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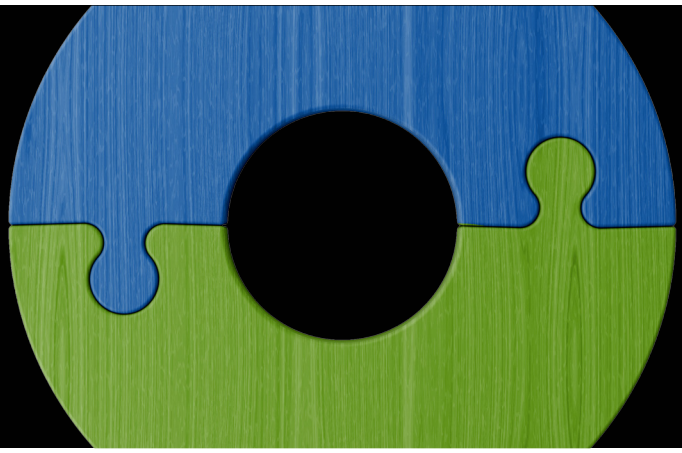
Hospital M&A:
When done well, M&A can achieve valuable outcomes



A research report from the Deloitte Center for Health Solutions and the Healthcare Financial Management Association

Executive summary

Hospital merger and acquisition (M&A) activity has increased significantly in the past decade, with buyers and sellers looking to create operational, strategic, and financial value. A main driver is the pursuit of economies of scale, the ability to decrease unit costs or improve productivity and outcomes through increased volumes. The assumption is that, through M&A, health system investments in technology, quality improvement, ancillary services, or shared services can be spread across a broader base post-transaction. But does M&A actually achieve these outcomes? The answer is "yes, it can," with well-conceived strategic intent and thorough planning and execution.

The Deloitte Center for Health Solutions collaborated with the Healthcare Financial Management Association (HFMA) in 2017 to analyze how M&A impacts a hospital's performance—and to learn why some transactions have more favorable results than others. Between 2008 and 2014, there were more than 750 hospital acquisitions or mergers. We conducted a quantitative analysis of these hospitals' financial, operational, and quality metrics. We also fielded a qualitative online survey of 90 hospital financial executives from organizations in our data set and conducted phone interviews with an additional 13.

Overall, we learned that higher operating margins did not immediately follow M&A for acquired hospitals. Indeed, once our analysis took into account market and hospital characteristics—including the fact that hospital margins in general improved over the analysis period—acquired hospitals, on average, experienced a post-transaction decline in operating margins, revenue, and expenses that typically lasted two years. We also saw no evidence that quality measures changed at an acquired hospital, though measure reporting lags the patient experience and survey respondents confirmed quality improvements.

However, the M&A experience varied a great deal among acquired hospitals. With proper integration planning and execution, some hospitals did experience higher operating margins following acquisition. Among a sample of transactions with better outcomes, executives reported spending more time on integration planning and execution than those from transactions that did not meet cost and quality goals. Moreover, we found other positive outcomes associated with M&A in our survey—including the ability to make capital investments and achieve cost efficiencies from economies of scale.

Capital investments:

- Nearly a third of surveyed executives from acquired hospitals sought M&A to improve their access to capital, the top-reported driver among those acquired.
- Close to 80 percent of all survey respondents said significant capital investments were made in the acquired facility after the transaction concluded.
- Nearly 40 percent of all survey respondents used the capital to upgrade or implement clinical information systems, the top-reported use of capital.

Cost efficiencies:

- Twenty-nine percent and 24 percent of acquirers and acquired hospital executives, respectively in our survey, sought M&A to improve efficiencies.
- Seventy percent of survey respondents said they achieved at least some of their transaction's projected cost structure efficiencies.

Executives from our survey and interviews indicated that M&A was more likely to succeed when leaders:

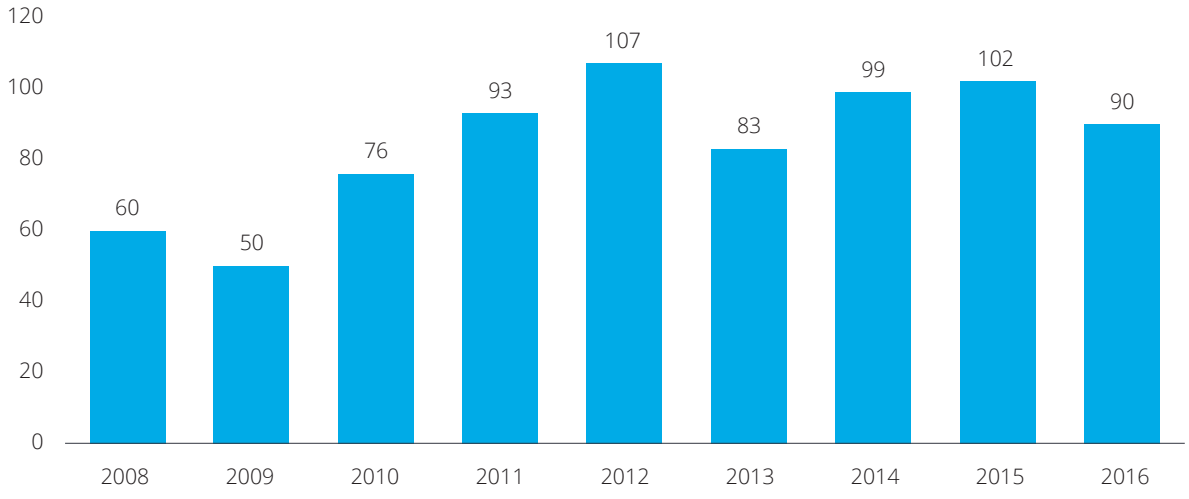
- Developed a strong strategic vision for pursuing the transaction;
- Had explicit financial and non-financial goals;
- Held leadership accountable, often at the vice-president level, for integration efforts;
- Identified cultural differences between the organizations;
- Made clear and upfront decisions 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.

Hospital M&A shows no signs of slowing down. Financial, market, competitive, and regulatory forces are likely to drive further consolidation. As hospital board members and executives contemplate participating in this trend, either as a buyer or a seller, they may benefit from lessons learned by those who preceded them.

Hospital M&A continues to grow

The annual number of hospital M&A transactions has increased over the past decade (Figure 1). Transaction size also has grown, with many larger health systems announcing mergers or acquisitions the past few years. Of the nearly 5,000 hospitals in the United States, nearly 60 percent are part of a health system.[1] Several pressures are motivating both individual hospitals and health systems to seek operational, strategic, or financial value through consolidation.

