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An Invitation to Walk a Mile in Their Shoes: A Rural Immersion Experience for College Pre-medical Students

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Abstract

Purpose

To report the outcomes of the first 15 years of an entirely rurally-based college-level program, based at a regional campus, designed to enhance rural students' understanding of rural health and reinforce their potential affinity for rural practice.

Method

Choice of career, practice site, and evaluation results were collected from 80 program participants for the period 2003-2017. Anonymous pre- and post-survey data were analyzed using the Wilcoxon Mann-Whitney tests to compare survey results of students' opinions of the importance of understanding traditional medical and social items when choosing a treatment option for very rural patients.

Results

The authors found no statistically significant difference between pre- and post- survey measures of opinions of traditional medical items. However, six of the nine social items showed a statistically significant increase ($p < .05$). The importance for a physician to understand social factors increased in post-test results for items of faith/spirituality, who prepares the patient's meals, health beliefs held by the patient, the kind of work the patient does, how ready the patient is to make changes, and where the patient lives. Evaluations were positive and comments supported that the goals were accomplished. Of those completing each stage of training, 83% chose some health career, 58% chose medical school, 31% chose family medicine, and 66% chose primary care. Of those establishing medical practice, 50% chose a rural site.

Conclusions

Rurally-based programs may reinforce college students' rural affinity, promoting the likelihood of completion of medical school and subsequent rural practice choice.

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Human Subjects: This study was determined exempt by the Baptist Health Madisonville Institutional Review Board.

Conflicts of Interest: None

The problem of unequal distribution of physicians in the United States continues to contribute to access issues for the 20% of Americans who live in rural areas. After completing residency, the majority of physicians preferentially choose non-rural practice sites for a variety of reasons.[1,2,3] Even with recent increases in medical school class size, the disparity of urban versus rural physicians will only continue to widen unless a different approach is taken.[2,4,5,6]

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Introduction

The rural affinity model supports that students who are from rural areas who remain connected to their rural background during training in non-urban settings are more likely to choose a rural practice site.[3,5,7,8,9] There are a small number of successful college rural pipeline programs in the United States.[10,11,12,13,14,15,16,17] These programs recruit undergraduate rural students who meet minimum academic requirements and then provide exposure to rural practice and some offer academic preparation to promote success in the classroom. While all provide some rural experience, they are usually based in the host university town which range in population from 100,000 to 200,000 and are focused on intermittent individual role modelling with a rural physician mentor and some field experiences.

In this article, we report the outcomes of the first 15 years of the College Rural Scholar (CRS) program, which takes place each summer on the University of Louisville School of Medicine Trover Campus. The 3-4 week clinical experience is in small towns of 600 to 3,000 population with about 40% time spent in team-based group assignments in Madisonville (population 20,000), the host town of the rural Trover Campus in western Kentucky. The students are housed together in Madisonville with a shared commons area.

Program description

The CRS program is a 3-4 week program that includes college students nominated by their college pre-med advisors who must meet specific criteria: (a) be a graduate of a high school in a town with a population under 30,000 in a non-metropolitan county, (b) show a substantial interest in a rural medical career, and (c) obtain at least a 24 score on the ACT and at least a 3.0 college GPA. Applicants provide two letters of reference from college professors and submit an essay describing the role of the rural physician. There are typically about twice as many applicants as available positions, and preference is given to residents of western Kentucky. Beginning in 2003, the early years of the program had 3-4 students per year and then subsequently stabilized at 8-10 per year. The selection committee includes the members of the rural campus-based medical school admissions selection committee, the medical school associate dean of admissions and the director of admissions as well as the senior associate dean for undergraduate medical education. Selected students who excel in the CRS program are nominated for early assurance admission and subsequently interview at the urban campus as early as their sophomore year of college. Students selected for early assurance must only meet minimum MCAT and GPA criteria and complete all pre-medical course requirements to be assured of medical school admission after completing their senior year of college. This acceptance also assures them a position at the rural campus for their last two years of medical school.

