JRMC Journal of Regional Medical Campuses

Does Attending a Regional Medical Campus Influence the Training Outcomes of Family Medicine Residents?

Komal Kochhar, Laurie M. Fancher, James J. Brokaw, Peter M. Nalin

DOI: https://doi.org/10.24926/jrmc.v2i1.1997
Journal of Regional Medical Campuses, Vol. *2*, Issue 2 (2019)

Published by University of Minnesota Libraries Publishing

Does Attending a Regional Medical Campus Influence the Training Outcomes of Family Medicine Residents?

Komal Kochhar, Laurie M. Fancher, James J. Brokaw, Peter M. Nalin

Abstract

Introduction: Indiana University School of Medicine (IUSM) is the largest medical school in the nation, with its main campus located in Indianapolis and 8 regional medical campuses (RMC) distributed across the state. In this study, we compared the survey responses of family medicine residents who had attended medical school at the main campus in Indianapolis versus an RMC to see if there were any noticeable differences in their residency training outcomes.

Methods: From 2012 to 2017, in the spring of each year, a cross-sectional survey was administered to all final-year family medicine residents graduating from the 11 family medicine residency programs in Indiana. A total of 519 out of 520 residents completed the survey. Of whom, 132 respondents indicated they had graduated from IUSM; 45 reported they had attended the Indianapolis campus and 87 had attended one of the RMCs in the state. Our dataset for this study was comprised of these 132 respondents. Chi-square test or Fisher's exact test were used to compare responses between groups. *P*-values ≤ 0.05 were considered statistically significant.

Results: In the ACGME competency areas, the residents who attended an RMC versus the Indianapolis campus were significantly more likely to report being fully competent in *Medical Knowledge* (90% vs. 76%, p = 0.032) and *Systems-Based Practice* (83% vs. 64%, p = 0.019). Additionally, the residents who attended an RMC compared to their Indianapolis counterparts reported significantly higher rates of being trained to serve rural populations (73% vs. 52%, p = 0.017) as well as being fully competent to serve rural populations (69% vs. 42%, p = 0.003). However, the residents who attended an RMC were not more likely to establish a practice in a rural area than were the residents who attended Indianapolis (18% vs. 17%, p = 0.845).

Conclusions: Based on these self-reported data, the family medicine residents who attended an RMC may perceive themselves to be better-prepared in a few core competency areas and in serving rural populations, compared to those who attended the Indianapolis campus. These findings suggest that IUSM's complex statewide system of medical education may offer some unique advantages in preparing students for residency, especially in family medicine.

Introduction

The Indiana University School of Medicine (IUSM) employs a large geographically distributed system of medical education, with approximately 1450 students enrolled across 8 regional medical campuses (RMCs) and the main medical campus at Indianapolis. IUSM currently admits 364 students per year and the majority (62%) are assigned to RMCs located at Bloomington, Evansville, Fort Wayne, Gary, Muncie, South Bend, Terre Haute, and West Lafayette (Fig. 1). The remainder of the class matriculates at Indianapolis. The RMC students complete their basic science years one and two onsite. They may also complete all or some of their third and fourth-year clinical rotations at the RMC, or they may opt to complete their clinical rotations at Indianapolis. By virtue of their locations, the RMCs produce graduates who are well-attuned to the local health care needs of the community. In fact, these graduates often return to the RMC region to practice medicine.[1]

Previous studies of IUSM's statewide system have assessed the influence of RMCs with regard to specialty choice and practice location.[1-3] However, it is during residency that medical school graduates hone their professional skills to become independent practitioners of their chosen specialty.[4] Yet, the residency training outcomes of IUSM graduates have never been fully evaluated in the context of our statewide system. The particular educational experiences these graduates had as medical students, and the kinds of patients they encountered, will undoubtedly impact their preparation for residency and early career plans. Previous studies have shown that graduates who attended an RMC are disproportionately influenced to pursue primary care careers in local communities similar to their hometowns.[1-2] This suggests that many RMC graduates enter residency training already predisposed in some ways that are fundamentally different from their Indianapolis counterparts, and this predisposition may manifest itself in the training outcomes at the end of residency. Thus, given the RMC's

