Patient-Centered Medical Home Implementation:
A Qualitative Study to inform Primary Care Practice and Implementation Science

by

Rosalind Eve Keith

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Doctoral Committee:
Associate Professor Jane C. Banaszak-Holl, Co-Chair
Professor Marita G. Titler, Co-Chair
Professor Steven J. Bernstein
Associate Professor Shoou-Yih Daniel Lee
Julie C. Lowery, Veterans Affairs Ann Arbor Health Care System, Center for Clinical Management Research

This dissertation is dedicated to my family… David, Noel, Peter, Douglas, and Gregory…

I sustain myself with the love of family. -Maya Angelou

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Chapter 1: Introduction

The healthcare system in the United States is challenged with unsustainable increasing costs, unwarranted variation in quality of care, and low patient and provider satisfaction (Barr, 2008). Current organizational, population, economic, and regulatory trends emphasize the need for transforming the health care system from a specialized and fragmented system of siloed medical professionals to a coordinated and interdependent system of teams of medical professionals emphasizing primary care, health promotion, and disease prevention (Benatar, Bondmass, Ghitelman, & Avitall, 2003; Starfield, Shi, & Macinko, 2005; Institute of Medicine [IOM], 2001; Reid et al., 2009). The Patient-Centered Medical Home (PCMH) has been set forth as a promising model of practice redesign in this transformation. However, the complexity involved in implementing the PCMH model into primary care practice has proven to be quite challenging (Nutting, Crabtree, Miller et al., 2011).

Although the general concept of the medical home has existed for decades, its advocate base has expanded in recent years (Backer, 2007). Payers and policymakers are exerting increasing pressure to adopt the PCMH model, presenting a considerable undertaking for provider organizations (Nutting et al., 2009). Despite myriad demonstration projects studying PCMH implementation and practice transformation, limited empirical investigation has focused on dynamic factors in the organizational

context (Crabtree, Nutting, Miller et al., 2010; Carrier, Gourevitch, & Shah, 2009). Implementation and organizational scholars alike posit the importance of understanding organizational context and the fidelity with which innovation is implemented to bring forth insight about how organizations achieve implementation and change (Damschroder et al., 2009; Douglas & Judge, 2001; Feldman & Orlikowski, 2011). This introductory chapter presents the specific aims of this dissertation and the overarching conceptual framework that guided this research to contribute to understanding PCMH implementation.

Central to this research is the exploration and understanding of how PCMH implementation occurs in practice. Implementation is defined as the dynamic organizational process that occurs between the organizational decision to adopt an innovation and the innovation's assimilation into ongoing organizational practices; it is the transition period during which organizational members incorporate an innovation into sustained use (Klein & Sorra, 1996). The following considerations of PCMH implementation provide the motivation for this research. First, variation in the fidelity with which the PCMH is implemented in different provider organizations is not well understood, because of the paucity of in-depth qualitative investigations of PCMH transformation (motivation for Essay #1) (Jaén et al., 2010). Second, organizational capacity for learning and development has been advocated to achieve PCMH implementation (Nutting, Crabtree, Miller, et al., 2010). However, the occurrence of organizational learning during achieving PCMH implementation has not been systematically studied (motivation for Essay #2). Finally, despite myriad demonstration projects investigating PCMH transformation, an implementation science approach has not

been used to understand contextual factors that may influence PCMH implementation (motivation for Essay #3).

Specific Aims

Essay # 1: Understanding Variation in Patient-Centered Medical Home Implementation: A Qualitative Study of Fidelity

Frameworks guided by organizational theory and implementation science are necessary to study PCMH transformation. Drawing from organizational theory literature, prior investigations of implementation comparable to PCMH, Total Quality Management (TQM) being the most prominent example, by and large focus on organizational level factors such as those associated with top management's adoption decision (Hackman & Wageman, 1995). As a consequence, studies assume that the intra-organizational process of implementation will have minimal variation across different organizations once the adoption decision has been made (Ansari, Fiss, & Zajac, 2010). TQM scholars have begun to examine intra-organizational dynamics of TQM implementation and the association with organizational outcomes, and they recommend including a measure of fidelity (Douglas & Judge, 2001). Current knowledge of PCMH implementation largely rests on the assumption that homogeneous implementation will follow the adoption of the PCMH model by provider organizations. If provider organizations are to successfully implement the PCMH model to achieve improved outcomes, a holistic assessment of the model is necessary to understand the extent to which changes are operationalized in practice (Jaén et al., 2010).

Specific Aim: To understand how PCMH implementation varies across primary care clinics.

Essay # 2: Creating Organizational Learning Capacity to Promote Patient-Centered Medical Home Implementation: Findings from a Qualitative Study

PCMH transformation is more than the implementation of incremental changes, but requires "epic whole-practice re-imagination and redesign," which can be compromised by change fatigue among clinicians and staff, even in highly motivated practices (Nutting et al., 2009). The intra-organizational practice context in which clinicians and staff interact with each other and with the PCMH operational infrastructure is an important aspect of PCMH implementation in need of further investigation (Nutting, Crabtree, Miller, et al., 2010; Wise, Alexander, Green, Cohen, & Koster, 2011). While the majority of recommendations made from investigations of PCMH transformation assess organizational level factors, they do not describe intra-organizational factors associated with change that are accessible to practitioners challenged with PCMH implementation. Correspondingly, organizational scholars call for additional research to discern how successful implementation occurs within organizations and to identify the intra-organizational factors associated with variation in implementation between organizations (Cool, Dierickx, & Szulanski, 1997; O'Mahoney, 2007).

Organizational learning theory has been used to investigate underlying intra-organizational contextual factors associated with change and implementation (Edmondson, Bohmer, & Pisano, 2001; Garud, Dunbar, & Bartel, 2011; Leykeum et al., 2011). Organizational learning mechanisms are arrangements within an organizational structure that support the processes through which individuals adapt their behaviors and actions to align with organizational changes and goals (Lipshitz & Popper, 2000). Organizational learning mechanisms enable individual-level learning (i.e. understanding

of the individual's role in the organization) and organizational-level learning (e.g. adapting organizational protocols and work processes), and therefore can account for an organization's capacity for change.

Specific Aim: To explore organizational learning mechanisms in primary care delivery that are associated with PCMH implementation and to describe the characteristics that differ across variation in PCMH implementation.

Essay # 3: An Exploration of Differences in Contextual Factors Related to Fidelity to the Patient-Centered Medical Home

PCMH research is limited in the use of an implementation science approach to inform PCMH implementation efforts (Reid et al., 2009; Barr, 2008; Nutting et al., 2009). An implementation science approach can contribute to understanding variation in how or why some organizations implementing a complex model of care delivery such as the PCMH achieve more consistent, high-quality, and appropriate use (i.e. higher fidelity) than others (Weiner, Lewis, & Linnan, 2009). Implementation theory is comprised of a broad scope of organizational contextual factors that may influence the level of fidelity with which an intervention is used in practice (Greenhalgh, Robert, MacFarlane, Bate, & Kyriakidou, 2004). Therefore a comprehensive an assessment of the organizational context in which implementation occurs is necessary to understand how a high level of fidelity to the PCMH is achieved.

Specific Aim: To identify and qualitatively describe organizational contextual factors associated with variation in fidelity to the PCMH in primary care clinics.

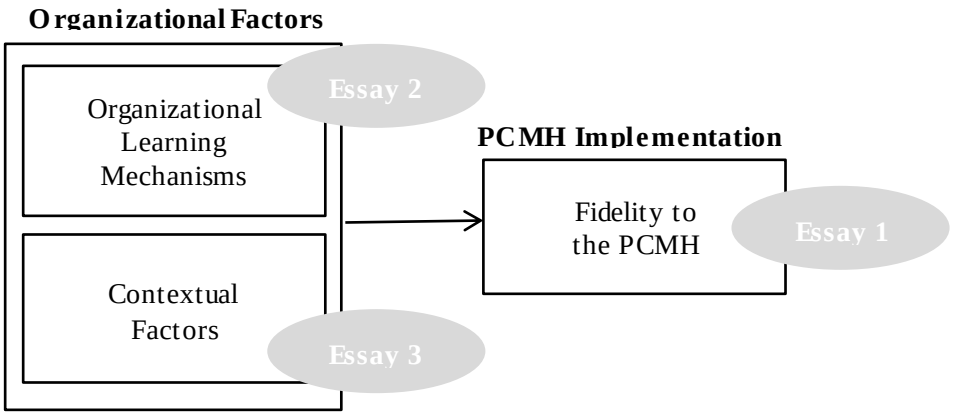
Overarching Conceptual Framework

Organizational and implementation scholars alike posit the importance of understanding organizational context and practice to bring forth insight about how organizations achieve change. Organizational scholars espouse the use of a practice ontology to understand the organizational context in which implementation and organizational change occur (Feldman & Orlikowski, 2011). Therefore, practice theory guided the conception of the operational components that form the functional infrastructure of the PCMH model in primary care practice. Aligning with the need to well define health care innovations in order to replicate them throughout the health system, practice theory endorses the identification and delineation of the adoption of organizational functions associated with anticipated organizational outcomes; in other words, "What is consequential for organizational outcomes is not the artifact itself, but how it is used to get work done in specific contexts." (2011: 8). For example, assessing the adoption of a patient registry in a provider organization is considerably different compared to assessing the functions within the organization supported by the adoption of a patient registry, such as systematic clinic outreach to patients for preventive services and the production of clinical reminders that are then used by clinicians at the point of care to increase the provision of preventive services. In this paper, the use of a practice ontology validates the explication of the elements of the PCMH model (i.e. principles and operational components), whose adoption by individuals within provider organizations is an aspect of PCMH implementation.

An implementation science approach to understanding PCMH implementation can also inform the study of factors in the organizational context and processes associated

with fidelity to the PCMH. Implementation theory is comprised of 1) organizational contextual factors and processes that influence the implementation of an intervention, 2) fidelity to the intervention, or the degree to which successful implementation is achieved within an organization, and 3) patient and organizational outcomes associated with the intervention Using a conceptual framework to guide the identification of the differences and similarities in fidelity to the PCMH, organizational learning, and organizational context, will provide insight into why PCMH implementation varies across organizations. Generalizations regarding the association between organizational learning and implementation will likely emerge.

Conceptual Framework of Patient-Centered Medical Home Implementation



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Chapter 2: Understanding Variation in Patient-Centered Medical Home Implementation: A Qualitative Study of Fidelity

The Patient-Centered Medical Home (PCMH) has been set forth as a promising model of practice redesign in the transformation of primary care delivery within the United States health care system. However, the complexity involved in implementing the PCMH model into primary care practice is quite challenging. The PCMH model is comprised of a set of principles (Joint Principles, 2007) and myriad operational components. The principles are the overarching aims of the PCMH model and the operational components are the explicit clinical and managerial interventions intended to promote a practice's functioning as a PCMH. Recent PCMH demonstration projects have concluded that a holistic assessment, focusing on both the principles and the operational components, is necessary to better understand PCMH implementation (Jaén et al., 2010). The purpose of this study is to explore how the principles and operational components that comprise the PCMH model are implemented in primary care clinics.

By conceptualizing the PCMH as a complex multi-faceted model of care delivery, comprised of multiple guiding principles and operational components, and using ethnographic methods to gather the perspectives of clinicians and staff working in several primary care clinics, this study extends prior research by describing an in-depth investigation of how the implementation of the PCMH principles and operational

components can vary across clinics within a single health system. Such findings will contribute to understanding how different practice contexts influence PCMH implementation and subsequently the effectiveness of the PCMH model in improving the quality and reducing the cost of care.