Goals of program

The CRS program goals are shown in Table 1. These goals are accomplished by immersing participants in activities focused on rural practice, all in a rural setting. Didactics include rural health issues specific to the region such as coal mining, financing of rural hospitals and health departments, rural physicians' practice models, rural interdisciplinary medical teams, and community health development. Participants shadow local rural primary care physicians and assist with free school and sports physical examinations for kindergarten and sixth grade patients in very rural counties. Their role is to develop a script of customizable anticipatory guidance to be used as they work with each individual screened as well as to find available teaching props that will provide hands on learning opportunities for the schoolchildren screened.[18] CRS meet with local residents described as key informants to discuss the current health resources available in their county. A final report is compiled by the students and presented at the end of the three to four weeks which summarizes the community information gleaned over the course of the program.

Table 1. University of Louisville School of Medicine Trover Campus College Rural Scholar Program Summary

Goal	Method	Measure
1) Promote understanding of primary care in a rural setting	a) Precepting in a rural area b) County health care assessment including key informant interviews	a) Case study discussion b) County health assessment report c) Preceptor evaluation d) Treatment Options Opinion Survey (TOOS)
2) Develop understanding of probabilistic clinical reasoning	a) Team-based case study assignments b) Student presentations of common definitions (sensitivity, specificity, Bayesian logic)	Case study discussion
3) Design efficient process for early adolescent health evaluation and anticipatory guidance	a) Team-based assignments b) Provide patient education during school/sports physical examinations (PE)	a) Final written "script" for patient education b) Props/materials gathered c) "Teach-back" results from adolescents d) Written evaluation feedback from nurses and parents
4) Meet specific need expressed by the community	Provide free school/sports PE at a time and place chosen by community	a) Average 80 exams provided each summer b) Feedback from community staff and parents
5) Discover health care barriers and obstacles	a) Discuss access with parents during PE b) Make referrals through school personnel	a) Session review with community staff b) County needs assessment c) TOOS
6) Experience interdisciplinary care	Hold PE sessions in health department with their nurses as co-examiners	a) Feedback from nursing and school staff b) County needs assessment
7) Understand local beliefs	a) Discuss risk-taking with families during PE (e.g. 4 wheeler use) b) Discuss usual diet and exercise routines c) Friday morning reflections	a) Written "script" for patient education b) County needs assessment c) TOOS

A case study of a patient who presents with fatigue and swelling is discussed using the iterative process of problem solving[19] and the students work in small groups led by preclinical medical students to develop a diagnostic process where the history, physical, lab, and imaging results are progressively revealed during twice weekly sessions facilitated by the regional campus dean (WJC). In the concluding session, the large group of students formulates an individualized treatment plan for the patient in the case study. This same individual (WJC) facilitates a once weekly large group session called "Friday morning reflections" that is focused on explaining choices made by the patients seen by the students from the previous week. The biopsychosocial model is used to promote the concept that a more thorough understanding of the details of the patients' lives leads to choice of treatment options that are most likely to be successful in these patients from very rural environments.

We report here data collected over 15 years from 80 college students who participated in the CRS program. Our focus was on outcomes measured by specialty and practice site choice and also a detailed view of the process of opinion change during this rural immersion.

Methods

Beginning in 2009, students completed an anonymous survey at the initial orientation session asking them to provide their opinions on how important some traditional medical items and some social issues are in choosing a treatment option. The initial survey items were developed by informal focus groups in the early years of the program by tabulating student responses to the invitation to report what they saw that surprised them in the week previous. As new themes emerged, they would be added to the list of questions on the survey in the following year. There was also an item asking their degree of agreement with a statement that they are comfortable planning and implementing a community health project. The same survey was administered on the closing day of the program. The social items were interspersed among the medical items, and the social issue questions changed across the years. Complete pre-post data were not available for 2011 and 2013. Also at the closing session, students completed an anonymous detailed evaluation where they rated how well each activity accomplished the program goals and separately indicated their enjoyment of each. We defined a rating of 7 and above as positive numerical feedback, using a 10 point scale from 1 = strongly disagree to 10 = strongly agree.

