Peer Review File

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Reviewer A

Comment 1: Regarding Comment (1): In regard to content, it is only in the paragraph before conclusion that the paper describes the findings in a positive light (with respect to accrediting agencies), i.e., that the findings could be leveraged by hospital leaders to switch accreditation agencies and benefit from the cost savings, given that the results reveal limited or no significant difference in patient outcomes across accrediting agencies. This message does not come across throughout the manuscript including the abstract.

Reply 1: Thank you for this comment. What you are explaining is indeed one of the messages that we would want to communicate with hospital decision makers. This was our incentive for this study, to show evidence to hospital leaders regarding differences to quality-of-care metric for different accreditation agencies. In that respect, in the Objectives section we have explained the contribution of this research to hospital leaders and how they can benefit from this study. We also elaborated in the Discussion section by explaining how the results can be used to enhance the understanding for leaders. Finally, we added one sentence on the Abstract of the manuscript.

Changes in the text 1: In the abstract section we added the following sentence to Line 8 of the Abstract: *"Results are anticipated to provide invaluable information to hospital decision makers about accreditation agency choices and quality of care."*
We also added the following sentence to Line 20 of the Abstract: "*As CMS, and leaders continue to evaluate and implement policies to improve efficacy, hospital accreditation agencies will need to revisit their focus and the processes they influence in hospitals"*

We added a new large portion on the Objectives section (page 1, line 13): *"These CoP processes help form the basis for care processes in hospitals and are important in designing safe and effective care. The objective of this research is to determine if there is a significant difference in hospital quality scores across hospitals that utilize different accrediting bodies. In that respect, the study does not seek to study the effect of accreditation vs non-accreditation on quality, but instead compares hospitals accredited by different agencies. CMS has mandated since its inception that hospitals must meet CoP to be eligible for reimbursement from CMS programs. Hospital reimbursement is now shifting to value-based care that rewards performance in quality measures by CMS. The accreditation process seeks to measure and evaluate physical plant standards, administrative and clinical processes, and understand the outcomes of care in episodes that are analyzed. The survey process currently utilized by the various agencies uses the patient care tracer methodology which evaluates a patient's journey of care and the collaboration among the different patient care areas. Physicians, nurses,*

ancillary staff, and administrators spend a significant amount of time and expense keeping up to date on the administrative tasks of accreditation but at what benefit to patient care? As healthcare leaders search for ways to reduce costs and improve outcomes, accreditation agencies will need to be a trusted partner going forward."

We added a new portion on the Discussion section (page 22, line 17): "*As healthcare leaders and the industry look to implement reform that rewards value and outcomes, accreditation agencies play a pivotal role on behalf of CMS. This study sought to determine if there was an accreditation industry leader in evaluating processes to produce better outcomes. The results showed that this is currently not the case in accreditation agencies. Further research needs to continue to evaluate what portions of the accreditation process support better outcomes and lower cost while revising those portions that do not."*

Comment 2: The paper appears to be drawing attention to the only significant association of 30-day mortality for COPD with the DNV agency in a negative way. It must be noted that COPD is a chronic condition that could be greatly impacted by population level health dipartites and social determinants of health (SDOH) that cannot be accounted for using administrate datasets. CMS payment models have also been criticized for not accounting for these key actors in their multivariate risk adjustment models. Given the lack of adjustment for potential ley drivers of COPD mortality (as reflected in the low R-square for the COPD regression model), and the key findings of no statistically significant differences in every other 30-day mortality rate and hospital-acquired conditions, it would not be appropriate to attribute it to the DNV, instead, a case needs to be made for future research on social and population-level drivers of COPD mortality that cannot be accounted for using administrative datasets. The growing literature on SDOH and population-level health disparities in chronic disease needs to be referenced in this regard. Correspondingly, my recommendation would be to revise the verbiage wherever appropriate throughout the paper, to convey the key message that is presently hidden in the paragraph before the conclusion, i.e., that after adjusting for key structural characteristics there were hardy any statistically significant differences across agencies on in 30-day mortality and hospital-acquired outcomes for a variety of conditions.

Reply 2: The authors agree that this association (DNV agency and 30-day COPD mortality) could be present due to inherent population health characteristics in geographic areas where there are more DNV accredited hospitals. In that respect we concur that it is not safe (and not fair as well) to point to DNV as a low performing agency. Since the dataset that the study has used does not include information about socioeconomic characteristics of the hospital populations, we believe that this needed to be addressed as a study limitation, in that section. In addition, when reading the new version of the manuscript we toned down language about this only association observed

in the study, as one that needs to be further be examined since it was present without considering/controlling for SDOHs. We finally made sure that there is now no portion of the paper where we try to overexplain the association, other than mentioning the caution it should be used with, due to the reasons that you have noted in your comment.

