

Is There Equivalency Between Students in a Longitudinal, Rural Clerkship and a Traditional Urban-based Program?

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Background: Demonstrating the equivalency between the traditional metro-based clerkships within close proximity to the academic health center and the nontraditional rural preceptorships is important. The University of Minnesota has had a 9-month longitudinal rural elective for third-year medical students for 40 years, the Rural Physician Associate Program (RPAP). In the metro area, traditional students rotate through clerkships of 4 to 8 weeks in length. Both cohorts of students are evaluated in similar ways. **Methods:** We analyzed the test scores and demographic data for two cohorts of students: RPAP ($n=201$) and traditional ($n=1,129$) who graduated between 2004 and 2009. Tests included pre-medical school data (Medical College Admission Tests, college grade point averages) as well as National Board of Medical Examiners subject examinations (shelf), US Medical Licensing Examination Step One and Two (Clinical Knowledge and Clinical Skills), and an Objective Structured Clinical Examination (OSCE). Scores were analyzed using descriptive/comparative statistics for the two groups of students. **Results:** For the most part, RPAP students performed similarly to students in the traditional metro-based curriculum on the standard educational outcome metrics. On the obstetrics shelf, while a similar proportion of the RPAP students passed, they scored statistically significantly lower (traditional: median 72 (range 50–98) versus RPAP: 71 (51–89)). **Discussion:** This study is the largest cohort demonstrating equivalency between students taking a rural longitudinal clerkship and their metro-trained colleagues.

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Rural experiences during medical school are known to be an important predictor that a student will select a career in rural practice.¹ Demonstrating the equivalency between the traditional metro-based clerkships within close proximity to the academic health center and the nontraditional rural preceptorships is important. To date, a handful of studies have demonstrated equivalency, but the sample sizes for the rural cohorts were small.

Schauer compared Medical College Admission Test (MCAT), Step 1 and Step 2 Clinical Knowledge (CK) and Clinical Skills (CS) scores of the United States Medical Licensing Examination (USMLE), and National Board of Medical Examiners shelf exam scores

(internal medicine, surgery, pediatrics, and obstetrics-gynecology) for 296 third-year medical students in the traditional clerkship and 29 students in the Rural Opportunities in Medical Education program (ROME) at the University of North Dakota. There was no significant difference between the two groups. However, a smaller sample (189 and 18, respectively) showed significant difference ($P=.03$) on the Internal Medicine Clinical Proficiency Exam, with the ROME students scoring higher. Students' scores were equivalent on the Internal Medicine subject exam.² ROME students are placed in their rural community for 7 months.

Lacy examined the National Board of Medical Examiners (NBME) standardized Family Medicine Examination (shelf exam) scores for 640 students at the University of Nebraska. Eighty percent of the students spend 8 weeks on a rural family medicine preceptorship. Scores were similar, and the preceptor's degree of rurality showed no affect.³

Waters examined equivalence at the School of Medicine at the University of Queensland in Brisbane, Australia. Students spend the entire third year in either a rural setting or in Brisbane conducting five specialist 8-week clerkships, all following the same content curriculum and taking the same examinations. Academic performance was comparable for 553 Brisbane students and 98 rural students between 2002 and 2004 on specialist clerkships (general practice, medicine, mental health, rural, and surgery) and end-of-year exams.⁴

The University of Minnesota has the oldest rural clerkship, established in 1971.^{5,6} Approximately 35–40 students apply each year and are accepted into the Rural Physician Associate Program (RPAP). They spend 9 months with a primary care preceptor, usually a family physician, in a small community. In that setting they complete many of their third-year requirements with physicians at the site, depending on what is available. These include family medicine, primary care, surgery, and often obstetrics-gynecology, orthopedics, emergency medicine, and pediatrics. The training format has been essentially the same since RPAP's inception with frequent visits from RPAP faculty, currently six times during the clerkship. On-line modules were added in 2004.

In the early years of the RPAP program, Verby, the founder of the program, looked at equivalency on the NBME Part 1 and 2 exams between RPAP and traditional students for 7 years and found no significant difference.⁷ In 2006, Power et al compared 33 RPAP and 35 traditional students on the MCAT, USMLE Step 1 and Step 2 scores, and their performance on the primary care Objective Structured Clinical Examination (OSCE). Again, no significant difference was identified.⁸ In this present study we examine a larger sample of RPAP and traditional students on similar parameters.

