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# Association between patient outcomes and accreditation in US hospitals: observational study

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## ABSTRACT

### OBJECTIVES
To determine whether patients admitted to US hospitals that are accredited have better outcomes than those admitted to hospitals reviewed through state surveys, and whether accreditation by The Joint Commission (the largest and most well known accrediting body with an international presence) confers any additional benefits for patients compared with other independent accrediting organizations.

### DESIGN
Observational study.

### SETTING
4400 hospitals in the United States, of which 3337 were accredited (2847 by The Joint Commission) and 1063 underwent state based review between 2014 and 2017.

### PARTICIPANTS
4 242 684 patients aged 65 years and older admitted for 15 common medical and six common surgical conditions and survey respondents of the Hospital Consumer Assessment of Healthcare Provider and Systems (HCAHPS).

### MAIN OUTCOME MEASURES
Risk adjusted mortality and readmission rates at 30 days and HCAHPS patient experience scores. Hospital admissions were identified from Medicare inpatient files for 2014, and accreditation information was obtained from the Centers for Medicare and Medicaid Services and The Joint Commission.

### RESULTS
Patients treated at accredited hospitals had lower 30 day mortality rates (although not statistically significant lower rates, based on the prespecified P value threshold) than those at hospitals that were reviewed by a state survey agency (10.2% *v* 10.6%, difference 0.4% (95% confidence interval 0.1% to 0.8%), P=0.03), but nearly identical rates of mortality for the six surgical conditions (2.4% *v* 2.4%, 0.0% (−0.3% to 0.3%), P=0.99). Readmissions for the 15 medical conditions at 30 days were significantly lower at accredited hospitals than at state survey hospitals (22.4% *v* 23.2%, 0.8% (0.4% to 1.3%), P<0.001) but did not differ for the surgical conditions (15.9% *v* 15.6%, 0.3% (−1.2% to 1.6%), P=0.75). No statistically significant differences were seen in 30 day mortality or readmission rates (for both the medical or surgical conditions) between hospitals accredited by The Joint Commission and those accredited by other independent organizations. Patient experience scores were modestly better at state survey hospitals than at accredited hospitals (summary star rating 3.4 *v* 3.2, 0.2 (0.1 to 0.3), P<0.001). Among accredited hospitals, The Joint Commission did not have significantly different patient experience scores compared to other independent organizations (3.1 *v* 3.2, 0.1 (−0.003 to 0.2), P=0.06).

### CONCLUSIONS
US hospital accreditation by independent organizations is not associated with lower mortality, and is only slightly associated with reduced readmission rates for the 15 common medical conditions selected in this study. There was no evidence in this study to indicate that patients choosing a hospital accredited by The Joint Commission confer any healthcare benefits over choosing a hospital accredited by another independent accrediting organization.

## WHAT IS ALREADY KNOWN ON THIS TOPIC

Accreditation is used internationally to assess hospital quality and to ensure patient safety

Much evidence so far has focused on the effect of accreditation on processes of care, many of which are emphasized and assessed by The Joint Commission

There are limited contemporary data to understand the association between accreditation and patient outcomes, including patient experience, hospital mortality, and readmission rates

## WHAT THIS STUDY ADDS

This study looked at the risk of mortality and readmission to hospital at 30 days for 15 common medical conditions and six common surgical conditions

Compared with surveys by state agencies, hospital accreditation by independent organizations was not associated with lower mortality and was only slightly associated with lower readmission rates for selected medical conditions in the United States

Hospital accreditation by The Joint Commission was not associated with consistently better healthcare outcomes when compared with accreditation by other independent accrediting organizations

## Introduction

Accreditation is a fundamental strategy used worldwide to assure a high baseline level of healthcare quality.[1 2] To ensure safety and quality in hospitals in the United States, the Centers of Medicare and Medicaid Services (CMS) has made accreditation by a CMS approved accrediting organization or review by a state survey agency a fundamental part of their Conditions of Participation.[3] With the substantial time and financial resources needed to prepare for any accreditation[1 4] and the importance of remaining eligible for Medicare payments, about 75% of hospital organizations have opted to pay accrediting organizations to receive accreditation,[5] fueling a multimillion dollar industry.[6]

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Although accreditation in general is seen as valuable, one entity—The Joint Commission—largely shapes the accreditation process, controlling more than 80% of the accreditation market as the accrediting agency of choice for nearly all major hospital systems. Moreover, the international branch of The Joint Commission currently accredits over 1000 organizations in over 60 countries outside the US.[7] Although accreditation by The Joint Commission can be expensive,[8 9] it has been seen as a measure of high quality performance.[10] Recently, several high profile examinations in the popular press[11 12] have called the value of accreditation by The Joint Commission into question, and the US Congress is now examining the degree to which accreditation seems to benefit patients.[13 14] Yet given how central accreditation is to the nation's strategy to assure hospital quality, little contemporary data exist on the degree to which it signals better outcomes.[15]

