

Correlation between WelCOM and COMLEX-USA Scores

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Abstract

WelCOM Phase 1 and Phase 2 are administered during the preclinical and clinical phases of osteopathic medical education to help students prepare for COMLEX-USA Level 1 and Level 2-CE, respectively. This study examined the score relationships between WelCOM and the corresponding COMLEX-USA assessments. The analysis included all first-time examinees who completed WelCOM Phase 1 and COMLEX-USA Level 1, and/or WelCOM Phase 2 and COMLEX-USA Level 2-CE. Results indicated a moderate to strong correlation between WelCOM Phase 1 and COMLEX-USA Level 1 scores, and a strong correlation between WelCOM Phase 2 and COMLEX-USA Level 2-CE scores. These findings suggest that WelCOM serves as a meaningful indicator of preparedness for COMLEX-USA.



Introduction

The osteopathic medical profession has experienced rapid growth in recent decades and now accounts for over 11% of all physicians in the United States. As of 2025, nearly 40,230 students are enrolled across 43 colleges of osteopathic medicine (Commission on Osteopathic College Accreditation, 2025). This expansion underscores the increasing need for effective assessments that help prepare students for clinical practice and licensure.

The WelCOM exams are designed to support early medical education and readiness for the COMLEX-USA licensure pathway. Understanding how well the WelCOM assessments align with the actual licensure assessments is essential. Therefore, this study examines the relationship between performance on WelCOM and on COMLEX-USA exam series.

COMLEX-USA is a three-level national standardized licensure exam developed and administered by the National Board of Osteopathic Medical Examiners (NBOME). It evaluates the competencies required for practice as an osteopathic generalist physician, including medical knowledge, clinical reasoning, and osteopathic principles (National Board of Osteopathic Medical Examiners).

To support students and colleges of osteopathic medicine (COMs) along the licensure pathway, the NBOME developed the WelCOM Phase 1 and Phase 2 exams. These standardized, formative assessments are closely aligned with the COMLEX-USA Level 1 and Level 2-CE blueprints and are designed to serve as self-evaluation tools.



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Research questions

This study examined the relationship between scores on WelCOM Phase 1 and COMLEX-USA Level 1, and between scores on WelCOM Phase 2 and COMLEX-USA Level 2-CE. The following two research questions were addressed:

1. What is the relationship between WelCOM Phase 1 exam raw scores and COMLEX-USA Level 1 scaled scores?
2. What is the relationship between WelCOM Phase 2 exam raw scores and COMLEX-USA Level 2-CE scaled scores?

Methodology

Sample

This study analyzed data from examinees who completed the WelCOM Phase 1 and Phase 2 exams, matched to their corresponding COMLEX-USA Level 1 and Level 2-CE scores, respectively. Unique identifiers were used to facilitate the matching process.

- WelCOM Phase 1: Examinees who took WelCOM Phase 1 between January 2021 and May 2024 were selected. COMLEX-USA Level 1 implemented the new standards in May 2024; hence we did not include data after that.
- WelCOM Phase 2: Examinees who took WelCOM Phase 2 between January 2021 and March 2025 were selected.

Data Cleaning Procedures

WelCOM Phase 1:

- Only the first attempts were included on each of the four WelCOM Phase 1 forms.
- Exams with scores at or below chance level (indicating low effort with no motivation) were removed.
- Exams with elapsed times above the 95th percentile (indicating atypical testing conditions) were excluded.



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The remaining exams were matched to the corresponding examinees' first-attempt COMLEX-USA Level 1 scores, resulting in 3,512 matched records. Of these:

- 2,917 (83.1%) WelCOM Phase 1 exams were completed before COMLEX-USA Level 1 and were included in the analysis.
- 595 (16.9%) were completed after COMLEX-USA Level 1 and were excluded.

WelCOM Phase 2:

- Only the records of examinees who completed the test were included.
- Only the first attempts on each of the six WelCOM Phase 2 forms were included.
- Examinees with WelCOM Phase 2 scores below chance level were removed.
- Examinees who answered fewer than 70 items (out of 75 total) were excluded.
- Examinees with a COMLEX-USA Level 2 scale score below 200 were also excluded (indicating low effort or motivation).

WelCOM Phase 2 data were subsequently matched with first-attempt COMLEX-USA Level 2-CE scores, yielding 5,591 matched records.

- 4,682 completed WelCOM before taking COMLEX-USA Level 2-CE.
- 909 completed WelCOM after their first COMLEX-USA Level 2-CE attempt.

Only data from WelCOM Phase 2 exams completed prior to the COMLEX-USA Level 2-CE were included in the analysis.