Komal Kochhar; Office of Research in Medical Education, Dean's Office for Educational Affairs, Indiana University School of Medicine, Indianapolis, Indiana
Laurie M. Fancher; Office of Research in Medical Education, Dean's Office for Educational Affairs, Indiana University School of Medicine, Indianapolis, Indiana
James J. Brokaw; Department of Anatomy and Cell Biology, Indiana University School of Medicine, Indianapolis, Indiana
Peter M. Nalin; Medical Sciences Program, Indiana University School of Medicine, Bloomington, Indiana

orientation to primary care and community-based practice, we conducted an exploratory study to determine whether residents who attended an RMC have noticeably different training outcomes compared to those who attended the Indianapolis campus.

To address this question, we evaluated the responses obtained from a statewide exit survey of all final-year family medicine residents who completed residency training in Indiana from 2012 to 2017. After excluding the non-IUSM graduates, we compared the responses of the IUSM graduates who attended an RMC versus Indianapolis and noted a few key differences in residency training outcomes that may be related to differences in the campus environments.

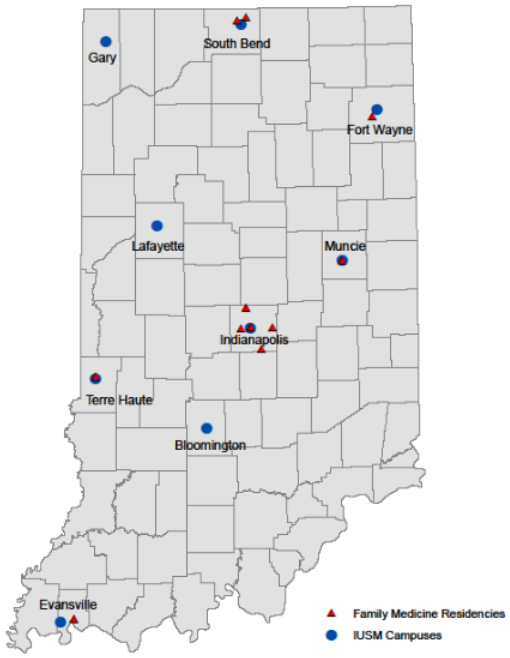

Figure 1: Statewide Family Medicine Residency Locations and IUSM Campus Locations

Methods

The *Indiana Family Medicine Residencies Exit Survey©* is a cross-sectional survey administered in the spring of each year to all final-year family medicine residents graduating from the 11 family medicine residency programs in Indiana (Fig. 1). Residents are asked to provide their demographic information, educational debt, an assessment of their residency training program, and their plans after graduation. For those planning to enter clinical practice directly after graduation, information is requested about the practice setting, its specific location, the main reason why it was chosen, and the residents' expectations for first-year income. In addition, residents are asked to self-report their perceived competence in each of the six Accreditation Council for Graduate Medical Education (ACGME) Core Competencies[5] and their perceived competence in providing care for underserved and rural populations (rating scale: fully – partially – not at all).

In the period from 2012 to 2017, the exit survey was administered to a total of 520 residents graduating from the 11 family medicine residency programs across the state. All but one resident (519) completed the survey, yielding a response rate of nearly 100%. This high response rate was achieved by administering the paper-and-pencil survey in group settings at each residency site during pre-arranged visits scheduled with the local program coordinators. Residents who were absent during the group-administered session were contacted and given the opportunity to complete the survey and return it by mail.

Of the 519 respondents, 132 were graduates of IUSM, as determined by a survey question asking them to identify their medical school location. Following which, the IUSM graduates were asked to indicate their campus assignment. Of the 132 respondents, 45 had been assigned to the Indianapolis campus and 87 had been assigned to one of the RMCs. This constituted the dataset for our analysis.

