

7-1-2015

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### Abstract

**Context:** An important consideration determining health outcomes is to have an adequate supply of physicians to address the health needs of the community. **Purpose:** The purpose of this investigation was to assess scope of practice factors for Idaho rural family physicians in 2012 and to compare these results to findings from a 2007 study. **Methods:** The target population in this study was rural family physicians in Idaho counties with populations of fewer than 50,000. Identical surveys and methods were utilized in both 2007 and 2012. **Results:** The physician survey was mailed to 252 rural physicians and was returned by 89 for a response rate of 35.3%. Parametric and non-parametric statistical analyses were conducted to analyze the 2012 results and to assess changes in scope of practice across the time periods. **Discussion:** The percentage of rural family physicians in Idaho in 2012 who provided prenatal care, vaginal deliveries and nursing home care was significantly lower than the results from the 2007 survey. Female physicians were more likely to provide prenatal care and vaginal deliveries than males in 2012. Male physicians were more likely to provide emergency room coverage and esophagogastroduodenoscopy or colonoscopy services than females in 2012. Younger physicians were found to be more likely to provide inpatient admissions and mental health services in 2012 than older physicians. Employed physicians were more likely to provide Cesarean sections, other operating room services and emergency room coverage in 2012 than non-employed physicians. Further research is needed to assess the root causes of these changes.

**Keywords:** family physician workforce, rural medicine, rural family physician recruitment, rural family physician scope of practice

Physician workforce in rural communities is a major problem in the United States (US) health care system.<sup>1-3</sup> About 19.2% of the US population resides in rural areas while only about 11.4% of US physicians practice medicine in these locations.<sup>4</sup> This disproportionately low number of practicing physicians in rural areas is troublesome since rural populations typically require additional health care services compared to urban communities due to lower socioeconomic status, sicker populations, access to care challenges, greater health disparities, and a larger proportion of uninsured individuals.<sup>5,6</sup> In addition, physician workforce shortages continue to increase with the overall rise of the US population, as the proportion of elderly increases,<sup>7</sup> and as health care legislation factors increase access to health care services.<sup>8</sup>

According to a recent report by the U.S Department of Health and Human Services the primary care physician supply will not reach the demand, leaving a projected shortage of roughly 20,400 physicians by 2020.<sup>9</sup> Physician choice of practice has fallen further away from primary care, which impacts the equality of health care in rural areas as well as health outcomes in the US health care system.<sup>10,11</sup> Medical students are deciding to follow careers in a sub-specialty field versus primary care for several reasons. These reasons include the following: the income gap, scope of practice challenges, work environment, additional administrative tasks demands, perceived lower status level, desire for lifestyle, and decreased patient interaction due to crammed schedules.<sup>5,12,13</sup>

Similarity, Idaho is experiencing a physician shortage, ranking 49th in the US for active physicians per capita and 47th for active primary care physicians per capita.<sup>14</sup> Idaho also has the 6th oldest physician workforce in the US with about 40% of the physicians age 55 or older and about 24.6% of the physicians 60 or older.<sup>14</sup> Idaho participates in the University of Washington Medical School WWAMI (Washington, Wyoming, Alaska, Montana, and Idaho) program and University of Utah programs. Idaho ranks 7th with a 56.0% physician retention rate of graduate medical students participating in an Idaho residency program but ranks 48th among states for residents and fellows per capita.<sup>14</sup>

A lack of sufficient rural training positions to fully address the number of properly trained physicians needed to provide medical care in rural communities can directly relate to scope of practice challenges, including the adequacy of preparation for practice in rural areas.<sup>5,8</sup> To help decrease this barrier nationally, several programs have offered family medicine Rural Training Track (RTT) residency programs in an effort to build the family medicine workforce in rural areas.<sup>15</sup> One multi-state study has reported that 71.9% of graduating RTT residency program family medicine physicians began their clinical practices in rural areas and that 60.6% continued to practice in rural areas after 3 years.<sup>16</sup>

Among other factors, scope of practice is an important factor contributing to the ultimate choice of physician location of practice.<sup>17,18</sup> The growing imbalance of supply and demand causes many rural family physicians to broaden their scope of practice to fill the void of health care services.<sup>6,19</sup> Oftentimes rural physicians are required to maintain a broader scope of training and practice in comparison to their urban counterparts in areas such as obstetrics, surgery, and emergency services—services which urban family physicians can quickly access through nearby local hospitals.<sup>6,20-22</sup> Other significant factors related to scope of practice include teaching opportunities, supervision of other health professionals and emergency room coverage.<sup>18,23-25</sup>