The accreditation process for US hospitals varies between state survey agencies and accrediting organizations.[16-20] A hospital that elects to undergo survey by a state agency can expect an annual, unannounced, onsite inspection that determines their accreditation status. These reviews vary in length and usually ensure that the hospital has people and policies needed to provide adequate quality care. Accrediting organizations are required to inspect hospitals at least every three years. The Joint Commission, for example, performs unannounced onsite surveys for its clients every 18 to 36 months, whereas Det Norske Veritas and Germanischer Lloyd (DNV GL), a newer accrediting organization, performs annual onsite inspections. Additionally, accrediting organizations tend to provide more structure, consulting with hospitals on how to prepare for an inspection, and often have additional quality metrics that they choose to examine. During the onsite inspection, surveyors observe a broad range of hospital operations, but the focus is still largely on structural factors and processes,[19] with less focus on whether the hospital is achieving good outcomes.

Many types of healthcare accreditation exist that are condition or specialty specific to hospital and organization level efforts. The current literature on accreditation reveals a mixed story of whether accreditation improves processes of care and outcomes.[1 21-39] For hospital accreditation specifically, much of the evidence so far has focused narrowly on the effect of accreditation on structural factors or processes of care, many of which are emphasized and assessed by The Joint Commission.[10 22 25 33 35-40] However, what really matters to patients is whether accreditation is associated with better outcomes. For patients, an association between accreditation and mortality rates would allow them to improve their likelihood of a good outcome by choosing an accredited hospital or by specifically choosing a hospital accredited by The Joint Commission. Given that accreditation offers not just inspections but an opportunity for hospitals to engage in improvement, one would expect that accreditation would be associated with better clinical outcomes. Moreover, it is entirely plausible that accredited hospitals, and more specifically those accredited by The Joint Commission, achieve better outcomes for other reasons: they could have more resources and, therefore, might be more willing to invest in efforts to improve quality. Empirical evidence here would be helpful.

Therefore, in this retrospective observational study, using contemporary national data, we sought to answer three questions. Firstly, is accreditation associated with better patient outcomes among US hospitals? Secondly, among hospitals accredited by accrediting organizations, do outcomes vary between hospitals accredited by The Joint Commission compared with those accredited by other independent accrediting organizations? And finally, how does patient experience differ between hospitals accredited by an accrediting organization and those undergoing a state survey, as well as between hospitals accredited by The Joint Commission and those accredited by other independent accrediting organizations?

## Methods

### Data source

Hospital admissions were identified from the 100% Medicare inpatient files for 2014. In the US, Medicare is available for people aged 65 or older, younger people with disabilities, and people with end stage renal disease.[41 42] Patients with Medicare often have multiple chronic conditions and lower median income than the rest of the population.[43] Beneficiary characteristics and death date were obtained from the Medicare beneficiary summary file. Medicaid eligibility was determined by use of the state buy-in coverage count variable. Any beneficiary with at least one month of state buy-in was considered eligible for Medicaid. Dual eligibility refers to patients who are eligible for both Medicaid and Medicare. Eligibility for Medicaid is determined primarily by state level poverty thresholds. Information on hospital characteristics was obtained from the American Hospital Association annual survey and Medicare impact file. Admissions to non-acute care hospitals, federal hospitals, and those outside the 50 states and the District of Columbia were excluded. Critical access hospitals were included in our study and are defined by statute in the US. Their key characteristics are that they are small (have 25 or fewer inpatient beds) and rural (located more than 35 miles from another hospital). These rural hospitals face substantial burdens in providing access to high quality care. To help reduce their financial burden, these hospitals are reimbursed on a cost basis.[44] The Harvard Institutional Review Board approved the present study.

### Hospitals by accreditation organization

A list of US acute care hospitals, including critical access hospitals, was obtained from the CMS,[45] which included hospitals' accreditation body or whether they were reviewed by the state and survey dates (ranging from 2014 to 2017). From the survey information

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available online at The Joint Commission website, we manually obtained hospital Medicare ID numbers and cross referenced the CMS list with The Joint Commission list. If a hospital was also identified on The Joint Commission list, then it was included as a hospital accredited by The Joint Commission. Hospitals not on The Joint Commission list were categorized in the CMS list as being accredited by an alternative organization or reviewed by a state survey agency.

