Pathways to Medical Home Recognition: A Qualitative Comparative Analysis of the PCMH Transformation Process

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Objective. To understand the process of practice transformation by identifying pathways for attaining patient-centered medical home (PCMH) recognition.

Data Sources/Study Setting. The CMS Federally Qualified Health Center (FQHC) Advanced Primary Care Practice Demonstration was designed to help FQHCs achieve NCQA Level 3 PCMH recognition and improve patient outcomes. We used a stratified random sample of 20 (out of 503) participating sites for this analysis.

Study Design. We developed a conceptual model of structural, cultural, and implementation factors affecting PCMH transformation based on literature and initial qualitative interview themes. We then used conventional cross-case analysis, followed by qualitative comparative analysis (QCA), a cross-case method based on Boolean logic algorithms, to systematically identify pathways (i.e., combinations of factors) associated with attaining—or not attaining—Level 3 recognition.

Data Collection Methods. Site-level indicators were derived from semistructured interviews with site leaders at two points in time (mid- and late-implementation) and administrative data collected prior to and during the demonstration period.

Principal Findings. The QCA results identified five distinct pathways to attaining PCMH recognition and four distinct pathways to not attaining recognition by the end of the demonstration. Across these pathways, one condition (change leader capacity) was common to all pathways for attaining recognition, and another (previous improvement or recognition experience) was absent in all pathways for not attaining recognition. In general, sites could compensate for deficiencies in one factor with capacity in others, but they needed a threshold of strengths in cultural and implementation factors to attain PCMH recognition.

Conclusions. Future efforts at primary care transformation should take into account multiple pathways sites may pursue. Sites should be assessed on key cultural and implementation factors, in addition to structural components, in order to differentiate interventions and technical assistance.

Key Words. Medical home, PCMH recognition, practice transformation, qualitative comparative analysis, QCA

The patient-centered medical home (PCMH) concept has evolved over the past decade into a comprehensive, multifaceted intervention to improve primary care, with wide appeal across the U.S. health system (Jackson et al. 2013; Paustian et al. 2014; Nielsen et al. 2016). However, transforming a primary care practice into a medical home can be enormously challenging, given the scope, complexity, and simultaneity of structural and cultural changes (e.g., team-based care, enhanced access, care coordination, as well as engaged leadership, quality improvement strategies, and patient-centered interactions) that need to be implemented across multiple aspects of a medical practice (Bitton et al. 2012; Sugarman and Wagner 2013). More than 100 pilots have attempted to stimulate medical home transformation in different primary care settings since the publication of the *Joint Principles of the Patient-Centered Medical Home* in 2007 (Edwards et al. 2014). These interventions have used a variety of PCMH specifications and models and often require participating practices to obtain some form of accredited medical home recognition (Burton, Devers, and Berenson 2012).

The literature on these interventions has identified numerous structural and cultural barriers to PCMH implementation and recognition in primary care. Many studies have focused on *structural* readiness and change issues, such as challenges implementing or modifying electronic health record (EHR) systems, availability of staff for new roles (e.g., care coordinators), and team-based structures, staff turnover, and consistency of clinical and care practices with PCMH models of care, such as self-management support, preventive care, and population management tools and techniques (Marcus Thygeson et al. 2012; Cronholm et al. 2013; True et al. 2013; Koshy, Conrad, and Grembowski 2015; Halladay et al. 2016). Other studies have emphasized *cultural* challenges and facilitators, including leadership support and staff buy-in to the PCMH model, lack of change management skills, competing

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demands and “change fatigue” among providers and staff, conflict between clinician autonomy and team-based care, and orientations valuing the involvement of patient and family in care decisions and the need to tailor patient communication and motivational strategies (Hoff 2013; Quinn et al. 2013; Bleser et al. 2014; O’Malley et al. 2015).

While a number of studies identify *both* cultural and structural issues (Nutting et al. 2009; Fontaine et al. 2015), there has been little systematic attention to the way that these factors *interact* during the process of implementing PCMH change. In particular, the literature lacks acknowledgment of how different practice contexts and change strategies may lead to similar transformation outcomes (Gresov and Drazin 1997; Ragin 1999). For example, sites with fewer structural components of the PCMH model might need particular cultural or implementation capacities to achieve PCMH recognition compared to sites with stronger baseline PCMH structures. In other words, there may indeed be “many paths up the mountain,” as well as ways to fall off or points at which to stall (Bate, Mendel, and Robert 2008).

The goal of this study was to improve understanding of the process of PCMH transformation by examining the interaction among key drivers of recognition. To analyze these dynamics, we developed a conceptual model of the contextual and implementation factors affecting PCMH transformation based on literature and our analysis of qualitative interview data from sites sampled in our evaluation of the Centers for Medicare & Medicaid Services (CMS) Federally Qualified Health Center (FQHC) Advanced Primary Care Practice (APCP) Demonstration. This three-year demonstration, which involved more than 500 sites, sought to help FQHCs become formally recognized as PCMHs to the 2011 National Committee for Quality Assurance (NCQA) Level 3 PCMH standards. We used cross-case methods, in particular qualitative comparative analysis (QCA) (Ragin 1987; Rihoux and Ragin 2009; Devers et al. 2013), to identify pathways—that is, different combinations of factors—associated with sites’ success or failure in attaining Level 3 recognition by the end of the demonstration.

CONCEPTUAL FRAMEWORK

Research suggests that organizational context plays a key role in the successful adoption of an innovation above and beyond the features of the innovation or the implementation strategies employed, which often must be substantially tailored to this context (Greenhalgh et al. 2004; Mendel et al. 2008; Damschroder et al. 2009). In addition, research on readiness for change broadly

differentiates between cultural and structural dimensions of organizational readiness (Weiner, Amick, and Lee 2008).

Informed by this literature, research on PCMH implementation, and themes from our initial qualitative analysis of site data (Kahn et al. 2017; described further below), our conceptual model shown in Figure 1 distinguishes between structural and cultural organizational contexts that influence the implementation process and, ultimately, the structural and cultural dimensions of PCMH transformation.

PCMH Structural Context

This context comprises structures such as policies, tools, techniques, and material and financial resources supportive of PCMH change. Our model highlights three domains.

