

The Cost of Sustaining a Patient-Centered Medical Home: Experience From 2 States

Michael K. Magill, MD¹

David Ehrenberger, MD²

Debra L. Scammon, PhD^{1,3}

Julie Day, MD⁴

Tatiana Allen, CRC¹

Andrew J. Reall, MBA Candidate³

Rbonda W. Sides, CPA⁵

Jaewhan Kim, PhD⁴

¹University of Utah, School of Medicine, Department of Family and Preventive Medicine, Salt Lake City, Utah

²Integrated Physician Network, Louisville, Colorado

³University of Utah, David Eccles School of Business, Department of Marketing, Salt Lake City, Utah

⁴University of Utah Medical Group, Salt Lake City, Utah

⁵Crosslin and Associates, Nashville, Tennessee



ABSTRACT

PURPOSE As medical practices transform to patient-centered medical homes (PCMHs), it is important to identify the ongoing costs of maintaining these “advanced primary care” functions. A key required input is personnel effort. This study’s objective was to assess direct personnel costs to practices associated with the staffing necessary to deliver PCMH functions as outlined in the National Committee for Quality Assurance Standards.

METHODS We developed a PCMH cost dimensions tool to assess costs associated with activities uniquely required to maintain PCMH functions. We interviewed practice managers, nurse supervisors, and medical directors in 20 varied primary care practices in 2 states, guided by the tool. Outcome measures included categories of staff used to perform various PCMH functions, time and personnel costs, and whether practices were delivering PCMH functions.

RESULTS Costs per full-time equivalent primary care clinician associated with PCMH functions varied across practices with an average of \$7,691 per month in Utah practices and \$9,658 in Colorado practices. PCMH incremental costs per encounter were \$32.71 in Utah and \$36.68 in Colorado. The average estimated cost per member per month for an assumed panel of 2,000 patients was \$3.85 in Utah and \$4.83 in Colorado.

CONCLUSIONS Identifying costs of maintaining PCMH functions will contribute to effective payment reform and to sustainability of transformation. Maintenance and ongoing support of PCMH functions require additional time and new skills, which may be provided by existing staff, additional staff, or both. Adequate compensation for ongoing and substantial incremental costs is critical for practices to sustain PCMH functions.

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INTRODUCTION

The patient-centered medical home (PCMH) is expected to help achieve the triple aim of improved health, improved quality, and controlled cost.¹ Transformation of a practice to a PCMH requires many changes, including new workflows, systems to improve patient access and manage health of a patient population, and potentially addition of staff to perform new services. Payers and practices must make sufficient up-front investments to develop PCMH functions. Support for the ongoing costs of sustaining the changes is also essential.

Most research done on economic impacts of PCMH has focused on the value achieved through the PCMH model. Analyses have found reduced downstream costs such as those for emergency department visits relative to enhanced insurance payments in support of PCMH, for example, through per member per month (PMPM) payments or shared savings.²

Relatively few studies, however, have documented the direct costs to medical practices of delivering PCMH functions. Zuckerman et al³ compared practice costs per full-time equivalent (FTE) physician as a function of level of PCMH functioning and found minimal increase in cost with higher levels of medical home implementation.

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CORRESPONDING AUTHOR

Michael K. Magill, MD
375 Chipeta Way, Ste A
Salt Lake City, Utah 84108
Michael.Magill@hsc.utah.edu

Patel et al⁴ identified a range of new staff and functions in PCMHs. Administrators from 9 internal medicine practices identified an addition of 1.57 staff per FTE physician, largely for care management, at an incremental cost of \$4.68 per member per month.

Holtrop et al⁵ examined personnel costs and revenue specifically for care management. They concluded that reimbursement for care management in fee-for-service (FFS) practices covers only 21% of associated costs.

A study by Nocon et al⁶ in Federally Qualified Health Centers (FQHCs) found that a 10-point increase in the PCMH score on a rating scale of 0 to 100 was associated with an increased operating cost of \$2.26 (4.6%) per patient per month.

Thus, relatively few studies have examined costs to maintain PCMH functions. Estimates were drawn from limited numbers and types of practices, and studies used varying methodologies and different definitions of PCMH services and related costs. In this study, we assessed the cost of PCMH services within a range of practice types, focusing specifically on the incremental personnel costs incurred by practices to deliver the functions specified within the 6 National Committee for Quality Assurance (NCQA) PCMH 2011 Standards.⁷

METHODS

The baseline against which we identified marginal costs was a traditional, "high-functioning" primary care practice. We envisioned this as an FFS primary care practice with an established electronic health record (EHR). We therefore did not include the costs of maintaining EHRs in our analyses. Further, we did not assess the costs involved in providing culturally and linguistically appropriate services, collecting patient information, collecting and documenting clinical data, conducting comprehensive health assessments, or using electronic prescribing, as these activities were considered to be part of a well-developed primary care practice and not unique to PCMHs.

