BMJ -
Decision on
Manuscript
ID
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4856

Body: 14-Jun-2018

Dear Prof. Jena,

Manuscript ID BMJ.2018.044856 entitled "Association between physician medical school ranking and patient outcomes in the United States: An observational study"

Thanks again for sending us this paper. We sent it for external peer review and discussed it today at our weekly manuscript meeting. We are interested in proceeding with it, but would like you to revise it to respond to matters raised by editors and reviewers. We are looking forward to reading the revised version and reaching a final decision.

Please remember that the author list and order were finalised upon initial submission, and reviewers and editors judged the paper in light of this information, particularly regarding any competing interests. If authors are later added to a paper this process is subverted. In that case, we reserve the right to rescind any previous decision or return the paper to the review process. Please also remember that we reserve the right to require formation of an authorship group when there are a large number of authors.

Very truly yours,

Elizabeth Loder
eloder@bmj.com

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Report from The BMJ's manuscript committee meeting of 14 June 2018

These comments are an attempt to summarise the discussions at the manuscript meeting. They are not an exact transcript.

Present: Elizabeth Loder (chair); Angela Wade (statistician); Wim Weber; Tiago Villanueva; John Fletcher; Georg Roeggla

Decision: Request revisions

* We agree with some of the reviewers that the US News and World Report rankings are probably flawed, but at the same time schools pay a lot of attention to the rankings and applicants use these to gauge where they should apply. We wonder, though, whether you might be able to assess alternative rankings such as that proposed by reviewer Phillips. We thought that perhaps such alternative rankings might produce slightly different lists but would probably be broadly similar to the USNWR rankings. Or is there any way to assess a broader range of possible predictors of good vs poor performance to identify those that matter most?

* How many physicians were excluded because they were not US graduates?

* You may want to discuss more fully that if you are just assessing what influence medical school has on outcome this seems from first principles likely to be only a small part of what makes up a doctors performance (there are pre-school experience, post grad training, supervision, teamwork, CME and accreditation, work environment, to name a few). In addition, med schools all have to reach a national standard for training of a

professional so that removes some variation that might be there if there were not national standards.

* We also thought that the power of big numbers gives you some significant findings and it is important not to give these more weight than they merit. The differences seem small and probably not clinically relevant: readmission rates 15.7% for top-10 schools vs. 16.1% for schools ranked ≥50.

* We would like more information about how you assessed which physician was responsible for the care. A European doctor noted that in his hospital many different doctors care for patients during their stay and "it is very well possible that the doctor whose name is on the bill has never seen the patient."

* Our statistician suggests that as long as the data on which analyses are based are reasonable (noting that the reviewers raise some doubts), the paper presents a valid statistical analysis.

* We wonder if age is important and how long ago physicians were at the school, which ties in with age.

* One of our editors noted that he thought about this in two ways: Logically it seems that if you have national standards and universities teaching similar things and of course there is a lot more including your postgraduate program and the hospital you work at, it's not surprising that the medical school you go to doesn’t make that much difference. A more interesting question is what are the major determinants of mortality and readmission and what factors are relevant. But on an emotional level he noted that when looking for a new doctor he is reassured to see they had attended a high quality medical school.

* A European editor noted that in small countries with few medical schools or in Europe where schools are predominantly public, people do care if a doctor went to a public or private school because public schools are looked upon less favorably. He recalled that when he was recruited to his current practice his boss mentioned that he did not want people from certain medical schools. Thus he felt that people do think about these things.

Please revise your paper to respond to all of the comments by editors and also those of the reviewers. Reviewer reports are available at the end of this letter, below. In your response please provide, point by point, your replies to the comments made by the reviewers and the editors, explaining how you have dealt with them in the paper. Please return both a "track changes" and "clean" version of the manuscript.

Comments from Reviewers

Reviewer: 1

Comments:
I appreciate the efforts of these authors to study the relationships between school rankings and outcomes. It is a worthy effort but the measures used to assess primary care rankings are seriously flawed. The US News & World Report rankings use metrics to assess primary care production that have been demonstrated to overestimate primary care production and erroneously assign graduates. For example the largest weighting (0.3) is given to graduates going into internal medicine, family practice, or pediatric residencies, but ABIM acknowledges that less than 20% of those entering an IM training program will remain in primary care and only about 40% of pediatricians will. Another heavily weighted item is peer assessment score (0.25) which only goes to deans, academic deans, and internal medicine chairs--there is ample evidence of the "deans' lie" which typically also only use initial training program as the metric for primary care

