Associations of Admission Grade Point Average and Postclinical Competency Assessment With American Society for Clinical Pathology Board of Certification Outcomes

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ABSTRACT

Certification through the American Society for Clinical Pathology Board of Certification (BOC) examination is an important achievement for medical laboratory science (MLS) graduates and a key indicator of program accountability. This study examined associations among admission grade point average (GPA), postclinical competency scores, and BOC outcomes among MLS graduates during and following the COVID-19 pandemic. A retrospective analysis was conducted using records from graduates at a Midwestern university who completed a 6-month clinical practicum and attempted the BOC within 1 year of graduation (2020–2024). Chi-square analyses were used to compare the observed pass rate with the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS) 75% benchmark and to assess associations between admission GPA and BOC outcomes, as well as between postclinical competency scores and BOC outcomes. The BOC pass rate was 67.1%, which did not differ significantly from the NAACLS benchmark but remained 7.9 percentage points lower. No statistically significant associations were found between admission GPA or postclinical competency scores and BOC outcomes. These findings suggest that commonly used academic and program-level metrics may not independently reflect certification readiness and highlight the importance of aligning internal assessments with certification expectations.

ABBREVIATIONS: ASCP - American Society for Clinical Pathology, BOC - Board of Certification, GPA - grade point average, MLS - medical laboratory science, NAACLS - National Accrediting Agency for Clinical Laboratory Sciences.

INDEX TERMS: medical laboratory science (MLS), Educational Measurement, certification, students, health occupations, ASCP Board of Certification (BOC), National Accrediting Agency for Clinical Laboratory Sciences (NAACLS), student success.

Clin Lab Sci 2026;38(1):1–6

INTRODUCTION

Certification examinations are a primary benchmark for readiness to enter professional practice across health professions education. In medical laboratory science (MLS), passing the American Society for Clinical Pathology (ASCP) Board of Certification (BOC) examination validates entry-level competence. It confirms graduates have the knowledge and clinical reasoning required for safe laboratory practice. Certification outcomes are also central to program evaluation. The National Accrediting Agency for Clinical Laboratory Sciences (NAACLS) requires accredited programs to maintain a 3-year rolling average BOC pass rate of at least 75% for graduates who attempt the examination within 1 year of graduation.[1] Certification success is essential for maintaining accreditation and for ensuring a steady supply of qualified professionals to address workforce shortages in the medical laboratory field.[2] Student attrition and certification failure have direct implications for program accreditation and can worsen workforce shortages, ultimately impacting the quality and availability of health care delivery. Therefore, understanding factors tied to certification success is vital for MLS educators. This knowledge enables programs to identify students who need support, improve student outcomes, and more effectively ensure a qualified laboratory workforce.

Previous MLS education research has identified grade point average (GPA) as a strong predictor of certification outcomes.[3-7] Studies report positive links between preadmission or program GPA and BOC examination success.[2-5] GPA signals not simply academic achievement but also the cognitive skills and academic engagement necessary to master complex scientific concepts. These abilities mirror the demands of both high-complexity clinical laboratory work and certification examinations, in which professionals must integrate multidisciplinary knowledge and apply scientific reasoning to support patient care.

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Although GPA has been associated with certification outcomes in certain contexts, MLS programs often use internal competency assessments to evaluate readiness for professional practice. NAACLS does not require a specific postcompletion or comprehensive examination; instead, programs must assess student learning outcomes across the cognitive, psychomotor, and affective domains and implement evaluation systems aligned with program competencies.[1] Consequently, programs may adopt various methods to assess readiness, such as postclinical comprehensive or competency examinations administered near program completion to evaluate cumulative knowledge and facilitate certification preparation. However, there is limited evidence regarding the extent to which these internal assessment strategies are associated with performance on national certification examinations, highlighting a gap in the literature.[7] Investigating the relationship between internal evaluation measures and certification outcomes is essential to ensure that assessment practices effectively support student readiness.