An important consideration in health outcomes in rural Idaho is to have an adequate supply of family physicians that are capable of covering the broad scope of practice necessary to address the health care needs of the community.<sup>26</sup> Efforts involve expansion of residency programs, including rural training tracks, which are linked to producing physicians practicing in rural and underserved communities following graduation. Other present efforts include the implementation of the patient-centered medical home model in transforming medical services delivery as illustrated in the Idaho State Healthcare Innovation Plan.<sup>27</sup> Additionally, workforce and education efforts are coordinated on a state basis, utilizing a governor-appointed Idaho Health Profession Education Council.<sup>28</sup> The purpose of this investigation is to compare the results from a 2007 Idaho family physician rural workforce study<sup>24</sup> to the current (2012) study of family medicine physicians in rural Idaho and identify factors important in the provision of key services by family medicine physicians in rural areas.

## Methods

### Human Subjects Review and Approval

The research methods described in this section as well as the survey instruments were reviewed and approved by Boise State University's Human Subjects Institutional Review Board on August 28, 2012 (EX 199-SB12-093).

### Survey Development

The rural family physician survey was developed by the researchers following an extensive review of the literature in 2007. The draft survey, cover letters and associated e-mail notification documents were subsequently reviewed by physicians from the Family Medicine Residency of Idaho, by leaders of the Idaho Academy of Family Physicians, Inc., and by executives at the Idaho Hospital Association prior to utilization in 2007. These documents

mirror those used in the 2007 survey in order to maximize the comparative value of the study. Only minor editorial changes in the cover letters were permitted in 2012. The surveys were equivalent in 2007 and 2012. The survey questions addressed demographic characteristics of the respondents, scope of practice and other medical practice issues. There were 25 total questions with several questions having multiple responses. Twenty-three of the questions were quantitative while the other two questions assessed employment/business relationships of the medical practices and methods of continuing education. The question addressing employment/business relationships was used to construct the dichotomous variable “employed versus not-employed” and was used in subgroup analyses, while the answers to the continuing education question were tallied into categories.

### Selection and Recruitment of Target Populations

The target population for the rural physician survey was physicians practicing in Idaho counties with populations of fewer than 50,000. The Idaho Academy of Family Physicians, Inc. (IAFP) initially identified 288 physicians meeting this criterion in their database. The IAFP was the primary contact to these physicians for all correspondence related to this research. This included the initial e-mail notification that a survey was being sent, the mailing of the survey and cover letter, and the second e-mail notification. Surveys were delivered by the IAFP to 252 physicians, as undeliverable addresses resulted in 36 surveys being returned. In 2007, surveys were delivered to 248 physicians. Target selection and recruitment processes were equivalent in 2007 and 2012.

### Survey Administration Process

The IAFP sent an e-mail notification to their association members on or about September 26, 2012, that a survey was being sent related to rural physician workforce concerns. Simultaneously, the surveys were mailed to the respondents. The survey package included: (1) the survey, (2) a cover letter with IAFP letterhead, and (3) a University X return postage-paid business reply mail envelope. The survey package was enclosed in an IAFP official envelope. Members were requested to return the survey by October 16, 2012. On or about October 8, 2012, a reminder e-mail was sent by the IAFP. Completed surveys were sent to University X. Survey administrative methods were equivalent in 2007 and 2012.

### Data Processing, Analysis and Storage

The surveys were processed at University X by researchers who coded quantitative responses and entered these data into SPSS (Version 20.0, IBM Corporation, Armonk, New York) for statistical analysis. The qualitative comments were transcribed into Excel documents. The researchers then reviewed and categorized these responses.

The overall analyses for the rural family physician survey employed descriptive statistics. The comparative analyses for the surveys utilized *t*-tests (with equal and unequal variance assumptions) and Mann-Whitney U tests for survey questions with numerical responses and Chi-Square and Fisher’s Exact tests for survey questions with categorical responses. These data have been stored in locked files and on password-protected hard drives at the University X. Access to the raw data has been limited to the research investigators.

## **Results**

### Rural Family Medicine Physician Survey Results

The rural family physician survey was successfully mailed to 252 rural family medicine physicians and was returned by 89 for a survey response rate of 35.3%. This response rate was similar to the 37.1% (92/248) rate obtained for the 2007 survey. Additional comparative demographic information for the 2007 and 2012 surveys is detailed in Table 1. None of these comparisons are statistically different across time, but it is interesting to note the higher percentage of family physicians who had medical school or residency training in Idaho in 2012 (33.7% in 2007 versus 44.3% in 2012).

