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Abstract

Context: Scope of practice is an important factor in both training and recruiting rural family physicians. **Purpose:** To assess rural Idaho family physicians' scope of practice and to examine variations in scope of practice across variables such as gender, age and employment status. **Methods:** A survey instrument was developed based on a literature review and was validated by physician educators, practicing family physicians and executives at the state hospital association. This survey was mailed to rural family physicians practicing in Idaho counties with populations of less than 50,000. Descriptive, bivariate and multivariate analyses were employed to describe and compare scope of practice patterns. **Results:** Responses were obtained from 92 of 248 physicians (37.1% response rate). Idaho rural family physicians reported providing obstetrical services in the areas of prenatal care (57.6%), vaginal delivery (52.2%) and C-sections (37.0%) and other operating room services (43.5%), esophagogastroduodenoscopy (EGD) or colonoscopy services (22.5%), emergency room coverage (48.9%), inpatient admissions (88.9%), mental health services (90.1%), nursing home services (88.0%), and supervision to midlevel care providers (72.5%). Bivariate analyses showed differences in scope of practice patterns across gender, age group and employment status. Binomial logistic regression models indicated that younger physicians were roughly three times more likely to provide prenatal care and perform vaginal deliveries than older physicians in rural areas. **Conclusion:** Idaho practicing rural family physicians report a broad scope of practice. Younger, employed and female rural family medicine physicians are important subgroups for further study.

Keywords: scope of practice, rural medicine, family medicine, residency education

Rural areas experience significant challenges in recruiting and retaining family physicians.^{1,2} The number of rural family physicians has been declining in contrast to the increasing health care needs among rural residents, who tend to be older, sicker, poorer, less educated, and living without health insurance.³ These challenges can materially impact local community access to health care, both for general medical care and for specific medical services such as obstetrics and emergency services. Considering the current and projected declining trends in family physicians and an increase in the number of elderly citizens, the U.S. must increase the number of family physicians, especially in rural areas, in order to provide adequate care to residents.⁴

Many studies have been conducted to identify predictive factors for the recruitment and retention of family physicians in rural areas. These known factors include pre-medical school aspects such as male gender and rural background, medical school aspects such as educational experiences in rural areas and National Health Service Corps scholarship, and post-medical school aspects such as economics and spousal satisfaction.^{3,5-9}

In addition to these demographic, economic, and lifestyle preference factors, scope of practice is also identified to be a factor that influences a choice of medical practice in rural areas.¹⁰ Medical students are interested in scope of practice issues when considering family medicine as their medical specialty.¹¹ This suggests the importance of understanding scope of practice for selection and education of family physicians. This issue may be magnified when family physicians choose to practice in rural areas where other supportive medical personnel are scarce.

The scope of practice is known to be different between urban and rural physicians. Rural doctors tend to provide a broader scope of practice than family physicians in urban areas.^{12,13} The broader scope of practice may provide competitive advantages and more clinical independence but also brings concerns of breadth of competency, maintenance of competency and the requirement to deal with situations that may be outside their previous experiences and prior training.^{10,14,15}

Though studies have indicated the difference in the scope of practice between urban and rural physicians, the number of studies that explored practice patterns in rural areas of the United States is limited. In Canada, rural physicians are more likely to practice anesthesia, minor surgery, chest tube placement, and endotracheal intubation than their urban counterparts.^{16,17} They also provide longer on-call services for inpatients, emergency rooms, and nursing homes.¹⁸ Significantly more obstetrical services also have been reported in rural areas by previous studies.^{16,17}

The purpose of this study was to explore the scope of practice among family physicians in rural Idaho counties with populations less than 50,000. Quantitative and qualitative data were collected in mailed surveys. The results were further analyzed by gender, age group, and employment status.

Methods

This research was approved by the Boise State University Human Subjects Institutional Review Board.

Survey Development. The Rural Family Medicine Physician Survey was developed by the researchers based on a literature review. The final survey consisted of 36 questions including 15 demographic questions, four questions related to continuing education, 10 questions regarding scope of practice, five satisfaction questions, and two qualitative questions. The qualitative questions addressed the respondents' employment/business relationships and their primary source of continuing medical education. The draft surveys, cover letters and associated e-mail notification documents were reviewed by family physicians from the Family Medicine Residency of Idaho, by leaders of the Idaho Academy of Family Physicians, Inc. (IAFP), and by executives at the Idaho Hospital Association.

