



# Scope of Practice Among Recent Family Medicine Residency Graduates

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**BACKGROUND AND OBJECTIVES:** The scope of practice among primary care providers varies, and studies have shown that family physicians' scope may be shrinking. We studied the scope of practice among graduates of residencies associated with Preparing the Personal Physician for Practice (P4) and how length of training and individualized education innovations may influence scope.

**METHODS:** We surveyed graduates 18 months after residency between 2008 and 2014. The survey measured self-reported practice characteristics, scope of practice and career satisfaction. We assessed scope using individual practice components (25 clinical activities, 30 procedures) and a scaled score (P4-SOP) that measured breadth of practice scope. We conducted subgroup analyses according to exposure to innovations over the project period and exposure to specific innovations.

**RESULTS:** No significant differences were found in mean P4-SOP scores between the Pre and Full P4 groups. Compared to national data, P4 graduates reported higher rates for vaginal deliveries (19.3% vs 9.2%), adult inpatient care (48.5% vs 33.7%) and nursing home care (25.4 vs 11.7%) in practice. Graduates exposed to innovations that lengthened training, compared to standard training length, were more likely to include adult hospital care (58.2% vs 38.5%,  $P=0.002$ ), adult ICU care (30.6% vs 19.2%,  $P=0.047$ ) and newborn resuscitation (25.6% vs 14%,  $P=0.028$ ) in their practice and performed 19/30 procedures at higher rates. Graduates of programs with individualized training innovations reported no significant differences in scope compared to graduates without this innovation.

**CONCLUSIONS:** Graduates of residencies engaged in significant educational redesign report a broad scope of practice. Innovations around the length of training may broaden scope and individualized education appears not to constrict scope.

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In 2004, the Future of Family Medicine (FFM) Report described a new model of practice "committed to providing the full basket of clinical services offered by family medicine."<sup>1</sup> This new model, now

termed the patient centered medical home (PCMH), was envisioned to ensure that family physicians provide accessible and comprehensive care for all Americans. Ten years later, Family Medicine for America's

Health calls for family physicians to consider expanding the services they provide and the settings in which they practice to deliver comprehensive, patient-centered primary care to patients, families, and communities.<sup>2</sup> Comprehensiveness of care, an essential tenet of primary care, has been described by Barbara Starfield as "universal provision of extensive and uniform benefits for children, the elderly, women, and other adults; routine OB care; mental health needs addressed; minor surgery; and generic preventive care."<sup>3</sup>

Despite the focus on comprehensive care, the actual scope of family physicians varies considerably<sup>4</sup> and appears to be shrinking, notably in the provision of maternity, pediatric and nursing home care.<sup>5-8</sup> Factors such as compensation, lifestyle concerns, and lack of institutional or community support have been mentioned as contributors to this narrowing of scope of practice.<sup>6,9</sup> Additionally, in an era of rapid changes in health care delivery, the definition of comprehensiveness is in evolution and studies of the association

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between practice scope and patient outcomes and costs of care are occurring.<sup>10</sup> Precise measures of practice scope are needed to better study comprehensiveness, and recently researchers have proposed methodology for measuring an individual family physician's scope of practice based on self-report of practice activities.<sup>11,12</sup>

Family medicine residency training ideally should be preparing its graduates to meet the needs of the patients and communities they serve. Identifying the impacts of innovations in graduate medical education on comprehensiveness of care is integral to the discussion of both primary care workforce needs and optimal training models in the discipline. This is justified, in part, by findings that a broader scope of practice among family physicians is associated with an increased likelihood of passing board certification examination<sup>13</sup> and with decreased cost and hospitalizations.<sup>10</sup> Residencies are trying to determine whether or not longer training or more individualized options move the discipline closer or farther from producing family physicians equipped to deliver comprehensive care.

The intent of the Preparing the Personal Physician for Practice (P4) project was to improve the graduate medical education of family physicians so they were better prepared to be outstanding personal physicians and work in emerging new models of care.<sup>14</sup> The project provided a naturalistic opportunity to study the possible effects of various residency innovations. In this paper, we present the scope of practice of graduates in the 14 family medicine residencies associated with the P4 project. We conduct subgroup analyses to examine scope of practice according to exposure to innovations over the project period, as well as associations between scope of practice and length of training experimentation and individualized education innovations. We specifically explored the following hypotheses: (1) graduates of P4 programs will report a wider scope

of practice compared to the nationally-reported scope of practicing family physicians; (2) graduates of P4 programs with expanded length of training will report a wider scope of practice compared to programs that did not change length of training; and (3) graduates of P4 programs with individualized curriculum will report a similar scope of practice compared to those without individualized curriculum.

