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Practices and Changes Associated With Patient-Centered Medical Home Transformation

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ABSTRACT

OBJECTIVES: Knowing which patient-centered medical home (PCMH) care delivery changes and quality improvement (QI) practices further PCMH implementation is essential.

STUDY DESIGN: We used the 2008-2017 National Committee of Quality Assurance (NCQA) PCMH directory of 15,188 primary care practices that received Level 1, 2, or 3 NCQA PCMH recognition to construct a stratified national sample of 105 practices engaged in PCMH transformation. We examined their QI practices and PCMH changes associated with PCMH transformation.

METHODS: We derived QI practice and PCMH change variables from semistructured interviews. Practice leaders completed the PCMH Assessment (PCMH-A) measuring the practice's degree of PCMH implementation, which is a proxy for patient-centeredness. Controlling for practice characteristics, we regressed PCMH-A scores on QI practice and PCMH change variables.

RESULTS: Practices undergoing PCMH transformation nationwide most commonly made care delivery changes in access and continuity of care. To improve quality, practices most commonly engaged in discussing and targeting areas of patient experience improvement, trending performance, and conducting targeted QI. However, practices lower in patient-centeredness as measured by the PCMH-A were more likely to engage in efforts to improve patient experiences, such as reviewing patient experience data or engaging in 1-on-1 provider counseling related to patient interactions. Mature PCMH practices focused on changes in continuity of care.

CONCLUSIONS: Practices undertake a wide variety of care delivery changes and QI practices simultaneously to meet PCMH requirements. The patient experience–specific QI practices and PCMH care delivery changes that practices make to improve patient-centeredness differ by years of PCMH recognition.

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Health care organizations in the United States face challenges in delivering high-quality primary care.[1,2] For reform measures to successfully improve health, affordability, and patient experience, as well as meaning in work for providers, the care delivery system must be transformed.[3] The patient-centered medical home (PCMH) model is a leading effort to improve quality of care[4-6] by reorganizing a practice's care delivery process to promote comprehensive care, patient-centeredness, care coordination, accessible services, safety, and high-quality care.[7] The model offers many pathways to reduce costs and improve quality, but evidence of its impact is mixed.[8-12] Due in part to variations in the amount and types of practices implemented, PCMH implementation varies significantly by site, with practices undergoing many changes.[13] Although there is no single way to achieve PCMH transformation, there is concordance in the main implementation steps.[9,14]

PCMH recognition and certification require that core criteria are satisfied; they also provide various optional criteria.[15] Practices target PCMH changes that are required for recognition and utilize a variety of quality improvement (QI) activities for PCMH transformation. Practices are required to collect and use patient experience surveys and other data to improve their care and services. Which QI activities and PCMH changes are most useful is unclear.[16-18] Research has examined organizational climate,[19] QI culture,[20] structural factors associated with PCMH changes,[21] and which PCMH implementation resources are widely used,[16] but it has not studied these factors alongside a validated measure of PCMH implementation with established psychometric qualities. One such measure is the PCMH Assessment (PCMH-A), a proxy for patient-centeredness that measures the degree of PCMH implementation at the practice level.[22] PCMH-A scores are higher for recognized PCMH practices than for nonrecognized practices.[23] In this study, we investigate QI practices and PCMH changes associated with higher levels of PCMH transformation using the PCMH-A.

TAKEAWAY POINTS

Evidence shows that practice leaders who implement the patient-centered medical home (PCMH) care model encounter challenges in driving change. Understanding which PCMH changes and quality improvement (QI) practices further PCMH implementation is essential.

- Practices implementing PCMH made a wide range of changes in care delivery and QI practices.
- The most common changes were in access and continuity of care. QI practices used most often were discussing and targeting areas of patient experience improvement and trending performance.
- Mature PCMH practices focused on changes to continuity of care, whereas practices lower in patient-centeredness focused on improving patient experiences. These differences provide guidance for practices undergoing PCMH implementation.