Our analysis focused on those functions specific to the PCMH model. NCQA criteria⁸ specify Factors as

Table 1. Characteristics of Study Practices (N = 20)

Characteristic	Utah Practices	Colorado Practices	
Number and type	8 university-owned primary care	7 private primary care practices	5 FQHC network practices
Medical home model	Care by Design (medical home)	NCQA PCMH 2011 (Level III)	NCQA PCMH 2011 (Level III)
Number of annual primary care visits/practice, range	12,912-38,076	7,206-29,880	10,433-47,777
Number of primary care physicians/practice, range	3-13	2-8	2-7
Number of primary care physician assistants and nurse practitioners/practice, range	1-4	1-6	2-12
Number of care managers, range	1-2	0-1	1.5-6
Payers	Primarily commercial insurance; 2 practices with ≥30% Medicaid	Primarily commercial insurance	≥69% Medicaid, Medicare, SCHIP
Urgent care and/or extended hours	2 evening/weekend urgent care 3 extended hours	Weekend and after hours	Weekend and after hours
Context	3 suburban, 3 urban, 2 rural	4 suburban, 3 urban	Urban and suburban

FQHC = Federally Qualified Health Center; NCQA = National Committee for Quality Assurance; PCMH = patient-centered medical home; SCHIP = State Children's Health Insurance Program.

Notes: Study practices in Utah were primary care practices including family medicine, internal medicine, and internal medicine/pediatrics. Colorado practices were full-spectrum family medicine practices; 6 did not include obstetrics. Colorado FQHC practices were full-spectrum family medicine practices and included obstetrics, pediatrics, and geriatrics. They also included on-site behavioral health and dental care and hospital care.

the most detailed level of implementation. These Factors are aggregated into Elements, which are in turn aggregated into Standards. We assessed direct personnel costs to deliver Factors, and aggregated these costs into Elements and Standards. We did not measure direct costs such as supplies or indirect costs such as general overhead.

Participants and Study Context

We studied 20 primary care practices, 8 in Utah and 12 in Colorado, that differed in PCMH recognition status, ownership, payor mix, and patient populations (Table 1). Utah practices include 8 primary care practices owned by the University of Utah that began transformation to Care by Design, their version of PCMH, in 2004.⁹ Care by Design anticipated key elements of PCMH: Appropriate Access, Care Teams, and Planned Care. The clinics have a centralized senior leadership team, and each practice has a medical director, clinic manager, and lead nurse. These practices have not applied for NCQA PCMH recognition. The 12 Colorado practices included 7 private practices plus 5 clinics that operated as a single business entity within a Federally Qualified Health Center, Clinica Family Health; 8 of the study practices were affiliated with Centura Integrated Physician Network, an accountable

care organization north of Denver. The Colorado practices have NCQA 2011 Level III PCMH recognition and have been operating as PCMHs for at least 4 years.

Development and Refinement of Cost Tool

We developed a PCMH cost dimensions tool based on NCQA 2011 recognition criteria^{7,8} to assess marginal costs associated with PCMH functions. The tool includes 3 worksheets: Costs, Personnel, and PCMH Functions (Supplemental Appendix 1, available at <http://www.annfam.org/content/13/5/412/suppl/DC1>).

The Costs worksheet includes a 127-item questionnaire based on Factor descriptions from the NCQA PCMH 2011 Standards⁷ to identify staff assigned to deliver each Factor. We calculated the number of hours worked per month to deliver PCMH functions by type of staff member. The Costs worksheet excluded questions regarding 5 Elements judged to reflect traditional high-functioning primary care as noted above.

We used the Personnel worksheet to document compensation (salary or hourly rate plus benefits) for every staff position. We used these data to produce the line item costs attributed to each PCMH function.

We used the PCMH Functions worksheet to assess the degree of medical home implementation at the Factor level. Two NCQA PCMH Clinical Content Experts defined the process for this functional assessment and ensured consistent application across all practices. Each practice's medical home Factor-level implementation was assessed as either present or absent (eg, for Factor 1A1, providing same-day appointments, the researcher verified that the practice actually offered same-day access).

We pilot tested the cost dimensions tool in 3 of our study clinics (2 in Colorado and 1 in Utah) and revised it to ensure we reliably identified which staff members performed PCMH tasks and the hours per month they typically spent completing them. Wording was clarified to facilitate consistent interpretation of PCMH functions according to the NCQA Standards.