The Patient-Centered Medical Home

The PCMH is oriented toward achieving patient-centered care. The seven Joint Principles of the PCMH put forth in 2007 by the American Academy of Family Physicians, the American Academy of Pediatrics, the American College of Physicians, and the American Osteopathic Association to formally establish the overarching aims of the PCMH model are listed and defined in Table 1.

[Table 1 about here]

For provider organizations to function as a PCMH and achieve these principles, explicit operational components are necessary. In recent years, public and private payers, state governments, and primary care professional organizations have identified specific operational components to be implemented in provider organizations intending to obtain PCMH designation (Nutting, Crabtree, Stewart et al., 2010; Stewart et al., 2010; Reid et al., 2009; Backer, 2007). To organize health care delivery around the Joint Principles, the operational components detail clinical and managerial interventions that must be implemented in order for a health care organization to achieve PCMH designation. Operational components include, but are not limited to: 1) mechanisms to increase patient awareness of the PCMH model and understanding of the role of the Primary Care Provider (PCP); 2) patient registries to facilitate provider outreach regarding needed services and development of point of care prompts; 3) performance reporting to provide

feedback and benchmarks to providers for quality and process improvement initiatives; 4) care management to optimize the care of patients with chronic disease; 5) tracking test results to assure patients receive timely notification of test results; 6) incorporating preventive services into patient visits through the use of point of care prompts; and 7) coordinating patient care between primary care providers and hospitals, specialists, and pharmacists.

Multiple demonstration projects have been carried out in recent years to asses PCMH implementation and to determine if there is sufficient evidence to support additional legislation at state and federal levels to promote PCMHs (Backer, 2007; Crabtree et al., 2010). These studies have shown that PCMH transformation requires substantial motivation, commitment to change, external support, incentives, and resources (Nutting et al., 2009; Nutting, Crabtree, Miller et al., 2010; Nutting et al., 2011; Crabtree et al., 2010; Rittenhouse et al., 2011; Wise, Alexander, Green, Cohen, & Koster, 2011). However, the majority of studies to-date do not differentiate between the organizational decision to adopt the PCMH and the implementation of the operational components into ongoing practice operations. Additionally, prior investigations have used self-reported data to measure PCMH implementation. Few studies use in-depth research methods and a comprehensive approach to understand the PCMH as a complex, multi-faceted model of care delivery comprised of multiple clinical and managerial interventions which are simultaneously implemented into ongoing clinic operations (Crabtree et al., 2010).

In evaluating the effectiveness of operational components on organizational outcomes, Jaén and colleagues (2010) divided the PCMH model into 39 elements.

Although the relative effectiveness of individual operational components was not determined, practices that implemented more operational components demonstrated improved quality of chronic care (percentage of patients with target conditions receiving recommended quality measures), and delivery of preventive services (percentage of eligible patients meeting US Preventive Services Task Force recommendations) (Jaén et al., 2010). In a related study, the operational components were divided into distinct organizational activities, revealing that variability in operational component implementation was due to the relative complexity and compatibility of the components. Operational components less likely to be implemented at the conclusion of the longitudinal evaluation involved multiple clinic roles and processes, necessitated coordination of different work units, required additional resources, and challenged the traditional model of primary care (Nutting, Crabtree, Stewart et al., 2010).

Although important findings have been drawn regarding the implementation of PCMH operational components, the data used in these evaluations were collected from a single brief observation (Jaén, Crabtree, Palmer et al., 2010), and select clinic informants (e.g. senior leaders and physicians) (Nutting, Crabtree, Miller et al., 2010). The data do not reflect the multiple experiences and perspectives of clinicians and staff working at the front lines of care delivery and tasked with adapting to new practices during implementation of the various PCMH components. Further qualitative exploration of clinician and staff perceptions of the various PCMH components is critical to understanding how health care organizations can successfully implement the PCMH model into practice (Nutting, Crabtree, Stewart et al., 2010; Nutting, Crabtree, Miller et al., 2010).

Conceptual Framework: Patient-Centered Medical Home Implementation

Implementation theory is used in this investigation to assess clinician and staff perception and use of PCMH operational components in the context of primary care delivery. The field of implementation science has emerged to explain the effectiveness of evidence-based interventions and to question a traditional assumption that interventions are used in clinical practice exactly as designed (Sobo, Bowman, & Gifford, 2008; Harachi, Abbott, Catalano, Haggerty, & Fleming, 1999; Dobson & Cook, 1980). Under this assumption, if an evidence-based intervention does not achieve expected improvements in patient outcomes when introduced into clinical practice, the intervention is deemed ineffective rather than not successfully implemented. Evaluating implementation is particularly salient for complex, multi-faceted interventions (e.g., the PCMH model of care delivery) where poor implementation of different components can compromise the effectiveness of the intervention as a whole in improving patient outcomes.

Implementation theory is comprised of 1) organizational contextual factors that influence the implementation of an intervention, 2) fidelity to the intervention, or the degree to which successful implementation is achieved within an organization, and 3) patient and organizational outcomes associated with the intervention (See Figure 1). This study focuses on 2) fidelity to the intervention to reveal novel insight on the phenomenon of variation in PCMH implementation across primary care clinics.

[Figure 1 about here]

In this study, implementation is conceptualized as a dynamic intra-organizational process during which organizational members incorporate PCMH operational

components into sustained use (Klein & Sorra, 1996). It is the period of transition that occurs after the organizational decision has been made to adopt the PCMH, and before sustained use by clinicians and staff has been achieved. Implementation research predominantly focuses on organizational contextual factors associated with implementation success or failure (Greenhalgh, Robert, MacFarlane, Bate, & Kyriakidou, 2004; Damschroder et al., 2009; Weiner et al., 2009). Research examining fidelity to the intervention as a theoretical construct of its own merit is scant. However, fidelity has been found to be associated with the effectiveness of evidence-based interventions (Shortell et al. 1995; Keith, Hopp, Subramanian, Wiitala, & Lowery, 2010), and has also been found to significantly vary across organizations (Pearson et al., 2005).

In this study, the PCMH is conceptualized as a complex, multi-faceted model of care delivery. The PCMH literature concludes that some components are more difficult to implement than others (Nutting, Crabtree, Stewart, et al. 2010). In order to understand variation in PCMH implementation, it is necessary to evaluate clinician and staff adaptation to the new tasks and clinic processes associated with the multiple PCMH components and the degree to which those components are implemented in different clinics. Therefore, a multi-level conceptualization of fidelity to the PCMH is used in this study to assess (A) individual level adoption of the PCMH principles and operational components, and (B) organizational level fidelity to the PCMH.

A recent review of the quality improvement literature suggests that, by and large, research treats innovation implementation as universally applicable across contexts; and posits that the lack of clear definition of fidelity and associated measures is problematic (Alexander & Hearld, 2010). This study addresses this problem by drawing from the

Total Quality Management[2] (TQM) literature, to define fidelity and associated measures for understanding PCMH implementation. Based on a review of ninety-nine TQM implementation studies, Hackman and Wageman recommend advancing research on TQM implementation by 1) assessing individual behaviors during implementation and 2) including empirical demonstration that operational components have been implemented as planned (1995). More recently, scholars have begun to explore intra-organizational dynamics of TQM implementation and recommend including a measure of fidelity (Douglas & Judge, 2001).

Demonstrating empirically that the PCMH operational components have been implemented as planned requires specifying the individual elements of the PCMH model (i.e. principles and components). Figure 2 illustrates a multi-level conceptual framework of fidelity to the PCMH based on recommendations from the TQM literature. In his seminal work on diffusion of innovations, Rogers posits that an individual's use of an innovation is improved when they understand and appreciate, or have knowledge of, the principle supporting the innovation (Rogers, 2003). Therefore, the Joint Principles of the PCMH are included in the conceptual framework to assess individual knowledge of the principles during implementation. Correspondingly, based on an extensive review of the intra-organizational acceptance literature, Frumbach and Schillewaert (2002) conclude that implementation is successful when targeted users accept and incorporate an innovation into organizational processes, and therefore empirical examination of individual acceptance and use of an innovation within an organization's processes is

[2] Total Quality Management (TQM) is a prominent example of innovation implementation most comparable to PCMH implementation. Similar to PCMH, TQM is a complex, multi-faceted program with core design principles realized in organizational practice through the implementation of multiple managerial and technical interventions.

important in understanding implementation. Therefore, individual use of PCMH operational components is also included in the framework.

[Figure 2 about here]

Research Objective

Further research is needed to explicate the complexity of the PCMH model and the varying degree to which myriad PCMH principles and operational components are implemented into primary care practice. This research uses implementation theory to evaluate fidelity to the PCMH as a multi-level organizational phenomenon in order to describe implementation of the PCMH principles and operational components in primary care delivery. Fundamentally, this research will assess how PCMH implementation varies across primary care clinics.

By describing variation in fidelity to the PCMH model and identifying the aspects of fidelity to the PCMH model that vary across primary care clinics, findings from this research provide important implications for guiding practitioners in adopting *and* implementing the PCMH and for policy analysts evaluating PCMH implementation.

Methods

The PCMH operational components assessed in this investigation were developed by a large payer for the purpose of incentivizing provider organizations to implement the PCMH model. The operational components specify functional changes to be made in management, point of care, and patient outreach activities in order for the organization to function as a PCMH. The operational components are specified and described in Table 2.

The principles to which the operational components align are detailed in Table 1, and the mapping of the principles and operational components are presented in Figure 2.

[Table 2 about here]

Setting

This investigation was carried out in general medicine and family medicine clinics affiliated with a large, academic, integrated health system in the Midwest. The physicians are full-time employees of the medical school's physician group practice organization. Primary care is provided in twenty five clinics organized under fifteen health centers. The health system participates in an insurer sponsored incentive program with documented guidelines for implementing the PCMH model into health center operations. Health system senior leadership oversees all clinics and determines strategic decisions with which the clinics must comply. Each primary care clinic was mandated by health system senior leadership to implement the PCMH model and followed standardized implementation guidelines to incorporate the operational components designed at the system level to comply with the PCMH implementation guidelines.

The similar contexts in which the clinics operate make this an appropriate setting for understanding variation in PCMH implementation. The clinics affiliated with the health system have access to similar resources, including a system-wide electronic health record and collaborative learning opportunities to facilitate implementing the components of the PCMH model mandated by health system senior leadership. The clinics also have the same incentive structure for PCMH implementation.

Sampling of Primary Care Clinics

Qualitatively driven research questions are best explored with a small purposefully selected sample of cases to allow for in-depth exploration and rich description of how PCMH implementation occurs in primary care clinics (Morse & Niehaus, 2009). To identify a small purposive sample of six primary care clinics appropriate for comparative analysis, the fifteen health centers affiliated with the health system were ranked based on varying levels of patient-centeredness and innovativeness. Patient-centeredness is fundamental to the Joint Principles of the PCMH therefore it is plausible that clinics ranked as having a high level of patient-centeredness will be more successful in PCMH implementation, compared to clinics ranked as having a low level of patient-centeredness. It is also plausible that clinics ranked as having a high level of innovativeness will be more successful with PCMH implementation, compared to clinics ranked as having a low level of innovativeness.

The data used to rank the primary care clinics on patient-centeredness and innovativeness were obtained from an annual employee survey of all health system clinicians and staff. The anonymous survey asks employees questions about resources, innovation and flexibility, fairness and recognition, intellectual change, communication, development and training, teamwork and respect, and patient/customer focus, with the emphasis of the questions being on the respondent's perception of the organization. Details of the survey questions and subscale data are provided in Appendix A.