METHODS

Design and Sample

The National Committee for Quality Assurance (NCQA) is the largest program to certify PCMH practices. To select our sample, we used NCQA's PCMH directory of 15,188 primary care practices that had applied for and received Level 1, 2, or 3 NCQA PCMH recognition between 2008 (when NCQA PCMH began) and 2017. We excluded practices that lacked a current NCQA PCMH status, were pediatric only, were in Puerto Rico, or provided care to the Armed Forces.

From the remaining 10,712 practices, we developed a stratified sample of 900 practices by US Census region, whether a statewide PCMH initiative existed, physician count, level and years of PCMH recognition, and use of the Consumer Assessment of Healthcare Providers and Systems (CAHPS) PCMH survey. Of these, 55 were ineligible (eg, merged, closed, HIV only, child only), leaving 845 practices. We drew a stratified random sample of 294 practices, contacted them via email and phone, and received completed responses from 105 (36% response rate). **Table 1** summarizes final sample characteristics. Details of the sample and qualitative findings are described elsewhere.[24]

Four researchers (2 coauthors [D.D.Q., N.Q.], 2 analysts) conducted semistructured, hour-long interviews with practice leaders in charge of PCMH transformation. Each interview discussed practice characteristics, such as PCMH history (ie, level and years of PCMH recognition), motivation for PCMH transformation, areas of care delivery change targeted for PCMH implementation, and QI practices used to make PCMH changes. Practice leaders completed the PCMH-A after the interview. We recorded and transcribed the phone interviews and paid participants a $75 honorarium.

Analytic Approach

We entered transcripts into Dedoose (SocioCultural Research Consultants), a web application for analyzing qualitative data. We created codes for care delivery changes identified in the NCQA PCMH standards and related QI practices using content analysis to identify key topics and develop a codebook.[25] We developed the code structure using systematic, inductive procedures to generate insights from responses and mapped codes to research questions.[26] We used content analysis to identify themes.

The 4 interviewers coded transcripts individually, using team meetings to reach consensus. We mapped emerging topics and processes to the 2017 NCQA PCMH standards and designated whether areas of improvement were part of core or optional criteria for PCMH recognition.[15] Practices must meet core criteria but have leeway on optional criteria. We also coded QI practices discussed during the interviews.

Interrater reliability was 0.93, indicating "very good" agreement.[27] We employed ongoing training among the coding team on emerging subcodes using the Dedoose training module. Study protocols were approved by RAND's Human Subjects Protection Committee (IRB Assurance No. FWA00003425; IRB No. IRB00000051) and the Office of Management and Budget (OMB No. 0935-0236).

Measures

PCMH-A scores range from 1 to 12, with higher scores indicating greater implementation of PCMH recommended practices. Scores assess 36 PCMH practices and behaviors associated with 8 PCMH change concepts. The overall score is the mean of the 8 change-concept scores. PCMH-A scores are sensitive to practice change over a time period as short as 6 months,[23,28] and we used the overall score as our dependent variable.

QI practice and PCMH change variables were elicited from semistructured interview questions about practice changes related to PCMH or its requirements. The **eAppendix Table** (available at **ajmc.com**) provides quotes and terms to establish these indicators. Responses were coded to align with NCQA PCMH standards and to note whether changes were core or optional.[29]

We derived QI practice indicators from questions on PCMH implementation and on efforts to improve patient experiences. The 4 general QI practices were (1) tracking performance and trending data over time, (2) discussing best practices with other providers or practices, (3) using staff meetings to review performance data, and (4) starting or continuing QI initiatives for PCMH change. The 5 patient experience QI practices were (1) sharing patient experience survey scores with leadership, (2) benchmarking and comparing patient experience scores over time, (3) discussing/targeting areas of needed improvement related to patient experiences of care, (4) reviewing provider performance on patient experience surveys, and (5) 1-on-1 counseling with low-performing providers. We scored these QI practice measures as dichotomous variables. We also created 2 count measures of the number of general (0-4) or patient-specific (0-5) QI practices.

