

MARKET WATCH

How The Expansion Of Hospital Systems Has Affected Consumers

Hospital consolidation has resulted in more negatives than positives for consumers so far.

by Alison Evans Cuellar and Paul J. Gertler

ABSTRACT: The past decade has seen profound changes in how the hospital industry has organized itself, including the rising importance of hospital systems. Theoretically, system consolidation can have positive effects from improved efficiency and quality or negative effects from greater market power. This study examines which hospitals consolidate and finds that hospitals were more likely to join systems if they were for-profit institutions, were located in urban areas, or had high managed care loads. Furthermore, the evidence suggests that system formation has primarily served to increase market power, not improve patient care quality or hospital efficiency, at least in the short run.

OVER THE PAST DECADE we have seen profound changes in how the hospital industry has organized itself, including the extensive consolidation of hospitals through mergers and the rising importance of hospital systems. Fifty-one percent of private, acute care hospitals were part of hospital systems in 1995, and this proportion rose to 57 percent by 2000.¹ We have surprisingly little research, however, on the effect that joining a system has on hospital operations and patient care.

Hospitals can consolidate via merger or system acquisition. Most of what we know about hospital consolidation comes from studies of the former, not the latter. The American Hospital Association (AHA) defines *merger* as a full-asset merger, where separate institutions come together under one license. In contrast, a system acquisition occurs when

a hospital retains its license but transfers ownership to a separate governing body. The number of mergers peaked at 152 in 1996 but fell to 18 in 2000. In contrast, mergers and acquisitions combined numbered 310 in 1997 and remained relatively high at 132 in 2000 and 101 in 2002.² For practical reasons, researchers made a distinction between mergers and system acquisitions that policymakers did not make. Researchers have had access to publicly available data on hospital mergers for many years, whereas system formation has historically been more difficult to track and study.³ In an environment where the number of system acquisitions far outnumbers that of mergers, it is important for researchers to address system acquisition specifically.

■ **Effects of consolidation.** Hospital consolidation through the formation of systems can have positive or negative effects. On the

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 Alison Evans Cuellar (ac2068@columbia.edu) is an assistant professor in the Department of Health Policy and Management, Mailman School of Public Health, Columbia University, in New York City. Paul Gertler is Distinguished Professor of Health Policy and Management at the Haas School of Business and School of Public Health, University of California, Berkeley.

upside, the formation of hospital systems holds the promise of care that is of better quality, better coordinated, and better tailored to local needs. On the downside, system formation theoretically holds the potential for competitive harm as once-rival hospitals become aligned. As a result, hospitals may gain greater bargaining power with health plans, leading them to raise prices anticompetitively and to lower volumes. Ultimately, this could translate into higher costs for consumers through higher premiums. Some argue that nonprofits are less likely than for-profit hospitals to raise prices anticompetitively. Others argue, as has at least one court decision, that even if prices are raised, local communities will continue to benefit since they are indeed the sponsors of private, nonprofit hospitals.⁴ Consequently, increased revenues from higher prices could be used to further community benefits, such as charity care. Whether nonprofits behave this way in practice is unclear.

■ **Reasons for consolidation.** Why do hospitals join systems? Hospital consolidation is likely a response to managed care. David Dranove and colleagues found that managed care was associated with sizable increases in hospital market concentration.⁵ Others have found that hospitals consolidated to make themselves indispensable to managed care's provider networks and to achieve economies of scale.⁶ Furthermore, those that had consolidated were aggressively pushing back on health plans' attempts to reduce provider payments.⁷ In some instances, hospitals walked away from negotiations with health plans. More recent studies found that the balance of power has indeed shifted toward hospitals; they have been able to solidify their negotiating positions and gain concessions from plans in the form of large rate increases.⁸

Ownership type may also influence a hospital's strategy. Nationally, in 1995, 73 percent of for-profit hospitals were part of hospital systems, compared with 77 percent in 2000. The two largest U.S. chains are for-profit chains, although nonprofit hospitals are increasingly likely to join systems. The proportion of nonprofit hospitals that were part of

systems increased from 40 percent in 1995 to 51 percent in 2000. However, a systematic study to sort out the extent to which market and hospital characteristics drive hospital system formation has not been done.

We also know very little about how much hospital system formation affects patient care or competition. A few recent quantitative studies suggest that locally concentrated systems may be cause for policy concern (Exhibit 1).⁹ In general, these studies look at one outcome in isolation. Consequently, it is difficult to assess trade-offs between efficiency, quality, and market power and weigh the overall effect of hospital consolidation on consumers. For example, increases in prices could be justified if quality of care also improved.