PCMH-aligned care practices refer to the degree to which a primary care site adheres to key medical home care practices. In the CMS demonstration, these practices were specified by the six standards of NCQA’s 2011 PCMH recognition model (NCQA 2012): enhance access and continuity of care, identify and manage patient populations, plan and manage care, provide self-

Figure 1: Conceptual Model of Factors Affecting PCMH Transformation and Recognition

Note. EHR, electronic health records; QI, quality improvement; PCMH, patient-centered medical home.

care support and community resources, track and coordinate care, and measure and improve performance.

EHR System Functionality. Similar to prior research, sites in the CMS demonstration noted that EHR systems were foundational to implementing PCMH practices such as previsit planning and care plans, self-management support, population management, and monitoring of quality and performance data (O'Malley et al. 2010; Kern, Edwards, and Kaushal 2014). EHRs were also seen as critical to documenting care as required for NCQA PCMH recognition.

Site Operational Characteristics. This dimension includes characteristics associated with services and staff (e.g., services offered, numbers, and types of staff), patients (e.g., age, gender, ethnic/racial, health, and insurance status), and geographic location (e.g., surrounding population size, density, socioeconomic status, and health care market). These site attributes often signal the resources available to a medical practice. Site size, measured by number of staff or patients, has been linked to increased structural capacity and readiness for PCMH transformation (Friedberg et al. 2009). Urban/rural location is an important characteristic for FQHCs, because sites typically face differential access to hospitals and specialists, transportation, and other issues affecting care coordination (Bolin et al. 2011; Gao et al. 2016).

PCMH Cultural Context

This context consists of beliefs, understandings, and group norms supportive of PCMH change. Our model groups these factors into two domains.

Leadership and Staff Support for PCMH. Leadership support has been found critical to providing inspiration, institutional cover, and resources for implementing quality and safety improvements, including PCMH transformation (VanDeusen Lukas et al. 2007; McMullen et al. 2013). Qualitative results from our sample indicated that this support derives from an understanding of the comprehensiveness of the PCMH model and the extent of transformation required, that is, "it is not just another QI (quality improvement) project." As we observed, this leadership support may come from different levels across a practice organization—flowing from the top-down (e.g., from executive leaders to clinical and site leaders to providers and staff), as well as bottom-up (starting with PCMH change leaders and champions).

Cultural Alignment and Stability for PCMH. Site *QI experience* includes the accumulation of change management skills, quality and safety know-how, and expertise with improvement methods and infrastructure. Several sites in our sample described how aligning the PCMH initiative with their overall QI efforts helped to both adopt and sustain the PCMH model. Cultural alignment also refers to the extent that *practice norms* support the PCMH model of care, for example, orientations toward interdisciplinary teamwork, preventive and holistic (vs. acute) treatment, patient-centeredness, and other “soft” PCMH practices (Hoff 2013). A relatively *stable environment* within practice organizations also appears to be an important condition of PCMH change. Several sites reported that major turmoil and changes in executive leadership caused key leaders of the PCMH effort to leave or to put the initiative on hold. Other sites similarly described how provider and staff turnover required additional time and resources for PCMH acculturation and training.

PCMH Implementation Process

We identified three main components within the PCMH implementation process:

Change Management Strategies. Our analysis of qualitative data highlighted two types of change management strategies employed by sites for PCMH implementation. *Change leader capacity* refers to the credibility, experience, and dedicated time exhibited by the individual put in charge of a site’s PCMH effort. *Change team formation* represents the degree to which a site had a stable and cohesive team supporting PCMH implementation, based on such factors as team turnover, frequency and quality of team interaction, and engagement of key stakeholders in the change team.

Use of External PCMH Supports. External supports included both technical assistance (TA) and funding for PCMH implementation. Sites in the demonstration received a care management fee from CMS of \$6 per month per Medicare beneficiary and reported receiving PCMH-related funding from other sources, including the Health Resources and Services Administration (HRSA) (e.g., to cover PCMH recognition application fees, chronic care improvement for specific diseases, and expanded staffing and services), state Medicaid programs, and, to a lesser extent, private payer PCMH programs.

The CMS demonstration provided sites with a range of TA supports, including interactive webinars, practice coaching, direct assistance with PCMH

implementation and the recognition application, and periodic feedback on site self-assessed PCMH readiness, beneficiary utilization, and costs. Many sites also used PCMH-related TA provided outside the scope of the demonstration by state Primary Care Associations, NCQA, HRSA, and state and local programs.

Change Challenges and Facilitators. Sites in the CMS demonstration encountered a range of challenges and facilitators to implementation. Some involved general change management issues (e.g., breadth of changes required, competing priorities, need for leader and staff support, and extent of existing QI experience). Other issues were related to the implementation of specific PCMH elements, such as modifying EHR systems to support PCMH changes, employing team-based care (e.g., instituting huddles and integrating care coordination), adapting the PCMH model to address characteristics of the FQHC patient population (e.g., high transiency, multiple languages, low health literacy, and lack of insurance), and managing specifics of the NCQA recognition application process.

PCMH Transformation

Our model addresses both structural and cultural dimensions of PCMH transformation. Structurally, PCMH transformation is reflected in the extent to which sites have adopted and consistently adhere to PCMH care practices. PCMH recognition formally assesses whether sites have minimally adopted PCMH practices according to standards specified by an accrediting body such as NCQA, the Accreditation Association for Ambulatory Health Care, or the Joint Commission (Friedberg et al. 2009; Burton, Devers, and Berenson 2012). NCQA confers three levels of PCMH recognition (1, 2, or 3) based on the extent to which primary care sites meet specific elements within each of the six standards domains noted above, as demonstrated by documentation of policies and care submitted via an online portal (NCQA 2012).

Culturally, PCMH transformation is reflected in the depth of understanding, commitment, and comfort with the PCMH model and norms of care supportive of PCMH practices. Although definitions of cultural transformation are less standardized, many respondents noted its importance to ensuring the mindful application and sustainability of the PCMH model.

PCMH Maintenance Process

The level of structural and cultural PCMH transformation at any given time represents one of a number of influences that help shape the ongoing

organizational context. Thus, constant attention to the implementation process is required to ensure that a site continues to transform toward, or at least avoids “backsliding” away from, the PCMH model. This maintenance process is indicated in Figure 1 by the feedback loop between PCMH transformation and organizational context, fueling the next cycle in a site’s PCMH journey.

