



Team Training in Family Medicine Residency Programs and Its Impact on Team-Based Practice Post-Graduation

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OBJECTIVE: Our objective was to examine perceptions of adequacy in team-based care training during residency and whether this influences practice choice post-residency training.

METHODS: We analyzed self-administered survey data from recent residency graduates collected as part of the Preparing Personal Physicians for Practice (P4) Project to characterize residents' perceptions of adequacy of training they received on team-based care. Multivariable logistic regression was used to assess the association between adequacy of team-based care training and joining practices that use team-based care after residency graduation, adjusting for differences in demographics.

RESULTS: A total of 241 residency graduates were included in these analyses with response rates to surveys of 80.8%–98.1%. They reported practicing in 31 different US states or districts and four other countries. Over 82% of residency graduates reported being adequately trained in team-based care, 9.5% reported being overtrained, and 7.9% reported receiving no team-based care training over the study period. Seventy-six percent of P4 graduates joined practices that used team-based care in 2011, which increased to 86% (81/94) in 2013. The adjusted odds of practicing in settings with team-based care was 5.7 times higher for residents who reported being adequately prepared for team-based care compared to those who reported receiving no team-based care training and was 12.5 times higher for those who reported being over-prepared compared to those who reported no training/under-prepared.

CONCLUSIONS: The majority of residency graduates perceive they were well trained in team-based care, which is significantly associated with joining practices that use team-based care post graduation.

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“teamness” that serve a variety of functions.⁷ Most early research on team performance has been conducted in military settings,⁸⁻¹¹ with some medical specialties translating concepts of team performance into health care settings.^{12,13}

More recently, the Veterans Health Administration Patient Aligned Care Teams (PACT) describes an initiative that involved more than 7,000 primary care teams in 150 medical centers and 800 community-based outpatient clinics that have been transitioning systems of care toward the PCMH.^{14,15} Results from this project indicate that high burnout rates (40%) exist in busy primary care settings, which can be mitigated with team-based care that addresses gaps in participatory decision making as well as ensuring teams are sufficiently staffed.¹⁶

In primary care, cohesive health care teams have been reported as having five key characteristics:² clear goals with measurable outcomes,

Interdisciplinary teamwork has been identified as an important feature of the patient-centered medical home (PCMH),¹ with several studies published more than a decade ago suggesting that health care teams can improve primary

care,²⁻⁴ reduce medical errors, and improve patient safety.^{5,6} While earlier research studies reflect a prevalence of teams working in health care, a number of inconsistencies exist in the definitions of team and teamwork, likely due to concepts of

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clinical and administrative systems, division of labor, training of all team members, and effective communication. More recent research adds leadership as a sixth element, which is needed to ensure core role descriptions and manage resistance to changes in roles.¹⁷ It is clear that restructuring care delivery toward the PCMH is becoming well established in primary care, and this care model likely increases team-based care. However, we found little in the literature that reports on team-based care in primary care settings where residents are trained. This is important because we may be making assumptions about the skill level of residency graduates. Understanding the extent to which residents are being trained to work in health care teams during residency and whether this is associated with joining practices that use team-based care models post-training would help answer this question. We explored both trends in team-based care among residency graduates who participated in the Preparing the Personal Physician for Practice Project (P4), who are located across the United States. In doing this, we examined the hypothesis that adequacy of training in team-based care would be associated with choosing to work in practice settings that include team based care post-training.

Methods

The P4 Project

The P4 project is described in detail elsewhere.¹⁸⁻²⁰ Briefly, it is a comparative case series of 14 family medicine residency programs that are testing innovative training redesigns, such as changes in the length, structure, and composition of training designed to prepare family medicine residents for practice in PCMHs. Innovations differed by site and typically included individualized curriculum, a focus on training in teams, and fewer hospital-based rotations in favor of more continuity clinic time to provide more ambulatory clinical experiences in redesigned clinical practices.²⁰

Fourteen programs were selected that represented the best innovations as determined by a peer-review committee. The programs included broad geographic representation across the United States from rural, urban, and suburban areas as well as community and/or university-based or administered programs. All programs participated in core data collection activities as part of the project, including annual surveys completed by all residents, the program director, and medical director and/or clinic staff at continuity clinics. Oregon Health & Science University's Institutional Review Board (IRB #3788) reviewed study activities and granted the study an educational exemption.