## Outcomes

### *Mortality and readmissions*

The primary outcomes were death at 30 days from the admission date and readmission 30 days from discharge. We chose 15 common medical causes of hospital admissions (using diagnosis related groups) and six common costly surgical procedures across a variety of surgical specialties (appendix table 1), because these conditions have been previously used in studies of medical and surgical quality.[46-48] Thirty day mortality and readmission rates were calculated for these medical conditions and surgical conditions, as well as by individual condition. To have the full 30 day follow-up data, we excluded index admissions in December 2014. Thirty day mortality was calculated for any death (inhospital or elsewhere) in the 30 days after the admission date. We followed the standard approach to calculating readmissions as developed by CMS.[49] The numerator includes any unplanned readmissions to a non-federal, short stay, acute care, or critical access hospital within 30 days after discharge. Multiple readmissions are counted once, and same day readmissions for the same principal diagnosis at the same hospital are excluded. The denominator includes beneficiaries aged 65 years or older who are admitted at non-federal, short stay, acute care, or critical access hospitals. A readmission can also serve as an index hospital admission. There are numerous exclusion criteria, which include: death during admission, discharge against medical advice, hospital admission for cancer, or lacking continuous enrolment in Medicare for at least 30 days after discharge.

### *Patient experience*

To understand patient experience, our hospital sample was constructed by use of publicly reported data from the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS), available through the CMS. The HCAHPS survey is a standardized set of questions given to patients who were discharged from the hospital, had at least one overnight stay in the hospital as an inpatient, had a non-psychiatric principal diagnosis at discharge, and were alive at time of discharge. Patients cannot be surveyed while they are still in the hospital. Sampled patients are surveyed between 48 hours and six weeks after discharge.[50] Approved modes of administration include mail only, telephone only, mail followed by telephone, and active interactive voice response.[51]

The HCAHPS survey asks discharged patients 27 questions about their recent hospital stay, and these questions are grouped and reported in the following 11 publicly reported measures: composite measures of clinical domain (responsiveness of hospital staff, pain management, discharge information, and care transition), communication measures (with physicians, with nurses, and about treatments), items related to hospital environment (cleanliness and quietness), and global measures (overall hospital rating and likelihood to recommend). The CMS summary star rating scores hospitals on a one to five star scale, based on the 11 domains in the HCAHPS survey. Response rates for the three groups were 29% for The Joint Commission, 30% for other accrediting organizations, and 34% for state survey.

## Statistical analysis

### *Mortality and readmissions*

After identifying hospital admissions for the selected medical and surgical conditions, we examined patient and hospital characteristics for each accreditation type: accreditation by The Joint Commission, accreditation by other independent organizations, and state survey review (the first two groups constituted the accredited hospitals group). To account for regionally mediated differences in care, all models included hospital referral region fixed effects, allowing effectively for comparison of hospitals in the same hospital referral region. Possible patient clustering within hospitals was accounted for by use of generalized estimating equations. To account for differences in patient severity, the model adjusted for age, sex, dual eligibility, and individual Elixhauser conditions. The final models also incorporated hospital teaching status, critical access hospital status, size, region, ownership, and urban versus rural location. The models aggregating across the selected medical and across the selected surgical conditions also included indicator variables for the individual conditions.

We calculated mortality and readmission rates by specifying a linear regression model with each hospital's overall 30 day mortality rate or 30 day readmission rate as the outcome and the accrediting body as the primary predictor. Because we compared accredited and state reviewed hospitals on the basis of two primary outcomes (mortality and readmissions) for both the selected medical and surgical conditions, we used a Bonferroni corrected P value of 0.0125 as our threshold for significance. We performed additional sensitivity analyses: we first repeated our analyses with 2015 Medicare data, and then narrowed our population to include hospitals that were accredited in 2014 and analyzed outcomes in 2015.

### *Patient experience*

We examined hospital level HCAHPS data from April 2014 to March 2015, obtained from the 2015 year end Hospital Compare database. We linked the HCAHPS data to the annual survey of the American Hospital Association. We first compared the summary star rating and 11 publicly reported measure scores between accredited hospitals and state survey

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reviewed hospitals. We repeated our analyses to compare patient experience scores among accredited hospitals, specifically between those accredited by The Joint Commission and those accredited by other independent organizations. Star ratings were adjusted for hospitals characteristics, county characteristics, critical access hospital status, and hospital referral region fixed effects. Our analysis used an ordinary least squares regression that was weighted for the number of completed responses at each hospital. Because we analyzed five different aspects of patient experience, we adjusted for multiple testing and used a statistical significance P value of 0.01 for these secondary outcomes.

### Patient and public involvement

No patients were involved in setting the research question or the outcome measures, nor were they involved in developing plans for the design or implementation of the study. No patients were asked to advise on interpretation or writing up of results. There are no plans to disseminate the results of the research to study participants or the relevant patient community.