Figure 1. Hospital M&A transactions have continued to increase[2]



Source: Irving Levin Associates, Health Care M&A News, 2008-2016

[1] American Hospital Association Survey, 2015, and Fast Facts, http://www.aha.org/research/rc/stat-studies/fast-facts.shtml

[2] Irving Levin Associations, *Health Care M&A News*

Does M&A pay off?

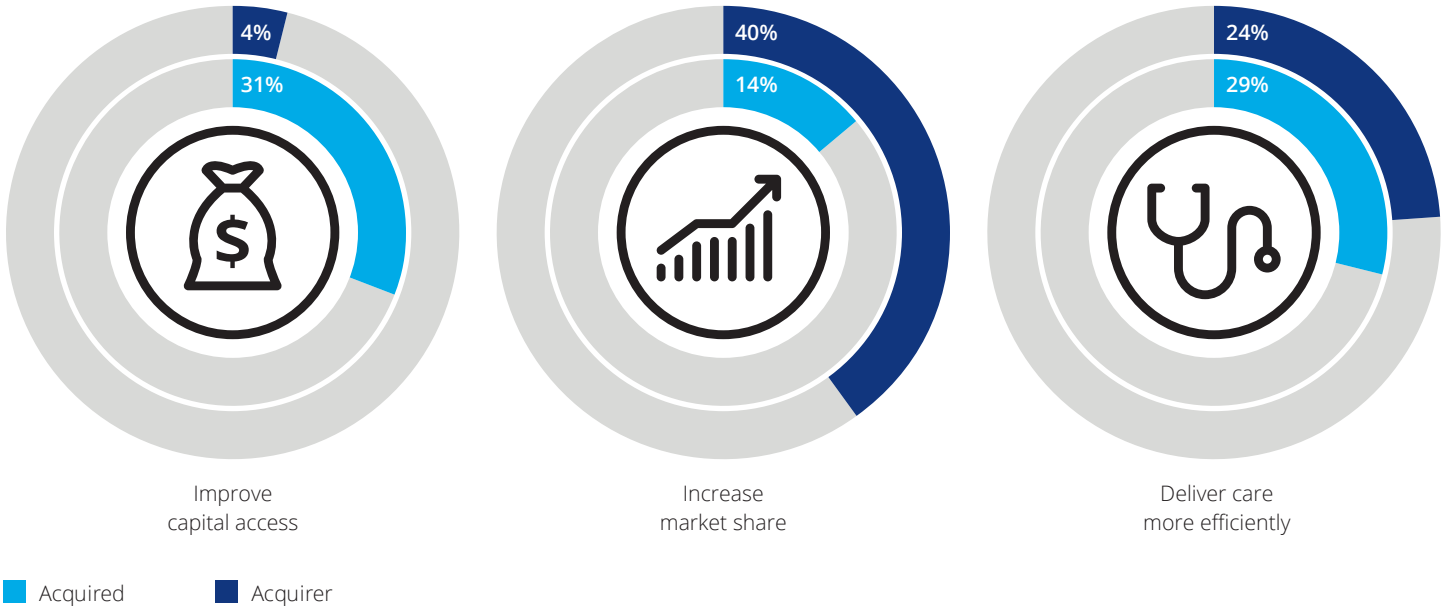
Between 2008 and 2014, the United States had nearly 400 hospital M&A transactions, resulting in more than 750 hospitals being acquired or merged. M&A is a complex and time-consuming process. The transaction life cycle—from concept through close—requires participants to work through numerous, rigorous steps. Post-transaction integration can be just as difficult, if not more so.

To better understand whether hospitals and health systems achieved their M&A goals and why some achieved them sooner than others, Deloitte and HFMA researched the intent, approach, and results for hospital M&A transactions (see Appendix for detailed survey and analysis methodology).

According to survey respondents, a desire to increase market share is the top driver for transactions among acquiring organizations (Figure 2). Increased market share can help a health system broaden its physician network and expand its access to patients, both critical factors for bearing increased financial risk in an evolving, value-focused health care market. Other goals respondents cited include a desire to improve efficiencies, boost care quality and patient satisfaction, and build capabilities for population health.

Access to capital was executives' second most frequently cited driver for seeking an acquisition (Figure 2). Many acquired organizations were in financial distress, or required investments in staff, health information technology (HIT), physician recruitment, facilities, medical equipment, or pension funding to improve operations and quality of care. In addition, nearly 80 percent of surveyed respondents said significant capital investments were made in the acquired organization. Such investments are sometimes needed to ensure patient access to high-quality care, which can impact financial performance in the post-transaction period.

Figure 2. Capital, market share, and cost efficiencies are top M&A drivers



Source: HFMA 2017 survey of executives involved in M&A transactions

Even though hospitals typically have a number of goals for M&A, our quantitative analysis focused on financial and quality outcomes. We looked at acquired hospitals' post-transaction financial, operational, and quality metrics, taking into account market and hospital characteristics such as payer mix, case mix, insurance coverage changes, and national and regional economic factors. Our data sources were the Medicare Cost Reports, the American Hospital Association (AHA) survey, the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS), and hospital quality indicators from the Centers for Medicare and Medicaid Services (CMS). We also fielded a qualitative online survey of 90 hospital financial executives and conducted phone interviews with an additional 13. All respondents were involved in transactions as either part of an acquiring health system or as part of the acquired hospital, and were included in our analysis data set. (See sidebar.)

About the analysis

The quantitative analysis reflects aggregate performance results of hospital mergers and acquisitions that occurred between 2008 and 2014.

The analysis included only those transactions where the majority of a hospital was either bought or merged. Collaborations, joint ventures, affiliations, and other types of M&A were not included in the analysis.

The analysis of hospital M&A is based solely on the acquired entities, and not on the acquirer or combined entity. While a combined entity might have achieved its goals, such results were not part of our research.

We examined acquired hospitals for the two years prior to a transaction and the two years after the transaction closed. Among some acquired hospitals, improved efficiencies and cost reductions could have been achieved outside of the two-year post-transaction period.

M&A goals can vary depending on the entities involved, and a transaction might benefit the community even if the results aren't tangible. For example, an acquired hospital might have aging physical plant and declining utilization. An acquisition could infuse needed capital to make infrastructure updates. While that would benefit the community, it could increase the hospital's short-term costs.

We looked at acquired hospitals' post-transaction financial, operational, and quality metrics, taking into account market and hospital characteristics such as payer mix, case mix, insurance coverage changes, and national and regional economic factors.

Overall, while expenses immediately declined after M&A, so did revenue and margins

We expected to see better financial and operational performance following M&A given that many typically have a goal of cost efficiencies, so it was surprising to learn that acquired hospitals as a group did not normally improve their overall financial and operational performance in the first two years post-transaction.

Figure 3 shows that acquired hospitals collectively saw a decrease in operating expenses after a transaction; however, operating revenue tended to decline at a greater rate, resulting in a decline in acquired hospitals' operating margins. These trends leveled-off two years post-transaction.