Definitions, Instrument Development and Adequacy of Training Classification

The research team visited all participating programs to understand, in-depth, how residency training and clinical care come together in residents' continuity clinics. We toured each clinic where residents see their continuity patients and asked detailed questions about how team-based care was provided. Detailed observations and field notes on innovations in training were collected. Based on observations made while conducting site visits with participating programs and our tours of clinic settings where team-based care was being delivered, we used the following operational definition of team-based care for the purposes of this study, "care delivered by intentionally created, relatively small work groups in health care, who are recognized by others as well as themselves as having a collective identity and shared responsibility for a patient or group of patients."

We developed two self-administered survey instruments to conduct this study. The first survey asked residents about their demographic characteristics (age, sex, ethnicity, and marital status in their intern year and time-dependent variables were

resurveyed in subsequent years) and their perceptions of the quality of the training they received. This survey was paper based and was administered during the In-Training Exam period starting in 2006 and ending in 2012. The response rate for this survey was 98.1%.

The second survey was a graduate survey, which was administered once to each residency graduate approximately 18 months after training was completed (between 2011 and 2013) using either a paper or an Internet-based version. Among its 143 variables (many of which assessed scope of practice), the survey included a question that assessed the use of team-based care in their residency continuity practice, and it also asked respondents to rate the adequacy of training in team-based care (no training/underprepared, adequately trained, or over-prepared) during their residency. In addition, this survey asked graduates whether they were board certified in family medicine, their current professional setting (solo family medicine, family medicine group (2+), multi-specialty partnership/group, community health center, academic medical center or other) and the community size of their practice location (small—<10,000, medium—10,001–100,000, or large—>100,000). The response rate for the graduate survey was 80.8%. A similar version of this survey has been published elsewhere.²¹ Collecting these variables in each post-graduate cohort over time allowed us to assess trends in the use of team-based care in actual clinical practice. Both survey instruments underwent rigorous pilot testing using cognitive interviewing techniques, where we interviewed pilot testers about their responses to determine if they answered the questions we believed we were asking.²² Several rounds of testing were conducted and the surveys were refined until we determined, through a final round of testing, that the survey questions were producing accurate responses.

Data Analysis

Our study sample included residents from P4 programs who entered residency training between academic

years 2006/2007–2008/2009 and who graduated from their training programs between 2009–2013. Each residency graduate received

the graduate survey 18 months after training was completed.

Chi-squared tests and Fisher's exact tests were used to compare

Table 1: Demographic and Current Practice Characteristics of P4 Graduates According to Self Reported Level of Team-Based Care Training During Residency

	Overall	No Training/ Underprepared	Adequately Trained	Over-Prepared	P Value†
	(n=241)	(n=19) 7.9%	(n=199) 82.6%	(n=23) 9.5%	
Demographic characteristics					
Mean Age (SD) (range 26–59)	34.1 (4.6)	33.7 (3.6)	34.2 (4.9)	34.5 (4.1)	.57*
	n (%)	n (%)	n (%)	n (%)	
Sex					
Female	123 (51.0)	7 (36.8)	103 (51.8)	13 (56.5)	.40‡
Male	118 (49.0)	12 (63.2)	96 (48.2)	10 (43.5)	
Race/Ethnicity					
White	144 (59.8)	12 (63.2)	117 (58.8)	15 (65.2)	.02‡
Black	16 (6.6)	1 (6.3)	14 (7.0)	1 (4.4)	
Other	72 (29.8)	2 (10.5)	64 (32.2)	6 (26.1)	
Asian/Pacific Islander	40 (16.6)	2 (10.5)	36 (18.1)	2 (8.7)	
American Indian/Alaska Native	1 (0.4)	0 (0)	1 (0.5%)	0 (0)	
Middle Eastern	8 (3.3)	0 (0)	8 (4.2)	0 (0)	
Mixed race	11 (4.6)	0 (0)	9 (4.5)	2 (8.7)	
Unknown	12 (5.0)	0 (0)	10 (5.0)	2 (8.7)	
Hispanic	9 (3.7)	4 (21.1)	4 (2.0)	1 (4.4)	
Marital status					
Single/never married	37 (15.4)	3 (15.8)	31 (15.6)	3 (13.0)	.93‡
Married/Partnered	195 (80.9)	15 (79.0)	161 (80.9)	19 (82.6)	
Other	9 (3.7)	1 (5.3)	7 (3.5)	1 (4.4)	
Practice characteristics					
Board certified in family medicine					
No	26 (10.8)	1 (5.3)	20 (10.0)	5 (21.7)	.21‡
Yes	215 (89.2)	18 (94.7)	179 (90.0)	18 (78.3)	
Current professional setting					
Solo family medicine	8 (3.3)	3 (15.8)	4 (2.0)	1 (4.4)	.01‡
Family medicine group (2+)	87 (36.1)	7 (36.8)	75 (37.7)	5 (21.7)	
Multi-specialty partnership/group	35 (14.5)	2 (10.5)	27 (13.6)	6 (26.1)	
Community health center	32 (13.3)	2 (10.5)	27 (13.6)	3 (13.0)	
Academic medical center	39 (16.2)	5 (26.3)	33 (16.6)	1 (4.4)	
Other	40 (16.6)	0 (0.0)	33 (16.6)	7 (17.5)	
Community size of practice					
Small	63 (26.3)	5 (26.3)	53 (26.6)	5 (22.7)	.64
Medium	56 (23.3)	7 (36.8)	44 (22.1)	5 (22.7)	
Large	121 (50.4)	7 (36.8)	102 (51.3)	12 (54.6)	