## Methods

### *Study Setting*

The P4 project, a 5-year (2007 through 2012) national demonstration project, included 14 family medicine residency programs with innovations in training associated with the PCMH. The programs experimented with changes in the structure, content, length, and location of training. Details of the project and characteristics of participating programs and their innovations are described elsewhere.<sup>15,16</sup> Briefly, participating programs represented a mix of community and university-based programs across the United States, and varied in size from four to 22 residents per class. The project evaluation team at Oregon Health & Science University (OHSU) was granted a waiver by the Institutional Review Board (IRB) and each P4 site's IRB review resulted in exemptions, waivers, or approvals from their respective institution, based on specific approaches they were deploying for measurement beyond the core P4 Project activities.

### *Data Management and Study Measures*

The P4 graduate survey, completed annually by program graduates at 18 months post-residency training, underwent extensive pilot testing using cognitive interviewing techniques.<sup>17,18</sup> This instrument measured practice characteristics, scope of practice, adequacy of residency training, and presence of PCMH features in graduates' clinical practices.

To examine scope of practice according to exposure to innovations

over the P4 project period, the 507 residents who completed training between 2007 and 2012, were categorized in three time periods: Pre-P4 (graduated in 2007 and completed training prior to implementation of innovations, n=77, response rate=77/107 [72%]); Partial P4 (graduated in 2008 and 2009, and completed training during implementation, n=161, response rate=161/212 [76%]); and Full P4 (graduated in 2010, 2011 and 2012 after full implementation, n=269, response rate=269/333 [81%]).

For Hypothesis 1, comparison was made to reported scope among family physicians in practice in 2014 for 1 to 10 years from American Board of Family Medicine (ABFM) data for those clinical activities and procedures similar to P4 variables.<sup>19</sup> This national source includes only aggregate data and thus, we were not able to undertake statistical analysis to compare these data to those from the P4 programs.

For Hypothesis 2, the 507 residents were categorized according to exposure to length of training innovations (LOT) (n=138 with full exposure to LOT; n=131 with full exposure to other P4 innovations but not LOT). Programs included in the LOT category included programs with fully integrated 4 years of training, optional integrated tracks with mastery or advanced degrees leading to 4 years of training and early commitment to residency in the fourth year of medical school (six programs).

For Hypothesis 3, the 507 residents were categorized according to exposure to individualized training (IND) (n=156 with full exposure to IND; n=113 with full exposure to other P4 innovations but not IND). Programs included in the IND category had defined curricular tracks in an area of concentration or a customized curriculum based on individual resident learning plans (seven programs). Three programs were included in both the LOT and IND categories.

### Scope of Practice Measures

We assessed practice scope in each graduate using two methods. First, we assessed graduates' self-reported individual practice components. We conducted a consensus process with a group that consisted of the family physician members of the P4 executive committee (authors MPE, JHR, and JS) that narrowed the content under consideration from 41 clinical activities included on the survey to 25 clinical activities based on a literature review of scope of practice in family medicine. These final 25 activities and 30 procedural variables represented what the group felt that a family physician, practicing the full scope of family medicine, would include in his or her practice. Each variable in the data was coded as 0 (not practiced) or 1 (practiced).

Secondly, we created a P4 Scope of Practice (P4-SOP) scale to characterize the graduate's overall scope of practice using methodology developed for the Individual Scope of Practice (I-SOP) scale.<sup>11</sup> The I-SOP scale consists of clinical activities, which are calibrated onto a scale, from a less to more broad scope of practice, and is based on an analysis of 7,856 family physicians' reported practice in 2013. The P4-SOP scale was aligned with the I-SOP scale because it would permit the results from the P4 sample to be compared to other researchers studying family physicians' scope of practice using measures comparable to the original form.<sup>19</sup> P4-SOP scores ranged from 8 to 26, with a smaller number indicating a narrower scope. See the Appendix at <https://www.stfm.org/Portals/49/Documents/FMAAppendix/Appendix1Eiff.pdf> for a more detailed explanation of the P4-SOP methodology.

### Data Analyses

Calculations of means and frequency distributions were used to characterize graduate personal and practice characteristics. The six community size categories on the graduate survey were collapsed into three categories: small:  $\leq 10,000$ ; medium:

10,001-100,000 and large:  $>100,000$ . We compared the subgroups according to P4 innovations using a one-way analysis of variance (continuous variables) or chi-squared test (categorical variables). When counts were less than five, we used Fisher's exact test to compare study groups. For graduates with full exposure to P4 innovations (Full P4 subgroup), we tested for differences in clinical activities and procedures performed between subgroups based on LOT and IND using a chi-squared test or Fisher's exact test (count $<5$ ). One-way analysis of variance was used to test for differences in mean P4-SOP scores between the subgroups. Because one P4 residency program was very large, with 22 residents per year, we conducted one sensitivity analysis with them included, and another analysis with them excluded. Our tables present results with them included, and we describe how results changed when they were excluded in the Results section.