In those instances where respondents provided an address for their practice location, we noted whether it fell within a primary care Health Professional Shortage Area (HPSA), a Medically Underserved Area (MUA), or a rural area. The Health Resources and Services Administration defines HPSAs as geographic areas and populations with health care provider shortages in primary care, dental care, or mental health; and MUAs are defined as geographic areas with inadequate access to primary care services.[6] Although several eligibility criteria are used in defining HPSAs and MUAs, the population to provider ratio is especially important in both designations. There are currently 30 geographic primary care HPSAs and 45 MUAs in Indiana.[6] The Federal Office of Rural Health Policy defines rural areas to include non-metro counties and rural census tracks.[7] According to the 2010 census, approximately 38% of Indiana's population live in counties designated as either rural or a rural/urban mix.[8]

Data analysis was performed using statistical software, *IBM SPSS Statistics v24.* Mapping software, *ArcGIS 10.5*, was used to measure distances from residency sites to practice locations. The chi-square test or Fisher's Exact Test were used to compare responses between groups. *P*-values ≤ 0.05 were considered statistically significant. Effect size measures of Cramer's V or phi were reported for all significant findings. The number of cases in each statistical analysis varied slightly because of missing data elements for certain questions. This study was granted exempt approval from the Indiana University Institutional Review Board.

Results

Table 1 displays the demographic characteristics of the 132 IUSM graduates who responded to the survey. Residents who attended an RMC were somewhat younger ($p = 0.012$, Cramer's $V = 0.260$) and more likely to be white ($p = 0.028$, phi = 0.192) than those who attended the Indianapolis

campus, but the proportion of males and females in the two groups was nearly identical. Over 90% of the residents in both groups were native to Indiana. Educational debt was similar across both groups, with about half of all residents owing at least $200K. The proportion of residents who planned to enter clinical practice immediately after residency was similar for both groups (80.5% for those who attended an RMC and 75.0% for those who attended Indianapolis, p = 0.768).

Table 1: Demographic Characteristics of Indiana University School of Medicine Graduates Who Completed a Family Medicine Residency Program In-State, 2012–2017: Comparing Residents Who Attended Medical School at the Main Campus Versus a Regional Campus

Characteristic	Attended Main Medical Campus[a] % (N)	Attended Regional Medical Campus[b] % (N)	P-value[c]
Age at Completion			
25–29	18.6 (8)	39.1 (34)	
30–34	62.8 (27)	55.2 (48)	**0.012**
35 and over	18.6 (8)	5.7 (5)	
Gender			
Male	57.8 (26)	57.5 (50)	0.973
Female	42.2 (19)	42.5 (37)	
Race/Ethnicity			
White (non-Hispanic)	75.0 (33)	89.7 (78)	**0.028**
All other	25.0 (11)	10.3 (9)	
State of Origin			
Indiana	97.8 (44)	90.8 (79)	0.165
All other	2.2 (1)	9.2 (8)	
Educational Debt			
$0	8.9 (4)	9.2 (8)	
$1 – $99,999	11.1 (5)	12.6 (11)	
$100,000 – $199,999	33.3 (15)	26.4 (23)	0.949
$200,000 – $299,999	35.6 (16)	40.2 (35)	
$300,000 and above	11.1 (5)	11.5 (10)	
Plans After Residency			
Clinical Practice	75.0 (33)	80.5 (70)	
Fellowship or Military	22.7 (10)	17.2 (15)	0.768
All other	2.3 (1)	2.3 (2)	

[a]45 respondents attended medical school at the main campus in Indianapolis before entering residency
[b]87 respondents attended medical school at one of the 8 regional campuses before entering residency
[c]Assessed by Pearson Chi-Square or Fisher's Exact Test

As shown in Table 2, the residents who attended an RMC had somewhat different perceptions of clinical competence compared to their Indianapolis counterparts. With regard to the ACGME Core Competencies, the proportion of residents who reported being fully competent in *Medical Knowledge* was significantly greater for those who attended an RMC than for those who attended Indianapolis (89.7% versus 75.6%, p = 0.032, phi = -0.186). Similarly, residents who attended an RMC reported being fully competent in *Systems-Based Practice* at a higher rate than those who attended Indianapolis (82.8% versus 64.4%, p = 0.019, phi = -0.205). No significant differences were noted for the other core competencies. With regard to patient care for special populations, 100% of residents in both groups reported that they received training to care for underserved populations, and both groups reported being fully competent to care for underserved populations by similar proportions (93.1% for those who attended an RMC and 86.7% for those who attended Indianapolis, p = 0.337). However, significant differences were noted between the two groups regarding rural populations. Compared to their Indianapolis counterparts, the residents who attended an RMC reported significantly higher rates of being trained to serve rural populations (73.3% versus 52.3%, p = 0.017, phi = 0.210) as well as being fully competent to serve rural populations (69.0% versus 42.2%, p = 0.003, phi = 0.292).