Data Collection

We provided the cost dimensions tool to the clinic manager and physician or medical home lead in each practice and to the central business manager of the Utah clinics. We asked these respondents to review the tool's 3 worksheets and to complete the Personnel worksheet before a scheduled interview.

Teams of authors and research assistants then conducted personal interviews with clinic representatives to complete the remainder of the PCMH cost dimensions tool, and to collect data on patient encounters per practice per month.

After on-site data collection, we completed iterative e-mail or telephone communication with respondents to

clarify and validate responses. We then reviewed each practice's responses for reasonableness and internal consistency. We compared responses between clinics to identify differences, and discussed outliers with respondents for clarification or correction.

Data Reporting

We report data for the 7 Colorado private practices and 8 Utah practices individually. The 5 FQHC sites operated as a single business entity; therefore, we report their data as for 1 practice.

Because practices vary in clinician composition and in the number of patient visits, in the literature, costs are often standardized across practices relative to the number of FTE clinicians and to the number of encounters at each practice.^{10,11} Standard ratios in physician practices include cost (both direct and indirect plus indirect) per FTE physician or clinician, cost per encounter or visit, and cost per patient or per member per month. We report costs using these standard ratios.

Data on patient panel attribution per physician were not available for most of the study practices. We therefore estimated marginal PMPM cost by dividing the cost per FTE physician by a standardized panel size of 2,000 patients.

This study was determined to be exempt from review by the University of Utah's institutional review board.

RESULTS

Cost of PCMH Functions

Costs of PCMH services per clinician FTE at individual practices were aggregated to average levels by state (Table 2). Average total costs per FTE clinician per month were \$7,691 in Utah and \$9,658 in Colorado. Average PCMH costs per encounter were \$32.71 and \$36.68, respectively. The estimated PMPM costs were \$3.85 for Utah and \$4.83 for Colorado, or \$4.37 for the practices overall. We calculated PMPM costs assuming a panel size of 2,000 patients per FTE primary care physician. Others have recommended panel sizes between 1,500 and 2,500,¹²⁻¹⁴ and reported actual panel sizes of 2,150⁴ and 2,640.³ We therefore conducted a sensitivity analysis of PMPM by varying estimated panel size between 1,700 and 2,640 patients, with a resulting studywide PMPM cost ranging from an increase of \$0.72 (18%) for a panel size of 1,700 to a decrease of -\$0.99 (-24%) PMPM for a panel size of 2,640.

Staffing Models

The total number of staff providing PCMH services per FTE clinician was similar between the states. Practices in the 2 states used different types of staff,

however. Colorado practices reported more nurse practitioners and physician assistants, and fewer medical assistants than Utah practices (Table 2).

PCMH Functions

We calculated annual costs per FTE clinician for each PCMH Standard. All study practices reported costs associated with all of the NCQA Standards, but the

attribution of costs to specific Elements within Standards differed by practice and between the 2 states. The costs per Standard differed the most between the states, with Utah practices spending less than Colorado practices for Standard 4 (Provide Self-Care Support and Community Resources) and Standard 5 (Track and Coordinate Care). The rank order of Standards by cost was similar between the 2 states. Standard 2 (Identify