### Results

A total of 507 graduates were included in the analyses. These graduates were distributed by region with 14% West, 17% Midwest, 24% Southwest, 11% Southeast, and 26% Northeast. We found no statistical differences across P4 innovation implementation groups for sex, race, community size, underserved practice setting, mean work hours/week, or visit volume (Table 1). Compared to graduates Pre-P4, graduates in the Full P4 group were more likely to be younger, have higher incomes and have a positive perception of the appeal of family medicine ( $P<0.001$ ).

Table 2 illustrates the P4-SOP score, and the percentage reporting that the 25 clinical activities and 30 procedures were part of their practice for the Pre, Partial, and Full P4 groups, along with comparison to national data on reported practice scope. There were no statistically significant differences in the mean P4-SOP scores among the three groups. Team-based care was the only clinical activity that

changed significantly between the Pre-P4 to Full P4 groups (67.3% vs 84%,  $P<0.001$ ). We found no statistical differences in the procedures performed by the graduates among the three groups except for exercise treadmill testing and peripheral nerve blocks, which were included less often in practices of graduates in the Full P4 group (13.6% vs 5% and 59.4% vs 45%, respectively,  $P<0.05$ ). The percentage of graduates who reported delivering babies, providing inpatient care, newborn care, nursing home care, end-of-life care and mental health care in their practices was not significantly different among graduates in the Full P4 group compared to Pre-P4 graduates.

Compared to a national comparison group, graduates with full exposure to P4 innovations reported higher rates for a number of clinical activities including: vaginal deliveries (19.3% vs 9.2%), adult inpatient care (48.5% vs 33.7%), nursing home care (25.4% vs 11.7%), and providing mental health care (86.6% vs 77.4%). P4 graduates performed several inpatient procedures (eg, central line), joint injections and gynecologic procedures (eg, IUD insertion) at rates higher than the national cohort. The mean P4-SOP score for graduates (17.9) was also higher than the scope score (15.3) in this sample of physicians in practice 1 to 10 years, using similar scoring methodology.

Residents exposed to LOT had slightly higher P4-SOP scores than those without exposure to LOT (with LOT=18.3 vs without LOT= 17.4,  $P=0.052$ ). Those exposed to LOT reported significantly different results in 4/25 (16%) of the clinical activities compared to those without this exposure (Table 3). Compared to residents without exposure to LOT, those from programs with this innovation were more likely to report including adult hospital care (58.2% vs 38.5%,  $P=0.002$ ), adult ICU care (30.6% vs 19.2%,  $P=0.047$ ), C-sections (12.4% vs 3.2%,  $P=0.013$ ) and newborn resuscitation (25.6% vs 14%,  $P=0.028$ ) in their practices. Residents exposed to LOT performed procedures in

their practices at higher rates for 19/30 procedures including routine office surgery (eg, skin biopsy, simple laceration repair), inpatient procedures (eg, central line), obstetric procedures (vacuum assisted delivery), and pediatric procedures (eg, circumcision) ( $P<0.05$ ) (Table 3). When we removed the large residency program (which experimented with lengthening training) from the clinical activities analyses, the results changed such that adult hospital and ICU/CCU care were no longer associated with LOT, but end-of-life care, teen care, and dermatology were significant for LOT. When we removed this large program from the procedures analyses, we found that only skin procedures (biopsies, cryosurgery) and removal of warts, toenails and foreign bodies were associated with LOT.

We found no significant differences in scope of practice for residents exposed to IND for either clinical activities or procedures performed, and P4-SOP scores were no different compared to graduates from programs without IND. Results are displayed in Table 4 (procedures data not shown). Removing the large residency training program from the clinical activities analyses (they also experimented with individualized training) did not affect the findings according to exposure to IND. However, when removing this program from the procedures scope analyses, we found that paracentesis, thoracentesis, lumbar puncture, chest tube placement, local anesthesia/field block and circumcision were associated with programs without individualized training innovations.

## Discussion

This report details important outcomes related to scope of practice of the graduates of the 14 programs in P4, a residency redesign project focused on better preparation of family physicians for the future. Our findings support our initial hypotheses in that graduates of P4 programs reported a wider practice scope compared to the nationally-reported

scope of practicing family physicians. Those with exposure to expanded length of training reported a wider practice scope, and those training in programs with individualized curriculum reported a similar scope compared to those without individualized curriculum. However, graduates in both the Pre-P4 and Full P4 exposure groups report delivering babies, providing adult inpatient care, providing nursing home care, and providing mental health care at rates that exceed findings in other reports of practice scope for family physicians.<sup>19</sup> Thus, the P4 innovations did not significantly alter the scope of practice for the graduates of these residencies, and the P4 programs may represent a subset of residencies that have trained to a broader scope of practice historically. While our report measures the scope of practice in a family physician's first practice, and other national studies assess physicians with a greater range of years in practice, it is encouraging to see recent graduates of residencies redesigning for the future choosing a broader scope of practice.