Methods

Demographic data, college grade point average (GPA), and test scores were compared for all University of Minnesota (UMN) medical students who graduated between years 2004 and 2009. This included 1,129 traditional students and 201 RPAP students. Tests included the MCAT, the NBME standardized specialty examinations (surgery, pediatrics, obstetrics-gynecology), the USMLE Step 1, Step 2 CK and CS, and the Primary Care Clerkship OSCE. The NBME exam is a standardized national clinical science examination that students take when they complete a clerkship. It is also known as the shelf exam. The Step 2 exams are taken after finishing RPAP and during the final year of medical school. The OSCE was administered at the end of the primary care clerkship for traditional students and at the conclusion of RPAP. The OSCE stations were identical for both groups of students and for the most part, the

same standardized patients and faculty scored the students. Simple descriptive frequencies and comparative statistics (*t* tests and chi-square) were calculated. All analyses were run using SPSS 17.0. If students took the exam more than once, the passing score was used. The Institutional Review Board reviewed the study protocol.

Results

Table 1 describes demographic data, MCAT scores, and college GPAs for the two cohorts. Significantly fewer RPAP students are not Caucasian (19% versus 8%, $P < .001$). RPAP students also had significantly lower MCAT scores.

Table 2 shows the test scores for students prior to beginning RPAP. Students must pass USMLE Step 1 to participate in RPAP. Prior to starting RPAP, students are also required to complete 12 weeks of required clerkships in the metropolitan area (either the Twin Cities or Duluth) alongside traditional students. They must complete 4 weeks of internal medicine. Other clerkship options include obstetrics-gynecology, pediatrics, psychiatry, or other required clerkships not available in their RPAP site. Of this cohort, 36% of the RPAP students took pediatrics, and 50% took obstetrics before heading out to their rural location in the fall. There was no significant difference between traditional and RPAP students on the NBME pediatric shelf. With the

Table 1

Demographic Data, MCAT Scores, and College GPAs for Traditional and RPAP Students at the University of Minnesota

	<i>Traditional</i> (<i>n</i> =1,129)	<i>RPAP</i> (<i>n</i> =201)	<i>Significance</i>
Gender	50% Female	48% Female	NS
Multicultural*	19%	8%	.001
MCAT**	<i>Mean (SD)</i> BI: 10.4 (1.5) PH: 10.1 (1.7) VR: 9.9 (1.6) Writing: P	<i>Mean (SD)</i> BI: 10.0 (1.3) PH: 9.6 (1.8) VR: 9.5 (1.8) Writing: O	.001 .01 .05 .01
College GPA	<i>Mean (SD)</i> 3.6 (.36)	<i>Mean (SD)</i> 3.6 (.39)	NS

MCAT—Medical College Admission Test

GPA—Grade point average

RPAP—Rural Physician Associate Program

NS—not significant

BI—biologic sciences

PH—physical sciences

VR—verbal reasoning

* Ethnicity other than Caucasian

** At least half of the RPAP students spend their first 2 years of medical school in Duluth. The application process for the medical school in Duluth gives preference to students with an interest in rural family medicine and a small-town background more than high MCAT scores.¹⁴

NBME OB-GYN shelf, all students passed, but the traditional students had a slightly higher score, median (range) 72 (50–98) and 71 (51–89), $P < .001$, respectively.

A more detailed look at the timing of the shelf exams showed that all students (traditional and RPAP) had significantly lower scores, $P < .01$, if they took the pediatric or OB-GYN shelf during the first 3 months of third year, before October. (Results not shown.) The experience gained on other clerkships probably helps students do better on the shelf exams when they are taken later during third year or fourth year. Approximately half of RPAP students completed OB-GYN prior to RPAP while only 10% of the traditional students take the clerkship during the same period. RPAP students who took OB-GYN during RPAP passed but scored statistically lower than traditional students (traditional: mean (SD) 73.2 (7.6) and RPAP: 71.2 (6.6), $P = 0.2$).

Table 3 compares the scores for NBME shelf exam for surgery, taken during RPAP, and the Step 2 Clinical Knowledge and Clinical Skills exams, which are usually taken soon after RPAP. There was no significant difference between the scores for the two cohorts. Table 4 shows the scores on the primary care OSCE that is completed at the end of RPAP and at the conclusion of the primary care clerkship. OSCE scores are broken into the overall score, patient communication, and clinical decision-making results. There were no significant differences between the two cohorts. Data on the OSCE exam are not available prior to 2005, so the samples sizes are smaller for both groups.

