Early Career Outcomes of Family Medicine Residency Graduates Exposed to Innovative Flexible Longitudinal Tracks

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BACKGROUND AND OBJECTIVES: The Preparing the Personal Physician for Practice (P4) project used a case series design to study innovations in the content, length, structure, and location of residency training in 14 geographically diverse family medicine programs between 2007 and 2012. We aimed to explore how offering flexible longitudinal tracks (FLT) affected graduates' scope of practice, particularly in maternal child health (MCH), which included at least 17 months of focused training that increased each year over 4 years.

METHODS: We administered a cross-sectional survey to graduates of P4 residencies approximately 18 months after they completed training (2011–2014) and compared graduates of the John Peter Smith (JPS) Family Medicine Residency MCH FLT to all other P4 graduates.

RESULTS: The overall response rate was 81.8% (365/446). JPS graduates who completed the flexible MCH track (n=15) compared to all other P4 graduates (n=332) were more likely to deliver babies (13/15, 86.7% versus 48/324, 14.6%) and perform C-sections as the primary surgeon (12/15, 80.0% versus 15/322, 4.7%). Additional areas of expanded scope associated with the MCH track included endoscopy (4/15, 26.7% versus 10/323, 3.1%), the care of hospitalized adults and associated procedures (central lines, eg: 8/15, 53.3% versus 47/322, 14.6%), and the care of hospitalized children (13/15, 86.7% versus 111/323, 34.4%).

CONCLUSIONS: Graduating from the JPS MCH FLT was associated with a higher provision of maternal, child, and ill adult patient care services, including associated procedures.

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Graduate medical education (GME) must change if the health needs of all Americans, especially those in underserved rural areas, are to be addressed. National studies of family physicians have concluded that scope of practice has decreased over the past 10 years, particularly in the areas of maternity care, inpatient care, and the care of children.[1-4] This trend is especially worrisome for Americans who live in underserved areas, particularly rural America, because these areas are more reliant on family physicians to provide this care.[5] This trend is also worrisome because a recent study by the Robert Graham Center concluded that patients who live in areas where family physicians provide the most comprehensive care have fewer hospitalizations and a lower total cost of health care.[6]

All three primary care boards have undertaken efforts to revise residency training.[7-9] Family Medicine's initiative, Preparing the Personal Physician for Practice (P^4) allowed selected residencies to implement a variety of curricular innovations, including changes to the content, structure, length, and location of training, as long as they participated in a rigorous evaluation program.[9] Fourteen residencies across the United States were chosen to take part in P^4. Program selection and results of the overall experiment have been published elsewhere.[10-12]

The proper role for maternity care in family medicine education has been debated from the early days of the specialty. The Association of Family Medicine Residency Directors recently proposed tiered maternity care education in family medicine,

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recognizing that different programs and residents seek options that will fit their career goals.[13,14] Previous research has recognized an association between the completion of a rural track or maternity care fellowship and an increased likelihood of providing those services in practice after training,[15-19] though little has been documented about non-maternity care services provided by these graduates, especially from maternity care fellowships.

One of the P4 programs, John Peter Smith Hospital (JPS) located in Fort Worth, TX, which is the largest family medicine residency training program in the United States, implemented flexible longitudinal tracks (FLT) that added up to 1 year of additional training to ensure residency graduates could prepare themselves for the kind of practice they wanted to undertake after their training was complete. The JPS setting is somewhat unique in that the family medicine residency is the largest one at a major urban safety net hospital, which does not include an internal medicine or pediatrics residency. FLTs became the JPS innovation because even before the P4 project began, some of its residents who wanted to practice in underserved areas began asking for added training experiences in addition to the traditional 3-year program, especially in operative obstetrics.

The purpose of this study was to explore the associations between educational exposures that included extra training in maternal child health (MCH) and the scope of practice of JPS graduates relative to other recent P4 graduates.

Methods

John Peter Smith Curricular Innovations

The FLTs worked as follows: Residents were allowed to stay for optional extra training to work in a specific area of emphasis (AOE). The extra training usually included a full extra fourth year, but in some cases the resident completed their desired extra training before the academic year was over. This longitudinal focus allowed residents to begin training in their AOE as soon as possible. Typically, this meant spending an extra month in the AOE in the intern year, 2–3 months in the second year, 4–5 months in the third year, and nearly all of the fourth year. However, the program expected that residents' generalist skills would be retained during their fourth year. As such, residents continued to cover family medicine clinics, adult medicine inpatient services, and the intensive care unit on occasion.