The reported scope of practice among graduates from programs that experimented with lengthier training was slightly broader compared to graduates of programs that did not change the length of training, especially in the provision of adult inpatient care and obstetric, inpatient and pediatric procedures. It is possible that the additional curriculum time resulted in broader clinical exposure and enhanced skill development, leading to greater competence or confidence in performing a wider array of activities. Because our findings were driven largely by the graduates of one program and there was heterogeneity in the extended training models, further studies are needed with stronger experimental designs to determine if longer training results in consistently broader practice scope.

We found no differences in the reported practice scope among graduates exposed to more individualized

curriculum compared to those without this innovation. A potential risk of individualized education may be a focus on depth over breadth, which could exacerbate the current trend of narrowing the practice scope of family physicians. Our findings that programs experimenting with individualized curricula still produced graduates with a similar scope of practice to those from programs without this innovation indicates that a balance can be struck between individualized depth and broad training. This should encourage residency educators interested in using more individualized learning approaches, which have the potential to help trainees develop lifelong learning skills, an important component of professionalism.<sup>22</sup>

In an era when the provision of a strong primary care workforce is essential to the nation's health, policy makers and educators must consider how to best support the scope of family medicine most strongly associated with high quality, high value care.<sup>23</sup> Traditionally, in rural areas, patients need their local family physician to provide the broadest scope of practice possible, usually including hospital care and delivering babies. However, in urban practices a broad ambulatory scope of care that includes office-based procedures, population management, management of transitions of care, team-based care, home visits, and nursing home care may be the essential elements of comprehensiveness that achieve the Triple Aim. Future measures of scope of practice for family physicians should include more contemporary clinical activities in addition to the historical content of family physicians' practices.

The strengths of our study include the comprehensive data collected in our graduate survey, the size of our resident cohorts, and our high response rates each year of the study. Our careful survey pilot testing resulted in robust interpretable data, as indicated by responses that were well characterized and usable in complex analyses. Our P4-SOP scale

compared favorably with the I-SOP scale indicating it is a useful metric for measuring the overall scope of practice even in the smaller sample of physicians in our study compared to the national sample used in constructing the I-SOP.

Our study has several limitations. Our sample included only the 14 P4 residencies, which may not be representative of other family medicine residencies and the P4 programs may be a group of programs more committed to training to a broader scope of practice. However, our sample of over 500 graduates practicing in 33 states, and trained in a diversity of programs with variable innovations represents a real-world circumstance that reinforces external

validity of our findings. The timing of our assessment of graduates (18 months out of residency) is different from the national comparison sample (those in practice 1 to 10 years), and this could impact our findings given that scope of practice may narrow over the first decade of practice. Our scope of practice measure is based on self-report and does not include an exhaustive list of clinical activities so we may not have fully captured the breadth of family medicine. Additionally, we did not provide specific definitions for the clinical activities on the survey and respondents may have interpreted individual activities differently. Lastly, we did have one large residency program included in the study, and determined, using

a sensitivity analysis, some results did change when this program was removed from analyses, which indicates our findings may not be fully generalizable to other family medicine residencies.

In conclusion, graduates of residencies engaged in significant educational redesign for the future are reporting a broad scope of practice. Innovations around the length of training may lead to an even broader scope and exposure to individualized education appears to not constrict scope. Further study of how new training innovations affect scope of practice is needed to help educators better prepare physicians for comprehensive care.