production. A simple comparison of the primary care rankings in this paper with those of Fitzhugh Mullan's paper (http://annals.org/aim/fullarticle/745836/social-mission-medical-education-ranking-schools, table 1, column 1) demonstrates a significant reordering of the rankings. Another paper by my colleagues offers a methodology for reproducing this assessment https://journals.lww.com/academicmedicine/Fulltext/2011/05000/Accounting_for_Graduate_Medical_Education.21.aspx
The AMA Masterfile offers them a straightforward way to produce a more reliable ranking based on training experiences--one of the most reliable elements of the Masterfile. While the rankings used are associated with significant outcomes, the authors will remain open to criticism from readers who understand the serious flaws of the US News process and the very audience that should be influenced by these findings will remain closed to them due to lack of credibility. The research ranking methodology used by US News has more objective metrics but is still influenced by peer rankings. I have less concerns about this methodology, but do know that the NIH has the RePORT tool and others have compiled data from it into rankings http://www.brimr.org/NIH_Awards/2017/NIH_Awards_2017.htm that could offer more straightforward methodology.

Additional Questions:
Please enter your name: Robert Phillips

Job Title: Vice President for Research & Policy

Institution: ABFM

Reimbursement for attending a symposium?: No

A fee for speaking?: No

A fee for organising education?: No

Funds for research?: Yes

Funds for a member of staff?: No

Fees for consulting?: No

Have you in the past five years been employed by an organisation that may in any way gain or lose financially from the publication of this paper?: No

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If you have any competing interests <A HREF='http://www.bmj.com/about-bmj/resources-authors/forms-policies-and-checklists/declaration-competing-interests'target='_new'> (please see BMJ policy) please declare them here: I have been funded by grants from US Federal Agencies to do research on primary care workforce

Reviewer: 2

Comments:
This is an observational study to determine the association between physician medical school rankings and their performance as measured by patient outcomes and costs of care in the United States. The authors found that physicians who graduated from

highly-ranked primary care medical schools exhibited slightly lower patient readmission rates and spending compared with physicians who attended lower ranked schools but had no difference in patient 30-day mortality. Physicians who graduated from highly-ranked research medical schools had slightly lower spending but no difference in patient mortality or readmission rates. This is an interesting study based on patient outcomes and costs of care for acutely hospitalized Medicare patients treated by general internists. The study is well designed with defined inclusion and exclusion criteria, and objective outcome measures. Sample seize for both patients and physicians is large. Study patients were Medicare fee-for-service beneficiaries hospitalized with an acute medical condition between 2011 and 2015. Doximity database was used to determine the attended medical schools by the treating physicians included in the study. Medical school rankings were based on the US News and World Report. Multivariate regression model was used to adjust for certain important confounding factors with additional sensitivity analyses as detailed in the manuscript.
While the results suggest an association between the rakings of US medical schools the practicing general internists attended and the downstream patient outcomes and costs of acute care for hospitalized patients, there are multiple important intermediates that influence physician future performance. Medical training is a long, step-wise and multifaceted process that also requires practice. Some of the important determinants are pre-med and medical school performance, residency training experience and post training practice settings.
It is very difficult to foresee physician future performance based only on a few parameters. There are many surrogate markers that have been studied to predict physician future performance in different stages with inconsistent results. These predictors include but not limited to MCAT scores, USMLE step 1,2,3 scores, interview rankings, numbers of clerkship and sub-internship honors, Alpha Omega Alpha (AOA) membership, residency evaluation scores, residency in-training exam scores, and post-residency board exam score. It would be better, if the study design could take into consideration more important physician-specific variables from their different training stages other than demographics and medical school rankings.
Residency training, a crucial transition stage from medical school to independent practice, has significant impact on physician future performance. Residency program rankings have been released by Doximity since 2014. Although the Doximity rankings are not validated, it has been used by medical students and shown to have real effects on students' choice of residencies. It would be very interesting to explore the association between residency program rankings and physician future performance and cost of cares.
The physicians included in this study were limited to US medical graduates only. Since there is a significant proportion of internal medicine residents are international medical graduates (IMGs), it would also be interesting to study this group of physicians, especially those who went to medical schools in countries with limited resources.
The findings from this study contribute to the current literatures and provide useful information for potential future studies.