The CRS program coordinator tracked subsequent student career choice and residence through social media and digital communications. Using this process, only one of the 80 students could not be located after training was completed. Residence was coded as rural if the town was not in a metropolitan county and was population less than 30,000.

Survey results were entered into Microsoft Excel Version 2010 (Microsoft, Redmond, WA) and then to SPSS Version 25.0 (IBM Corp, Armonk, NY) for analysis. Mann-Whitney U was used to compare differences between pre- and post-test results. A P value < 0.05 was set for statistical significance. The Baptist Health Madisonville Institutional Review Board determined this study exempt.

Results

There were no statistically significant differences on traditional medical items, with these items ranked as important both before and after the program (Table 2).

Table 2. College Rural Scholars Treatment Survey, Pre and Post-Test Results, Medical Items

"Indicate your opinion concerning the importance of understanding the following items in choosing the best treatment option for your patient."							
	Least Important		Somewhat Important		Most Important		
	1	2	3	4	5	Total	P value
Understanding the biochemical abnormality involved[a], no., (%)							
Pre-test	0 (0.0)	0 (0.0)	2 (3.2)	32 (50.8)	29 (46.0)	63 (100.0)	.60
Post-test	0 (0.0)	2 (3.1)	3 (4.7)	31 (48.4)	28 (48.4)	64 (100.0)	
Understanding the anatomy involved[a], no., (%)							
Pre-test	0 (0.0)	0 (0.0)	1 (1.6)	27 (42.9)	35 (55.6)	63 (10.00)	.95
Post-test	0 (0.0)	1 (1.6)	4 (6.3)	22 (34.4)	37 (57.8)	64 (100.0)	
Understanding the laboratory abnormalities involved[a], no., (%)							
Pre-test	0 (0.0)	0 (0.0)	12 (19.4)	29 (46.8)	21 (33.3)	62 (100.0)	.69
Post-test	0 (0.0)						
Understanding the imaging (x-ray, ultrasound, etc) abnormalities[a], no., (%)							
Pre-test	0 (0.0)	0 (0.0)	3 (4.8)	34 (54.0)	26 (41.3)	63 (100.0)	.74
Post-test	0 (0.0)	0 (0.0)					
Understanding the mechanism of the medications used[a], no., (%)							
Pre-test	0 (0.0)	1 (1.6)	3 (4.8)	25 (39.7)	34 (54.0)	63 (100.0)	.28
Post-test	0 (0.0)	1 (1.6)	8 (12.5)	25 (39.1)	30 (46.9)	64 (100.0)	
Understanding the published expert guidelines for the patient's problems[b], no., (%)							
Pre-test	0 (0.0)	1 (2.9)	10 (29.4)	16 (41.1)	7 (20.6)	34 (100.0)	.72
Post-test	0 (0.0)	2 (5.9)	8 (23.5)	20 (58.8)	4 (11.8)	34 (100.0)	

[a]2009, 2010, 2012, 2014-2017
[b]2009, 2010, 2012, 2014

Of the nine social items (Table 3), six showed a significant change, all in the direction of more important. The item concerning prayer almost reached significance, and was one of the items that had a smaller sample size because it was added later in the process to try to understand the spirituality item better. Health benefits and ethnic background did not show a significant change, and were also later-added items.

Table 3. College Rural Scholars Treatment Survey, Pre and Post-Test Results, Social Items