## Results

### Patient and hospital characteristics

A total of 4 242 684 hospital admissions were recorded across 4400 hospitals (2847 hospitals accredited by The Joint Commission (TJC), 490 hospitals accredited by other independent accrediting organizations (non-TJC), and 1063 hospitals reviewed by a state survey agency (table 1). Of these admissions, 3 567 853 (84%) occurred at TJC hospitals, 492 937 (12%) at non-TJC hospitals, and 181 894 (4%) at state survey hospitals (table 1, appendix table 2). Compared with TJC or non-TJC accredited hospitals, state survey hospitals were more often smaller, non-teaching, more likely to be located in rural settings, and lacking an intensive care unit. TJC hospitals were more likely to be larger, teaching institutions, located in urban locations, and in the northeast and south regions, compared with non-TJC hospitals or state survey hospitals (appendix table 3). Across the three groups, most patients were white and female, and about a quarter were dual eligible with similar comorbidity profiles.

### Mortality and readmission among accredited hospitals versus state survey hospitals

Thirty day mortality for the 15 selected medical conditions was slightly lower for accredited hospitals (that is, TJC and non-TJC hospitals) than for those hospitals reviewed by state survey (10.2% *v* 10.6%, P=0.03; table 2), but did not meet the prespecified Bonferroni threshold of P=0.0125. Thirty day mortality for the six selected surgical conditions was similar between accredited hospitals and state survey hospitals (2.4% *v* 2.4%, P=0.99; table 2). When broken down by medical condition, renal failure was the only statistically significant condition with lower mortality among accredited hospitals (11.8% *v* 13.9%, P=0.008; appendix table 4), although no adjustments were made for multiple testing in these subgroup analyses. Thirty day mortality for the individual surgical procedures did not differ between the two groups.

Thirty day readmissions for the 15 selected medical conditions was significantly lower for accredited hospitals than for state survey hospitals (22.4% *v* 23.2%, P<0.001; table 2), but 30 day readmissions for the six selected surgical conditions did not differ between the two groups (15.9% *v* 15.6%, P=0.75; table 2). When broken down by condition or procedure, 30 day readmissions for pneumonia (19.4% *v* 20.5%, P=0.008), sepsis (21.7% *v* 23.0%, P=0.02), gastrointestinal bleeding (20.1% *v* 23.5%, P<0.001), and pulmonary lobectomy (15.6% *v* 26.1%, P<0.001) were significantly lower for accredited hospitals than for state survey hospitals (appendix table 4), although no adjustments were made for multiple testing in these subgroup analyses. Thirty day readmissions for the remaining medical and surgical conditions did not differ between the two groups.

### Mortality and readmission among TJC accredited hospitals versus non-TJC accredited hospitals

Thirty day mortality rates for the selected medical and surgical conditions were similar among hospitals accredited by The Joint Commission and those accredited by other independent accrediting organizations (10.1% *v* 10.3%, P=0.18 and 2.4% *v* 2.4%, P=0.92, respectively; table 3). When broken down by medical condition, 30 day mortality was lower at TJC hospitals than non-TJC hospitals for pneumonia (9.2% *v* 9.7%, P=0.02), gastrointestinal bleeding (6.6% *v* 7.0%, P=0.02), and renal failure (11.7% *v* 12.4%, P=0.01; appendix table 5). Among surgical procedures, 30 day mortality for endovascular abdominal aortic aneurysm repair was higher for TJC hospitals than for non-TJC hospitals (2.8% *v* 2.1%, P=0.02; appendix table 5). No adjustments were made for multiple testing in these subgroup analyses.

Readmission rates for the selected medical and surgical conditions were similar between TJC and non-TJC hospitals (22.4% *v* 22.4%, P=0.73 and 16.0% *v* 15.8%, P=0.78, respectively; table 3). When broken down by condition, 30 day readmissions were lower at TJC hospitals than at non-TJC hospitals for pneumonia (19.4% *v* 20.1%, P=0.008) and metabolic disease (23.0% *v* 23.8%, P=0.03; appendix table 5), although no adjustments were made for multiple testing in these subgroup analyses. We saw no statistical difference in 30 day readmissions between the two groups for the remaining medical and surgical conditions.

### Sensitivity analyses

These analyses were repeated with 2015 data. Thirty day mortality and readmission rates for both the selected medical and surgical conditions were similar for accredited hospitals versus state survey hospitals (appendix table 6). These rates were also similar among TJC hospitals and non-TJC hospitals (appendix table 7).