Table 2: Perceived Clinical Competence of Indiana University School of Medicine Graduates Who Completed a Family Medicine Residency Program In-State, 2012–2017: Comparing Residents Who Attended Medical School at the Main Campus Versus a Regional Campus

Outcome	Attended Main Medical Campus[a] % (N)	Attended Regional Medical Campus[b] % (N)	P-value[c]
ACGME[d] Core Competencies			
Residents who self-reported being fully competent in each core competency:			
Patient Care and Procedural Skills	88.9 (40)	95.4 (83)	0.273
Medical Knowledge	75.6 (34)	89.7 (78)	**0.032**
Practice-Based Learning and Improvement	73.3 (33)	83.9 (73)	0.148
Interpersonal and Communication Skills	93.3 (42)	97.7 (85)	0.337
Professionalism	93.3 (42)	97.7 (85)	0.337
Systems-Based Practice	64.4 (29)	82.8 (72)	**0.019**
Underserved Populations			
Residents who self-reported:			
Having received training to serve	100 (45)	100 (87)	1.000
Being fully competent to serve	86.7 (39)	93.1 (81)	0.337
Rural Populations			
Residents who self-reported:			
Having received training to serve	52.3 (23)	73.3 (63)	**0.017**
Being fully competent to serve	42.2 (19)	69.0 (60)	**0.003**

[a]45 respondents attended medical school at the main campus in Indianapolis before entering residency
[b]87 respondents attended medical school at one of the 8 regional campuses before entering residency
[c]Assessed by Pearson Chi-Square or Fisher's Exact Test
[d]Accreditation Council for Graduate Medical Education

Table 3 shows the intended practice outcomes of the 103 residents who planned to enter clinical practice directly after completing residency. About two-thirds of these residents chose hospital-based settings in Indiana for their first practice location, unaffected by whether they attended an RMC or Indianapolis (69.8% versus 60%, p = 0.497). The proportion of residents practicing in areas designated as either underserved (HPSA or MUA) or rural was unaffected by what campus they attended. About two-thirds (67.8%) of all residents chose practice locations within 50 miles of where they completed residency. Although salary was an important consideration in selecting their first practice location (it was rated fourth), the residents appeared to give priority to interpersonal and family relationships in making their decision. For example, "liked the people" was the reason selected by 75.7% of the residents who attended an RMC and by 72.7% of those who attended Indianapolis (p = 0.745). Expected income in the first-year was similar across both groups, with over half of all residents expecting to earn $200K or more.

Table 3: Practice Outcomes of Indiana University School of Medicine Graduates Who Completed a Family Medicine Residency Program In-State, 2012–2017: Comparing Residents Who Attended Medical School at the Main Campus Versus a Regional Campus

Outcome	Attended Main Medical Campus[a] % (N)	Attended Regional Medical Campus[b] % (N)	P-value[c]
Practice Setting			
Hospital-Based	60.0 (18)	69.8 (44)	
Private Practice	30.0 (9)	19.0 (12)	0.497
All other	10.0 (3)	11.1 (7)	
Practice Location			
Indiana	100 (33)	87.0 (60)	0.096
HPSA[d]/MUA[e]	43.3 (13)	51.7 (31)	0.456
Rural Area	16.7 (5)	18.3 (11)	0.845
Top 4 Reasons for Choosing Practice Location			
Selected by residents from a provided list:			
Liked the people	72.7 (24)	75.7 (53)	0.745
Met my personal needs or preferences	75.8 (25)	67.1 (47)	0.374
Proximity to my family	60.6 (20)	60.0 (42)	0.953
Salary or compensation	54.5 (18)	44.3 (31)	0.331
Expected Income			
Less than $150,000	9.7 (3)	9.5 (6)	
$150,000 – $199,999	38.7 (12)	31.7 (20)	0.604
$200,000 – $249,999	29.0 (9)	42.9 (27)	
$250,000 and above	22.6 (7)	15.9 (10)	

