ORIGINAL RESEARCH

Family Physicians' Scope of Practice and American Board of Family Medicine Recertification Examination Performance

Lars E. Peterson, MD, PhD, Brenna Blackburn, MPH, Michael Peabody, PhD, and Thomas R. O'Neill, PhD

Purpose: **Previous research indicated that rural family physicians were more likely to pass the American Board of Family Medicine (ABFM) Maintenance of Certification for Family Physicians (MC-FP) examination. One possible explanation is that rural family physicians may have a broader scope of practice.**

Method: **This was a cross-sectional study of family physicians taking the ABFM MC-FP examination in 2013. Examination results were linked with the Scope of Practice for Primary Care (SP4PC) scale. Linear and logistic regression models, with and without SP4PC score, determined associations between scope of practice and examination results.**

Results: **Among 10,978 examinees, rural physicians had a higher passing rate (90.7% vs 86.8%, $P < .05$) and higher SP4PC score (16.1 vs 14.3 $P < .05$) compared with urban physicians. Regression models without SP4PC score confirmed that urban physicians were less likely to pass (OR = 0.73; 95% CI, 0.62–0.87) and scored lower, −15.6 points, compared with rural physicians. Including SP4PC score completely attenuated the relationship between practice location and passing (OR = 0.86; 95% CI, 0.73–1.02) and decreased the relationship between score and practice location (−5.8 points). Each point increase on the SP4PC score was associated with 9% higher odds of passing (OR = 1.09; 95% CI, 1.07–1.11) and 4.9 more points.**

Conclusion: **A broader scope of practice rather than rural or urban practice location, was associated with increased likelihood of passing the MC-FP examination. If higher board scores are associated with providing higher quality of care, then maintaining a broad scope of practice may enable the delivery of higher quality primary care. (J Am Board Fam Med 2015;28:265–270.)**

Keywords: **Certification, Clinical Competence**

Rural family physicians often maintain a broader scope of practice than family physicians in urban locations. For example, 52% of family physicians in rural Idaho provided vaginal deliveries and 90% provided mental health care in 2010, [1] rates that are much higher than national averages (10% and 43% respectively) reported by all family physicians.[2,3] Rural family physicians may maintain a broad scope out of necessity due to fewer subspecialists practicing in rural areas and rural hospitals reliance on local family physicians to provide inpatient and emergency department care.[4]

Previous research found that self-designated community size, used as a rural/urban proxy, was associated with passing the American Board of Family Medicine (ABFM) Maintenance of Certification for Family Physicians (MC-FP) examination.[5] Specifically, family physicians located in metropolitan communities (> 500,000 residents) were 33% less likely to pass the MC-FP examination compared with family physicians in rural (< 25,000 residents) communities. The ABFM MC-FP examination content is based on a blueprint that mirrors

This article was externally peer reviewed.
Submitted 15 July 2014; revised 10 November 2014; accepted 12 November 2014.
From the American Board of Family Medicine (LEP, BB, MP,TRO), Lexington, KY; Department of Family and Community Medicine (LEP), University of Kentucky, Lexington, KY
Funding: none.
Conflict of interest: All authors were employees of the ABFM during the course of this study.
Corresponding author: Lars E. Peterson, MD, PhD, American Board of Family Medicine, 1648 McGrathiana Parkway, Suite 550, Lexington, KY 40511-1247 (E-mail: lpeterson@theabfm.org).

the breadth and scope of family medicine training;[6] as such, it stands to reason that physicians who maintain a broader scope of practice may be more likely to pass the MC-FP examination than physicians with a narrower scope of practice. Therefore, the objective of our study was to determine whether the previously demonstrated relationship between rural/urban location and ABFM MC-FP examination success can be explained by a physician's scope of practice.

Methods

Data Sources

We used practice information supplied during the application for the ABFM MC-FP examination and test results from 2013. As part of the examination application, examinees must complete a practice demographic questionnaire which asks about scope of practice, practice ownership, and practice size.