For this study, we examined which individual and market-level factors help explain whether hospitals join a system in a local area, to understand what motivates these transactions. We then examined changes in hospital performance subsequent to joining a system. Our study includes acute care, nongovernment hospitals in four geographically dispersed states—Arizona, Florida, Massachusetts, and Wisconsin—from 1995 to 2000.¹⁰

Data And Methods

In this analysis we used longitudinal data on hospitals to study how joining a system changes hospital behavior. We used multivariate regression methods that take advantage of the longitudinal nature of the data.¹¹ We relied on three major sources: (1) the AHA's Annual Survey of Hospitals, (2) hospital-level annual financial data collected by each state agency, and (3) patient-level annual hospital discharge data.¹² The AHA asks whether the hospital belongs to a system, which allows us to assess changes in system status.¹³ It also provides data on hospital ownership, bed size, and teaching status. Hospital-level annual financial data from states provide income statement and balance sheet information, including hospital operating costs and payer discounts. Finally, the patient-level discharge data can be aggregated to determine hospitals' total discharges by payer,

**EXHIBIT 1
Prior Studies On Hospital System Acquisition**

Author	Outcomes examined	Area studied, years	Finding
Dranove and Lindrooth (2003)	Efficiency	National, 1988–2000	No effect
Ho and Hamilton (2000)	Quality	California, 1991–1995	No effect or lower quality ^a
Vita and Sacher (2001)	Prices and efficiency	California, case study of a single acquisition in 1990	Higher prices No change in efficiency or small decrease ^a
Krishnan (2001)	Prices	California and Ohio, 1994	Higher prices
Young, Desai, and Hellinger (2000)	Prices	California, 1990–1995	Higher prices
Capps and Dranove (2004)	Prices	4 markets, not named, 1997–2001	Higher prices (3 markets) No effect (1 market)

SOURCES: See Note 9 in text for full citations of studies.

^aResults depend on the measure examined.

total patient days by payer, and case-mix; county-level managed care penetration; and hospital inpatient quality and patient safety indicators. The county-level managed care measure includes patients in health maintenance organizations (HMOs) and preferred provider organizations (PPOs). Data from all three sources and years were combined and resulted in 1,377 hospital observations being used in subsequent analyses.

Which Hospitals Joined Systems?

It is difficult to evaluate whether consolidations have had their intended effects unless we examine where and why consolidations occur. Here we look at the hospital and market characteristics of hospitals that joined systems that had another hospital in the same metropolitan statistical area (MSA) relative to those that did not over the full study period.

We used multivariate regression models using data from the four states. We found that hospitals were more likely to local join systems if they were for-profit institutions or located in urban areas. For-profit hospitals had ten times higher odds of joining a system than nonprofits, while urban hospitals had 3.7 times higher odds than nonurban hospitals. Higher margins were associated with a greater pro-

pensity to join systems, meaning that hospitals under greater financial pressure were less likely to join systems.

The effect of managed care depended on whether the measure of managed care was hospital-specific or marketwide. Hospitals in markets with high levels of managed care penetration were less likely to join systems, but where managed care was growing quickly, hospitals were more likely to join systems. Those hospitals that had high managed care patient loads also were more likely to join systems. Whether the hospital was a teaching institution or had high per admission costs did not predict its joining a hospital system, controlling for other factors. In summary, we found that hospital consolidation is likely a response to managed care in urban areas, particularly among for-profit hospitals.

Impact On Performance

We examined the effect of joining a local system on a number of hospitals outcomes, including per patient expenditures, inpatient quality, prices, volume, and charity care. In each case we examine the impact one year after joining a system, allowing for an adjustment period. We used multivariate regression, taking advantage of the longitudinal data, and

controlled for whether a competitor hospital in the market consolidated; for local wage rates using a wage index; and for local managed care penetration, case-mix, and overall state trends.¹⁴ The panel-data method used here compares the outcome of interest (costs, quality, or prices) before and after joining a system. These changes are compared with the group of hospitals that did not join systems (Exhibit 2).

■ **Efficiency.** Those who support greater hospital consolidation argue that systems are able to improve efficiency, for example, by bringing in greater managerial expertise, updating hospital information systems, improving access to capital, and streamlining hospital functions. Also, when hospitals are located in the same area, they might be able to rationalize service delivery and coordinate care more effectively. Such improvements should lead to care that is produced at a lower cost.¹⁵

Using the longitudinal data, we estimated the effect of system formation on average hospital spending per patient day and per admission.¹⁶ In addition to the variables listed previously, we controlled for hospital case-mix and

volume. We found no statistical difference in the average spending per day between system and nonsystem hospitals. Hospitals that joined systems, however, had spending per admission that was on average 2.8 percent higher than that of nonsystem hospitals.