Our qualitative findings helped clarify this point. Survey respondents acknowledged that immediate investments and additional staffing were sometimes required to improve quality at an acquired hospital, which can impact financial performance.

Figure 3. Acquired hospitals had a post-transaction decline in operating margin, revenue, and expenses that lasted until two years post-transaction

Correlation between acquisition and financial and operational performance for acquired hospitals, 2008-2014

	Regression results by variable			
Acquisition impact	**Operating margin**	**Operating expense per adj admission**	**Operating revenue per adj admission**	**FTEs per 100 adj admission**
Pre vs post transaction overall	↓	↓	↓	↑
1 year after the deal	↓	↓	↓	↑
2 years after the deal				

Arrow direction: Statistically significant, positive or negative correlation.

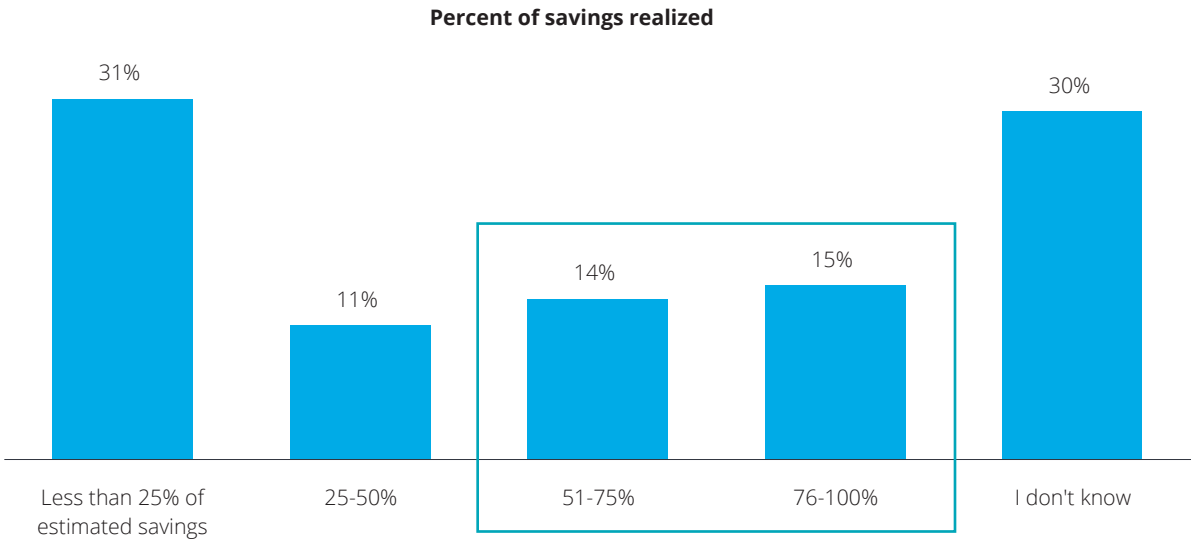
Arrow color: Green=good, Gray=Bad. Cells shaded in light blue did not have statistically significant findings.

Source: Deloitte regression analysis results. Acquisition impact overall is the average performance before and after the transaction. Medicare Cost Report data two years after the transaction is not yet available.

Some transactions are successful at achieving financial goals

Some M&A transactions are able to reduce costs, although this can take several years. Survey results showed that many transactions realized some of their projected cost-structure efficiencies (Figure 4). When asked how much of their originally projected cost efficiencies were achieved, approximately 40 percent of respondents said they achieved 25 percent or more of their goals. For those who achieved their financial goals, most admitted that it took longer than two years for improvement efforts and investments to pay off.

Figure 4. Percentage reporting the projected cost structure efficiencies they achieved from the transaction



Source: HFMA 2017 survey of executives involved in M&A transactions

Seventy percent of survey respondents said they achieved at least some of their transaction's projected cost structure efficiencies.

Quality of acquired hospitals did not decline; it improved for some measures

For the most part, reported quality measures at an acquired hospital were unchanged after the transaction, according to the regression analyses. Of the 28 quality measures we analyzed, 20 were unchanged and not correlated with an M&A transaction. There were, however, some notable exceptions (Figure 5).

Surgical patients at acquired hospitals, for example, were more likely to receive beta blockers after an acquisition than they were before. We also found that readmission rates for joint replacements decreased at some acquired hospitals. And more than half of survey respondents (56 percent) said at least one aspect of care quality improved after an acquisition.

Among hospitals with the highest patient satisfaction scores (i.e., scores of 9 or 10 on a 10-point scale), however, regression analyses revealed that scores declined slightly after an acquisition, and did not rebound until two years post-transaction.

Figure 5. Most quality measures did not change for acquired hospitals post-transaction, but there were some exceptions

Correlation between acquisition and quality performance for acquired hospitals, 2008-2014

	Regression results by variable			
Acquisition impact	**Patients given beta blockers**	**30-Day readmissions-hip or knee replacement**	**Patients who gave their hospital a rating of 9 or 10**	**ED—Median time from ED arrival to ED departure for admitted ED patients**
Overall	↑		↓	
1 year after the deal	↑		↓	
2 years after the deal		↓	↓	

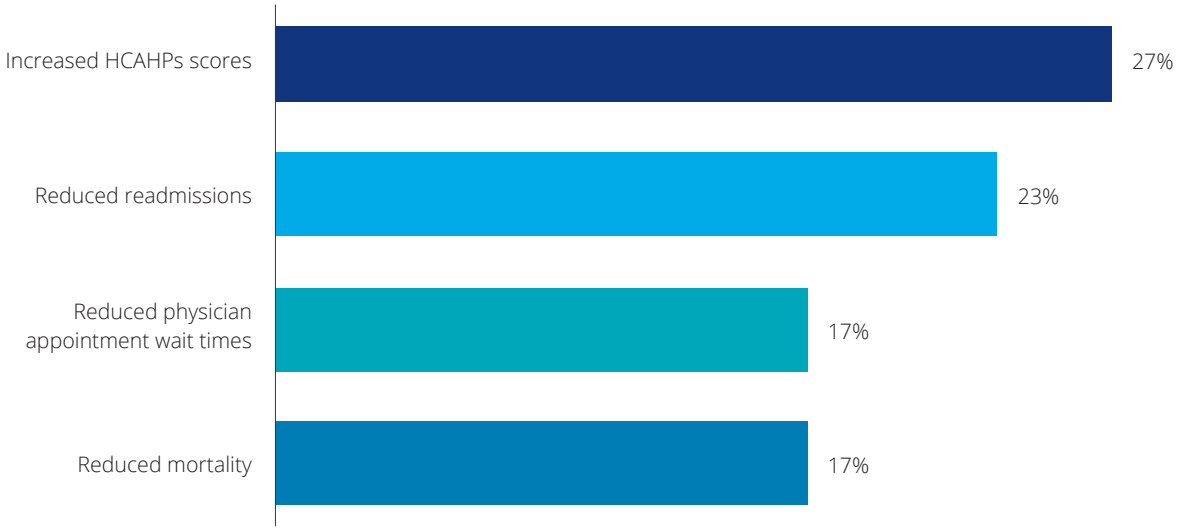
Arrow direction: Statistically significant, positive or negative correlation.

