

THE OSCE COMPARED TO THE PACKRAT AS A PREDICTOR OF PERFORMANCE ON  
THE PANCE

A Research Project by

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Assistant and the faculty of the Graduate School  
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of the requirements for the degree of Master of  
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College of Health Professions  
Department of Physician Assistant

I hereby recommend that the research project prepared under my supervision by Barbara T. Oberle entitled THE OSCE COMPARED TO THE PACKRAT AS A PREDICTOR OF PERFORMANCE ON THE PANCE be accepted as partial fulfillment for the degree of Master of Physician Assistant.

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Permission was granted by Dr. Muma to use previous data from Derek Wilson, Class of 2006, in his paper entitled *PACKRAT: A Predictor of Success on the PANCE*.

## ABSTRACT

*Background and Purpose:* The purpose of this study was to compare the Physician Assistant Clinical Knowledge Rating and Assessment Tool (PACKRAT) and the Objective Structured Clinical Examination (OSCE) as predictors of performance on the Physician Assistant National Certifying Examination (PANCE). In order to become a licensed physician assistant one must graduate from an accredited program and pass the PANCE. Physician assistant programs use several methods to evaluate students and prepare students to take the PANCE. These methods include exams such as the PACKRAT and the OSCE. Due to the fact that the PACKRAT and the OSCE are being used for this purpose, it is imperative to know the predictive value of these exams on the PANCE. *Methods:* The study data used in this investigation were collected on 84 WSU PA Program graduates of 2003 and 2004 who have taken the PANCE. The identified set of explanatory variables include PACKRAT I, PACKRAT II, OSCE I, OSCE II, and PANCE scores. Correlation analysis was conducted comparing PACKRAT I and PANCE, PACKRAT II and PANCE, OSCE I and PANCE, and OSCE II and PANCE using linear models to determine how the scores relate. Logistic regression was used to assess the capability of PACKRAT I, PACKRAT II, OSCE I, and OSCE II to predict the PANCE score. *Results:* PACKRAT and PANCE scores were shown to be highly correlated. OSCE and PANCE scores were also correlated, but to a lesser degree. Linear regression revealed a significant relationship between the PACKRAT and PANCE, with 58% of variance in PANCE scores being accounted for by the variance in PACKRAT scores. The OSCE scores accounted for 19% of variance in PANCE scores. *Conclusion:* Both the PACKRAT and OSCE scores were predictive of PANCE scores. The PACKRAT was more predictive of the PANCE than the OSCE.

## INTRODUCTION

### *Background*

Physician assistants (PAs) are health professionals licensed to practice medicine with physician supervision. PAs exercise autonomy in medical decision making, providing a broad range of diagnostic and therapeutic services in a variety of practice settings. In order to practice, all physician assistants must graduate from an accredited physician assistant educational program in addition to certification by the National Commission on the Certification of Physician Assistants (NCCPA). There are more than 135 accredited programs in the United States offering professional certificates, baccalaureate degrees, and master's degrees in physician assistant studies. Although these programs vary in terms of length, design, sequencing, sponsoring institution, and degree awarded, all must meet minimal standards set by the Accreditation Review Commission on Education for the Physician Assistants (ARC-PA). All key aspects of program operation are addressed in the Standards: administration and sponsorship, personnel, financial resources, operation, curriculum, evaluation, fair practices, laboratory and library facilities, clinical affiliations, faculty qualifications, admissions processes, publications, and record keeping.<sup>1</sup> Upon graduation from an accredited PA program, candidates must take the Physician Assistant National Certifying Exam (PANCE) given by the NCCPA. The NCCPA is an independent organization that developed the PANCE to assure PA competency to employers, state boards, and patients by ensuring a minimal level of clinical knowledge and skills for PAs entering the workforce.<sup>2</sup> It is required by all states that candidates graduate from an accredited PA program and pass the PANCE to become licensed to practice as a PA.<sup>1</sup>