"Indicate your opinion concerning the importance of understanding the following items in choosing the best treatment option for your patient."							
	Least Important		Somewhat Important		Most Important		
	1	2	3	4	5	Total	P value
Understanding the role of faith/spirituality in the patient's life[a]							
Pre-test	1 (1.6)	6 (9.7)	15 (24.2)	30 (48.4)	10 (16.1)	62 (100.0)	.03
Post-test	1 (1.6)	2 (3.1)	13 (20.3)	26 (40.6)	22 (34.4)	64 (100.0)	
Understanding who prepares the patient's meals[b]							
Pre-test	3 (10.3)	12 (41.4)	4 (13.8)	5 (17.2)	5 (17.2)	29 (100.0)	< .000
Post-test	0 (0.0)	0 (0.0)	8 (27.6)	6 (20.7)	15 (51.7)	29 (100.0)	
Understanding the health beliefs held by the patient[c]							
Pre-test	0 (0.0)	2 (5.3)	11 (28.9)	17 (44.7)	8 (21.1)	38 (100.0)	.003
Post-test	0 (0.0)	2 (5.1)	5 (12.8)	9 (23.1)	26 (59.0)	39 (100.0)	
Understanding the role of prayer in the patient's life[d]							
Pre-test	0 (0.0)	2 (5.9)	12 (35.3)	15 (44.1)	5 (14.7)	34 (100.0)	.09
Post-test	0 (0.0)	0 (0.0)	10 (29.4)	13 (38.2)	11 (32.4)	34 (100.0)	
Understanding the kind of work the patient does[b]							
Pre-test	1 (3.4)	4 (13.8)	6 (20.7)	7 (24.1)	11 (37.9)	29 (100.0)	.01
Post-test	0 (0.0)	1 (303)	4 (13.3)	4 (13.3)	21 (70.0)	30 (100.0)	
Understanding how ready the patient is to make changes[b]							
Pre-test	0 (0.0)	1 (3.4)	6 (20.7)	6 (20.7)	16 (55.2)	29 (100.0)	.04
Post-test	0 (0.0)	1 (3.3)	1 (3.3)	4 (13.3)	24 (80.0)	30 (100.0)	
Understanding where the patient lives[b]							
Pre-test	0 (0.0)	3 (10.3)	10 (34.5)	8 (27.6)	8 (27.6)	29 (100.0)	.01
Post-test	0 (0.0)	0 (0.0)	7 (23.3)	5 (16.7)	18 (60.0)	30 (100.0)	
Understanding the ethnic background of the patients family[d]							
Pre-test	0 (0.0)	0 (0.0)	13 (38.2)	17 (50.0)	4 (11.8)	34 (100.0)	.44
Post-test	0 (0.0)	3 (8.8)	11 (32.4)	7 (20.6)	13 (38.2)	34 (100.0)	
Understanding the health benefits held by the patient[d]							
Pre-test	0 (0.0)	1 (2.9)	7 (20.6)	19 (55.9)	7 (20.6)	34 (100.0)	.23
Post-test	0 (0.0)	1 (2.9)	7 (20.6)	12 (35.3)	14 (41.2)	34 (100.0)	

[a]2009, 2010, 2012, 2014-2017
[b]2015-2017
[c]2014-2017
[d]2009, 2010, 2012, 2014

The students were significantly more in agreement with a higher comfort level with planning and implementing a community health project after the program as shown in Table 4.

Table 4. College Rural Scholars Survey, Pre and Post-Test Results, Community Planning

"I am comfortable planning and implementing a community health project[a]."							
	Strongly Disagree		Somewhat Agree		Strongly Agree		
	1	2	3	4	5	Total	P value
Pre-test	1 (2.7)	5 (13.5)	9 (24.3)	13 (35.1)	9 (24.3)	37 (100.0)	.009
Post-test	0 (0.0)	0 (0.0)	8 (20.5)	15 (30.8)	19 (48.7)	39 (100.0)	

[a]2014-2017

Students reported that case studies was the most effective component in achieving the goals at 98.5% (131/133 responses), followed by free school physicals 97.2% (172/177 responses), shadowing physicians 93.9% (200/213 responses), and group discussion sessions 85.3% (424/497 responses). Comparison of summed scores for each session/topic compared to previous years showed less than 5% variation from year to year. Themes in student written comments are exemplified by those shown in Table 5.

Table 5. College Rural Scholars Summative Evaluation, "What part of the program did you like the most?"