**Table 1. Physician Characteristics Based on Exposure to Innovations in P4 Project Periods**

Demographics	Pre P4 (2007 grads; in practice 2009)  n=77	Partial P4 (2008 & 2009 grads; in practice 2010 & 2011)  n=161	Full P4 (2010, 2011 & 2012 grads; in practice 2012, 2013 & 2014)  n=269	P value <sup>a</sup>
N (%) Women	48 (62.3)	90 (55.9)	152 (56.5)	0.608
Mean Age (SD)	36.6 (6.1)	35.2 (5.2)	33.7 (4.4)	<0.001 <sup>b</sup>
Race, N (%)				0.252
Caucasian	46 (59.7)	87 (54.0)	169 (63.1)	
African American	9 (11.7)	16 (9.9)	20 (7.5)	
Asian/Pacific Islander	16 (20.8)	36 (22.4)	41 (15.3)	
Other	6 (7.8)	22 (13.7)	38 (14.2)	
Marital Status, N (%)				0.727
Married/Partnered	62 (1.3)	128 (79.5)	213 (79.2)	
Not Married/Partnered	15 (19.5)	33 (20.5)	56 (20.8)	
No.(%) Fellowship-trained	17 (22.1)	45 (28.1)	94 (34.9)	0.066
No.(%) CAQ	10 (13.3)	31 (19.6)	60 (22.4)	0.220
Income, N (%)				<0.001
\$0 - \$100,000	10 (13.5)	31 (19.7)	31 (11.7)	
\$100,001 - \$125,000	16 (21.6)	14 (8.9)	28 (10.6)	
\$125,001 - \$150,000	24 (32.4)	57 (36.3)	58 (21.9)	
\$150,001 - \$175,000	13 (17.6)	31 (19.7)	74 (27.9)	
Greater than \$175,001	11 (14.9)	24 (15.3)	74 (27.9)	
Practice Community Size, N (%)				0.420
% Small	18 (23.4)	37 (23.1)	68 (25.4)	
% Medium	17 (22.1)	31 (19.4)	70 (26.1)	
% Large	42 (54.5)	92 (57.5)	130 (48.5)	
Underserved practice setting, N (%)	29 (37.7)	63 (39.1)	92 (34.2)	0.256

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Table 1, continued

Demographics	Pre P4 (2007 grads; in practice 2009) n=77	Partial P4 (2008 & 2009 grads; in practice 2010 & 2011) n=161	Full P4 (2010, 2011 & 2012 grads; in practice 2012, 2013 & 2014) n=269	P value <sup>a</sup>
Professional Setting, N (%)				
Solo family medicine	5 (6.5)	3 (1.9)	7 (2.6)	0.412 <sup>c</sup>
Family medicine group	27 (35.1)	50 (31.1)	94 (34.9)	
Multi-specialty group	9 (11.7)	26 ( 16.1)	44 ( 16.4)	
Community Health Center	13 (16.9)	24 ( 14.9)	26 ( 9.7)	
Academics	12 (15.6)	20 ( 12.4)	48 ( 17.8)	
Other	11 (14.3)	38 ( 23.6)	50 ( 18.6)	
Mean hrs/week worked (SD)	42.5 (12.2)	43.4 (15.0)	44.7 (13.5)	
Mean #visits/day (SD)	20.1 (10.4)	19.1 (7.6)	19.3 (8.7)	0.274 <sup>b</sup>
<b>Career Satisfaction</b>				
Family Medicine NO LONGER has the appeal it used to have. No. (%agree/strongly agree)	37 (48.1)	70 (43.5)	75 (27.9)	<0.001
If I were to start my career over again, I would choose to be a family physician. No. (% agree/strongly agree)	63 (81.8)	139 (86.3)	234 (87.0)	0.509
I would recommend family medicine to a student seeking advice. No. (% agree/strongly agree)	68 (88.3)	148 (91.9)	248 (92.2)	0.545
Overall, my residency prepared me well for my current clinical practice. No. (% agree/strongly agree)	72 (93.5)	153 (95.0)	259 (96.3)	0.558

(a) P-value from chi-squared test unless otherwise noted

(b) One-way analysis of variance

(c) Fisher's exact test due to low cell sizes

Table 2. Scope of Practice Based on Exposure to Innovations in P4 Project Periods and Compared to National Data

	Pre P4 (2007 grads; in practice 2009) n=77	Partial P4 (2008 & 2009 grads; in practice 2010 & 2011) n=161	Full P4 (2010, 2011 & 2012 grads; in practice 2012, 2013 & 2014) n=269	P value <sup>a</sup>	2014 National data -family physicians in practice 1-10 yrs <sup>d</sup> n=2747
P4-SOP Score mean (SD)	17.4 (3.5)	17.4 (3.5)	17.9 (3.6)	0.185 <sup>b</sup>	15.3 (I-SOP mean)
<b>Clinical Activity</b>	<b>No. (%) Reporting Aspect as Part of Their Current Practice</b>				
Prenatal care	50 (32.3)	34 (22.7)	75 (28.3)	0.171	333 (12.1)
Vaginal Deliveries	10 (14.1)	16 (10.7)	51 (19.3)	0.062	252 (9.2)
C-Section Primary Surgeon	3 (4.3)	5 (3.5)	20 (7.9)	0.175	
Adult Ambulatory Care	67 (94.4)	139 (92.7)	243 (92.4)	0.849	
Adult Hospital Care	70 (45.8)	58 (38.7)	128 (48.5)	0.153	926 (33.7)
Adult ICU/CCU	34 (22.4)	33 (22.0)	66 (25.0)	0.731	
Nursing Home Care	42 (27.8)	44 (29.5)	67 (25.4)	0.644	322 (11.7)
Geriatrics	62 (87.3)	135 (91.8)	244 (92.4)	0.386	

