

Estimating the Staffing Infrastructure for a Patient-Centered Medical Home

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Amid a shortage of primary care physicians, the need to provide high-quality, affordable care to a growing population drives the patient-centered medical home (PCMH) movement as an innovative method of delivering primary care in the United States.¹ The key premise is that improvements in the quality and efficiency of care will result from a interprofessional team-based approach where each member of the team works collaboratively with other team members, all performing at the top of their scope of practice.

Although implementation of a PCMH is highly contextual, there is growing evidence to suggest that certain functionalities are important for success.²⁻⁶ In 2007, *Joint Principles for the Medical Education of Physicians as Preparation for Practice in the Patient-Centered Medical Home* summarized the overarching principles that seek to strengthen the physician-patient relationship by replacing episodic care with coordinated, proactive, team-based, and accessible care that emphasizes safety and quality.⁷ Practices have used the following key strategies to help transition to the PCMH model: enhanced care management,^{8,9} integration of behavioral health into medical care,¹⁰⁻¹⁵ improved medication management,¹⁶⁻²⁰ improved triage and appointment availability,^{6,21,22} population management,^{23,24} and engagement of patients and families including community outreach.²⁵⁻³⁰ All these elements require a strong health information system, the capacity to analyze data for quality improvement, and an emphasis on team-based care involving a range of personnel.

Given these new functionalities, the decision to implement a PCMH requires completing a needs assessment that examines existing staff roles and functions, considers the extent to which existing staff can meet the new and expanded roles of a PCMH, and determines whether additional personnel and financial support will be needed to fill the gaps. Thus far, there are limited data on staffing requirements for practices that are interested in transitioning to a PCMH.²⁻⁵ The objective of this study was to evaluate the roles of personnel within a PCMH and to propose necessary staffing ratios and associated incremental costs to implement this model of care.

METHODS

This study was initiated based on the deliberation of a work group created at the PCMH Education

Background: The patient-centered medical home (PCMH) offers an innovative method of delivering primary care. However, the necessary staffing infrastructure is not well established.

Objectives: To evaluate the roles of personnel within a PCMH and to propose necessary staffing ratios and associated incremental costs to implement this model of care.

Methods: We sampled primary care clinical practices that either have successfully deployed or were in the process of implementing a PCMH practice model. We conducted targeted interviews of administrators from these practices and reviewed published literature on the personnel roles within a PCMH. Collectively, these data were compared with current staffing standards and used to inform an analytical model and sensitivity analysis.

Results: Primary care practices that successfully transitioned to a PCMH have incorporated a range of new staff and functionalities. Based on our model, we estimated that 4.25 full-time equivalents (FTEs) should be allocated to staffing personnel per 1 physician FTE. Compared with the base-case model of current staffing in the United States of 2.68 FTEs per physician FTE, this is a 59% increase. After applying sensitivity analysis for variability in staffing and compensation, the incremental staffing FTE per physician FTE was 1.57 (range 1.41-1.73) and the incremental associated cost per member per month was \$4.68 (range \$3.79-\$6.43).

Conclusions: Our study suggests that additional staff with specific expertise and training is necessary to implement a PCMH. Further study and opportunities for funding additional staffing costs will be important for realizing the potential of the PCMH model of care.

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Take-Away Points

In this study we evaluated the personnel infrastructure, staffing ratio, and associated costs needed to implement a patient-centered medical home (PCMH).

- Experience from successful PMCH practices suggests that additional staff with necessary expertise and training will be required in order to achieve the goals of improved outcomes and better care at reasonable cost that incorporate effective care coordination, medication management, and support for behavioral health and population management.
- This additional support may need to be further augmented in practices serving vulnerable populations and/or providing practice sites for resident trainees.

a PCMH (eg, PCMH, patient-centered medical home, medical home).

During the Society of General Internal Medicine Education Summit, we identified a convenience sample of primary care clinical practices that were known to have either successfully deployed or were in the process of implementing a PCMH practice model.

These practices were selected because

Summit convened by the Society of General Internal Medicine in 2011. The purpose of this summit was to discuss the challenges of advancing the PCMH model within academic medical centers in the United States and to create work groups to address specific topics ranging from curriculum and scheduling to infrastructure. The summit, but not this study, was supported by the Josiah Macy Jr Foundation and others. This study was approved by the institutional review board at the University of Pennsylvania.

There is limited published literature to address our research question: what is the appropriate staffing infrastructure of a PCMH? Because limited role-specific data exist in some contexts (eg, role of pharmacists in the PCMH¹⁶⁻²⁰), we used published data when available and conducted targeted interviews of a small sampling of practices implementing a PCMH to fill in the gaps when published data were not available. Collectively, these data were compared with current staffing standards and were used to inform an analytical model and sensitivity analysis to propose insights into the necessary staffing infrastructure for a PCMH.