[a]33 respondents who attended medical school at the main campus in Indianapolis entered clinical practice at the end of residency
[b]70 respondents who attended medical school at one of the 8 regional campuses entered clinical practice at the end of residency
[c]Assessed by Pearson Chi-Square or Fisher's Exact Test
[d]Health Professions Shortage Area
[e]Medically-Underserved Area

Discussion

This study explored the question of whether attending an RMC during medical school influences the training outcomes of family medicine residents. By examining the responses obtained from a statewide exit survey of all final-year family medicine residents in Indiana, we found that the residents who attended an RMC reported significantly higher rates of

being "fully competent" in certain ACGME core competencies and in their ability to care for rural patients compared to the residents who attended the Indianapolis campus. In all other aspects, the training outcomes of the two groups were comparable. These findings suggest that IUSM's complex statewide system of medical education may confer some unique advantages in preparing students for residency, particularly in family medicine.

According to IUSM's Match data and recent trends, about 11% of each graduating class will Match into family medicine. We chose to examine family medicine residents, as opposed to residents in other specialties, primarily because the family medicine exit survey collected information about the campus assignment of IUSM graduates, which enabled us to distinguish the responses of those who had attended an RMC from those who had attended Indianapolis. The survey solicits information specifically relevant to family medicine, so our findings cannot be extrapolated beyond this primary care specialty. It still remains an open question whether RMC attendance has any impact on the residency training outcomes of IUSM graduates pursuing other specialties.

IUSM responded to the perceived physician shortage of the late 1960s by establishing 8 RMCs at strategic locations around the state in the hope that they would serve as incubators for primary care physicians who would eventually return to those communities to practice medicine. There is some evidence that this strategy was effective. By analyzing a large dataset of IUSM graduates from the classes of 1988-1997, researchers found that students who attended the RMCs were statistically more likely to practice primary care medicine in local communities compared to students who attended the Indianapolis campus.[1,2] However, in the ensuing 20-30 years since these graduates completed residency and settled into practice, the RMCs have evolved considerably and are no longer limited to pre-clinical education as they now offer third and fourth year clerkships as well. A more recent study of IUSM graduates from the classes of 2011 to 2017 found that RMC students entered primary care fields in about the same proportions as Indianapolis students, suggesting that the training environments of the RMCs and Indianapolis are sufficiently alike to engender similar career paths for the students.[3] The one exception is the Terre Haute RMC, which produces proportionally more family physicians than any other IUSM campus, but that is largely due to its special Rural Medical Education Program, which emphasizes primary care.[3] Nevertheless, it remains fair to say that students attending the RMCs are probably exposed to more primary care medicine than students attending the Indianapolis campus, which is an academic medical center emphasizing specialty care.

The residents in this study graduated from IUSM between 2009 and 2014 and then entered one of the 11 family medicine residency programs in Indiana. As might be expected, the demographic characteristics of the residents who attended an RMC versus Indianapolis were for the most part similar. The observed difference in the racial/ethnic composition of the two groups is probably a consequence of the campus assignment process at IUSM which, for a variety of reasons, tends to favor the placement of under-represented minority students at the Indianapolis campus.[1] However, there is no obvious explanation for the apparent age difference between the two groups. Perhaps the residents who attended Indianapolis were somewhat older when they started their residency compared to those who attended an RMC. The reason this should be so is not clear. It is possible that Indianapolis has more dual-degree students (e.g., MD-MBA) who would require a longer time to graduate. The level of educational debt reported by the residents in this study is fairly consistent with previous research. In a recent cross-sectional survey of 6,229 family medicine residents seeking American Board of Family Medicine certification, 60.1% of the respondents had more than $150 000 of debt and 28.5% had more than $250 000 of debt.[9]