Table 2

Test Scores for Traditional and RPAP Students*

	<i>Traditional</i> (n=1,129)	<i>RPAP</i> (n=201)	<i>Significance</i>
Step 1 (Pass rate 185) First-time takers**	Median: 219 Range: 145–271 95.2% pass	Median: 215 Range: 162–259 96.3% pass	NS
Shelf—Pediatrics (Passing score \geq 60%)	Median: 74% Range: 54–99	Median: 73% Range: 57–93	NS
Shelf—OB-GYN (Passing score \geq 60%)	Median: 72% Range: 50–98	Median: 71% Range: 51–89	.001
Shelf—OB-GYN Taken before starting RPAP (prior to October)	Mean (SD) n=10% of 1,129 71.2 (6.2)	Mean (SD) n=50% of 201 70.0 (4.6)	NS
Taken later (after October)	n=90% of 1,129 73.2 (7.6)	n=50% of 201 71.2 (6.6)	.02

RPAP—Rural Physician Associate Program

NS—not significant

* Step 1 is taken prior to beginning the RPAP clerkship. The National Board of Medical Education Pediatrics and Obstetrics-Gynecology subject exam (Shelf) is taken either during the 12 weeks before starting RPAP, during RPAP, or shortly after completing RPAP.

** Since all RPAP students need to pass, the test of significance was a chi-square of the proportion that passed the first time.

Note: Prior to beginning RPAP, 36% and 50% of the RPAP students, respectively, completed the pediatrics and OB-GYN clerkships before starting RPAP (before October).

Table 3

Test Scores for Traditional and RPAP Students During and After RPAP Clerkship: NBME Subject Exam Surgery (Shelf), Step 2 Clinical Knowledge and Clinical Skills

	<i>Traditional</i> (n=1,129)	<i>RPAP</i> (n=201)	<i>Significance</i>
Shelf—Surgery (95th percentile)	Median: 71% Range: 44–99	Median: 71% Range: 54–94	NS
Step 2 CK (Pass rate 184) First-time takers	Median: 227 Range: 144–218 96.7% pass	Median: 222 Range: 138–269 95.2% pass	NS
Step 2 CS First-time takers	98.2% pass	98.9% pass	NS

RPAP—Rural Physician Associate Program

NBME—National Board of Medical Examiners

NS—not significant

CK—Clinical Knowledge

CS—Clinical Skills

Discussion

This study examines 5 years of UMN medical students and demonstrates similar testing outcomes for RPAP and traditional students, except for the statistical differences in the passing scores on the OB-GYN

Table 4

Objective Structured Clinical Exam (OSCE) Scores Taken at the End of the Primary Care Clerkship and the RPAP Elective

	<i>Traditional</i> (n=972)	<i>RPAP</i> (n=177)	<i>Significance</i>
OSCE—Overall (Pass rate 65%) First-time takers	Median: 75.3% Range: 56–89 % pass 96%	Median: 74.4% Range: 62–86 % pass 97%	NS
OSCE—Patient Communication	Median: 88.0% Range: 56–100	Median: 88.4% Range: 67–98	NS
OSCE—Clinical Decision Making	Median: 73.6% Range: 42–91	Median: 73.8% Range: 55–90	NS

RPAP—Rural Physician Associate Program
NS—not significant

OSCE scores are shown for first-time test takers after primary care clerkship and RPAP elective. Note the OSCE began in 2005, data for 2005–2009.

NBME subject exams. These findings support the growing body of literature that shows equivalency between the test performance of students trained in rural clerkships and traditional students.^{2-4,7,8} Showing that clerkships in rural areas produce students with similar academic performance demonstrates the educational quality of these experiences. In rural settings, students have more autonomy and less structured lecture time than traditional students; as a result, they are responsible for completing online modules, independently reading subject matter and working with their preceptors to cover the same material.

