Reviewer’s report

Title: Do expanded seven-day NHS services improve clinical outcomes? Analysis of comparative institutional performance from the "NHS Services, Seven Days a Week" project 2013-2016

Version: 1 Date: 20 Jun 2017

Reviewer: Deirdre Thornlow

Reviewer's report:

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Thanks for the opportunity to review the revised manuscript. The authors acknowledge that the organizations implemented various interventions with regards to monies spent, employees hired, etc. and that the interventions were neither standardized nor controlled across sites. Regardless of interventions pursued, no changes in outcomes across the NHS were found and in some cases the aggregate data revealed worse outcomes. I would be interested to see if the volume of patients changed across the time frames. That is, did the NHS hospitals treat fewer, more, or the same number of patients over time?

I still had difficulty figuring the number (n) for each of the outcomes (Table 2). Outcome data of 159 Trusts were examined. 18 hospitals were excluded from SHMI analysis (n = 141) but I could not tally the other n's for the other outcomes and years. My own tallies seem to be off by 1. I suggest adding the n to the text portion of the manuscript so the reader can more easily follow along.

And finally, and perhaps most importantly, I did not see where the weekend effect was actually studied. The data for an entire week were aggregated so that weekdays and weekends were viewed as one week and then yearly data were aggregated. The authors note that service reorganization could 'result in weekday care worsening at the expense of increasing weekend service provision so that overall outcomes through the seven-day week are worse or unchanged.' They did not separate out the data to determine if that was the case, so that after the NHS changes, we are no further along in determining if weekend outcomes are worse, better, or the same as weekday outcomes. If weekend outcomes compare to weekday outcomes yet overall mortality remain unchanged then the issue is most likely one of staffing and resources bc outcomes are similar regardless of day of week. If weekend outcomes are still worse than weekday outcomes, then other issues yet still unknown contribute to the effect. Perhaps you were
unable to analyze the data in this respect to answer this particular question, but at least acknowledge it as a limitation of the dataset.

**Are the methods appropriate and well described?**  
If not, please specify what is required in your comments to the authors.

Yes

**Does the work include the necessary controls?**  
If not, please specify which controls are required in your comments to the authors.

Yes

**Are the conclusions drawn adequately supported by the data shown?**  
If not, please explain in your comments to the authors.

No

**Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?**  
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I recommend additional statistical review

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Please indicate the quality of language in the manuscript:

Acceptable

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