■ **Quality.** We subsequently examined whether this increase in spending translated into higher-quality care. In the wake of reports by the Institute of Medicine (IOM) on poor hospital quality and patient safety, more public attention has been paid to this issue, and hospitals may sense pressure from purchasers to respond.¹⁷ In addition, improved quality may be an appropriate justification for hospitals that have raised their prices relative to other hospitals.

The quality measures used in this analysis were created from the patient-level discharge data and were adjusted for patient characteristics.¹⁸ We examined only technical quality of care, not other characteristics that may be valued by consumers, such as hospital amenities. These indicators were grouped into three types: (1) rates of inpatient mortality following certain hospital conditions and proce-

EXHIBIT 2
Average Effect Of Hospital Consolidation On Key Outcomes

Concept	Outcome measure	Average change ^a
Efficiency	Hospital spending per patient admission	2.8% increase
Quality	Rate of inpatient mortality following conditions and procedures, by payer	No change for managed care patients No change for indemnity patients
	Rate of overused procedures, by payer	1.2% decrease for managed care patients No change for indemnity patients
	Rate of adverse patient safety events, by payer	No change for managed care patients No change for indemnity patients
Prices	Net inpatient per admission price, by payer	7.7% increase for managed care patients
		4.1% increase for indemnity patients
Volume	Inpatient admissions, by payer	14% increase for managed care patients No change for indemnity patients
Community benefits	Charity care admissions	No change

SOURCES: Authors' analyses of 1995-2000 American Hospital Association data; and of state hospital financial and hospital discharge data from the Arizona Department of Health Services, Florida Agency for Health Care Administration, Massachusetts Division of Health Care Finance and Policy, and Wisconsin Bureau of Health Information.

^a Changes are relative to hospitals that did not join systems as reflected in regression analyses.

dures, (2) rates of procedures considered overused, and (3) patient safety indicators.¹⁹ The mortality indicators include procedures and conditions for which evidence suggests that high mortality rates may reflect deficiencies in quality of care.²⁰ The patient safety indicators encompass twenty potential in-hospital complications and adverse events following surgeries, procedures, and childbirth. We examined each of the quality measures separately for managed care and indemnity patients.

For managed care patients we found that quality improved for one measure. System hospitals reduced the rate of overused procedures by 1.2 percentage points. However, rates of avoidable inpatient mortality and inadequate patient safety did not change. Among indemnity patients, we found that quality did not change. Separately, we assessed whether overall case-mix might drive the effects on quality. We found that joining a system did not change the average case-mix of either managed care or indemnity patients.

■ **Prices.** Our next step was to test whether system hospitals had higher prices than nonsystem hospitals. Price increases do not exclusively result from greater bargaining power with plans; they are also driven by changes in quality.²¹ If hospitals offer an improved product, payers may be willing to pay more for it. However, the study found little or no effect of systems on inpatient quality. Consequently, any price changes are likely to reflect gains or losses in market power, particularly if there is a combined pattern of higher prices and lower volumes.

The data do not include prices for individual hospital transactions with plans. Instead, we calculated the average discounted price per day paid by managed care plans and indemnity plans, respectively, after adjusting for differences in patient characteristics.²²

We found that managed care prices were higher in system hospitals than in nonsystem hospitals by an average of \$103 per day. Price increases for indemnity plans were somewhat smaller: \$99 per day. For managed care plans, this translates into a 7.7 percent increase in prices, while the increase in indemnity prices

was somewhat smaller: 4.1 percent. In addition, hospitals that joined systems had sizable increases in managed care inpatient admissions—on average, 14 percent. Changes in indemnity inpatient admissions were small and not statistically significant.

■ **Charity care.** Some argue that hospitals in systems could lose their local community orientation as control is shifted to corporate offices; others, that hospitals may be able to leverage greater bargaining power and use additional revenues to provide more charity care.²³ We found no changes in the average volume of hospital charity care admissions after joining a system.

Discussion

The number of hospital acquisitions has declined each year, yet policy circles are still concerned with the potential negative consequences of extensive hospital consolidation. This study suggests that some of these concerns may be justified. Our results show that following consolidation, hospital market power, not the efficiency of care delivery, increased; and hospitals gained higher prices but did not translate them into higher quality of inpatient care or the provision of more community goods. On net, this analysis suggests that consumers were worse off as a result of hospital consolidation, taking into account a broad range of outcomes.