Additional Questions:
Please enter your name: Jian Huang

Job Title: Staff Physician and Clinical Professor of Medicine

Institution: VA Central CA Health Care System; UCSF Fresno Medical Education Program

Reimbursement for attending a symposium?: No

A fee for speaking?: No

A fee for organising education?: No

Funds for research?: No

Funds for a member of staff?: No

Fees for consulting?: No

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Reviewer: 3

Comments:
[1] The article found to be interesting however it is not much relevant to a patient. For example, when patients were emergently hospitalized or even otherwise with a medical condition, in general, do not ask the ranking of the medical school a physician attended rather patients or accompaniers would ask the specialized physician for the reported health problem or someone who can provide first-aid before consulting to the specialists to reduce the stress/pain. I believe this is the universal phenomenon. As a patient, I do not see any return on value addition ranking of the medical school a physician attended.

[2] Even general internists come from other than the top 20 ranked institutions too have developed their skills, enhanced their competency and improved their subjective knowledge over the time due to competitions and supervised mechanisms that exist within (i.e., quality cell) and outside (i.e., regulatory authority) hospitals. The objective of medical schools is to impart the quality education irrespective of their ranking, while Hospitals are supposedly providing better healthcare and improve the health promotion. These conditions are required to be met by any country, irrespective of their level of development and socio-economic condition of the population, and the Healthcare system shall ensure that there is no discrepancy and/or biases taking place in the name of race, religion, ethnicity, regions etc.

[3] As this article noted that physicians graduating from higher-ranked schools had slightly lower healthcare spending but no differences in mortality or readmissions. Why? Because, the study is not focused on specific health conditions to draw the difference and which might vary to one patient to another due to varied biological conditions etc., Hence, this argument needed to be validated.

[4] Moreover, as a carer, I do not see any value addition being in the ranking of the medical school a physician attended, as agreed in the study itself and it shall not be.

Focus required on

[5] Unless, we correlate with a specific health condition (communicable and non-communicable diseases) with a severity level, length of stay, the age of the patients, duration of illness, readmission status, treatment carried, intervention studied and co-morbidities listed, the study will have less bearing in terms of its applicability.

[6] Moreover, given national/government efforts to improve the efficiency of healthcare, how is a ranking of the medical school a physician attended associated with readmissions and costs of care? Not clear.

Feasibility and Challenges

[7] Since the study is not focused on treatment, intervention results studied or cross-sectional analyses carried out through given practice; the relational feasibility along with a ranking of the medical school a physician attended will not get the aimed results of the study.

[8] The results of treatment on specific health conditions, outcomes of varied interventions and rational drug use policies that were/are adopted by a physician might influence the patient perception. This might differentiate the physician ranked among the top and others. This is grossly missing.

[9] The outcomes that are being measured in the study are not clear as there are no indicators drawn in the study. The study used very generic indicators which are not useful to both carers and patients.

[10] I agree that tracing the patients who received care from ranked medical school a physician attended and interview them might be costly affairs. However, a few patients' views might have enhanced the study perspectives and also reflect about whether patients view the same as authors of the article?

[11] Moreover, for instance, Continuous Medical Education supposedly enhancing the competency and competence of a physician, and which is given due importance across the regions. Is there any CME in place in the USA? If it is there, what was to the effect of ranking? As the article talking about the 4-years data, how many of the physicians undergone CME, irrespective of ranking they belong? Are physician required to undergo the renewal of licensing under Medicare schemes or any other health financing mechanism? If so, what is their impact on studied objectives? I did not find the answer from the article.

[12] Too many statistics are applied but without understanding its relevance to the study objectives. The article required to be more qualitative rather statistical one.

[13] Discussion required more elaboration with specific to the study objective as outlined in the article, but it is missing.

[14] Conclusion needs more clarity and required to be strengthening with the study findings.

[15] The study used secondary data and positioned with retrospective information limited in gaining the understanding of the patients' perception. Patients' perception is an important variable might have helped in the deeper understanding of the study. This is missing.

I hope the above suggestions that are placed here to strengthen the paper to make it more useful for the physician to share and discuss with patients.

Looking at the above suggestions/comments and required clarity, I wish authors shall re-visit the article and re-submit for further review processing. We hope this will help authors think of the best ways to include patients in their future research and further progressive patient involvement in their research enterprise.

