

Do Preclinical Assessment Strategies Matter? NBME Usage and Student Outcomes Across U.S. Medical Schools

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Introduction

- Preclinical assessment strategies vary widely across U.S. medical schools
 - Common assessment types include faculty-written exams, National Board of Medical Examiners (NBME) subject exams, Comprehensive Basic Science Exam (CBSE) and NBME Customized Assessment Services (CAS) exams
- Limited data exist on how these strategies relate to student success outcomes
 - Prior work demonstrated national variation in NBME exam use across 48 U.S. medical schools¹
- Our study examines whether exam usage patterns are associated with Step 1 performance, Step 2 performance, and overall match rate
 - These findings may help clarify whether NBME-style assessments better prepare students for board exams
 - Results may inform medical school curriculum designers which assessment resources are most effective in supporting student board-related and non-board-related success

Methods

- A Qualtrics survey was administered to 155 LCME-accredited U.S. medical schools
- Data were collected from each school on preclinical assessment use: NBME subject exams, CBSE, CAS, and professor-written exams
- Institutional outcome data were obtained on Step 1 pass rate, Step 2 pass rate, mean Step 2 score, and match rate
- IRB-approved by Oakland University (IRB-FY2026-83)

Results

A. Sample Characteristics

Characteristic	n	%
Total Schools	27	100.0%
Respondent: Administrator	24	88.9%
Respondent: Student	3	11.1%
Preclinical: 12-15 months	4	14.8%
Preclinical: 16-18 months	13	48.1%
Preclinical: 19-24 months	10	37.0%

B. Student Performance Outcomes

Outcome Metric	n	Mean	SD	Median	IQR	Range
Step 1 Pass Rate (%)	18	93.6	4.7	95.0	90.2-97.4	85-100
Step 2 CK Pass Rate (%)	18	98.5	1.4	99.0	98.0-99.0	94-100
Step 2 CK Score	14	249.5	5.3	250.0	249.2-252.0	237-256
Match Rate (%)	23	97.3	2.4	98.0	95.5-99.0	90-100

Table 1: Sample Characteristics and Student Performance Outcomes.