Previous studies have reported associations between GPA and certification success, although the reported outcomes remain inconsistent. Recent research in MLS has examined additional program-level variables and determined that some factors are significantly associated with certification outcomes, whereas others are not.[8]

Furthermore, most MLS literature on certification success is based on prepandemic cohorts.[3-7] The COVID-19 pandemic disrupted clinical practicum, educational delivery, and certification testing timelines for many MLS students.[9] These disruptions included delayed, shortened, or canceled clinical practicums, as well as transitions to alternative instructional methods.[9] Because the study cohort completed portions of their didactic and clinical practicums during and immediately after the pandemic, these disruptions may have influenced the educational experiences represented in the present study and affected the relationship between academic indicators and BOC outcomes. Therefore, it is necessary to re-examine these relationships in cohorts trained during and after the COVID-19 pandemic.

The purpose of this study was to examine the associations between admission GPA and ASCP BOC examination success, as well as between postclinical competency examination outcomes and BOC success among MLS graduates. Specifically, this study addressed 2 research questions: (1) what was the overall BOC pass rate among MLS graduates, and (2) were academic indicators, including admission GPA categories and postclinical competency examination outcomes, associated with BOC outcomes? By evaluating these relationships, this study aimed to provide practical insights for MLS educators seeking to improve student outcomes and align internal assessment practices with certification expectations.

MATERIALS AND METHODS

A retrospective cross-sectional quantitative design was used to evaluate relationships between academic indicators and certification outcomes. Institutional review board approval was obtained from 2 institutional review boards prior to conducting the study.

The study population comprised graduates of an MLS program at an academic institution in the Midwestern United States who completed a 6-month clinical practicum between 2020 and 2024. Completion of this practicum was required for the MLS degree. A total of 92 students completed the practicum; however, 22 students were excluded because of incomplete data, consistent with the study's inclusion criteria. According to the study's findings, 14 students had not completed the ASCP BOC examination within 1 year of graduation, and 8 students had not completed the MediaLab ASCP Exam Simulator postclinical competency examination.

A follow-up review of certification records showed that among the 14 students who had not taken the BOC examination within 1 year of graduation, 5 subsequently completed the examination, whereas 9 had not taken it by the time of data collection. Admission GPA was recorded for all students. The purposive sampling strategy included only graduates with complete records for admission GPA, postclinical competency examination scores, and BOC outcomes within the defined timeframe, resulting in a final analytic sample of 70 graduates.

Program admission GPA was defined as each student's cumulative undergraduate GPA at the time of entry into the MLS program. GPA values were initially classified as very low (<2.75), low (2.75–3.00), average (3.01–3.50), or high (3.51–4.00). This classification allowed for the evaluation of differences in certification outcomes across varying levels of academic preparation. For analysis, GPA categories were consolidated into 2 groups (lower GPA: very low and low; higher GPA: average and high) to allow for the use of chi-square tests of independence, which require categorical variables, and to ensure adequate expected cell counts given the sample size.

Postclinical competency performance was measured using the MediaLab ASCP Exam Simulator, administered following completion of clinical practicums. The examination was designed to reflect BOC content domains and used adaptive testing principles similar to the BOC examination.[10] Scores were reported as percentages (0%–100%) and categorized as pass (≥80%) or fail (<80%) for analysis, with scores of 80% or higher classified as passing based on program benchmarks.

BOC examination outcomes were obtained from institutional program records and categorized as pass (score ≥ 400) or fail (score < 400), consistent with ASCP BOC scoring criteria.[6] Data were deidentified prior to analysis to protect student confidentiality.

Descriptive statistics summarized demographic characteristics and academic performance variables. A chi-square

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goodness-of-fit test compared observed BOC pass rates with the NAACLS benchmark of 75%. For the goodness-of-fit analysis, BOC examination outcomes were categorized as pass or fail. Observed frequencies were compared with expected under the NAACLS benchmark of a 75% certification pass rate among graduates who attempted the examination within 1 year of graduation. Chi-square tests of independence examined associations among admission GPA categories, competency examination outcomes, and certification results. Statistical significance was established at P less than .05. All analyses were conducted using IBM SPSS Statistics for Windows, version 29.0 (IBM Corp, Armonk, NY).