Table 2. Cost Ratios, Staffing Ratios, and Practice Staff by State and Practice

Outcome	Value								
Utah practices	A	B	C	D	E	F	G	H	Mean
Cost ratios									
Cost per clinician FTE, \$	8,366	5,001	8,568	9,066	7,247	8,423	5,079	5,176	7,698
Cost per encounter, \$	30.04	30.36	33.01	31.86	30.31	74.02	25.72	23.83	32.71
Cost PMPM, \$	5.02	2.50	4.40	4.05	3.65	4.21	3.06	2.59	3.85
Staffing ratios									
MA per physician FTE	2.35	1.35	1.71	2.33	3.24	1.81	1.94	2.52	2.16
Other staff per physician FTE	1.15	0.64	1.19	1.62	0.95	0.73	0.42	0.98	0.96
NP or PA per physician FTE	0.34	0.11	0.08	0.33	0.61	0.08	0.48	0.14	0.27
Practice staff									
Physician FTE	8.7	9.3	6.3	11.2	4.5	12.4	8.5	7.2	8.5
NP and PA FTE	3.0	1.0	0.5	3.7	2.8	1.0	4.1	1.0	2.1
Resident FTE	0	3.6	0	0	0	0	3.6	0	0.9
Nurse (PRN or manager) FTE	2.0	2.0	1.0	5.3	1.0	4.0	2.5	1.0	2.5
MA FTE	22.6	12.6	10.8	26.0	14.6	22.5	16.5	18.0	17.7
Care manager FTE	1.0	1.0	1.0	2.0	1.0	1.0	1.0	1.0	1.1
Other support staff FTE	10.0	4.0	6.0	14.5	5.0	5.0	4.2	6.0	6.8
Colorado practices	A	B	C	D	E	F	G	H	Mean
Cost ratios									
Cost per clinician FTE, \$	7,529	5,437	13,055	10,190	13,929	9,295	6,558	7,464	9,658
Cost per encounter, \$	34.12	19.65	50.06	36.32	59.34	37.18	23.57	19.04	36.68
Cost PMPM, \$	3.80	2.71	6.08	4.96	6.96	4.65	3.28	3.73	4.83
Staffing ratios									
MA per physician FTE	2.00	1.76	3.16	1.67	4.98	3.08	4.00	3.00	2.96
Other staff per physician FTE	3.25	1.50	8.97	2.97	3.85	2.13	1.72	2.92	3.41
NP or PA per physician FTE	1.50	0.63	1.02	0.20	1.30	0.46	2.60	1.65	1.17
Practice staff ^a									
Physician FTE	2.0	8.0	22.5	3.0	3.0	1.3	1.5	2.0	3.6
NP and PA FTE	3.0	5.0	23.0	0.6	4.0	0.6	4.0	3.3	3.7
Resident FTE	0	0	0	0	0	0	0	0	0
Nurse (PRN or manager) FTE	0	4.6	21.0	0	0	0	0	0	2.1
MA FTE	4.0	14.0	71.0	5.0	15.0	4.0	6.0	6.0	10.4
Care manager FTE	1.0	0	21.0	1.0	1.0	0.4	0	1.0	2.1
Other support staff FTE	8.5	12.4	205.5	8.5	14.5	3.0	6.6	8.0	22.3

FTE = full-time equivalent; MA = medical assistant; NP = nurse practitioner; PA = physician assistant; PMPM = per member per month; PRN = pro re nata.

^a Weighted means.

Note: Key cost and staffing ratios are presented for individual study practices with averages calculated for each state. Numbers of staff by category are presented by practice with averages calculated for each state. Clinicians include physicians, residents, nurse practitioners, and physician assistants. Other support staff include nurses, nurse managers, care managers, front desk staff, call center staff, information technology developers, and dietitians.

and Manage Populations) had the lowest average annual cost (\$5,646), while Standard 3 (Plan and Manage Care) had the highest (\$35,248) (Table 3). Total average cost of PCMH services including all Standards and averaged across all study practices was \$104,799 per primary care physician FTE per year.

DISCUSSION

This study provides the first estimate to our knowledge of the cost of PCMH services across a diverse group of practices in 2 states and calculated based on detailed data at the individual practice level about types of personnel providing PCMH services, time devoted to these activities, and actual compensation for these personnel. The similarity of costs between practices in the states that we observed gives us confidence that our data paint a realistic picture of the costs required to sustain a medical home.

Our average estimated PMPM of \$3.85 in Utah practices and \$4.83 in Colorado practices is similar to the \$4.68 observed by Patel et al⁴ and the \$4.80 to \$4.86 support staff cost PMPM reported by Zuckerman et al.³ These costs are also similar to the actual PMPM

paid in some demonstration projects (typically about \$3 to \$10 for a mixed-population practice, with higher payments in Medicare demonstration projects).¹⁵

In a comparative analysis of costs between practices at lower vs higher levels of PCMH scores, Zuckerman et al³ found only minimal differences. We believe our approach provides a more useful estimate of costs associated with delivery of PCMH functions because it focuses on total incremental costs. In addition, those authors' inclusion of total physician compensation rather than cost of physician time spent on PCMH functions could skew results. Also, that study obscures differences in cost by assuming that practice profit is passed on to physicians, whose income and benefits obscure differences in practice operating cost.

Our data suggest that even the partial implementation reported by our study practices costs on average about \$105,000 per FTE clinician annually. We believe this estimate is robust because it was calculated based on granular analysis of implementation in multiple practices, with considerable between-practice variation in personnel assigned and time allocated to performance of each PCMH function. Of the PCMH Standards, only Standard 1 (Enhance Access and

Continuity) is likely to yield additional revenue in a traditional FFS payment model by generating additional patient visits. We found an average cost for this Standard to be \$28,076, or 27% of the total. This estimate of potential FFS reimbursement of 27% of cost is similar to the 21% reimbursement in FFS payment for cost of care management services identified by Holtrop et al.⁵ Thus, even if 100% of Standard 1 were paid for from increased revenue, the remainder (\$104,799 – \$28,076 = \$76,723) would represent unreimbursed annual cost to the practice under traditional FFS payment.

