

# Hospital Merger Benefits, a Review and Extension

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Since the release of our study *Hospital Merger Benefits: Views from Hospital Leaders and Econometric Analysis*,<sup>2</sup> two closely related studies have been released. One study was published in the *Journal of Health Economics*<sup>3</sup> and another was released by the Deloitte Center for Health Solutions in collaboration with the Healthcare Financial Management Association (HFMA).<sup>4</sup> Supplementing these studies, in this report, we extend our previous empirical analysis of the benefits of hospital mergers and acquisitions (hereafter referred to as “mergers”) to assess the effect that proximity of the merging hospitals has on hospitals’ ability to realize those benefits. All three of these new studies corroborate our previous findings that hospital mergers can significantly reduce hospitals’ costs. Furthermore, Deloitte’s interview findings complement our own related to several key drivers of merger activity: access to capital, cost efficiencies, and improved patient care. We discuss each of these studies in more detail below.

## Review of the Charles River Associates *Hospital Merger Benefits Study*

In our *Hospital Merger Benefits* study, we presented two analyses of the benefits of hospital mergers. In the first part of our study, we conducted structured interviews with 20 different hospital system leaders representing systems with a broad variety of characteristics. The leaders were asked to describe the cost reductions and quality enhancement that may be achieved through mergers. They were also asked about the primary motivation for mergers with other hospitals. The leaders consistently indicated that scale is necessary to address the demands of health care reform. Furthermore, they indicated that the largest savings,<sup>5</sup> as well as quality benefits, can only be achieved through full financial integration of hospitals. The hospital leaders suggested that the lack of accountability, commitment and alignment of incentives makes it difficult to achieve the same outcomes in looser affiliations.

The second part of our study provided an econometric analysis that compared cost per admission, revenue per admission, and inpatient quality measures for hospitals that have undergone mergers or acquisitions with similar hospitals that have not.

In our study, we adopted a “difference-in-differences” methodology to measure the extent to which hospital acquisitions changed financial or quality measures at the acquired hospitals.<sup>6</sup> We examined these changes for all non-federal short-term acute care hospitals (comprehensively identifying any hospital that was involved in a merger) in the United States between 2009 and 2014. Changes in these metrics at acquired hospitals were all measured relative to changes in similar metrics for non-merging hospitals. In so doing, we assumed that, absent the merger (after controlling for other factors described below), cost, revenue, and quality would have changed at the merging hospitals in the same way that those metrics changed at the benchmark non-merging hospitals.

Our analyses accounted for other factors that may affect hospitals’ costs, revenues, or quality, including characteristics of the hospital (e.g., the number of inpatient admissions, whether the hospital is for-profit,

whether the hospital is a teaching hospital, and whether the hospital was in a rural area), the hospital's cost structure (e.g., the Medicare wage index for the hospital, the fraction of the hospital's revenue attributable to outpatient services, and the hospital's inpatient case mix index), and the hospital's payor mix.

The results of our analyses indicate that mergers were associated with a 2.5 percent reduction in operating expense per admission at the acquired hospitals. The average annual operating expense of the merging hospitals in our study is approximately \$235 million, implying average merger-related annual savings of \$5.8 million. We also found that net patient revenue per admission—which includes revenue associated with patients covered by commercial health insurers—declined at the acquired hospitals (relative to revenue at comparable non-merging hospitals). Our analyses found less conclusive support for the quality benefits of hospital mergers than were highlighted in our interviews. These less precise findings on quality, however, may be related to the difficulty in developing reliable, comprehensive metrics with which to measure quality. Because of data limitations, our study relied on two relatively uncommon outcomes (readmission and death) for only three specific conditions. Using measures of readmission rates and mortality rates for heart attacks, heart failure, and pneumonia, we found a small positive, but generally statistically insignificant, effect of hospital mergers on these outcomes.

### **Extensions to the *Hospital Merger Benefits Study***

To extend our previous empirical analysis, we have examined the effect that the proximity of the merging hospitals has on those hospitals' ability to realize merger-related benefits. As with our initial study, we adopted a "difference-in-differences" methodology and utilized the same data on costs, revenue, quality, and characteristics of merging and non-merging hospitals. We supplemented these data with information on proximity of the merging hospitals by measuring the distance between each acquired hospital and the *closest* hospital of the acquiring system. We then characterized each merger based on whether or not this distance was greater than or less than 30 miles.<sup>7</sup> Categorizing mergers in this way allows us to separately identify merger benefits achieved by nearby hospitals and more distant hospitals.