The most popular AOE was maternal child health, which included training to perform Cesarean sections as the primary surgeon. This track evolved over time with significant resident input. Its core features eventually included the full-time presence of family medicine teaching staff with Cesarean privileges, imbedded time spent with OB department labor and delivery teams, Wednesday afternoon MCH didactic sessions, coverage of women's care services at a local Federally Qualified Health Center, competency in standard mid-pregnancy anatomy ultrasounds, and exposure to maternity care overseas. Many MCH participants also spent some of their flexible time on overseas or rural rotations.

Other popular AOEs included rural and global health, as well as more traditional Certificates of Added Qualifications (CAQs), such as sports medicine and geriatrics. Other residents helped develop AOEs in HIV care and advanced surgical procedures.

Parameters of trainee classification were negotiated with the P4 Steering Committee, the Accreditation Council for Graduate Medical Education, and the Family Medicine Residency Review Committe, where all trainees were considered residents in training and not junior faculty during their fourth year. All trainees completed core aspects of family medicine training in 3 years and were eligible to sit for their board exam at that time. All study activities were approved by the JPS Health Network Institutional Review Board (IRB), the OHSU IRB, and received either approvals, exemptions, or waivers from the relevant IRBs at all participating P4 residency programs.

The Graduate Survey

The graduate survey was designed and tested by the evaluation team of educational researchers at Oregon Health & Sciences University (OHSU) and has been published elsewhere.[20] Major categories of topics covered were basic practice demographics, major services provided, procedures provided, and implementation of patient-centered medical home (PCMH) features. Pilot testing involved repeated administrations to residency graduates who were not part of the P4 project using cognitive interviewing techniques[21] to ensure that participants' responses aligned with the questions' intent.

Each participating P4 residency program staff helped the OHSU team follow up its own graduates, but responses were sent from each graduate directly to OHSU. Thus, identified survey responses were never seen by residency program faculty or staff. Graduates were surveyed approximately 18 months after graduation using either a mailed paper survey or an online version of the same survey (distributed 2011–2014). The 18-month time interval was chosen to capture scope of practice that likely occurs as a result of residency training, while also giving physicians new to independent practice time to settle into their new settings and arrange for privileging of services provided.

Data Analysis

Results were analyzed using descriptive statistics. Continuous variables were assessed using independent samples *t* tests, and categorical data were analyzed using chi square. Fisher's Exact test was used when cell sizes were small. SPSS (Statistical Package for the Social Scientist) version 22. All tests were two tailed,

and alpha levels were set at 0.05 to determine statistical significance.

Results

Across all P4 residency graduates, the response rate to the graduate survey was 81.8% (365/446), which was similar at each program.

JPS MCH Graduates Versus All Other P4 Residency Graduates

Except for a small difference in age (31.7 (1.1) versus 33.9 (4.4), *P*=.04), there were no differences in the demographics of the JPS MCH graduates from all other P4 graduates (Table 1). For women's and children's health and maternity care, MCH graduates were more likely to provide every service measured (Table 2). They were also more likely to provide endoscopy services, urgent care and hospital procedures, care for children including newborns in the hospital, care for adults in the hospital, genitourinary services such as vasectomies, and some anesthesia services such as peripheral nerve blocks and conscious sedation. There was little to no difference in other provided services including musculoskeletal, skin procedures, behavioral medicine, surgical subspecialty services, other specialty areas such as dermatology and end of life care, quality improvement, and team-based care.

All JPS Graduates Versus All Other P4 Graduates

The demographic and clinical practice characteristics of all residency graduates from JPS compared to all other P4 residency graduates are shown in Table 3. JPS graduates were more likely to be male (49/80, 61.3% versus 109/268, 40.7%; *P*=.001), work in rural health centers (9/80, 11.3% versus 8/268, 3.0%; *P*=.006), and practice in small or medium-sized towns. The scope of

Table 1: Demographic and Practice Characteristics of John Peter Smith (JPS) Family Medicine Residency Maternal Child Health (MCH) Graduates and All Other Preparing the Personal Physician for Practice (P4) Graduates (2011–2014)