METHODS

Site Sampling and Data Sources

The qualitative site sample for our evaluation included 20 FQHCs from the CMS demonstration selected using a trifold stratified random sampling scheme to obtain variation on three characteristics: geographic region, self-assessed PCMH readiness survey scores, and urbanicity.

Indicators corresponding to factors in our conceptual model were derived from semistructured interview and site visit qualitative data, as well as quantitative administrative data collected on each site. Semistructured interviews were conducted with FQHC leaders in the qualitative sample at two time points during the demonstration: mid-implementation (May–September 2013) and late-implementation (October–December 2014). Site visits were conducted with a subsample of five sites during the late-implementation period. One mid-implementation interview site that declined the second interview was replaced with a new matched demonstration site that also participated in the site visit sample. Table 1 describes the site sample used in the analysis.

Site operational characteristics and PCMH recognition outcomes were obtained primarily from quantitative data collected from CMS, HRSA, and NCQA. PCMH structural context, cultural context, and implementation process indicators were primarily sourced from the qualitative data. Both qualitative and quantitative data were used to derive indicators on EHR system functionality, QI experience, and PCMH recognition outcomes of sites that left the demonstration. Appendix SA2 provides additional detail on the study design, case sampling, and site interview protocols.

Analytic Methods

We used three analytic methods that built on each other to qualitatively understand the key dynamics and pathways to recognition among cases in our site sample: initial qualitative analysis of interview themes, conventional cross-case analysis, and qualitative comparative analysis (QCA).

Table 1: Federally Qualified Health Center Sample Site Characteristics ($n = 20$ sites)

<i>Site Characteristics</i>	<i>Mean</i>	<i>Standard Deviation (Range)</i>
Site patients		
Number of patients	8,485	6,830 (1,815–26,038)
Percent non-White	35%	25 (3–98%)
Percent medicaid	38%	14 (14–60%)
Percent uninsured	27%	13 (10–50%)
Site providers		
Number of physicians (FTE)	4.0	3.9 (0.3–15.9)
Number of NPs & PAs (FTE)	2.0	2.5 (0.0–10.7)
Parent organization		
Total clinical sites	12.5	9.2 (2–37)
	<i>Number of Sample Sites</i>	<i>Percent of Sample Sites</i>
PCMH practices self-assessment*		
Top tertile	7	35
Improved (≥ 15 points)	7	35
Bottom tertile	6	30
Urbanicity		
Urban	10	50
Rural	10	50
Geographic region/state		
Northeast (NY)	4	20
Southeast (FL)	4	20
Midwest (MI)	4	20
Southwest (NM)	4	20
West (CA)	4	20

*Participating sites completed a Readiness Assessment Survey—a PCMH practices self-assessment developed by the demonstration—every 6 months. Categories are based on a site being in the top tertile of RAS scores at both baseline and 1-year assessments, the bottom tertile at both time points, or having improved 15 or more points.

FTE, full-time equivalent; NP, nurse practitioner; PA, physician assistant.

Qualitative Thematic Analysis. We used a form of both inductive and deductive content analysis to qualitatively describe the range of themes discussed in the semistructured interviews with site leaders (Krippendorff 1980; Weber 1990; Pope, Ziebland, and Mays 2000). A team of three analysts developed a codebook based on the interview protocol and emergent themes during test coding, with discrepancies resolved by consensus. Using the *NVivo* 10 qualitative software package (QSR 2012), interview transcripts were then coded for major topical themes in the codebook (e.g., change challenges), and next for subthemes within each topic (e.g., types of change challenges). Specific themes used to construct the conceptual model and indicators for the

subsequent cross-case analyses included reasons for participating in the demonstration, site strategies for organizing their PCMH effort, major practice changes implemented and remaining to be accomplished, challenges and facilitators with PCMH implementation, and use of TA and financial supports from the demonstration and other sources.

Conventional Cross-Case Analysis. We next applied conventional cross-case methods that relied on manual sorting and pattern finding of data arrayed in a case-by-attribute matrix (Eisenhardt 1989; Ryan and Bernard 2000; Yin 2013). This analysis was designed to explore the influence of factors in our conceptual model on sites' attainment of PCMH recognition based on starting levels of PCMH structural readiness.

Qualitative Comparative Analysis. We utilized QCA methods with an expanded set of indicators to systematically identify factors associated with PCMH recognition outcomes. QCA, a technique based on Boolean logic algorithms, differs from standard linear statistical methods in that it allows for multiple combinations of factors (also referred to as *pathways* or *recipes*) to be associated with an outcome, as well as for different pathways to be associated with positive versus negative values of an outcome (Ragin 1987; Rihoux and Ragin 2009). Based on this approach, we developed separate QCA models of outcomes for attaining NCQA Level 3 recognition and for not attaining Level 3 recognition by the demonstration's end. We employed "crisp set" QCA algorithms, which require all indicators to be dichotomized, using the *R* statistical software package (R Core Team 2013; Thiem and Dusa 2013).

As part of the QCA method, we performed a process of model refinement both to hone which variables to include in the analysis and to "calibrate" those variables, that is, determine the proper categorization of values for an indicator (Schneider and Wagemann 2012; Devers et al. 2013). This process included conducting separate models of variables in each domain (i.e., site operational characteristics, PCMH structural context, cultural context, and implementation process) to identify factors that were either most commonly associated or appeared to differentiate sites with respect to recognition outcome. This led to combining or excluding certain variables for the final models, which included indicators across all the conceptual domains. Table 2 provides definitions and descriptive statistics of the final indicators used for the QCA analysis. (See Appendix SA3 for details on the thematic, conventional cross-case, indicator coding, and indicator calibration methods, and Appendix SA4 for technical details on the QCA model output.)¹