The 7 core PCMH changes were for access, communicate lab test results, continuity of care, flow of patient visit, referrals to specialists, team-based care, and team huddles. The 4 optional PCMH changes were for behavioral health[30] services, information from specialists,[31] use of electronic health records (EHRs) to support

TABLE 1. Practice Characteristics and Associated PCMH-A Score (N = 105)

Variable	n (%)	Mean (SD) PCMH-A score
Ever administered CAHPS PCMH survey	64 (61%)	9.2 (1.6)
Current CAHPS administration	34 (32%)	9.3 (1.7)
Past CAHPS administration	30 (29%)	9.1 (1.5)
Never CAHPS PCMH administration (control)	41 (39%)	9.1 (1.6)
PCMH history**		
PCMH Level 1 or 2	28 (27%)	8.5 (1.5)
PCMH Level 3: <3 years	27 (26%)	9.1 (1.7)
PCMH Level 3: ≥3 years	50 (48%)	9.6 (1.4)
Location**		
Initiative states (New York, Vermont, Maine)	30 (29%)	8.8 (1.4)
Other Northeast	21 (20%)	10 (1.1)
Midwest/West	29 (28%)	8.6 (1.5)
South	25 (24%)	9.6 (1.7)
Size of practice		
1 or 2 physicians	38 (36%)	9.3 (1.4)
3 to 9 physicians	44 (42%)	9.5 (1.4)
≥10 physicians	23 (22%)	8.5 (1.9)
Ownership		
Private	32 (30%)	9.4 (1.7)
Large organization	37 (35%)	8.8 (1.7)
Federally qualified health center	36 (34%)	9.4 (1.3)
Has adult-only care		
Yes	22 (21%)	9.4 (1.6)
No	83 (79%)	9.1 (1.6)
Has an in-house pharmacy		
Yes	17 (16%)	9.0 (1.5)
No	88 (84%)	9.2 (1.6)
Practice has urgent care		
Yes	15 (14%)	8.5 (2.1)
No	90 (86%)	9.3 (1.5)
Practice is part of a network or medical group		
Yes	86 (82%)	9.1 (1.6)
No	19 (18%)	9.6 (1.1)
Primary care practice only*		
Yes	83 (79%)	9.4 (1.4)
No	22 (21%)	8.5 (1.9)
Has access to or works with a clinical pharmacist		
Yes	33 (31%)	9.3 (1.2)
No	72 (69%)	9.2 (1.6)
Practice has extended hours		
Yes	72 (69%)	9.4 (1.4)
No	33 (31%)	8.8 (1.8)

CAHPS, Consumer Assessment of Healthcare Providers and Systems; PCMH, patient-centered medical home; PCMH-A, PCMH Assessment.

*P < .05; **P < .01; ***P < .001 for F test comparing means.

patient care, and population health management. We analyzed dichotomous indicators of whether the practice implemented each of these changes and also total counts of the 7 core and 4 optional changes made by a practice.

We classified practices' PCMH history into 3 groups: (1) practices that had not yet achieved Level 3 PCMH recognition (ie, received NCQA Level 1 or Level 2), (2) practices that had achieved Level 3 PCMH recognition within the past 3 years, and (3) practices that had held Level 3 PCMH recognition for more than 3 years.

Statistical Analysis

We examined the percentages of practices reporting each QI and PCMH initiative overall and by PCMH history (**Table 2**). We fit separate multiple linear regression models for the 9 QI practices, 11 PCMH changes, and 4 count variables, controlling for PCMH history, CAHPS PCMH survey status, location, and number of physicians. Next, we fit these same models with an interaction term between each QI practice or PCMH change and PCMH history. We added the interaction terms because PCMH history is a potential effect modifier. Because access and continuity of care changes were endorsed by nearly all practices, we did not include them in the interaction model.