Data Sources and Collection

To inform the staffing and cost estimates of our analytical model, we reviewed published literature on the staffing roles within *Joint Principles for the Medical Education of Physicians as Preparation for Practice in the Patient-Centered Medical Home*,⁷ conducted interviews with leaders and administrators at a small sampling of primary care practices, obtained current staffing estimates from the Medical Group Management Association (MGMA),³¹ and gathered staffing compensation estimates by geographic location.^{32,33}

After determining key functions of a PCMH based on practice principles, published literature on staffing roles within a PCMH was reviewed to determine which professionals within current PCMHs carried out those roles in practice. In **Table 1**,^{6,8-30,34,35} we display the PCMH principles based on the 2007 *Joint Principles*⁷ and the key strategies and components for each principle. Based on this information, we elucidated the implications for staffing and conducted a keyword search for the staffing role (eg, care manager) and combinations of the staffing role and

they had published their results in peer-reviewed journals, they had presented their approaches at academic meetings, or their efforts to deploy the PCMH were known to members of the Society of General Internal Medicine Education Summit working group. We chose to interview administrators because they were often cited as the primary decision makers for staffing their medical practices. Administrators of eligible practices, physician or nonphysician, were interviewed over the telephone and asked the following questions: (1) What are your average attending and resident panel sizes? Do you use any risk adjustment methodologies? (2) What types of health professionals (including care managers, nurse practitioners, physician assistants, clinical pharmacists, health coaches/educators, social workers, behavioral health providers, or nutritionists) have been incorporated in the care team, and what are their roles? (3) Have any other administrative personnel (eg, data analysts) had been added to the team? (4) What are the staffing ratios between these positions and physician full-time equivalents (FTEs) in the practice? (5) Is the practice certified as a PCMH by the National Committee for Quality Assurance (or other organization)? (6) Does the manager directly overseeing the practice have a master's degree in business, healthcare administration, public health, or a related field?

Nine administrators with knowledge of their institution's primary care practices and PCMH initiatives agreed to be interviewed. They represented academic medical centers, nonprofit and for-profit institutions, and government-owned health systems. Of these institutions, 7 had at least 1 practice certified as a PCMH (6 by the National Committee for Quality Assurance, 1 by a health insurer). One practice had applied for certification. One large practice group had not sought formal PCMH certification. Between January 2011 and May 2011, a single investigator (MJA) conducted the telephone interviews and followed up by phone and/or e-mail to confirm findings when additional clarification was needed. Interview results were de-identified and aggregated for review by study authors.

Data from the MGMA 2010 cost survey report³¹ were used to assess current staffing models in the United States. The median staffing level for all internal medicine practices owned by a hospital/integrated delivery system was used as the

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■ **Table 1.** Strategies for Implementing PCMH Principles in Practice^a

PCMH Principle	Strategies for Implementation	Examples of Specific Components	Staffing Implications: Potential Types of Staff	References
Patient care will be coordinated and/or integrated across healthcare system	Care management/ care coordination	Assess barriers to care Financial counseling Coordinate visits to non-PCP providers Work with team to create a care plan	Care managers Patient navigators	8,9
	Medication management	Medication reconciliation at time of transfer of care Identification of factors leading to nonadherence Evidence-based use of medications in chronic disease	Pharmacist support/ consultation	16-20
Patient care will be comprehensive and oriented to the whole person	Behavioral health integration	On-site counseling (depression, anxiety, domestic violence, anger management) Provide substance abuse management Pain management Train staff in motivational interviewing/ self-management training	Collocated or embedded behavioral health providers Psychiatric support Social worker support	10-15
	Patient and family engagement and community outreach	Provide patients with information needed to self-manage Connect patients to resources in their community Establish self-management goals	Peer coaching Health educators Nutritionists	25-30
Quality and safety will be hallmarks	Population management	Provide reminders for appointments, testing Identify patients with gaps in care Use of clinical decision alert Planned care of chronic conditions at dedicated visits	Dedicated clerical support IT support to create and maintain registries Nurse practitioners	23,24
	Quality improvement/ data analysis	Establish goals and track progress (dashboards) Report performance internally and to outside organizations when appropriate (NCQA, TJC) Ongoing PDSA cycles within the practice	Quality analyst Data manager	34,35
Patient care will be accessible, and continuity with physician-directed care team will be maintained	Improved triage and appointment availability	Use of templates for common clinical problems Appropriate use of appointment slots 24/7 access for patients for clinical concerns	Triage nurse Clinical team to provide coverage (nurse practitioner, physician)	6,21,22

IT indicates information technology; NCQA, National Committee for Quality Assurance; PCMH, patient-centered medical home; PCP, primary care provider; PDSA, plan-do-study-act; TJC, The Joint Commission.

