Analysis of Drew-Hill et al. (2025) *'Physician Associate graduates have comparable knowledge to medical graduates'* :

Summary: This analysis critically evaluates the methodology and claims made by Drew-Hill et al. (2025)[1], which assert that physician associate (PA) graduates have comparable medical knowledge to medical graduates. Using their publicly available dataset, this review finds:

- PA graduates exhibit fundamentally different knowledge patterns compared to medical graduates (r = 0.008).
- The original paper's claim of comparability often relies on non-significant p-values for mean score differences between selected stages, while downplaying or re-interpreting medium-to-large effect sizes where differences are statistically significant.
- On questions showing consistent improvement through medical school, PAs often perform similarly to early-years medical students.
- PAs outperform medical graduates on some questions, but without access to the questions themselves, it's unclear what specific knowledge this represents.
- The claim of "comparable knowledge" is not supported by the data.

Introduction: The study by Drew-Hill et al. (2025), aims to determine the knowledge of PAs in comparison to medical students and Foundation Year 1 (FY1) doctors in the UK. The authors conclude that PA student performance is comparable, based on a retrospective analysis of assessment data from identical medical knowledge progress tests.

An examination of their publicly available dataset finds a more complex picture[2,3].

Claim 1: *"PA student performance was comparable to medical students and FY1 doctors"*

Evidence against this claim:

Statistically significant differences in performance between these groups:

- PA Stage 2 vs Medical Stage 5: Cohen's d = 1.15 (large effect size)
- PA Stage 2 vs FY1: Cohen's d = 0.73 (medium-large effect size)
- Only 23.9% of questions showed PA-medical performance within a 10% margin.

These effect sizes represent substantial and meaningful differences. A Cohen's d of 1.15 means the average medical graduate outperforms approximately 87% of PA graduates.

Claim 2: *"Performance at the end of PA Stage 2 is consistent with Stage 4 medicine"*

Evidence against this claim:

- Mean scores appear similar (PA: 49.92% vs Medical Stage 4: 51.63%), but the correlation is weak (r = 0.16, 95% CI: -0.194 to 0.225). (Figure 1)
- PAs excel in areas that show limited progression through medical school, suggesting different knowledge areas compared to medical students (Figure 2)
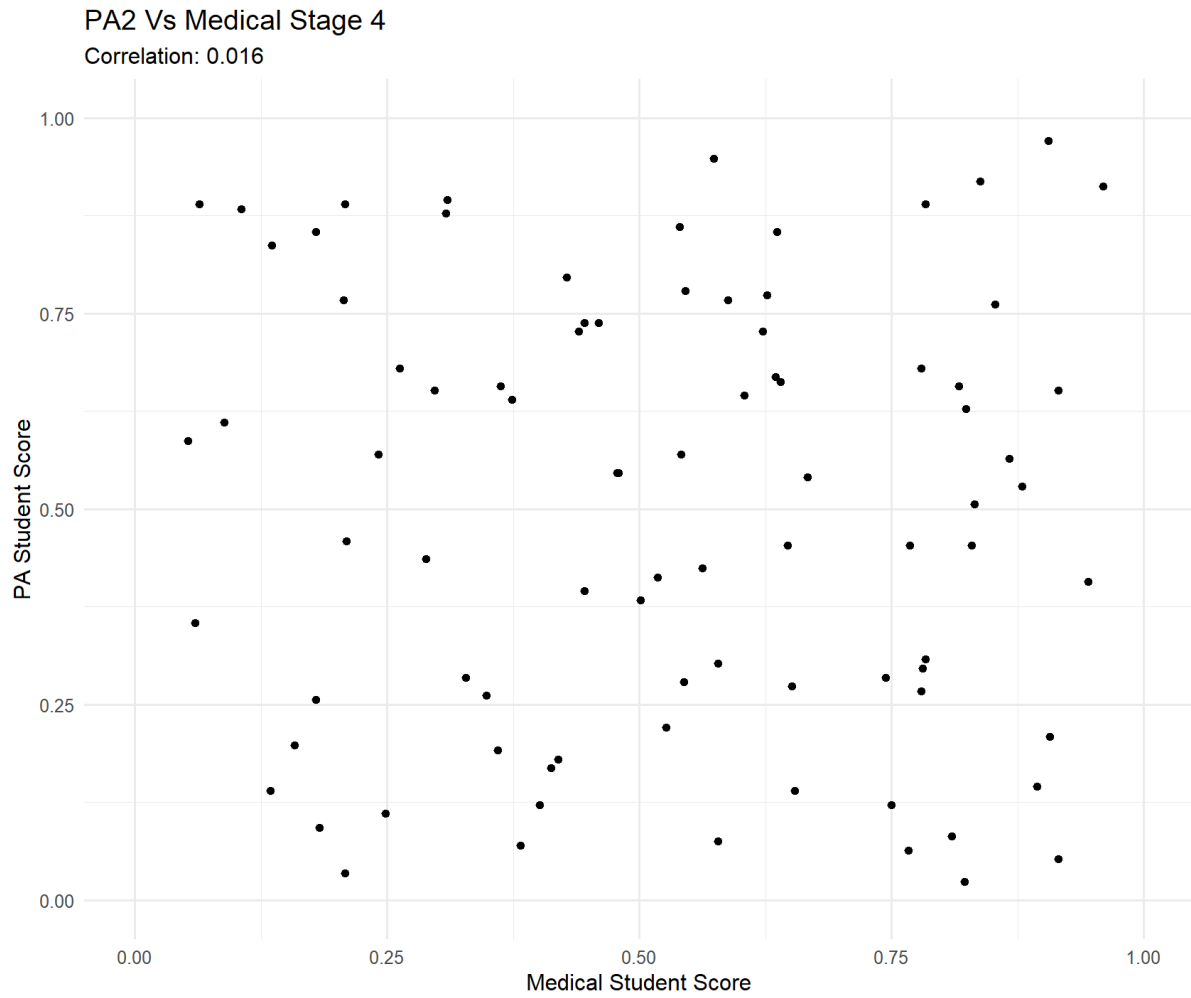