## 2012 Overall Descriptive Results

Rural family physician respondents were an average of 48.9 years of age and had an average of 17.2 years in practice post residency. These family physicians reported an average of 12.7 years of service at their current practice site and anticipated they would be at this site for an additional average of 11.4 years. They also reported that they anticipated future years of work at any site to be an average of 15.5 years. The average distance from the practice site to the reported physician residency site was 784.5 miles. There were 53.5% of rural family medicine physicians less than 500 miles from their practice site to the reported physician residency site. The 2012 results show that 22.5% of the respondents were female and 44.3% of the respondents had medical school or residency training in Idaho. Of the responding family medicine physicians, 25.6% indicated that they had an opportunity for loan repayment at their current site.

## Comparison Results Across Years

Table 2 represents the overall comparison results for family physician scope of practice results examined across 2007 to 2012. In 2012 rural family physicians were significantly less likely to provide prenatal care ( $P = .020$ ), vaginal delivery ( $P = .011$ ), and nursing home services ( $P = .037$ ) compared to 2007 results.

Table 3 indicates the differences in scope of practice variables by gender and year. In 2012 females were more likely to provide prenatal care ( $P < .05$ ) than males, and similarly females were more likely to provide vaginal deliveries ( $P < .05$ ) than males in 2012, which were both not significantly different in 2007. In 2007 males were significantly more likely than females to offer other operating room services ( $P < .05$ ), while in 2012 there was no significant difference to report. In 2012 male respondents were more likely than females to provide esophagogastroduodenoscopy or colonoscopy ( $P < .05$ ), which mirrored the significant difference between gender for this category in 2007. In 2012 males were significantly more likely than females to provide emergency room coverage ( $P < .05$ ).

Table 4 represents differences in scope of practice variables by age group and year. In 2012 the previous significant values identified in 2007 for the younger age group—being more likely than the older age group to provide prenatal care and vaginal delivery—were no longer identified as significant. In 2012 the younger age group was significantly more likely to provide inpatient admissions ( $P < .001$ ), continuing a significant difference first identified in the 2007 survey. The younger age group was also more likely to provide mental health services ( $P \leq .05$ ) in 2012, a difference that was not identified in the 2007 survey.

Table 5 demonstrates the differences in scope of practice variables by employment group and year. In 2012 the employed respondents were significantly more likely than the not employed group to provide Cesarean sections ( $P < .05$ ) and other operating room services ( $P = .05$ ). These differences were not noted in 2007. Employed physicians were also more likely to cover the emergency room ( $P < .01$ ), which was consistent with 2007 findings. In 2007 the employed group was significantly more likely than the not employed group to provide prenatal care, mental health services and supervision to mid-level care. These differences were not identified in the 2012 data.

## **Discussion**

### Research Limitations

The primary limitation of this research is that the respondents for the surveys may not represent the entire eligible respondent classes. However, comparisons of the average age and gender of the respondents to the comparable statistics of the full Idaho Academy of Family Physicians (IAFP) membership show similar values (average age: 48.9 sample versus 47.6 IAFP full membership; percent female: 22.5% sample versus 30.8% IAFP full membership), and this increases the likelihood that the obtained sample of physicians represents the entire population of interest. Similar comparisons were done for the 2007 survey with consistent results, indicating that the samples were representative of the target populations. It is important to note that the full IAFP membership includes both rural and non-rural IAFP members and may overstate total female membership relative to rural female actual rates.

A second limitation of this study is that the statistics reported represent percentages and not actual number of physicians. The total number of eligible family physician respondents who were members of the Idaho Academy of Family Physicians (IAFP) did not change materially from 2007 to 2012 (248 eligible respondents in 2007 versus 252 eligible respondents in 2012). Actual number of practicing rural family physicians is difficult to collect due to idiosyncrasies in the methods used by the Idaho Bureau of Labor and State Board of Medicine. That being said, the similar number of eligible IAFP respondents for the two time periods suggests a stable number of rural family physicians in Idaho.