The NCCPA provides a blueprint for the PANCE, which outlines organ systems and the diseases, disorders and medical assessments PAs encounter within those systems and the

knowledge and skills PAs should exhibit when confronted with those diseases, disorders and assessments. (Tables 1 and 2)

Table 1

PANCE Blueprint: Knowledge and Skill Areas<sup>3</sup>

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<b>Tasks</b>	<b>% of Exam Content</b>
History Taking & Physical Examinations	16
Using Laboratory & Diagnostic Studies	14
Formulating Most Likely Diagnosis	18
Health Maintenance	10
Clinical Intervention	14
Pharmaceutical Therapeutics	18
Applying Basic Science Concepts	10
Total	100

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Table 2

PANCE Blueprint: Body Systems<sup>3</sup>

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<b>Organ System</b>	<b>% of Exam Content</b>
Cardiovascular	16
Pulmonary	12
Endocrine	6
EENT	9
Gastrointestinal/Nutritional	10
Genitourinary	6
Musculoskeletal	10
Reproductive	8
Neurologic	6
Psychology/Behavioral	6
Dermatologic	5
Hematologic	3
Infectious Disease	3
Total	100

---

Over 50,000 people have taken the PANCE since it was first given in 1973, with pass rates fluctuating between 69.0 and 94.6 percent.<sup>2</sup> As part of preparing students for clinical practice, physician assistant programs strive to prepare students for the PANCE, as passing rates are increasingly being used to measure the quality of a PA program. Currently, the only ranking of PA programs is conducted by *U.S. News and World Report* in which the data is based solely on the results of surveys sent to deans, faculty, and administrators of accredited graduate programs who answer questions regarding academic quality. In addition, many applicants take PANCE pass rates into consideration when choosing programs to apply to, as this is currently the generally accepted objective way to compare programs in academic achievement and effectiveness. Furthermore, PA programs are required to report PANCE scores to the ARC-PA and on federal PA grant applications.<sup>4</sup> In response to the increasing importance of PANCE scores, there has been an increased interest in developing exams that help students prepare for the PANCE and help programs gauge student knowledge and readiness to take the PANCE. Such exams include the Physician Assistant Clinical Knowledge Rating and Assessment Tool (PACKRAT) and the Objective Structured Clinical Examination (OSCE). The PACKRAT was developed by a group of PA educators and clinicians in 1996. It is a 225 multiple-choice question examination, modeled from the PANCE blueprint. It is used by physician assistant programs as an evaluative tool for assessing the strengths and weaknesses of both programs and individual students. The format of the OSCE varies by institution and program, but is generally comprised of numerous stations at which students perform various tasks. An OSCE exam generally includes history taking stations, physical examination stations, laboratory investigation stations, and interpretation stations.<sup>5</sup> The OSCE has been used for many years by medical

schools and other health professions programs to evaluate a set of behaviors believed to predict clinical competence. This exam may also be used to evaluate program and student strengths and weaknesses, as clinical competence of graduating PA students is the ultimate goal of PA education.

### *Purpose of the Study*

Healthcare is a dynamic field and educators must stay on top of changes in medical education. One way to evaluate effectiveness of changes in PA curriculum is by looking at PANCE scores, but it may take years to get this objective measurement of the impact of implemented changes. Physician Assistant programs across the country use the PACKRAT and the OSCE as a more immediate way to evaluate student performance and program curriculum. Due to the fact that the PACKRAT and the OSCE are being used for this purpose, it is imperative to know the predictive value of these exams on the PANCE.

Therefore, the purpose of this study is to evaluate whether PACKRAT and OSCE scores serve as predictors of PANCE scores. This study will also compare the OSCE to the PACKRAT as a predictor of PANCE in an attempt to identify which is the better predictor.

