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An Eight-Week Rural Surgical Clerkship: Does It Help to Produce More Rural Physicians?

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Abstract

Purpose:
The purpose of our study was to determine what effect an eight-week rural surgical clerkship rotation during the third year of medical school has on future practice site location.

Methods:
We report the subsequent practice site for 95 third-year medical students who completed an eight-week rural surgical clerkship from 2013-2016 compared to a cohort from the same time who completed this clerkship on the urban campus, matched by year and specialty chosen.

Findings:
On first analysis, there is a significant correlation (p=.0026) between rural clerkship and subsequent rural practice. With secondary analysis, all but one of the students in the rural clerkship group who chose rural practice were rural track students completing most of both clinical years in the rural setting.

Conclusions:
As found previously, longer duration rural exposures are associated with more frequent subsequent rural practice, but we found no such association for the eight-week rural surgical clerkship. The previous report of positive attitude changes among urban-based medical students completing this rural clerkship may help them understand rural patients seeking their care in an urban setting, but such attitude changes are not adequate to affect the complex decision of practice choice. Future studies of rural exposures during medical school should focus on intermediate duration exposures as well as different specialty clerkships beyond surgery and seek an association with subsequent practice site location.

Introduction:

Most estimates of the United States' shortage of physicians are significant, with one projecting a shortage of between 37,000 and 124,000 physicians within the 12-year period beginning in 2019.[1] Rural locations and residents will be affected disproportionally, with 60% of the 7,200 federally designated health professional shortage areas considered rural.[2] Twenty percent of the US population lives in rural communities, with only nine percent of physicians practicing in these areas.[3] This disproportionate distribution of physicians may explain some of the age-adjusted mortality rate that is 12.1% higher for rural residents 25-64 years of age than urban residents.[4]

Previous studies have not clarified the minimum or optimum duration of rural immersion that is needed

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to affect future rural practice choice significantly.[5] The Rural Physician Associate Program (RPAP) at the University of Minnesota Medical School is a nine-month rural integrated clerkship. This program showed that more RPAP graduates practice within the same state as their training, in primary care, in family medicine, and in rural areas than non-RPAP graduates.[6] However, this program was nine-months in duration and primarily focused on nurturing students' interest in primary care with the intent of practicing rurally. The Michigan State Upper Peninsula program includes two years of preclinical basic science courses at Michigan State's main urban campus, and the final two clinical years at a rural site. A 30-year longitudinal look at this model found that students in this rural track were more likely to choose primary care or rural in-need specialty, practice in a rural location, and practice in a Health Professional Shortage Area compared with all other Michigan State graduates.[7] The University of Louisville Trover Campus (ULTC) is a similar program in rural Madisonville, Kentucky. It also showed that students in the rural track were more likely to choose family medicine or other primary care specialties, and to practice in a rural location post-residency.[8] Rural training programs such as these are important in providing the next generations of physicians who could address the rural physician shortage.

The previous report from our study site showed positive changes in attitudes towards rural medical practice among urban-based medical students completing an eight-week rural surgical clerkship.[9] These included a more positive perception after the clerkship of comfortable rural living, availability of quality services, rural community support, and local medical resources. The goal of the current study was to determine if an eight-week rural surgical clerkship would result in more visiting students choosing rural practice. The three student authors who are currently in the rural track have spent two summers at the rural campus and have completed one academic year at the urban campus. We predicted prior to data analysis that we would find a positive effect on later rural practice. If our prediction is correct, this short immersion model could influence a large group of urban-based medical students to choose rural practice, addressing the physician shortage in rural areas.

Methods:

Rural Site

The rural campus hosting the rural surgery clerkship is in a town of 20,000 that is 160 miles southwest of the main urban campus. The campus was designed for ten to 12 students in each class to complete their third- and fourth-year rotations in a rural setting, termed the rural track. These students complete the first two academic years at the urban campus, then move to the rural campus for the final two. In addition to these students, students based at the urban campus have an opportunity to complete their eight-week required surgery clerkship in this rural setting. These students complete all other clerkships at the urban campus.