Additional Questions:
Please enter your name: Dr N Ravichandran

Job Title: Professor

Institution: Jamia Hamdard, Hamdard University

Reimbursement for attending a symposium?: No

A fee for speaking?: No

A fee for organising education?: No

Funds for research?: No

Funds for a member of staff?: No

Fees for consulting?: No

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Reviewer: 4

Comments:
This retrospective observational study, using Medicare data from 2011 to 2015, looked to understand whether there was a relationship between the ranking of the medical school a physician attended and subsequent patient outcomes and healthcare spending. The authors used a 20% random sample of Medicare fee-for-service beneficiaries aged >64 years, who were emergently hospitalized with a medical condition and treated by general internists. Main outcome measures were the association between the ranking of the medical school a physician attended (determined by US News and World Report ranking) and physicians' patient outcomes (30-day mortality and readmission rates) and Medicare Part B spending, adjusted for patient and physician characteristics and hospital fixed effects. A total of 949,774 patients treated by 29,147 physicians were analyzed. When using primary care rankings, physicians who graduated from higher-ranked schools exhibited lower 30-day readmission rates and slightly lower spending compared with graduates of lower-ranked schools but no difference in patient mortality. When using research rankings, physicians graduating from higher-ranked schools had slightly lower healthcare spending but no differences in mortality or readmission.

Introduction: Well-laid out, emphasizing gap in our knowledge to better understand why practice patterns vary widely across physicians.

Methods: Rankings were used published in 2002; yet there was variability in time of completion of medical school for the physicians (And variability in age of physician, with significant difference in physician age between top 20 ranked and lower rankings). Just using 2002 seems to generalize the data too much (I know in a subsequent analysis you restricted too physicians graduating within 5 years of when rankings were created, but this still seems to generous a period). Whilst many schools may remain within similar deciles over long periods of time (you cite relatively stable rankings over time for top-20 medical schools) I would have thought it was important to look at this correlation in more detail specifically related to exact period of time the physician was there (and perhaps taking an aggregate of ranking over that period) to better understand the relationship and draw conclusions – especially as outside the top 20 there may be even more movement in placing. Although hospital fixed effects was taken into account, did this account for whether hospitals are teaching institutions/academic medical centers which may account for trainees having a large hand in patient care and consequent outcomes. Does the US News and World Report ranking adequately capture the quality of medical education in a valid way? What about looking at the results from the surveys taken by graduating medical students which looks in more details at aspects from their medical education experience which may have direct relevance to their later competence as a practicing physician?

Results: Results well described and laid out, with several supplementary tables for added details. Was physician age taken into account in the models? There is a significant difference in physician age and medical school ranking (Table 1) which could influence results.

Discussion: The authors conclude that physicians who graduated from higher-ranked schools exhibited lower 30-day readmission rates and slightly lower spending compared with graduates of lower-ranked schools but no difference in patient mortality. When using research rankings, physicians graduating from higher-ranked schools had slightly lower healthcare spending but no differences in mortality or readmission. Communication failures are known to be major contributors to medical errors, adverse patient events, and patient safety incidences. To what degree does the ranking indicate better communication training? It would be interesting to better understand how components of a medical school curricula link to later patient safety events by their graduates. This would be enormously helpful as medical schools look to revamp curricula and change training techniques. Does the school culture have a stronger influence if physicians stay on from medical school for residency training in an affiliated hospital compared to physicians who switch?

The authors highlight limitations of this study, including the limitations of the US News and World Report rankings as a measure of medical school quality (page 20, lines 31-33) and the limitations of relying on medical school rankings from a single year when the physicians matriculated from medical schools across a wide range of years (page 20, line 54 – page 21, line 6). An additional limitation is the performance of the physician within the medical school – did they do well through medical school, or have several re-takes/come in at the bottom of their class? This presumably could impact results and their effectiveness/safety record as a physician in practice.

This study seems to demonstrate that the medical school from which a physician graduates from bears no relationship with patient mortality after hospitalization, and only limited relationship with readmissions and spending, using the US News and World Report ranking to rank medical schools (which only goes to 50) and using 2002 (and then 2009) as the ranking year. As we know there is huge variability in physician practice behavior, it seems likely that using the US News and World Report as a proxy for medical school training is missing much detail of training (both in clinical competencies and in professionalism attributes and communication skills) that is important in the foundational

training of a future physician, and may therefore misrepresent the importance that a medical school has on later impact of physician.

What is already known on subject: is it known that patients perceive the medical school from which a physician graduated as a signal of care quality, or is this an assumption made by the authors? If the latter, then it should be included in the discussion of potential impact of this study as opposed to in the "what is already known on the subject".