### *Literature Review*

Many researchers have studied the reliability and validity of standardized tests in prediction of success in various educational programs. Other researches have tried to identify other variables that predict success in these programs. A review of the literature was performed using MEDLINE, CINAHL, and ERIC databases, aided by keywords such as PANCE, PACKRAT, OSCE, Physician Assistant, and National Certification Examinations. Studies

included in the review are those that evaluated specific predictors of PANCE scores such as student demographics and program characteristics and those that look at the PACKRAT as a predictor of PANCE. Currently no studies have been published evaluating the correlation of the OSCE with the PANCE, so correlation studies between OSCE scores and national certification exams in various other medical professions, as well as other measures of the success of these programs such as clinical performance are also included in the review.

Several studies have attempted to identify selection criteria, program characteristics, or other factors that are predictive of success on the PANCE. Lary<sup>6</sup> analyzed demographic and academic variables as predictors of success on the PANCE. Variables included age, gender, ethnicity, length and level of health care experience, and previous academic degree type. Most of the factors were not shown to be predictive of PANCE scores. Age over 40 and non-Caucasian students did, however, demonstrate lower program completion rate and lower PANCE scores. Oakes et al<sup>7</sup> examined a number of independent variables categorized as demographics, academic performance, and clinical performance as predictors of success on the PANCE. Although limited by a small sample size (n = 88 students), the study demonstrated a correlation between academic performance in courses taken in the first and third trimesters and success on the PANCE. Overall, student demographics did not appear to predict PANCE scores although age was shown to be a negative predictor of success on the PANCE, and indicated that older students did not perform as well as younger students. This finding is supported by a larger study conducted by Asprey et al<sup>8</sup> in which there was a statistically significant negative correlation between age and PANCE scores. In addition, the correlation between age and score was almost twice as high in males, indicating that age was more strongly associated with lower scores for males than for females.

Other studies have tried to determine what influence program characteristics have on performance on the PANCE. McDowell et al<sup>9</sup> found that students graduating from master's degree-granting programs had higher PANCE scores than students graduating from bachelor's degree programs. Although program length was not found to be correlated with PANCE scores, a relationship was identified between number of years since first accreditation and the average PANCE score on the clinical skills portion of the exam. A study by Asprey et al<sup>10</sup> also identified a relationship between the degree granted and PANCE scores. It also demonstrated that changing from a non-master's to a master's degree program was associated with higher performance of the PANCE. A larger study by Hooker et al<sup>11</sup> looking at physician assistant program attributes including type of institution (public vs. private), type of degree granted (master's vs. non-master's), type of higher education institution (undergraduate vs. graduate-level research I and II institutions), class size, duration of program and cost of tuition, and examinee age and gender found no meaningful association between PA program characteristics, age, or gender with PANCE performance. Although the difference in PANCE scores was statistically significant in some of the variables, most notably in type of degree (master's higher than non-master's) and gender (female higher than male), a multiple regression analysis revealed that only 3.6% of the total variability in PANCE scores was accounted for by the set of variables. For this reason, the researchers decided that the factors were not meaningfully associated with PANCE performance.

Three studies have been conducted evaluating the PACKRAT as a predictor of PANCE. Cody et al<sup>12</sup> analyzed data from seven classes of students enrolled in the Interservice Physician Assistant Program (IPAP) which took the PACKRAT after the didactic year prior to clinical rotations. Performance on the PACKRAT was found to be highly correlated with performance

on the PANCE, accounting for 44.6% of the variability in PANCE scores. In a preliminary study, Bruce<sup>13</sup> also identified a significant relationship between student's scores on both the PACKRAT I (taken at the end of the didactic phase) and the PACKRAT II (taken at the end of the clinical phase) and PANCE performance in students in the DeSales University PA Program. A recent study by Wilson<sup>14</sup> evaluated the correlation between PACKRAT I and PACKRAT II scores with the PANCE scores of Wichita State University PA Program graduates from 2003 and 2004. In this study PACKRAT scores were found to be predictive of PANCE scores.