The case study and Friday morning reflections…because the process was interesting to learn, and (the facilitator) really challenges us to think like clinicians.
Case studies…because I was involved and learned so much about thinking like a rural physician and diagnosing patients while also treating them.
The heath screenings. Being an introverted person, this was surprising to me. However, I managed to come out of my shell a little bit and interact with my peers, pre-clinicals, children, and the parents in a way that was beneficial to them and me as well.
This program has made me feel like I have finally found my place. Being here has made me the happiest I have ever been.
The health screenings. Being able to interact with a family one-on-one was very rewarding. They were very open about their lives and this in turn let me be open and connect with them. I think it helped demonstrate the way rural medicine works.
…specifically what it means to be a rural physician instead of just "the physician". …(the program) contributed to my amended and more insightful goal for how I want to practice and treat patients in the future.
Thoroughly enjoyed "Friday Morning Reflections" and hearing (facilitator's) insight on treating the patient as a whole. Makes me wanna be a family doc even more than I did already!
Absolutely love the fact that I can walk out of this program being more confident in my pursuit of medical family practice. I love the small/exclusiveness 'feel' of the program. I feel like I know much more about what I am "getting myself into."
I definitely enjoyed the real life application of seeing patients and understanding how to effectively talk to them about their health.
Shadowing a doctor who truly loved not only their work but also their patients.
I liked being able to gain hands-on experience and also be able to solve clinical problems as a group.
Gives a great insight to rural medicine. I learned so many things about finding a treatment plan for a patient.
This has been an incredible experience that really opened my eyes to the joys and difficulties of rural medicine.
Interacting with the people who live in these counties and talking with their children was an experience where we truly got to see what life was like in rural towns.
I feel much more knowledgeable about rural practice now. This program has also cemented in my mind that I would like to practice in a rural community.
It was a great experience to teach the kids and be involved in the process of the physical. This is probably the best way for us to see what practicing medicine, especially in a rural setting, is like.
The health screenings were … a unique, real-world application of what we learn. There could never be a stronger motivator for academic and professional success than the patients. Just having a role during the screenings challenged me to do well in school and ultimately to learn medicine.
The health screenings… got you out and into the community dealing with real patients and real problems. It helped you to learn to work with others in a clinical session and gave you first-hand experience with problems facing this rural area.
(My preceptor) was a good example of a physician who took time to listen to their patients stories and problems… and he even went as far as to personally call patients with results or concerns.

To date, 64 participants in the CRS program have completed college and 16 are currently in college. Of the 64 CRS students who have finished college, 53/64 (83%) have pursued a career in the health care field. This includes 37/64 students (58%) who chose medical school. Of the 26 CRS students who have completed medical school, 8/26 (31%) are in family medicine, 6/26 (23%) are in pediatrics/internal medicine/combined medicine-pediatrics, 3/26 (12%) are in obstetrics-gynecology, and 9/26 (35%) are in other specialties (emergency medicine, plastic surgery, dermatology, general surgery, neurology, radiology, psychiatry research). Of the 26 CRS medical school graduates, 14 have successfully completed their residency training and chosen a practice site and 7/14 (50%) chose a rural practice site. Of CRS who chose other health careers, 4/16 (25%) chose a rural location, and 3/11 (27%) of those choosing a non-health career chose a rural location.

Discussion

Strategies for addressing the maldistribution of physicians have included admissions efforts to include more rural students in medical school as well as rural tracks within medical school and residencies.[5] Others have reported positive results of brief rural immersion efforts of urban-based medical students which comprise a much larger potential pool for future rural physicians.[20] In most regions, without focused programs as early as high school, the pool of

competitive rural students for admission to medical school is just too small to make a difference.[21] The few established college programs in the U.S. have been successful, but the pipeline is very long. As in our report here, college programs occur 7 years before specialty choice and 10-15 years prior to first practice site choice.

In addition to traditional didactic and individual mentoring efforts, our approach has been a bit broader, with a clear intent for these students to understand how rural patients make healthcare choices. It might seem that rural students would already understand this importance, but their opinions prior to the program supports that they had not considered this issue. Perhaps already affected by the culture of their college town or broader popular culture, the non-scientific aspects that are part of everyday life did not seem important to understand when, as future doctors, they were to make treatment decisions. The comments on evaluations support that this realization came in the group discussions of their common experiences in the very small communities. Although the "Friday morning reflections" provided an organized forum for these discussions, it was clear that the students had already begun these discussions among themselves without a faculty facilitator. While our focus was on rural experiences, it seems likely that this repetitive process of immersion followed by group discussion would provide students a deeper understanding of any subculture.