Arrow color: Green=good, Gray=Bad. Cells shaded in light blue did not have statistically significant findings.

Source: Deloitte regression analysis results. Acquisition impact overall is the average performance before and after the transaction. Medicare Cost Report data two years after the transaction is not yet available.

Survey respondents who said quality eventually improved saw changes in a variety of process and outcome areas, the most common being patient experience as measured through HCAHPS scores (Figure 6). Respondents also noted that quality initiatives take time to pay off. Moreover, quality reporting lags patient experience, sometimes by two years or more, since important outcomes measures such as readmissions are based on rolling data.

Figure 6. Respondents noted several quality improvement areas after an acquisition

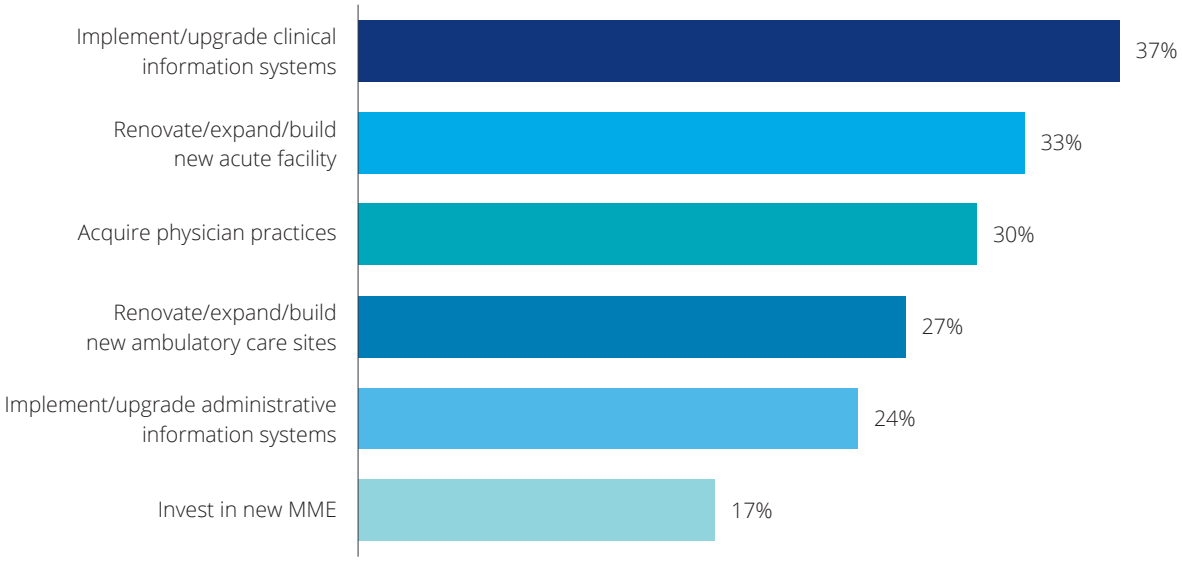


Source: HFMA 2017 survey of executives involved in M&A transactions
Note: Respondents were asked to select more than one option, so total does not equal 100%

Survey respondents who said quality eventually improved saw changes in a variety of process and outcome areas, the most common being patient experience as measured through HCAHPS scores.

Capital investments (one of the common goals for M&A) may be directed to improving quality and the effectiveness of care coordination in acquired hospitals. Survey respondents indicated that implementing a single HIT system is the most common use of new capital invested at an acquired facility (Figure 7). Implementing best-practice clinical protocols, commonly through an integrated clinical HIT system, is the strategy acquiring health systems most frequently pursue to improve quality. However, it takes a year or more to implement these systems and realize improvements.

Figure 7. Two-thirds of survey respondents used capital for HIT or facility upgrades



Source: HFMA 2017 survey of executives involved in M&A transactions
Note: Respondents were asked to select more than one option, so total does not equal 100%

Survey respondents indicated that implementing a single HIT system is the most common use of new capital invested at an acquired facility.

Hospitals with clearly defined goals and strategies are most likely to achieve cost and quality outcomes

Our research showed that financial experience varied greatly among acquired hospitals. Indeed, some transactions achieved their goals sooner than others for both quality improvements and cost savings.

When we dug into the reasons for the better outcomes we found several key factors. According to our survey and interviews, acquired hospitals were more likely to be successful if leadership:

- 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.

Of the 90 hospital executives who completed the survey, 49 said the acquired hospital experienced improved care quality, and 25 said the acquired hospital achieved at least 50 percent of the transaction's anticipated cost savings. Notably, 17 of the surveyed executives said they were involved in acquisitions that improved quality *and* met cost-savings goals— what we call "high-value" transactions—and that a hallmark of these transactions is a defined operating model (see sidebar on the following page).

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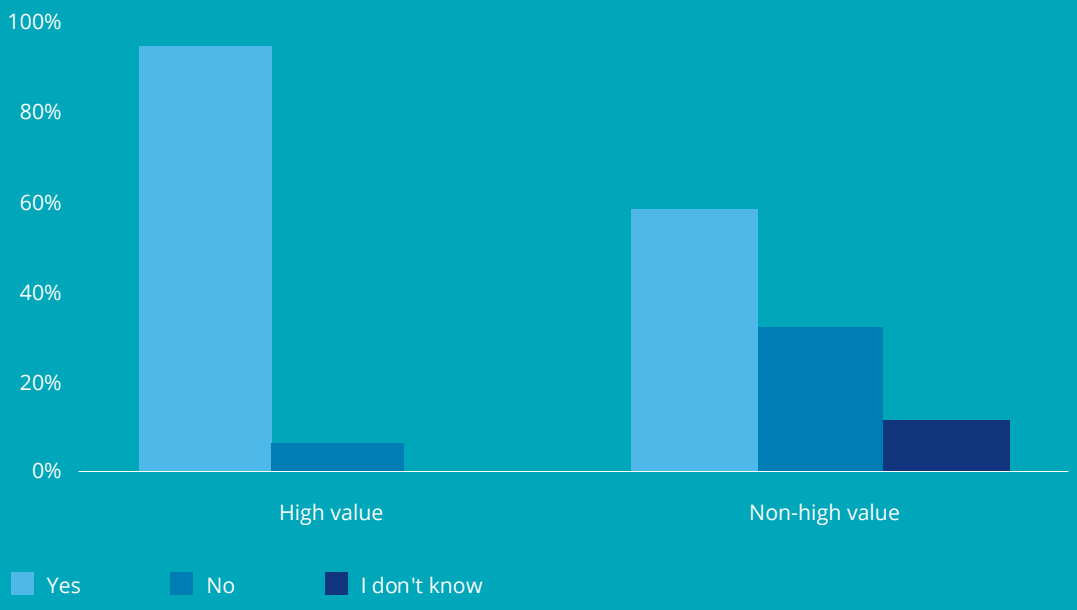
Characteristics of a high-value transaction