### Overall Results

Responding rural family physicians reportedly are significantly less likely to provide prenatal care and vaginal deliveries in 2012 compared to 2007. This finding could suggest that a fewer number of physicians are providing obstetrics services in the rural hospital settings overall, could be related to a consolidation of those family physicians providing obstetrics services, or might be associated with a change in the type of staff performing obstetrics services. This is an area for further research. A significant difference in the response by gender was identified for prenatal care and vaginal delivery in 2012, with females more likely than males to be providing these services, while no such significant difference was reported in 2007. Although not reaching statistical significance, an increase in the percentage of family physicians reporting the supervision of physicians and/or nurse practitioners may be worthy of additional research and was the only scope of practice factor which increased from 2007 to 2012 (72.5% in 2007 versus 81.8% in 2012).

Gender was also noted to be a significant factor for the likelihood of providing emergency room coverage and for esophagogastroduodenoscopy or colonoscopy services, with males reported providing these services at a significantly higher rate. The reasons for differences seen in scope of practice between gender groups are areas for further research. Possible causes may relate to patient preferences in selecting a provider; provider preferences in areas of practice including enjoyment of practice, payment or lifestyle implications; or other factors. Regardless, with a recognized increase in females entering medical schools as a proportion of all matriculates,<sup>26</sup> these changes in demographics regarding medical school admissions and practicing physicians are important areas for further study, as they effect delivery of specific areas of patient care to already underserved rural areas.

Age was noted to be a factor in that younger physicians were found to be more likely to provide inpatient admissions and also mental health services. As every part of Idaho is a federally designated Mental Health Shortage Area,<sup>29, 30</sup> this is an important area for further study. One possible reason for these findings would be the training family physicians receive and the recency of that residency training in such areas as mental health and care of hospitalized patients in rural settings.

Differences by employment status were seen in 2012 for Cesarean sections, other operating room services and emergency room coverage, with employed physicians more likely to provide these services than the not employed group. Emergency room coverage demonstrated significantly more employed respondents providing services in both 2007 and 2012. While an area for further study, this may be due to the absolute requirement for hospitals providing emergency care and those providing obstetrical deliveries to have continuous coverage for these services at all times. This unique requirement for these types of services in settings of lower patient encounter rates is likely related to the contractual relationships seen in rural family physician hospital settings.

Overall, rural Idaho family physicians in 2012 were significantly less likely to provide nursing home services when compared to 2007, which should be further researched to determine if nursing home services are being alternatively staffed, consolidated, or if services for nursing home care have otherwise changed. It can be anticipated that specialization in geriatrics and expertise in nursing home care may continue to be a high priority for family physician training and workforce as rural geriatric populations continues to grow.<sup>31</sup>

### **Summary**

Rural hospitals and family physician practices across the country are experiencing workforce challenges. Understanding more about which providers in these settings deliver what scope of services has important implications. An example is the continuous coverage of critical services such as emergency room coverage and obstetrical care, which may be in jeopardy of no longer being offered in some isolated rural areas. In this study,

however, we found significant differences across gender, age group, and employment status, which should be considered further in an effort to ensure the availability of robust services to rural Idaho citizens in a state that ranks nearly last for the number of physicians per capita. Idaho has made concerted efforts to expand physician training, focus on the development of rural training track programs and coordinate workforce needs with educational resource allotment. In a transforming delivery system, Idaho will continue to coordinate these efforts to provide the necessary scope of services and better define the roles of family physicians in rural areas. A better understanding of these factors has implications for sustaining rural hospitals and physician practices, will impact medical education, and will be important in health care system planning.

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**Table 1. Demographic Characteristics of Survey Respondents**

Continuous Variables	Year 2007		Year 2012		P value
	N	Mean	N	Mean	
Age	92	47.2	89	48.9	.282
Years in practice post residency	92	16.0	89	17.2	.444
Years at this practice site	92	12.9	89	12.7	.905
Future years anticipated to be at this practice site	76	13.1	76	11.4	.191
Future years anticipated to be in practice at any site	83	16.7	81	15.5	.411
Proximity of practice site to residency training site in miles	88	705.7	86	784.5	.511
Proximity of practice site to hometown or extended family in miles	88	861.8	86	707.6	.258
Categorical Variables	N	Yes (%)	N	Yes (%)	
Gender (Males coded as "Yes"; Females "No")	91	70 (76.9)	89	69 (77.5)	.923
Any medical school/residency training in Idaho	92	31 (33.7)	88	39 (44.3)	.144
Any service obligation or loan repayment at current site	92	20 (21.7)	86	22 (25.6)	.546
Plan to maintain board certification in Family Medicine	87	78 (89.7)	86	78 (90.7)	.818
Encourage medical students/residents to enter rural Family Medicine	86	76 (88.4)	82	65 (79.3)	.108

Continuous Variables, \*\* $P < .01$ , \* $P < .05$ ,  $t$ -test test statistic.