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Table 2, continued

	Pre P4 (2007 grads; in practice 2009) n=77	Partial P4 (2008 & 2009 grads; in practice 2010 & 2011) n=161	Full P4 (2010, 2011 & 2012 grads; in practice 2012, 2013 & 2014) n=269	P value <sup>a</sup>	2014 National data -family physicians in practice 1-10 yrs <sup>d</sup> n=2747
Clinical Activity	No. (%) Reporting Aspect as Part of Their Current Practice				
End of Life Care	52 (73.2)	102 (69.9)	194 (73.5)	0.723	
Ambulatory Pediatric Care	56 (78.9)	123 (82.0)	223 (85.1)	0.408	2,428 (88.4)
Newborn Resuscitation	14 (19.7)	37 (24.7)	52 (19.8)	0.485	
Newborn Care in Hospital	61 (39.6)	44 (29.3)	78 (29.8)	0.077	
Teen Care	59 (83.1)	125 (83.3)	228 (87.0)	0.507	
Women's Health	61 (85.9)	131 (88.5)	228 (86.7)	0.822	2,206 (80.3)
Orthopedics/Musculoskeletal Med.	66 (93.0)	133 (89.9)	242 (91.7)	0.714	2,468 (89.8)
Sports Medicine	52 (73.2)	118 (79.7)	204 (77.3)	0.558	1,743 (63.5)
Emergency Medicine	29 (40.8)	72 (48.6)	120 (45.5)	0.549	
Dermatology	62 (87.3)	132 (89.8)	243 (92.0)	0.436	
Pre and Post-op Care	45 (63.4)	88 (58.7)	179 (67.8)	0.173	
Psych Disorders	59 (83.1)	127 (84.7)	227 (86.6)	0.708	2,126 (77.4)
Alcohol/Substance Abuse	53 (74.6)	119 (80.4)	216 (81.8)	0.402	
Pain Management	63 (90.0)	134 (90.5)	236 (89.7)	0.966	1,722 (62.7)
Health Behavior Change Counseling	136 (88.9)	136 (91.9)	235 (89.4)	0.636	
Quality Improvement	126 (82.4)	134 (90.5)	229 (87.1)	0.109	
Team-based Care	103 (67.3)	114 (77.0)	221 (84.0)	<b>&lt;0.001</b>	
Skin biopsy	125 (80.1)	109 (74.1)	212 (80.3)	0.300	
Cryosurgery	121 (77.6)	108 (73.5)	199 (75.4)	0.709	
Remove warts/toenail/FB foreign body	132 (84.6)	121 (82.3)	225 (85.2)	0.733	
Incision/drainage abscess	144 (92.3)	126 (85.7)	242 (91.7)	0.090	
Simple laceration repair	134 (85.9)	122 (83.0)	228 (86.4)	0.635	
IUD insertion/removal	76 (49.0)	69 (46.9)	119 (45.2)	0.754	129 (18.6)
Endometrial biopsy	62 (39.7)	54 (36.7)	89 (33.8)	0.472	113 (16.3)
Colposcopy	34 (21.9)	25 (17.0)	44 (16.7)	0.373	
Uterine aspiration/dilation aspiration/dilation/ evacuation	11 (7.2)	7 (4.8)	20 (7.6)	0.533	
OB ultrasound	22 (14.2)	15 (10.3)	40 (15.2)	0.376	27 (3.9)
Vacuum assisted delivery	24 (15.5)	12 (8.2)	39 (14.8)	0.110	
C-section assist	24 (15.5)	11 (7.5)	37 (14.0)	0.082	
Central line	24 (15.5)	27 (18.5)	42 (16.0)	0.749	44 (6.3)
Paracentesis	34 (22.1)	25 (17.1)	60 (22.8)	0.380	34 (4.9)
Thoracentesis	27 (17.6)	23 (15.8)	48 (18.3)	0.813	30 (4.3)
Lumbar puncture	45 (29.4)	35 (24.0)	69 (26.2)	0.562	63 (9.1)
Endotracheal intubation	39 (25.2)	30 (20.5)	52 (19.8)	0.420	

