES** The regression coefficients used to produce this exhibit are presented in appendix table A3 (see note 28 in text). All continuous independent variables not shown in the exhibit were held at their sample means, the year dummy variable was set to 2016, and the county fixed effect was set to San Francisco.

Discussion

The most dramatic changes in hospital, physician, and insurer markets in California from 2010 to 2016 are seen most clearly in our measures of vertical integration—the percentages of primary care physicians and specialists in practices owned by hospitals. In 2016 more than 40 percent of physicians worked for practices owned by hospitals. Hospitals' desire to increase referrals has been advanced by researchers as a plausible explanation for why they pursue acquiring physician practices.^{3,29,30} Additionally, physicians working in a hospital-owned practice can add a hospital facility fee, which raises prices.³¹ Although there was little change in the market concentration of insurers and hospitals during our study period, both were highly concentrated according to the DOJ/FTC Horizontal Merger Guidelines and warrant high levels of concern and scrutiny by regulators. Any further consolidation, either horizontal or vertical, may need to be carefully examined.

There was significant variation in market concentration across the fifty-eight counties in California. Our hot-spot analysis shows that certain counties were high on all six measures of horizontal concentration and vertical integration. Moreover, some of these counties had an HHI increase of more than 200, which signals the need for regulatory scrutiny. This information can be used by California's Office of the Attorney General, the legislature, and other regulators to examine further consolidations and other actions that might increase market concentration or vertical integration.

An important result of our analysis is the com-

bined effect of hospital concentration and vertical integration on Marketplace premiums. Hospital concentration was positively associated with premiums, and the impact of hospital concentration on premiums became larger as vertical integration increased.

Our measure of vertical integration, the percentage of physicians in practices owned by hospitals, was positively and significantly correlated with primary care and specialty physician prices. This suggests that increased and special attention should be given to the acquisition of physician practices by hospitals in California.

Such acquisitions are not California-specific: From 2010 to 2016 the national share of office-based physicians who worked in organizations owned by hospitals increased from 30 percent to 48 percent.³² Other states have already taken regulatory actions to address this trend. One such action is taking place in Washington State, where the State Attorney General's office filed suit against Franciscan Health System to unwind acquisitions of and affiliations with physician organizations that allegedly violated antitrust laws and harmed consumers via anticompetitive health care prices.³³ The results of the St. Luke's case in Idaho are also relevant.³⁴ In this case, the judge took into account the benefits of vertical integration but found that the hospital's purchase of physician practices would give the hospital too much market power. Instead of allowing the hospital to purchase practices, he suggested that the benefits of vertical integration could be achieved by contracting, which would give the other hospitals in the area the ability to work with these physicians as well.

What can be done in the California legislature to deal with the effects of market concentration and integration on health care prices and premiums? Three important bills have been introduced in the legislature but have not yet passed. The first is SB-932 (2016), which proposes that any merger or consolidation would need to be approved by the director of the California Department of Managed Health Care and involve public hearings to ensure that the change would not have adverse effects on competition, health care costs, access, or quality of care in the state. SB-932 would also prevent hospitals from making anticompetitive demands when negotiating with health plans and insurers.³⁵ More recently, AB-595 (2017) would similarly require the director to review and approve health care plan or provider mergers based on whether they would have adverse effects on competition, health care costs, access, or quality of care.³⁶ Finally, SB-538 (2017) focuses on preventing anticompetitive practices among large hospital chains by instituting new rules for how hospital systems can contract with health plans, such as prohibiting hospital systems from requiring plans to include all of a system's hospitals in a contract.³⁷

California's health care markets are at a pivotal point. Rapid integration and consolidation may have significant benefits. Care coordination and quality improvement are possible, but so are significant increases in the cost of care.³⁸ There is also a large variation in quality across California, as measured by the California Regional Health Care Cost and Quality Atlas.³⁹ It would be very

useful to understand the relationship between quality and market concentration. Evidence provided by our study sheds light on what has been happening in California's health care markets. Our work highlights areas that should be of concern to regulators, policy makers, payers, and consumers.

Conclusion

Three aspects of hospitals' acquisition of physician practices in California and across the country are notable. First is the horizontal aspect of this consolidation, which needs to be scrutinized. For example, if a hospital system controls the market for orthopedists, it can raise prices for orthopedic surgery. Second is the cross-market power in hospital and physician service markets. For example, if a dominant hospital system acquires enough physician practices in a specialty, it can add significantly to its market power. Finally, the key and perhaps most important competitive threat is the ability of the acquiring hospital system to either foreclose rivals or significantly increase their costs. For example, lack of access to the patients of an acquired primary care practice by a rival hospital would be a vertical restraint that would limit competition.

The potential impact of hospitals' acquisition of physician practices calls for careful and detailed examination.⁴⁰ Improved economic and legal theories need development so that these acquisitions' potential efficiency and quality improvement can be weighed against the costs.^{41,42} ■

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article. The authors are also grateful to Martin Gaynor and Kathleen Foote for helpful discussions on the economic and legal theories of vertical integration.

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