† P value from chi-square test unless otherwise specified

‡ P value from Fisher's exact test due to low cell counts

* P value from one-way ANOVA

demographic and practice characteristics between residents according to their self-reported adequacy of training in team-based care. We tested for differences in the mean age at baseline for the three groups using a one-way analysis of variance.

A multivariable logistic regression analysis was used to compute the odds of using team-based care in practice based on their self-reported adequacy of training in team-based care. Odds were adjusted for differences found in baseline characteristics across the three adequacy of training groups. All statistical analyses were performed using Stata 12 (StataCorp, 2011. Stata Statistical Software: Release 12. College Station, TX: StataCorp LP) and R version 3.1.1 software (R Core Team, 2014, R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL <http://www.R-project.org/>).

Results

A total of 241 graduates of P4 residency programs were included in these analyses. At the time of their

graduate survey, they were practicing in 31 different US states or districts, with two practicing in Canada and five practicing abroad (Thailand, Africa, and Saudi Arabia). There were 199 (82.6%) P4 graduates who reported being adequately trained in team-based care (Table 1), 23 (9.5%) who reported being over-trained, and 19 (7.9%) reported receiving no team-based care training over the study period.

There were no significant statistical differences for age, gender, or marital status according to adequacy of training in team-based care, apart from a significant difference in race/ethnicity ($P=.02$) (Table 1). In terms of current practice characteristics, there were no differences in board certification or community size of practice according to adequacy of training (Table 1); however, there was a significant difference in current professional setting ($P=.01$) where those in family medicine group practices or multi-specialty partnership groups reported being adequately or over-trained more frequently than those in other practice

settings, such as academic or community health center practices (Table 1).

Figure 1 depicts the trends for self-reported adequacy of team-based care training during residency during the P4 project. About 83% of residents in the cohort who graduated in 2009 reported adequate training in team-based care, and this stayed consistent over the study period. Graduates who reported either being over-prepared or inadequately prepared had similar results that ranged from about 6% to 10% (Figure 1) over the course of the study period.