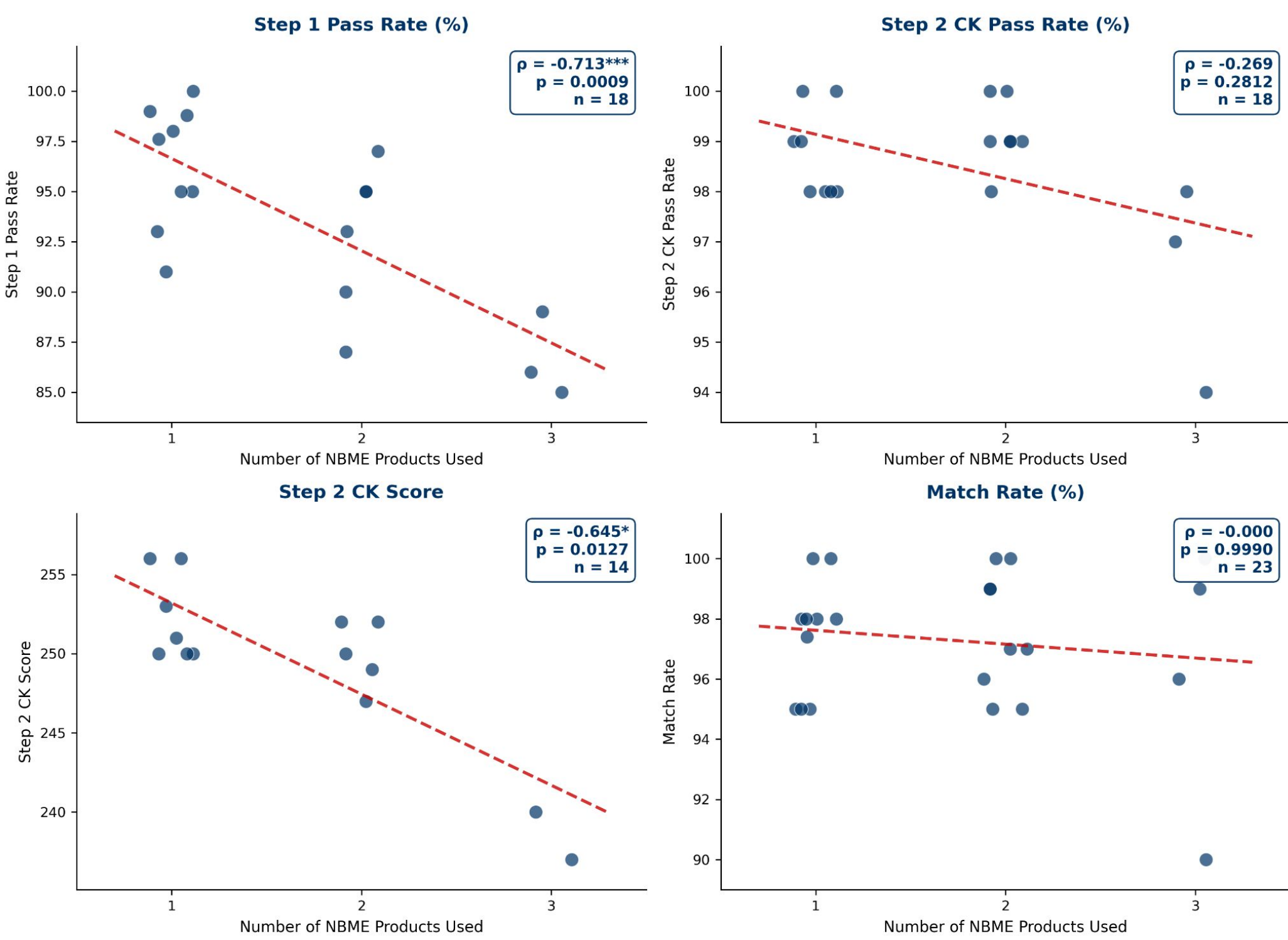


Table 2: Individual User vs. Non-User NBME Product Influence. Mean student outcomes were compared between schools that use vs do not use individual NBME products. Mean differences represent user-non-user differences, with statistical significance assessed using Mann-Whitney U tests. Overall, individual NBME product usage was not significantly associated with student performance outcomes, though consistent directional trends toward lower Step performance were observed among users.

Product	Outcome	Users	n	Non-Users	n	Δ	p
Subject Exams	Step 1	89.2	(n=4)	94.8	(n=14)	-5.6	0.062
Subject Exams	Step 2 Pass	97.0	(n=4)	98.9	(n=14)	-1.9	0.052
Subject Exams	Step 2 Score	243.0	(n=3)	251.3	(n=11)	-8.3	0.180
Subject Exams	Match Rate	96.2	(n=5)	97.6	(n=18)	-1.4	0.678
CBSE	Step 1	92.9	(n=16)	99.0	(n=2)	-6.1	0.056
CBSE	Step 2 Pass	98.5	(n=17)	98.0	(n=1)	+0.5	—
CBSE	Step 2 Score	249.0	(n=13)	256.0	(n=1)	-7.0	—
CBSE	Match Rate	97.2	(n=21)	98.0	(n=2)	-0.8	0.782
CAS	Step 1	91.8	(n=10)	95.8	(n=8)	-4.0	0.108
CAS	Step 2 Pass	98.2	(n=10)	98.9	(n=8)	-0.7	0.487
CAS	Step 2 Score	247.3	(n=7)	251.7	(n=7)	-4.4	0.136
CAS	Match Rate	97.4	(n=14)	97.2	(n=9)	+0.2	0.609