Selection and Recruitment of Target Populations. The target population for the survey was family physicians practicing in Idaho counties with populations of less than 50,000. Idaho is a rural state with 38 of the 44 counties meeting this definition of a rural county. The IAFP initially identified 275 family medicine physicians meeting this criterion in their database. The IAFP was the primary contact to these family medicine physicians for all correspondence related to this research. This included an initial e-mail notification that a survey was being sent, the mailing of the survey and cover letter along with an associated e-mail that the survey was being mailed, and the third follow-up e-mail notification which served as a reminder to return the survey. Only one mailing was employed due to budgetary constraints. Surveys were

delivered to 248 respondents in April 2007 (incorrect addresses resulted in 27 surveys being returned). Completed surveys were sent to Boise State University and were processed by researchers in the Center for Health Policy.

Data Processing and Analysis. The quantitative responses were coded and entered into SPSS (Version 14, SPSS Inc, Chicago, IL) for statistical analysis. Descriptive statistics were calculated for the 15 demographic and 10 scope of practice variables. Bivariate analyses were conducted to examine the statistical significance of differences in responses between gender, age category, and employment status. Mann-Whitney U tests were employed for survey questions with numerical responses and chi-square and Fisher exact tests were used for survey questions with categorical responses.

Multivariate analyses were conducted using Stata (Version 9.1, StataCorp., College Station, TX). Binomial logistic regression models were created for each dependent variable (scope of practice provided) to further examine the relationships among the independent variables (gender, age category, and employment status). The independent variables were introduced using a forced entry method with a standard significance criteria of $p < .05$. Variables were added one at a time to assess the change in the betas and various interactions were also examined before variables were removed from each model.

Results

The survey was returned by 92 physicians, for a response rate of 37.1%. Survey respondents matched overall 2009 IAFP membership by gender (23.1% of respondents were female versus 26.2% of IAFP membership were female) and age (average age of respondents was 47.2 years versus average age of 2009 IAFP membership being 46.5 years) supporting the representativeness of the sample. Discussions with IAFP leaders indicated no material changes in membership demographics for gender and age from 2007-2009.

Descriptive Statistics. Supplemental Table 1 provides descriptive statistics for the 15 demographic variables in the survey. Table 1 provides information on the scope of practice variables. Physician respondents reported providing obstetrics services in the areas of prenatal care (57.6%), vaginal delivery (52.2%) and C-sections (37.0%). These respondents also provided other operating room services (43.5%), esophagogastroduodenoscopy (EGD) or colonoscopy services (22.5%), emergency room coverage (48.9%), inpatient admissions (88.9%), mental health services (90.1%), nursing home services (88.0%), and supervision to midlevel care providers (72.5%).

Comparative Bivariate Results. Comparative bivariate analyses were conducted by gender, age group and employment group. Age groups were constructed using the median age for all family medicine physician respondents. The median age was 48.5 years. Two age groups were created: 30-48 years and 49-83 years of age. Employment group classifications were constructed using qualitative responses from the survey. Two groups were constructed: Employed and Not Employed. Examples of "Employed" include employees of a community health center or a hospital. Examples of "Not Employed" include co-owner of a corporation, solo LLC and partnership.

Supplemental Tables 2 and 3 provide statistical results for the comparative bivariate analyses for gender, age group and employment group for the 15 demographic variables in the survey. Table 2 shows the comparative bivariate analyses for the scope of practice variables. Scope of practice findings indicated that male respondents were more likely to provide other operating room services ($p = .012$) and EGD or colonoscopy services ($p = .005$) than female respondents. Respondents in the 30-48 year age group were more likely to provide prenatal care ($p = .006$), vaginal delivery ($p = .012$), and inpatient admissions ($p = .044$) than respondents in the 49-83 year age group. Employed respondents were more likely to provide prenatal care ($p = .049$), emergency room coverage ($p = .007$), and to supervise midlevel providers ($p = .039$) than not employed respondents. Not employed respondents were more likely to provide mental health services ($p = .016$) than their employed counterparts.

Results for Multivariate Modeling. When gender, age category and employment status were introduced into a binomial logistic regression model for each scope of practice type, many of the significant bivariate results disappeared. However, two models indicated significant differences: prenatal care and vaginal delivery. Rural family physicians age 30-48 were roughly three times more likely to practice both prenatal care (OR= 3.30, CI= 1.39-7.85, $p < .01$) and vaginal deliveries (OR=2.92, CI=1.25-6.81, $p < .05$) compared to their 49-83 year old counterparts. As illustrated by the small McFadden's R^2 for the prenatal care model (0.06) and vaginal delivery model (0.05), little of the variance was explained by the available independent variables. The ROC curve for the prenatal model was 0.64 and was 0.63 for the vaginal delivery model.

Each of the scope of practice categories were examined with the independent variables and interactions between age and gender were also examined for each model. Beside the prenatal care and vaginal delivery models, the other models indicated non-significant p values or high standard errors, an indicator of potential collinearity, and therefore are not reported.