Table 2: Indicators Used in the QCA Analysis

Indicators	Coding Categories	Number of Cases
PCMH structural context		
PCMH-aligned care practices (baseline)		
Low sites had an average PCMH care practice score (based on interview data) across the six NCQA domains of <0.5 (range 0–1.8), compared to average score of 0.5–1 (moderate), and >1 (high).	Low	5
EHR functional (baseline)	High or moderate	15
Sites with a fully functional EHR system at the beginning of the demonstration (not including modifications needed for PCMH), compared to only a partially functioning system or implemented concurrent with the demonstration.	Fully functional	13
PCMH cultural context	Not fully functional	7
Prior QI/NCQA experience		
High experience indicated by prior NCQA recognition or ≥2 previous QI initiatives. Low experience indicated by no prior NCQA recognition and <2 previous QI initiatives.	High	10
Leadership support	Low	10
High sites had strong combinations of clinic leader involvement in PCMH, endorsing of efforts, providing resources, and/or monitoring progress, compared to leaders doing only some or intermittent support behaviors (moderate) or to minimal or no degree (low).	High	14
Staff support	Low or moderate	6
High sites had generally wide buy-in by staff and presence of staff champions for PCMH, compared to sites with mixed support (moderate) or general apathy or skepticism of PCMH among staff (low).	High	10
Implementation process	Low or moderate	10
Change leader capacity		
High sites had PCMH leaders strong in at least two of three change capacity dimensions (change credibility, change experience, and dedicated time) for at least half the demonstration, compared to strong in only one or moderate in all dimensions for at least half the demonstration (moderate) or exhibiting weaker or less consistent capacity (low).	Low	3
Change team formation	High or moderate	17
High rating indicated by stable and cohesive change team throughout the demonstration, compared to those that were unstable or disorganized.	High	16
Use of PCMH supports	Low	4
High sites used six or more sources of external PCMH technical assistance or financial support (out of 10), compared to sites that used five or fewer (low).	High	10
PCMH transformation	Low	10
NCQA level 3 PCMH recognition		
Sites were required to apply for NCQA PCMH recognition by the end of the demonstration with the goal to attain Level 3 (the highest of three levels conferred by NCQA).	NCQA Level 3 attained	14
	NCQA Level 3 not attained	6

Note. See Appendix SA3 for details on indicator coding and development.

To make the models parsimonious, we do not include indicators for the change challenges encountered by sites (see separate analyses in Appendix SA4) or for site operational characteristics (we instead note their distribution among cases for each pathway in the tables of results).

RESULTS

The QCA results identified five distinct pathways to attaining NCQA Level 3 PCMH recognition, and four distinct pathways to not attaining the recognition by the end of the CMS demonstration. Analysis across these pathways also identified one condition that was common to all the pathways for attaining Level 3 recognition and another that was absent in all pathways for not attaining the recognition by end of the demonstration.

Results for Sites Achieving NCQA Level 3 PCMH Recognition

Table 3 presents results for the 14 demonstration sites in the qualitative sample that attained NCQA Level 3 PCMH recognition by the end of the demonstration. The columns represent the dimensions of PCMH structural context, cultural context, and implementation process. Each row of the table groups sites with a similar pathway toward recognition. A check mark in the main cells of the table denotes that all sites in the row had that attribute in common, while the “+/-” sign in a cell indicates that sites in that row (i.e., pathway) varied on the value of that attribute.

Although each of the five pathways for attaining NCQA Level 3 recognition is unique, all had one attribute in common—moderate-to-high change leader capacity—signified by the dashed vertical box across pathways for this condition.

Sites that started the demonstration with high rates of PCMH-aligned care practices—that is, care practices that were largely consistent with PCMH principles—are shown in the first three rows of Table 3. Three trajectories were identified:

- *Independent Superstars.* In addition to high change agent capacity and PCMH-aligned care practices at baseline, these five sites also shared functional EHR systems at baseline, prior QI/NCQA experience, high leadership support, and stable and cohesive change teams. Some but not all sites had high staff support for PCMH. The fact that they exhibited strengths in so many areas may explain another shared attribute: the relatively low use of PCMH supports.

- *Studios Superstars*. In addition to high change agent capacity and PCMH-aligned care practices at baseline, these three sites shared prior QI/NCQA experience, high leadership support, and stable and cohesive change teams. Unlike the Independent Superstars, this group of sites had high uptake of PCMH supports despite their overall structural and cultural readiness and strong change management process. Across the Studios Superstars sites, only some had a functional EHR system at baseline, and none exhibited high levels of staff support.
- *Groundswell*. The remaining three sites that had high change leader capacity and PCMH-aligned care practices at baseline followed a different path to PCMH recognition than did the Superstar sites. These sites showed high structural readiness in terms of PCMH-aligned care practices and functional EHR systems at baseline, but all lacked leadership support and some lacked the prior QI/NCQA experience found in the Superstar sites. Groundswell sites, however, had high staff support and high uptake of PCMH supports, and some had stable and cohesive change teams. Despite these strengths, Groundswell sites had more weaknesses than Superstar sites but were able to attain Level 3 recognition, likely because of the combination of staff support and uptake of PCMH supports, which supplemented their structural readiness.

The two bottom rows of Table 3 show the pathways to attaining NCQA Level 3 PCMH recognition for sites that began the demonstration with low levels of PCMH-aligned care practices:

- *Boostraps*. These two sites exhibited low levels of PCMH-aligned care practices, lacked a functional EHR system, and had little to no experience with QI or NCQA efforts at the beginning of the demonstration. However, Bootstrap sites had high levels of leadership and staff support, as well as high change leader capacity, stable and cohesive change teams, and high uptake of PCMH supports. Despite low structural readiness, strong cultural context and exemplary change management strategies allowed these sites to achieve Level 3 recognition by the end of the demonstration period.
- *Long Shot*. The last site in the table achieved Level 3 recognition despite low levels of PCMH-aligned care practices and a number of cultural context and implementation factors, including relatively low uptake of PCMH supports. At the same time, the site exhibited several strengths, such as a functional EHR system, leadership support, and capable change leader and team. Closer examination revealed the FQHC initially was focused on other strategic and improvement initiatives. However, a year into the demonstration, the FQHC leadership began to prioritize the PCMH effort, appointing a highly effective PCMH change leader who mobilized the change team and overall implementation. The site also reported being too busy to fully partake in the demonstration TA, but their close relationship with a local hospital system whose own outpatient practices were pursuing PCMH recognition served as an important external support.

