PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Comparing Physician Associates and Foundation Year One Doctors-in-training undertaking Emergency Medicine Consultations in England: a quantitative study of outcomes
AUTHORS	King, Nicole; Helps, Suzannah

VERSION 1 – REVIEW

REVIEWER	Shea, Judy University of Pennsylvania Perelman School of Medicine, Medicine
REVIEW RETURNED	22-Aug-2023

GENERAL COMMENTS	Overall this was an interesting manuscript to read. It is very descriptive. I wondered if the author(s) had a conceptual model or a priori hypotheses? They clearly showed that they are knowledgeable of the literature. Other strengths include a well-rounded and transparent acknowledgement of the limitations. However, there is one major flaw: the analyses did not adjust for the provider. Some approach that nested patients within provider is needed. With the number of providers being so small, it might be there was one very slow provider – and that is what made the difference. Other points to consider: Why power on a secondary outcome? Provide more context -who/how is it decided who sees a patient. Do PA and FY1 work in same place at the same time? Say more about the 3 locations/departments. Pdf Page 10-12 and Figure 1 – reduce redundancy with table 1 I don't understand Resus versus majors The data are 3+ years old now..[how] might this matter? Abstract/participants – this seems to tell me how many patients had complete data. How many other patients were seen at the same time and did NOT have complete data? Abstract/results – present adjusted data. Some editing and punctuation work is needed. Define acronyms when first used: LWBS (page 5) Pdf Page 9 – first line of results says 7407 patients, abstract said 7405 The disposal of patients is so different. I'm a little amazed that LOS is only 10 minutes longer for PAs. They seem to have much sicker patients. At the end of the day I reflected on a few questions: is the 10 minutes difference in wait time and 15 LOS an important difference? Is this good news or bad news? Can the analyses really control for all on the differences such as location and time of day? Are we comparing apples and oranges given the PAs can't

	prescribe and they need supervision, they work different hours, in different parts of the hospital and with a different patient profile…

REVIEWER	Merdler, Ilan Tel Aviv Sourasky Medical Center
REVIEW RETURNED	18-Oct-2023

GENERAL COMMENTS	Thank you for the opportunity to review this manuscript comparing physician associates and doctors-in-training undertaking emergency medicine consultations. You showed longer wait times and length of stay with PAs. I have several comments: - Rewrite the strengths and limitations, make it clear and concise. - Add a supplementary detailing what PAs can and cannot do, with a table. You did good by trying to address this already in the introduction. - You checked quality outcomes, what about clinical outcomes? - Why are you publishing only now, results from 2018-2020? Did you wish to show pre-COVID-19 results? Do you think the pandemic had an effect and why? - You show differences in baseline characteristics and presenting complaints between PAs and doctors. This is very peculiar. In theory, there shouldn't be. - No need of titles for different sections of the discussion. - A strong conclusions paragraph is missing. The implications section is not enough. - Try not to reference websites or papers more than a decade ago. - Summarize your findings in a good figure.

VERSION 1 – AUTHOR RESPONSE

Reviewer: 1
Dr. Judy Shea, University of Pennsylvania Perelman School of Medicine
Comments to the Author:
BMJ_2023_078511
Overall this was an interesting manuscript to read. It is very descriptive.

Dear Dr J Shea. Thank you for reviewing our manuscript. I now answer your comments in turn below:

1. I wondered if the author(s) had a conceptual model or a priori hypotheses? Bayesian analyses were not conducted, so there were no prior hypotheses or conceptual model, and no expectations or estimates of relative effectiveness of a PA or FY1 in the ED.
They clearly showed that they are knowledgeable of the literature. Other strengths include a well-rounded and transparent acknowledgement of the limitations.

2. However, there is one major flaw: the analyses did not adjust for the provider. Some approach that nested patients within provider is needed. With the number of providers being so small, it might be there was one very slow provider – and that is what made the difference.
Thank you for your message. Initially, our inclusion criteria consisted of all PA and FY1 data during the specified timeframes, except for the first two weeks for newly rotating FY1s or PAs to allow sufficient time for settling in.
Despite adjusting for various confounding factors, we acknowledge that patients seen by the same clinician are likely to be correlated, which makes it necessary to perform nested analysis to account

for this. We have now included nested analyses (via linear mixed models) in each adjustment, and the manuscript has been updated accordingly.