The results of our updated analyses are shown in the tables below. We continue to see a statistically significant decline post-merger in expense per adjusted admission, with the effect being greatest for mergers of hospitals that are in close proximity. Specifically, the decline in expense per adjusted admission (relative to non-merging hospitals) is a statistically significant 2.8 percent for mergers of nearby hospitals. For mergers of more distant hospitals, the decline in expense is 1.5 percent but is not statistically significant. That is, consistent with our interviews with hospital leaders, mergers of more proximate hospitals tend to lead to greater reductions in cost. This result is also consistent with studies by Connor et al.,<sup>8</sup> Alexander et al.,<sup>9</sup> and Spang et al.,<sup>10</sup> which examined mergers that result in a single hospital license.<sup>11</sup>

As before, we found a statistically significant decline in revenue per admission following an acquisition, with the decline realized both in mergers of nearby and more distant hospitals. While the estimates appear to indicate that larger declines in revenue per admission are realized when the merging hospitals are more than 30 miles apart—a decline of 5.9 percent for mergers involving hospitals more than 30 miles apart compared to a decline of 3.5 percent for mergers involving closer hospitals—the magnitudes of these declines are not statistically significantly different.

Our results regarding the effect of hospital mergers on measures of inpatient quality remain less conclusive when proximity is taken into account. We do find that mergers are associated with small improvements in quality for some quality measures. However, of the inpatient quality metrics in our study, only the result

associated with readmission rates for mergers between hospitals in close proximity is statistically significant at the 10 percent level. For mergers of more distant hospitals, there is no statistically significant change in readmission rates.

## Deloitte Study

Subsequent to the release of our study, Deloitte and HFMA published the results of a study that is similar to our initial study.

In particular, Deloitte surveyed 90 hospital financial executives who said that access to capital, cost efficiencies, and improved patient care were significant positive outcomes of hospital mergers.<sup>12</sup> Almost a third of respondents said the merger was used to gain access to capital. Nearly 80 percent indicated that significant capital investments were undertaken post-merger. In addition, close to 40 percent of the capital investments included spending on clinical information systems. On the cost side, nearly 80 percent of the executives said that post-merger the combined system was able to achieve at least some of the projected cost-structure efficiencies.

Deloitte also identified integration practices that were more often associated with successful mergers and acquisitions. Specifically, they found that a merger was more likely to be viewed as successful when leaders:

- Developed a strong strategic vision for pursuing the transaction;
- Had explicit financial and non-financial goals;
- Held leadership accountable, often at the vice-president level, for integration efforts;
- Identified cultural differences between the organizations;
- Made clear and upfront decisions on executive and mid-management leadership;
- Aligned clinical and functional leadership early in the process;
- Followed best practices for integrating the acquired or merged organization into the parent organization; and
- Implemented project management best practices, with tracked targets and milestones, from day one of transaction close until two years after.<sup>13</sup>

Mirroring our study, Deloitte supplemented its interviews with empirical analysis. Their analysis examined mergers occurring between 2008 and 2014 using similar datasets and methods as our studies. Deloitte found that, post-merger, both operating expense and revenue per adjusted admission decline, relative to a control group of non-merging hospitals. They also found that revenue decreases faster than operating costs, causing a decline in operating margins at the merging hospitals.

Despite examining a different set of quality metrics, Deloitte's findings related to quality improvements were similar to our findings. Specifically, they found that "[f]or the most part, reported quality measures at an acquired hospital were unchanged after the transaction." Furthermore, "[o]f the 28 quality measures [HFMA] analyzed, 20 were unchanged and not correlated with an M&A transaction."<sup>14</sup> These results (for both financial and quality measures) are summarized in the tables below.

## Schmitt Study

An academic study by Matt Schmitt at the University of California at Los Angeles, and published in the *Journal of Health Economics*, focuses solely on empirical analyses of reductions in costs associated with

hospital mergers. Examining hospital mergers occurring between 2000 and 2010, Schmitt found merger-related cost savings of between 4 and 7 percent, relative to non-merging comparison hospitals. Schmitt also shows that the observed cost declines are not attributable to differences in cost trends or service or patient mix differences at the merging and non-merging hospitals. In addition, his results do not depend on whether the costs of merging hospitals are compared to a group of all non-merging hospitals, or a matched set of non-merging hospitals with characteristics similar to the merging hospitals.

Schmitt also examines the role that the size of the acquiring system plays in realizing cost savings. He finds that mergers between independent hospitals are unlikely to result in cost savings, whereas acquisitions made by hospital systems had statistically significant cost savings. This result suggests that some scale is necessary to achieve cost savings associated with mergers. Lastly, in contrast to our findings, Schmitt finds that mergers between nearby hospitals are less likely to result in cost savings than mergers of more distant hospitals not in the same market, perhaps because of differing measures of proximity.<sup>15</sup> An overview of Schmitt's findings can be found in the first table below.

## Conclusion

Since the publication of the study by Charles River Associates, two additional studies have used similar data sources and empirical methodologies to confirm the primary findings of our study of the benefits of hospital mergers: these mergers benefit patients and health plans by reducing costs and revenue at the acquired hospitals, but there is no compelling statistical evidence of changed quality at acquired hospitals. We have also extended the results of our own study to examine the role that proximity plays in achieving merger benefits, and find that acquisitions of nearby hospitals result in larger cost decreases than acquisitions of more distant hospitals.