Variables

The main outcome variables were MC-FP examination scores and results (pass/fail). The examination score is reported from 200–800 with a passing score of 390 in 2013. To characterize scope of practice we adapted the Individual Scope of Practice Scale, referred to here as the Scope of Practice for Primary Care (SP4PC) scale. The SP4PC scale ranges from 0–30, with zero representing a physician who does not provide any direct patient care. In the demographic questionnaire, physicians report whether they perform 22 separate clinical activities representing aspects of family medicine training and usual scope of practice, (see Table 1 for complete list of elements). The SP4PC score is calculated based on the number of clinical activities reported. Additional information on the scale is available elsewhere.[7]

Other physician level variables included in the analysis were age, gender, degree type (MD/DO), international medical school graduate status, medical school faculty status, holding another American Board of Medical Specialties certification, and primary practice organization. To enable comparison with prior research,[5] practice organization was categorized as solo, group, and other. Physicians could list up to three office addresses with the percent time delivering care at each address. Primary practice site was determined when only one address was reported or, if multiple addresses were reported, the address where the physician reported delivering the majority of care. We then determined rural and urban location by linking the zip code of the primary practice location to the Rural-Urban Commuting Area Codes Version 2.0.[8]

Table 1. Scope of Practice for Primary Care Scale Elements and the Percentage of Family Physicians taking the American Board of Family Medicine Maintenance of Certification for Family Physicians Examination Performing each Element (n = 10,978)

Element	Urban (n = 8,838)	Rural (n = 2,140)
School health	3.9	4.9*
Emergency care	12.3	30.7*
Geriatric medicine	96.5	98.6*
Women's health	68.3	74.2*
Hospital medicine	29.7	53.0*
Occupational and industrial medicine	25.6	43.0*
Adult medicine	98.2	98.7
Major surgery	1.0	4.6*
Office surgery	50.2	64.9*
Musculoskeletal problems	72.5	76.1*
Pain management	42.7	53.2*
Palliative care	28.2	52.1*
Care for children	81.0	90.9*
Adolescent medicine	87.5	93.2*
Pre -operative care	54.2	63.9*
Post-operative care	27.3	41.7*
Mental health	58.0	66.9*
Sports medicine	34.1	43.7*
Urgent care	62.2	66.8*
Deliveries	7.1	15.6*
Care for newborns	54.0	67.4*
Prenatal care	13.3	19.5*

*P for Chi-Square test $< .05$.

Analytic Strategy

Physicians not located in the United States were excluded. If a physician sat for both the spring and the fall 2013 examinations, we used their fall demographic information and results in the analysis. χ^2 and t tests compared demographics between physicians in rural and urban locations. t tests were used to test for differences in percentages reporting performing the 22 clinical activities elements of the SP4PC scale between rural and urban physicians.

Linear and logistic regression models determined adjusted associations between examination

score and results and scope of practice. To determine whether scope of practice was associated with examination results we ran two models for both examination score and result. In the first model, we ran regression models, logistic and linear, with all variables except for the SP4PC scale. In the second model, we ran the same regression models adding in the SP4PC scale. After performing descriptive statistics, we found that rural physicians had a higher SP4PC score than urban physicians. Modeling rural and urban physicians in the same model may mask a possible interaction between SP4PC and examination results. To test for this we ran the models again stratified by rural and urban status. All analyses were conducted in SAS version 9.2 (Cary, NC). Institutional Review Board approval was granted by the University of Kentucky.

Results

Our final sample included 10,978 family physicians, with 2,140 (19.5%) located in rural areas. Rural physicians were less likely to have taken the examination twice (9.4% vs 12.4%, $P < .05$) in 2013. In bivariate analyses, rural family physicians had significantly higher examination scores, passing rates, and SP4PC scores (Table 2) and were also more likely to be male, slightly older, and a US medical school graduate. Rural family physicians were significantly more likely to report performing every element in the SP4PC scale except adult medicine (Table 1). The individual elements demonstrating the biggest differences between rural and urban family physicians were palliative care (52.1% of rural physicians vs 28.2% of urban physicians), hospital medicine (53% vs 29.7%), and emergency care (30.7% vs 12.3%).