Other points to consider:
Why power on a secondary outcome?

When I wrote my protocol to NHS Ethics, there was a recently published paper that focused on re-attendances. At that time, my supervisor and I decided that I could power on any of the outcomes, as the effect size would provide similar power requirements for all the variables. For instance, based on the re-attendance power, only 304 patients would be required to attain the said power of 80%. Our study included 15 times this amount of PA consultations and approximately 9 times this amount of FY1 consultations. Therefore, we believe that our study is well-powered. Additionally, there is literature that supports powering on a secondary outcome.
https://jeccm.amegroups.org/post/view/optimizing-the-utility-of-secondary-outcomes-in-randomized-controlled-trials

Provide more context -who/how is it decided who sees a patient. Do PA and FY1 work in same place at the same time? Say more about the 3 locations/departments.

Both clinicians see undifferentiated cases. However, the Emergency Department Consultant in charge can either give the clinician a choice as to which area of the department they wish to work in (UTC, Resus, or Majors) or deploy the clinician to a specific area of the department based on their previous experiences of the clinician's work capabilities linked to the department pressures.

Resus is where patients with higher acuity and requiring closer monitoring are admitted, as they may be unstable. Majors also admits higher acuity patients, but they tend to be more stable than patients in Resus. UTC usually receives lower acuity, more stable patients than in Majors and Resus.

The data are 3+ years old now..[how] might this matter?

Although the data is now 3 years old, it's worth noting that nothing has changed with the legislation or scope of practice of PAs. This means that the results of the research would likely still be valid today. However, it might be a good idea to repeat the research after a period of time has elapsed post-regulation of the PAs to see if any differences in the results would be detected.

Abstract/participants – this seems to tell me how many patients had complete data. How many other patients were seen at the same time and did NOT have complete data?

Thank you for highlighting this, I can confirm that all data was available, with no incomplete or missing data. This statement has now been incorporated into the manuscript.

Abstract/results – present adjusted data.

I have now updated the abstract to only include the adjusted data. Many thanks

Some editing and punctuation work is needed.
The manuscript has now been updated grammatically.

Define acronyms when first used: LWBS (page 5)

Thank you for highlighting this. I have since ensures all acronyms explained in the abstract are re-introduced in the introduction in the order they first appear.

Pdf Page 9 – first line of results says 7407 patients, abstract said 7405
Thank you for highlighting this, the total number of patients is 7,405; 4580 seen by PAs and 2825 seen by FY1s.

The disposal of patients is so different. I'm a little amazed that LOS is only 10 minutes longer for PAs. They seem to have much sicker patients.
The unadjusted LOS showed a difference of 77 minutes longer for patients seen by PAs compared to FY1s, which could be attributed to the higher acuity of patients seen by PAs and their need for admission, leading to a wait for a bed space. However, after adjusting for this potential confounder and conducting an individual clinician analysis, it was found that the LOS was still 52 minutes longer for patients seen by PAs compared to FY1s, which was statistically significant.

At the end of the day I reflected on a few questions: is the 10 minutes difference in wait time and 15 LOS an important difference? Is this good news or bad news? Can the analyses really control for all on the differences such as location and time of day? Are we comparing apples and oranges given the PAs can't prescribe and they need supervision, they work different hours, in different parts of the hospital and with a different patient profile…

The adjusted and unadjusted numbers showed significant differences in the length of stay (LOS) between patients seen by the two clinicians. We believe that the statistical adjustments applied provided accurate results, as confirmed by the analysis of individual cases. However, as mentioned in the limitations section, there may be other reasons for the differences in outcome measures that could be better understood through qualitative studies. Some studies suggest that physician assistants (PAs) tend to be more thorough in their documentation, which may increase the time they spend with patients. This may not necessarily be a negative quality. Another limiting factor is that PAs are unable to prescribe or order investigations that involve ionizing radiation. This could contribute to an increased LOS, particularly for patients with higher acuity who require more investigations. However, this study did not assess the number of investigations required for each patient, so it was not possible to adjust for this factor.