^aBased on *Joint Principles of the Patient-Centered Medical Home* (2007).⁷

benchmark for comparison in our study. Data from Kenexa CompAnalyst Market Data,³² a national proprietary database, were used to determine the median annual total salary for the clinical and administrative staffing roles. Variances in compensation by geography were based on data from the Economic Research Institute's Geographic Assessor pay survey.³³

Data and Sensitivity Analysis

Data from literature review and interviews were aggregated for role-specific comparison. A model incorporating

an estimate of staffing of each role was developed as follows. Published estimates of staffing ranges were used when available. When published data were unavailable, current staffing baselines were compared with interview ranges and the median from our survey of 9 administrators was used. Using the median staffing level in the 2010 MGMA cost survey³¹ as a baseline, the incremental staff necessary to meet our proposed staffing model was then determined. Data were reported as FTE requirements per physician FTE. Sensitivity analysis was applied at ±10% to each staffing estimate.

■ **Table 2.** Staffing Ratios for PCMHs

Staffing Variable	Interview Range ^a	MGMA ^b	Proposed
Provider FTE		1	1
Provider panels	625-2500	2435	2150
Patient panels			
Risk adjustment	Most were unadjusted; several used risk stratification techniques	No	Based on proprietary risk adjustment software ^c
Staffing ratio estimates (FTEs)			
Clerical	0.18-1.85	1.12	1.42
MA, technician, LPN	0-1.66	1.33	1.33
RN	0.21-1.78	1.33	1.33
RN care manager	0-1.0	1.33	0.40
NP/PA	0-1.36	0.23	0.25
Health coaches	0-0.25	0	0.25
Pharmacist	0-0.53	0	0.20
SW (includes mental health)	0-0.50	0	0.25
Mental health providers	0-0.83	0	0.25
Nutritionist	0-0.20	0	0.10
Clinical data analyst	NA	0	0.05
Total		2.68	4.25

FTE indicates full-time equivalent; LPN, licensed practical nurse; MA, medical assistant; MGMA, Medical Group Management Association; NA, not applicable; NP, nurse practitioner; PA, physician assistant; PCMH, patient-centered medical home; RN, registered nurse; SW, social worker.

^aBased on telephone interviews.

^bMedian integrated delivery system owned, all internal medicine.

^cData are from reference 33.

Median annual compensation for clinical and administrative roles in the PCMH was estimated using the Kenexa Compensation Analysis.³² The cost of fringe benefits, estimated to be 30% of base salary, then was added to estimate total annual employee compensation. Sensitivity analysis for compensation was conducted by using the Economic Research Institute survey data to estimate the range among the 9 institutions in our study. A range of -10% to +25% was applied to represent geographic variations between 2 cities: Dubuque, Iowa (a city with lower salaries) and Manhattan, New York (an area with high salaries). Incremental cost estimates were calculated by multiplying the incremental FTEs per physician by the annual compensation estimates. The incremental reimbursement required to offset the incremental costs were estimated. Assuming a typical panel size of ~2150 patients per physician FTE (approximately the median among the 9 practices in our study), the incremental cost per member per month was computed, where each member was a patient within the physician's panel.

RESULTS

Interviews

The majority of practices interviewed in our study noted that the manager directly responsible for the PCMH did not have formal leadership training such as a master's degree in public health, business administration, health administration, or another related field. A commonly expressed sentiment was that the increased complexity of a PCMH required a significant expansion of the administrative skills of the managers.

In **Table 2**, we display a summary of the results of staffing estimates from our interviews compared with MGMA baseline estimates. Panel sizes for physician FTEs ranged from 625 to 2500 patients and varied significantly in terms of the criteria used to define a physician's panel and the number of patients a physician was expected to manage. This wide range reflects the variability in criteria used to determine panel sizes and includes academic faculty, who carry smaller patient loads. Resident panels provided by 2 practices varied

by site and years of training, ranging from 30 to 60 patients for postgraduate year 1 to 80 to 125 patients for postgraduate years 2 and 3. Only 3 sites reported risk adjustment to their patient panels, using either software imbedded within the electronic health record and practice management systems or proprietary software. Several practices noted their intent to risk-adjust patient panels in the future.