The results of regression models without the SP4PC scale matched previously reported findings (Table 3).[5] Specifically, we found that physicians in urban areas scored 15.6 points lower than rural physicians on the examination and were 27% less likely to pass the examination (OR = 0.73; 95% CI, 0.62–0.87). When the SP4PC scale was added to the regression models, the relationship between urban location and examination score was reduced 66% to 5.8 points but was still statistically significant. Inclusion of the SP4PC scale improved model fit (R^2 increased 12–16%) in the linear models. Inclusion of the SP4PC score completely attenuated the relationship between urban location and passing the examination (OR = 0.86; 95% CI, 0.73–1.02). In the full model, each point increase on the SP4PC scale was associated with an examination score increase of 4.9 points and a 9% increase in the odds of passing (OR = 1.09; 95% CI, 1.07–1.11). Other findings of interest from the adjusted analyses were that physicians who work in solo practices score 36.4 lower points than physicians who work in group practices and were nearly 50% less likely to pass (OR = 0.51; 95% CI, 0.43–0.60). Similar to linear regression, model fit in logistic regression improved with addition of the SP4PC score.

Regression models stratified by rural/urban status were largely consistent with the results using all physicians. Specifically we found that the association between SP4PC and examination score was slightly larger in urban areas (5.6 vs 3.2 points) than in rural areas but the size of the association was small (Table 4). Similarly, the odds of passing the examination were nearly identical between rural physicians (OR = 1.11; 95% CI, 1.07–1.16) and urban physicians (OR = 1.08; 95% CI, 1.06–1.11) and to the full model.

Table 2. Characteristics of Family Physicians Seeking American Board of Family Medicine Recertification and Examination Results in 2013 (n = 10,978)

Characteristic	Urban (n = 8,838)	Rural (n = 2,140)
2013 primary exam score (SD)	495.4 (105.7)	516.7 (104.0)*
Percent who passed the examination	86.8	90.7*
Scope of practice for primary care score	14.3 (3.4)	16.1 (4.0)*
Gender (% Female)	38.5	29.1*
Age, years	51.0 (8.5)	51.9 (8.6)*
Degree (% DO)	8.6	9.4
International medical school graduates	18.5	9.7*
Medical school faculty	25.0	22.6*
Hold other American Board of Medical Specialties certification	3.1	1.5*
Practice organization		
Group	39.0	38.3
Solo	12.8	12.4
Other	48.2	49.3

Values are percentage or mean (standard deviation).
*P for t test or Chi-Square test $< .05$.
SD, standard deviation; DO, doctor of osteopathic medicine.

Table 3. Adjusted Associations between American Board of Family Medicine Recertification Examination Score and Result with and without Scope of Practice for Primary Care (SP4PC) Scale

	Linear Regression: Examination Score: Beta Estimate of Change in Examination Score		Logistic Regression: Passing Examination: OR of Passing (95% CI)	
	Without SP4PC	With SP4PC	Without SP4PC	With SP4PC
SP4PC		4.9*		1.09 (1.07–1.11)
Urban	−15.6*	−5.8*	0.73 (0.62–0.87)	0.86 (0.73–1.02)
Female	−9.4*	−7.8*	0.81 (0.72–0.92)	0.83 (0.72–0.94)
Age	−1.0*	−0.9*	0.96 (0.95–0.96)	0.96 (0.95–0.96)
Degree (DO)	−57.5*	−55.8*	0.39 (0.33–0.47)	0.40 (0.33–0.48)
International medical school graduates	−71.5*	−67.8*	0.30 (0.26–0.34)	0.31 (0.27–0.36)
Medical school faculty	17.0*	9.4*	1.44 (1.24–1.68)	1.30 (1.11–1.52)
Hold other American Board of Medical Specialties certification	−3.4	6.4	1.20 (0.83–1.72)	1.37 (0.94–1.99)
Practice organization				
Group	Reference	Reference	Reference	Reference
Solo	−40.8*	−36.4*	0.48 (0.41–0.56)	0.51 (0.43–0.60)
Other	3.9	11.7*	1.11 (0.97–1.28)	1.31 (1.14–1.51)

*Beta estimate significantly different than zero at $P < .05$.
OR, odds ratio; DO, doctor of osteopathic medicine.