RPAP faculty know that at times students focus on the clinical work, occasionally sacrificing their reading and study time. This may explain why RPAP students who took OB-GYN during RPAP passed, but their median score was significantly less than the traditional students. Our other work has shown that the rural rotation provided increased patient care exposure and resulted in large numbers of procedures.⁹ In an examination of logged procedures for RPAP students between 2004–2006, one student performed more than 60 deliveries in the 9 months on RPAP, the mean was 8.0 (SD 12.4), with a range of 1–64. The mean for students who did obstetrics prior to RPAP was much lower, 1.1 (SD 3.2).⁹ Another study in this journal examines how the RPAP experience improved communication skills and increased the flow of the patient encounter.¹⁰

These findings are important for medical education on two accounts. First, training in a rural setting increases the likelihood of students choosing rural practice and, therefore, increases the supply of rural physicians.¹ Research shows that training in rural communities also helps to recruit metropolitan-raised students to a career of rural practice.^{3,11} Exposure to

rural practice and the life of a rural physician helps students understand whether or not this is the career path they want to choose.⁹ Solid performance on standard academic outcome metrics allows us to continue placing students with preceptors in rural areas and to know that they are receiving a sound educational as well as an experiential elective.

Second, using rural physicians as preceptors increases the pool of preceptors available for training medical students. Given the practice and productivity pressures today, it is important to have as broad a pool of preceptors as possible to choose from. Physicians who precept students are usually not remunerated and lose some productivity.¹² Studies

have shown that RPAP preceptors teach for a variety of reasons, including the joy of teaching, keeping current on medical practice, stimulation for clinic staff, and recruiting future practice partners.¹³ Equivalent educational experiences for rural students allows us to continue to tap this pool of teaching talent.

There are limitations to this study. The analysis focused on only one medical school. However, RPAP is an established rural elective, and the sample size in this study is larger than those in other published work. This study adds to previously published work that has demonstrated equivalence between rural and metro clerkships in Minnesota and in other medical schools around the world.

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References

- Phillips RL, Dodoo MS, Petterson S, et al. Specialty and geographic distribution of the physician workforce: what influences medical student and resident choices? Washington, DC: Robert Graham Center, 2009.
- Schauer RW, Schieve D. Performance of medical students in a nontraditional rural clinical program, 1998-99 through 2003-04. *Acad Med* 2006;81:603-7.
- Lacy NL, Geske JA, Goodman BJ, Hartman TL, Paulman PM. Preceptorship rurality does not affect medical students' shelf exam scores. *Fam Med* 2007;39:112-115.
- Waters B, Hughes J, Forbes K, Wilkinson D. Comparative academic performance of medical students in rural and urban clinical settings. *Med Educ*. 2006;40(2):117-20.
- Verby JE, Feldman B. The Rural Physician Associate Program (RPAP). A right-on program for all participants. *Minn Med* 1983;66:181-5.

6. Halaas GW, Zink TM, Finstad D, Bolin K, Center B. Recruitment and retention of rural physicians: outcomes from the Rural Physician Associate Program of Minnesota. *J Rural Health* 2008;24:356-63.
7. Verby JE. The Minnesota Rural Physician Associate Program for medical students. *J Med Educ* 1988;63:427-37.
8. Power DV, Harris IB, Swentko W, Halaas GW, Benson BJ. Comparing rural-trained medical students with their peers: performance in a primary care OSCE. *Teach Learn Med* 2006;18:196-202.
9. Zink T, Halaas GW, Finstad D, Brooks KD. The Rural Physician Associate Program: the value of immersion learning for third-year medical students. *J Rural Health* 2008;24:364-70.
10. Zink T, Power DV, Olson K, Harris IB, Brooks KD. Qualitative differences between traditional and rural-longitudinal medical student OSCE performance. *Fam Med* 2010;42(10):707-11.
11. Zink T, Center B, Finstad D, et al. Efforts to graduate more primary care physicians and physicians who will practice in rural areas: examining outcomes from the University of Minnesota-Duluth and the Rural Physician Associate Program. *Acad Med* 2010;85:599-604.
12. Ricer RE, VanHorne A, Filak AT. Costs of preceptors' time spent teaching during a third-year family medicine outpatient rotation. *Acad Med* 1997;72:547-51.
13. Brooks KD, Zink T, Stelter KM, Christensen R, Westra R. Community preceptor faculty development needs in a longitudinal rural continuity clerkship. Presented at the 2010 Society of Teachers of Family Medicine Annual Spring Conference, Vancouver.
14. University of Minnesota Duluth Campus. About our school. Available at www.med.umn.edu/duluth/about/home.html. Accessed August 11, 2010.