Demographics	Extra MCH Training at JPS n=16	All Other P4 Grads n=332	*P* Value
Mean age, years (SD)	31.7 (1.1)	33.9 (4.4)	.04
% Male	11/16 (68.8)	147/332 (44.3)	.07
% Married/partnered	13/16 (81.3)	264/332 (79.5)	.89
% White	10/16 (62.5)	216/332 (65.1)	.80
% African American	1/16 (6.3)	28/332 (8.4)	1.00
% Hispanic	2/16 (12.5)	19/332 (5.7)	.25
% Asian/Pacific Islander	3/16 (18.8)	56/332 (16.9)	.74
Current Professional Setting			
% in solo family medicine	0/16 (0.0)	9/332 (2.7)	.76
% in family medicine partnership	2/16 (12.5)	14/332 (4.2)	
% in family medicine group	7/16 (43.8)	97/332 (29.2)	
% in multi-specialty partnership or group non-health maintenance organization	0/16 (0.0)	42/332 (12.7)	
% in multi-specialty partnership or group health maintenance organization	0/16 (0.0)	17/332 (5.1)	
% in community health center	2/16 (12.5)	36/332 (10.8)	
% in academic	3/16 (18.8)	56/332 (16.9)	
% in emergency medicine/urgent care	0/16 (0.0)	13/332 (3.9)	
% in Other practice setting	2/16 (12.5)	45/332 (13.6)	
Practice Community			
% in community of <2,500 people	0/16 (0.0)	13/330 (3.9)	.48
% in small town of 2,501–5,000	1/16 (6.3)	27/330 (8.2)	
% in medium-sized town of 5,001–10,000	4/16 (25.0)	40/330 (12.1)	
% in small city of 10,001–100,000	3/16 (18.8)	79/330 (23.9)	
% in large city of >100,000	7/16 (43.8)	112/330 (33.9)	
% in suburb	1/16 (6.3)	59/330 (17.9)	

Table 2: Scope of Practice According to Completion of Extra Maternal Child Health (MCH) Training Versus All Other Preparing the Personal Physician for Practice (P^4) Graduates (2011–2014)

Women's Health	Extra MCH Training at JPS n=16 Count (%)	All other P^4 Grads n = 332 Count (%)	*P* Value
Intrauterine device insertion/removal	14/15 (93.3)	139/324 (42.9)	.00
Endometrial biopsy	13/15 (86.7)	101/324 (31.2)	.00
Remove cervical polyp	12/15 (80.0)	60/324 (18.5)	.00
Colposcopy	11/15 (73.3)	48/324 (14.8)	.00
Uterine aspiration/dilation/evacuation	11/15 (73.3)	14/325 (4.3)	.00
Tubal ligation	11/15 (73.3)	14/325 (4.3)	.00
Maternity Care			
OB ultrasound	13/15 (86.7)	37/324 (11.4)	.00
Spontaneous vaginal delivery	13/15 (86.7)	48/324 (14.8)	.00
Cesarean section assist	13/15 (86.7)	30/324 (9.3)	.00
Cesarean section primary surgeon	12/15 (80.0)	15/322 (4.7)	.00
Gastrointestinal and Colorectal			
Colonoscopy	4/15 (26.7)	10/323 (3.1)	.002
Upper endoscopy	4/15 (26.7)	10/321 (3.1)	.002
Urgent Care and Hospital			
Lumbar puncture	11/15 (73.3)	73/323 (22.6)	.00
Paracentesis	10/15 (66.7)	63/323 (19.5)	.00
Central line	8/15 (53.3)	47/322 (14.6)	.001
Endotracheal intubation	9/15 (60.0)	57/322 (17.7)	.00
Chest tube placement	9/15 (60.0)	37/320 (11.6)	.00
Genitourinary			
Circumcision	13/15 (86.7)	78/322 (24.2)	.00
Vasectomy	8/15 (53.3)	9/322 (2.8)	.00
Anesthesia/Other Clinical			
Peripheral nerve block	11/15 (73.3)	140/321 (43.6)	.03
Conscious sedation	5/15 (33.3)	35/321 (10.9)	.02
Care of Children			
Newborn resuscitation	12/15 (80.0)	55/323 (17.0)	.00
Newborn care in hospital	14/15 (93.3)	83/323 (25.7)	.00
Other hospital care	13/15 (86.7)	111/323 (34.4)	.00
Care of Adults			
Inpatient hospital care	13/15 (86.7)	142/325 (43.7)	.001
Intensive care unit	8/15 (53.3)	75/325 (23.1)	.01
Nursing home care	4/15 (26.7)	88/324 (27.2)	1.00

practice results of all JPS graduates compared to other P^4 resident graduates are shown in Table 4. JPS graduates were more likely to provide a wide range of cognitive and procedural services compared to graduates of other P^4 residencies. This was especially true for women's health, maternity care, gastrointestinal and colorectal care, urgent and hospital care, and genitourinary care. Some features of obstetrical care, such as spontaneous vaginal deliveries and labor induction did not differ.