Three centers ranked as having high levels of patient-centeredness and innovativeness, and three centers ranked as having low levels of patient-centeredness and innovativeness were selected from the fifteen health centers. The health centers range in

size from 3,436 patient visits to 26,465 patient visits over a six-month period. Studies on the association between organizational size and innovation implementation have produced inconsistent findings, and this was found to be the case with the results of the employee survey across the fifteen health centers. Therefore, within the two groups of three centers, two centers were classified as large (i.e. ≥ 13,000 patient visits over a six month period), and one center was classified as small (i.e. < 13,000 patient visits over a six month period). See Table 3. The nine centers that scored in the middle range for patient/customer focus and innovation and flexibility were not included in the purposive sample. The lead investigator was initially blinded from the rankings so as not to bias collection, analysis, and interpretation of the qualitative data.

[Table 3 about here]

This strategy of sampling complies with the criteria of extreme sampling based on the phenomenon of interest in order to reveal insight that may be especially enlightening for understanding PCMH implementation (Lincoln & Guba, 1985). Sampling clinics based on two constructs theoretically correlated with aspects of PCMH implementation increases the likelihood of observing and identifying variation in PCMH implementation.

Sampling of Study Informants

The primary sources of data are direct observation and structured interviews with study informants working in the six selected primary care clinics. For a wide range of clinician and staff perspectives in each clinic, a snowball sampling method was used to obtain a purposive sample of the various roles in each clinic. Recruiting study informants for variation in clinic role is an appropriate strategy to increase the range of data collected

and to amass a holistic understanding of PCMH implementation, because the informants experience different aspects of the PCMH.

An even representation of study informants from the following categories was obtained: PCPs (physicians and nurse practitioners), non-PCP clinicians (clinical pharmacists, licensed practical nurses, registered nurses, and medical assistants), and office staff (call center clerk, check-out clerk, manager, receptionist, and panel manager). Initially, informants were recruited through introduction by the clinic manager, and then through subsequent site visits, informants were recruited directly by the lead investigator. All informants who were asked to participate in the study agreed to do so. The final sample of study informants included 57 individuals representing a variety of roles in each primary care clinic. See Table 4. Sample of Study Informants.

[Table 4 about here]

Data Collection Instrumentation

An observation checklist was designed to identify PCMH principles (Table 1) and operational components (Table 2) in behaviors and clinic operations during clinic site visits. The checklist was based on four sources: 1) documented guidelines[3] developed by the payer for a state-wide incentive program to evaluate the implementation of individual PCMH operational components in physician organizations; 2) attendance at clinic PCMH audits (clinic audits are meetings between payer representatives and clinic leadership to review the payer's documented guidelines and discuss how the clinic was meeting the specified criteria); 3) regular meetings between the lead investigator and health system

[3] The guidelines were developed by a large payer for the purpose of remuneration at the clinic level, not for the purpose of identifying variation in implementation efforts.

staff who developed interventions designed to improve institutional compliance with the payer's documented guidelines to discuss details of the components; and 4) observable dimensions of theoretical constructs of effective use of operational components (i.e. attitude toward use, consistency and quality of use). See Appendix B for the Observation Checklist. The observation checklist was pilot tested and refined to ensure face and content validity to assess the observable elements of the PCMH and the best times and locations to observe those elements (Trochim & Donnelly, 2007).

A structured interview guide was designed to elicit perceptions of aspects of the different PCMH principles and components. The interview guide was developed from the observation checklist and pilot tested. Study informants were asked open-ended and situational questions about their experiences with practice changes related to PCMH principles and operational components. Probing questions were asked to verify details or prompt expansion of new insights. The interview guide was divided into five sections: 1) questions about the informant's role and experience in the clinic; 2) questions about the informant's experiences with the introduction of new clinic processes; 3) questions about PCMH principles and operational components (when appropriate, probes were used to elicit additional information on the informant's perceived role and familiarity with principles and operational components, their understanding of how components improve patient care, how the participant uses components, their attitude toward the components, and the challenges and successes experienced with components); 4) questions about theoretical dimensions of organizational learning used in a separate but related analysis (Chapter 3); and 5) questions about the informant's perception of the PCMH. See Appendix C for the Interview Guide.

Data Collection Procedures

The primary purpose of the observations was to observe behaviors and how clinicians and staff engage in tasks and work processes reflective of PCMH principles and operational components. Observation as a method of data collection was important for obtaining a sense of clinicians and staff in their day-to-day work environment and for noting activities related to PCMH implementation which may have been taken for granted by study informants and therefore not acknowledged in interviews. Forty-six observations were conducted with study informants, ranging from 45 minutes to 6 hours and 25 minutes. During the observation, when agreeable, the study informant was shadowed as if the investigator were an apprentice learning the informant's job. When appropriate, aspects of a think-aloud method of data collection were used, in which the informant was asked to share perceptions while engaged in activities related to the PCMH (Ericcson & Simon, 1980; Fonteyn, Kuipers & Grobe, 1993). Notes were taken during the observation period. Following each observation, investigator impressions guided by the observation checklist were documented within 48 hours. Field notes were documented to provide as objective as possible a narrative of how each study informant experienced PCMH activities.

Approximately one to two months after the observations, structured interviews were conducted with study informants. The purpose of the interview was to obtain information about attitudes and experiences with roles and tasks, the technologies and tools used to carry out tasks, PCMH principles and operational components, and overall impressions of the PCMH as a model of care delivery. The interviews were conducted in a quiet and private clinic location that was comfortable for the informant. Forty-six

interviews were conducted, ranging from 35 minutes to 99 minutes, averaging 54 minutes. With the exception of one informant who agreed to participate in the interview but refused to be recorded, all interviews were audio-recorded and transcribed verbatim. Not every informant provided information on every element of the PCMH model, because the intention of the interview was to allow the informant to elaborate or focus on the components that involved him or her for which they had an opinion.

Observations and structured interviews were conducted over a 12 month period, beginning approximately 12 months after initial PCMH implementation efforts by the health system. The components were rolled out at different times in the different clinics starting in July 2009 and through the data collection period. Conducting observations prior to interviews established a familiarity with each study informant's role and responsibilities within their respective clinic, which allowed for revision to the interview guide before the interview in order to focus on the informant's involvement in PCMH components and to draw out information necessary for corroborating emergent findings. Conducting observations before interviews helped to establish trust which was important when asking potentially sensitive questions about challenges experienced at work.

Procedures for data collection, storage, and analysis were reviewed and approved by the health system's Institutional Review Board. Informed consent was obtained from each informant before each observation and interview, and after study objectives and data collection and storage procedures were explained. Including field notes and transcripts, a total of 1,271 pages of data were collected, coded, and analyzed.

Data Analysis

Phase 1. Coding of the Data

Qualitative data analysis began with deductive, line-by-line coding of the field notes and transcripts into the pre-specified categories of PCMH principles and operational components (Miles & Huberman, 1984). Segments of field notes and text from transcripts, ranging from a sentence to several paragraphs, reflecting informant involvement with and perceptions of operational components within their clinic, and informant knowledge and perceptions of principles were coded; mere identification or mention of an operational component was not coded. Because a number of principles and operational components overlap, double-coding was determined to be appropriate.

After an initial refinement of the definitions of the principles and operational components in a codebook, fifty-percent of the transcripts were coded by both the lead investigator and a second qualitative analyst[4]. See Appendix D for the codebook with coding definitions and documented coding rules developed to ensure coding was judged by the same criteria by both coders. Disagreements in assignment or description of codes were resolved through discussions between coders and when necessary the definitions of codes were enhanced. The final list of codes, constructed through a consensus of a third project investigator involved in developing the operational components, consisted of a list of six principles and twenty operational components. Coder agreement was at a high level well before fifty-percent of the interviews were coded, however, due to the large number of codes, consensus was discussed for fifty-percent of the interviews. The remaining

[4] The second qualitative analyst has received training in qualitative methods in a Master of Public Health program and also has experience with using implementation theory to evaluate the effectiveness of evidence-based interventions.

interviews were coded by either the lead investigator or the qualitative analyst. When coding was completed, the data for each informant, including supporting field notes, were organized by operational component and the principle(s) to which the operational components most closely aligned, as presented in Figure 2.

Phase 2: Assigning Individual Level Adoption Ratings

Once informant level data were coded into analyzable units, the second phase of analysis involved assigning individual level ratings of adoption to the principles and operational components. Categorical measures were constructed to reflect relative ratings of individual adoption to both PCMH principles and operational components. Ratings for the operational components were based on informant compliance with using the component in their clinic role. The ratings for compliance with using components were based on three dimensions of use: attitude towards use, consistency of use, and quality of use. This measure of compliance was used in previous studies to assess implementation fidelity to a new manufacturing technology (Klein, Conn, & Sorra, 2001) and a case management program for patients with chronic heart failure (Keith et al., 2010). The individual adoption ratings for PCMH operational components include:

> *Nonuse:* Informant demonstrates or expresses disregard or resistance to the use of a component, or the component is absent from clinic operations. The informant may have stated explicitly that they do not use the component, they perceive nonuse of the component within the clinic, or the use of the component was not observed.
>
> *Low Compliance Use:* Informant demonstrates or expresses using the component according to protocol and speaks negatively in reference to the component, or demonstrates or expresses not using the component according to protocol. The informant may have stated that they perceive the component is not used according to protocol in the clinic.

Compliant Use: Informant demonstrates or expresses using the component according to protocol and: a) does not speak positively or negatively about the component, b) speaks both positively and negatively about the component, or c) does not use the component according to protocol, but speaks positively about it.

High Compliance Use: Informant demonstrates or expresses using the component according to protocol and speaks positively in reference to the component, and also identifies potential areas for improvement.

Committed Use: Informant demonstrates or states explicitly that they use the component according to protocol and speaks positively about the component without qualifications.

Individual adoption ratings for the PCMH principles were based on informant knowledge of the principles underlying how each operational component contributes to achieving overarching clinic goals, informant understanding of the principle, and appreciation for the principle in practice. The individual adoption ratings for principles include:

Not Aware of Principle: Informant expresses a lack of awareness or misunderstanding of the principle, such as understanding the operational aspects of a component, but not the connection of the component to achieving overarching clinic goals. The informant does not express understanding the principle beyond their individual tasks.

Aware of Principle: Informant expresses an awareness and understanding of how the principle contributes to achieving the overarching clinic goals.

Committed to Principle: Informant expresses an understanding and appreciation of the connection between operational components, overarching clinic goals, and the principle.

Both the lead investigator and qualitative analyst independently assigned individual level adoption ratings to each operational component and principle for which there was supporting data. Disagreements on ratings were resolved through consensus discussions. Minimal disagreement arose over the assignment of individual adoption ratings, and the majority of disagreement that arose was between adjacent ratings, such as

compliant versus high compliance. When conflicts arose in assigning a rating and consensus could not be clearly decided through discussion, determination of the rating was made in the comparison of roles across clinics and interpretation of informant comments and actions in the context of the clinic as a whole (as discussed in Phase 3). This was also the procedure for inferring ratings when conflicts arose between informant observation and interview data.