In comparing PAs to first-year doctors in the UK (FY1s), a more appropriate analogy would be clementines to oranges, rather than apples to oranges. This is because at the time of the study, FY1s were new to the department and were also considered to be novel clinicians. FY1s are the most junior of the medical doctors in training, and they are not fully registered by the General Medical Council (GMC) until they have successfully completed their first post-qualification year. They also have some dependency and restrictions on medication prescribing in the Emergency Department. For these reasons, we believed that FY1s were more suitable as a comparator to PAs. A table outlining the comparisons between the two providers has now been added to the manuscript.

Reviewer: 2
Dr. Ilan Merdler, Tel Aviv Sourasky Medical Center
Comments to the Author:
Thank you for the opportunity to review this manuscript comparing physician associates and doctors-in-training undertaking emergency medicine consultations. You showed longer wait times and length of stay with PAs.
Dear Dr I Merdler, thank you for taking the time to review our manuscript. Please find responses in blue to your comments.

I have several comments:

- Rewrite the strengths and limitations, make it clear and concise.
The strengths and limitations bullet points have been revised, many thanks

- Add a supplementary detailing what PAs can and cannot do, with a table. You did good by trying to address this already in the introduction.
I included a summary in the form of a table (Table 1) comparing UK PAs scope of practice to FY1s, thanks for your excellent comment.

- You checked quality outcomes, what about clinical outcomes?
The study examined the clinical outcomes of patients in terms of their disposition in the ED, including deaths and admissions or discharges. There were no reported patient deaths. However, this retrospective review did not follow up on patients after they were transferred to the ward as it was beyond the scope of the study.

- Why are you publishing only now, results from 2018-2020? Did you wish to show pre-COVID-19 results? Do you think the pandemic had an effect and why?
The timeframe of the study was decided on based on it being the first rotations of FY1s into the ED and it being a time where I was mostly on leave, so not much if any of my data would have been included, avoiding researcher bias, despite being anonymised.

- You show differences in baseline characteristics and presenting complaints between PAs and doctors. This is very peculiar. In theory, there shouldn't be.
The patients in the study had some differences in their baseline characteristics, but these were adjusted for during the analysis. The presenting complaints were grouped based on the systems involved, but were also adjusted for according to the area where the patient was seen. For instance, a patient with a cardiac concern could be seen in the UTC because they were less critical and more stable compared to one seen in the higher acuity Majors or Resus areas. While the inclusion of triage scores would have made the study stronger, this parameter was not yet documented in the hospital records during the study period.

- No need of titles for different sections of the discussion.
It was decided to maintain the subheadings as previous studies published in BMJ Open to ensure appropriate flow and indexing when completing the STROBE checklist. Thank you for your comment.

- A strong conclusions paragraph is missing. The implications section is not enough.
After revising the text, we have added a conclusion and revised the implications.

- Try not to reference websites or papers more than a decade ago.
The reference list has been reviewed ensuring the most up to date references have been used.

Summarize your findings in a good figure.
The maximum number of figures and tables has been reached. However, I have included all outcome results in Table 4 and summarized the findings in the new conclusion section. Thank you.

VERSION 2 – REVIEW

REVIEWER	Shea, Judy University of Pennsylvania Perelman School of Medicine, Medicine

REVIEW RETURNED	25-Nov-2023

GENERAL COMMENTS	The authors did a nice job addressing most of the comments by reviewers. I personally remain a bit uncertain why the two groups of clinicians were compared as the services they cover (and thus the patients) are so different but the work is solid. There remain multiple editorial mistakes such as missing closing parentheses, etc.

REVIEWER	Merdler, Ilan Tel Aviv Sourasky Medical Center
REVIEW RETURNED	21-Nov-2023

GENERAL COMMENTS	Thank you for addressing my comments.

VERSION 2 – AUTHOR RESPONSE