The most interesting observations in this study relate to residents' perceptions of their own clinical competence. Compared to the residents who attended Indianapolis, those who attended an RMC appear to rate themselves more highly in two of the ACGME Core Competencies, *Medical Knowledge* and *System-Based Practice*. According to the ACGME Common Program Requirements[10], *Medical Knowledge* is defined as "knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences, as well as the application of this knowledge to patient care" and *Systems-Based Practice* is defined as "awareness of and responsiveness to the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care." It is important to point out that the residents reported their *perceived* competence in these two domains, which is not the same as an objective measure of their *actual* competence. However, as noted by Lurie et al.[11], objectively measuring the ACGME Core Competencies independently of one another is exceedingly difficult. We have only the residents' subjective self-assessments of their clinical competence, which are likely to be inaccurate.[12] Nevertheless, our data suggest that something in the collective educational experiences of the residents who attended an RMC may have promoted a stronger sense of competence in *Medical Knowledge* and *Systems-Based Practice* compared to those who attended Indianapolis. The formal curriculum is unlikely to be responsible because it is essentially the same at all IUSM campuses. Perhaps the residents who attended an RMC were nurtured to be less self-critical than their Indianapolis counterparts, who were immersed in the more competitive environment of an academic medical center. Further studies with a larger sample are needed to confirm these preliminary results and identify the specific factors responsible.

The observed difference in the residents' perceived competence to care for rural patients may be more easily

explained. Each RMC has its own unique training environment, characterized in part by its network of connections with the local clinical community and patient population. Given the RMCs' placement in smaller communities, it is reasonable to assume that, on average, the RMC students would be more likely to encounter rural patients compared to the Indianapolis students who would be more likely to see patients from the surrounding metro area. These early clinical experiences may shape the residents' perceived competence in serving rural patients throughout their residency training. This is consistent with previous research showing positive associations between rural training experiences during medical school and a variety of outcome measures, including high student satisfaction, improved clinical skills, and choice of rural practice locations.[13]

However, despite their greater perceived competence in serving rural patients, the residents who attended an RMC are no more likely to actually practice in a rural area than are the residents who attended Indianapolis, nor are they any more likely to practice in an underserved community more broadly (i.e., HPSA or MUA). This finding is an agreement with an earlier study of IUSM graduates showing that the RMCs and Indianapolis produce graduates practicing in underserved areas in about the same proportions.[3] In fact, all of the residents' practice outcomes are remarkably similar, regardless of which campus they attended. After completing residency, the 'typical' family physician will remain in Indiana to practice in a hospital-based setting located within 50 miles of the residency site, which conforms to the well-established observation that first practice locations are often found in close proximity to the residency sites.[14] The practice location will be chosen primarily on the basis of interpersonal and family relationships with an expected income of at least $150K in their first year of practice.

Limitations

The relatively small sample size of 132 family medicine residents necessarily limits the study's statistical rigor and obscures trends that might otherwise be apparent with a larger study population. For example, the contribution of individual RMCs to the overall study results cannot be properly evaluated due to the small number of residents from each RMC. However, with a larger sample, the survey responses of residents from individual RMCs could be statistically compared to determine whether some RMCs are more influential than others. Moreover, the residency training itself could be confounding our results. Over the three-year training program, residents will experience a variety of clinical encounters that will shape their skills as physicians, apart from whatever influence RMC attendance may have. Perhaps the observed differences in perceived clinical competence have less to do with RMC attendance and more to do with differences in the training at the various residency sites. With a larger sample, a multivariate study could be devised to control for this potential confounding effect.

Another limitation stems from the fact that the study population is restricted to family medicine residents, which excludes all of the IUSM graduates who matched into other specialties. To what extent these residents are representative of IUSM graduates completing residency programs in other specialties is not known. This represents a significant selection bias, which must temper any broader conclusions about the role of RMCs in residency preparation. The findings of this study are not generalizable to all residents, as they only have applicability to family medicine residency.