■ **Caveats.** Although our results give reason for policy concern, they should be interpreted in light of several limitations. First, hospitals may have made improvements in certain types of care that were not captured here. This study is strictly based on changes in inpatient care quality and charity care. These two factors could have been changing in the outpatient arena, and such changes would not be captured in our analyses. In addition, reengineering care delivery and improving quality may take longer than the brief window assessed here. Furthermore, the analysis is limited to a few states and captures an average effect of hospital consolidation in those states; any given transaction could have effects that are quite different from those presented here.

Our data end at 2001; it is possible that different trends have been observed in the past four years, but insights gained from more recent interviews across a broad set of hospital markets show that this is unlikely.²⁴ Finally, we are unable to assess whether particular types of hospitals, such as academic medical centers, respond to consolidation differently than others do. There is great heterogeneity in the degree to which hospitals' missions emphasize financial motives, research, quality, or charitable ends. Our study could not take this diversity into account, because there were not enough consolidation transactions among subsets of hospitals to assess their impact separately.

■ **Implications for antitrust enforcement.** Our study is in the spirit of the original "medical arms race" studies that first led courts to believe that competition among hospitals was beneficial and that antitrust enforcement should be curtailed.²⁵ This is a view that persists among courts.²⁶ In contrast, our results support a more contemporary view that greater effort to investigate cases and enforce antitrust policy in this area is warranted. Federal authorities pursuing potential antitrust violations must examine many factors in a specific case, rather than the behavior of hospitals across the board. Recently, federal authorities have lost several antitrust cases, often on the basis of hospital market definitions.²⁷ Market definition for antitrust cases has been the subject of much nuanced research and controversy, as it relates directly to the required calculation of competition indexes. We find that acquisition leads to higher prices despite using a broad market definition, the MSA, rather than a narrow geographic area as would likely be used in an antitrust case. Furthermore, we find that any commitments hospitals may make in exchange for acquisition approval, such as quality or charity care, appear to be difficult to achieve, at best. Outside of antitrust enforcement, health policymakers who take a broad view of the health care system are faced with mounting evidence that hospital consolidation has meant more negatives than positives for consumers so far.

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NOTES

1. Includes nonpublic, acute care, general hospitals only.
2. Irving Levin Associates, *The Health Care Acquisition Report*, 8th and 9th eds. (New Canaan, Conn.: Irving Levin Associates Inc., 2002 and 2003).
3. For instance, the AHA has published annual listings of hospital mergers for many years. Not until 1995, however, did the AHA consistently provide data on hospital systems through its annual hospital data set.
4. See *F.T.C. v. Butterworth Health Corp.*, 946 F. Supp. 1245 (W.D. Michigan, 1996).
5. D. Dranove, C.J. Simpson, and W.D. White, "Is Managed Care Leading to Consolidation in Health-Care Markets?" *Health Services Research* 37, no. 3 (2002): 573–594.
6. C.S. Lesser and P.B. Ginsburg, "Update on the Nation's Health Care System: 1997–1999," *Health Affairs* 19, no. 6 (2000): 206–216.
7. C.S. Lesser and P.B. Ginsburg, "Back to the Future? New Cost and Access Challenges Emerge, Initial Findings from HSC's Recent Site Visits," Issue Brief no. 35 (Washington: Center for Studying Health System Change, February 2001).
8. J. White, R.E. Hurley, and B.C. Strunk, "Getting Along or Going Along? Health Plan–Provider Contract Showdowns Subside," Issue Brief no. 74 (Washington: HSC, January 2004).
9. D. Dranove and R. Lindrooth, "Hospital Consolidation and Costs: Another Look at the Evidence," *Journal of Health Economics* 22, no. 6 (2003): 983–997; V. Ho and B.H. Hamilton, "Hospital Mergers and Acquisitions: Does Market Consolidation Harm Patients?" *Journal of Health Economics* 19, no. 5 (2000): 767–791; M. Vita and D. Sacher, "The Competitive Effects of Not-for-Profit Hospital Mergers: A Case Study," *Journal of Industrial Economics* 49, no. 1 (2001): 63–84; R. Krishnan, "Market Restructuring and Pricing in the Hospital Industry," *Journal of Health Economics* 20, no. 2 (2001): 213–237; G.J. Young, K.R. Desai, and F.J. Hellinger, "Community Control and Pricing Patterns of Nonprofit Hospitals: An Antitrust Analysis," *Journal of Health Politics, Policy and Law* 25, no. 6 (2000): 1051–1081; and C. Capps and D. Dranove, "Hospital Consolidation and Negotiated PPO Prices," *Health Affairs* 23, no. 2 (2004): 175–181.