Changes in the text 2: We added the following text in the Limitations section of the article (page 19, line 21): *These measures are risk adjusted by CMS accounting for patient demographics and morbidities to ensure that individual patient complexity was accounted for in the analysis but are only reported at the hospital level. These risk adjustments do consider other patient demographics such as race, socioeconomic status, literacy rate, or other social determinants of health factors. Acknowledging this limitation, we realize that the results in their entirety cannot be attributed to the accrediting agency, but hospital processes play a major part in outcomes. These social factors play a major role in a patient's overall health and should be considered in future research.*
We also added the following text in the Discussion section of the article (page 16, line 16): *This association, though needs to be interpreted with caution. This is since it may be present due to inherent population health characteristics in geographic areas where there are more DNV accredited hospitals, and the study did not control for any social determinants of health.*

Comment 3 (regarding organization and flow): Revise the introduction to highlight the problem of interest and the gap in the literature it will be addressing. For example, how is this paper different from others that have addressed the same or similar research questions, e.g., Lam, 2018? This explanation needs to lead a separate subsection within the introduction on 'purpose, scope, and research questions.' The research questions of this study need to be clearly stated in this subsection.

Reply 3: In response to your comment, we tried to provide to the reader a more concise problem definition and the literature gap that it addresses. We added text explaining that the main goal of the study is to compare hospitals accredited by different agencies to help them understand if some important quality outcomes may be associated with any of the accrediting bodies themselves. Additionally, we explained that the study is aimed to help hospital decision makers understand the role of the accreditation selection in terms of quality, and if there is any association between specific agencies and quality. Regarding the literature gap that the study addresses, we explained better that while there are several studies that compare accredited vs non-accredited hospitals in terms of quality, or focus on one agency only, our study is the first one in the United States that attempts a comparison between the main independent accreditation agencies.

Changes in the text 3: We added the following text in the introduction section (page 1, line 16): *In that respect, the study does not seek to study the effect of accreditation vs*

non-accreditation on quality, but instead compares hospitals accredited by different agencies.

We also added a new subsection (Scope) that explains, we believe with clarity the scope of the article, per your recommendation (page 2, line 8): *The objective is to study how hospitals accredited by different independent agencies perform against one another. This knowledge will help hospital decision makers understand the role of the accreditation selection in terms of quality, and if there is any association between specific agencies and quality. Much of the previous literature evaluates hospital outcomes for hospitals that utilize Joint Commission and those that are accredited by SHHS. Other studies also compare only one accrediting body against all other peers. Many of the current studies evaluate the differences between accredited hospitals compared to non-accredited hospitals throughout the world. There is less known literature on how hospitals perform when comparing outcome measures across hospital accredited by different agencies. This research compares the entities in metrics utilized in the CMS pay for performance hospital programs as including SHHS outcomes will introduce significant variation.*

Comment 4 (regarding organization and flow): Add in that we are publishing comparisons of the agencies, compared to other papers.

Reply 4: Per your recommendation, the new "Scope" subsection makes it clear, with a sentence that we are publishing comparisons of the agencies, compared to other papers.

Changes in the text 4: We added the following text in the new "Scope" subsection (page 2, line 8): *The objective is to study how hospitals accredited by different independent agencies perform against one another.*

We also added the following text at the start of the article (page 1, line 14): *The objective of this research is to determine if there is a significant difference in hospital quality scores across hospitals that utilize different accrediting bodies. In that respect, the study does not seek to study the effect of accreditation vs non-accreditation on quality, but instead compares hospitals accredited by different agencies.*

Comment 5 (regarding organization and flow): Add in the research questions of the study.

Reply 5: Per your recommendation, we added a new portion at the end of the introduction section where we included the research questions of the study. Please see below.

Changes in the text 5: We added a Research Questions subsection to the new version

of the manuscript (page 2, line 20):
Research Question 1
1(a): Is there a statistically significant difference in the HAI SIR rates across hospitals accredited by different independent accrediting agencies? (ANOVA and Post-hoc tests).
1(b): Is there a significant association between the (i) HAI SIR rates and the (ii) HFAP and DNV hospitals against Joint Commission ones, after controlling for hospital structure characteristics? (Multiple Linear Regression).
Research Question 2
2(a): Is there a difference in the 30-Day Mortality rates across hospitals accredited by different independent accrediting agencies? (ANOVA and Post-hoc tests).
2(b): Is there a significant association between the (i) 30-Day Mortality rates and the (ii) HFAP and DNV hospitals against Joint Commission ones, after controlling for hospital structure characteristics? (Multiple Linear Regression).

Comment 6 (regarding organization and flow): Additionally, since this paper is narrative heavy, wherever possible, meaningful subheadings should be added to guide the reader. These improvements could be made in all sections. The discussion section needs to include three subheadings: 1) summary of findings, 3) implications for policy and practice and 3) limitations and future research avenues.

Reply 6: We added subheadings in the document. Per your recommendation, the discussion section now includes the three subheadings (summary of findings, implications for policy and practice, limitations and future research avenues).

Changes in the text 6: Now the paper is organized by added subheadings to separate different areas of the manuscript for ease of reading.

Comment 7: The conclusion should be strengthened to summarize the overall contribution to the study to the literature of interest ad avenues for future research.