From these models, we calculated estimated marginal means (EMMs) for all practices (using the noninteraction model) and by practice subgroups (using the interaction model). For the 4 count variables, we calculated the EMM to compare practices that had a sum of 1 with those that had a sum of 0. In calculating the EMM, we set all other control variables to their mean values. All analyses used R version 3.6.1 (R Foundation for Statistical Computing), including the *emmeans* package.

RESULTS

Practice Characteristics

Table 1 summarizes characteristics of the 105 practices. About half the practices were in the Northeast, and about half had Level 3 certification for at least 3 years. Most had fewer than 10 physicians on staff. The mean PCMH-A score for practices with Level 3 PCMH recognition for 3 or more years (9.6) was higher than the overall mean score of 9.2. It was also higher for non–PCMH initiative states (8.8), other Northeast states (10.0), and sites that were primary care only (9.4). Seventy-eight percent of practice leaders were present since the start of PCMH implementation (described elsewhere).[32]

Table 2 shows the proportion of the 105 practice managers reporting the implementation of QI practices and PCMH changes. The most widely implemented PCMH changes were changes to continuity of care and access to care, followed by use of the EHR for patient-centered care, conducting team huddles, and changing the flow of a patient visit. The least implemented PCMH change was investing in population health management activities. Sixteen percent of practices had implemented all 11 changes; the mean number of core changes was 6.0 (of 7) and the mean number of optional changes was 2.9 (of 4).

TABLE 2. Reported QI Practices and PCMH Changes: Overall and by PCMH History[a]

Practice/change	All practices % reported (in order of frequency)	Practices with PCMH Level 1 or 2 % reported	Practices with PCMH Level 3: <3 years % reported	Practices with PCMH Level 3: ≥3 years % reported
QI practices				
Discuss/target areas of patient experience improvement[b]	34	39[a]	30[a]	34[a]
Track and trend performance data over time[c]	33	32[a]	30[a]	36[a]
Start/continue ongoing QI[c]	30	39[a]	19	30[a]
Share patient experience data with leadership[b]	20	25	22[a]	16
Review provider performance on patient experience[b]	19	21	11	22
Use staff meetings to review performance data[c]	19	21	15	20
Benchmark and compare data over time[c]	15	18	11	16
1-on-1 counseling for patient experience[b]	15	21	19	10
Discuss best practices with providers/practices[b]	10	11	7	10
Reported any QI practices:	84	75	96	82
Reported all QI practices:	0	0	0	0
PCMH changes				
Access[d]	91	86	100[a]	90[a]
Continuity of care[d]	91	96[a]	89	90[a]
Use of EHR to support patient care[d]	89	93[a]	93[a]	84
Flow of patient visit[d]	89	89[a]	81	92[a]
Team huddles[d]	89	86	96[a]	86
Team-based care[d]	88	82	89	90[a]
Referrals to specialists[e]	80	79	89	76
Information from specialists[e]	77	82	93[a]	66
Communicate lab test results[d]	76	79	70	78
Behavioral health[e]	75	79	78	72
Population management[e]	45	46	30	52
Reported all PCMH changes:	16	18	19	14

EHR, electronic health record; PCMH, patient-centered medical home; QI, quality improvement.
[a]Denotes the 3 most common QI practices or changes.
[b]QI practices specific to patient experience data.
[c]General QI practices.
[d]PCMH changes that are core to obtaining recognition.
[e]PCMH changes that are optional for recognition.

Eighty-eight percent of practices employed at least 1 of the 9 QI practices during PCMH implementation, but none employed all 9 practices. Sixty-three percent of practices engaged in at least 1 general QI practice and 60% in at least 1 patient experience–specific QI practice. The most-used QI practices were discussing and targeting areas of patient experience improvement (34%), tracking performance and trending data over time (33%), and starting or continuing QI activity for PCMH change areas (30%). The least-used practices were discussing best practices with other providers or practices (10%), benchmarking or comparing patient experience data over time (15%), and 1-on-1 counseling with low-performing providers (15%). The mean count of general QI practices was 0.9 (of 4) and of patient experience–specific practices was 1.1 (of 5).