Discussion

Rural family physicians who responded to this survey were involved in a variety of clinical activities that varied across gender, age group and employment status. Female respondents were younger than male respondents and were also more likely to be employed. As such, these family physicians may be an important group for further research on retention issues. Females treated fewer clinic patients per week than males and this productivity finding may merit additional research. Females were less likely to provide non-obstetrics related operating room services and EGD or colonoscopy procedures than males.

Respondents in the 30-48 year group were more likely to provide prenatal care, vaginal deliveries and inpatient admissions than respondents in the 49-83 year age group. The binomial logistic regression model showed that younger physicians were roughly three times more likely to provide prenatal care and vaginal delivery when controlling for age, gender and employment status. Respondents in the 30-48 year age group were also more likely to be employed, more likely to have medical school or residency training in Idaho, more likely to have service obligation or loan repayment at their current site and more likely to plan to maintain board certification in family medicine than older respondents.

Employed respondents were younger and saw fewer clinic patients per week than not employed respondents. Employed respondents were also more likely to have service obligation or loan repayment at their current site and to plan to maintain board certification in family medicine than not employed respondents. Employed respondents were more likely to provide prenatal care, emergency room coverage, and to supervise midlevel care. Employed respondents were less likely to provide mental health care. The provision of mental health service issue also supports further research, especially given the demographic changes anticipated over the next 25 years.

The primary limitation of this research is that the respondents for the survey may not represent the entire eligible respondent class. The overall response rate (37.1%, 92/248) was relatively high given the survey methodology; however the non-respondents could significantly impact the results. However, the fact that the respondents matched the IAFP general membership across gender and age demographics mitigates this concern. A second limitation of the research is that small sample sizes in some analyses yielded limited statistical power to detect differences between groups. The multivariate models would benefit from additional independent variables. However, the sample size must be increased prior to the introduction of additional independent variables in order to build robust models.

Practicing rural family physicians in Idaho report providing a broad scope of patient services across a wide variety of practice domains. This research suggests that factors such as age, employment status and gender are important as they relate to scope of practice of family physicians in rural areas of Idaho. A consistent and adequate supply of family physicians is critical to Idaho citizens in order to maximize their health outcomes. That being said, recent research indicates that Idaho will need substantially more family physicians in the coming years.^{4,19} Curricular development in residency programs must respond to the scope of practice demands anticipated in rural practice following graduation. One such area is obstetrics where younger respondents reported even greater participation than their counterparts. The key groups in the recruitment, training, and retention of these physicians have a duty to assist in making sure that all reasonable efforts are made to ensure that rural areas have the medical services they need. Further investigating these factors may have significant implications when planning for the future health care needs of Idaho's rural citizens as well as their national counterparts.

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Table 1
Overall Scope of Practice Results

Respondents who Provide	N	Yes (%)
Prenatal care	92	53 (57.6)
Vaginal delivery	92	48 (52.2)
C-section	92	34 (37.0)
Other OR services	92	40 (43.5)
EGD or colonoscopy	89	20 (22.5)
ER coverage	92	45 (48.9)
Inpatient admissions	90	80 (88.9)
Mental health services	91	82 (90.1)
Nursing home services	92	81 (88.0)
Supervision to midlevel care	91	66 (72.5)

Table 2
Differences in Scope of Practice Variables by Gender, Age Group, and Employment Group

	Gender		Age Group		Employment Group	
	Male	Female	30-48 years old	49-83 years old	Employed	Not Employed
Respondents who Provide	% Yes	% Yes	% Yes	% Yes	% Yes	% Yes
Prenatal care	58.6	52.4	71.7**	43.5**	73.3*	51.7*
Vaginal delivery	54.3	42.9	65.2*	39.1*	63.3	48.3
C-section	38.6	28.6	41.3	32.6	43.3	35.0
Other OR services	50.0*	19.0*	43.5	43.5	36.7	48.3
EGD or colonoscopy	28.4 ^{††}	0.0 ^{††}	28.3	16.3	26.7	21.1
ER coverage	51.4	38.1	56.5	41.3	70.0**	40.0**
Inpatient admissions	89.9	85.0	95.6*	82.2*	93.1	89.8
Mental health services	89.9	90.5	93.5	86.7	80.0 [†]	96.6 [†]
Nursing home services	90.0	81.0	91.3	84.8	80.0	91.7
Supervision to midlevel care	71.0	76.2	78.3	66.7	86.7*	66.1*

**p < .01, *p < .05, two-tailed Chi-square test.

^{††}p < .01, [†]p < .05, two-tailed Fischer's Exact test due to cell count minimums.