RESULTS

The study included 70 MLS students who graduated between 2020 and 2024. The sample was predominantly female (68.6%, $n = 48$). A total of 67.1% ($n = 47$) of graduates passed the ASCP BOC examination within the first year following graduation. Regarding academic metrics, the majority of students were classified within the average (31.4%) and low (28.6%) admission GPA categories. For the postclinical competency measure, the majority of students, 60.0% ($n = 42$), failed to achieve the passing benchmark (≥80%). A complete summary of the frequencies and percentages for all categorical variables is presented in Table 1.

Table 1. Frequencies and distribution of categorical variables ($N = 70$)

Variables	N	%
Sex		
Male	22	31.4
Female	48	68.6
BOC result		
Fail	23	32.9
Pass	47	67.1
GPA group		
Very low (<2.75)	10	14.3
Low (2.75–3.00)	20	28.6
Average (3.01–3.50)	22	31.4
High (3.51–4.00)	18	25.7
MediaLab result		
Failing (<80%)	42	60.0
Passing (≥80%)	28	40.0
Graduation year		
2020	20	28.6
2021	15	21.4
2022	6	8.6
2023	13	18.6
2024	16	22.9

Abbreviations: BOC, board of certification; GPA, grade point average.

Distribution of Academic Metrics

Descriptive statistics for admission GPA and MediaLab postclinical examination scores are presented in Table 2. Admission GPA values demonstrated relatively low variability (SD = 0.42; interquartile range [IQR] = 0.68), indicating relatively consistent academic performance among admitted students. In contrast, MediaLab postclinical examination scores demonstrated greater variability (SD = 11.18; IQR = 16.25), suggesting greater differences in performance on the postclinical competency assessment.

Inferential Statistics

Research question 1: MLS students' overall pass rates on the BOC examination

A chi-square goodness-of-fit test was conducted to compare the observed BOC pass rates of MLS students with the NAACLS benchmark of 75%.[1] The BOC examination score categories were defined as passing (score ≥ 400) and failing (score < 400). The results showed no statistically significant difference between the observed pass rate (67.1%) and the expected 75% NAACLS benchmark, $\chi^2(1, N = 70) = 2.31$, $P = .13$ (Table 3).

Although the difference was not statistically significant, the observed pass rate was 7.9 percentage points below the NAACLS benchmark. Nevertheless, this difference may be of practical interest for program evaluation, particularly given the importance of maintaining accreditation benchmarks. However, given the lack of statistical significance, this difference should be interpreted with caution.

Research question 2: associations between academic indicators and BOC outcomes

To address small cell counts and meet the chi-square test assumptions, GPA categories were consolidated into 2 groups: lower GPA (very low and low) and higher GPA (average and high). A chi-square test of independence

Table 2. Descriptive statistics for continuous variables ($N = 70$)

Variable	Minimum	Maximum	Mean	SD	Median	IQR
Admission GPA	2.43	4.00	3.18	0.42	3.08	0.68
MediaLab score	46	96	76.00	11.18	77.0	16.25

Abbreviations: GPA, grade point average; IQR, interquartile range.

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Table 3. Comparison of observed BOC pass rate to NAACLS 75% benchmark

BOC Examination Outcome	Observed Frequency, %	Expected Frequency, %	*N*	χ^2	*P*	Cramer's *V*
Pass	67.1	75	47	2.31	.13	.18
Fail	32.9	25	23	–	–	–

Abbreviations: BOC, board of certification; NAACLS, National Accrediting Agency for Clinical Laboratory Sciences.

Table 4. Associations between academic indicators and BOC examination outcome (*N* = 70)

		BOC Examination Result		
Academic Indicator	**Category**	**Fail, *n* (%)**	**Pass, *n* (%)**	**Total**
GPA category	Lower GPA	12 (40.0)	18 (60.0)	30
	Higher GPA	11 (27.5)	29 (72.5)	40
Postclinical competency	Fail (<80%)	15 (35.7)	27 (64.3)	42
	Pass (≥80%)	8 (28.6)	20 (71.4)	28

Lower GPA encompassed both the very-low and low GPA categories combined, whereas higher GPA encompassed both the average and high GPA categories combined. Abbreviations: BOC, board of certification; GPA, grade point average.

(Table 4) was then performed to examine the association between program admission GPA category and BOC examination outcome.

The analysis revealed no statistically significant association between GPA category and BOC examination outcome, $\chi^2(1, N = 70) = 1.21$, $P = .27$. The effect size was small (Cramer's $V = .13$), indicating a negligible association between admission GPA and certification success.

