

Pre-clerkship Clinical Skills Assessments Predict Clerkship Performance

Lindsay C. Strowd MD, Donna Williams MD, Hong Gao PhD, Timothy R. Peters MD, Jennifer Jackson MD
Wake Forest School of Medicine, Winston-Salem, NC

Background

- Assessment of medical students' clinical skills (CS) remains an important challenge in medical education
- Prior studies highlight the need for assessment tools with strong validity evidence.^{1,2}
- Few studies have examined earlier predictors of students' future CS performance.³
- Identifying performance outcomes early in medical school that predict later CS performance can help identify at-risk students promptly and inform early curricular interventions to enhance students' performance prior to high-stakes CS assessments and future unsupervised patient care.

Purpose

- The purpose of this study was to examine the relationship between medical students' performance on pre-clerkship clinical skills (PCCS) assessments and their performance during clinical clerkships.

Methods

- We performed a retrospective analysis of three consecutive student cohorts, examining 7-8 PCCS assessments each consisting of a single standardized patient encounter.
- MS1 PCCS exams assessed performance of history taking skills, physical examination skills, professionalism, and communication skills; MS2 PCCS exams assessed the same 4 skill sets in addition to clinical documentation skills and clinical reasoning skills. Evaluators assigned a grade of 'satisfactory' or 'unsatisfactory' for performance of each skill set.
- Regression analyses were performed to identify differences in MS3 clinical clerkship performance between students assessed as 'unsatisfactory' or 'borderline' for one or more skill sets on any PCCS exam versus students assessed as 'satisfactory' for all skill sets on all PCCS exams.

Results

- A total of 320 students were included in the analysis.
- The number of students with at least one borderline or unsatisfactory (US) grade (n=78) represented 24% of subjects.
- In MS1 year, history-taking performance was the CPX component with highest number of US scores (Table 1)
- In MS2 year, clinical reasoning performance had the highest number of US scores (Table 1)

	Communication and interpersonal	History taking	Physical exam	Professionalism	Clinical documentation	Clinical reasoning
MS1	0 (0%)	12(4.75%)	7 (2.19%)	0 (0%)	NA	NA
MS2	3(4.31%)	17(5.31%)	21(6.56%)	0 (0%)	11(3.44%)	40(12.51%)

Table 1: PCCS CPX Exam Performance: Students with US performance by CS skill components and year

- The cohort of borderline and US students performed significantly worse than other students on NBME subject exams, workplace-based assessments (WBAs), number of honors, and Year 3 clerkship overall score (Table 2).
- Of the fifteen students who received an US grade on an entire PCCS CPX exam (rather than just a CPX component), 8 (53%) failed the USMLE Step 2 CS exam on the first attempt.

	US group (n=78)	Non-US (N=242)	F statistics	P value
Pediatrics	-0.27(SD=0.97)	0.13(SD=0.95)	10.69	<0.01
Medicine	-0.25(SD=0.96)	0.31(SD=0.85)	23.84	<0.01
Psychiatry	-0.15(SD=1.02)	0.04(SD=0.98)	2.21	>0.14
Emergency Medicine	0.04(SD=1.01)	0.32(SD=0.97)	4.71	<0.05
Surgery	-0.24(SD=0.98)	0.14(SD=0.99)	8.65	<0.01
Neurology	-0.11(SD=0.98)	0.03(SD=1.02)	1.2	>0.27
Obstetrics and Gynecology	-0.10(SD=0.87)	0.10(SD=1.00)	2.53	>0.11
Family Medicine	-0.05(SD=0.97)	0.27(SD=0.93)	6.86	<0.01

Table 2: Group comparisons for overall clerkship clinical scores (z scores) by clerkship

Conclusion

- PCCS exam predicted future student performance on multiple performance measures in the core clinical clerkships.
- PCCS courses are designed to develop students' skills acquisition and performance using a deliberate practice (DP) model.
- Students' performance on these PCCS exams may reflect their motivation to devote adequate attention and effort to DP.⁴
- Students who underperform in PCCS exams may underperform in clinical clerkships and on Step 2 CS due to skill deficiencies, difficulty applying skills to novel patient encounters (limited adaptive expertise)⁵, or test-associated performance anxiety.⁶
- Early identification and remediation of individual students' CS challenges is important to optimizing students' future CS performance on their clerkships but also in high stakes exams such as USMLE Step 2 CS.
- Programmatic analysis such as what is presented here should be completed to determine the impact of early curricular components on later medical student performance.

References

1. Kogen JR, Holmboe ES, & Hauer KE. Tools for direct observation and assessment of clinical skills of medical trainees. *JAMA*. 2009; 302(12): 1316-1326.
2. Cuddy MM, Windward ML, Johnston MM, Lipner RS, Caluser BE. Evaluating validity evidence for USMLE Step 2 Clinical Skills data gathering and data interpretation scores: does performance predict history-taking and physical examination ratings for first-year internal medicine residents? *Acad Med*. 2016 Jan;91(1):133-9.
3. LaRochelle JS; Dong T, Durning SJ. Preclerkship assessment of clinical skills and clinical reasoning: the longitudinal impact on student performance. *Military Medicine* 2015;180(4 Suppl):43-6.
4. Howley LD. (2004). Performance Assessment in Medical Education: Where We've Been and Where We're Going. *Evaluation & the Health Professions*, 27(3), 285-303. <https://doi.org/10.1177/0163278704267044>
5. Cutrer WB, Miller B, Pusic MV et al. Fostering the Development of Master Adaptive Learners: A Conceptual Model to Guide Skill Acquisition in Medical Education. *Acad Med*. 92(1):70-75, Jan 2017. PMID: [27532867](https://pubmed.ncbi.nlm.nih.gov/27532867/)
6. Moss, F., McManus, I.C. The anxieties of new clinical students. *Med Educ*. 1992;26:17-20 DOI: <https://doi.org/10.1111/j.1365-2923.1992.tb00116.x>