Statistical Analysis

For COMLEX-USA Level 1, the study used the numerical scaled scores, reported to examinees before COMLEX-USA Level 1 became strictly Pass/Fail and then retained by NBOME for exams administered after the move to Pass/Fail. For COMLEX-USA Level 2-CE, the study used the reported scaled scores. Score distributions for COMLEX-USA are not presented in the results for this study. WelCOM scores on different test forms were not equated, hence raw scores based on numbers of items answered were used. Pearson correlations were calculated between the pair of WelCOM Phase 1 and COMLEX-USA Level 1 scores, and between the pair of WelCOM Phase 2 and COMLEX-USA Level 2-CE scores.



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Effect sizes were interpreted using Cohen's (1992) guidelines:

- Large effect size: $r \geq 0.50$
- Medium effect size: $0.30 \leq r < 0.50$
- Small effect size: $0.10 \leq r < 0.30$.

Results

Results of WelCOM Phase 1 and COMLEX-USA Level 1

The first part of this analysis uses a matched sample of 2,917 osteopathic medical students, including only first attempts on one or more of the four WelCOM Phase 1 forms and on COMLEX-USA Level 1. All students in the sample completed WelCOM Phase 1 prior to taking COMLEX-USA Level 1.

Table 1 presents the raw score descriptive statistics for each of the four WelCOM Phase 1 forms, along with the Pearson correlation coefficients. Across the four WelCOM Phase 1 forms (Form 1 to Form 4), sample sizes ranged from 192 to 1,791 examinees, with most test takers taking Form 1 and the fewest taking Form 4.

Mean scores varied by form, ranging from 45.36 to 49.60. Based on Cohen's (1992) guidelines, all forms demonstrated moderate or strong positive correlations with COMLEX-USA Level 1 scores, with Pearson's r values ranging from 0.37 to 0.57. Overall, the results suggest that WelCOM Phase 1 performance is at least a moderately strong predictor of COMLEX-USA Level 1 outcomes.

Results of WelCOM Phase 2 and COMLEX-USA Level 2

Descriptive statistics and correlations between WelCOM Phase 2 scores and COMLEX-USA Level 2-CE scores are summarized in Table 2. Across the six WelCOM Phase 2 forms (Form 1 to Form 6), sample sizes ranged from 514 to 1,369 examinees.

Mean scores varied by form, with values ranging from 49.83 to 56.20 for WelCOM Phase 2, and 471.77 to 486.18 for COMLEX-USA Level 2-CE. Scores on all WelCOM Phase 2 forms demonstrated strong positive correlations with COMLEX-USA Level 2-CE scores, with Pearson's r values ranging from 0.51 to 0.58. This indicates that WelCOM Phase 2 performance is a meaningful predictor of COMLEX-USA Level 2-CE.



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Table 1.

WelCOM Phase 1 Descriptive Statistics and Correlation with COMLEX-USA Level 1 Scores

Form Code	N	COMLEX-USA		WelCOM Phase 1				Cor.
		Level 1		Mean	SD	Min	Max	
		Testing Window	Testing Window					
Form 1	1791	Feb 5, 2021–Nov 20, 2024	Jan 20, 2021–May 6, 2024	48.41	7.17	18	70	0.47
Form 2	536	Feb 5, 2021–Nov 20, 2024	Feb 3, 2021–May 5, 2024	46.49	6.90	19	66	0.57
Form 3	398	Mar 10, 2023–Jul 18, 2024	Jan 25, 2023–May 4, 2024	45.36	6.97	28	61	0.37
Form 4	192	Jan 20, 2023–Jul 8, 2024	Jan 19, 2023–May 6, 2024	49.60	6.15	29	63	0.52

Conclusion and Discussion

The purpose of this study was to investigate the empirical relationship between WelCOM COMLEX-USA licensure examinations. The findings provide strong evidence supporting the predictive validity of both WelCOM Phase 1 and Phase 2 exams. Specifically, moderate to strong positive correlations were observed between WelCOM Phase 1 scores and COMLEX-USA Level 1 scores, and strong correlations were found between WelCOM Phase 2 scores and COMLEX-USA Level 2-CE outcomes. These results suggest that performance on WelCOM assessments is meaningfully associated with subsequent success on COMLEX-USA exams, reinforcing their utility as formative tools for gauging licensure readiness in osteopathic medical education.



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Table 2.

WelCOM Phase 2 Descriptive Statistics and Correlation with COMLEX-USA Level 2-CE Scores

Form Code	N	COMLEX-USA Level 2-CE				WelCOM Phase 2				Cor.
		Mean	SD	Min	Max	Mean	SD	Min	Max	
Form 1	1,369	485.31	88.02	241	798	49.83	5.68	20	67	0.58
Form 2	863	484.32	84.99	271	758	50.07	6.13	25	66	0.57
Form 3	754	486.18	86.75	257	798	51.02	5.64	35	68	0.57
Form 4	634	479.19	83.64	271	298	51.85	5.86	31	66	0.51
Form 5	514	471.77	77.77	271	742	56.20	4.74	42	70	0.52
Form 6	548	478.37	80.47	271	725	53.95	5.39	26	67	0.55



Reference

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