The higher GPA group achieved a BOC pass rate of 72.5%, compared with 60.0% in the lower GPA group. Although this difference suggests a trend toward higher pass rates among students with higher GPAs, the difference was not statistically significant.

No statistically significant association was found between postclinical competency outcomes and BOC examination results, $\chi^2(1, N = 70) = 0.39$, $P = .53$ (Table 4). The small effect size (Cramer's $V = .08$) indicates a negligible association between postclinical competency performance and BOC outcomes. Students who passed the postclinical competency benchmark (≥80%) achieved a BOC pass rate of 71.4%. This was only slightly higher than the 64.3% pass rate observed among students who did not meet the benchmark. The resulting 7.1-percentage-point difference was not substantial enough to represent a meaningful association with certification success.

DISCUSSION

This study examined the extent to which admission and program-level metrics were associated with success on the ASCP BOC examination. A key finding of this study was that the overall BOC pass rate among MLS graduates was 67.1%, which did not significantly differ from the NAACLS benchmark of 75%. Although this difference was not statistically significant, the observed pass rate fell below the recommended benchmark for program accreditation. This finding is important in the context of program evaluation because BOC pass rates are commonly used as an indicator of program effectiveness and graduate readiness. These results suggest that although the program demonstrates moderate success in preparing students for certification, there may be opportunities for targeted improvements to consistently meet or exceed accreditation standards.

Contrary to expectations informed by previous MLS education research, admission GPA did not demonstrate a statistically significant association with certification success in this sample. Although students with higher GPAs had a higher BOC pass rate than those with lower GPAs, the difference was not statistically significant, and the effect size was small. These results indicate that although preadmission academic performance may reflect foundational skills such as study habits and academic persistence, it may not be independently associated with certification outcomes. This finding is consistent with prior research suggesting that GPA alone may not fully capture certification readiness and should be considered alongside additional academic and program-level factors.[3,5] Additionally, the study cohort included students whose educational experiences occurred during and shortly after the COVID-19 pandemic, which may have influenced academic preparation and certification timing.

Although not a definitive indicator, admission GPA may still serve as an initial marker of potential academic risk. Programs may be able to use GPA data to identify students who could benefit from early academic support. In this context, GPA should be considered as 1 element within a comprehensive, multifactorial strategy for promoting student success rather than as a sole decision-making criterion.

A second key finding was that postclinical MediaLab competency performance showed no significant association

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with BOC outcomes. These findings suggest a potential assessment–certification disconnect because internal postclinical competency evaluations did not match performance on the comprehensive, high-stakes BOC examination. If these assessments are intended to measure readiness for professional practice, their lack of association with certification outcomes raises questions about whether current competency evaluations sufficiently capture the knowledge integration and clinical reasoning needed for certification success. This result highlights a possible misalignment between internal competency assessments and certification expectations. Similarly, prior studies have emphasized the importance of considering multiple academic and program-level factors in supporting certification readiness, suggesting that assessment design may play a role in preparing students for high-stakes examinations.[3,5]

Platforms such as MediaLab are designed to reinforce content knowledge, identify areas of weakness, and approximate the format, content distribution, and adaptive structure of certification examinations.[10] However, certification examinations require higher-order cognitive skills, including the synthesis of laboratory data across disciplines such as hematology, microbiology, chemistry, transfusion medicine, and molecular diagnostics. In this study, performance on the program's postclinical competency benchmark was not significantly associated with BOC outcomes. This may suggest that the way the assessment is implemented or interpreted within the program, including reliance on a single percentage benchmark, may not fully capture the range of factors that contribute to certification performance.

Differences in assessment stakes may also contribute to this misalignment. The BOC examination is a high-stakes milestone that directly influences employability and professional identity, potentially driving student preparation. Additionally, each BOC attempt incurs a financial cost for the student, further heightening the perceived consequences of poor performance. In contrast, the postclinical competency examination in this program is administered within a capstone course and is designed to facilitate learning rather than function as a high-stakes gatekeeper. Students have multiple opportunities to complete the assessment, and performance on the examination does not solely determine the final course grade or eligibility for graduation. Therefore, these internal assessments may not provoke the same level of preparation or performance pressure as the BOC examination. Consequently, results on these assessments may not reliably reflect students' readiness for certification.