Because the rural affinity model suggests that students from rural areas who remain connected to their rural roots throughout training will be more likely to choose a rural practice site, targeted college programs should help increase the number of physicians who choose a rural practice site. Our initial proportion of 50% choosing rural sites is encouraging, and comparable to those of other similar programs. With time for more of our CRS students to choose practice sites, it is possible that our broader rural immersion approach may even result in a higher proportion choosing a rural location.

It is also interesting that the students who initially sought medical school but then moved to other careers chose a rural residence at only half the proportion (25% and 27%, respectively). We have previously shown in a subset of CRS students that those who opted out of medicine were those who placed a higher priority on prestige and physician salaries when they made the initial decision to choose pre-med.[4] It is possible that the CRS program laid bare the practicalities of rural health and those who stayed with it embraced these challenges.

Survey limitations

The responses to the post- survey could have been skewed by a form of social acceptability bias, as the group facilitator and other faculty may have shown support for the importance of considering social issues in assessing patient adherence to treatment plans, but the anonymity of the survey should have minimized that effect. As these students began their identity development as future rural physicians, it would be natural for them to begin to agree with their role models, and thus their responses could be considered a lasting change rather than a transient survey bias.

Another possible limitation is that the individual student interpretation of the meaning of the words in the survey was something other than that intended. This was most apparent in the term "health benefits" which the authors intended to mean differences in out of pocket cost for medical care during the upheaval in the individual insurance market. Since the cost to the patient for two options may differ, a caring physician might consider this when making recommendations between two roughly equally effective treatment options. However, in discussion with CRS who had completed the post-survey, it became clear that some students interpreted this wording to mean that a patient who is underinsured might not be offered some options, and the experience of the program did not change their ambivalence about this.

The other variation about meaning of the survey words was in the importance of understanding the ethnic background of the patient. Some students agreed that this was an important nuance in choosing treatment options that the patient would embrace, but others in discussions after the post-survey saw this as a potential racial bias, potentially not offering all options to all ethnicities. Future clarification of the survey wording could address these issues.

Program limitations

The outcomes of the CRS with regard to primary care residency and rural practice choice are very positive, in keeping with reports from other similar programs. However, another potential limitation is that it could be rural upbringing, and not the program itself, that is responsible for these outcomes. However, in a multiple logistic regression analysis in a population very similar to the CRS, we found the value of our rural campus experience most significant. Among 1120 graduates of both our urban and rural campuses, rural upbringing showed an odds ratio of 2.67 (1.58-4.52) of association with subsequent rural practice choice. Family medicine residency choice showed an odds ratio of 5.08 (2.88-8.98) for rural practice choice, and training at our rural campus showed an odds ratio of 5.46 (2.61-11.42), all $p<.001$ when controlling for the other factors.[9] To determine whether the brief CRS rural immersion is as powerful as 2 years at our rural campus in affecting choice of subsequent rural practice will require further longitudinal study.

Another potential limitation on the value of small, intensive programs like the CRS is their ability to produce only a small number of future rural physicians. With this issue, small numbers matter, however. In our region of Kentucky where almost two thirds of counties are classified as Health Professional Shortage Areas (more than 3500 population per primary care doctor), most of these counties would be removed from that classification if 1-2 primary care doctors located there.[22] And retention is of the utmost importance, and students who make a practice choice based on good preparation are more likely to stay long term.[23]

Conclusion

The effectiveness of the CRS program to broaden student opinions and the high percentage of CRS graduates who choose rural practice could be cause to support development of more such rural programs, and continued support for those few in existence currently. The rural affinity model predicts that students coming from rural backgrounds are more likely to choose a rural practice site if they continue to maintain their rural connection throughout their training. If this rural connection is strengthened earlier in the academic pipeline during college, then the hope is that more students who complete programs like CRS will choose to practice in non-urban settings and thus increase the number of rural physicians.

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