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Table 2, continued

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<b>Clinical Activity</b>	<b>No. (%) Reporting Aspect as Part of Their Current Practice</b>				
Ventilator management	23 (14.8)	18 (12.3)	45 (17.2)	0.420	
Chest tube placement	19 (12.3)	17 (11.7)	38 (14.6)	0.672	
Anterior nasal packing for epistaxis	53 (34.2)	67 (45.9)	95 (36.3)	0.077	
Exercise treadmill testing	21 (13.6)	10 (6.9)	13 (5.0)	<b>0.006</b>	45 (6.5)
Joint injection/aspiration	125 (81.2)	112 (76.7)	219 (83.6)	0.235	405 (58.3)
Fracture care	69 (45.1)	72 (49.3)	123 (46.9)	0.765	305 (43.9)
Splinting & casting	80 (51.9)	82 (56.2)	137 (52.3)	0.705	
Local Anes/Field Block	119 (76.8)	107 (74.3)	189 (72.1)	0.577	
Peripheral nerve block	92 (59.4)	65 (45.1)	118 (45.0)	<b>0.010</b>	
Circumcision	45 (29.0)	34 (23.4)	73 (27.9)	0.509	96 (13.8)
Vasectomy	5 (3.3)	4 (2.8)	15 (5.7)	0.347 <sup>c</sup>	
Colonoscopy	8 (5.3)	6 (4.1)	10 (3.8)	0.764	9 (1.3)
Endoscopy	6 (4.0)	6 (4.2)	10 (3.8)	0.984	11 (1.6)

(a) P-values for chi-square test unless otherwise noted

(b) One-way analysis of variance

(c) Fisher's exact test due to low cell counts

(d) Source: Coutinho AJ, Cochrane A, Stelter K, Phillips RL, Peterson LE. Comparison of intended scope of practice for family medicine residents with reported scope of practice among practicing family physicians. JAMA 2015;314(22):2364-2372.

Table 3. Scope of Practice Based on Exposure to Length of Training Innovation

	P4 Programs with Length of Training Innovation (2010-2012) n=138	P4 Programs without Length of Training Innovation (2010-2012) n=131	P value <sup>a</sup>
Scope Score mean(SD)	18.3 (3.4)	17.4 (3.4)	0.052 <sup>b</sup>
<b>Clinical Activity</b>	<b>No. (%) Reporting Aspect as Part of Their Current Practice</b>		
Prenatal care	35 (25.9)	40 (30.8)	0.460
Vaginal Deliveries	29 (21.5)	22 (17.1)	0.450
C-Section Primary Surgeon	16 (12.4)	4 (3.2)	<b>0.013</b>
Adult Ambulatory Care	127 (94.8)	116 (89.9)	0.211
Adult Hospital care	78 (58.2)	50 (38.5)	<b>0.002</b>
Adult ICU/CCU	41 (30.6)	25 (19.2)	<b>0.047</b>
Nursing home care	34 (25.4)	33 (25.4)	1.000
Geriatrics	126 (94.0)	118 (90.8)	0.442

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Table 3, continued

	P4 Programs with Length of Training Innovation (2010-2012) n=138	P4 Programs without Length of Training Innovation (2010-2012) n=131	P value <sup>a</sup>
Clinical Activity	No. (%) Reporting Aspect as Part of Their Current Practice		
End of Life Care	105 (78.4)	89 (68.5)	0.093
Ambulatory Pediatric Care	116 (87.2)	107 (82.9)	0.425
Newborn Resuscitation	34 (25.6)	18 (14.0)	<b>0.028</b>
Newborn care in hospital	43 (32.3)	35 (27.1)	0.432
Teen Care	120 (90.2)	108 (83.7)	0.167
Women's Health	115 (85.8)	113 (87.6)	0.809
Orthopedics/Musculoskeletal Med.	122 (91.0)	120 (92.3)	0.882
Sports Medicine	105 (78.4)	99 (76.2)	0.779
Emergency Medicine	64 (47.8)	56 (43.1)	0.522
Dermatology	126 (94.0)	117 (90.0)	0.326
Pre and post-op care	96 (71.6)	83 (63.8)	0.221
Psych Disorders	119 (88.8)	108 (84.4)	0.383
Alcohol/Substance Abuse	111 (82.8)	105 (80.8)	0.783
Pain Management	121 (90.3)	115 (89.1)	0.917
Health behavior change counseling	117 (87.3)	118 (91.5)	0.372
Quality Improvement	117 (87.3)	112 (86.8)	1.000
Team-based care	112 (83.6)	109 (84.5)	0.973
Skin biopsy	117 (87.3)	95 (73.1)	<b>0.006</b>
Cryosurgery	110 (82.1)	89 (68.5)	<b>0.015</b>
Remove warts, toenail, foreign body	123 (91.8)	102 (78.5)	<b>0.004</b>
Incision & drainage of abscess	128 (95.5)	114 (87.7)	<b>0.038</b>
Simple laceration repair	123 (91.8)	105 (80.8)	<b>0.015</b>
IUD insertion/removal	61 (45.9)	58 (44.6)	0.937
Endometrial biopsy	49 (36.8)	40 (30.8)	0.363
Colposcopy	24 (18.0)	20 (15.4)	0.680
Uterine aspiration/dilation/evacuation	14 (10.4)	6 (4.6)	0.119
OB ultrasound	25 (18.7)	15 (11.5)	0.150
Vacuum assisted delivery	26 (19.4)	13 (10.0)	<b>0.048</b>
C-section assist	26 (19.4)	11 (8.5)	<b>0.017</b>
Central line	32 (24.2)	10 (7.7)	<b>&lt;0.001</b>
Paracentesis	40 (30.1)	20 (15.4)	<b>0.007</b>
Thoracentesis	34 (25.6)	14 (10.8)	<b>0.003</b>
Lumbar puncture	49 (36.8)	20 (15.4)	<b>&lt;0.001</b>
Endotracheal intubation	37 (28.0)	15 (11.5)	<b>0.001</b>
Ventilator management	28 (21.2)	17 (13.1)	0.114
Chest tube placement	31 (23.5)	7 (5.4)	<b>&lt;0.001</b>
Anterior nasal packing for epistaxis	58 (43.6)	37 (28.7)	<b>0.017</b>