Results for Sites Not Achieving Level 3 Recognition

Table 4 presents results of the QCA model for the six demonstration sites in the qualitative sample that did not achieve NCQA Level 3 PCMH recognition by the demonstration's end. All sites that did not attain Level 3 recognition were

Table 3: Qualitative Comparative Analysis Results for Achieving NCQA Level 3 PCMH Recognition

	PCMH Structural Context			PCMH Cultural Context			Implementation Process			Case Notes	
	PCMH-aligned care practices (at baseline)	EHR (functional at baseline)	Prior QI/NCQA Experience (high)	Leadership Support (high)	Staff Support (high)	Change Leader Capacity (moderate to high)	Change Team Formation (stable and cohesive)	Use of External PCMH Supports (high)	# of Cases (n=14)	Site Operational Characteristics	
Pathways for Attaining Level 3 Recognition											
Independent Superstars Sites with strong foundations (both structural and cultural), did not need PCMH supports	H	✓	✓	✓	+/-	✓	✓		5	Mixed urban and rural All med/large	
Studios Superstars Strong foundations, but high users of PCMH supports	H	+/-	✓	✓		✓	✓	✓	3	2 of 3 rural 2 of 3 small	
Groundswell Compensated for low leadership support through combination of staff support, change leaders, and use of PCMH supports	H	✓	+/-		✓	✓	+/-	✓	3	2 of 3 urban Mixed sizes	
Bootstraps Sites lacked structural readiness, but had strong internal support, change process, and use of PCMH supports	L			✓	✓	✓	✓	✓	2	Both rural Mixed sizes	
Long Shot Overcame low levels of PCMH-aligned care practices with few external supports, but threaded the needle with baseline EHR, strong leadership support and change strategies	L	✓		✓		✓	✓		1	Rural Med/large size	

Note: H = High; L = Low; ✓ = factor present at indicated value in header. Factors which are present for all cases are indicated with a dashed box.
Blank = factor not present at indicated value in header; +/- = mixed values of the factor for cases in a pathway.

relatively lacking in prior QI or NCQA recognition experience (as signified by the dashed vertical box across pathways for this condition).

Sites that started at a low baseline level of PCMH-aligned care practices are at the top of Table 4. One might expect that these sites would be less likely to attain Level 3 recognition by the end of the demonstration, given where they started. The results indicate at least two pathways to not attaining recognition for sites that started in this position:

- *Unsurprising.* In addition to low levels of PCMH-aligned care practices and lack of experience, this site lacked key elements of other structural and cultural context, and, with the exception of a capable change leader, exhibited a poorly executed implementation process. This site's failure to attain NCQA Level 3 PCMH recognition is not unexpected.
- *Uphill Battle.* This site also had low levels of PCMH-aligned care practices and little experience at baseline, but it had more strengths to build from than the Unsurprising site, including a functional EHR at baseline and a good implementation process. However, this site was unable to attain Level 3 recognition, perhaps because of a weak cultural context for PCMH (i.e., low QI experience, leadership support, and staff support).

The last two rows in Table 4 represent pathways for sites that started the demonstration with high levels of PCMH-aligned care practices; in some sense, they are more surprising for not having achieved Level 3 recognition:

- *Mismatched Strengths.* The two sites in this cluster had high levels of baseline PCMH-aligned care practices and staff support but lacked strong QI/NCQA experience and a functional EHR system at the beginning of the demonstration period. These two sites were mixed across the other attributes, but neither combination of supplementary strengths exhibited by these sites was enough to achieve NCQA Level 3 PCMH recognition. In both cases, sites had some strengths in each area (structural readiness, cultural context, and implementation process), but the strengths were perhaps too diffuse to provide a firm foundation for PCMH transformation.
- *Missed Opportunity.* The last row of the table represents two sites that had a number of strengths. Despite lacking QI or NCQA experience, these sites had high levels of PCMH-aligned care practices, functional EHR systems at baseline, and leadership support, and each site had either staff support or a stable and cohesive change team. Both sites lacked high change leader capacity, and neither was a strong user of PCMH supports. For these two sites, the poorly executed implementation process signals a missed opportunity for otherwise well-equipped sites to transform into medical homes.

DISCUSSION

Implementation of the PCMH, and recognition according to models such as the NCQA Level 3 standards, has been promoted as a means toward transforming primary care in the United States (AHRQ 2015; Nielsen et al. 2016). We conducted these analyses to understand pathways by which sites like those

Table 4: Qualitative Comparative Analysis Results for Not Achieving NCOA Level 3 PCMH Recognition

Pathways for Not Attaining Level 3 Recognition	PCMH Structural Context		PCMH Cultural Context			Implementation Process			Case Notes	
	PCMH-aligned care practices (at baseline)	EHR (functional at baseline)	Prior Q/NCOA Experience (high)	Leadership Support (high)	Staff Support (high)	Change Leader Capacity (moderate to high)	Change Team Formation (stable and cohesive)	Use of External PCMH Supports (high)	# of Cases (n=6)	Site Operational Characteristics
Unsurprising Strikingly low structural and cultural readiness and poor change process	L					✓			1	Urban Small size
Uphill Battle Despite strong change process, did not overcome lack of PCMH-aligned care practices and cultural readiness at baseline	L	✓				✓	✓	✓	1	Urban Med/large size
Mismatched Strengths Low EHR and lack of experience were not counterbalanced by strengths in other areas	H			+/-	✓	+/-	+/-	+/-	2	Mixed urban and rural Med/large size
Missed Opportunity Strong structural readiness, but low experience, change agency capacity, and use of supports. With right change leader or better uptake of PCMH supports, these sites may have made it	H	✓		✓	+/-		+/-		2	Rural Med/large size

Note: H = High; L = Low; ✓ = factor present at indicated value in header; Blank = factor not present at indicated value in header.
+/- = mixed values of the factor for cases in a pathway; Factors which are not present for all cases are indicated with a dashed box.

in the CMS FQHC APCP Demonstration might succeed or fail in achieving that recognition. Supplementing conventional qualitative thematic and cross-case analyses with QCA methods, this study identified five distinct pathways to attaining PCMH recognition and four distinct pathways to not attaining recognition among sites in our sample by the end of the demonstration. Across these pathways, one condition—*moderate-to-high change leader capacity*—was common to all the pathways for attaining Level 3 recognition, and another—*high previous QI or NCQA experience*—was absent in all pathways for not attaining the recognition by end of the demonstration. These two conditions appear to represent key factors that TA providers and sponsors of practice transformation can use to differentiate sites at varying levels of risk for poor outcomes and that sites can build other factors around to improve their likelihood of successful transformation.²