Individual level adoption ratings were organized into clinic level fidelity matrices, by PCMH operational component. Because the principles represent the overarching goals of the PCMH, they were mapped to the operational components, and therefore categorized under components during the Phase 1 coding, as illustrated in Figure 2. For example, the principle of Quality and Safety is a broad principle encompassing multiple operational components; Patient Registry, Individualized Patient Care, Performance Reporting, and Test Result Tracking. Informant knowledge of the principle of Quality and Safety with respect to the different components varied; some informants understood how the patient registry was used to integrate clinical and managerial health information technology (HIT) systems supporting the optimization of patient care, and some informants were not aware of how this integration of systems supported the optimization of patient care. In this investigation, the assumption of homogeneous implementation across clinics was not made; the determination of informant compliance with using components was based on three dimensions of use (i.e. attitude, quality and consistency) and knowledge of the aspects of principles related to the component, and interpreted within the context of informant role. Making comparisons within roles and across clinics helped to inform a full picture of the different levels of individual adoption; however,

final decisions about individual level adoption ratings were made in consideration of the clinic as a whole, as described in Phase 3.

Phase 3: Assigning Clinic Level Fidelity Ratings

The third phase of analysis followed an embedded case study approach, drawing insight from individual level adoption ratings to make collective inferences about clinic level fidelity for each PCMH operational component (Mason, 2002). The clinic level fidelity ratings were determined by the lead investigator, followed by consensus discussions with the qualitative analyst. Judgment on clinic level fidelity ratings considered individual level knowledge of the principle and use of the related operational component. Informants who were direct users of a component were given more weight in the clinic level fidelity rating compared to informants who were not direct users of the component. Clinic managers were the exception to this decision rule; since clinic managers were not direct users of the operational components, but had knowledge of how they were to be used in practice; therefore in determining clinic level fidelity ratings, clinic managers' perceptions of principles and components were weighted more heavily than informants who were not direct users of the component in the clinic level fidelity ratings. Holistic interpretations of each component in each clinic were made as understood in the context of the clinic as a whole. Inferences about clinic level fidelity were not based solely on the data collected from one informant, but from agreement between multiple informants in a clinic. When disagreement arose between informants within a clinic, judgment on fidelity was made in the context of the clinic as a whole.

In this investigation, PCMH implementation is assessed as an organizational level phenomenon that is a composite of organizational members' knowledge, attitudes, and

behaviors framing the organizational circumstances in which PCMH implementation occurs. This assessment includes two organizational levels, 1) the knowledge, attitude and behaviors of clinicians and staff as they adapt their work practices during PCMH implementation, and 2) the fidelity to which the PCMH operational components and principles are realized in clinic practice as implementation is carried out (Bond, Evans, Salyers, Williams, & Kim, 2000). In other words, assessing PCMH implementation at both levels (i.e., individual and clinic) increases the reliability of inferences made about the varying degrees with which the PCMH principles and operational components have been implemented, resulting in a depth of information from which variation in PCMH implementation can be understood. The clinic level fidelity ratings include:

> *Nonuse:* Component is absent from clinic operations, and/or a disregard of the component was expressed by clinic informants. There is also a general lack of awareness of the related principle, and/or a lack of understanding of the principle beyond individual tasks.
>
> *Low Fidelity:* Component is used with low compliance in clinic; it is perceived negatively and/or is not used according to protocol. Clinic informants do not have an awareness of the related principle, or they have an awareness of how the related principle contributes to achieving clinic goals, but they do not appreciate the principle in practice.
>
> *Neutral Fidelity:* Component is used according to protocol in the clinic; or it is not used according to protocol, but is perceived positively. There is a general awareness of how the related principle contributes to achieving clinic goals.
>
> *High Fidelity:* Component is used with high compliance in the clinic; it is used according to protocol and perceived positively, with potential areas for improvement. Clinic informants have an awareness of the related principle, and/or appreciate the connection between the principle, the operational components, and achieving the overarching clinic goals.
>
> *Committed:* Component is used with committed use; it is used according to protocol and perceived positively, without qualifications. Clinic informants have an understanding and appreciation of the connection between the principle, the operational components, and achieving the overarching clinic goals.

Phase 4: Categorizing Relative Fidelity Ranking

After the clinic level fidelity ratings were assigned, in order to evaluate the research objective for this study and assess how PCMH implementation varies across clinics, the clinics and components were categorized based on relative clinic level fidelity ranking into high, moderate, and low fidelity. Although the categories of clinic level fidelity assigned in Phase 3 are nominal categorical variables, to differentiate relative levels of fidelity across clinics, numeric values were assigned to the different categories in order to identify patterns in variation across clinics (Nonuse = 1, Low Fidelity = 2, Neutral Fidelity = 3, High Fidelity = 4, and Committed = 5). The numeric values were then totaled 1) within clinic and across components, and 2) within component and across clinics. To determine relative fidelity ranking across the six clinics, the total range of highest and lowest cumulative fidelity scores (Clinic F = 32 and Clinic B = 23, range = 10) was divided by 3 in order to divide the 6 clinics into tertiles of High Fidelity (≥ 30), Moderate Fidelity ($29 \geq$ and ≤ 26), and Low Fidelity ($25 \geq$). The same method was used to determine relative fidelity ranking across the nine components, the total range of highest and lowest cumulative fidelity scores (Patient Registries = 22 and Test Result Tracking = 15, range = 8) was divided by 3 in order to divide the 9 components into tertiles of High Fidelity (≥ 20), Moderate Fidelity ($19 \geq$ and ≤ 18), and Low Fidelity ($\geq$ 17). See Table 5. Relative Fidelity Rankings by Clinic and PCMH Component.

[Table 5 about here]

Phase 5: Categorizing Variation in Fidelity

After calculating the cumulative fidelity scores, to further evaluate the research objective and assess how PCMH implementation varies across clinics, the level of

variation in fidelity across clinics and components was categorized based on variation in clinic level fidelity ranking into high, moderate, and low levels of clinic variation in fidelity, and high, moderate, and low levels of component variation in fidelity. The numeric values assigned to the categories of clinic level fidelity in Phase 4 were used to calculate the level of variation in fidelity 1) within each clinic and across all components, and 2) within component and across clinics. To calculate the level of variation in fidelity within each clinic and across all components, the number of different clinic level fidelity scores was totaled across the nine components to determine the value. To calculate the level of variation in fidelity within each component and across all clinics, the number of different clinic level fidelity scores was totaled across the six clinics to determine the value. As was done in Phase 4, to categorize the levels of variation in fidelity into high, medium, and low, the range of level of variation was divided into tertiles. See Table 6. Levels of Clinic Variation in Fidelity and PCMH Component Variation in Fidelity.

[Table 6 about here]

Results

Considerable variation in implementation of the PCMH components across the six clinics was found, despite the clinics having similar organizational structures, (e.g., resources, health information systems, incentives, centralized innovation and quality initiatives within the health system, PCMH tools and processes, and opportunities to participate in collaborative learning opportunities to facilitate implementation). Tables 5 provides a visual representation of the different fidelity rankings across clinics and across PCMH components. Table 6 provides a visual representation of variation in fidelity within clinics and across components, and within components and across clinics. The

clinics with high-fidelity rankings had moderate and low variation in fidelity to the PCMH components. The clinics with low fidelity rankings also had moderate and low variation in fidelity to the PCMH components. This pattern of moderate and low variation in both the high-fidelity and low-fidelity clinics suggests the influence of organizational factors on high and low fidelity to the PCMH as a whole. The clinics with moderate fidelity rankings had high variation in fidelity to the PCMH components. This absence of a pattern in fidelity in clinics with moderate fidelity rankings, suggests that different PCMH components may have characteristics that cause them to fit better or worse in different clinics and influencing variation in implementation across clinics.

The components with the lowest variation in fidelity across clinics, Patient Registries and Test Result Tracking, had the highest and lowest cumulative fidelity scores, respectively. To implement the Patient Registries component, additional resources were provided to clinics in order to create a new clerical role to manage the patient registries. The new position had a key role in the implementation of the Patient Registries component. Additionally, the standardized protocol for the implementation of the Patient Registries function was largely developed at the health system level and managed in each clinic by the new clerical role, after receiving training in their new function. Test result racking on the other hand, is a PCP dependent process. PCPs have a key role in test result tracking and must delegate the responsibility of communicating test results to various staff in the clinic, depending on the outcome of each individual patient's test. The clinics with higher fidelity to the Test Result Tracking component had a higher level of satisfaction with the idiosyncratic nature of the test result tracking processes being patient-centered.

The components with the highest variation in fidelity across clinics, Patient Provider Partnership and Performance Reporting, had high and low fidelity rankings, respectively. The Patient-Provider Partnership is an essential aspect of primary care delivery on which professional caregivers in primary care trained. The clinics with higher fidelity to the Performance Reporting component were more successful at dispersing the activities related to performance reporting across various clinic roles, effectively achieving performance reporting as a clinic wide activity.

Knowledge of PCMH principles was a key factor that emerged in the variation in implementation of PCMH components across clinics. The components for which the related principle was not understood or not appreciated were implemented with relatively lower fidelity. For example, Performance Reporting is primarily related to the principle of Quality and Safety, which encourages the use of performance feedback and engagement in quality improvement initiatives, and Preventive Services is primarily related to the principle of Whole-Person Orientation, which encourages meeting all of a patient's health care needs. In the clinics with relatively lower levels of fidelity to those components, clinicians and staff implemented those components to the extent that they were already part of clinic work flows. The importance of having knowledge of the PCMH principles, versus understanding of tasks associated with the components, is made apparent in the results.

The clinic manager as a facilitator in the adaptation to new roles associated with specific components is a key factor in variation in implementation. Evidence of this arose in the variable implementation of the PCMH components: Patient-Provider Partnership (clinic manager's involvement in the use of the medical home information sheet to raise

patient awareness of the PCMH); Patient Registry (clinic manager's involvement in establishing a new role to manage the patient registry and incorporating the registry functions into clinic work flows); and Transitions of Care (clinic manager's involvement in the allocation of time for making phone calls to patients and documenting in patient record).

The dependence of the PCMH on the role of the PCP was a key factor in variation of PCMH implementation. The components for which successful implementation was PCP (i.e. Specialist Referral and Test Result Tracking) were not implemented with as high fidelity as components that were not dependent on the PCP. Additionally, those components that were not physician dependent were implemented with higher fidelity when the clinic manager was directly involved in incorporating the new processes into clinic work flows, for example the Patient Registry and Transition Care. Availability of PCPs and physicians in general appears to be a key factor in variation in PCMH implementation. The components for which successful implementation was dependent on the availability of physicians received low to moderate fidelity (i.e. Extended Access and Specialist Referral). Availability of PCP appointments was also identified as an important barrier in a clinic's functioning as a PCMH.

These qualitatively identified themes, knowledge of PCMH principles, clinic manager as facilitator, and dependence on PCPs, are illustrated below in the comparing and contrasting of clinics with high versus low fidelity for each PCMH component to describe the occurrence of variation to the PCMH components across clinics. The remainder of this results section describes the variation in fidelity across clinics for each PCMH component. First, describing any consistencies in fidelity across clinics, then

describing the facilitators of implementation in the high-fidelity clinics, and finally, describing challenges to implementation faced by the low-fidelity clinics.

Patient Registries

The Patient Registries component had the highest cumulative fidelity score and low variation in fidelity across clinics. Patient Registries were developed, maintained, and generated by the health system for the clinics. Across clinics, informants expressed feeling overwhelmed with the amount of patient information generated by the registries that needed to be processed. This PCMH component motivated the development of a new clinic role, which was primarily a clerical function assigned to one or two people in each of the six clinics. The clinics with high fidelity to this component had a single staff member in this new role who expressed a commitment to the Principle of Quality and Safety in describing their use of the patient registry to optimize patient care. Additionally, those staff members did not have other responsibilities in the clinic, received direct support from the clinic manager in incorporating patient registry functions into clinic work flows, and expressed personal satisfaction with their role in the clinic. The two clinics with neutral fidelity to this component had multiple staff members in the new role who also had other responsibilities in the clinic, did not receive direct support from the clinic manager for incorporating patient registry functions into clinic work flows, and expressed variable awareness of the Principle of Quality and Safety and how the patient registry could be used to optimize patient care.