A care manager was the most consistent addition of staff to the practices in our study. A registered nurse filled this role, often in a ratio of 1 to 1 with each physician FTE. Other common findings among practices included the use of health coaches or educators (0-0.25 per physician FTE) and behavioral health providers (0-0.83) to address the importance of self-management and emotional support, and the addition of pharmacists (0-0.53) to assist in medication management, chronic disease care, and consultation practice. Several practices employed nutritionists (0-0.20) to educate patients regarding dietary issues. There were less consistent data on which professional provided information technology support, including registry management, coordinating an effective and updated electronic health record, and ongoing data reporting.

Staffing Model and Associated Cost Estimates

Based on review of estimates in published literature and themes within our interviews, we propose our staffing model in column 5 of Table 2. The total staffing estimate per physician FTE was 4.25, which resulted in an additional 1.57 staff per physician FTE. In comparison with baseline MGMA estimates, we recommend increased staffing in the forms of care managers, behavioral health/social workers, pharmacists, health educators, nutritionists, and data analysts. We also suggest an increase in clerical staff that is required for population management reporting.

In **Table 3**, we report cost estimates for the roles within our proposed staffing infrastructure. We applied sensitivity analysis to the incremental staffing estimates (range 1.41-1.73) and then estimated incremental costs with sensitivity analysis to adjust for geographic variation. The incremental cost of our proposed infrastructure for staffing a PCMH was estimated to be \$4.68 (range \$3.79-\$6.43) per member per month, where each member is a patient within the physician's panel.

DISCUSSION

Transforming primary care practices into PCMHs will require substantial changes in work flow and for many practices, additional staff. Based on our proposed staffing model, we estimate that a 59% increase (4.25 vs 2.68) in staff per physician FTE will be needed for practices currently staffing at the MGMA median to transition successfully to a PCMH. While

the exact mix of new personnel will vary by each individual practice, it is clear that in order to provide such services the new staff will require health professionals with specialized training such as nurse practitioners, care managers, data analysts, pharmacists, and behavioral health providers. Practices that may need staffing on the higher range of our estimates are those that care for patients with higher levels of illness complexity or more demanding socioeconomic environments.

Many components of our proposed incremental staffing estimates fall within the range of that suggested for specific PCMH roles in the literature.³⁶⁻³⁸ Our overall proposed staffing model is higher because we included improved functionality that professionals such as pharmacists, social workers, health coaches, dieticians, and clinical data analysts provide, which were not included in prior reports. Furthermore, our interviews with practice administrators provided anecdotal evidence supporting the experience of others that adding a care manager (typically a registered nurse) yielded substantial, rapid benefits.^{6,8,9}

Substantial increases in reimbursement will be required to support these additional staff. Based on our model, we estimate an extra \$4.68 per member per month will be necessary to cover additional staffing compensation. It is important to note that this figure does not include new personnel costs related to reconfigured office space, new technology, and training materials or any incremental compensation for the primary care physicians. Additionally, the potential costs attributable to obtaining more experienced nonphysician managers and greater involvement of physicians in practice management are not included in this estimate.³⁹ The augmented reimbursement necessary will vary considerably by geography. In our study, sensitivity analysis estimated a range of \$3.79 to \$6.43, which accounts for variation in number of staff FTEs per physician FTE and compensation by geography. It is worth noting that the estimated incremental revenue needed to support the PCMH in our model is within the range offered by many pilot projects across the United States.⁴⁰⁻⁴³

Recent studies raise hope that the additional staffing costs might be offset by savings achieved through improved outcomes due to implementation of the PCMH. The Group Health Cooperative conducted a study that compared costs before and after the first 2 years of implementing their PCMH.⁴ After implementing their PCMH model, they observed 29% fewer emergency department visits and 6% fewer hospital admissions for the practice. This translated into a savings of \$10.30 per member per month; however, this amount was not statistically significant ($P = .08$). Geisinger conducted a study of their PCMH that compared utilization data 2 years before and 2 years after implementation.³⁴ They found 18% fewer hospital admissions and 36% fewer hospital readmissions after