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Table 1 | Characteristics of patient and hospitals by accreditation status. Data are number (%) unless stated otherwise

| Characteristics | TJC hospitals (3 567 853 admissions) | Non-TJC hospitals (492 937 admissions) | State survey hospitals (181 894 admissions) |
|---|---|---|---|
| **Hospital characteristics** | | | |
| No of hospitals | 2847 | 490 | 1063 |
| Size | | | |
| Small (1-99 beds) | 975 (34.3) | 241 (49.2) | 987 (92.9) |
| Medium (100-399 beds) | 1469 (51.6) | 206 (42.0) | 72 (6.8) |
| Large (≥400 beds) | 403 (14.2) | 43 (8.8) | 4 (0.4) |
| Ownership | | | |
| For profit | 629 (22.1) | 79 (16.1) | 93 (8.8) |
| Non-for-profit | 1859 (65.3) | 281 (57.4) | 507 (47.7) |
| Federal government | 359 (12.6) | 130 (26.5) | 463 (43.6) |
| Teaching status | | | |
| Major | 216 (7.6) | 18 (3.7) | 0 |
| Minor | 779 (27.4) | 105 (21.4) | 67 (6.3) |
| Non-teaching | 1852 (65.1) | 367 (74.9) | 996 (93.7) |
| US region | | | |
| Northeast | 420 (14.8) | 53 (10.8) | 83 (7.8) |
| Midwest | 725 (25.5) | 169 (34.5) | 441 (41.5) |
| South | 1155 (40.6) | 164 (33.5) | 323 (30.4) |
| West | 547 (19.2) | 104 (21.2) | 216 (20.3) |
| Location | | | |
| Rural | 294 (10.3) | 79 (16.1) | 664 (62.5) |
| Urban | 2553 (89.7) | 411 (83.9) | 399 (37.5) |
| Critical access hospital | 342 (12.0) | 106 (21.6) | 785 (73.9) |
| Intensive care unit | 2078 (73.0) | 303 (61.8) | 293 (27.6) |
| **Patient characteristics** | | | |
| Age (years; mean (standard deviation)) | 75.6 (12.3) | 75.5 (12.1) | 77.1 (11.7) |
| Race/ethnicity | | | |
| White | 2 861 168 (80.2) | 404 960 (82.2) | 162 492 (89.3) |
| Black | 403 020 (11.3) | 51 357 (10.4) | 10 101 (5.6) |
| Hispanic | 191 234 (5.4) | 22 572 (4.6) | 4871 (2.7) |
| Other | 112 431 (3.2) | 14 048 (2.9) | 4430 (2.4) |
| Women | 2 042 140 (57.2) | 281 696 (57.2) | 107 576 (59.1) |
| Medicaid eligible | 950 660 (26.7) | 125 250 (25.4) | 54 709 (30.1) |
| Comorbidity | | | |
| Heart failure | 365 684 (10.3) | 49 816 (10.1) | 20 497 (11.3) |
| Diabetes mellitus | 949 412 (26.6) | 135 054 (27.4) | 47 544 (26.1) |
| Renal failure | 783 212 (22.0) | 107 742 (21.9) | 29 544 (16.2) |
| Liver disease | 78 080 (2.2) | 9827 (2.0) | 2187 (1.2) |
| Depression | 402 927 (11.3) | 53 691 (10.9) | 19 223 (10.6) |

TJC=hospitals accredited by The Joint Commission; non-TJC=hospitals accredited by other independent accrediting organizations; state survey=hospital reviewed by a state survey agency.

These analyses were repeated for a subset of hospitals, specifically 2015 Medicare outcomes of those hospitals that were accredited in 2014. In this subset of hospitals, 30 day mortality and readmission rates for both the selected medical and surgical conditions were similar for accredited hospitals versus state survey hospitals (appendix table 8). Among accredited hospitals, 30 day mortality rates for the 15 selected medical conditions were similar among TJC hospitals and non-TJC hospitals, but 30 day mortality rates for the six selected surgical conditions were significantly lower for TJC hospitals than for non-TJC hospitals. All readmission rates were similar for TJC hospitals and non-TJC hospitals (appendix table 9).

### Patient experience (HCAHPS)

The HCAHPS summary star rating for accredited hospitals was significantly lower than for state survey hospitals (3.2 *v* 3.4, P<0.001; table 4). When broken down by domains, accredited hospitals scored significantly lower in communication with physicians, with nurses, and about treatments (3.2 *v* 3.5, P<0.001; 3.4 *v* 3.6, P<0.001; 2.7 *v* 2.9, P<0.001; respectively); staff responsiveness (3.1 *v* 3.4, P<0.001); and hospital quietness and cleanliness (3.0 *v* 3.3, P<0.001; 2.9 *v* 3.2, P<0.001; respectively). Overall hospital rating (3.1 *v* 3.3, P=0.012) and care transition (3.0 *v* 3.1, P=0.04) were lower for accredited hospitals but did not meet our significance level of P<0.01 when adjusted for multiple testing.

Among accredited hospitals, the HCAHPS summary star rating for TJC hospitals was similar to those for non-TJC hospitals (3.1 *v* 3.2, P=0.06; table 5). TJC hospitals scored lower than non-TJC hospitals in cleanliness (2.9 *v* 3.0; P<0.001). The following domains were lower for TJC hospitals than for non-TJC hospitals but did not meet our significance level of P<0.01: recommend the hospital (3.2 *v* 3.3, P=0.02), care transition (2.9 *v* 3.1, P=0.013), pain management (3.35 *v* 3.44, P=0.04), and staff responsiveness (3.0 *v* 3.2, P=0.014).