Discsussion

Our study of greater than 10,000 family physicians seeking recertification with the ABFM found that a broad scope of practice, not rural location, was associated with both a higher score and increased odds of passing the MC-FP examination. A broad scope of practice and comprehensive care are foundational to primary care and geographic areas with stronger primary care systems have better health outcomes.[9] There is a consistent relationship between board certification status and the delivery of higher quality care across medical specialties. [10,11] Further, among general internists higher board scores are associated with better quality of care. [12] If the association between board scores and quality is generalizable, similar to that between board certification and quality, then our findings suggest that a broad scope of practice may be associated with the ability to deliver higher quality of care.

With family physicians shrinking their scope of practice, [2,13,14] there are critical concerns that family physicians may lose the "special sauce" of comprehensiveness[15] needed to provide effective primary care. Family medicine has the most to offer patients when family physicians have continuous relationships with patients that cross boundaries of care (outpatient, inpatient, nursing home, etc.) and when they are able to meet a majority of a patient's health care needs. When physician/patient relationships extend across multiple settings, the physician may be better able to provide patient centered and higher quality care.

Our main finding that family physicians who report a broad scope of practice that more closely mirrors the breadth of residency training perform better on the MC-FP examination may not be surprising, because the blueprint for the MC-FP examination reflects the "average family physician."[6] Family physicians are trained broadly but not to the depth of knowledge of subspecialists in specific content areas or procedural skills. While many physicians may tailor their scope of practice to their interests and patient needs, deviations from formal training may detract from core competencies gained during residency. This finding is supported by a recent study of physicians undergoing a comprehensive competence assessment which found that, across specialties, physicians whose scope of practice deviated from their training were more likely to be found incompetent.[16]

Our study is subject to multiple limitations. First, data are cross sectional and we do not know how long a physician was practicing certain clinical activities. Second, our measure of scope of practice is based on self-reported data and is not an exhaustive list of clinical activities. As such, we may not have fully captured the breadth of family medicine and also physicians may have over reported per-

Table 4. Adjusted Associations between American Board of Family Medicine Recertification Examination Score and Result Stratified by Urban and Rural Status with and without Scope of Practice for Primary Care (SP4PC) Scale

	Urban				Rural			
	Linear Regression: Examination Score Beta Estimate of Change in Examination Score		Logistic Regression: Passing Examination OR of Passing (95% CI)		Linear Regression: Examination Score Beta Estimate of Change in Examination Score		Logistic Regression: Passing Examination OR of Passing (95% CI)	
	Without SP4PC	With SP4PC	Without SP4PC	With SP4PC	Without SP4PC	With SP4PC	Without SP4PC	With SP4PC
SP4PC		5.6*		1.08 (1.06–1.11)		3.2*		1.11 (1.07–1.16)
Female	−10.8*	−9.1*	0.78 (0.68–0.90)	0.79 (0.69–0.91)	−3.0	−1.7	0.99 (0.70–1.14)	1.04 (0.73–1.48)
Age	−1.0*	−1.0*	0.95 (0.95–0.96)	0.95 (0.95–0.96)	−1.0	−0.8	0.97 (0.95–0.99)	0.97 (0.96–0.99)
Degree (DO)	−57.2*	−55.1*	0.39 (0.32–0.49)	0.40 (0.32–0.50)	−58.5*	−57.7*	0.39 (0.25–0.61)	0.40 (0.26–0.63)
International medical school graduates	−71.5*	−67.2*	0.31 (0.27–0.36)	0.32 (0.27–0.37)	−69.9*	−66.8*	0.25 (0.17–0.37)	0.27 (0.18–0.39)
Medical school faculty	19.5*	11.5*	1.48 (1.26–1.75)	1.35 (1.14–1.61)	5.7	−0.5	1.25 (0.85–1.83)	1.02 (0.68–1.51)
Hold other American Board of Medical Specialties certification	−2.1	9.1	1.28 (0.87–1.89)	1.47 (0.98–2.21)	−18.2	−13.2	0.64 (0.23–1.78)	0.71 (0.25–1.99)
Practice organization								
Group	Reference	Reference	Reference	Reference	Reference	Reference	Reference	Reference
Solo	−41.7*	−37.1*	0.45 (0.98–0.54)	0.47 (0.40–0.57)	−37.5*	−33.8*	0.68 (0.44–1.05)	0.77 (0.50–1.19)
Other	4.6*	13.3*	1.11 (0.95–1.28)	1.31 (1.12–1.52)	0.5	5.2	1.18 (0.84–1.64)	1.41 (0.99–1.99)