## Financial Outcome Measures

	Operating expense per adjusted admission	Operating revenue per adjusted admission	Operating margin	Full-time equivalents (FTE) per 100 adjusted
<b>CRA study</b>				
Overall	▼	▼		
<b>CRA extension</b>				
Mergers < 30 miles	▼	▼		
Mergers > 30 miles	◄►	▼		
<b>Deloitte study</b>				
Overall	▼	▼	▼	▲
1 year post merger	▼	▼	▼	▲
2 years post merger	◄►	◄►	◄►	◄►
<b>Schmitt study*</b>				
Acquired hospitals	▼			
Acquirer hospitals	◄►			
In-market mergers	◄►			
Out-of-market mergers	▼			
Independent acquirer	◄►			
System acquirer	▼			

## Quality Outcome Measures

	Readmission composite	Mortality composite	Outcome composite	Surgical patients given beta blockers	30-day readmissions - hip or knee replacement	Patients who gave their hospital a rating of 9 or 10	Median time from ED arrival to ED departure for admitted ED patients
<b>CRA study</b>							
Overall	▼	◄►	◄►				
<b>CRA extension</b>							
Mergers < 30 miles	▼	◄►	◄►				
Mergers > 30 miles	◄►	◄►	◄►				
<b>Deloitte study</b>							
Overall				▲	◄►	▼	◄►
1 year post merger				▲	◄►	▼	◄►
2 years post merger				◄►	▼	▼	◄►

**Arrow direction:** Indicates the direction of a statistically significant change. ◄► indicates a statistically insignificant change.

**Color:** Green arrow = Favorable. Red arrow = Unfavorable. Grey = Outcome not studied.

\* Results shown for Schmitt study are indicative of overall results across multiple variations.

Note: The Deloitte study characterizes the revenue, margin and FTE findings as “unfavorable.” However, from the perspective of consumers and health insurers, rather than hospitals, they are favorable, so we indicate them as such.

Source: CRA summary of analysis

## Sources

1. Drs. Noether and May are vice presidents at Charles River Associates. The authors acknowledge that the American Hospital Association provided financial support for this research project. The conclusions set forth herein are based on independent research and publicly available material. The views expressed herein are the views and opinions of the authors and do not reflect or represent the views of Charles River Associates or any of the organizations with which the authors are affiliated.
2. Monica Noether and Sean May, "Hospital Merger Benefits: Views from Hospital Leaders and Econometric Analysis," American Hospital Association and Charles River Associates, January 2017, <https://www.aha.org/system/files/2018-04/Hospital-Merger-Full-Report-FINAL-1.pdf>.
3. Matt Schmitt, "Do Hospital Mergers Reduce Costs?" *Journal of Health Economics*. 52 (2017): 74-94.
4. "Hospital M&A: When done well, M&A can achieve valuable outcomes," Deloitte Center for Health Solutions and Healthcare Financial Management Association, October 2017, <https://www2.deloitte.com/us/en/pages/life-sciences-and-health-care/articles/hospital-mergers-and-acquisitions.html>.
5. Cost savings fell into three general categories: cost reductions related to scale; reductions in the cost of capital; and savings related to standardization of clinical processes.
6. As in our initial study, we used six outcome measures collected by the Centers for Medicare and Medicaid Services (CMS) over the time period of our study: three measures of 30-day readmission rates for acute myocardial infarction, heart failure, and pneumonia and three measures of 30-day mortality rates for heart attack, heart failure, and pneumonia. To reduce the variability in these measures of quality, we combine the six separate outcome measures tracked by CMS into three composite outcome indices: one for mortality, one for readmission, and one that combines both mortality and readmission measures. For each measure, a lower score indicates better performance.
7. In at least one recent case, a federal court concluded that "the area encompassing a 30-minute drive-time radius [or approximately a 30-mile radius] from Rockford [where the merging hospitals were located] is an appropriate geographic market..." (FTC v. OSF Healthcare Sys. and Rockford Health Sys., 852 F. Supp. 2d 1069, 1077 (N.D. Ill. 2012).)
8. Robert A. Connor, Roger D. Feldman, and Bryan E. Dowd, "The Effects of Market Concentration and Horizontal Mergers on Hospital Costs and Prices," *International Journal of the Economics of Business* 5, no. 2 (1998): 159-180.
9. Jeffrey A. Alexander, Michael T. Halpern, and Shoou-Yih D. Lee, "The Short-Term Effects of Merger on Hospital Operations," *Health Services Research* 30, no. 6 (1996): 827-847.
10. Heather Radach Spang, Gloria J. Bazzoli, and Richard J. Arnould, "Hospital Mergers And Savings For Consumers: Exploring New Evidence," *Health Affairs* 20, no. 4 (2001): 150-158.
11. Medicare regulations only permit hospitals in close proximity of each other to operate under the same license.
12. Deloitte also conducted structured interviews of 13 additional executives.
13. *Supra* n. 3 at 2.
14. *Id.* at 7.
15. Schmitt identifies nearby hospitals as those located in the same area for different definitions of area (HSA, County, Commuting Zone, HRR, and State) as opposed to our distance-based measure.