Lastly, as with all surveys, the data collected is self-reported and subject to recall bias. Missing or inaccurate data elements are inevitable. As mentioned earlier, the clinical competence of residents is reported as a subjective self-assessment, not an objective measure of actual competence.

Conclusions

Residents who attended an RMC for medical school are at least as well-prepared for family medicine residency as are those who attended the Indianapolis campus, and there is some evidence to suggest they may be more self-confident in certain areas of clinical competence, including the care of rural patients. However, attending an RMC appears to have little impact on the residents' choice of practice location after residency.

References

1. Brokaw JJ, Mandzuk CA, Wade ME, Deal DW, Johnson MT, White GW, Wilson JS, Zollinger TW. The influence of regional basic science campuses on medical students' choice of specialty and practice location: A historical cohort study. *BMC Medical Education* 2009; 9:29. (https://doi.org/10.1186/1472-6920-9-29).
2. Wade ME, Brokaw JJ, Zollinger TW, Wilson JS, Springer JR, Deal DW, White GW, Barclay JC, Holloway AM. Influence of hometown on family physicians' choice to practice in rural settings. *Family Medicine* 2007; 39(4):248-254.
3. Kochhar K, Fancher LM, Brokaw JJ, Wilson JS, Nalin PM. Tracking medical students and graduates from hometown to practice using geographic information systems, 2011-2017. *Journal of Regional Medical Campuses* 2018; 1:3. (https://doi.org/10.24926/jrmc.v1i3.1136).
4. Cooke M, Irby DM, O'Brien BC. The resident's experience: Graduate medical education. In: Cooke M, Irby DM, O'Brien BC. Educating Physicians: A Call

for Reform of Medical School and Residency. San Francisco, CA: Jossey-Bass; 2010.

5. New England Journal of Medicine Knowledge Plus Team. Exploring the ACGME Core Competencies (Part 1 of 7). (https://knowledgeplus.nejm.org/blog/exploring-acgme-core-competencies/). Published June 2, 2016. Accessed January 21, 2019.
6. Health Resources and Services Administration. Find Shortage Areas. (https://data.hrsa.gov/tools/shortage-area). Accessed March 4, 2019.
7. Health Resources and Services Administration. Federal Office of Rural Health Policy Data Files. (https://www.hrsa.gov/rural-health/about-us/definition/datafiles.html). Accessed March 4, 2019.
8. Ayres J, Waldorf B, McKendree M. Defining Rural Indiana—The First Step. (http://www.extension.purdue.edu/extmedia/EC/EC-766-W.pdf). Published January, 2013. Accessed March 4, 2019.
9. Phillips JP, Peterson LE, Fang B, Kovar-Gough I, Phillips RL Jr. Debt and the emerging physician workforce: The relationship between educational debt and family medicine residents' practice and fellowship intentions. *Academic Medicine* 2019; 94(2):267-273. DOI:10.1097/ACM.0000000000002468.
10. Accreditation Council for Graduate Medical Education. Common Program Requirements. (https://www.acgme.org/What-We-Do/Accreditation/Common-Program-Requirements). Revised February, 2017. Accessed March 9, 2019.
11. Lurie SJ, Mooney CJ, Lyness JM. Measurement of the general competencies of the Accreditation Council for Graduate Medical Education: A systematic review. *Academic Medicine* 2009; 84(3):301-309. DOI:10.1097/ACM.0b013e3181971f08.
12. Davis DA, Mazmanian PE, Fordis M, Harrison RV, Thorpe KE, Perrier L. Accuracy of physician self-assessment compared with observed measures of competence: A systematic review. *Journal of the American Medical Association* 2006; 296(9):1094-1102. DOI:10.1001/jama.296.9.1094
13. Barrett FA, Lipsky MS, Lutfiyya MN. The impact of rural training experiences on medical students: A critical review. *Academic Medicine* 2011; 86(2):259-263. DOI:10.1097/ACM.0b013e3182046387.
14. Dorner FH, Burr RM, Tucker SL. The geographic relationships between physicians' residency sites and the locations of their first practices. *Academic Medicine* 1991; 66(9):540-544.