The Effect of Preceptorship Rurality on Students’ Self-perceived Clinical Competency

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Objective: This study’s objective was to determine whether students’ learning experiences, as measured by the improvement in students’ perceived competence in several clinical areas, varied by the preceptorship county’s rurality. Methods: Rural preceptorship experiences from 1990 to 2003 were assessed using pre- and post-preceptorship questionnaires regarding students’ perceived levels of competence. Questionnaires addressed basic clinical skills, common diagnoses, and advanced clinical skills. Rurality was measured both as population density and using the Rural-Urban Continuum (RUC) codes. Results: Primary analysis was completed using 1,037 sets of questionnaires; 231 questionnaires were unsuitable for analysis due to missing information. Mean perceived competency improved for all items. Students in rural locations, regardless of operationalization, had no statistically significant differences from students in urban locations in perceptions of their clinical skill or comfort with basic diagnoses. Individual item analyses revealed a gendered pattern. Women improved more than men on the technical skills; men improved more on women’s health and psychosocial items. Conclusions: There were no differences in medical students’ perceived competence based on the rurality of their family medicine preceptorship site. The preceptorship experience provides both women and men with a variety of experiences that lead to increased confidence in areas where they were least confident prior to the preceptorship.

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One of the missions of the University of Nebraska Medical Center (UNMC) is to train rural physicians, and studies show that individuals who have rural exposure are more likely to choose to practice in rural locations. To this end, the family medicine clinical preceptorship emphasized rural care and is a learning experience that is highly valued by many medical students. The UNMC family medicine rural preceptorship has long been the highest-rated required clinical rotation by students in the College of Medicine.

Students value the preceptorship for several reasons. The exposure to an undifferentiated patient population allows medical students an opportunity to view disease processes of interest regardless of the student’s specialty preference. Further, the preceptorship provides a “real world” taste of ambulatory primary care, a one-to-one clinician-to-student ratio, and the chance to use and integrate previously acquired knowledge and skills to evaluate and treat common clinical problems.

Other authors have described learning areas, such as preventive health care skills and care for patients with chronic health problems, that may also be unique to family medicine and primary care clinical learning experiences. A strongly held belief among students and community physicians participating in our preceptorship is that the smaller and more rural the preceptorship site is, the better the learning experience for the students. However, there is little evidence to support this conclusion. Only a few studies have examined the effect the family medicine rotation’s location has on students’ learning and evaluation of the clerkship. These studies indicate that students tend to rate rural and community-based rotations higher than urban and university rotations. Most of the students, however, suggest that there are no or small differences in clinical content or teaching quality based on rotation site (urban versus rural). These studies have differentiated only between urban and rural location, with no control for “degree” of rurality.

Our literature search revealed no published studies that have examined students’ perceptions of learning.
at preceptorship sites controlled for degree of rurality. Degree of rurality can be defined in many ways. Two potential means are population density and Rural-Urban Continuum (RUC) codes. Much of the western United States has a population density of less than 15 persons per square mile, with many counties having population densities less than five persons per square mile. RUC codes combine population and economic factors to form a categorical classification system.9

This study addresses whether the degree of rurality for preceptorship locations is related to student self-perceived learning during a family medicine preceptorship. Because many family medicine medical student rotations occur away from the medical school campus, evaluating students’ perceived improvement in common clinical competencies could be important for family medicine curriculum designers and administrators as they attempt to recruit and retain physician preceptors at preceptorship sites.6,8,10 Assuring that medical students improve their self-assessed knowledge and skills during preceptorships in rural areas may have implications for placing physicians in those areas, because previous studies have shown an association between completion of a rural family medicine preceptorship and eventual practice in a rural community.11 We hypothesized that students’ learning experiences, as measured by the improvement in students’ perceived competence in several clinical areas, vary by preceptorship county’s rurality.

Methods
Overview

The UNMC Department of Family Medicine has had a required family medicine 8-week rural preceptorship for junior medical students (approximately 120 students per year) since 1971. The UNMC rural family medicine preceptorship is governed by the UNMC preceptorship committee, appointed by the dean of the College of Medicine. All applications for physicians to become preceptors are reviewed by the committee against standard criteria. All preceptorship sites are staffed by board-certified family physicians and offer the student a full scope of practice, including prenatal care and delivery. The preceptorship educational experience is reviewed on a site-by-site basis by the precepting committee to ensure adequate and equivalent educational experience for the students. Previously collected student clinical experience logbook data suggest educational equivalency across preceptorship sites.

Data for this study were collected between January 1990 and December 2003. During the preceptorship, students were assigned to family physicians in Nebraska communities with populations ranging from 1,100 to 45,000 (Figure 1). They completed assessment instruments during the orientation at the beginning of the preceptorship and again during the final week of the preceptorship. Institutional Review Board approval was obtained to use these data for publication.

Figure 1

Population Distribution of Nebraska
Instruments
Assessment of the preceptorship was performed, in part, using before and after questionnaires to assess students’ perceived levels of clinical competence. Items for the questionnaires were developed via a review of the literature about medical students’ skill and knowledge acquisition during family medicine clerkships. In addition, we applied data from an earlier student logbook assessment instrument, which asked students to document their clinical experiences during their preceptorship. We used that information to ensure that the questionnaire did not omit any of the 10 most common items, including common diagnoses and basic to advanced clinical skills listed by students. The final questionnaire consisted of items in three areas: basic clinical skills, common diagnoses, and advanced clinical skills. The stem question for the basic clinical questions asked, “How competent do you feel in performing the following tasks?” For all questions, the response option was a Likert scale, where 1 is the least competent/comfortable and 9 is the highest level of competence/comfort.