Overall, a well written and researched article attempting to look in more detail at a very important area: to understand the determinants of physician-level variation in patient outcomes and healthcare spending. I commend the authors on this work.

Additional Questions:
Please enter your name: Arabella Simpkin

Job Title: Associate Director, Center for Educational Innovation and Scholarship

Institution: Massachusetts General Hospital

Reimbursement for attending a symposium?: No

A fee for speaking?: No

A fee for organising education?: No

Funds for research?: No

Funds for a member of staff?: No

Fees for consulting?: No

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Reviewer: 5

Comments:
I have used the BMJ Review Template for patient reviewers, quoted as bullet points, below. Thank you for the invitation to review this manuscript from the perspective of patients and carers.

- Are the study's aims and the issue and questions that the paper addresses relevant and important to you as a patient? Do you think it would be relevant to other patients like you? What about carers?

The subject of the study is not relevant or important to me as a patient and carer, and unlikely to be important to other patients like me.

Choosing among doctors based on their medical school's ranking is nothing I've ever heard about from patients. A glance at the US News and World Report website (1) shows clearly that the ranking of American medical schools is intended for medical school applicants. Online guides for US patients choosing doctors do not mention medical school ranking, either as recommended or best avoided: e.g. Consumers Reports (2), Blue Cross Blue Shield (3), UnitedHealthcare (4), National Institute on Aging (5), Medline Plus (6). The exception is US News and World Report's advice for patients choosing a doctor (7) who reference their own medical school rankings and then raises doubts by advising: "how much emphasis to place on a doctor's schooling is contentious".

What evidence is cited as the premise for this study? In the manuscript footnote #9, Dr Chen offers no evidence of patient interest, but rather offers her own reflection on a professional obsession with school ranking (8). Manuscript footnote #10 for Dr Gao's study of patient-ratings is based on RateMD, and explicitly distinguishes this perspective from US New and World Report Medical School Ranking (9).

Furthermore, even in the United States, patients would certainly not be in a position to interview alternative candidates to ascertain their medical school's ranking in US News and World Report (or any other ranking) in order to select a hospitalist of choice.

- Are there any areas that you find relevant as a patient or carer that are missing or should be highlighted?

Evidence for the patient relevance of the hypothesis for the study is missing.

- Would the treatment, intervention studied, or guidance given work in practice? Is it feasible? What challenges might patients face that should be considered?

There is no relevant treatment, intervention or guidance suggested for any challenges that patient might face.

- Are the outcomes that are being measured in the study or described in the paper the same as the outcomes that are important to patients? Are there others that should have been considered?

Most patients will die in the care of a physician. Many times death will take place in a hospital (10), presumably under the care of a hospitalist. The criteria for care excellence may very well be caring, compassion, access, understanding, support for family needs, palliative expertise (such as pain management), seamless teamwork and have very little to do with readmission or mortality rates. In fact, practitioner attributes that contribute to such qualities of care are what the cited online guides advise for choosing doctors at any stage of life.

- Do you have any suggestions that might help the author(s) strengthen their paper to make it more useful for doctors to share and discuss with patients?

There is nothing in this paper that a doctor would use to share and discuss with patients. I have no suggestions on how to make it so.

- If and how the level of patient involvement in the research described could have been improved.

There is no patient involvement mentioned. Interviewing patients to find out what they think medical school ranking means to care quality might have dissuaded the research team from following this line of statistical analysis.

References
(1) https://www.usnews.com/best-graduate-schools/top-medical-schools
(2) https://www.consumerreports.org/doctors/how-to-find-a-good-doctor/
(3) https://www.bcbs.com/five-tips-choosing-new-primary-care-physician
(4) https://newsroom.uhc.com/health/engagement/primary-care-doctor.html
(5) https://www.nia.nih.gov/health/how-choose-doctor-you-can-talk
(6) https://medlineplus.gov/choosingadoctororhealthcareservice.html
(7)
https://health.usnews.com/top-doctors/articles/2011/07/26/how-to-find-the-right-doctor
(8) https://www.nytimes.com/2010/06/17/health/17chen.html
(9) http://www.jmir.org/2012/1/e38/
(10) https://www.cdc.gov/mmwr/volumes/65/wr/mm6513a6.htm

Additional Questions:
Please enter your name: Carolyn Canfield

Job Title: honorary lecturer

Institution: University of British Columbia Faculty of Medicine

Reimbursement for attending a symposium?: No

A fee for speaking?: No

A fee for organising education?: No

Funds for research?: No

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