Discussion

This study is among the largest conducted to date to explore the relationships between innovations in training and the scope of practice, or basket of services, being delivered within the first 18 months of independent practice. We learned that

Table 3: Demographic and Practice Characteristics of All John Peter Smith (JPS) Family Medicine Residency Graduates Compared to All Other Preparing the Personal Physician for Practice (P4) Graduates (2011–2014)

Practice Characteristics of P4 Graduates 2009–2012, n=365	All JPS Grads n=82 # (%)	All Other P4 Grads n=283 # (%)	*P* Value
Demographics			
Mean age (SD)	33.1 (3.85)	34.1 (4.4)	.06
% male	49/80 (61.3)	109/268 (40.7)	.001
% married/partnered	65/80 (81.3)	212/268 (79.1)	.28
% White	54/80 (67.5)	172/268 (64.2)	.69
% African American	4/80 (5.0)	25/268 (9.3)	.26
% Hispanic	7/80 (8.8)	14/268 (5.2)	.28
% Asian/Pacific Islander	14/80 (17.5)	45/268 (16.8)	.87
Current Designated Areas/Practices			
% of graduates practicing in health professional shortage area	20/80 (25.0)	43/268 (16.0)	.07
% in RHC	9/80 (11.3)	8/268 (3.0)	.006
Practice Community			
% in community of <2,500 people	1/79 (1.3)	12/267 (4.5)	.028
% in small town of 2,501–5,000	11/79 (13.9)	17/267 (6.4)	
% in medium-sized town of 5,001–10, 000	12/79 (15.2)	32/267 (12.0)	
% in small city of 10,001–100,000	12/79 (15.2)	70/267 (26.2)	
% in large city of >100,000	33/79 (41.8)	86/267 (32.2)	
% in suburb	10/79 (12.7)	50/267 (18.7)	
Office Visits/Hours Worked			
Mean number of hours worked per week (SD)	49.6 (16.6)	42.9 (12.5)	<.001
Mean number of office visits in an average day (SD)	19.6 (7.9)	19.2 (8.4)	.69
Teaching Activities			
% of graduates involved in teaching medical students	34/79 (43.0)	159/265 (60.0)	.01
% of graduates involved in teaching residents	22/79 (27.8)	112/265 (42.3)	.03
% of graduates not involved in any teaching activities	31/79 (39.2)	54/265 (20.4)	.001

the additional MCH training received by those JPS residents who selected this AOE was associated with a much higher provision of maternity care services in those early graduates. In addition, these graduates also provided a wider basket of cognitive and procedural services to ill adults and children in hospitals. When analyzed in aggregate, JPS graduates reported providing a wider basket of cognitive and procedural services than all graduates from other P4 residencies. These findings suggest that training location, in addition to content and structures, make a difference in scope of practice.

It may be that the educational "culture" at JPS emphasizes full scope family medicine more than the cultures at other programs. It is also likely that JPS attracts those residents who are more interested in full scope family medicine than occurs at other P4 programs. A weakness of this study is that other P4 programs did not implement similar enough curricular innovations to allow for an even larger MCH FLT sample size and comparison to other P4 residency graduate outcomes. This limits the generalizability of our findings.

There is very little previous research on aspects of residency training and their association with scope of practice of recent graduates. Previous reports focus mainly on physician attitudes and demographics related to rural general surgery,[22] pediatric care,[23,24] general internal medicine,[25,26] and rural family

Table 4: Differences in Scope of Practice: John Peter Smith (JPS) Family Medicine Residency Compared to All Preparing the Personal Physician for Practice (P^4) Project Graduates (2011–2014)