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Table 2 | Risk adjusted* mortality and readmission rates at 30 days for accredited hospitals versus state survey hospitals, by selected medical or surgical conditions

| | % (95% CI) | | | |
|---|---|---|---|---|
| | Accredited hospitals† | State survey hospitals‡ | Difference | P§ |
| **30 day mortality** | | | | |
| Medical conditions | 10.2 (10.11 to 10.24) | 10.6 (10.2 to 10.9) | −0.4 (−0.8 to −0.1) | 0.03 |
| Surgical conditions | 2.4 (2.33 to 2.42) | 2.4 (2.1 to 2.7) | 0.001 (−0.3 to 0.3) | 0.99 |
| **30 day readmission** | | | | |
| Medical conditions | 22.4 (22.3 to 22.5) | 23.2 (22.8 to 23.7) | −0.8 (−1.3 to −0.4) | <0.001 |
| Surgical conditions | 15.9 (15.6 to 16.1) | 15.6 (14.2 to 17.0) | 0.3 (−1.2 to 1.6) | 0.75 |

*Adjusted for patient and hospital characteristics and hospital referral region fixed effects.
†Hospitals accredited by The Joint Commission and other independent accrediting organizations.
‡Hospitals reviewed by a state survey agency.
§P<0.0125 was considered significant.

## Discussion

### Principal findings

Among US hospitals, we found no meaningful association between private accreditation and mortality rates. Although the readmission rates for the 15 selected medical conditions (but not the six selected surgical conditions) were lower for accredited hospitals than for state survey hospitals, the differences were modest. Furthermore, accredited hospitals had, on average, modestly worse patient experience scores than state survey hospitals. The lack of meaningful differences in outcomes between accredited and state survey hospitals suggest that a closer examination of the benefits of private accreditation would be useful.

### Comparison with other studies

It is possible that accreditation by an independent accredited organization is not associated with better patient outcomes because the focus of these organizations has been on improving structural factors and clinical processes rather than actually improving patient outcomes. Previous work has shown that efforts at improving clinical processes of care can lead to better patient outcomes,[52 53] but these results do not always hold true,[54 55] and general hospital accreditation has shown mixed results on patient outcomes.[1 29 31 56] Additionally, we did not observe better patient experience among patients receiving care at accredited hospitals; in fact, satisfaction was slightly worse compared with satisfaction at state survey hospitals. This finding is consistent with results from a study by Sack and colleagues, who showed that accreditation is not associated with better quality as perceived by patients across 73 hospitals in Germany.[57] Again, this finding might be due to the accreditation process focusing on measures that do not directly translate to better patient experience.

There are several other explanations for why accreditation is not associated with better outcomes. Since US hospitals compete within local or regional markets, competition might be a driver of overall improvement in quality. The US malpractice system might also be exerting influence on hospitals to provide high quality care. Finally, insurance companies have information about the quality of care in hospitals and could use their bargaining power to influence decisions of hospitals to invest in quality of care. These companies might exclude low quality providers from their network, providing additional pressure for hospitals to make quality investments.

We could not find any consistent differences in clinical outcomes between patients treated at hospitals accredited by The Joint Commission compared with hospitals accredited by other independent organizations. Outcomes over two years (2014 and 2015) showed consistent results. When examining hospitals accredited in 2014 with 2015 outcomes data, we found that TJC hospitals had lower surgical mortality than non-TJC hospitals but did not have differences in medical mortality. The Joint Commission is the clear market leader, accrediting over 80% of US hospitals and often serves as a symbol of high quality care. We hypothesized that the best financially resourced hospitals in the country could have sought out accreditation by The Joint Commission, and since those same hospitals could have resources and

Table 3 | Risk adjusted* mortality and readmission rates at 30 days for TJC hospitals versus non-TJC hospitals, by selected medical or surgical conditions

| | % (95% CI) | | | |
|---|---|---|---|---|
| | TJC hospitals† | Non-TJC hospitals‡ | Difference | P§ |
| **30 day mortality** | | | | |
| Medical conditions | 10.1 (10.07 to 10.21) | 10.3 (10.1 to 10.5) | −0.2 (−0.4 to 0.1) | 0.18 |
| Surgical conditions | 2.4 (2.35 to 2.45) | 2.4 (2.2 to 2.5) | 0.01 (−0.2 to 0.2) | 0.92 |
| **30 day readmission** | | | | |
| Medical conditions | 22.4 (22.3 to 22.5) | 22.4 (22.1 to 22.8) | −0.1 (−0.5 to 0.3) | 0.73 |
| Surgical conditions | 16.0 (15.7 to 16.2) | 15.8 (15.0 to 16.7) | 0.1 (−0.8 to 1.0) | 0.78 |

*Adjusted for patient and hospital characteristics and hospital referral region fixed effects.
†Hospitals accredited by The Joint Commission.
‡Hospitals accredited by independent accrediting organizations other than The Joint Commission.
§P<0.0125 was considered significant.