Figure 1: *Question-by-question correlation between physician associates at the end of their second year (PA2) and medical students at the start of their 4th year (Medical Stage 4) scores (r = 0.016), showing no consistent pattern of relative performance across individual questions.*
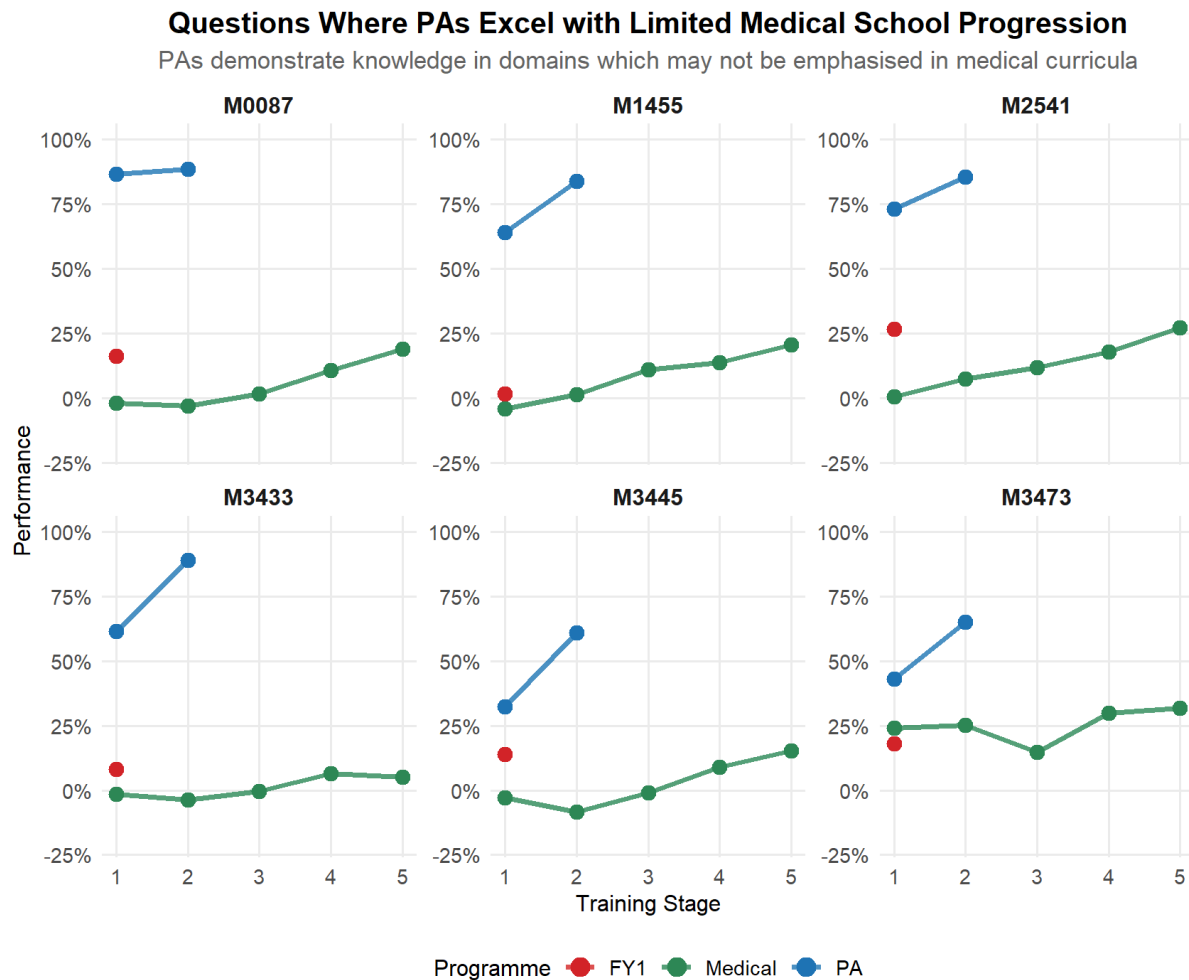
Questions Where PAs Excel with Limited Medical School Progression