The basic clinical skills included 23 items. These ranged from establishing rapport with a patient to doing a discharge summary.

The common diagnoses scale was comprised of 10 items. The stem asked, “How comfortable do you feel in dealing with the following patient problems?” The list included the 10 diagnoses identified by our students during the rural preceptorship from a prior assessment tool.

The third scale, advanced clinical skills, used the stem, “How competent do you feel in performing the following tasks?” The 10 skills ranged from skin sutures to interpreting an electrocardiogram.

In addition to the questionnaire data, we recorded the preceptorship site, the student’s gender and marital status, the population of the student’s hometown, and the student’s anticipated top four specialty training choices. Degree of rurality was operationalized in two ways. First, it was measured as persons per square mile for the county in which the preceptor’s office is located based on the 2000 data from the US Census Bureau. For population of the hometown, we also used data from the 2000 US Census. This measure is a more continuous approximation of rurality but does not allow for adjacency to urban areas. In cases where these data were not available (unincorporated communities and foreign sites), we used the best information available.

Second, we analyzed the data using RUC codes from the Economic Research Service. These codes are not continuous but allow for differentiation in rural areas by both “degree of urbanization and adjacency to a metro area or areas.”

Analyses
Analyses were conducted controlling for gender on the basis of prior findings suggesting there might be learning differences by gender. We performed a post-hoc analysis of the gender effects to identify any significant differences in the pretest and the posttest.

Analyses also were conducted controlling for size of hometown, since Harris found a self-selection bias by size of hometown. We considered controlling for month of rotation but did not, based on the findings of Jacques. We did, however, control for year of rotation as a means of allowing for changes in curriculum.

Analyses used ANOVA and were conducted using SPSS 12.0. The significance level for all analyses was set at a Bonferroni-corrected significance level of P=.00125. This is the corrected value for P=.05 and 40 items.

Results
The data were collected from 1990 to 2003. During this period, there were 73 active rural family medicine preceptorship sites. A total of 1,268 students completed the preceptorship at these sites during the study period. From these 1,268 students, 1,037 completed sets of questionnaires were available for the primary analysis, and 231 questionnaires were unsuitable for analysis due to missing information. There were no statistically significant differences in student demographics between the cases with missing information and the rest of the sample.

Regardless of the way rurality was operationalized, perceived competency improved for all items. The largest mean change occurred in the advanced clinical skills. In no area did students’ mean self-assessed competence decrease.

Competence
Students perceive a similar learning experience, measured as self-assessed competency, in urban and varying rural settings. Students in very rural locations did not have statistically significant differences in their perceptions of either their clinical skill or comfort with basic diagnoses. Regardless of how it was measured, rurality of the preceptorship county was not significantly associated with perceived improvement in skills. Nor was it significant when we controlled for the gender, hometown population, and year of rotation. This held true for the three composite scales (see Table 1) and the individual items.

As expected from our review of prior literature, there was a difference in perceived skills competence based on gender. Unexpectedly, our individual item analyses also revealed a pattern by gender. Women improved more than men on technical skills, while men improved more on items related to women’s health and psychosocial issues. Figure 2 shows the differences in the mean improvement for each skill.
The post-hoc analysis showed that those areas in which there were significant gender differences between pretest and posttest, with a few exceptions, were significantly different at the pretest as well. In all cases where the pretest analysis showed significant differences, the posttest analysis did not support our hypotheses that students’ confidence levels varied by gender.

### Discussion

Our results lend no support for the hypothesis that the degree of rurality is correlated with student self-assessment of skills. We did find, however, that gender differences in self-perception prior to the preceptorship experience were no longer present after the preceptorship experience.

Our results have two important implications for directors of programs that use preceptorships. First, our study implies that program directors can send students to very rural areas with no degradation of educational quality as measured by student’s perception of skill confidence. This finding may be important to family medicine predoctoral education, because most family medicine student clerkships take place in decentralized locations.

The second implication is that real-world experiences have the valuable contribution of removing gender differences in students’ self-perception regarding skills. Both women and men become more confident in areas where they were least confident prior to the preceptorship. Our findings indicate that students placed in family medicine preceptorships or clerkships in very rural locations perceive a similar improvement in their clinical competencies as do students rotating in more densely populated sites. This is an important finding because the majority of family medicine predoctoral preceptor programs rely heavily on having a large number of volunteer community preceptors who come from a variety of different sites. Proven educational equivalency, regardless of site rurality, may help medical schools and family medicine departments as they attempt to recruit and retain community physician preceptors to train medical students by expanding the pool of potential preceptors.

One obvious limitation of this study is that the data is from student self-assessments. The limitation of our self-assessment tool is that students may either under-rate or over-rate their skill levels. Thus, we would like to see this research expanded to prospectively examine skill levels, as assessed by an independent source, to
determine if these findings hold outside the area of self-assessment and across types of preceptorships. In addition, this study only examined data from family medicine preceptorships in the state of Nebraska. Perhaps using data from other types of preceptorships or other locations across the country would result in different findings.

A second area we would like to see further developed is variances in learning based on gender. In this area, again, it would be useful to know if the gender differences in self-assessed confidence prior to the preceptorship experience are only perceptual or if there is an actual difference in skills. Finding that there is, in fact, a difference would suggest that it is important to study the ideal timing of preceptorship experiences.

The third area we would like to see studied is if there is a relationship between having a positive rural experience and actually entering family medicine programs or practice. While Backer et al have shown that rural exposure is important to those who go into rural practice, it would be interesting to see if the timing of that exposure makes a difference.

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Figure 2

Significant Gender Differences in Change*

* (P<.05, Bonferroni corrected for comparisons, ie, P<.00125)
REFERENCES