Patient-Provider Partnership

Patient-Provider Partnership had the second highest cumulative fidelity score (along with Transition of Care) and high variation in fidelity across clinics, with one clinic rated as committed. Across clinics, there was an awareness of the role of the PCP in patient care and the role of primary care as a patient's medical home in the broader health care system; however, due in large part to varying levels in the availability of PCP appointments in the different clinics, clinicians and staff expressed varying levels of appreciation for the Principle of the Personal Physician and the related operational components.

Clinicians and staff in the clinic ranked as committed to the Patient-Provider Partnership component expressed a coherent commitment to the Principle of the Personal Physician; they described their role in supporting patient trust and continuity of care, and appreciated being knowledgeable of individual patient histories and social circumstances to help patients overcome challenges to adhering to care or making changes in health behaviors. Additionally, the clinicians and staff in this clinic demonstrated high compliance to educating patients about the PCMH and the role of the PCP in patient care. The PCP demonstrated high compliance in her efforts to cultivate relationships between patients and herself or other PCPs in the clinic and to make the patients aware of what it meant that the clinic was their medical home. The manager ensured staff in the clinic were trained on a medical home information sheet which was developed at the system level as a tool to educate patients about the PCMH and the role of the PCP in their care.

In the clinics with low and neutral fidelity rankings for the Patient-Provider Partnership component, clinicians and staff generally expressed an awareness of the

Principle of the Personal Physician, but identified barriers to realizing the principle in their clinic; particularly the unavailability of PCP appointments resulting in patients not having a relationship with their PCP. The operational components targeting education of patients about the PCMH and the role of the PCP were rarely used by informants in these clinics. PCPs made assumptions about patients' understanding of the role of the PCP, stating that patients take the role of the PCP for granted. The majority of clinicians and staff in the low and neutral fidelity clinics were rated as low compliance in their use of the medical home information sheet as a tool to educate patients about the PCMH. For example, in the clinic ranked as low fidelity to this component, the lack of clarity around who in the clinic was responsible for educating patients about the PCMH was apparent in the data. In the neutral fidelity clinics, which had more availability of PCP appointments, it was observed that the office staff were not aware of giving new patients a medical home information sheet during the check in process, because the sheet was generated automatically with an array of other forms upon patient check-in.

Transition of Care

Transition of Care also had the second highest cumulative fidelity score (along with Patient-Provider Partnership), and moderate variation in fidelity across clinics, with four out of the six clinics having high fidelity, and two having low fidelity. Across clinics, the transition of care report was generated at the system level and each clinic was largely reliant on the RN role in calling patients upon discharge from the hospital to ensure coordination of care between the hospital and the PCP, and then documenting necessary information in the patient's electronic health record (EHR). Although PCPs had access to the information documented by the RNs in the EHR, all but one PCP

expressed indifference to the information. Across clinics, RNs expressed a high level of appreciation for their role in reaching out to patients to ensure care was coordinated between the hospital and the PCP, because it allowed them to shift away from a reactive triage role to a more proactive role in patient care and education. The RNs felt strongly that the Transition of Care component was important in coordinating patient care. However, the PCPs did not express congruence with the RNs appreciation for catching multiple gaps in care for patients recently discharged from the hospital.

The differentiating factor between clinics ranked as high fidelity versus low fidelity was the direct involvement by the clinic manager in the implementation of the Transitions of Care intervention. The clinic managers in the clinics with high fidelity to this component allocated time and resources to the RNs responsible for carrying out tasks related to the Transition of Care component. In the low-fidelity clinics, the RNs expressed dissatisfaction with the component because they felt they did not have adequate time to prepare for making the phone calls to patients and then documenting the appropriate information in the EHR.

Individualized Management of Patient Care

The Individualized Management of Patient Care component had a moderate cumulative fidelity score and moderate variation in fidelity across clinics, with three out of the six clinics having neutral fidelity ratings, two having high fidelity, and one having low fidelity. This component is comprehensive of a clinic's activities for organizing care to meet patient's individual needs, and the breadth of this component contributed to the variation in fidelity within and across clinics. However, the greatest variation in fidelity to this component across clinics arose from different perceptions regarding the use of the

[Point of Care] report, which was a form that was designed at the system level and generated for every patient visit prompting clinicians to obtain specific information or conduct procedures relevant to each patient. The medical assistants (MA) had a key role in the use of the [Point of Care] report during the patient visit; however their use of the report was often compromised when PCPs had unique expectations of the MA function, and therefore impeded standardization of the MA process for using the report.

The care managers (RN and PharmD) also had a key role in supporting patient self-management, providing patient education, and motivating patients to overcome barriers to making healthy lifestyle and behavior changes. Particularly in the care management function, fidelity varied based on the care manager's level of experience, skill, and commitment to patients. For example, in terms of how patient education was conveyed and the extent to which motivational interviewing was used to support patients in overcoming barriers to achieving self-management goals.

In the clinics with high fidelity to this component, efforts were made to standardize the MA role throughout the clinic, and the MAs were rated with high compliance to this component based on their standardized processes for consistently obtaining appropriate patient information, and their high levels of satisfaction with those processes. The care managers in Clinics A and F were allocated time to provide care management services to patients and were recognized as key members of the caregiving team in their clinic. They were also part of the clinic in that they acted as advocates for the MAs in establishing processes through which high quality care management was provided to patients. Additionally, managers in Clinics A and F were particularly knowledgeable about the implementation of the operational components.

In the clinic with low fidelity to this component, informants were consistently committed to the principles related to individualized management of patient care, yet overall had low ratings of compliance to the operational components. The MA identified the problem of the MA role not being standardized around the use of the [Point of Care] report to support PCPs during the patient visit and this was also identified as a problem by the Clinic D PCP. The care management function in Clinic D was not well established, largely because the patients who were candidates for referral to the care managers did not have adequate insurance and the care manager expressed frustration with the care management processes which were designed at the system level, and therefore not entirely appropriate for her patients.

Preventive Services

Preventive Services had a moderate cumulative fidelity score and moderate variation in fidelity across clinics. Across clinics, PCPs understood their role in providing comprehensive patient care. This component varied between clinics primarily with respect to the level to which preventive services were incorporated into clinic flow. In the two high-fidelity clinics, informants demonstrated commitment to the preventive aspect of the principle of Whole-Person Orientation, and high compliance to consistently incorporating preventive services into clinic flow for all patient visits, regardless of the reason for the patient's visit. Correspondingly, in clinics with low fidelity to this component, informants expressed varying levels of awareness of the principle of Whole-Person Orientation, and low to neutral compliance with incorporating preventive services into clinic flow for all patient visits; for example, informants did not consistently agree that preventive services should be incorporated into acute visits. The following quote

provides evidence of the frustrations experienced by an MA in incorporating preventive services into acute visits:

> I think that when it's an urgent visit, it really isn't a good idea for those reports to print up, because it's not dealing with anything that's acute. Therefore, it can end up taking time away from--you may miss a vital, because you're looking at that. And then, all of a sudden, you kind of forget the purpose of why they're really there. […] because if you see that they need an A1C, you kind of switch from, they're here for an upper respiratory infection. Then you start to think about their diabetes and trying to prepare them for that appointment when that's not what they're there for. (Medical Assistant, Clinic C)

Extended Access

Extended Access had a moderate cumulative fidelity score and moderate variation in fidelity across clinics. All patients had twenty-four hour access to a clinical decision-maker and multilingual services, which were implemented at the system level. With the exception of one clinic, the six clinics consistently provided extended office hours during one or two weekday evenings and on Saturday mornings. The variation in fidelity across clinics was largely based on patients' ability to schedule appointments with their PCP, which was often identified as the biggest barrier to a clinic functioning as a PCMH, as demonstrated in the following answers to the question of, "*What do you perceive as being the barriers to a clinic being organized as a patient-centered medical home?*":

> We lost one staff doctor who has not been replaced and we are going to lose one more provider. Each provider sees 50-60 patients per week and when the provider leaves, the appointments are no longer available. Patients get frustrated, because they can't get in to see a provider. (Office Staff, Clinic D)

> Access. We don't have enough providers. We don't have enough rooms. We don't have enough time in the day. We have a large patient base, but we never have enough appointments. Today I tried to make a health maintenance exam for a patient, and the doctor was already full for the next three months. (Office Staff, Clinic E)

In the clinics with high fidelity to this component, informants expressed commitment to the principle of enhanced access and high compliance to being able to schedule patient appointments with their PCP, or alternatively patients having a

relationship with another PCP in the clinic for when their PCP was unavailable. In low fidelity clinics (Clinic E and B), informants expressed not being able to schedule patients appointments with their PCP.

Specialist Referral

Specialist Referral had a moderate cumulative fidelity score and moderate variation in fidelity across clinics. The coordination of specialist referrals was a routine aspect of the PCP function. Across clinics, the specialist referral process was not implemented following a standardized protocol. By and large, dissatisfaction with specialist referrals was outside the control of the clinic; there was a high level of frustration and concern regarding the lack of specialist appointments available for patients when referrals were made by the PCP.

The clinic manager in the clinic with high fidelity to this component discussed a mechanism for tracking patient appointments with specialists to facilitate follow-up with patients who did not schedule and/or attend their appointment with a specialist, when referred by their PCP. In the other clinics with lower fidelity to this component, this function of the specialist referral was either addressed as being poorly implemented or not acknowledged by informants when asked about the specialist referral process.

The operational aspects of the Specialist Referral component are largely physician-dependent. PCPs expressed varying expectations for communicating with specialists about patients. In the low-fidelity clinics, PCPs expressed dissatisfaction due to a lack of direct communication with specialists regarding patient referrals; however, some PCPs expressed satisfaction with having only indirect communication with specialists, via notes in the electronic medical record. Low fidelity across clinics resulted

from the inconsistencies and redundancies in communication between the PCP and specialist provider, this process often involved multiple members of the clinic to coordinate multiple channels of communication. Low fidelity ratings were also inferred based on the frustration among clerical staff with receiving incomplete referral consults from physicians.

Performance Reporting

Performance Reporting had the second lowest cumulative fidelity score and a high level of variation in the implementation across clinics. Across clinics and various roles there was considerable variability in awareness of how performance reporting was used as a mechanism for identifying and initiating process improvements throughout the clinic (the PCMH Principle of Quality and Safety). In contrast to other components, there was not one role category within a clinic that stood out as expressing more or less fidelity to the Performance Reporting component. There was a high level of variability in the extent of clinic managers and MA's awareness of the principle of quality and safety and the use of performance reporting to initiate process improvements. There was also variability in the extent of RNs awareness of the principle of quality and safety; however, RNs were either compliant or highly compliant in their perception of how performance reporting was used in their clinic to initiate process improvements. PCPs were aware or committed to the principle of quality and safety; however, their levels of using performance reporting were quite variable, ranging from nonuse to committed use.

The informants in the clinic with high fidelity to this component expressed a coherent commitment to the principle of quality and safety with respect to using performance reporting as a mechanism through which process improvements were

accomplished on a regular basis in the clinic. Additionally, the informants in this clinic provided a coherent description of how performance reporting was used to accomplish process improvements, and they expressed a great amount of satisfaction with respect to the use of performance reports.

