Author’s response to reviews

Title: Does regulation increase the rate at which doctors leave practice? Analysis of routine hospital data in the English NHS following the introduction of medical revalidation

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Author’s response to reviews:

We thank the editors and four reviewers for their careful attention to our paper, and are pleased to address them. We have reproduced the reviewers’ comments (C) below with our responses (R) and any changes to the manuscript implemented. Please view the attached response to reviewers document for a formatted version of this message.

Reviewer #1

C: This is an interesting and well written paper. I think the topic of revalidation and attrition/early retirement is highly topical, and will be of interest to a wide range of stakeholders both in the UK as well as internationally. I think it's important that research is carried in order to examine the validity of revalidation recommendations as this is indeed a high stakes assessment. However, I have some concerns about the latter aspect of this research which is detailed below.

Background: the background section is a clear and well-written and justifies the subsequent study. There is sufficient context for the reader unfamiliar with the subject to understand the purpose of revalidation and the research undertaken. Page 3, line 15 beginning "from the GMC register…” needs clarification.

R: We thank Reviewer #1 for the complimentary words. We have clarified the relevant section of page 3 as follows:

Previous paragraph:
Figures released by the GMC noted that in the three years before the introduction of medical revalidation (November 2009 to December 2012), 7,994 doctors relinquished their licence to practise, and in three and a half years following its introduction (December 2012 to July 2016) this figure was 33,148 (+256%) (18). It is important to note that this may not be actively practising doctors leaving the profession: many doctors who no longer practise may have kept their licence in the past for various reasons, and they are likely to have been prompted to relinquish this by the introduction of revalidation. From the GMC register there is no way of separating practising clinicians from those who no longer practise but still retained a licence.

New paragraph:

All doctors practising in UK medicine must have a licence to practise with the General Medical Council (GMC), but the reverse is not the case: not all doctors on the register are currently in clinical practice. Many doctors who no longer practise may have chosen to keep their licence in the past, for various reasons. At present, around 280,000 doctors are on the register, and 140,000 doctors are employed by the NHS. Figures released by the GMC noted that in the three years before the introduction of medical revalidation (November 2009 to December 2012), 7,994 doctors relinquished their licence to practise, and in three and a half years following its introduction (December 2012 to July 2016) this figure was 33,148 (+256%) (18). It is important to note that this may not be actively practising doctors leaving the profession, but if they are no longer practising, they are likely to have been prompted to relinquish their licence by the introduction of revalidation. From the GMC register there is no way of separating practising clinicians from those who no longer practise in any clinical setting, but nevertheless, in the past, still retained a licence.

C: Methods 2.3 "change in clinical performance": I think it's problematic to attribute the FCEs to the first consultant providing hospital care. This in practice is highly unlikely and hence measurements of the 30 day mortality rate by this means is, in my opinion, very unreliable. Patients now admitted under acute medical takes rarely spend more than 24 hours under the first consultant providing care and consultants often rotate responsibilities for looking after inpatients (often on a weekly basis). It is more likely that it is the consultant at the time of discharge, or death that has had the greatest input into care. I think you have picked this point up in the limitations section however; it is my view that this is a major limitation impacting on the results.

R: We have explored the sensitivity of our findings to the choice of allocating outcomes to the first or last consultant in the admission spell. Most admission spells (>93%) comprise only a single FCE so the first and last consultant are necessarily the same. The results of our analysis of 30-day mortality by ‘stayer/leaver’ status are essentially unchanged when assigning outcomes to the last consultant in the admission spell.
Since referee 1 and 2 raised the same concern, we have edited the manuscript and now present the analysis with outcomes assigned to the last consultant as our main analysis. The analysis of outcomes assigned to the first consultant are presented in Appendix Table A1.

C: I would also contest the hypothesis in this section. The Kruger-Dunning effect would counter this supposition.

R: This is an interesting point, and we were not familiar with this theory – thank you for the suggestion. We have rephrased the hypothesis as follows:

Previous paragraph

Medical revalidation may prompt poorer performing consultants to cease practice if they judge the high effort required to achieve improvements in care quality to outweigh the benefits of retaining a licence. We therefore hypothesise that differences in mortality rates between groups of consultants who cease NHS practice (‘leavers’) and those who remain (‘stayers’) would increase following the introduction of medical revalidation.

New paragraph

Medical revalidation may influence poorer performing consultants differently compared with higher performing clinicians. If they believe their own performance is lower than the standard required, they may choose to cease practice if they judge the high effort required to achieve improvements in care quality to outweigh the benefits of retaining a licence. Alternatively, poorer performers may hold overly favourable views of their own ability (21). We therefore hypothesise that differences in mortality rates between groups of consultants who cease NHS practice (‘leavers’) and those who remain (‘stayers’) could change following the introduction of medical revalidation.

C: Discussion: I fully agree that there are unintended consequences to medical revalidation and that it’s of great interest to other regulators and other professionals. It would be good to say why you think, especially in the light of your findings, that medical revalidation has strengthened regulation of the profession.

R: Thank you for this comment. We did not intend the term to imply approval – what we meant by ‘strengthening’ was that the stringency of regulatory processes might be viewed as having increased. We have revised the phrasing in the discussion (and also the background section) to reinforce our neutrality, as follows:

Previous sentences:
In the UK, public outcry over some failures of medical regulation (most notably errors by paediatric cardiac surgeons in Bristol (4) and the activities of a prolific serial killer in general practice (5)) resulted in substantial strengthening of regulatory processes. (Background, page 1)

Developed by the GMC, revalidation considerably strengthens previous mechanisms of oversight of medical practitioners in the United Kingdom (UK) (Background, page 1)

Medical revalidation in the UK has strengthened regulation of the profession, in response to earlier regulatory failures. (Discussion, page 9).