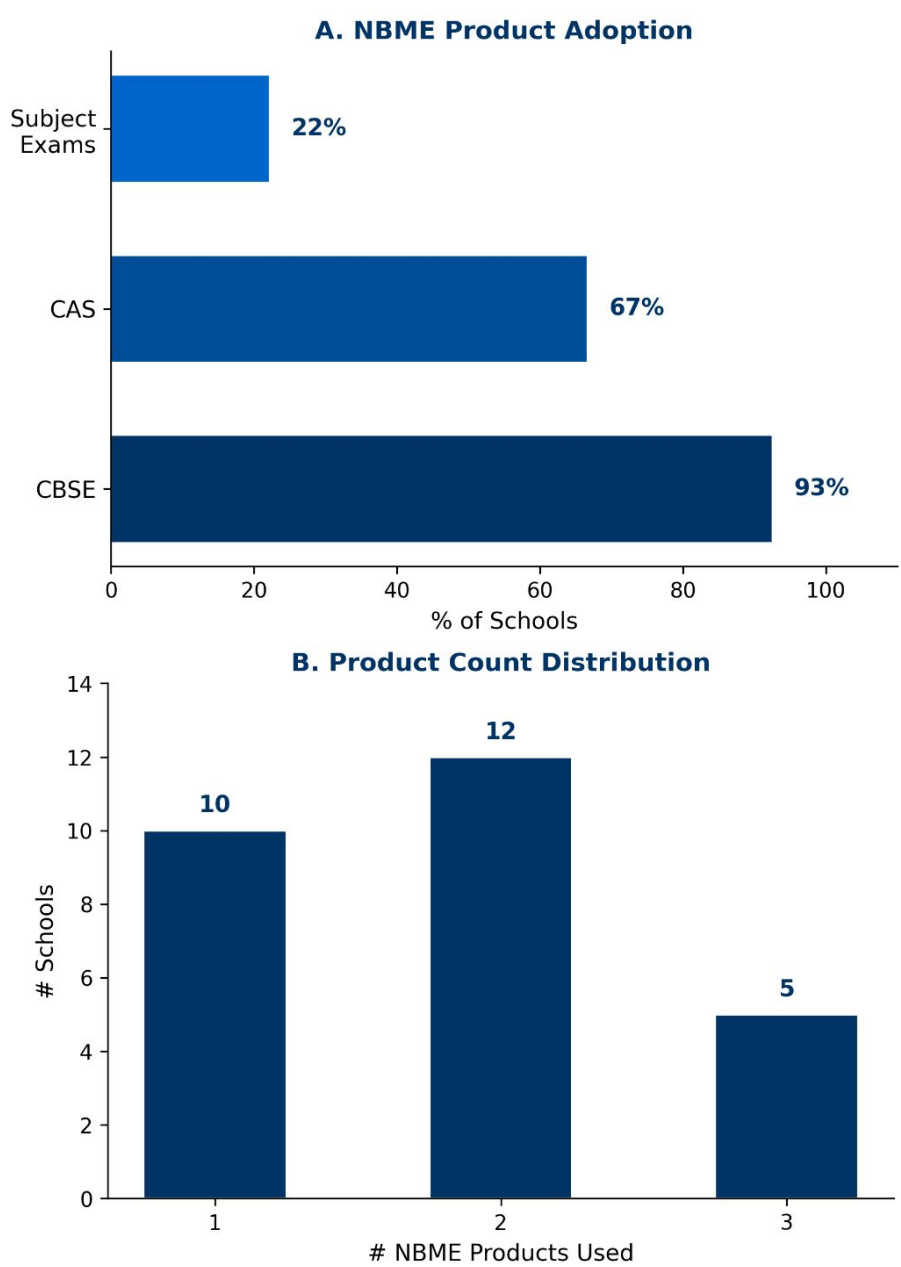


Figure 1: NBME Assessment Usage Patterns Across Medical Schools (n=27).

Figure 2: Greater NBME Product Use Was Associated with Lower Step Performance.

Greater NBME product use was significantly associated with lower Step 1 pass rates ($p = -0.713$, $p = 0.0009$) and lower Step 2 CK scores ($p = -0.645$, $p = 0.0127$).

A non-significant negative trend was observed for Step 2 CK pass rates ($p = -0.269$, $p = 0.2812$). No association was observed between NBME product use and residency match rate ($p = -0.000$, $p = 0.9990$).

Discussion

- Traditional NBME preclinical subject exams are now used by fewer than 1 in 4 schools, suggesting that discipline-specific standardized testing may be declining in favor of other assessment approaches
- CBSE use is nearly universal, supporting its role as the current standard for benchmarking preclinical performance and Step 1 readiness
- Surprisingly, schools that used a greater number of NBME products tended to have lower Step 1 pass rates and average Step 2 CK scores
 - It is possible that curriculum design allowing for professor flexibility leads to better student understanding
 - It is also possible that not all NBME products are made equal, and that certain products may not yield students with optimal board exam parallels
- NBME usage was not significantly associated with residency match rates, likely because match outcomes are shaped by many factors beyond preclinical assessment strategy

Conclusion

- CBSE is currently the dominant standardized preclinical assessment tool, while discipline-specific NBME subject exams are used by a minority of schools
- U.S. medical schools appear to be converging on a hybrid model that combines CBSE benchmarking with professor-written, NBME-style assessments
- Interpretation of these findings is promising but still limited by the current response rate. Ongoing data collection may further strengthen these associations to draw powerful conclusions to inform optimized curriculum design

References

1. Wright WS, Baston K. A national survey: use of the National Board of Medical Examiners® basic science subject exams and Customized Assessment Services exams in US medical schools. Adv Med Educ Pract. 2018;9:599-604. Published 2018 Aug 27. doi:10.2147/AMEP.S169076