The informants in the clinic rated as non-use of the Performance Reporting component, did not express appreciation of or familiarity with the use of performance reports to identify and initiate process improvements in the clinic. In particular, the clinic manager did not articulate an appreciation for using performance reports to enable process improvements, but rather described having specific staff members to whom delegation of the reports could be assigned.

Test Result Tracking

The Test-Result Tacking component had the lowest cumulative fidelity score and a low level of variation in implementation across clinics. Similar to Patient Registries, Test Result Tracking was maintained centrally within the health system, however communicating test results to patients was a manual physician-dependent process for which no formal protocol had been implemented in any of the clinics.

In the clinics with neutral fidelity to this component, the manual physician-dependent process was perceived positively and a cohesive understanding of the test tracking process existed across clinicians and staff to support patient-centered care; tests were communicated on a patient-by-patient basis. Informants perceived this process as being accommodating of individual patient needs, and a collective understanding of the hierarchy for communicating test results was adhered to throughout the neutral fidelity clinics.

In the clinics with low fidelity to this component, the manual physician-dependent process was perceived negatively, and a more standardized process of test result tracking was preferred. The idiosyncrasies in physician practices for test result tracking were identified as being problematic, unnecessarily taking up extra time during patient visits to review and interpret results that had not been appropriately communicated to patients, and causing confusion due to different physician and MA teams following different practices for communicating test results to patients.

Discussion

From the analyses of variation across the six primary care clinics and nine PCMH components, important factors associated with fidelity to the PCMH emerged. Individual knowledge and appreciation of PCMH principles was a key factor in the variation in fidelity to the PCMH across clinics. Lack of understanding of PCMH principles related to the different operational components resulted in dissatisfaction with the component. Lack of understanding of the principle arose in clinics for various components implemented with relatively lower fidelity. For example, the Preventive Services component, in which a lack of an appreciation of the principle of Whole-Person Orientation resulted in resistance to providing both acute and preventive services in the same visit. Additionally, the variation in knowledge and appreciation of the principle of Quality and Safety resulted in variation in implementing the Patient Registry component across clinics. This finding of the importance of knowledge of PCMH principles aligns with previous findings that clinics must embrace a different paradigm to move from functioning as an efficient assembly line to more proactive planning and meeting the needs of individual patients (Nutting, Crabtree, Miller et al., 2010). The findings from this study show that to

embrace a different paradigm and successfully implement the PCMH, knowledge and appreciation of related PCMH principles by individuals implementing the change is necessary.

Understanding of role was a key factor in the variation in implementation of PCMH components across clinics. Lack of understanding of role in activities supporting the implementation of components resulted in inconsistent implementation of PCMH components and therefore variation in fidelity across clinics. The lack of role clarity was apparent in the Patient-Provider Partnership, in which clinic with lower fidelity did not have clarity around roles for educating patients about the role of the PCMH and the medical home in patient care. Additionally, the lack of clarity around the role of the MA in their use of the POC report resulted in lower fidelity to the Individual Care Management component. This finding aligns with the finding that PCMH implementation is more than a series of changes but requires shifts in roles (Nutting, Crabtree, Miller et al., 2010). The findings from this study show that shifts in roles are different across components, and may require individual attention from clinic leadership to facilitate shifts in roles.

The level of involvement by the clinic manager was also a factor in the variation in fidelity to the PCMH across clinics. This finding highlights the role of the clinic manager in helping individuals understand their role in the PCMH at the clinic level. The availability of the PCP was also a factor in the variation in the fidelity to the PCMH across clinics. Most notably in the lack of availability of PCP appointments, hindering both appreciation for PCMH principles by clinic staff and implementation of the operational components.

Implications

An important implication of these findings is that implementation efforts should emphasize and raise awareness of PCMH principles as opposed to focusing training on incorporating new tasks and tools into clinic work flows. Implementation efforts should support clinicians and staff working to the expectations of their role to overcome traditional hierarchy of primary care and should also be acknowledged when contradiction in practice and principle arises (i.e. unavailability of PCP appointments challenges commitment to PCMH principles).

At the policy level, there is deliberation over appropriate criteria for evaluating a health care organization as meeting the standards of a PCMH. This study brings into question whether the appropriate concepts are being measured and suggests that PCMH evaluation tools should not assess uniform implementation, but should incorporate the importance of organizational context into evaluation criteria. Criteria for evaluation should subjectively assist provider organizations with implementing various PCMH components, as opposed to objectively checking off a list of items necessary for PCMH certification. In other words, ask providers about the processes through which the patient registry is being used, rather than asking them only if they have a functioning patient registry. Evaluation tools can be used as a mechanism of research dissemination to share best practices for PCMH component implementation and provide guidance on what was effective and why. Although PCMH evaluation tools are criticized for the amount of resources necessary for completion, variability in PCMH implementation limits the ability of primary care providers to align with the broader health care system, for example with Accountable Care Organizations.

Limitations

The PCMH components evaluated in this study are not comprehensive of all operational components. The PCMH model of care delivery, from which the components were identified, is being implemented in over 700 primary care clinics for PCMH certification and payment.

The clinics in this study do not represent a nationally representative sample of primary care clinics. The focus of academic physician's work can be disparate compared to private practice physicians; some clinics have physicians on staff who are full-time, and other clinics have physicians who work only part time in clinic. Even more variation of PCMH implementation is expected to occur among private practices and community centers. The practices in the purposive sample all operate within the same integrated health system. This provides a context in which all clinics have relatively uniform expectations, guidance, incentives, and resources for PCMH implementation (i.e. best case scenario for understanding social aspects of PCMH implementation), compared to a sample of clinics where implementing the PCMH involves implementing an HER (Nutting, Crabtree, Miller et al., 2010). Three of the clinics in the sample measured and reimbursed PCPs based on their response to certain clinical reminders, however this was not found to have a consistent effect on variation in the implementation of the components in which clinical reminders were used.

Several procedures were included in this analysis to ensure rigor, depth, and a high level of internal validity in determining clinic level fidelity ratings from the qualitative data. The identification of a purposeful sample of heterogeneous cases (primary care clinics) increased the likelihood that variation in PCMH implementation

would be observed across cases (Yin, 2003; Teddlie & Yu, 2007). Collecting information about the multiple PCMH principles and operational components from various clinicians and staff in each of the six clinics provided rich and comprehensive information to assess variation in PCMH implementation. Observation and interview data from multiple informants were triangulated to develop a complete assessment of PCMH implementation in each of the clinics. Analyses were conducted by two experienced qualitative analysts. Inter-coder reliability was high in all phases of data coding and analysis. Consensus discussions were carried out to achieve full agreement on individual level and clinic level fidelity ratings. Finally, although novel, the measure of implementation fidelity used in this research is theoretically grounded and adapted from a previously tested measure, providing precedence for using this systematic approach to qualitatively determine categorical ratings of fidelity for each operational component accounting for multiple organizational levels in the context of each clinic as a collective practice (Keith et al., 2010; Alexander & Hearld, 2010).

Conclusion

By focusing on fidelity to the PCMH, the findings from this study provide important insight into PCMH implementation. The findings presented in this study confirm and move forward findings to date in the PCMH literature with respect to variability in the implementation of PCMH components. Overall, the results of this study demonstrate that despite similar organizational structures--resources, health information systems, learning collaboratives, incentives, and PCMH tools and processes—considerable variation in PCMH implementation was found. Therefore, the degree of fit between unique aspects of PCMH components and clinic context should be considered

during PCMH implementation, and necessitates further investigation of organizational contextual factors associated with variation in fidelity to the PCMH. The patterns of PCMH implementation across clinics and components also suggest that factors in the organizational context influence fidelity to the PCMH.

By using ethnographic methods to explore the PCMH as a complex, multi-faceted model of delivery, this study extends the PCMH literature by illuminating the factors underlying variation in fidelity to the PCMH and sheds light on recommendations for PCMH implementation strategies at the practice and policy levels. Successful implementation of the PCMH can have a significant impact on the healthcare system in the U.S., and will largely be achieved in primary care delivery. To address the impact of the PCMH on cost and quality outcomes, this study provides evidence that further assessment of PCMH implementation is necessary to avoid the conclusion that the PCMH is an ineffective model for achieve needed change throughout the health care system.

Table 1: Patient-Centered Medical Home Joint Principles

Principle	Description
Personal Physician	Each patient has an ongoing relationship with a personal physician, trained to provide first contact, comprehensive, and ongoing care.
Physician-Directed Practice	The personal physician acts as the leader of a multidisciplinary team of caregivers who are collectively responsible for the ongoing care of the patient.
Whole-Person Orientation	The personal physician is responsible for providing all of the patient's health care needs or arranging care throughout the system as appropriate (i.e. acute care, chronic care, preventive services, and end-of-life care).
Coordinated & Integrated Care	Care is coordinated and integrated throughout the healthcare system, facilitated by information technology (IT).
Quality & Safety	Evidence-based decision support, clinical and managerial IT system integration, performance feedback to physicians, engagement in quality improvement initiatives, patient education, and incorporating feedback from patients are all used in decision making.
Enhanced Access	Patients are provided timely access to care and improved communication with caregivers.
Payment Alignment	Provider reimbursement is realigned to appropriately recognize the value of the PCMH.

Table 2: Patient-Centered Medical Home Operational Components

Operational Component	Description	Indicator
Patient Provider Partnership	The establishment of an ongoing therapeutic relationship between a patient and a primary care provider to maintain continuity in patient care.	Medical Home information sheet Conversation with patient about PCMH Discussion of follow-up care w/ patient Appointment reminders Patient appointment tracking
Patient Registries	Paper or electronic databases that organize the collection, aggregation, summarization, and use of valid patient data to facilitate care delivery and longitudinally monitor individual patient care.	Clinic outreach to patients Report on indicators for chronic disease Report on indicators for vaccines and immunizations Report on preventive care interventions Maintenance of registry information
Performance Reporting	The provision of timely patient and clinic level reports on clinical performance including individual provider performance with peer and national benchmarks for comparison.	Provider level performance reporting Clinic level performance reporting for process improvements
Individualized Management of Patient Care	A team-based, organized and systematic approach to deliver comprehensive care that addresses each individual patient's full range of healthcare needs.	Care management Patient education Motivational interviewing Self-management goal setting Patient information at the point of care Patient medication reconciliation Obtaining outside patient records Planned visits
Preventive Services	Disease prevention practices that focus on identifying and educating patients about their health behaviors and needed immunizations, screenings, and other procedures or tests intended to reduce the risk of disease and injury.	Preventive services are incorporated into patient intake process
Test Result Tracking	Providing patients with effective and timely follow-up for all tests and test results, regardless of whether the result is normal or abnormal.	Communication of test results to patients
Extended Access	Patients have increased access to clinical decision-makers and to their PCP.	Extended hours Appointment availability
Transition Care	Establishing mechanisms for notifying the patient's PCP when the patient is admitted and discharged from the hospital, as well as other transitions of care (e.g. hospital to skilled nursing facility). Following discharge the patient should receive a phone call from a member of the PCP's practice to discuss transition care and patient needs.	Transition care
Specialist Referral	Coordinating patient referrals to specialists and communication between the PCP and specialist provider.	Communication/information exchange with specialists Scheduling patient appointment with specialist Tracking appointment with specialist

Table 3: Sampling of Primary Care Clinics

	Small <13,000 patient visits in 6 months	Large ≥13,000 patient visits in 6 months
High Patient Focus & Innovation	1	2
Low Patient Focus & Innovation	1	2