Study Limitations

This study has several limitations that should be considered in evaluating the results. None of our study practices had fully implemented all of the PCMH functions. Our findings therefore represent

Table 3. Annual Cost Per PCMH Standard Per FTE Clinician

PCMH Standards and Elements	Annual Cost per FTE Clinician, \$		
	Utah Practices	Colorado Practices	All Study Practices
1. Enhance Access and Continuity After-hours, same-day access, urgent care, electronic access, practice care team	25,658	30,059	28,076
2. Identify and Manage Populations Comprehensive health assessment, proactive outreach, use data/registries for population management	5,603	5,688	5,646
3. Plan and Manage Care Previsit planning/huddles, implement evidence-based guidelines, identify high-risk patients, care management, medication reconciliation	31,935	38,431	35,248
4. Provide Self-Care Support and Community Resources Support self-care processes (self-management, activation, education), provide referrals to community resources	5,710	14,124	10,172
5. Track and Coordinate Care Referral and test tracking, follow-up, care transitions/coordination	10,503	18,602	14,663
6. Measure and Improve Performance Measure, report performance; measure patient, family experience; implement continuous quality improvement; report externally	12,884	8,990	10,994
Total annual cost per clinician FTE	92,293	115,894	104,799

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

Notes: Not all practices reported costs for each of the Factors for each of the Standards. Because average cost calculations are sensitive to the denominator used, in computing the average cost at the NCQA Standard level we excluded Factors for which no costs were reported to ensure that only actual practice costs incurred in support of each Standard were reflected in the results. Annual costs per FTE clinician for all study practices are therefore not means of Utah and Colorado practices.

the costs of substantial, although partial, implementation and likely understate the cost of some Standards and of sustaining a fully implemented PCMH.

Time estimates for the line item PCMH functions were based on reports by clinic leaders, not objective time-motion studies. Although we corroborated these estimates by information from clinic leaders, they could be overestimates or underestimates. Our confidence in them is increased by the similarity of overall estimates from different practice types with differing approaches to implementing PCMH services.

We defined PCMH services relative to those in a "normal" advanced primary care practice. Our definition was based on the authors' expert judgment. Others might have chosen different thresholds for including specific activities in estimates of PCMH costs. Also, incremental costs would have been higher if a less well developed practice model were used as baseline.

We studied a convenience sample of only 20 practices in just 2 states. Although our sample intentionally included diversity of practice type, size, and location, the range of these characteristics for practices across the nation is greater than in this sample. A larger and more diverse set of practices could further clarify the extent to which data reported for practices in this study can be generalized to other locations and practices.

Our estimate of PMPM cost is based on an assumption of a standardized panel size of 2,000 patients per FTE primary care clinician. The PMPM cost would vary for different panel sizes.

We isolated the personnel costs associated with providing PCMH functions. In some practices, staff costs may not have been incremental to the practice but rather reflect existing staff reassigned to new duties or simply working harder. We did not assess asset, supply, and overhead costs. Our cost estimates thus are likely somewhat conservative. Further, these staffing costs should not be misinterpreted as the prices/charges for those services.

We did not evaluate the startup costs of PCMH implementation, its revenue impact, or its associated opportunity costs. We found, however, that only 27% of costs were associated with activities that have potential to generate standard FFS revenue, such as extended hours. The remainder is associated with activities not typically expected to generate such revenue, such as care management. This finding is also consistent with our finding that cost most closely correlates with "other staff," who by definition are not billing clinicians.

Future Directions

The relationship of cost and staffing models to important outcomes including quality, total cost of care, and clinician, staff, and patient experience should be

explored. Examination of costs as they relate to associated revenue and to opportunity costs will further clarify the business impact of PCMH.

As noted, our practices had not fully implemented all PCMH functions. It will be important to examine line-item costs related to each PCMH Element to estimate cost of a fully implemented PCMH. Future research should examine cost variation by practice type and by staffing model to identify the most efficient practice models.

We obtained primary source data through interviews with key practice personnel; other methodologies could be useful. These methodologies might include objective time-motion study, and development of detailed care process models to attach specific costs to processes of care for individual patients.

In conclusion, there are substantial costs associated with the delivery of PCMH functions. We found that the costs of delivering these functions, most of which are not reimbursable in a FFS environment, are approximately \$105,000 per FTE clinician annually. Payment reform to offset the marginal costs of PCMH is essential for primary care practices to sustain medical home services.

To read or post commentaries in response to this article, see it online at <http://www.annfammed.org/content/13/5/429>.

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