The multiple pathways identified in the QCA analyses also illustrate the alternate combinations of structural, cultural, and implementation factors that sites relied on to reach similar recognition states. The “Superstar” sites, which started with higher levels of PCMH-aligned care practices, tended to be strong in multiple areas of readiness, regardless of whether they utilized external PCMH supports. Sites that attained recognition but started with lower levels of PCMH-aligned care practices, that is, the “Bootstrap” and “Long Shot” sites, needed strength in three specific cultural context and implementation factors (high leadership support, stable change teams, and high change leader capacity) in addition to at least one other structural readiness or implementation process factor (either a baseline functional EHR system or high use of external PCMH supports). The QCA results indicate that even sites with relatively high levels of PCMH-aligned care practices at baseline were not able to achieve recognition without a sufficiently robust PCMH cultural context and implementation process, as shown in the “Mismatched Strengths” or “Missed Opportunity” pathways.

Strengths and Limitations

Qualitative comparative analysis methods were uniquely suited to identifying key dynamics and the various distinct pathways associated with PCMH recognition outcomes. Expanding on previous QCA analyses of PCMH capacity that focused solely on structural factors (Marcus Thygeson et al. 2012), this study employed QCA methods to identify multiple combinations of cultural, structural, and implementation factors associated with PCMH transformation. In addition, our use of three methods that built on each other—initial qualitative analysis of themes, conventional cross-case analysis including

quantitative site data, and QCA methods—provided deep insight into case context and causally relevant conditions that Ragin suggests are critical to QCA and other case-based analyses (1999). Moreover, this study's approach highlights the conditions under which different factors are relevant. For example, although leadership support was an important facilitator in most attainment pathways, the "Groundswell" sites were able to overcome a lack of this factor through high staff support and strong implementation factors. Thus, reading the columns vertically in the results tables shows which factors mattered for sites that did and did not achieve recognition—similar to previous studies that have identified barriers and facilitators. But reading the tables horizontally shows the dynamic and contingent nature of factors that interact to produce alternate pathways of transformation.

One limitation of these analyses is that they are based on a sample of 20 sites, so we cannot be certain that we identified all possible pathways that might have existed within the more than 500 sites in the demonstration under study. The demonstration also consisted only of FQHC sites, which may similarly constrain the generalizability of results. However, the number of sampled sites and our use of a stratified random sampling procedure provides a more generalizable sample compared to previous case-based analyses (Bitton et al. 2012; Derrett et al. 2014). In addition, the results are based upon a conceptual model rooted in the wider literature, as well as an accumulated series of thematic, cross-case, and QCA analyses. Another limitation is the focus of our analysis on the outcome of PCMH recognition, which is only one indicator of PCMH transformation, and which may not capture fully the cultural aspects of transformation, such as how well sites mindfully applied and adhered to the PCMH model in practice (Dohan et al. 2013; Ho and Antonucci 2015). Consequently, the generalizability of our results is less clear for other forms of practice change or transformation outcomes, especially in non-FQHC settings, and may require additional research.

Implications

Implications of this study for policy and practice include the need for future efforts at primary care transformation to take into account the multiple pathways sites may pursue. Sites should be assessed and monitored on key cultural and implementation factors, in addition to structural components, in order to identify likely pathways and factors that might facilitate or hinder success and to differentiate interventions and types of assistance. Feasible, standardized measurement of key cultural and implementation factors would facilitate such assessments.

CONCLUSION

The QCA methods used in this study proved uniquely suited to identify not only key factors to promote medical homes among primary care practices but also alternate pathways that sites may pursue toward practice transformation. In general, sites could compensate for deficiencies in one factor with capacity in others, but needed a threshold of strengths in cultural and implementation factors, in addition to structural components, to attain PCMH recognition. Change leader capacity and previous improvement or recognition experience, in particular, represent signals that may differentiate sites at varying risks for successful PCMH outcomes.

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NOTES

1. For specific results of the thematic and conventional cross-case analyses, see Kahn et al. (2017).
2. In formal terms of the Boolean logic used in QCA, a condition that is common to all positive cases of an outcome is considered a "necessary" condition for that outcome. A condition that is absent in all negative cases of an outcome is considered a

“sufficient” condition for that outcome, regardless if any of the positive cases do not exhibit that condition. A condition that is common to all positive cases and absent for all negative cases is considered a “necessary and sufficient” condition for that outcome (Schneider and Wagemann 2012). In describing results in this paper, we have eschewed these formal definitions, as popular use of the term “sufficient” often implies what in Boolean logic would be considered “necessary and sufficient,” and thus may be misleading to a reader not familiar with the technical meaning of these terms. In particular, the formal labeling of a condition as “sufficient” merely indicates, by the fact it was not present in any of the negative cases of the outcome, that any case in the sample that did exhibit the condition had a positive outcome. However, it does not indicate that all positive cases of the outcome had the condition (that would be a “necessary and sufficient” condition) nor that it was required for a case to have a positive outcome. Indeed, the results of our QCA models showed that each pathway required a combination of conditions, which together uniquely explained whether the cases in those pathways attained or did not attain the recognition. To avoid confusion related to these terms, we therefore simply describe the two conditions that were common across pathways while emphasizing their conjoint role with other factors in defining the alternate pathways. But it may be helpful for readers to be aware of the technical use of these terms if they appear in future QCA or logic-based analyses.

REFERENCES

- AHRQ. 2015. “Primary Care Transformation” [accessed on February 9, 2015]. Available at <http://www.ahrq.gov/professionals/systems/primary-care/tpc/index.html>
- Bate, P., P. Mendel, and G. Robert. 2008. *Organizing for Quality: The Improvement Journeys of Leading Hospitals in Europe and the United States*. Abingdon, UK: Radcliffe Publishing.
- Bitton, A., G. R. Schwartz, E. E. Stewart, D. E. Henderson, C. A. Keohane, D. W. Bates, and G. D. Schiff. 2012. “Off the Hamster Wheel? Qualitative Evaluation of a Payment-Linked Patient-Centered Medical Home (PCMH) Pilot.” *Milbank Quarterly* 90 (3): 484–515.
- Bleser, W. K., M. Miller-Day, D. Naughton, P. L. Bricker, P. F. Cronholm, and R. A. Gabbay. 2014. “Strategies for Achieving Whole-Practice Engagement and Buy-in to the Patient-Centered Medical Home.” *Annals of Family Medicine* 12 (1): 37–45.
- Bolin, J. N., L. Gamm, J. R. Vest, N. Edwardson, and T. R. Miller. 2011. “Patient-Centered Medical Homes: Will Health Care Reform Provide New Options for Rural Communities and Providers?” *Family & Community Health* 34 (2): 93–101.
- Burton, R., K. J. Devers, and R. A. Berenson. 2012. *Patient-Centered Medical Home Recognition Tools: A Comparison of Ten Surveys’ Content and Operational Details*. Washington, DC: Urban Institute.