Table 4: Sample of Study Informants

Role in Clinic	N
Primary Care Providers (MD, NP)	8
Non-Primary Care Providers (PharmD, LPN, RN, MA)	20
Office Management (Manager, Office Assistant)	29
Total	57

Table 5: Relative Fidelity Rankings by Clinic and PCMH Component

Operational Component	Clinic F	Clinic A	Clinic D	Clinic C	Clinic E	Clinic B	Cumulative Fidelity Score	Relative Fidelity Ranking
Patient Registries	4	4	3	4	4	3	22	High
Patient-Provider Partnership	4	3	5	3	2	3	20	High
Transition of Care	4	4	4	4	2	2	20	High
Individualized Patient Care	4	4	2	3	3	3	19	Moderate
Preventive Services	4	3	4	2	3	2	18	Moderate
Extended Access	4	3	3	4	2	2	18	Moderate
Specialist Referral	3	4	3	3	3	2	18	Moderate
Performance Reporting	3	4	2	1	3	3	16	Low
Test Result Tracking	2	3	2	2	3	3	15	Low
Cumulative Fidelity Score	32	32	28	26	25	23		
Relative Fidelity Ranking	High	High	Mod	Mod	Low	Low		

Nonuse Low Fidelity Neutral High Fidelity Committed

Table 6: Levels of Clinic Variation in Fidelity and PCMH Component Variation in Fidelity

Operational Component	Clinic F	Clinic A	Clinic D	Clinic C	Clinic E	Clinic B	Number of Fidelity Scores	Individual Component Variation in Fidelity (across clinics)
Patient Registries	4	4	3	4	4	3	2	Low
Patient-Provider Partnership	4	3	5	3	2	3	4	High
Transition of Care	4	4	4	4	2	2	2	Moderate
Individualized Patient Care	4	4	2	3	3	3	3	Moderate
Preventive Services	4	3	4	2	3	2	3	Moderate
Extended Access	4	3	3	4	2	2	3	Moderate
Specialist Referral	3	4	3	3	3	2	3	Moderate
Performance Reporting	3	4	2	1	3	3	4	High
Test Result Tracking	2	3	2	2	3	3	2	Low
Number of Fidelity Scores	3	2	4	4	3	2		
Individual Clinic Variation in Fidelity (across components)	Mod	Low	High	High	Mod	Low		

Nonuse Low Fidelity Neutral High Fidelity Committed

Figure 1: Conceptual Framework: Implementation Theory

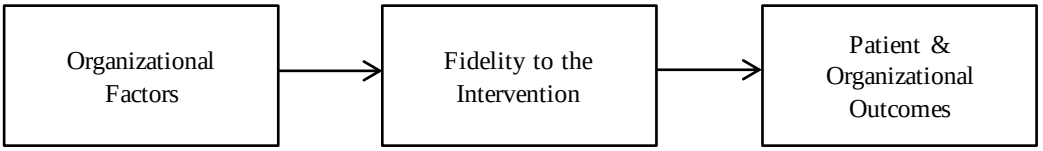
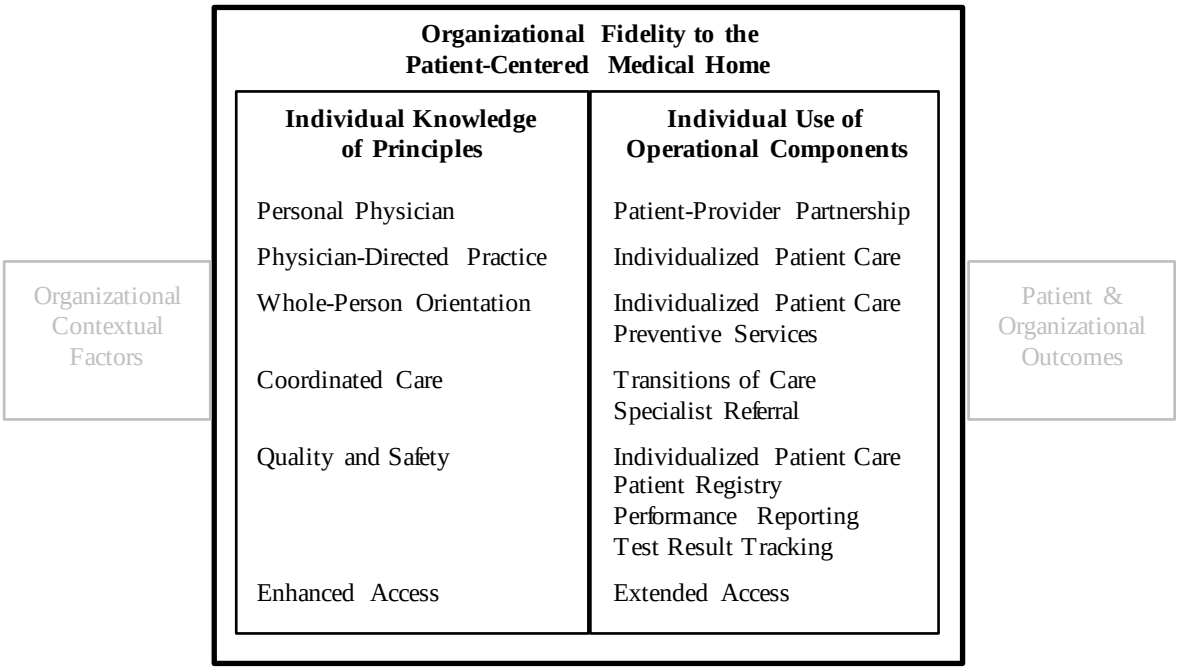


Figure 2: Conceptual Framework: Fidelity to the PCMH



Appendix A: Chapter 1

Employee Survey Questions for the Subscales of Patient-Centeredness and Innovativeness

Patient Focus and/or Customer Focus
1. We anticipate the difficulties our patients and/or customers might face and work to minimize those problems.
2. We address requests and complaints from our patients and/or customers in a manner that is thorough, speedy, and polite.
3. We work to prevent uncertain delays and long waits for our patients and/or customers.
4. We make sure that our work is well-coordinated with the work of other employees at [health system], both inside and outside our team.
5. We go out of our way and take on extra tasks to make sure our patients and/or customers get excellent care.
6. My team is an excellent example of what it means to have good patient focus and/or good customer focus.
Innovation and Flexibility
1. We do a good job of trying out new ideas that solve persistent problems.
2. We are flexible and resourceful when facing unexpected problems.
3. We do a good job of adopting new procedures even when they alter an established work routine.
4. We effectively adopt new procedures that continuously improve quality and lower costs.
5. My team is an excellent example of what it means to have good innovation and flexibility.

Responses were based on a 1 to 7 "never" to "always" scale. The subscales of patient focus and innovation have Cronbach's alphas of 0.943 and 0.920 respectively, indicating the reliability for the subscales is high.

Appendix B: Chapter 2

Observation Checklist

Date:
Time:
Clinic ID:
Participant ID:
Participant Role:
Components used by Participant:

Research Objective: Assess how and why PCMH implementation varies across primary care clinics.

Categories of Observation are organized by PCMH Operational Component: clinical practices to look for and describe participant's understanding of and use of (including satisfaction with use, quality of use, consistency of use). Provide specific examples of use.

1. **PATIENT PROVIDER PARTNERSHIP (in place 1 year before PCMH):** establishing an ongoing therapeutic relationship between a patient and one or more primary care providers.
   a. **ALL:** Training on the PCMH and the related patient communication tools.
      i. Is there observable evidence that participant is knowledgeable of the patient-provider partnership? (Principle-Personal Physician)
      YES □ NO □ N/A □
      _____
      _____

      ii. Is there observable evidence that patients are knowledgeable on the patient-provider partnership? (Principle-Personal Physician)
      YES □ NO □ N/A □
      _____
      _____

   b. **RECEPTION:** Patient-Provider Partnership Agreement Form prints at patient check-in for any patient who has not yet received the form.
      YES □ NO □
      _____
      _____
      i. Language specific Patient Provider Agreement created.
      YES □ NO □

   c. **PCP/CARE MANAGER:** Discusses the Patient Provider Agreement Form with patients and answers any questions. (relevant only to new patients & preventive visits)
      YES □ NO □
      _____
      _____

   d. **PCP:** Acute visit OR Preventive visit
      i. Is the goal of the patient's visit clear? Are the expectations of the visit set by the patient? (Principle – Quality & Safety)
      YES □ NO □ N/A □
      _____
      _____

ii. **PCP:** Acute visit. Is there observable evidence that PCP is knowledgeable on care provided by other providers. (Principle – Personal Physician, Coordination of Care, Specialist Referral)
YES □ NO □ N/A □

_____
_____

iii. **PCP:** Preventive visit. Is there observable evidence that PCP is knowledgeable about the patient's history? (Principle – Personal Physician)
YES □ NO □ N/A □

_____
_____

iv. **PCP/CARE MANAGER:** How does the patient contribute to the agenda for the appointment?
YES □ NO □ N/A □

_____
_____

v. **PCP/CARE MANAGER:** Listens to the patient to understand the patient's lifestyle and the social factors that may impact illness. (i.e. motivational interviewing)
YES □ NO □ N/A □

_____
_____

vi. How does the provider respond to patients who may be considered non-compliant? (Principle – Quality and Safety)

_____
_____

vii. **PCP/CARE MANAGER:** Is there a discussion of follow-up care? How is the timeframe for the patient's follow-up visit determined?
YES □ NO □ N/A □

_____
_____

e. **CARE MANAGER:** Reaching out to patients. Registry data are used to proactively call patients who have not been to the health center.

i. Is there observable evidence that patients are being identified for visits?
YES □ NO □ N/A □

_____
_____

ii. Is there observable evidence that patients are being scheduled for visits (to see their PCP) and are they showing up for their appointment?
YES □ NO □ N/A □

_____
_____

2. **PATIENT REGISTRY:** an electronic database that organizes the collection, aggregation, and summarization of valid patient data to facilitate care delivery and monitor patient care.

   a. **PCP:** All Diabetic, Asthma, CHF, and CAD patients are actively managed in the registry and they have a PCP attributed. (Principle – Quality & Safety: IT)
   _____
   _____

   b. **PCP:** The [Point of Care] Report provides point of care prompts for patients with diabetes, CAD, CHF, and Asthma. (Principle – Coordinated & Integrated Care)
   YES □ NO □ N/A □
   _____
   _____

      i. **MA:** Takes care of clinical reminders indicated on the [Point of Care] Report
      YES □ NO □ N/A □
      _____
      _____

   c. **CARE MANAGER:** Utilizes the [registry reports] to identify patients with gaps in care.
   YES □ NO □ N/A □
   _____
   _____

      i. **CARE MANAGER/CLERKS:** Contact patients who have gaps in care to schedule visits, either through phone calls or bi-annual automated reminder letters for services due (A1C, LDL, foot & eye exams).
      YES □ NO □ N/A □

   _____
   _____

3. **PERFORMANCE REPORTING:** (better captured in the interview), involves physicians receiving reports of their clinical performance, often as it compares to the performance of their peers and to national benchmarks.
   a. Performance reports are acted on through [registry reports], which identify gaps in care.
   YES □ NO □ N/A □
   _____
   _____
   –

   b. The Performance reports identify areas where the clinics should focus (process improvements).
   YES □ NO □ N/A □
   _____
   _____

4. **INDIVIDUAL CARE MANAGEMENT:** involves the use of clinical data to monitor chronic conditions and an integrated multi-disciplinary care team approach to patient care to meet the patient's full range of healthcare needs.
   a. **ALL:** Clinicians and office staff have been trained/educated and have comprehensive knowledge of the PCMH, the Chronic Care Model, and practice transformation concepts.
      i. Is there observable evidence that participant has received training and is knowledgeable on the PCMH, CCM, and practice transformation concepts? If yes, what is the evidence? (Principle – Whole Person Orientation)
      YES □ NO □ N/A □
      PCMH _____
      CCM _____
      Practice Transformation _____

   b. Practice unit has the ability to deliver coordinated care management services with a multidisciplinary team of providers and a systematic approach is in place to deliver comprehensive care that addresses patients' full range of health care needs.
      _____
      _____

      i. **ALL:** Is there observable evidence of a systematic approach to delivering comprehensive care that addresses patients' full range of health care needs? If yes, what is the evidence?
      YES □ NO □ N/A □
      _____
      _____

      ii. **ALL:** Is there evidence of a team of members with clear roles and responsibilities? (Principle – Physician Directed Practice) (See Attachment 1)

      PCP: Serves as team leader by providing vision and guidance to other members; Responds to EMR notifications twice daily and more if possible; Refills medications for one year when possible.