Although no studies have been conducted on the OSCE as a predictor of PANCE, many studies have been conducted on the reliability and validity of the OSCE. The OSCE is generally accepted as a valid and reliable predictor of clinical performance and is often used to compare the predictive value of other evaluation methods in medical education.<sup>5, 15, 16</sup> In a study conducted to determine the validity and reliability of a new OSCE in dentistry, Brown et al<sup>17</sup> found that the fourth year OSCE(D) was a better predictor of performance in the final examination than either the concurrent fourth year examination in medicine and surgery or Advanced level (A-level) university entry grades. There is also some data to suggest that the diagnosis and plan components of the OSCE are positively correlated with medical board examination scores.<sup>18, 19</sup>

## METHODOLOGY

Data for this study were collected from historical records held and maintained in the Wichita State University (WSU) Physician Assistant Department administrative office. The identified set of explanatory variables included PACKRAT I, PACKRAT II, OSCE I, OSCE II, and PANCE scores. The study data used in this investigation were collected on the WSU PA Program graduates of 2003 and 2004 as part of the students' summative evaluation. This data corresponded to the first time NCCPA data was made available by individual student name, which could then be matched to PACKRAT and OSCE scores. The sample size was 84 students who have completed the program and have taken the PANCE. PANCE scores used represent first time test administration only.

For both classes, the PACKRAT I and OSCE I were administered at the end of the didactic year just prior to the beginning of clinical rotations. The PACKRAT II and OCSE II were administered during the clinical year and prior to the administration of the PANCE.

Correlation analysis was conducted comparing PACKRAT I and PANCE, PACKRAT II and PANCE, OSCE I and PANCE, and OSCE II and PANCE using linear models to determine how the scores relate. Linear regression was used to assess the capability of PACKRAT I, PACKRAT II, OSCE I, and OSCE II to predict the PANCE score. Statistical analysis was performed using Statistical Package for the Social Sciences (SPSS) software version 13.0.

## RESULTS

A total sample of 84 students from the WSU PA graduation classes of 2003 and 2004 were studied. Overall both classes were similar in terms of their demographic and descriptive variables (Table 3).

Table 3

WSU PA Class of 2003 and 2004 Profile

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	<b>Class of 2003</b>	<b>Class of 2004</b>
<b>Age</b>		
Average	29.88	28.6
Range	21 - 51	20 - 51
<b>Gender</b>		
Male*	13	12
Female*	33	36
<b>Healthcare Experience (# of Months)</b>		
Average	32.8	41.8
Range	0 - 180	2.9 - 142.8
<b>Degree</b>		
None	13	11
Associate	9	4
Bachelor	20	27
Graduate	4	4
<b>Overall GPA</b>		
High	4.0	4.0
Low	3.0	3.0
Average	3.65	3.66
<b>Prerequisite GPA</b>		
High	4.0	4.0
Low	3.06	3.06
Average	3.63	3.62

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Notes: \*The number of students included in the study is lower than these numbers due to attrition.

Descriptive statistics demonstrated very similar results between classes for PANCE, PACKRAT I, PACKRAT II, OSCE I, and OSCE II. There was no significant difference in means between the two classes as determined by independent samples t-test. Table 4 depicts the results for each class separately and in combination.

Table 4

Descriptive Statistics

	<b>Class</b>	<b>N*</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>t-test+</b>
<b>PANCE</b>	2003	43	481.63	92.694	
	2004	40	499.05	98.182	
	Combination	83	491.84	94.507	-0.836
<b>PACKRAT I</b>	2003	43	143.63	19.003	
	2004	40	137.14	16.708	
	Combination	83	140.72	18.206	1.669
<b>PACKRAT II</b>	2003	43	150.49	13.179	
	2004	40	154.50	14.039	
	Combination	83			-1.359
<b>OSCE I</b>	2003	43	80.89	9.644	
	2004	40	83.67	6.091	
	Combination	83			-1.586
<b>OSCE II</b>	2003	43	81.65	6.747	
	2004	40	80.88	7.391	
	Combination	83			0.497

Notes: \*Class of 2003 n=43; Class of 2004 n=42. Some subjects were excluded from data analysis as some did not complete either the OSCE, PACKRAT or PANCE. +Not significant.