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Table 3, continued

	P4 Programs with Length of Training Innovation (2010-2012) n=138	P4 Programs without Length of Training Innovation (2010-2012) n=131	P value <sup>a</sup>
Clinical Activity	No. (%) Reporting Aspect as Part of Their Current Practice		
Exercise treadmill testing	8 (6.0)	5 (3.9)	0.572
Joint injection/aspiration	117 (88.0)	102 (79.1)	0.075
Fracture care	65 (48.9)	58 (45.0)	0.610
Splinting & casting	73 (54.9)	64 (49.6)	0.465
Local Anesthesia/Field Block	107 (80.5)	82 (63.6)	<b>0.004</b>
Peripheral nerve block	66 (49.6)	52 (40.3)	0.164
Circumcision	46 (34.6)	27 (20.9)	<b>0.020</b>
Vasectomy	12 (9.0)	3 (2.3)	<b>0.030<sup>c</sup></b>
Colonoscopy	9 (6.8)	1 (0.8)	<b>0.019<sup>c</sup></b>
Endoscopy	9 (6.8)	1 (0.8)	<b>0.019<sup>c</sup></b>

(a) P-values for chi-square test

(b) One-way analysis of variance

(c) Fisher's exact test due to low cell counts

Table 4. Scope of Practice Based on Exposure to Individualized Training Innovation

	P4 Programs with Individualized Training Innovation (2010-2012) n=156	P4 Programs without Individualized Training Innovation (2010-2012) n=113	P value <sup>a</sup>
Clinical Activity	No. (%) Reporting Aspect as Part of Their Current Practice		
Scope Score	17.7 (3.3)	18.0 (3.6)	0.517 <sup>b</sup>
Prenatal care	39 (25.3)	36 (32.4)	0.259
Vaginal Deliveries	26 (17.0)	25 (22.5)	0.334
C-Section Primary Surgeon	14 (9.5)	6 (5.7)	0.395
Adult Ambulatory Care	140 (90.9)	103 (94.5)	0.398
Adult Hospital care	76 (49.4)	52 (47.3)	0.835
Adult ICU/CCU	41 (26.6)	25 (22.7)	0.564
Nursing home care	41 (26.6)	26 (23.6)	0.684
Geriatrics	143 (92.9)	101 (91.8)	0.937
End of Life Care	110 (71.4)	84 (76.4)	0.451
Ambulatory Pediatric Care	127 (83.0)	96 (88.1)	0.337
Newborn Resuscitation	28 (18.3)	24 (22.0)	0.558
Newborn care in hospital	42 (27.5)	36 (33.0)	0.403
Teen Care	135 (88.2)	93 (85.3)	0.613
Women's Health	128 (83.7)	100 (90.9)	0.128

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Table 4, continued

	P4 Programs with Individualized Training Innovation (2010-2012) n=156	P4 Programs without Individualized Training Innovation (2010-2012) n=113	P value <sup>a</sup>
<b>Clinical Activity</b>	<b>No. (%) Reporting Aspect as Part of Their Current Practice</b>		
Orthopedics/Musculoskeletal Med.	143 (92.9)	99 (90.0)	0.547
Sports Medicine	120 (77.9)	84 (76.4)	0.882
Emergency Medicine	72 (46.8)	48 (43.6)	0.707
Dermatology	141 (91.6)	102 (92.7)	0.908
Pre and post-op care	110 (71.4)	69 (62.7)	0.174
Psych Disorders	132 (86.3)	95 (87.2)	0.982
Alcohol/Substance Abuse	121 (78.6)	95 (86.4)	0.145
Pain Management	138 (89.6)	98 (89.9)	1.000
Health behavior change counseling	136 (88.3)	99 (90.8)	0.654
Quality Improvement	132 (85.7)	97 (89.0)	0.553
Team-based care	125 (81.2)	96 (88.1)	0.182

(a) *P*-values for chi-square test

(b) One-way analysis of variance

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