Significant Predictors of PCMH-A Scores

Our noninteraction models show that review of provider performance on patient experience, 1-on-1 counseling for patient experience, and referrals to specialists were associated with lower mean PCMH-A scores (**Table 3**). Use of more patient experience–specific QI practices was also associated with lower mean PCMH-A scores.

Our exploratory interaction models for each group of practices by PCMH maturity indicate that among practices with less than 3 years of PCMH recognition, those that engaged in benchmarking and comparing data over time or 1-on-1 counseling for patient experience had lower PCMH-A scores than those that did not (**Table 4**). In addition, a greater number of QI-specific practices or optional PCMH changes were associated with lower PCMH-A scores. The only

TABLE 3. EMMs of the PCMH-A Score for QI Practices and PCMH Changes (N = 105)[a]

Practice/change	Not reported Mean (SD)	Reported Mean (SD)
QI practices		
Count of general QI practices	8.88 (0.24)	8.77 (0.21)
Discuss best practices with providers or practices	8.80 (0.21)	8.67 (0.55)
Benchmark and compare data over time	8.88 (0.22)	8.29 (0.44)
Track and trend performance data over time	8.80 (0.23)	8.78 (0.30)
Start/continue ongoing QI	8.83 (0.24)	8.74 (0.31)
Count of QI practices specific to patient experience data	9.08 (0.24)	8.77 (0.20)*
Share patient experience data with leadership	8.88 (0.23)	8.60 (0.34)
Review provider performance on patient experience	8.87 (0.21)	8.10 (0.39)*
Use staff meetings to review patient experience data	8.81 (0.21)	8.68 (0.40)
Discuss/target areas of patient experience improvement	8.88 (0.23)	8.59 (0.31)
1-on-1 counseling for patient experience	8.96 (0.21)	7.88 (0.42)*
PCMH changes		
Count of core PCMH changes	9.19 (0.59)	9.13 (0.50)
Access	8.83 (0.54)	8.79 (0.21)
Continuity of care	8.83 (0.54)	8.79 (0.21)
Communicate lab test results	8.71 (0.35)	8.82 (0.22)
Referrals to specialists	9.63 (0.34)	8.58 (0.21)**
Flow of patient visit	8.85 (0.45)	8.79 (0.22)
Team-based care	9.04 (0.48)	8.77 (0.21)
Team huddles	9.05 (0.48)	8.78 (0.21)
Count of optional PCMH changes	8.86 (0.51)	8.84 (0.37)
Information from specialists	8.93 (0.37)	8.77 (0.22)
Behavioral health	8.46 (0.33)	8.92 (0.23)
Population management	8.89 (0.24)	8.68 (0.27)
Use of EHR to support patient care	9.02 (0.46)	8.76 (0.22)

EHR, electronic health record; EMM, estimated marginal mean; PCMH, patient-centered medical home; PCMH-A, PCMH Assessment; QI, quality improvement.

*$P < .05$; **$P < .01$; ***$P < .001$.

[a]The PCMH-A score ranges from 0 to 12 and measures practice-level implementation of PCMH. The noninteraction model controls for PCMH history, practice location, size, ownership, and whether practices currently, previously, or never administered the Consumer Assessment of Healthcare Providers and Systems PCMH survey. EMMs are calculated at values 0 and 1.

reported practice type associated with significantly higher PCMH-A scores was those with 3 or more years of PCMH recognition that worked on continuity of care.