Students in this study had an overall first time pass rate on the PANCE of 95% (class of 2003) and 90% (class of 2004). A Pearson Correlation comparison of student scores on the PACKRAT (reported as number correct) to the performance on the PANCE (measured by the reported score) showed a statistically significant relationship. A statistically significant relationship was also seen in the comparison of student scores on the OSCE (reported as percentage scores) with student scores on the PANCE. (Table 5) (Figures 1-12)

Table 5

Pearson Correlation

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	<b>CLASS</b>	<b>PACKRAT I</b>	<b>PACKRAT II</b>	<b>OSCE I</b>	<b>OSCE II</b>
<b>PANCE</b>	2003	0.588**	0.806**	0.213	0.398**
	2004	0.717**	0.684**	.434**	.325*
	Combination	0.602**	0.744**	0.300**	0.353**

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Notes: \*Correlation is significant at the 0.05 level (2-tailed).  
 \*\*Correlation is significant at the 0.01 level (2-tailed).

Figure 1

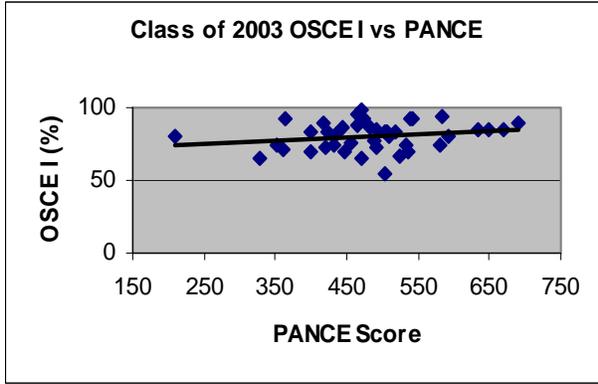