Revised sentences:

In the UK, public outcry over some failures of medical regulation (most notably errors by paediatric cardiac surgeons in Bristol (4) and the activities of a prolific serial killer in general practice (5)) resulted in reforms of previous regulatory processes.

Second sentence removed.

Medical revalidation in the UK has reformed regulation of the profession, in response to earlier regulatory failures.

Reviewer #2

C: This manuscript regarding the impact of revalidation on physician retirement is well-written. There are limitations to the study and most of these are outlined in the discussion. Use of mortality data post discharge is a crude and imprecise measure of quality of care and attributing the mortality to the first consultant is problematic since the duration of care by this consultant is not assessed. Would it be more accurate to assign the mortality to the last consultant who might have been most responsible for the decision to discharge, or the consultant who cared for the patient for the longest period of time during the hospitalization?

R: Thank you for your comment, which was also raised by reviewer 1. We have addressed this concern by conducting sensitivity analysis on the assignment of outcomes to consultants. The results are essentially unchanged when assigning outcomes to the last consultant in the hospital stay. Please see response to reviewer 1 for additional information.

C: The authors conclude that revalidation leads to DOCTORS ceasing clinical practice, but this analysis is limited to hospital-based consultants only. This might be noted as a limitation of the study and the conclusion reworded to reflect that these findings are limited to doctors who work as hospital consultants.
R: Thank you for this useful comment, we have included this as a limitation, and reworded the discussion as follows:

There are nevertheless a number of limitations to the analysis. First, we focus solely on hospital consultants (fully trained specialists), not doctors in training, those in primary care or other settings.

We have not amended the conclusion statement since it reflects the results of our analysis appropriately.

C: The conclusion should include the measure of quality used in the analysis since this is a major limitation.

R: We have changed the conclusion as follows:

There is no evidence that those ceasing NHS practice provided, on average, lower quality care, as measured by patient mortality within 30 days of admission.

C: The authors do not address in the discussion the higher risk of exit for surgeons; this is a very interesting finding and it would be of interest to readers for the authors to discuss the possible reasons for this difference (e.g. are there differences in the revalidation process for surgical vs medical consultants which might explain this? are surgeons more likely to be financially able to exit?)

R: This is indeed an interesting finding, but we feel limited in our capacity to speculate on possible reasons for this from our (limited) quantitative data – we will certainly consider this as a possible area for future exploration.

C: In the section which is title "What this study adds" the authors refer to revalidation as a "scheme", this suggests they are biased against revalidation, suggest a more neutral term be used.

R: Apologies, we meant no such implication and have removed the term. The sentence now reads:

Medical revalidation requires all licensed doctors to demonstrate every 5 years that they are up to date and fit to practise.
Reviewer #3

C: The analysis is quite detailed and well written. Authors took into account possible confounders.

R: We thank Reviewer #3 for the complimentary words.

C: Could you please explain why "other" specialty group is not included in the 2.3 analysis?

R: Consultants working in non-surgical and non-medical specialties treat a very heterogeneous mix of patients and short-term mortality may not always be a relevant outcome for these care episodes (e.g. routine dialysis). It is likely that our risk-adjustment would have been insufficient to draw meaningful conclusions and we therefore excluded those consultants from analysis.

We have added the following sentence to the relevant methods section:

Consultants working in other specialties were excluded because their patients’ profiles were deemed to heterogeneous for meaningful comparison of outcomes.

C: Please clarify Table 1, at a moment it reads as there were 121735 years.

R: We apologise for this mistake. We have amended the column header to read ‘Number of consultant-years in revalidation state' in keeping with usual survival analysis terminology.

C: Clarify results, for example, page 9, line 25: "The hazard of exit was independently associated with consultants' age and was higher for non-UK" - compared with who?

R: We have revised this paragraph, which now reads as follows:

The hazard of exit was independently associated with consultants’ age (older doctors had a higher risk of exit) and was also higher for non-UK trained doctors compared with those who trained in UK medical schools (HR: 1.29; 95% CI: 1.16 to 1.43). Consultants working in surgical specialties were at higher risk of exit than those working in medical specialties (HR: 1.76; 95% CI: 1.34 to 2.32). Risk of exit was negatively associated with volume of activity in 2008 for all specialties (see Appendix).

C: It might be worth adding full analysis, included adjusted consultant characteristics (Table 4) in the appendix (supplementary material).
R: We now report the set of regression coefficients for each stratified analysis and sensitivity analysis as part of supplementary material. The tables are quite large and we therefore prefer not to include them in the main body of the document. In addition, we also report the set of regression coefficients underpinning our DID analysis (by specialty and year) as part of Appendix Tables A2 and A3. However, we have suppressed the rather lengthy list of several hundred coefficients for individual HRG roots to improve readability. These results are available on request.

Reviewer #4

C: I have been asked to comment on statistical method. From the detail provided in the paper this would appear appropriate to the data and research question addressed. I enter the caveat that I have not received advanced training in econometrics and have not used the methods employed here in my own research.

The research is conducted carefully within the limits of available data. The discussion is measured and appropriate.

Figure 3 shows an increase in both the observed and predicted number of consultants ceasing activity over the period of analysis. It reveals that alongside revalidation there were other important contemporaneous developments accounting for the termination of consultant activity. Among these developments one, often remarked, was the 2012 change in the tax exempt ceiling on pension contributions - which may have induced consultants to revise and advance retirement plans. The method employed, D-I-D, seeks to control for these contemporaneous developments. As the authors note the results hold on "the assumption that the hazard of exit following a positive recommendation fully reflects these confounding influences" (Discussion). The assumption is reasonable and any dissension could generate illuminating discussion.

The paper represents an important contribution. I recommend publication.

R: We thank the reviewer for the supportive comments.