*Beta estimate significantly different than zero at $P < .05$.
OR, odds ratio; CI, confidence interval; DO, doctor of osteopathic medicine.

forming certain activities. Third, there are likely other factors associated with physician performance on the MC-FP examination that we were unable to account for. However, our results are consistent with prior studies that indicate strong relationships with studied variables.

In conclusion, we found that family physicians who maintain a broader scope of practice were more likely to pass the ABFM MC-FP examination. Family physician's practicing a broad scope of practice likely yields external benefits beyond passing an examination. Gains in medical knowledge from routine use in providing full spectrum care and more robust patient relationships may be associated with the ability to provide higher quality care. Determining what predicts family physicians practicing a broad or narrow scope of practice may require a mixed methods approach to capture contextual and personal preferences.

References

1. Baker E, Schmitz D, Epperly T, Nukui A, Miller CM. Rural Idaho family physicians' scope of practice. J Rural Health 2010;26:85–89.
2. Tong ST, Makaroff LA, Xierali IM, et al. Proportion of family physicians providing maternity care continues to decline. J Am Board Fam Med 2012;25: 270–271.
3. Xierali IM, Tong ST, Petterson SM, Puffer JC, Phillips RL Jr, Bazemore AW. Family physicians are essential for mental health care delivery. J Am Board Fam Med: 2013;26:114–115.
4. Peterson LE, Dodoo M, Bennett KJ, Bazemore A, Phillips RL Jr. Nonemergency medicine-trained physician coverage in rural emergency departments. J Rural Health 2008;24:183–188.
5. Schulte BM, Mannino DM, Royal KD, Brown SL, Peterson LE, Puffer JC. Community size and organization of practice predict family physician recertification success. J Am Board Fam Med 2014;27:383–390.
6. Norris TE, Rovinelli RJ, Puffer JC, Rinaldo J, Price DW. From specialty-based to practice-based: a new blueprint for the American Board of Family Medicine cognitive examination. J Am Board Fam Pract 2005;18:546–554.
7. O'Neill T, Peabody M, Blackburn B, Peterson L. Creating the Individual Scope of Practice (I-SOP) Scale. J Appl Meas 2014;15(3):227–239.
8. WWAMI Rural Health Research Center. Rural-Urban Commuting Area Codes (RUCAs). Available at http://depts.washington.edu/uwruca/. Accessed January 21, 2015.
9. Starfield B, Shi L, Macinko J. Contribution of primary care to health systems and health. The Milbank quarterly 2005;83:457–502.
10. Reid RO, Friedberg MW, Adams JL, McGlynn EA, Mehrotra A. Associations between physician characteristics and quality of care. Arch Intern Med 2010; 170:1442–1449.
11. Pham HH, Schrag D, Hargraves JL, Bach PB. Delivery of preventive services to older adults by primary care physicians. JAMA 2005;294:473–481.
12. Holmboe ES, Wang Y, Meehan TP, et al. Association between maintenance of certification examination scores and quality of care for medicare beneficiaries. Arch Intern Med 2008;168:1396–1403.
13. Xierali IM, Puffer JC, Tong ST, Bazemore AW, Green LA. The percentage of family physicians attending to women's gender-specific health needs is declining. J Am Board Fam Med 2012;25:406–407.
14. Bazemore AW, Makaroff LA, Puffer JC, et al. Declining numbers of family physicians are caring for children. J Am Board Fam Med 2012;25:139–140.
15. Holt C. An argument for comprehensiveness as the "special sauce" in a recipe for the patient-centered medical home. J Am Board Fam Med 2014;27:8–10.
16. Grace ES, Wenghofer EF, Korinek EJ. Predictors of physician performance on competence assessment: Findings from CPEP, the Center for Personalized Education for Physicians. Acad Med 2014;89:912–919.