PAs demonstrate knowledge in domains which may not be emphasised in medical curricula

Figure 2: A *selection of 6 questions where Physician Associates in their second year (PA2s) performed substantially better than Foundation Year 1 doctors (FY1s) and medical students. Medical students showed limited improvement on these questions across different year groups, and FY1s also performed poorly compared to PAs. This suggests the knowledge gap reflects content not typically covered in standard medical school curriculum, rather than a deficiency specific to Plymouth medical school.*

Claim 3: *"PA knowledge gaps will be addressed through revision."*

Critique:

This claim is unsupported by evidence. While revision undoubtedly aids knowledge consolidation, the assumption that it can bridge the substantial gaps observed, particularly in core medical knowledge, within 12 weeks is unsubstantiated[4].

To evaluate whether revision could realistically bridge these knowledge gaps, I studied a specific subset of questions that demonstrate progressive learning through medical training.

Methodology: I selected 30 questions that met three criteria:

- Low performance in early medical years
- Significant improvement in later medical years
- Progressive improvement with each year of training

These questions serve as a proxy for core medical knowledge that develops through sustained study.

Results: The analysis revealed substantial differences:

- PA Stage 2: 47%
- Medical Stage 1: 13%
- Medical Stage 5: 82%
- FY1: 77%

These differences were statistically significant ($p<0.001$, t-test) with very large effect sizes (Cohen's d: 1.73 for PA2 vs. Med5; 1.36 for PA2 vs. FY1). See Figure 3 below for average performance on these 30 questions, and Figure 4 on a question-by-question basis on a subset of 24 questions.
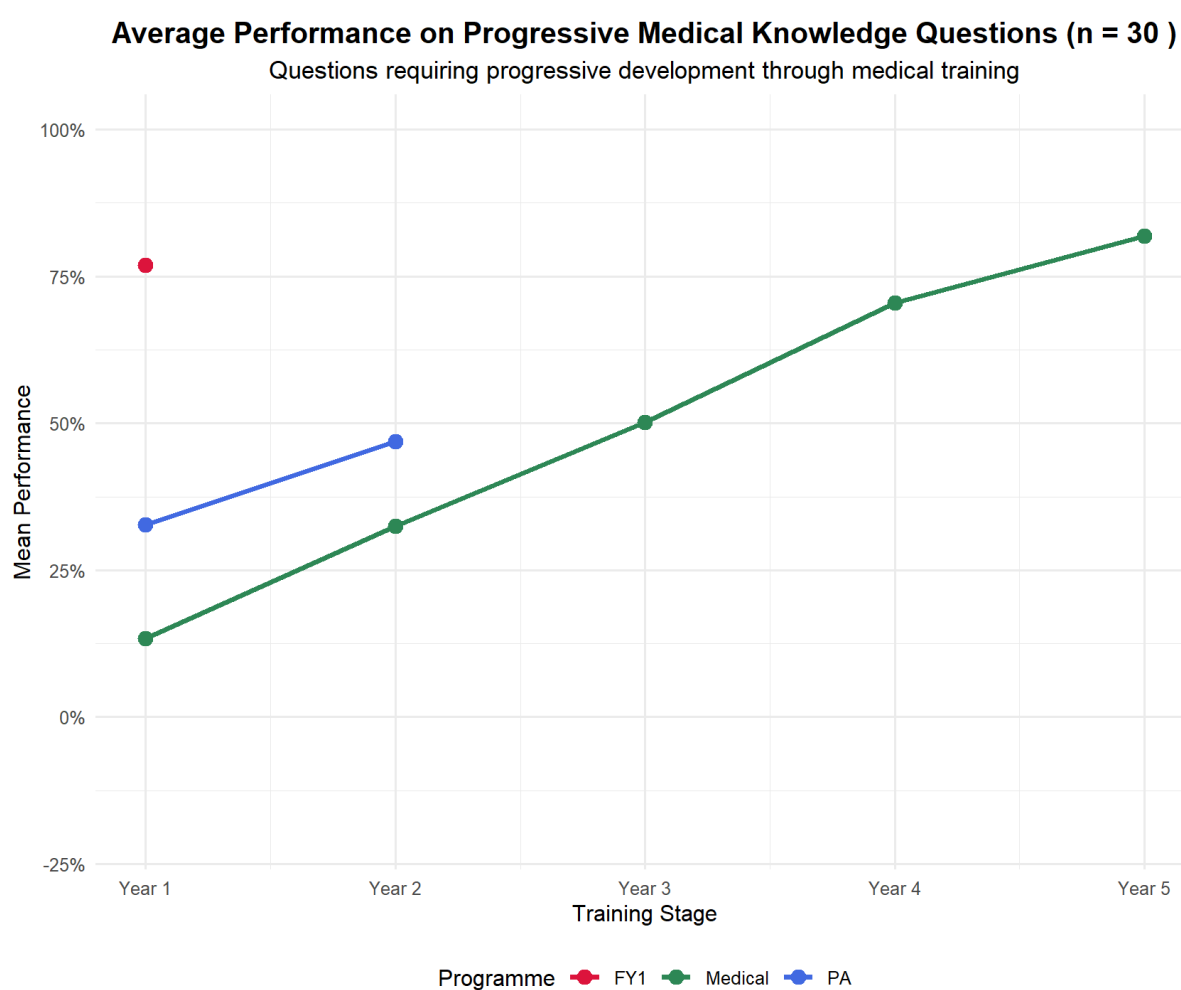