■ **Table 3.** Incremental Cost Estimates for Staffing a PCMH

Position	Median Annual Salary, \$	Benefits Expense at 30%, \$	Total Employee Costs, \$ ^a	Incremental FTE per Physician FTE ^b	Incremental Costs, \$
Medical receptionist ^c	29,900	8970	38,870 (34,983-48,588)	0.30 (0.27-0.33)	11,661 (9445-16,034)
Medical assistant	30,300	9090	39,390 (35,451-49,238)	0.00	0
Licensed practical nurse	42,300	12,690	54,990 (49,491-68738)	0.00	0
Registered nurse	66,500	19,950	86,450 (77,805-108,063)	0.00	0
Nurse care manager	73,300	21,990	95,290 (85,761-119,113)	0.40 (0.36-0.44)	38,116 (30,874-52,410)
Nurse practitioner	91,700	27,510	119,210 (107,289-149,013)	0.02 (0.018-0.022)	2384 (1931-3278)
Physician assistant, medical	91,200	27,360	118,560 (106,704-148,200)	0.00	0
Pharmacist (not clinical)	114,500	34,350	148,850 (133,965-186,063)	0.20 (0.18-0.22)	29,770 (24,144-40,934)
Social worker	56,400	16,920	73,320 (65,988-91,650)	0.25 (0.225-0.275)	18,330 (14,847-25,204)
Nutritionist	53,000	15,900	68,900 (62,010-86,125)	0.10 (0.09-0.11)	6890 (5581-9474)
Health coach (medical assistant)	30,300	9090	39,390 (35,451-49,238)	0.25 (0.225-0.275)	9848 (7976-13,540)
Clinical data specialist	56,200	16,860	73,060 (65,754-91,325)	0.05 (0.045-0.055)	3653 (2959-5023)
Total				1.57 (1.41-1.73)	120,652 (97,728-165,896)
Panel size, ^d n					2150
Incremental cost per member per month ^e					4.68 (3.79-6.43)

FTE indicates full-time equivalent; PCMH, patient-centered medical home.

^aRange includes sensitivity analysis of -10% to +25%.

^bRange includes sensitivity analysis of ±10%.

^cIncludes 0.13 FTE for office receptionist and 0.17 FTE for population health.

^dCompared with Medical Group Management Association, integrated delivery system owned, all internal medicine, 2010 cost report.³¹

^eEach member is a patient within the provider's panel.

implementing the PCMH. A subsequent financial analysis of Geisinger's Medicare Advantage patients after a median of 26 months in the PCMH demonstrated a 4.3% to 7.1% reduction in total costs ($P < .01$).⁴⁴ Other pilot projects have demonstrated significant improvement in quality and reductions in utilization and total costs.^{43,45}

Networking and creative partnerships could help to leverage resources across smaller practices. As indicated in Table 2, solo practitioners would require only a 0.40 FTE of a care manager and 0.25 FTE of a social worker. A large health system with smaller affiliate primary care practices might decide to hire a diabetic educator to work part-time at each practice site, in hopes of improving patient adherence and chronic disease management within each of the practices. Several practices might create a network that could hire a care manager who could be a liaison between those practices and a hospital system.^{35,46} Improved collaboration with insurance plans might allow more efficient use of the insurance plan's management of high-risk patients. Ultimately, however, significant enhancement in reimbursement to practices is likely to be required if the full functionality and benefit of a PCMH model is to be realized.

Limitations

Our study has several limitations. The range of staffing ratios between physician and clinical staff in the surveyed practices varied considerably. Determining precise ratios was challenging in some practices due to differences in position titles across practices, shared staff within a PCMH or with other non-PCMH practices, bundled staffing data that prevented determination of ratios of specific roles, the inclusion of some positions in the practice that were not integrated into the PCMH team, and the off-site locations of some staff (eg, case managers).

Staffing estimates were derived from phone interviews and written communication, and therefore are subject to reporter bias. The practices surveyed included a mix of academic and community-based offices. Only 2 practices provided specific information about intern and resident panel sizes, and only 3 practices provided specific staffing ratios for their teaching practices. As a result, the recommended staffing ratios may need to be modified for use in teaching practices. In addition, it is important to note that we sampled administrators and not front-line staff or workers within the practices, who might have different perspectives on staffing infrastructure.

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The staffing ratios for some roles in the MGMA report were derived from a relatively small number of practices. The cost estimates we used reflected median compensation levels, and compensation levels will vary considerably across the country. The cost of employee benefits will also vary considerably across practice settings and may be substantially different from the estimate used in this analysis (30% of base salary). Finally, many of the practices surveyed in our study noted that their planning was influenced by the initiatives and regulations in the state in which they reside, and we were not able to account for this variation.

CONCLUSIONS

Implementing a PCMH requires an evaluation of the practice's current staffing and functional roles, along with determination of the needs of its patient population. Our proposed staffing model suggests that in order to achieve the goals of improved outcomes and better care, additional staff with necessary expertise and training will be required. Although potential long-term savings from implementation of a PCMH might offset the additional up-front costs of increased staffing, further study is needed and additional funding sources will be required if we are to realize the full potential of the PCMH.

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