DISCUSSION

Implementing the PCMH model of care includes a wide range of changes in care delivery, particularly changes related to continuity of care and access. This is not surprising, because access and continuity of care are core aspects of PCMH recognition and transformation. Many sites across the 3 groups of PCMH transformation reported implementing the core set of NCQA PCMH changes. This is consistent with attempts to implement the standards and elements of the PCMH model. There is variation in how practices chose to implement optional criteria, with, for example, 80% implementing referrals to specialists and 44% implementing population health practices. Our findings support the adage that what is required is implemented and what is measured is managed.

Our results confirm that QI is a key activity of PCMH implementation, with the majority of practices engaging in combinations of multiple QI practices. PCMH transformation most often included the general QI practices of tracking and trending performance over time and starting or continuing a QI activity, as well as the more patient experience–specific QI practices of sharing patient experience data with leadership and discussing and targeting areas of patient experience improvement. Tracking and trending performance can identify target areas for QI efforts. Discussing and targeting areas of patient experience improvement indicates that patient experience data, metrics, and improvement are key for practices as they become more patient centered. However, practices undertook each individual QI practice much less often than making one of the central changes to care delivery outlined to achieve required PCMH standards.

Controlling for site characteristics, we found that practices using 1-on-1 counseling to improve patient experience scores or reviewing provider performance on patient experience had significantly lower PCMH implementation than others. Reviewing provider performance on patient experience and using 1-on-1 counseling for providers can identify and target modifiable provider behaviors.[33] Such coaching has been effective in building and maintaining competencies among providers and in increasing compliance with practice guidelines.[34,35]

Furthermore, among practices with the same stage of PCMH implementation from our exploratory analysis, we find that sites with less than 3 years of PCMH Level 3 recognition significantly differ in their use of 1-on-1 counseling, benchmarking and comparing data, and utilizing an increased number of patient experience–specific QI practices. Controlling for site characteristics, those using 1-on-1 counseling for patient experience performance improvement, benchmarking and comparing data over time, and more QI practices related to patient experience have lower PCMH implementation. This suggests that sites lacking PCMH care delivery (ie, low PCMH implementation indicating low patient-centeredness) focus more on benchmarking and comparing data over time, 1-on-1 counseling for patient experience performance improvement, and QI activities specific to improving patient experience. That is, practices recognize that they are lacking in patient-centeredness and search for ways

TABLE 4. EMMs of the PCMH-A Score for QI Practices and PCMH Changes, by PCMH History[a]