Figure 2

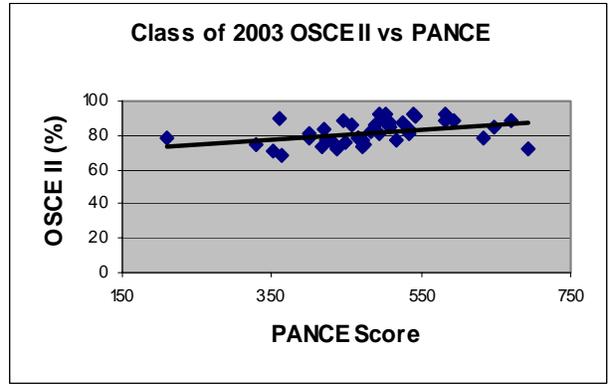


Figure 3

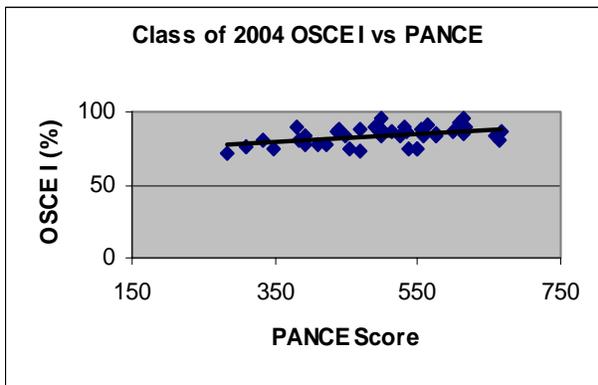


Figure 4

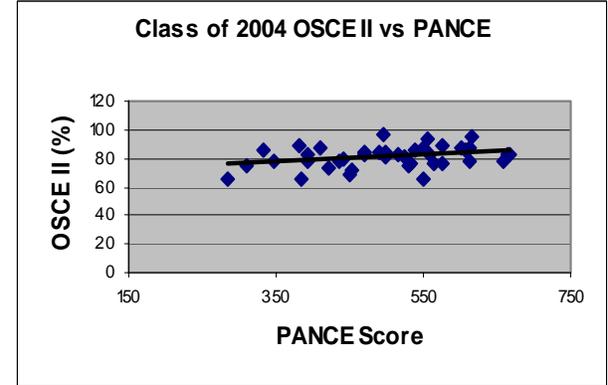


Figure 5

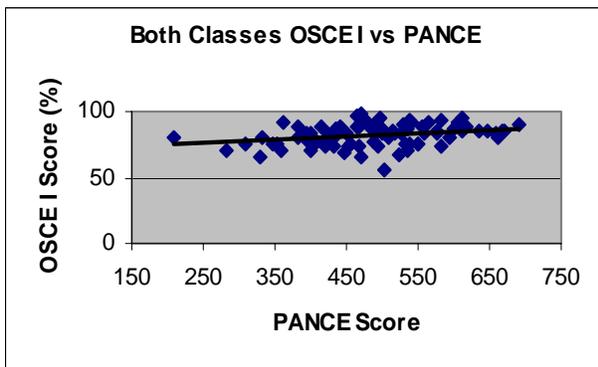


Figure 6

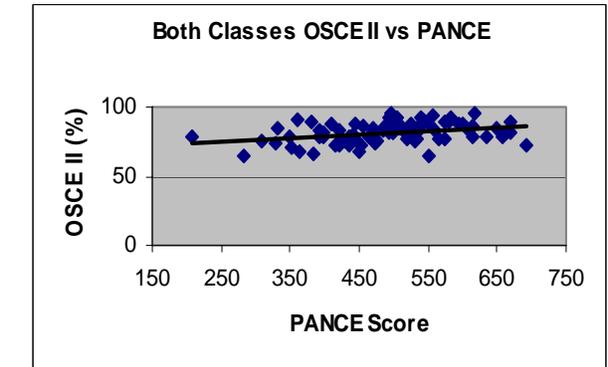


Figure 7

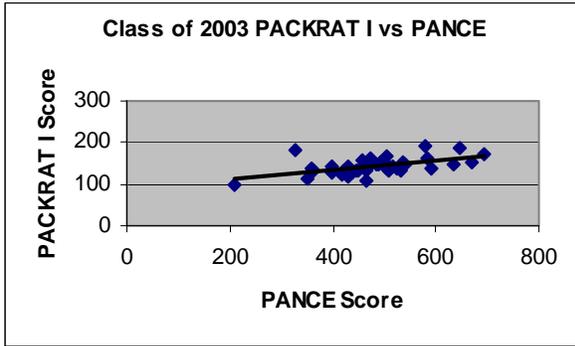


Figure 8

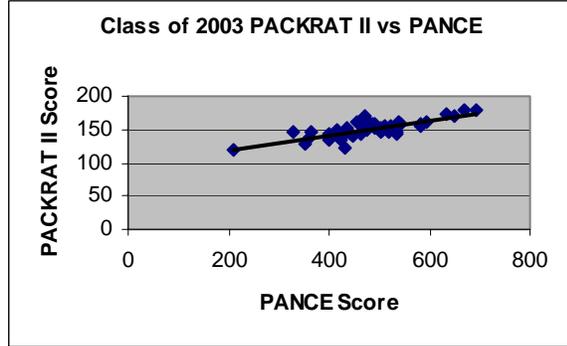


Figure 9

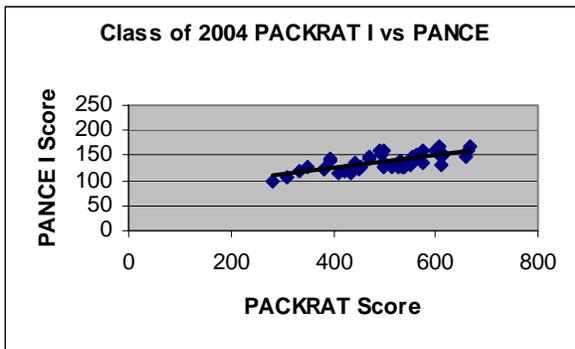


Figure 10

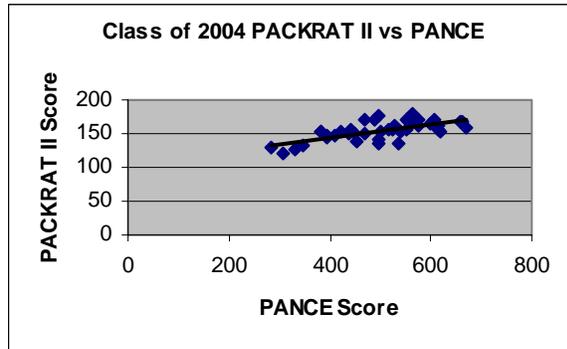


Figure 11

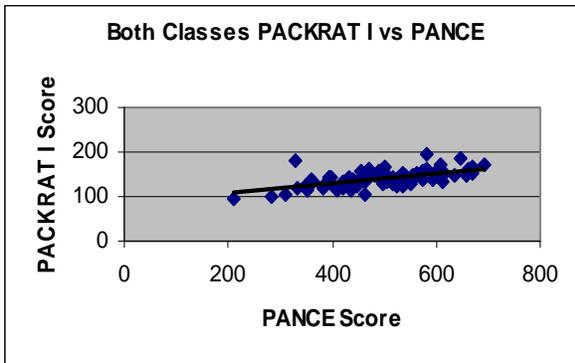
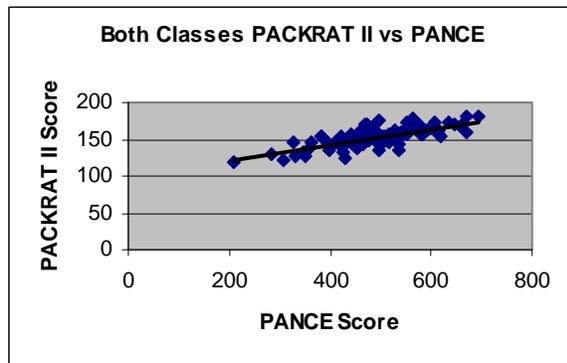


Figure 12



Linear regression of PACKRAT I and II (as measured by the number correct) with PANCE (as measured by the reported score) revealed a significant relationship between the PACKRAT and PANCE. As is shown by the data in table 6, 58 % of the variance in the PANCE scores could be accounted for by the variance in PACKRAT scores. Likewise, a relationship was identified between OSCE I and II (reported as percentage scores) and the PANCE. Data in table 6 demonstrates that 19% of the variance in the PANCE scores could be accounted for by the variance in OSCE scores. When the PACKRAT and OSCE were combined and linear regression was performed against the PANCE, 60% of variance in the PANCE scores could be accounted for by the variance in PACKRAT and OSCE scores.

Table 6

Linear Regression of PACKRAT, OSCE, and PANCE Scores

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	<b>R</b>	<b>R Square</b>	<b>Adj. R Square</b>	<b>Std. Error of the Estimate</b>
<b>PACKRAT</b>	0.765	0.586	0.576	62.05009*
<b>OSCE</b>	0.435	0.189	0.169	86.169±
<b>COMBINATION</b>	0.777	0.603	0.583	61.042±

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\* p < 0.05

± p < 0.001

## DISCUSSION

The results of this study demonstrated that PACKRAT and OSCE scores were correlated with PANCE scores and that PACKRAT and OSCE scores predicted success on the PANCE. However, upon interpretation of this data, it must be noted that this was a small sample size and results cannot be generalized beyond Wichita State University.