10. Public hospitals, specialty hospitals (for example, psychiatric hospitals), and those with fewer than 100 discharges are excluded.
11. Details on the regression methods are available from Alison Cuellar, ac2068@columbia.edu.
12. Hospital financial and discharge data were obtained from the Arizona Department of Health Services, Florida Agency for Health Care Administration, Massachusetts Division of Health Care Finance and Policy, and Wisconsin Bureau of Health Information.
13. We confirmed system participation of hospitals by referencing acquisition announcements in *Modern Healthcare* and other news sources as well as hospital Web sites. Examples include systems with a national presence, such as Tenet, as well as those that operate in local markets, such as New York Presbyterian Healthcare System.
14. We estimated fixed-effects models and include year indicators, state indicators, and state-year interactions. Other methodological details are available from the authors.
15. J.D. Kleinke, "Deconstructing the Columbia/HCA Investigation," *Health Affairs* 17, no. 2 (1998): 7–26.
16. The dependent variable in the cost models was logged because of the skewed nature of the data.
17. L.T. Kohn, J.M. Corrigan, and M.S. Donaldson, eds., *To Err Is Human: Building a Safer Health System* (Washington: National Academies Press, 1999); and IOM, *Crossing the Quality Chasm: A New Health System for the Twenty-first Century* (Washington: National Academies Press, 2001).
18. We used quality indicators developed by the Healthcare Cost and Utilization Project (HCUP). HCUP was intended to develop standardized, user-friendly quality indicators that could be calculated from patient-level discharge data such as the data used here. See Agency for Healthcare Research and Quality, *Inpatient Quality Indicators*, Version 2.1, Revision 2, September 2003, www.qualityindicators.ahrq.gov/iqi_archive.htm (16 November 2004); and *Guide to Patient Safety Indicators*, Version 2.1, Revision 1, May 2003, www.qualityindicators.ahrq.gov/psi_archive.htm (16 November 2004). Individual hospital rates of a particular type of event are adjusted using patient-level data and multivariate regression for age, sex, and diagnosis. Further details can be obtained from the authors.
19. Mortality rates for conditions and procedures are combined and include acute myocardial infarction, congestive heart failure, gastrointestinal hemorrhage, hip fracture, pneumonia, stroke, abdominal aortic aneurysm repair, coronary artery bypass graft, craniotomy, esophageal resection, hip replacement, pancreatic resection, and pediatric heart surgery. The procedures utilization rates combine three procedures: cesarean section delivery; incidental appendectomy in the elderly; and bilateral cardiac catheterization. Patient safety indicators include accidental puncture and laceration; birth trauma—injury to neonate; complications of anesthesia; death in low-mortality diagnosis-related groups (DRGs); decubitus ulcer; failure to rescue; foreign body left in during procedure; iatrogenic pneumothorax; obstetric trauma—cesarean delivery; obstetric trauma—vaginal delivery with and without instrument; postoperative hemorrhage or hematoma, hip fracture, physiologic and metabolic derangements, pulmonary embolism or deep vein thrombosis, respiratory failure, sepsis, and wound dehiscence in abdominopelvic surgical patients; selected infections due to medical care; and transfusion reaction. Because in some cases many patients are at risk for these conditions, random samples were drawn for large hospitals, leading to a maximum sample of 10,000 discharges per hospital in the analysis.
20. AHRQ, *Inpatient Quality Indicators*, Version 2.1, Revision 2.
21. M. Gaynor and D. Haas-Wilson, "Change, Consolidation, and Competition in Health Care Markets," *Journal of Economic Perspectives* 13, no. 1 (1999): 141–164.
22. Additional details on how this measure was constructed are available from the authors.
23. J.A. Alexander and K.A. Schroer, "Governance in Multihospital Systems: An Assessment of Decision-Making Responsibility," *Hospital and Health Services Administration* 30, no. 2 (1985): 9–20.
24. White et al., "Getting Along or Going Along?"
25. See H.E. Frech, *Competition and Monopoly in Medical Care* (Washington: AEI Press, 1996); and M.A. Morrissey, "Competition in Hospital and Health Insurance Markets: A Review and Research Agenda," *Health Services Research* 36, no. 1, Part 2 (2001): 191–221.
26. P.J. Hammer and W.M. Sage, "Antitrust, Health Care Quality, and the Courts," *Columbia Law Review* 102, no. 3 (2002): 545.
27. See, for example, *California v. Sutter Health*, 130 F. Supp. 2d 1109 (N.D. California, 2001); *F.T.C. v. Tenet Health Care Corp.*, 186 F. 3d 1045 (8th Cir. 1999); and *F.T.C. v. Freeman Hospital*, 69 F. 3d 260 (8th Cir. 1995).