Supplemental Table 1
Demographic Characteristics of Survey Respondents

Continuous Variables	N	Mean	SD	Median	Range
Age	92	47.2	10.9	48.5	30-83
Years in practice post residency	92	16.0	11.2	13.5	1-55
Years at this practice site	92	12.9	10.3	10.0	1-38
Future years anticipated to be at this practice site	76	13.1	7.9	10.0	0-30
Future years anticipated to be in practice at any site	83	16.7	8.4	17.0	0-40
Proximity of practice site to residency training site in miles	88	705.7	743.4	375.0	15-3000
Proximity of practice site to hometown or extended family in miles	88	861.8	963.0	460.0	0-3400
Hours per week on average in providing direct patient care	92	44.3	12.1	44.5	16-72
Hours per week on average in being on call for any service	82	40.0	32.5	33.5	0-168
Number of clinic patients seen per week on average	88	88.5	36.3	85.0	0-210
Categorical Variables	N	Yes (%)			
Gender (Males coded as "Yes"; Females "No")	91	70 (76.9)			
Any medical school/residency training in Idaho	92	31 (33.7)			
Any service obligation or loan repayment at current site	92	20 (21.7)			
Plan to maintain board certification in Family Medicine	87	78 (89.7)			
Encourage medical students/residents to enter rural Family Medicine	86	76 (88.4)			

Supplemental Table 2

Differences across Demographic Continuous Variables by Gender, Age Group, and Employment Group

Continuous Variables	Gender		Age Group		Employment Group	
	Male	Female	30-48 years old	49-83 years old	Employed	Not Employed
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Age	48.7 (10.4)*	42.0 (11.0)*	38.1 (5.1)	56.4 (6.4)	40.7 (8.7)**	50.3 (10.3)**
Years in practice post residency	17.4 (10.7)**	10.8 (11.2)**	7.1 (4.4)**	24.8 (8.5)**	9.1 (7.5)**	19.4 (11.3)**
Years at this practice site	14.4 (10.3)**	7.2 (8.2)**	5.9 (4.3)**	19.8 (9.9)**	6.7 (5.8)**	16.2 (10.7)**
Future years anticipated to be at this practice site	13.7 (8.1)	11.3 (6.7)	17.1 (7.8)**	9.8 (6.2)**	14.3 (7.6)	12.7 (8.0)
Future years anticipated to be in practice at any site	16.5 (8.5)	17.6 (8.4)	21.8 (7.3)**	11.4 (5.9)**	21.1 (8.3)**	14.6 (7.6)**
Proximity of practice site to residency training site in miles	631.1 (662.4)	894.0 (924.7)	694.2 (794.8)	716.7 (699.6)	792.1 (754.9)	627.9 (711.1)
Proximity of practice site to hometown or extended family in miles	777.9 (896.7)	1120.4 (1163.5)	949.0 (1093.0)	778.5 (823.9)	1017.7 (1003.8)	802.8 (954.6)
Hours per week on average in providing direct patient care	45.2 (12.4)	40.3 (10.2)	45.7 (11.3)	42.8 (12.9)	47.2 (11.8)	43.4 (11.7)
Hours per week on average in being on call for any service	42.2 (31.0)	32.8 (37.0)	34.4 (25.2)	45.1 (37.5)	45.9 (31.7)	37.6 (33.1)
Number of clinic patients seen per week on average	93.9 (38.1)**	69.8 (22.7)**	81.0 (24.9)	96.3 (44.3)	69.5 (24.8)**	98.7 (37.3)**

** $p < .01$, * $p < .05$, two-tailed Mann Whitney-U test.

Supplemental Table 3

Differences across Demographic Categorical Variables by Gender, Age Group, and Employment Group

Categorical Variables	Gender		Age Group		Employment Group	
	Male	Female	30-48 years old	49-83 years old	Employed	Not Employed
	% Yes	% Yes	% Yes	% Yes	% Yes	% Yes
Gender (Males coded as "Yes")	-	-	69.6	84.4	62.1**	83.3**
Age Group (30-48 years old coded as "Yes")	45.7	66.7	-	-	73.3*	38.3*
Employed Group (Employed coded as "Yes")	26.5*	52.4*	48.9**	17.8**	-	-
Any medical school/residency training in Idaho	35.7	28.6	54.6**	13.0**	43.3	30.0
Any service obligation or loan repayment at current site	20.0	28.6	43.5**	0.0**	43.3**	11.7**
Plan to maintain board certification in Family Medicine	88.0	94.7	97.8 [†]	80.5 [†]	100.0 [†]	85.7 [†]
Encourage medical students/residents to enter rural Family Medicine	87.7	95.0	88.9	87.8	93.3	87.0

** $p < .01$, * $p < .05$, two-tailed Chi-square test.

^{††} $p < .01$, [†] $p < .05$, two-tailed Fischer's Exact test due to cell count minimums.