- Cronholm, P. F., J. A. Shea, R. M. Werner, M. Miller-Day, J. Tufano, B. F. Crabtree, and R. Gabbay. 2013. "The Patient Centered Medical Home: Mental Models and Practice Culture Driving the Transformation Process." *Journal of General Internal Medicine* 28 (9): 1195–201.
- Damschroder, L. J., D. C. Aron, R. E. Keith, S. R. Kirsh, J. A. Alexander, and J. C. Lowery. 2009. "Fostering Implementation of Health Services Research Findings Into Practice: A Consolidated Framework for Advancing Implementation Science." *Implementation Science* 4 (1): 1.
- Derrett, S., K. E. Gunter, R. S. Nocon, M. T. Quinn, K. Coleman, D. M. Daniel, E. H. Wagner, and M. H. Chin. 2014. "How Three Rural Safety Net Clinics Integrate Care for Patients: A Qualitative Case Study." *Medical Care* 52(11 Suppl 4): S39–S47.
- Devers, K. J., N. Cafarella Lallemand, R. A. Burton, L. Kahwati, N. McCall, and S. Zuckerman. 2013. *Using Qualitative Comparative Analysis (QCA) to Study Patient-Centered Medical Homes: An Introductory Guide*. Washington, DC: Urban Institute.
- Dohan, D., M. H. McCuiston, D. Frosch, D. Hung, and M. Tai-Seale. 2013. "Recognition as a Patient-Centered Medical Home: Fundamental or Incidental?" *Annals of Family Medicine* 11 (Suppl): 514–18.
- Edwards, S. T., A. Bitton, J. Hong, and B. E. Landon. 2014. "Patient-Centered Medical Home Initiatives Expanded in 2009–13: Providers, Patients, and Payment Incentives Increased." *Health Affairs* 33 (10): 1823–31.
- Eisenhardt, K. M. 1989. "Building Theories from Case Study Research." *Academy of Management Review* 14 (4): 532–50.
- Fontaine, P., R. Whitebird, L. I. Solberg, J. Tillema, A. Smithson, and B. F. Crabtree. 2015. "Minnesota's Early Experience With Medical Home Implementation: Viewpoints from the Front Lines." *Journal of General Internal Medicine* 30 (7): 899–906.
- Friedberg, M. W., D. G. Safran, K. L. Coltin, M. Dresser, and E. C. Schneider. 2009. "Readiness for the Patient-Centered Medical Home: Structural Capabilities of Massachusetts Primary Care Practices." *Journal of General Internal Medicine* 24 (2): 162–69.
- Gao, Y., R. Nocon, K. E. Gunter, R. Sharma, Q. Ngo-Metzger, L. Casalino, and M. Chin. 2016. "Characteristics Associated with Patient-Centered Medical Home Capability in Health Centers: A Cross-Sectional Analysis." *Journal of General Internal Medicine* 31 (9): 1041–51.
- Greenhalgh, T., G. Robert, F. Macfarlane, P. Bate, and O. Kyriakidou. 2004. "Diffusion of Innovations in Service Organizations: Systematic Review and Recommendations." *Milbank Quarterly* 82 (4): 581–629.
- Gresov, C., and R. Drazin. 1997. "Equifinality: Functional Equivalence in Organization Design." *Academy of Management Review* 22 (2): 403–28.
- Halladay, J. R., K. Mottus, K. Reiter, M. Mitchell, K. E. Donahue, W. Gabbard, and K. Gush. 2016. "The Cost to Successfully Apply for Level 3 Medical Home Recognition." *Journal of the American Board of Family Medicine* 29 (1): 69–77.
- Ho, L., and J. Antonucci. 2015. "The Dissenter's Viewpoint: There Has to Be a Better Way to Measure a Medical Home." *Annals of Family Medicine* 11 (Suppl): 514–18.