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**Table 4 | Risk adjusted* HCAHPS overall and star rating scores for patient experience at accredited hospitals versus state survey hospitals**

| | HCAHPS score (95% CI) | | | |
|---|---|---|---|---|
| | Accredited hospitals† | State survey hospitals‡ | Difference | P§ |
| Summary star rating | 3.17 (3.14 to 3.20) | 3.35 (3.26 to 3.44) | −0.18 (−0.28 to −0.08) | <0.001 |
| Overall satisfaction | | | | |
| Recommend the hospital | 3.23 (3.20 to 3.26) | 3.31 (3.2 to 3.4) | −0.09 (−0.20 to 0.03) | 0.15 |
| Overall hospital rating | 3.08 (3.04 to 3.11) | 3.25 (3.1 to 3.4) | −0.17 (−0.31 to −0.04) | 0.012 |
| Communication | | | | |
| With physicians | 3.21 (3.18 to 3.24) | 3.48 (3.4 to 3.6) | −0.28 (−0.39 to −0.16) | <0.001 |
| With nurses | 3.39 (3.36 to 3.42) | 3.59 (3.5 to 3.7) | −0.19 (−0.31 to −0.08) | <0.001 |
| About treatments | 2.73 (2.71 to 2.76) | 2.94 (2.8 to 3.0) | −0.21 (−0.32 to −0.10) | <0.001 |
| Clinical processes | | | | |
| Care transition | 2.99 (2.96 to 3.02) | 3.12 (3.0 to 3.2) | −0.13 (−0.24 to −0.01) | 0.04 |
| Discharge information | 3.28 (3.25 to 3.30) | 3.20 (3.1 to 3.3) | 0.08 (−0.03 to 0.18) | 0.14 |
| Pain management | 3.39 (3.36 to 3.42) | 3.47 (3.4 to 3.6) | −0.08 (−0.19 to 0.02) | 0.13 |
| Staff responsiveness | 3.11 (3.08 to 3.14) | 3.35 (3.3 to 3.5) | −0.24 (−0.35 to −0.13) | <0.001 |
| Hospital environment | | | | |
| Quietness | 3.04 (3.01 to 3.07) | 3.27 (3.2 to 3.4) | −0.23 (−0.34 to −0.12) | <0.001 |
| Cleanliness | 2.92 (2.89 to 2.95) | 3.19 (3.1 to 3.3) | −0.27 (−0.37 to −0.16) | <0.001 |

HCAHPS=Hospital Consumer Assessment of Healthcare Providers and Systems.
*Adjusted for hospital characteristics, county characteristics, critical access hospital status, and hospital referral region fixed effects.
†Hospitals accredited by The Joint Commission and other independent accrediting organizations.
‡Hospitals reviewed by a state survey agency.
§P<0.01 was considered significant.

capital to dedicate toward improving patient care and outcomes, they might have better outcomes (whether due to accreditation by The Joint Commission or not). In our study, we did not find an association between accreditation status and patient outcomes. Therefore, although we were unable to make overarching conclusions about the benefits of accreditation by The Joint Commission, the data did not consistently support our hypothesis that hospitals accredited by The Joint Commission would have better outcomes.

These findings have important implications. Hospital accreditation is a central element of the quality strategy for many countries and is thought to be an important component of maintaining the quality and safety of care delivered.[2] However, given the minimal benefit seen with accreditation in our study, it raises the question of whether our national efforts need to emphasize accreditation as much as they do. If we are to continue to use accreditation—and spend the substantial sums of money they require—then we should consider substantially rethinking our accreditation process. Given the resources that accreditation requires, ensuring that it leads to better care seems to be a minimum goal of the process.

Our work adds to a limited and mixed body of evidence on accreditation and outcomes. Griffith and colleagues found that lower quality scores in US acute care facilities were associated with higher mortality