Compared with survey peers who participated in M&A transactions that did not achieve both cost and quality goals, the vast majority of executives involved in high-value transactions said the transactions included a defined operating model (Figure 8) which had:

- A strategic vision for the combined entity
- Identified and validated areas for value capture
- A strategy to realize revenue growth and cost-reduction opportunities
- An understanding of key enablers

Figure 8. Executives from high-value transactions were more likely to report a clearly defined operating model compared to executives from non-high value transactions



Source: HFMA 2017 survey of executives involved in M&A transactions

For more information on creating a strategic vision for a newly combined entity, please see HFMA's previous research study, *"Acquisition and Affiliation Strategies: An HFMA Value Project Report,"* http://www.hfma.org/valueaffiliations.

Steps to a defined operating model

Our interview results suggest that, when a hospital or health system receives a merger or acquisition request for proposal, executives should consider taking the following two steps as they define the combined companies' future operating model.

Step 1: Develop a strategic rationale. When developing the strategic rationale that anchors a future operating model, hospital leaders should analyze the transaction's potential value drivers and consider whether to collapse service lines, reduce duplicative service lines, relocate services, or vertically integrate and add assets. As part of this process, leaders should look beyond the potential to increase scale and determine what an acquisition will allow the health system to do that it cannot do alone. As well, executives should be mindful of factors that may limit future value-creation (see sidebar).

Market dynamics: An important consideration in strategic M&A planning

If growing market share is an important goal of an acquiring health system's strategic rationale, market dynamics matter. Consider this: A health system acquires a hospital in a commuter town that lies beyond the city and its suburbs. Health system leaders intend to create value by capturing market share from competing hospitals in adjacent suburbs where many residents currently seek care, and from city hospitals near their workplaces. However, the health system's leaders do not fully appreciate the strength of patient brand preferences for the competing hospitals. They also ignore the depth of relationships that people from the commuter town have with primary care physicians and specialists who are aligned with competing facilities. Acquisition team members should understand and incorporate local market dynamics into their transaction planning and diligence process.

Step 2: Rigorously test the transaction's hypothesized value drivers. Acquiring organizations should test a strategic rationale's assumptions during pre-transaction discussions or early-stage due diligence. This process should be led by the executive who is primarily responsible for integrating the two organizations. Testing the strategic rationale requires breaking it down into a list of activities the organizations will complete. The resulting document can form the foundation of the strategy and tie to the transaction's value drivers. Moreover, the process of creating the document may illuminate relationships and dependencies that might need further evaluation during the due-diligence phase.

Testing strategic rationale assumptions should define outcome metrics that can be used during the integration process. The analysis results should be presented to the board to reach alignment and gain support for the steps needed to achieve the transaction's full value.

After a transaction closes, a project management office (PMO) charged with integrating the organizations should continue to track value drivers and related milestones. This should begin day one of transaction close and continue for multiple years to maintain the new entity's alignment to the original value drivers.

Culture and communications count

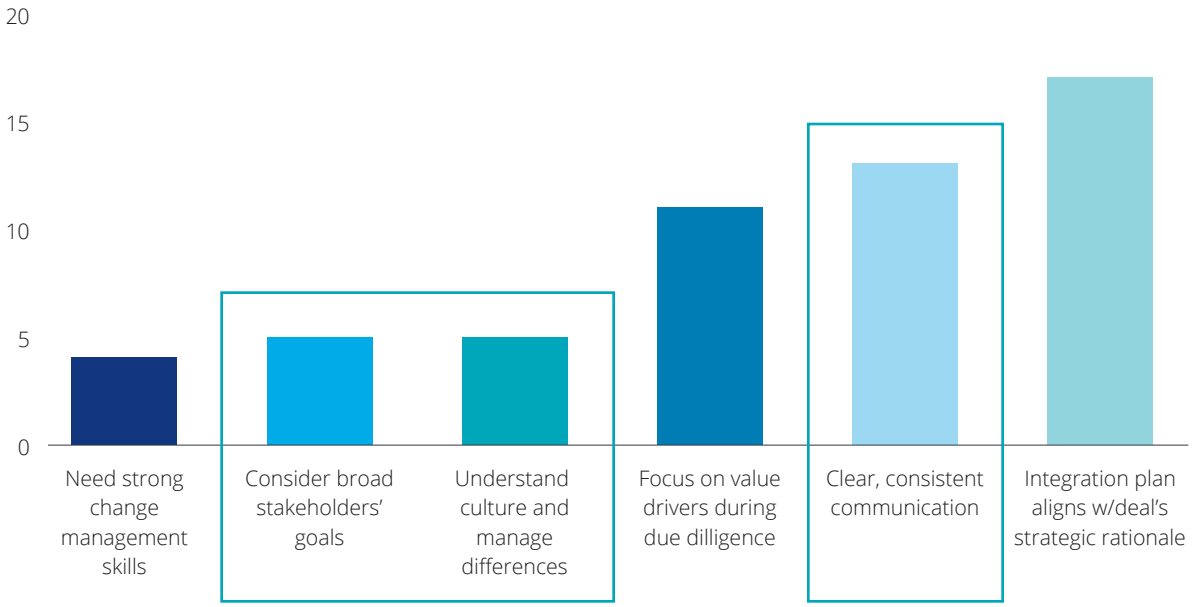
Survey respondents said that improving care quality can be challenging. Acquiring organizations, particularly in situations where the transaction is perceived as a "merger of equals," sometimes fail to designate a system-wide quality leader. This inadvertently creates a barrier to developing a common clinical culture: medical staff at both organizations might continue to work in silos on quality improvement initiatives and not take advantage of the opportunity to share best practices and intellectual property.

Executives should consider strategies to anchor and define the combined companies' future operating model.

Developing a shared culture of quality

While an acquisition's strategic rationale might look perfect on paper, meeting the post-transaction goals of a combined organization may be difficult if company cultures aren't compatible. According to surveyed financial executives who had participated in a recent merger or acquisition, the importance of culture and communications cannot be overstated. While the interviewed executives agreed that there is no easy solution to addressing cultural differences, the survey suggests steps to remove some potential roadblocks (Figure 9).