Categorical Variables, † $P < .01$ , ‡ $P < .05$ , two-tailed Chi-square test.

**Table 2.**  
**Overall Scope of Practice Results Across Years**

	Year		Year		P value
	2007	2012	2007	2012	
Respondents Who Provide:	N	N	Yes (%)	Yes (%)	
Prenatal care	92	87	53 (57.6)	35 (40.2)	.020*
Vaginal delivery	92	87	48 (52.2)	29 (33.3)	.011*
Cesarean section	92	84	34 (37.0)	21 (25.0)	.087
Other OR services	92	82	40 (43.5)	26 (31.7)	.110
Esophagogastroduodenoscopy or colonoscopy	89	86	20 (22.5)	15 (17.4)	.406
ER coverage	92	88	45 (48.9)	35 (39.8)	.217
Inpatient admissions	90	87	80 (88.9)	68 (78.2)	.054
Mental health services	91	87	82 (90.1)	75 (86.2)	.420
Nursing home services	92	88	81 (88.0)	67 (76.1)	.037*
Supervision to midlevel care	91	88	66 (72.5)	72 (81.8)	.139

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

**Table 3. Differences in Scope of Practice Variables by Gender by Year**

Respondents Who Provide:	2007		2012	
	Gender		Gender	
	Male	Female	Male	Female
	% Yes	% Yes	% Yes	% Yes
Prenatal care	58.6	52.4	34.3*	60.0*
Vaginal delivery	54.3	42.9	26.9*	55.0*
Cesarean section	38.6	28.6	23.1	31.6
Other OR services	50.0*	19.0*	30.2	36.8
Esophagogastroduodenoscopy or colonoscopy	28.4 <sup>††</sup>	0.0 <sup>††</sup>	22.7 <sup>†</sup>	0.0 <sup>†</sup>
ER coverage	51.4	38.1	47.1*	15.0*
Inpatient admissions	89.9	85.0	80.6	70.0
Mental health services	89.9	90.5	86.6	85.0
Nursing home services	90.0	81.0	79.4	65.0
Supervision to midlevel care	71.0	76.2	77.9	95.0

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

<sup>††</sup> $P < .01$ , <sup>†</sup> $P < .05$ , two-tailed Fischer's Exact test due to cell count minimums.

**Table 4. Differences in Scope of Practice Variables by Age Group by Year**

	2007		2012	
	Age Group		Age Group	
	≤ 48 years old	>49 years old	≤ 48 years old	>49 years old
Respondents Who Provide:	% Yes	% Yes	% Yes	% Yes
Prenatal care	71.7**	43.5**	48.8	32.6
Vaginal delivery	65.2*	39.1*	41.5	26.1
Cesarean section	41.3	32.6	27.5	22.7
Other OR services	43.5	43.5	28.9	34.1
Esophagogastroduodenoscopy or colonoscopy	28.3	16.3	22.5	13.0
ER coverage	56.5	41.3	34.1	44.7
Inpatient admissions	95.6*	82.2*	95.1**	63.0**
Mental health services	93.5	86.7	97.6**	76.1**
Nursing home services	91.3	84.8	80.5	72.3
Supervision to midlevel care	78.3	66.7	90.2	74.5

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

†† $P < .01$ , † $P < .05$ , two-tailed Fischer's Exact test due to cell count minimums.

**Table 5. Differences in Scope of Practice Variables by Employment Group by Year**

	2007		2012	
	Employment Group		Employment Group	
	Employed	Not Employed	Employed	Not Employed
Respondents Who Provide:	% Yes	% Yes	% Yes	% Yes
Prenatal care	73.3*	51.7*	51.4	32.6
Vaginal delivery	63.3	48.3	45.9	25.6
Cesarean section	43.3	35.0	37.1*	16.7*
Other OR services	36.7	48.3	44.4*	23.1*
Esophagogastroduodenoscopy or colonoscopy	26.7	21.1	24.3	9.5
ER coverage	70.0**	40.0**	60.5**	23.3**
Inpatient admissions	93.1	89.8	83.8	76.7
Mental health services	80.0 <sup>†</sup>	96.6 <sup>†</sup>	86.5	86.0
Nursing home services	80.0	91.7	75.7	79.5
Supervision to midlevel care	86.7*	66.1*	83.8	77.3

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

<sup>††</sup> $P < .01$ , <sup>†</sup> $P < .05$ , two-tailed Fischer's Exact test due to cell count minimums.