Like the study conducted by Cody, et al, strong statistical significance was demonstrated in this study. The measured correlation coefficients of 0.602 and 0.744 for PACKRAT I and PACKRAT II respectively, showed that the PACKRAT score was correlated to the score on the PANCE. This was a strong correlation, accounting for 58% of variability in PANCE scores. The OSCE I had a correlation coefficient of 0.300 and the OSCE II had a correlation coefficient of 0.353, demonstrating that performance on the OSCE was also correlated to the score on the PANCE. As predicted, the OSCE was not as highly correlated as the PACKRAT, but it still accounted for 19% of variability in PANCE scores. When the PACKRAT and OSCE results were combined they accounted for 60% of variability in PANCE scores.

These findings were consistent with results from previous studies looking at the correlation between the PACKRAT and PANCE (Cody et al, Bruce, Wilson). Although a review of the literature did not find any studies looking at the OSCE as a predictor of PANCE, it has been shown to be a predictor of certification exams in other areas of medicine. The results of this study were significant, considering previous studies looking at the ability of other variables such as program characteristics and demographics to predict success on PANCE showed much lower correlations.

At the Wichita State University PA Program the PACKRAT and OSCE exams were used along with a comprehensive exam as part of a summative evaluation of students. The OSCE I

and PACKRAT I were given near the end of the first year prior to starting clinical rotations. The OSCE II was given during the fall semester of the second year and the PACKRAT II and the comprehensive examination were given during the spring semester of the second year. The results of this study may be helpful to WSU faculty in determining the ability of these exams to evaluate student knowledge in a summative fashion and student preparedness to take the PANCE.

### *Study Limitations*

Limitations of this study include a small sample size as well as the specific focus on students from only one program. Some parameters were not taken into consideration in this study such as grade point average, previous healthcare experience, age, gender, ethnicity, and degree type. In addition, the OSCE, PACKRAT, and PANCE are different exams each year; therefore results cannot be generalized to all classes. However the *t*-test demonstrates no statistical difference between the two classes used in this study. Another possible limitation is whether students taking the PACKRAT and OSCE exams focus as seriously as they do on the PANCE exam. The OSCE exams are graded as part of a class and a passing score is required. In an effort to give more meaning to the PACKRAT exams, WSU assigns grades based on the national average. Finally, the PACKRAT and PANCE exams are based on a similar blueprint, the OSCE was not, limiting its use as a comparison assessment.

### *Suggested areas for future research*

This study utilizes a small sample size. It is recommended that data for future Wichita State University classes continue to be collected and analyzed in order to have a greater sample

size. Many physician assistant programs administer the PACKRAT and OSCE exams to their students. It is recommended that these programs document similar research in an effort to better validate findings. Future studies should also consider adding other parameters such as student demographics and variables to the analysis of PACKRAT and OSCE to PANCE. The PACKRAT and PANCE exams can be divided into sub-specialty scores in the various areas of medicine. The scores could be used to evaluate individual and program weakness and strengths. In the case of Wichita State University and other programs that use a comprehensive exam other than or in addition to the PACKRAT to evaluate students, a similar study could be done to evaluate that exam's ability to predict PANCE scores.

### *Conclusion*

This study demonstrated that the PACKRAT and OSCE scores from Wichita State University's physician assistant students from the classes of 2003 and 2004 were able to predict performance on the PANCE. The PACKRAT was more highly correlated to PANCE scores than the OSCE. The PACKRAT scores accounted for 58% of the variability seen on the PANCE. The OSCE scores accounted for 19% of the variability seen on the PANCE. Together they accounted for 60% of the variability seen on the PANCE.

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