Figure 9. Suggestions for improving results of future M&A included culture and communication considerations



Source: HFMA 2017 survey of executives involved in M&A transactions

Meeting the post-transaction goals of a combined organization may be difficult if company cultures aren't compatible.

Interviewees stressed that investing time, particularly early in pre-merger conversations, is essential to achieve a successful transaction. They also noted the importance of understanding each organization's unique culture, and said that failing to identify cultural differences could make it difficult for newly combined organizations to meet their strategic goals. Interviewees said it also is important to test assumptions about cultural compatibility during a transaction's early stages. Doing so can help define expectations and identify potential problems.

Executives from organizations looking to be acquired should consider evaluating their internal culture long before a solicitation is sent to potential acquirers. They also should consider avoiding preliminary M&A conversations with executives from health systems with which they have existing relationships. Such conversations could jump-start the M&A process before the board and hospital community recognize and align around the need to become a part of a larger health system.

Executives from organizations looking to be acquired should consider evaluating their internal culture long before a solicitation is sent to potential acquirers. They also should manage the timing of the solicitation process carefully and avoid informal, detailed M&A conversations with executives from health systems where they have relationships. Such conversations risk getting ahead of the board and community. For example, if one of these key stakeholders does not recognize the need to become a part of a larger health system, it could complicate the process.

Our interviewed executives agreed that conversations prior to reaching an agreement to merge or acquire should focus on difficult issues that tend to be avoided during pre-transaction discussions, due to concerns that they might derail the transaction. Among potentially sensitive subjects:

- Determining the powers the acquired facility's board will retain if it remains in place;
- Defining the roles that executives in each organization will play in the combined organization;
- Articulating decision-making authority at each level of the organization so that key projects aren't negatively affected;
- Identifying high-level strategies for redistributing/rationalizing key service lines that could shift volume to or from the acquired facility.

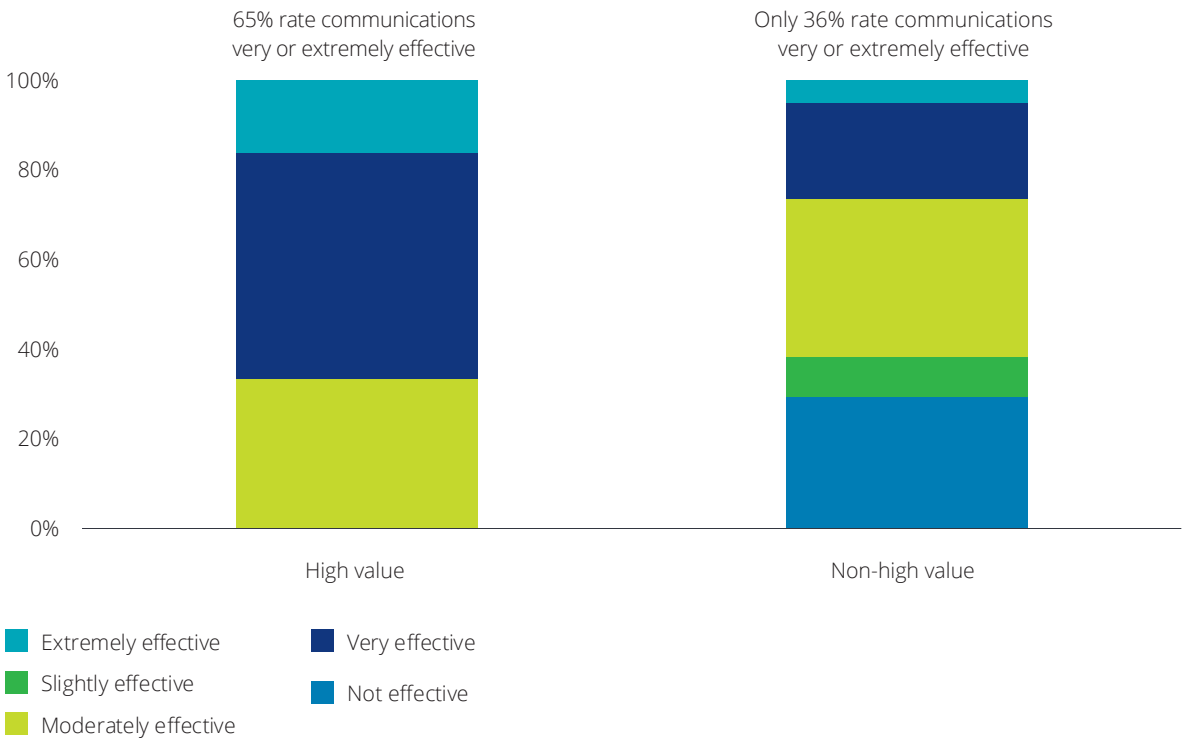
For more information on educating boards, identifying potential partners, and strengthening M&A-related communications please see *Acquisition and Affiliation Strategies: An HFMA Value Project Report*, hfma.org/valueaffiliations.

Implementing proactive, transparent communications

A proactive and appropriately transparent communications strategy was one of the clear differentiators between M&A transactions that created value and those that fell short. Once the transaction process begins, communications should focus on supporting integration efforts and building the foundation for a common culture between the organizations. Still, surveyed hospital executives admitted that overcoming cultural barriers can take years.

To help break down these barriers, some interviewees suggested that leaders from the acquiring entity should consistently and frequently articulate the mission and goals of the transaction. Executives from high-value transactions were much more likely than executives from transactions that didn't achieve cost and quality goals to indicate that their communications were effective (Figure 10). As one interviewee noted, "Just because you have a super-majority of board members at a facility you acquire doesn't mean you've solved issues related to culture. You still need to work every day from day one to win hearts and minds."

Figure 10. Executives from high-value transactions rated their communications' more effective than did executives from non-high-value transactions



Source: HFMA 2017 survey of executives involved in M&A transactions

Each of the 13 financial executives we interviewed stressed the importance of communications before, during, and after a merger or acquisition. However, our survey identified a disconnect between acquiring organizations and acquired entities when it comes to the effectiveness of communication efforts.

- Nearly 60 percent of survey respondents from acquiring organizations said communication efforts related to the transaction were "very" or "extremely" effective.
- However, just 26 percent of survey respondents from acquired organizations held a similar opinion of the acquiring organization's communications.