Skin Procedures	All JPS Grads # (%)	All Other P4 Grads # (%)	*P* Value
Simple laceration repair	73/78 (93.6)	214/262 (81.7)	.01
Women's Health			
Intrauterine device insertion/removal	41/78 (52.6)	112/261 (42.9)	.15
Endometrial biopsy	35/78 (44.9)	79/261 (30.3)	.02
Remove cervical polyp	25/78 (32.1)	47/261 (18.0)	.01
Bartholin's cyst management	32/78 (41.0)	62/261 (23.8)	.004
Uterine aspiration/dilation/evacuation	13/78 (16.7)	12/262 (4.6)	.001
Tubal ligation	14/78 (17.9)	11/261 (4.2)	<.001
Maternity Care			
OB ultrasound	18/78 (23.1)	32/261 (12.3)	.03
Spontaneous vaginal delivery	18/78 (23.1)	43/261 (16.5)	.18
Cesarean section assist	17/78 (21.8)	26/261 (10.0)	.01
Cesarean section primary surgeon	16/78 (20.5)	11/259 (4.2)	<.001
Deliveries			
Mean number of vaginal deliveries per year (SD)	51.8 (60.8)	21.1 (20.9)	.005
Mean number of Cesarean section deliveries as primary surgeon per year (SD)	26.3 (31.5)	5.6 (17.5)	.002
Gastrointestinal and Colorectal			
Flexible sigmoidoscopy	5/77 (6.5)	1/261 (0.4)	.003
Colonoscopy	13/78 (16.7)	1/260 (0.4)	<.001
Upper endoscopy	13/78 (16.7)	1/258 (0.4)	<.001
Urgent Care and Hospital			
Anterior nasal packing for epistaxis	42/77 (54.5)	85/260 (32.7)	.001
Lumbar puncture	40/77 (51.9)	44/261 (16.9)	<.001
Paracentesis	33/77 (42.9)	40/261 (15.3)	<.001
Central line	33/77 (42.9)	22/260 (8.5)	<.001
Ventilator management	26/77 (33.8)	27/260 (10.4)	<.001
Chest tube placement	31/77 (40.3)	15/258 (5.8)	<.001
Genitourinary			
Circumcision	32/77 (41.6)	59/260 (22.7)	.002
Vasectomy	10/77 (13.0)	7/260 (2.7)	.001
Anesthesia/Other Clinical			
Local anesthesia/field Block	68/77 (88.3)	173/259 (66.8)	<.001
Peripheral nerve block	52/77 (67.5)	99/259 (38.2)	<.001
Conscious sedation	24/77 (31.2)	16/259 (6.2)	<.001
Care of Adults			
Inpatient hospital care	50/78 (64.1)	105/262 (40.1)	<.001
Intensive care unit	28/78 (35.9)	55/262 (21.0)	.01

medicine tracks.[15,16,27] Studies from the late 1980s and early 1990s found that graduates of primary care internal medicine programs were more likely to have generalist careers and practice in underserved areas,[25,28] but there is very little literature that further details which services and patient settings are covered by recent residency or fellowship graduates. Some may believe that all primary care residencies produce the same product, but our study suggests that additional training appears to benefit learners to be better prepared for settings where a broader scope of practice is needed.

The recent Family Medicine Residency Review Committee changes loosened regulatory requirements on residencies and specifically called for innovation in curricula.[29] Other reformers are working on a tiered approach to maternity care education in family medicine that recognizes that different programs and residents seek options that will fit their career goals.[13,14] Our findings support the legitimacy of these efforts. The provision of maternity care and other services reported in MCH track graduates is higher than that reported by graduates of 13 rural training tracks.[15,16]

Additionally, the recent observation that family physicians who provide a more comprehensive basket of services are associated with lower total costs of care suggest that all Americans may benefit from residencies that train family physicians to provide more comprehensive care.[6] Similarly, a recent study from Canada concluded that better health system outcomes were delivered by high-responsibility family physicians who provided a wider basket of cognitive services.[30] Therefore, increased flexibility and length of training in family medicine to promote a wide breadth of cognitive and procedural services after graduation may produce health system benefits.

Our study was also limited by a lack of comparison to non-P4 programs that may have implemented curricular innovations during the same time period. The selection process associated with P[4] does introduce inherent bias in that the residencies chosen were considered to be innovative, have strong leadership, and be in good standing with the ACGME. We do know that the family medicine residencies selected did represent geographically and administratively diverse programs. Another limitation is that this is an observation study utilizing a case series design, which is weaker than more rigorous study designs but is not uncommon in educational research because randomization of learners in educational settings has many challenges. The analyses conducted here were exploratory as we did not specifically power the study for the comparisons we conducted. Nevertheless, many findings did reach meaningfully statistically significant levels, though we did not construct a causal pathway and thus can only speculate on the causes of the associations we discovered.

In conclusion, we found that offering additional training in a certain location appears to result in a broader scope of practice post training. Our results support the idea that residency review committees should continue to promote innovation in curricula, especially increased flexibility in residency training that is tied to specific career goals. The requisite funding streams—eg, increased GME funding for a fourth year of family medicine training—should be created to support these innovations. The entire health care system may benefit if more family physicians are trained to provide more comprehensive care.[6]

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