PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (**http://bmjopen.bmj.com/site/about/resources/checklist.pdf**) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

ARTICLE DETAILS

TITLE (PROVISIONAL)	Retrospective analysis of the national impact of industrial action by English junior doctors in 2016
AUTHORS	Furnivall, Daniel; Bottle, Alex; Aylin, Paul

VERSION 1 – REVIEW

REVIEWER	Dr Andrew F Goddard Royal College of Physicians 11 St Andrews Place Regent's Park London NW1 4LE UK
REVIEW RETURNED	01-Sep-2017

GENERAL COMMENTS	Introduction: Using DoH as abbreviation for the Department of Health is not their preferred term (DH). This is a very minor point. Methods: Describing patient counts as having a Poisson distribution needs a little justification as it is a little unclear to the reader why this would be the case (and the appropriateness of the statistics rests on it). The authors have as much experience in this type of descriptive analysis as anybody else so this should not be an issue. It would have been very useful to look at data for the 2 day periods immediately post strikes including weekends. It is conceivable that delay in attendance by patients may have resulted in increased mortality or LoS. This was an opportunity to assess this potential 'effect' of the strike on patient behaviour and mortality. As an extension of this hypothesis, exclusion of weekends from the analysis is a limitation. If there is a weekend mortality effect (although hotly debated) this may have been aggravated by delayed admissions of patients waiting until after strike days. There is some discussion of this by the authors. If there was no change in LoS or mortality for those attending immediately post-strike this would raise some very interesting questions about response times required of health services for some conditions.

	Although acknowledged as a weakness in the discussion, some limited financial modelling would have been useful as it would also have shown the financial effect on trusts due to lost activity in out-patients and elective admissions. This would add strength to the paper and be useful to the service to understand the costs of such industrial action.

REVIEWER	David Metcalfe University of Oxford, UK I am a junior doctor and was formerly a member of the British Medical Association. I was not an NHS employee (working instead for the University of Oxford) and did not participate in the 2016 industrial action.
REVIEW RETURNED	11-Sep-2017

GENERAL COMMENTS	These authors have undertaken a straightforward study used Hospital Episode Statistics (HES) to describe the impact of four strikes by junior doctors in 2016. The study is clearly important given the scale and historic significance of these events. I have proposed a small number of revisions but recommend publication once these have been taken into consideration. -=Major=- My main concern is that the focus throughout the manuscript is on the impact of industrial action on NHS services, even though it was inevitable that these would be disrupted. Although it is clearly important to quantify the degree of disruption, the real question in the run-up to the strikes was whether or not they would lead to patient deaths. This is also important in view of the suggestion that doctor strikes should be prohibited on safety grounds (e.g. Andrew Bridgen MP, Hansard 607[1762]). The observation that mortality did not measurably increase on strike days is probably the most important finding of this study. It should therefore be more prominent, e.g. mentioned in the abstract and first/last paragraphs of the Discussion alongside the findings about service disruption. I accept that the mortality finding may need to be couched in limitations - patient deaths might occur days after poor care, mortality isn't a sensitive metric, etc. It is not however particularly convincing that the mortality outcome was underpowered given that there were 3,663 deaths on strike days and so presumably many more events than this overall during the study period, i.e. including non-strike comparator weeks. It certainly doesn’t present the picture of patient risk that was suggested by many politicians and journalists in the run up to the strike action. This is also important context as it might suggest that NHS trusts responded appropriately to the disruption, e.g. by cancelling outpatient appointments to bolster higher risk services. -=Minor=- The Results section is correctly descriptive throughout except for p8 (lines 13-17) and p9 (lines 8-9), which are interpretation and really belong in the Discussion.

REVIEWER	Prof. Ramesh P Aacharya Tribhuvan University Teaching Hospital Institute of Medicine Nepal
REVIEW RETURNED	14-Sep-2017

GENERAL COMMENTS	Excellent study on national scale. Discussion can be elaborated by comparing each outcomes with the similar studies in other parts of the world. Having each outcome and comparison in one paragraph may enhance the flow of the article and ease for the readers.

VERSION 1 – AUTHOR RESPONSE

In response to reviewer 1 (Dr Andrew F Goddard), we have made all the requested changes to our limitations section and introduction, and an explanation of the choice of distribution for count data. However, we did not feel it was right to add any financial modelling at this stage, as we believe that would be better suited to a future, more detailed standalone paper. This has been acknowledged as a limitation of the work.

In response to reviewer 2 (David Metcalfe), we have increased the prominence of the mortality finding, as requested - adding it to the abstract and first/last paragraphs of the discussion, as well as improving the discussion regarding this. However, as mentioned by the reviewer, it was important to mention the limitations of such a finding. We have also made the requested minor changes.

In response to reviewer 3 (Prof. Ramesh P Aacharya), we would like to thank you for highlighting the non-international nature of our study. There is somewhat of a reason for this - in the original manuscript, we referred to the work of Metcalfe et al (2015), which provides a very thorough overview of the impacts of international doctor's strikes across several different countries (India, USA, Israel, Spain, New Zealand, South Africa, Croatia).
To avoid redundancy, we have increased the prominence of Metcalfe et al's work within our resubmitted manuscript in lieu of adding point-by-point comparisons for each country in response to your suggestion.

We would like to take this opportunity to thank the editor and the reviewers for their insightful comments and helpful suggestions, and look forward to hearing your response.

VERSION 2 – REVIEW

REVIEWER	Dr Andrew F Goddard Royal College of Physicians UK
REVIEW RETURNED	05-Nov-2017

GENERAL COMMENTS	The authors have acknowledged the limitations of the study in their discussion following peer review of the original version of the paper. I remain concerned by the lack of weekend data, especially given the close proximity of weekends some of the strike days. I am also concerned that declaring the week after strikes to be "normal" and thus an acceptable comparator may lead to missing an effect as any adverse outcomes will be seen in that week. Separate comparisons of strike weeks wit those before and after would show this. I also remain a little unclear how we can be sure that patient counts follow a Poisson distribution. However, this paper is still a very useful addition to the literature and will hopefully stimulate debate. I would be happy for it to be published as is.

REVIEWER	David Metcalfe University of Oxford, UK As previously stated in my initial review.
REVIEW RETURNED	19-Oct-2017

GENERAL COMMENTS	Thank you for making these changes. I have now recommended publication.

REVIEWER	Prof. Ramesh P Aacharya Department of Emergency and General Practice Tribhuvan University Teaching Hospital Institute of Medicine Nepal
REVIEW RETURNED	20-Oct-2017

GENERAL COMMENTS	Excellent. Revisions well done.

VERSION 2 – AUTHOR RESPONSE

In response to reviewer 1: Our team realised that although likely helpful, it would be difficult to include weekends in the study at this stage, as the entire analysis would need to be repeated. You are also right to mention that it would be advantageous to include disaggregated before/after weeks in the analysis. Regarding the use of the poisson distribution for patient counts, there is some justification in the literature, as the most comparable paper to this one (Ruiz et al, 2013, https://www.ncbi.nlm.nih.gov/pubmed/23759894) also utilised a poisson distribution in this way.

Thanks again for all the work involved in reviewing and editing this study.