Figure 3: *Average performance on questions showing cumulative progression by training stage*
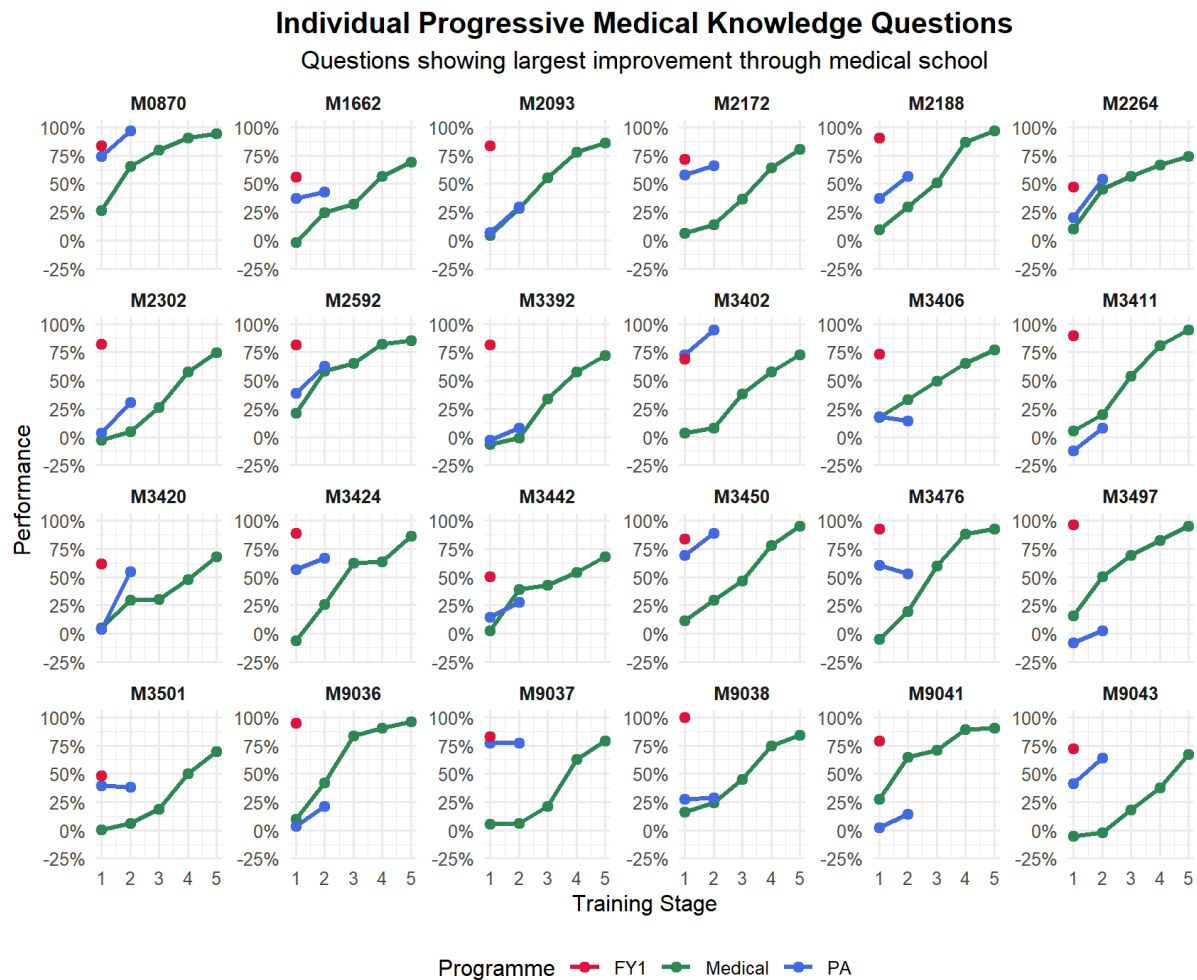
Figure 4: *Performance on 24 of the 30 questions showing cumulative progression. Physician associate students (PA) achieve high scores on certain questions but perform at or below early-stage medical student levels on others. This variable performance may reflect gaps in their training curriculum, with some areas showing knowledge levels similar to early-year medical students.*

Conclusion

The assertion by Drew-Hill et al. (2025) that PA graduates possess "comparable knowledge" to medical graduates is not robustly supported by their own data. While PAs may match or exceed medical student/doctor performance on certain items within the 88-question set, others; particularly those requiring deep, cumulative learning, PA graduates are closer to medical students early in their training.