**Table 5 | Risk adjusted* HCAHPS overall and star rating scores for patient experience at TJC hospitals versus non-TJC hospitals**

| | HCAHPS score (95% CI) | | | |
|---|---|---|---|---|
| | TJC hospitals† | Non-TJC hospitals‡ | Difference | P§ |
| Summary star rating | 3.12 (3.09 to 3.14) | 3.20 (3.12 to 3.27) | −0.08 (−0.16 to 0.003) | 0.06 |
| Overall satisfaction | | | | |
| Recommend the hospital | 3.20 (3.17 to 3.23) | 3.32 (3.2 to 3.4) | −0.12 (−0.22 to −0.02) | 0.02 |
| Overall hospital rating | 3.03 (3.00 to 3.07) | 3.12 (3.0 to 3.2) | −0.08 (−0.20 to 0.03) | 0.15 |
| Communication | | | | |
| With physicians | 3.14 (3.11 to 3.17) | 3.18 (3.1 to 3.3) | −0.04 (−0.14 to 0.06) | 0.41 |
| With nurses | 3.34 (3.31 to 3.37) | 3.41 (3.3 to 3.5) | −0.06 (−0.16 to 0.03) | 0.19 |
| About treatments | 2.69 (2.66 to 2.72) | 2.71 (2.6 to 2.8) | −0.02 (−0.11 to 0.07) | 0.61 |
| Clinical processes | | | | |
| Care transition | 2.94 (2.90 to 2.97) | 3.07 (3.0 to 3.2) | −0.13 (−0.22 to −0.03) | 0.013 |
| Discharge information | 3.25 (3.22 to 3.28) | 3.25 (3.17 to 3.33) | 0.001 (−0.09 to 0.09) | 0.99 |
| Pain management | 3.35 (3.32 to 3.38) | 3.44 (3.36 to 3.51) | −0.09 (−0.18 to −0.003) | 0.04 |
| Staff responsiveness | 3.03 (3.00 to 3.06) | 3.15 (3.06 to 3.23) | −0.12 (−0.21 to −0.02) | 0.014 |
| Hospital environment | | | | |
| Quietness | 2.98 (2.95 to 3.01) | 3.01 (2.9 to 3.1) | −0.03 (−0.13 to 0.07) | 0.53 |
| Cleanliness | 2.85 (2.82 to 2.88) | 3.01 (2.9 to 3.1) | −0.16 (−0.25 to −0.07) | <0.001 |

HCAHPS=Hospital Consumer Assessment of Healthcare Providers and Systems.
*Adjusted for hospital characteristics, county characteristics, critical access hospital status, and hospital referral region fixed effects.
†Hospitals accredited by The Joint Commission.
‡Hospitals accredited by independent accrediting organizations other than The Joint Commission.
§P<0.01 was considered significant.

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rates.[15] Falstie-Jensen and colleagues found that in 31 Danish hospitals, full accreditation (*v* partial accreditation) was associated with lower mortality rates and shorter length of stay but no difference in acute readmissions.[58 59] Schmaltz and colleagues showed that accredited hospitals have marginally better scores on process measures,[34] but Bogh and colleagues found that accreditation was not associated with larger improvement for patients with acute stroke, heart failure, or ulcers.[40] Furthermore, there is wide variation in mortality rates reported among accredited hospitals.[60] Barnett and colleagues found that unannounced accreditation visits by The Joint Commission led to improved mortality for patients admitted during that week, although the mortality rates then returned back to baseline.[61] These studies provide important information on how accreditation is associated with process and outcomes worldwide. There is less information about how accreditation in general, and specifically by The Joint Commission, affects patient outcomes across common medical and surgical conditions as well as patient experience over an extended period.

### Strengths and limitations of study

Our study has several limitations. Firstly, as an observational study, it cannot assess causality. Owing to the non-randomized study design, we cannot exclude the possibility that our results might be confounded by unmeasured factors. The possibility of selection bias of which hospitals decide to undergo accreditation also exists. Given that accreditation is a choice, one would assume that the institutions with better and more resources would undergo this process, potentially biasing us toward finding a benefit of accreditation.

Secondly, our mortality and readmissions measures were calculated only on the basis of the Medicare population, and we do not know whether our findings are similar among commercially insured populations or other publicly insured populations. The rates are also based on administrative claims data, which lack detailed clinical information. However, CMS depends on these data to assign rankings and to distribute payment determinations in national pay-for-performance programs. Moreover, when examining patient experience, HCAHPS surveys have a low response rate, and the responses are subjective and affected by personal and cultural expectations.

Finally, our exposure in this study was whether hospitals were accredited, and if so, by which accrediting body. Risk of information bias is minimized due to the use of national databases. We did not take into account when the accreditation or review occurred in the past three years because this study had a cross sectional design.

### Conclusions

In the present study, we found that hospitals accredited by private organizations did not have better patient outcomes than hospitals reviewed by a state survey agency. Furthermore, we found that accreditation by The Joint Commission, which is the most common form of hospital accreditation, was not associated with better patient outcomes than other lesser known, independent accrediting agencies.

**Contributors:** All authors contributed to the design and conduct of the study, data collection and management, analysis interpretation of the data; and preparation, review, or approval of the manuscript. MBL supervised the study and is the guarantor. The corresponding author attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted.

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**Ethical approval:** The study was approved by the institutional review board at Harvard T H Chan School of Public Health.

**Data sharing:** No additional data available.

The lead author affirms that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

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**Web appendix:** Supplemental appendix

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