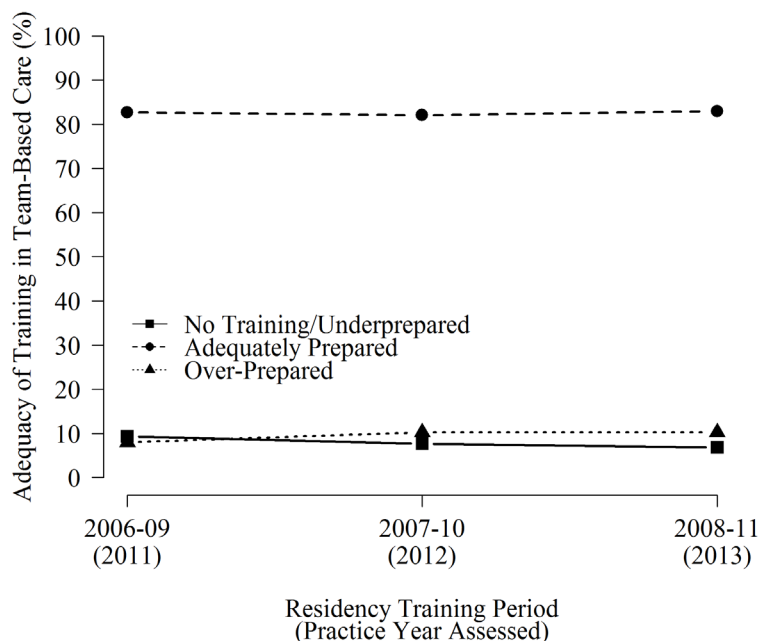
Figure 2 illustrates trends in clinical practice for P4 graduates in terms of their use of team-based care. Seventy-six percent (57/75) of P4 graduates joined practices that used team-based care in 2011, which increased to 86% (81/94) in 2013. We found no significant differences between those who did and did not practice with team-based care for age, sex, ethnicity, board certification, or community size where practice is located (data not shown).

Increases in self-reported adequacy of training in team-based care were correlated with significant increases in the odds of practicing in settings with team-based care. Relative to residents who reported receiving no team-based care training, those who reported being adequately prepared ($OR=5.69$, $P=.001$) and those who reported being over-prepared ($OR=12.52$, $P=.005$) had greater odds of practicing in settings with team-based care (Table 2).

Discussion

This study is the first to our knowledge to show both training and actual team-based care practice occurring in geographically diverse primary care settings. We found that perceived adequacy in team-based care training in family medicine resident continuity clinics was relatively high and remained stable during the P4 project. We also learned that the majority of the practices where graduates chose to begin their careers

Figure 1: Trends in Adequacy of Resident's Training in Team-Based Care



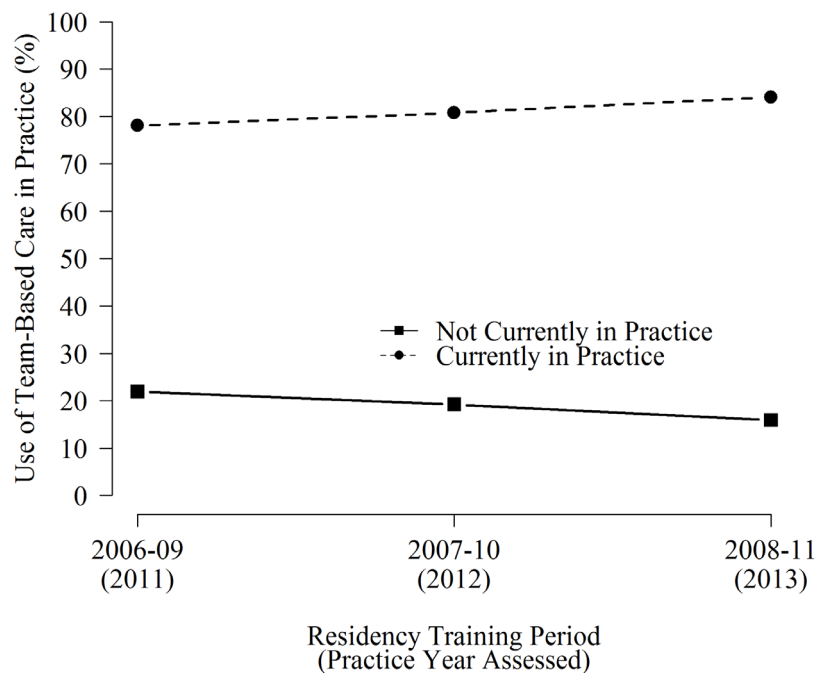
*Graduate surveys were collected 18 months after completion of training

were already using team-based care, even as early as 2011, and that the presence of team-based care for P4 graduates in their postgraduate practices only increased by about 7% over the course of the study.