Reply 7: The new version of the manuscript now has a more substantial Conclusions section that better explains the main lesson learnt from this study, that is there is not currently an accreditation industry leader in evaluating processes to produce better outcomes.

Changes in the text 7: We added the following text to the Conclusion section of the article (page 22, line 19): *As healthcare leaders and the industry look to implement reform that rewards value and outcomes, accreditation agencies play a pivotal role on behalf of CMS. This study sought to determine if there was an accreditation industry leader in evaluating processes to produce better outcomes. The results showed that this is currently not the case in accreditation agencies. Further research needs to continue*

to evaluate what portions of the accreditation process support better outcomes and lower cost while revising those portions that do not.

Reviewer B

Comment 1: The principal finding is: "the mean COPD and HF mortality differ in a statistically significant way" and "All other 30-Day mortality and HAI outcomes were not found to be different." (30-33) This finding, if true, is of modest consequence, given the agencies' focus on process, rather than patients. It does not suggest any specific cause or corrective action.

Reply 1: The processes evaluated by the accrediting agencies are foundation of clinical care pathways used to treat patients. The structures of patient care facilities, medical equipment, and administrative processes support the processes. All of which can contribute to better outcomes for patients, though the outcomes themselves may not be attributed wholly to the processes. As the patients' co-morbidities and SDHO factors contribute to outcomes as well. So we have added text within the Scope section to reflect that accreditation agencies review processes and not patients, these process are foundational to patient care.

Changes in the text 1: The rationale was added in the Scope subsection of the, page 2, line 11.

Hospital accreditation standards function as the structure to which hospitals must meet the CMS CoP to receive reimbursement. These CoP processes help form the basis for care processes in hospitals and are important in designing safe and effective care. The objective of this research is to determine if there is a significant difference in hospital quality scores across hospitals that utilize different accrediting bodies

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Comment 2: The conclusion: "The findings in this study and other recent studies have found that the accreditation agency utilized by a hospital does not have a significant impact on hospital outcomes or the patient experience." (390-391) is not well-supported by the research. The patient outcomes used in the paper cannot be compared without adjustment for social risk factors such as income, employment, education, and race. The CMS measures exclude these adjustments, e.g. The National Quality Forum (NQF) re-endorsed the measures without adjustment for patient-level social risk factors in the last endorsement maintenance submission prior to 2020. (2020 Measure Updates: AMI, COPD, HF, Pneumonia Readmission, p.14; file:///C:/Users/17347/Downloads/2020_Rdmn_CSR.pdf) "(A)djusted to account for a patient's age and prior medical history" (170) is not enough. It is unreasonable to say that the hospitals serving different populations (e.g., Detroit and Midland) should achieve the same results without addressing their social risk factors. At the very least, the omission must be discussed in Conclusions. This reviewer argues that it is a fatal flaw.

Reply 2: We were not able to assess outcomes at the patient level to account for SDOH within patients. The analysis was completed at the hospital level and we agree that future research should include further analysis to account for these demographic factors withing patients. For that reason, any associations could be due to SDOH variations. That is the reason why the only association that was found in our research was discussed under this assumption. We explained the non-use of SDOH data in the limitations section.

Changes in the text: We have addressed these SDOH factors should be considered as a limitation and need further research on page 19, starting with line 19.

Changes in the text 2: *These measures are risk adjusted by CMS accounting for patient demographics and morbidities to ensure that individual patient complexity was accounted for in the analysis but are only reported at the hospital level. These risk adjustments do consider other patient demographics such as race, socioeconomic status, literacy rate, or other social determinants of health factors. Acknowledging this limitation, we realize that the results in their entirety cannot be attributed to the accrediting agency, but hospital processes play a major part in outcomes. These social factors play a major role in a patient's overall health and should be considered in future research.*

Comment 3: The decision to exclude state-approved hospitals ("Hospitals not accredited by any of the four independent agencies were also removed, since the research is focusing on comparing the accrediting bodies rather than the accreditation process in general." (203-4)) is difficult to justify. The states at least theoretically do what the accrediting bodies do, verify that the hospital has appropriate processes to support quality care. A different justification—It is not clear that the 50 states are equally diligent. —might justify the omission. It would be interesting to examine variability between states.

Reply 3: We agree that the State does the same evaluation of hospitals and processes as the independent accrediting agencies. States are required to evaluate hospitals; hospitals therefore do not have any choice over whether they would be evaluated by the State or not. On the other hand, hospital entities do have the option to select accrediting bodies. In that respect this study sought to analyze the independent agencies as they are referred to as the experts or industry leaders in hospital process evaluation. A future research study should be conducted to examine the 50 states and see if there are better outcomes achieved by the different states compared to one another.

Changes in the text 3: The rationale was added in the Scope subsection of the, page 2, line 16.

In that respect, the study does not seek to study the effect of accreditation vs non-accreditation on quality, but instead compares hospitals accredited by different agencies.

Comment 4: There are a great many acronyms in the paper, not all of which are clearly identified.

Reply 4: On the revised version of the manuscript, we have identified all the acronyms the first time they are used in the text.