Rural Surgery Clerkship Description

The two-day orientation was the same at both sites, provided virtually to the rural site. Weekly grand rounds were also shared virtually. Lectures were given separately at each campus by their onsite faculty, approximately two hours each weekday. The rural clerkship follows an apprenticeship model with one to two students working with each faculty. This includes accompanying faculty in the office, on hospital rounds, and in the operating room. In the operating room at the rural campus, students are typically the second assistant and are actively involved in all procedures. Students at the rural campus write a note on each patient they see on daily rounds. As a result, the rural campus is described as providing more hands-on experience. Scores on cumulative clerkship examinations and final grades are comparable to those of the urban surgery clerkship students.

Subjects

During 2013-2016, there were 95 students who completed their eight-week surgery clerkship in the rural setting. Each student was matched by specialty and year to 95 students who completed their eight-week surgery clerkship in the urban setting. Students still in residency or fellowship were excluded from the analysis. Of the 95 students completing the clerkship at the rural site, 28 were in the rural track. The host hospital IRB approved the study as exempt.

Procedures

Current practice sites were found using the AMA database, local hospital directories, and the specific physicians' professional networking site. Eight physicians in the database whose current practice location could not be found, or who were still in residency or fellowship, were excluded from this study along with their matched counterpart. A chi square was used to compare the study groups and by convention, $p<.05$ was set for significance.

Rural-Urban Continuum Codes (RUCC) were used to define current practice sites as metropolitan or not. A score of one to three was considered Urban and a score of four to nine was considered rural.[10]

Results:

At the time of the study in summer 2022, of the 95 students who completed the surgery clerkship at the rural site, 17 (18%) were practicing in a rural area while only five (5%) of the 95 matched students who completed no rotations at the rural site were practicing in a rural area (chi-square = 9.04, p=.0026) (Table 1). Table 2 shows the distribution of rural hometowns among the three groups. Table 3 shows that 16 of the 17 students shown in Table 1 who ultimately chose rural practice were participating in the rural track. Table 3 also shows that, of the 28 rural track students included in Table 1, 16 of the 28 (57%) rural track students chose rural practice. Only one of the 67 urban track students who completed only their eight-week surgery clerkship in the rural site was currently practicing in a rural area. Table 4 shows the specialty choice among those completing the rural surgery rotation.

	Rural Surgical Clerkship N=95	Urban Matched Surgical Clerkship N=95
Current Rural Practice	17 (18%)	4 (4%)
Current Urban Practice	78 (82%)	91 (96%)
Chi-Square Stats	(Chi Square = 9.04 CI:95%, p=.0026)	

Table 1: Percentages of physicians who are practicing in a Rural area (RUCC code 4-9) or Urban area (RUCC code 1-3) that completed their Rural surgery rotation vs the matched individuals who completed their rotation in an urban area.

	Rural Surgery Clerkship N=93	Urban Matched Surgery Clerkship N=93	Total Medical School Class N=634
Rural Hometown	40 (44%)	18 (20%)	159 (25%)
Urban Hometown	53 (56%)	75 (80%)	475 (75%)

Table 2: Number of students from Rural/Urban areas that participated in the Rural Surgery Clerkship, the matched students from the Urban Surgery Clerkship, and then the entire ULSOM class of graduation years 2013-2017. Two students from the urban clerkship didn't have their hometowns listed and therefore were excluded from this table along with their matched rural cohort students.

	Rural Track Students N=28	Urban Matched Surgical Clerkship (N=28)
Current Rural Practice	16 (57%)	0 (0%)
Current Urban Practice	12 (43%)	28 (100%)
Chi-Square Stats	Unable to Run with Zero	

Table 3: Percentages of physicians that completed the Rural Track vs the matched individuals who completed their rotation in an urban area.

Specialty	# Practicing N=95
Family Medicine	22 (23%)
Internal Medicine	16 (17%)
Pediatrics	11 (12%)
OB-GYN	8 (9%)
Emergency Medicine	7 (7%)
Neurology	5 (5%)
General Surgery	4 (4%)
Orthopedic Surgery	4 (4%)
Anesthesiology	3 (3%)
Psychiatry	3 (3%)
Radiation Oncology	2 (2%)
Radiology	2 (2%)
Med-Peds	2 (2%)
Physical Medicine & Rehabilitation	2 (2%)
Dermatology	1 (1%)
Ophthalmology	1 (1%)
Pathology	1 (1%)
Otolaryngology	1 (1%)
Urology	1 (1%)

Table 4: Specialties of the students who participated in the rural surgery clerkship from the graduation years 2014-2017.