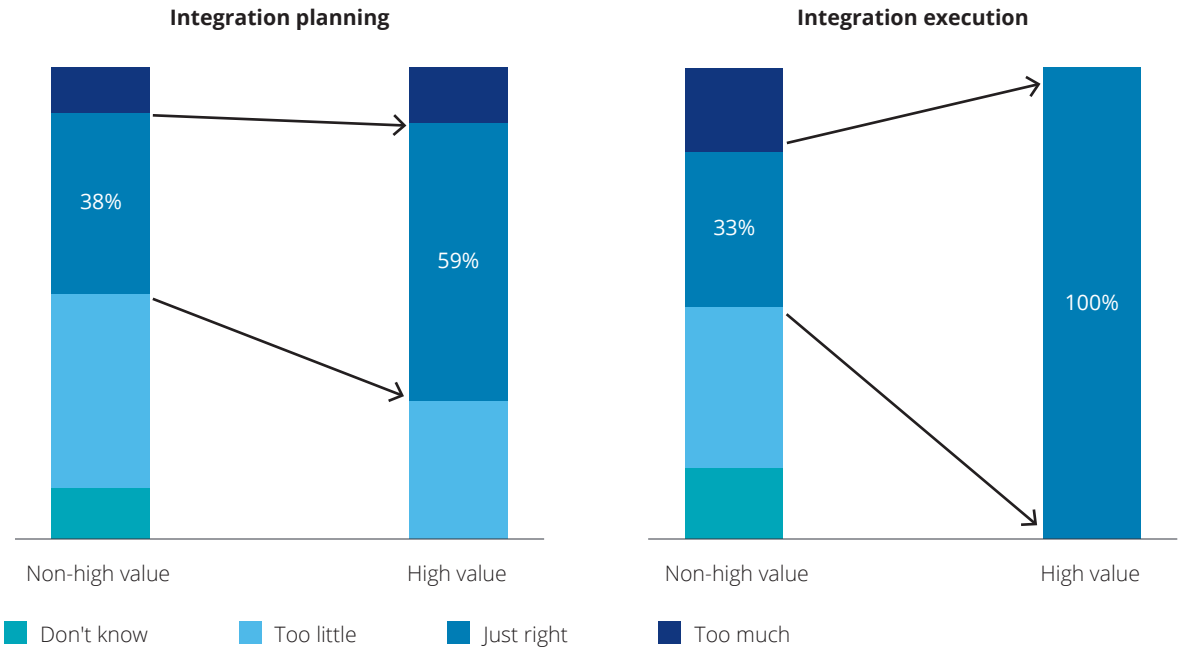
To bridge this gap, interviewees said communications should occur both on a scheduled basis and organically. For example, when crafting a communication strategy, it is important to identify some of the likely questions a proposed merger or acquisition may generate among stakeholders. Also, when appropriate, senior leaders should cascade messages related to the transaction to their direct reports, and instruct those team members to push the message down through the organization.

Integration planning and execution are key success drivers

Integration planning and execution are seen by surveyed executives as key success drivers for M&A transactions. Having an integration plan that aligns with the transaction's strategic rationale was among the most commonly cited "lessons learned" by survey respondents.

For transactions that achieved both quality and cost goals, 59 percent of survey respondents said they spent enough time on integration planning, and 100 percent said they spent adequate time on integration execution. In contrast, 38 percent of hospital executives surveyed from non-high-value transactions said they spent enough time on integration planning, and 33 percent thought they had spent adequate time on integration execution (Figure 11).

Figure 11. Executives from high-value transactions perceived they spent more time on integration than executives from non-high-value transactions



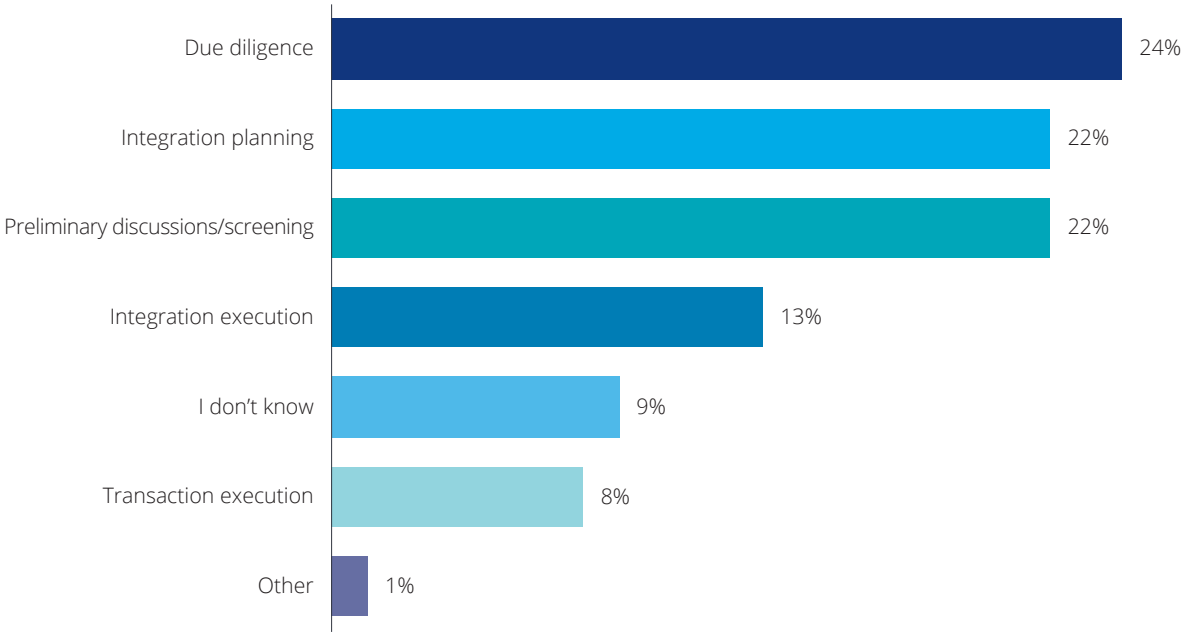
Source: HFMA 2017 survey of executives involved in M&A transactions

Our interviews did not produce consensus about an optimal structure for managing the integration process. However, executives' responses yielded two recurring themes:

1. Bring integration team leaders into the transaction process early (Figure 12), and ensure that their teams have the appropriate capabilities and bandwidth. Involving integration team leaders early in the M&A process can help them develop relationships with their counterparts at the entity being acquired. It also can help them identify potential issues that could complicate integration efforts and adjust project plans accordingly.

Interviewees suggested that using an experienced outside adviser can expedite integration planning and execution by providing bandwidth and subject matter expertise. An adviser can quickly identify opportunities, offer analyses, and suggest action steps that are likely to be perceived as unbiased by all stakeholders and support decision-making when sensitive situations arise. In addition, an external advisor can bring transaction-specific experience that might not exist within the acquiring organization. In transactions that involve academic medical centers, for example, it can be helpful to engage professionals who understand the nuances of issues such as funds flow, staffing, and compensation for faculty practice plans.