Practice/change	PCMH Level 1 or 2: not PCMH recognized (n = 28)		PCMH Level 3: recognized < 3 years (n = 27)		PCMH Level 3: recognized ≥ 3 years (n = 50)	
	Not reported	Reported	Not reported	Reported	Not reported	Reported
QI practices						
Count of general QI practices	8.01 (0.40)	8.05 (0.31)	9.00 (0.42)	9.00 (0.36)	9.53 (0.34)	9.29 (0.28)
Discuss best practices with other providers or practices	8.08 (0.32)	7.86 (0.92)	8.98 (0.34)	9.09 (1.05)	9.31 (0.28)	9.12 (0.76)
Benchmark and compare data over time	8.00 (0.31)	8.09 (0.64)	9.25 (0.30)	5.00 (0.98)***	9.24 (0.28)	9.17 (0.52)
Track and trend performance data over time	8.06 (0.36)	8.08 (0.52)	8.85 (0.38)	9.33 (0.54)	9.41 (0.31)	9.10 (0.41)
Start/continue ongoing QI	8.06 (0.38)	8.13 (0.45)	8.82 (0.35)	10.00 (0.67)	9.56 (0.32)	8.87 (0.41)
Count of specific QI practices	8.17 (0.41)	8.10 (0.30)	10.06 (0.45)	8.91 (0.31)**	9.52 (0.30)	9.27 (0.26)
Share patient experience data with leadership	8.18 (0.35)	7.82 (0.59)	9.06 (0.37)	8.94 (0.62)	9.38 (0.30)	9.06 (0.57)
Review provider performance on patient experience	8.10 (0.34)	7.50 (0.61)	8.94 (0.34)	8.70 (0.85)	9.45 (0.28)	8.39 (0.53)
Use staff meetings to review patient experience data	7.90 (0.34)	8.57 (0.63)	9.05 (0.34)	8.63 (0.76)	9.36 (0.28)	8.86 (0.55)
Discuss/target areas of patient experience improvement	8.06 (0.38)	8.20 (0.48)	9.36 (0.37)	8.09 (0.57)	9.35 (0.30)	9.25 (0.42)
1-on-1 counseling for patient experience	8.23 (0.32)	7.64 (0.59)	9.44 (0.32)	6.55 (0.69)*	9.30 (0.26)	9.18 (0.70)
PCMH changes						
Count of core PCMH changes	7.90 (1.00)	7.93 (0.85)	10.10 (1.75)	9.93 (1.48)	9.91 (0.78)	9.81 (0.67)
Access	7.67 (0.77)	8.16 (0.33)	N/A[b]		9.69 (0.70)	9.27 (0.28)
Continuity of care	N/A[b]		10.33 (0.78)	8.99 (0.32)	8.64 (0.61)	9.54 (0.28)*
Communicate lab test results	8.13 (0.61)	8.07 (0.34)	7.98 (0.60)	9.35 (0.36)	9.77 (0.50)	9.17 (0.28)
Referrals to specialists	8.79 (0.59)	7.82 (0.34)	10.18 (0.83)	8.83 (0.33)	10.07 (0.46)	9.08 (0.29)
Flow of patient visit	7.30 (0.86)	8.14 (0.33)	9.59 (0.68)	8.85 (0.36)	9.28 (0.77)	9.30 (0.28)
Team-based care	8.11 (0.67)	8.08 (0.34)	9.66 (0.91)	8.95 (0.34)	9.56 (0.75)	9.31 (0.28)
Team huddles	8.05 (0.75)	8.11 (0.34)	9.22 (1.55)	9.01 (0.33)	9.74 (0.62)	9.26 (0.29)
Count of optional PCMH changes	6.85 (1.02)	7.26 (0.71)	11.49 (1.14)	10.65 (0.79)*	9.16 (0.64)	9.22 (0.45)
Information from specialists	7.27 (0.65)	8.32 (0.33)	10.25 (1.04)	8.92 (0.33)	9.67 (0.42)	9.17 (0.30)
Behavioral health	7.61 (0.62)	8.33 (0.33)	9.96 (0.62)	8.77 (0.34)	8.51 (0.40)	9.74 (0.31)
Population management	7.95 (0.41)	8.22 (0.43)	9.20 (0.39)	8.66 (0.54)	9.48 (0.35)	9.16 (0.34)
Use of EHR to support patient care	8.47 (1.05)	8.00 (0.32)	10.55 (1.07)	8.89 (0.33)	9.18 (0.54)	9.33 (0.29)

EHR, electronic health record; EMM, estimated marginal mean; N/A, not applicable; PCMH, patient-centered medical home; PCMH-A, PCMH Assessment; QI, quality improvement.

*$P < .05$; **$P < .01$; ***$P < .001$.

[a]Models control for practice location, size, ownership, and whether the practices currently, previously, or never administered the Consumer Assessment of Healthcare Providers and Systems PCMH survey. EMMs are calculated at values 0 and 1.

[b]N/A because reported by 100% of Level 3 practices recognized less than 3 years and by 96% of Level 1 or Level 2 practices.

to improve patient experiences of care through identifying low performers and using targeted, individual counseling as a means of improving quality.[36-38]

Our study extends previous evidence on PCMH implementation. Solberg et al[21] found among 123 primary practices in Minnesota that setting goals and benchmarking performance at least yearly worked well for PCMH implementation. We found that benchmarking practice-level performance was used most often during the early stages of PCMH transformation.