In this study, a subset of students was excluded because they did not complete the BOC examination within 1 year of graduation. Follow-up review indicated that some students subsequently attempted the examination, whereas others had not pursued certification at the time of data collection. This may reflect alternative career pathways, such as entering positions for which certification is not required, pursuing other credentialing examinations, or enrolling in advanced degree programs (eg, doctor of medicine, physician assistant, doctor of osteopathic medicine, doctor of philosophy). Consequently, BOC pass rates, although a common benchmark for MLS programs, may not fully represent the range of graduate outcomes or professional trajectories.

These findings are particularly relevant for MLS program directors in the context of accreditation and program outcomes. NAACLS requires accredited programs to maintain a 3-year ASCP BOC pass rate of at least 75%.[1] Programs that do not meet this benchmark are required to conduct internal reviews and implement improvement strategies. Although admission GPA alone may not demonstrate a strong association with certification success, the results underscore the importance of evaluating multiple indicators of student readiness and ensuring alignment among curriculum, assessment, and certification expectations.

This study provides 2 practical implications for MLS educators. First, admission GPA may be used cautiously as an early indicator to identify students who could benefit from additional academic support rather than as the sole indicator of success.[3,5] Second, the lack of association between postclinical competency performance and BOC outcomes suggests that program-level assessments may benefit from continued evaluation to ensure alignment with the cognitive demands of certification examinations. These findings indicate that although GPA reflects foundational academic skills, it does not consistently demonstrate an association with certification outcomes in all program contexts.

To improve both accreditation outcomes and workforce readiness, MLS programs may benefit from prioritizing the alignment of assessments with certification expectations and implementing targeted, data-informed student support strategies. These approaches may help ensure that graduates are not only knowledgeable but also capable of applying clinical reasoning in complex laboratory settings.

LIMITATIONS

Limitations of this study include the single-institution design and retrospective methodology. An additional limitation involves the use of admission GPA as an indicator of academic performance. In this program, students enter from a variety of academic pathways, including those who completed prerequisite coursework at the host institution, as well as transfer and postbaccalaureate students from other colleges and universities. Even students at the host institution may complete prerequisite coursework at external institutions when courses are unavailable locally. As a result, admission GPA may reflect differences in grading scales, course difficulty, and institutional standards. Although grading within the MLS program itself is standardized, preadmission GPA is not uniformly derived. This variability may affect the comparability of GPA as a

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measure of academic performance and limit the generalizability of findings related to certification success. Additionally, the relatively small sample size may have limited statistical power to detect significant associations. This was reflected in the need to consolidate GPA categories to meet the chi-square test assumptions, which may have reduced the sensitivity of the analysis to detect group differences.

A related limitation is that this study evaluated certification outcomes based solely on the MLS ASCP certification examination. Other certification pathways, including categorical ASCP certifications, the ASCP International certification, and the American Medical Technologists certification, were not included. As a result, the findings may not be generalizable to all certification routes within the medical laboratory workforce.

Other limitations include the lack of psychosocial variables, such as motivation or test anxiety, that may influence certification performance. The study cohort also completed their education during and immediately after the COVID-19 pandemic. Disruptions in instructional delivery and clinical experiences may have affected student outcomes.

Future research should include multi-institutional and longitudinal studies that include both academic and affective variables to develop more comprehensive models of certification success. Evaluating alignment between internal assessments and certification blueprints may further strengthen understanding of relationships and support educational decision-making.

CONCLUSION

This study examined the associations between admission GPA and ASCP BOC examination outcomes, as well as between postclinical competency performance and BOC outcomes among MLS graduates. The overall BOC pass rate was 67.1%, which did not differ significantly from the NAACLS benchmark of 75%, but remained below the recommended accreditation standard. Neither admission GPA nor postclinical competency performance demonstrated a statistically significant association with BOC examination success. These findings suggest that commonly used academic and program-level metrics may not independently reflect certification readiness in all contexts. Therefore, the results indicate that strengthening alignment between internal competency assessments and certification standards may help improve certification outcomes and support program quality improvement.

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