Figure 12. Integration leads are usually first involved in the M&A process during the early stages of the transaction



Source: HFMA 2017 survey of executives involved in M&A transactions

2. Deploy best-practice project management techniques. Interviewees stressed the importance of deploying best-practice M&A project management techniques. This starts during the transaction's early phases by developing and validating a strategic rationale, operating model, and integration plan. In addition, top executives should consider establishing a team comprised of clinical and business function owners—typically vice president-level individuals—to lead integration plan work streams and generate regular updates and communications. Board approval of these practices can empower the management team to make difficult staffing and service distribution decisions rather than delay them, which can be a barrier to achieving desired results.

The integration work plan should front-load activities that underpin the transaction's ability to create value for the combined health system. As the strategic rationale is being translated into the integration plan, the project team should answer two key questions for each activity:

- Have we identified metrics and milestones to measure progress on each of these activities?
- Who on the executive team is ultimately responsible for the successful completion of each activity?

Conclusions and implications

Many hospital financial executives who have been involved in acquiring or merging hospitals admit to underestimating important cultural, competitive, and market differences of acquired organizations that may limit post-transaction value realization. However, when acquirers employ a proactive, purposeful, and sustained approach to M&A—one that includes developing a strong strategic vision, setting explicit financial and non-financial goals, aligning executive and functional leadership, integrating cultures and the new entity into the organization, and leveraging best-practice project management and integration—they increase the potential for every transaction to have valuable outcomes.

When acquirers employ a proactive, purposeful, and sustained approach to M&A, they increase the potential for every transaction to have valuable outcomes.

Appendix

Qualitative survey and phone interviews methodology

HFMA fielded an online survey of 90 financial executives involved in a hospital transaction as either part of an acquiring health system or as part of the acquired hospital. HFMA also conducted structured telephone interviews with 13 additional executives. All the executives were from organizations in our data set of hospital transactions between 2008-2014 and the dataset of acquired hospitals' financial, operational, and quality performance. In both the survey and interviews, to understand how some transactions fared better than others, the executives were asked a series of quantitative and qualitative questions on their M&A approach and performance.

Regression analysis methodology

Deloitte performed regression analyses to examine the association between hospital performance metrics, categorized into financial, operating and quality, and hospital acquisition status as well as years since acquisition. We used controls for factors that could influence this association, including hospital organizational characteristics (such as hospital size, urban/rural location, ownership type, service mix, teaching status, and being part of a system), case and payer mix, and local market conditions.

Our data sources were the Medicare Cost Reports, the American Hospital Association's (AHA) annual survey, the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS), and CMS hospital quality indicators.

We conducted the regression for 398 hospital transactions, which resulted in 759 hospitals being identified as hospitals acquired or merged between 2008 and 2014.

Regression model

Our main regression specification was of the following linear form:

Performance metric=f(acquisition indicator, hospital organizational characteristics, case and payer mix, local market characteristics, year indicators) where the regression variables are as follows:

Performance metrics: The acquired hospital performance metrics—19 financial metrics, 12 operating metrics, and 28 quality metrics—that we analyzed are listed in Figure 13. All quality metrics are standardized to facilitate comparison across hospitals. For metrics with non-normal distributions we removed the top and bottom percentiles of measures to reduce the potential for outlier values to affect the analyses.

Figure 13. Hospital performance metrics in regression analyses

Financial performance (19 metrics)

Profitability
- Return on assets
- Return on equity
- Net margin
- Operating margin
- Operating margin adjusted for depreciation and interest

Balance sheet stridency
- Current ratio
- Long term debt to capital ratio
- Cash to net patient revenue

Revenue and expenses
- Operating revenue
- Operating revenue per adjusted admission
- Operating expenses
- Operating expenses per adjusted admission
- Operating expenses adjusted for depreciation and interest
- Operating expenses adjusted for depreciation and interest per adjusted admission
- Administrative costs per adjusted admission
- Clinical contract expense as a % of operating expense
- Non-conical contract expense as a % of operating expense

Operating performance (12 metrics)

Utilization and operating efficiency
- Adjusted admissions overall
- Inpatient days—overall
- Average daily census—acute care
- Average daily census—overall
- Average length of stay—acute care
- Average length of stay—overall
- Occupancy rate—acute care
- Occupancy rate—overall
- Average age of plant
- FTE per average daily census
- FTE per 100 adjusted admissions
- Days in accounts receivables

Quality measures (28 metrics)

Mortality
- AMI mortality rate
- Heart failure mortality rate
- Mortality rates for pneumonia

Readmissions
- All causes readmission rate
- AMI readmission rate
- Heart failure readmission rates
- Readmission rates for pneumonia
- Hip/knee replacement readmission rate

Information/education level
- Stroke education

Preventive care
- Immunization for influenza

Surgical process of care
- Patients given beta blockers
- Patients given right kind of antibiotic (infection)
- Patients urinary catheters removed
- Treatment at the right time for blood clots after surgery

Effectiveness of care
- Stroke patients treated properly to prevent blood clots
- Patients treated to prevent blood clots
- Icu patients treated to prevent blood clots
- Preventive antibiotics stopped at right time
- Newborn deliveries scheduled earlier than necessary
- Pneumonia patients given right antibiotic

Patient experience
- Patients who gave their hospital a rating of 9 or 10
- Patients who gave their hospital a rating of 7 or 8
- Patients who gave their hospital a rating of 6 or lower

Ed timeliness of care
- Median time—arrival to admission
- Median time—before leaving
- Median time—to pain med
- Door to diagnostic evaluation time
- % Of patients who left before being seen

Acquisition variables. We used two main specifications. In one, our acquisition variable was an indicator which was 1 during the years following the transaction, and 0 in the years preceding the transaction. In these estimations, we essentially compared the performance of a given hospital in the years prior to the transaction compared to performance after the transaction closed.

To shed some light on whether the impact of acquisition might vary over time, we also performed specifications where our acquisition variables were three indicators: for the year the transaction occurred, for one year after the transaction, and for two years or more after the transaction. In these estimations, we compared the performance of a hospital prior to acquisition with that during the year of the transaction, one year after the transaction, and two years after the transaction.

Hospital organizational characteristics: Indicators for the hospital being part of a system, ownership (indicators for government and not-for-profit hospital ownership) and size (indicators for small and medium hospitals).

Payer and case mix variables: Medicare and Medicaid shares in payer mix, an indicator for disproportionate share status, case mix index, intensive care indicators, and non-acute share in total patient days.

Local market characteristics: Area wage mix index, critical access indicator, urban location indicator, 457 hospital referral region indicators.

Year indicators: Year indicator for each year between 2008 and 2015.

In these regression models, the unit of observation is the hospital-year cell. Since we include hospital referral regions and year indicators, the association between hospital performance metrics and acquisition horizon is estimated from changes in acquisition status in a given hospital, as compared to other hospitals with similar characteristics in the same hospital referral region.

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