Previous research found that the culture of quality improvement and specifically conducting QI efforts during PCMH implementation is important; however, studies that investigated QI as part of PCMH implementation were a single health care organization[14,21,37,39] or single-state[17,40] or regional efforts.[41] To our knowledge, the only nationwide PCMH implementation study was a cross-sectional study of 6464 Veterans Health Administration primary care personnel within clinics nested within 135 hospitals.[16] That study found that team huddles were most widely used and QI was least frequently used.

Additionally, we found that practices with mature PCMH recognition achieve higher levels of PCMH implementation by focusing on changes to continuity of care. We examined the association of team huddles and changes to continuity of care or access to care in addition to the role of QI practices in assessing a site-level measure of PCMH implementation. Although we did not find a significant association between most PCMH changes and QI practices and higher levels of PCMH implementation, we did find that practices lacking

in PCMH implementation engaged more in benchmarking and comparing data over time and more QI activities related to improving patient experience, specifically 1-on-1 counseling. When needing to improve patient-centeredness, practices focused on improving their referrals to specialists and engaging in benchmarking and comparing data over time. They did not engage in general QI but instead in specific QI practices for improving patient experience.

The lack of significant findings for PCMH changes by levels of implementation may be because of the high endorsement of PCMH changes, yielding little variation. Or, the nonsignificant findings for conducting QI may result from the wide range of general QI efforts that practices can undertake during PCMH transformation, with each connected to PCMH implementation. Further work should characterize general PCMH QI initiatives during PCMH transformation and investigate their association with PCMH history and implementation.

Limitations

Our study has limitations. Although the study design included a national, large, stratified set of primary care practices, it was not nationally representative. Also, although we recruited and identified leaders most knowledgeable and responsible for PCMH changes in the practice, we typically interviewed 1 representative per organization. There may be additional perspectives within practice leadership that we did not capture, and leaders with more positive feelings toward PCMH may have chosen to participate. Our participation rate was 36% and may not have been random within each stratum. Nevertheless, this study explored a rich, wide range of perspectives from practice leaders about PCMH implementation. It was able to show which PCMH changes were more common and provide evidence that practices do engage primarily in making core PCMH changes and that they vary in making optional PCMH changes. Our data are limited in that they are cross-sectional, but we were able to control for practice characteristics including PCMH history. The PCMH-A was completed after the interview, which may have resulted in higher PCMH-A scores. Because the PCMH-A is meant to be an inventory of all PCMH changes, these scores likely reflect more accurate assessments than if the interviews were conducted after PCMH-A completion. Finally, we focused on practices that obtained PCMH recognition from NCQA, the most widely used organization to provide PCMH recognition, and did not include practices that sought PCMH recognition from different programs (eg, The Joint Commission).[42]

CONCLUSIONS

Implementation of the PCMH model includes a wide range of changes in care delivery and a varied set of QI practices. Practices that recognize they are lacking in patient-centeredness seek to specifically improve patient experiences of care; they review patient experience scores or engage in 1-on-1 counseling of providers to improve their patient experience scores. Practices that have recently obtained PCMH Level 3 recognize their lack of patient-centeredness (ie, low PCMH implementation) and engage in ways to improve their implementation. This includes increasing the number of optional PCMH changes, benchmarking and comparing data over time, and increasing QI-specific practices related to patient experience, particularly 1-on-1 counseling for patient experience improvement. Such actions can advance the PCMH transformation process, whereas practices with mature PCMH recognition can achieve higher implementation scores by focusing on changes to continuity of care.

Practices undertake a wide variety of care delivery changes and QI practices simultaneously to meet PCMH requirements. Given limited resources, it is important to know what care delivery changes or QI practices are needed when PCMH implementation is lacking and when those changes or practices should be implemented. Our study provides considerations for which PCMH changes and what QI practices, particularly those related to patient experience performance, should be instituted to improve PCMH implementation. Differences in timing of care delivery changes during the course of PCMH recognition provide guidance for practices in PCMH implementation. ■

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