Importantly, we learned that those graduates who reported being either adequately or over-prepared for team-based care had significantly higher odds of joining a practice that used team-based care compared to those with no preparation. It may be that residents who chose training programs that were innovating in many aspects of their education, such as the settings, content, length of training, and PCMH features were more likely to join practices that were also innovating, including in the use of team-based care. It may also be that those who received team-based care training sought out positions in practices that were well versed in this approach to patient care because it was familiar or desirable to them. Lastly, it could be that a secular trend involving more team-based care in practice presented more opportunities for them to work in a practice with this as a feature.

The P4 practices had a higher rate of implementing team-based care than the 28% rate reported in a 2011 study of a national sample of primary care practices.²³ It may be that many recent graduates of residency training have come to expect this patient care feature in their future practices. In any case, there is evidence that many health professions schools are now including interprofessional education (IPE) into their training programs, with one study of 16 medical and allied health professions schools reporting that 87.5% were undertaking formal IPE activities²⁴ with 93% of these involving collaborations between the schools of nursing and medicine. While such studies are promising, there is still much to be learned about IPE and its linkages to successful team-based care in actual clinical practice. For example, practices can do

Figure 2: Trends in Utilization of Team-Based Care in Practice



* Graduate surveys were collected 18 months after completion of training.

team-based care with medical assistants, nurses, and administrative front desk staff, most of whom learned about “teamness” and team function on the job and not in an IPE setting. A recent systematic review involving 83 articles on IPE²⁵ found a wide array of IPE models and educational components are being implemented with some inconsistencies and shortfalls in how IPE activities

are conceptualized, implemented, assessed, and reported. It may be that differing perceptions of team-based care has affected these studies, requiring more refined definitions. For example, in 2014, the American Medical Association published a definition of team-based care: “Teamwork in a health care setting between physicians and non-physician practitioners is important as the medical

Table 2: Adjusted Odds of Practicing in a Setting With Team-Based Care According to Adequacy of Team-Based Care in Residency* *n=238

Characteristics	Odds Ratio	CI	P Value
Adequacy of residency training in team-based care			
No training/underprepared	1.00	—	—
Adequately prepared	5.69	1.98, 16.32	.001
Over-prepared	12.52	2.17, 72.17	.005
Race/ethnicity			
White	1.00	—	—
Black	1.25	0.32, 4.84	.751
Hispanic	2.29	0.37, 14.31	.377
Other	2.12	0.90, 4.97	.085

community works to better coordinate care to ensure patients get the best possible care.”²⁶ Mitchell et al²⁷ in a key report on Core Principles & Values of Effective Team-based Health Care published in 2012 advocated for Naylor and colleagues 2010 definition:²⁸ “Team-based health care is the provision of health services to individuals, families, and/or their communities by at least two health providers who work collaboratively with patients and their caregivers—to the extent preferred by each patient—to accomplish shared goals within and across settings to achieve coordinated, high-quality care.” The two definitions appear different in terms of patient involvement and the extent of community involvement.

We do know from anecdotal interactions with the P4 programs that some continuity clinic practices started and stopped or refined their team-based care activities more than once over the duration of the project, indicating that implementing significant changes at the level of the practice can be challenging. Residents may not have felt as involved in team-based care activities in the clinic because they could not always be included in planning activities due to competing demands away from clinic, and they may not have received adequate communication about clinic changes. Such events could have affected residents’ perceptions of the team-based care training they received.

The strengths of this study include the broad geographic representation of P4 programs and their graduates’ practice locations and the use of well tested instruments with very complete data capture. Weaknesses of the study include the selection bias associated with being graduates of a P4 program, which would limit the generalizability of these findings, and the possibility of measurement error related to different perceptions of what team-based care is. Lastly, our study was exploratory in nature and was not specifically powered to fully test any single hypothesis. Thus, this observational

case series design does not allow us to draw as strong a conclusion as a more discriminating study design. Regardless of these weaknesses, given the central role that team-based care plays in a high-functioning medical home, it is vitally important to understand the best approaches needed to prepare family physicians to provide effective team-based care. Much more research is needed using more rigorous study designs.

In conclusion, a majority of graduates of residencies undergoing redesign perceived they were well trained in team-based care, and increases in this perception were associated with joining practices with team-based care in place. Residency programs can influence future practice patterns by creating clinical learning environments that expose residents to important aspects of a high-functioning medical home.

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