Discussion:

An overall comparison would first appear to show that the changed attitudes in urban campus students previously shown from this site[9] resulted in more urban campus students choosing to practice in a rural site. But after removing the 28 rural track students and comparing only non-rural track students, there were too few who chose rural practice regardless of

where they did their surgery clerkship to detect any difference. So, we were unable to find what we predicted. It is possible that using a larger sample size could show a subtle difference.

A recent study from New Zealand compared a shorter length immersion program (five-week), longer length immersion program (33-week), or no immersion program, and their effects on intended practice site rurality. Those with a longer immersion program exposure were 6.4 times more likely to choose rural practice.[11] Our analysis shows that even eight weeks of a clinically strong rotation in a rural environment is not enough for a student in an urban medical school to commit to practicing in a rural environment in the future. However, it has been shown that eight to 20 months in the rural area is enough to make a difference.[8,12,13]

As previous reports from the rural track at this site showed,[5] we also found that 57% of the 28 rural track students chose rural practice compared to 0% of the 28 specialty-matched urban track students (Table 3). Similarly, previous similar reports from truly rural campuses show the same results.[12,13] Our data supports these previous studies that a longer rural immersion experience is needed to affect practice choice.

Limitations:
Practice site choice post-residency is complex, and dependent on many factors other than medical school education experiences.[14] These include rurality of hometown, marital status, job availability, family location, and proximity to residency training site. As shown in Table 2, a much larger percentage of students from a rural hometown completed their surgical clerkship in the rural setting. This suggests that those from a rural hometown are more likely to complete their surgical rotation in a rural environment. Since they are more likely to practice in a rural environment, this could be a confounding variable in our study, and it is possible that a much larger study might allow for detecting this effect. In a previous study from this site, a longer rural immersion was the strongest association with rural practice, even after controlling for rural upbringing and family medicine specialty.[5] Even so, only 19% of the variance in practice choice was explained by their multivariate model. Like many rural states, even the urban campus of our medical school has almost five times as many students from rural backgrounds as the national medical school average, and is reflective of the statewide population distribution. Since this is a powerful predictor of subsequent rural practice, our results are only generalizable to similar medical schools.

Future Studies and Recommendations:
Future Studies of intermediate durations of rural immersion would be beneficial, somewhere between the eight-week program as done here and other established nine-month programs. The specialty-matched control group is a tedious but powerful methodology that has not been reported previously and could be useful in future studies. Future studies may also look at the effect of different specialties included in the rural immersion for the urban campus students. For instance, an eight-week rural rotation in Family Medicine might be more likely to increase affinity for rural practice. Also, maximizing rural residency experiences after a student has made a career choice might be more effective. This could be facilitated by creating more rural track residencies and making rural immersions during urban-based residencies more attractive. This could be done by engaging communities to provide pleasant housing and free entrance fees to local attractions as well as a living stipend for the rural experiences.

Almost all studies that report rural practice outcomes have included students who have expressed some interest in rural medicine at the outset. An important area of study is to identify what factors are at play in students who have never considered rural practice but might be swayed. These include the personal and social factors discussed above and it might be useful to discover the relative power of each. For instance, an urban-raised spouse with a positive childhood experience at a rural summer camp who can work from home might influence the physician to consider a rural practice site.

Conclusions:

As found previously in studies from this site and other similar rural programs, eight to 20 months' duration of immersion makes rural practice choice more likely, while our eight-week rural surgical clerkship did not.

The positive changes in attitudes among urban based students after the rural clerkship reported from this site previously may make it easier to understand the needs of the rural patients who travel to see them. These attitudes may also make these urban physicians more willing to provide outreach clinics or telehealth care to rural patients. Our results support that longer duration immersion, however, is needed to affect practice site choice.

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