The extremely low correlations in performance patterns between PA Stage 2 and medical students and doctors are the most critical findings (Figure 5). The data suggest that PAs and medical graduates have fundamentally different patterns of knowledge, even if selected mean scores appear close. The original paper's reliance on mean score comparisons leads to an incomplete picture and risks drawing misleading conclusions.
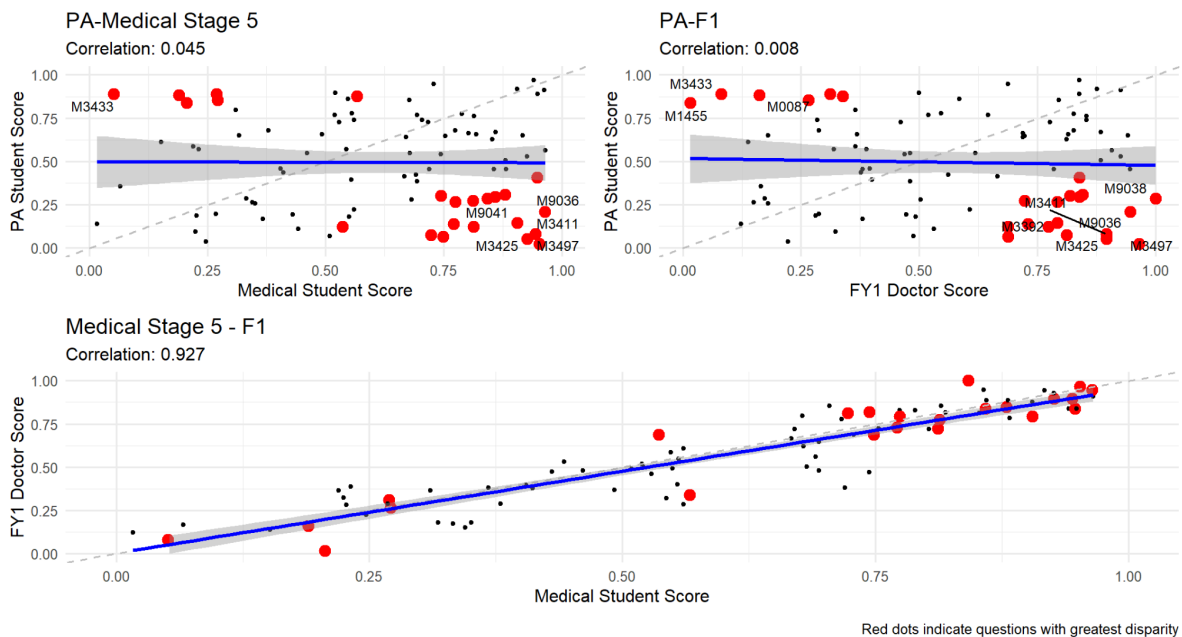
Figure 5: *Correlations between physician associates in their second year (PA2s), Foundation Year 1 doctors (F1s), and final year medical students (Medical Stage 5). While the correlation between F1s and final year medical students is very strong (r = 0.927), showing similar knowledge structures, there was no correlation between PA2s and either group (r = 0.008 with F1s; r = 0.045 with Medical Stage 5), suggesting entirely different patterns of knowledge acquisition and curriculum focus.*

Bibliography

1. Drew-Hill, A. *et al.* Physician Associate graduates have comparable knowledge to medical graduates. *MedEdPublish* **15**, 20 (2025).

2. jhfl2. jhfl2/pa-knowledge-comparison-analysis. (2025).

3. Wickham, H. *et al.* Welcome to the Tidyverse. *J. Open Source Softw.* **4**, 1686 (2019).

4. Pell, G., Fuller ,R., Homer ,M. & and Roberts, T. Is short-term remediation after OSCE failure sustained? A retrospective analysis of the longitudinal attainment of underperforming students in OSCE assessments. *Med. Teach.* **34**, 146–150 (2012).

5. R: The R Project for Statistical Computing. https://www.r-project.org/.