- Hoff, T. 2013. "Medical Home Implementation: A Sensemaking Taxonomy of Hard and Soft Best Practices." *Milbank Quarterly* 91 (4): 771–810.
- Jackson, G. L., B. J. Powers, R. Chatterjee, J. Bettger, A. R. Kemper, V. Hasselblad, R. J. Dolor, R. J. Irvine, B. L. Heidenfelder, and A. S. Kendrick. 2013. "The Patient-Centered Medical Home: A Systematic Review." *Annals of Internal Medicine* 158 (3): 169–78.
- Kahn, K. L., J. W. Timble, M. W. Friedberg, P. Mendel, L. Hiatt, E. K. Chen, A. M. Kress, C. Buttorff, T. A. Lavelle, B. A. Weidmer, H. D. Green, M. Kommareddi, R. Malsberger, A. Kofner, A. Rastegar, and C. M. Setodji. 2017. *Evaluation of CMS's Federally Qualified Health Center (FQHC) Advanced Primary Care Practice (APCP) Demonstration: Final Report*. Santa Monica, CA: RAND Corporation, RR-886/S-CMS.
- Kern, L. M., A. Edwards, and R. Kaushal. 2014. "The Patient-Centered Medical Home, Electronic Health Records, and Quality of Care." *Annals of Internal Medicine* 160 (11): 741–49.
- Koshy, R. A., D. A. Conrad, and D. Grembowski. 2015. "Lessons from Washington State's Medical Home Payment Pilot: What It Will Take to Change American Health Care." *Population Health Management* 18 (4): 237–45.
- Krippendorff, K. 1980. *Validity in Content Analysis*. Pittsburgh, PA: University of Pennsylvania, Penn Libraries, Departmental Paper.
- Marcus Thygeson, N., L. I. Solberg, S. E. Asche, P. Fontaine, L. Gregory Pawlson, and S. H. Scholle. 2012. "Using Fuzzy Set Qualitative Comparative Analysis (fs/QCA) to Explore the Relationship between Medical 'Homeness' and Quality." *Health Services Research* 47(1.1): 22–45.
- McMullen, C. K., J. Schneider, A. Firemark, J. Davis, and M. Spofford. 2013. "Cultivating Engaged Leadership through a Learning Collaborative: Lessons from Primary Care Renewal in Oregon Safety Net Clinics." *Annals of Family Medicine* 11 (Suppl 1): S34–S40.
- Mendel, P., L. S. Meredith, M. Schoenbaum, C. D. Sherbourne, and K. B. Wells. 2008. "Interventions in Organizational and Community Context: A Framework for Building Evidence on Dissemination and Implementation in Health Services Research." *Administration and Policy in Mental Health* 35 (1–2): 21–37.
- National Committee for Quality Assurance (NCQA). 2012. *NCQA PCMH 2011 Standards, Elements and Factors – Document Guideline/Data Sources*. Washington, DC: NCQA.
- Nielsen, M., L. Buel, K. Patel, and L. M. Nichols. 2016. *The Patient-Centered Medical Home's Impact on Cost and Quality, Annual Review of Evidence, 2014–2015*. Washington, DC: Patient-Centered Primary Care Collaborative.
- Nutting, P. A., W. L. Miller, B. F. Crabtree, C. R. Jaen, E. E. Stewart, and K. C. Stange. 2009. "Initial Lessons from the First National Demonstration Project on Practice Transformation to a Patient-Centered Medical Home." *Annals of Family Medicine* 7 (3): 254–60.
- O'Malley, A. S., J. M. Grossman, G. R. Cohen, N. M. Kemper, and H. P. Hoangmai. 2010. "Are Electronic Medical Records Helpful for Care Coordination? Experiences of Physician Practices." *Journal of General Internal Medicine* 25 (3): 177–85.

- O'Malley, A. S., R. Gourevitch, K. Draper, A. Bond, and M. A. Tirodkar. 2015. "Overcoming Challenges to Teamwork in Patient-Centered Medical Homes: A Qualitative Study." *Journal of General Internal Medicine* 30 (2): 183–92.
- Paustian, M. L., J. A. Alexander, D. K. El Reda, C. G. Wise, L. A. Green, and M. D. Fetters. 2014. "Partial and Incremental PCMH Practice Transformation: Implications for Quality and Costs." *Health Services Research* 49 (1): 52–74.
- Pope, C., S. Ziebland, and N. Mays. 2000. "Analysing Qualitative Data." *British Medical Journal* 320 (7227): 114–16.
- QSR. 2012. *NVivo Qualitative Data Analysis Software, Version 10*. Melbourne, Australia: QSR International Pty Ltd.
- Quinn, M. T., K. E. Gunter, R. S. Nocon, S. E. Lewis, A. M. Vable, H. Tang, S. Y. Park, L. P. Casalino, E. S. Huang, J. Birnberg, D. L. Burnet, W. T. Summerfelt, and M. H. Chin. 2013. "Undergoing Transformation to the Patient Centered Medical Home in Safety Net Health Centers: Perspectives from the Front Lines." *Ethnicity and Disease* 23 (3): 356–62.
- R Core Team. 2013. *R: A Language and Environment for Statistical Computing*. Vienna, Austria: R Foundation for Statistical Computing.
- Ragin, C. 1987. *The Comparative Method: Moving Beyond Qualitative and Quantitative Methods*. Berkeley, CA: University of California.
- . 1999. "Using Qualitative Comparative Analysis to Study Causal Complexity." *Health Services Research* 34 (5 Pt 2): 1225.
- Rihoux, B., and C. C. Ragin. 2009. *Configurational Comparative Methods: Qualitative Comparative Analysis (QCA) and Related Techniques*. New York: Sage.
- Ryan, G. W., and H. R. Bernard. 2000. "Data Management and Analysis Methods." In *Handbook of Qualitative Research*, edited by N. Densin, and Y. Lincoln, pp. 769–802. Thousand Oaks, CA: Sage.
- Schneider, C., and C. Wagemann. 2012. *Set-Theoretic Methods for the Social Sciences: A Guide to Qualitative Comparative Analysis*. New York: Cambridge University Press.
- Sugarman, J. R., and E. H. Wagner. 2013. *A Framework to Guide Patient-Centered Medical Home Transformation. Safety Net Medical Home Initiative Implementation Guide Series*. Seattle, WA: Qualis Health; The MacColl Center for Health Care Innovation at the Group Health Research Institute.
- Thiem, A., and A. Dusa. 2013. *Qualitative Comparative Analysis With R: A User's Guide*. New York: Springer.
- True, G., A. E. Butler, B. G. Lamparska, M. L. Lempa, J. A. Shea, D. A. Asch, and R. M. Werner. 2013. "Open Access in the Patient-Centered Medical Home: Lessons from the Veterans Health Administration." *Journal of General Internal Medicine* 28 (4): 539–45.
- VanDeusen Lukas, C., S. K. Holmes, A. B. Cohen, J. Restuccia, I. E. Cramer, M. Schwartz, and M. P. Charns. 2007. "Transformational Change in Health Care Systems: An Organizational Model." *Health Care Management Review* 32 (4): 309–20.
- Weber, R. P. 1990. *Basic Content Analysis*. Newbury Park, CA: SAGE Publications.
- Weiner, B. J., H. Amick, and S. Y. Lee. 2008. "Conceptualization and Measurement of Organizational Readiness for Change: A Review of the Literature in Health

Services Research and Other Fields.” *Medical Care Research and Review* 65 (4): 379–436.

Yin, R. K. 2013. *Case Study Research: Design and Methods*. New York: Sage.

SUPPORTING INFORMATION

Additional supporting information may be found online in the supporting information tab for this article:

Appendix SA1: Author Matrix.

Appendix SA2: Detail on Study Design, Case Sampling, and Interview Protocols.

Appendix SA3: Detail on Thematic, Conventional Cross-Case, and Indicator Calibration Methods.

Appendix SA4: QCA Model Output of Pathways Associated with Level 3 Recognition.