      RN: Takes symptomatic calls and provides triage/advice.

      PharmD: Involved in chronic care management. Facilitates medication intensification.

      CARE MANAGERS: Provide education and care management interventions to individual patients.

      LPN: Delegates prescription renewals.

      MA: Address action items/POC prompts on [Point of Care] Report, including A1c testing, removing shoes and performing monofilament exams, administration of immunizations through delegation protocols, enters data into EMR.

      Social Workers: Is there a social worker in the clinic?
      _____
      _____

      iii. **RN/PHARMD/CARE MANAGER:** Is there observable evidence of Patient Education? (Particularly for asthma and diabetes).
      YES □ NO □ N/A □
      _____
      _____

iv. **MD/RN/PHARMD/CARE MANAGER:** Are motivational interviewing techniques used? (Principle – Whole-Person Orientation)
YES □ NO □ N/A □

_____
_____

c. **ALL/CARE MANAGER:** Is there observable evidence of the care manager (RN/PharmD) on the care management team? What is their role? (Principle – Whole-person Orientation)
YES □ NO □ N/A □

_____
_____

d. **DIABETIC PATIENTS**: Practice monitors all key clinical data, clinical outcomes measures, process measures, and patient satisfaction/office efficiency measures
Point of care A1c YES □ NO □ N/A □
BP monitoring loaning program YES □ NO □ N/A □
Entering outside labs into CareWeb YES □ NO □ N/A □
Glucometer POC prompt? YES □ NO □ N/A □

_____
_____

e. **MD/MA/CARE MANAGER:** Action Plan Development & Self-Management Goal Setting
i. Self-management goal support "What is the one thing the patient will do in the next two weeks to improve their health?"
Does the provider ask the patient what they want to do to improve their health?
Is there evidence that patient goals are understood by all members of the care team?
CARE MANAGER/MA: assists patient in setting specific self-management goals and documents in the medical record
CARE MANAGER/MA: calls patient in 2 weeks to follow-up
PCP: supports the patient's goal
CARE MANAGER: Billing documentation
ii. **PCP:** On-line Asthma action plans implemented across all provider units

_____
_____

iii. **PCP/CARE MANAGER:** Asthma Action Plan is stored electronically in EMR

f. **CLERKS** (Delegated from Care Managers)**:** Systematic Approach for Appointment Tracking and generation of Appointment Reminders for all patients with the chronic condition selected for initial focus.

i. **CLERKS:** All patients receive appointment reminders
YES □ NO □ N/A □

_____
_____

ii. **CLERKS:** Sites do reminder calls
YES □ NO □ N/A □

_____
_____

iii. **CLERKS:** Use of a script when doing reminder calls.
YES □ NO □ N/A □

iv. **CLERKS:** Is there evidence that all no shows are reviewed and action taken? No show letters are sent.
YES □ NO □ N/A □

_____
_____

g. **CARE MANAGER:** Systematic approach in place to ensure follow-up for needed services provided for all patients with the chronic condition selected for initial focus (see 2.c.i.)

_____
_____

h. **PCP/CARE MANAGER:** Planned visits are offered to patients with chronic conditions selected for initial focus. (see 1.d.v.)

i. Diabetic patients are seen every 3-6 months and more frequently as needed
YES □ NO □ N/A □

_____
_____

ii. **PCP:** Reviews labs with patients during visit
YES □ NO □ N/A □

_____
_____

iii. Patients with gaps in care are sent reminder letters based on registry data (see 2.b.i)
YES □ NO □ N/A □

_____
_____

i. Group visit option is available for all patients with the chronic condition selected for initial focus.

i. Is there evidence of group visits being offered to patients in the clinic? (ex. Diabetes Group visit flyer)
YES □ NO □ N/A □

_____
_____

j. **MA:** The [Patient Summary and Medication] list is used to provide a medication review and reconciliation at every visit for all patients with chronic conditions.

i. Does the [list] print at patient check-in?
ii. Does the [list] list patient medications?
iii. Is there observable evidence that medications are reconciled – How is the patient's medication information shared with the PCP?

k. **MA:** Obtains patient smoking status. Is the MA prompted to ask patient if they would agree to a referral to the Tobacco Consultation Service?

5. **PREVENTIVE SERVICES:** involves a primary prevention program focusing on identifying and educating patients about personal health behaviors, appropriate screening tests and treatments to reduce their risk of disease and injury.
   a. **CARE MANAGER:** Primary prevention program is in place that focuses on identifying and educating patients about personal health behaviors to reduce their risk of disease and injury.
      i. Is there evidence of training on health promotion and disease prevention and incorporation of preventive-focused practices into routine clinical practices?
      YES □ NO □ N/A □

      _____
      _____

      ii. Is there evidence of established preventive health guidelines? (Adult preventive care guideline and pediatric immunization guideline)
      YES □ NO □ N/A □

      _____
      _____

   b. Is there evidence of a systematic approach to providing preventive services?
      i. **CLERKS:** Is the [health history] questionnaire printed with Medication Reconciliation and Allergy Review Form?
      YES □ NO □ N/A □

      _____
      _____

      ii. **MA:** Does the [Patient Summary and Medication] list include the patient's last pap, PSA, lipid profile, bone density and mammogram, and last colonoscopy?
      YES □ NO □ N/A □

      _____
      _____

      iii. Immunizations: are they entered in the EMR? Is there a POC immunization list for high risk patients?
      YES □ NO □ N/A □

      _____
      _____

   c. Is there observable evidence that the practice has a process in place to inquire about a patient's outside health encounters and incorporates this info in the EMR?

      i. Is the patient encouraged to bring/send outside records/reports.
      YES □ NO □ N/A □

      ii. Is there a process to enter outside immunizations and preventive care and image documents?
      YES □ NO □ N/A □

      _____
      _____

   d. **MA:** Are smoking screenings performed at every visit and information materials distributed, including group visits? (see 4.k.)
      YES □ NO □ N/A □

      _____
      _____

e. **PCP & MA:** Is there evidence of established protocols for MAs to give immunizations and complete preventive care requisitions if services needed.
YES □ NO □ N/A □

_____
_____

f. **ALL:** Is there evidence of clear roles and responsibilities regarding preventive services
YES □ NO □ N/A □

_____
_____

6. **<u>TEST TRACKING</u>**: tracking patient tests and notifying patients of test results, regardless of the type of test result.

a. **ALL:** Practice unit has test tracking process/procedure documented, which requires tracking and follow-up for all tests and test results, with designated roles and identified timeframes for notifying patients of results. All clinicians and appropriate staff are trained to ensure adherence to the test-tracking procedure.

i. Is there observable evidence that participant is knowledgeable of the test-tracking procedure in the clinic?
YES □ NO □ N/A □

_____
_____

b. **PCP:** Timeframes are in place for ensuring patients receive needed tests and practice obtains results.
YES □ NO □ N/A □

_____
_____

i. Are test results delivered to provider's results inbox?
YES □ NO □ N/A □

ii. Is there a process in place for undeliverable results?
YES □ NO □ N/A □

_____
_____

c. **<u>CLERK:</u>** Patient verification form is used to ensure that patient contact details are kept up to date.
YES □ NO □ N/A □

_____
_____

d. **<u>CLERK/MA:</u>** Patients are mailed normal test results
YES □ NO □ N/A □

_____
_____

e. PATIENTS: Understand the follow-up process for tests?
YES □ NO □ N/A □

_____
_____

f. Is there evidence of a systematic approach for informing patients of abnormal test results in a timely manner?
YES □ NO □ N/A □

_____
_____

g. Roles are dependent on significance of the results and timeframes are based on the urgency of the result:
   i. **PCP/PHARMD/RN:** Call patients with unexpected results
   ii. **RN/PHARMD:** call patients with complex results
   iii. **LPN/MA:** Minimally abnormal results are mailed with an annotation from provider or called (Principle – Quality & Safety)

7. EXTENDED ACCESS: (better captured in the interview), patients should have twenty-four hour access to a clinical decision-maker by phone and access to non-emergency after hours care for urgent care needs.

a. Physician is on call 24/7 and documents after hours patient encounters in EMR including sending a note to the PCP.
b. Providers have remote access to EMR through home computers, thus having ability to access and update patient's EMR while on the phone with patient (Intv Q)

_____
_____

c. Clinic offers at least 8 hours a week of non-ED after hours provider for urgent care needs.

_____
_____

d. **PCP:** If patient receives care from a provider different from their PCP clinic, the after-hours provider has a feedback loop within 24 hours or next business day to the patient's PCMH. (Intv Q)

_____
_____

e. Is there observable evidence of a systematic approach in place to ensure that all patients are fully informed about after hours care availability and location, at the PCMH site as well as other after-hours care sites, including urgent care facilities?
YES □ NO □ N/A □

_____
_____

f. **PATIENTS:** Able to make appointments with their PCP in a timely manner?
YES □ NO □ N/A □

g. A spreadsheet has been created and distributed identifying local Urgent Care Centers, location, hours, and accepted insurance within the surrounding markets, available on Medical Home website and the Ambulatory Care website

_____
_____

h. Practice unit has telephonic or other access to translator(s) for all languages common to practice's established patients. Over the phone interpreting.

_____

i. **PCP:** Has enough time with the patient to cover all necessary aspects of the visit?

_____
_____

8. **COORDINATION OF CARE:** a defining component of primary care. Involves establishing mechanisms for notification, tracking, and flagging of patient hospital admission, discharge, and other types of encounters at non-primary care facilities, supporting the exchange of necessary medical records and continued discussion of care arrangements among different providers. Coordination of care also involves the development of transition plans for patients leaving the primary care practice.

a. **PCP:** Is there evidence that the [daily patient discharge] report is reviewed in regards to patient hospital admission and inpatient discharge? (should be received via fax)
YES □ NO □ N/A □

_____
_____

b. **ALL:** Is there evidence that practice has written procedures on care coordination processes, and appropriate members of care team are trained on care coordination processes transition care and have clearly defined roles within that process?
YES □ NO □ N/A □

_____
_____

c. **CARE MANAGER:** Calls all patients after hospital discharge.

_____
_____

9. **SPECIALIST REFERAL:** A means by which PCPs and specialists interact and exchange patient information to provide care to a patient.

a. Is there evidence that the appropriate clinic staff have been trained on all aspects of the specialist referral process?
YES □ NO □ N/A □

_____
_____

b. Is there evidence of collaboration across clinics for specialist referral?
YES □ NO □ N/A □

_____
_____

c. **PCP:** [medical consult request] form is used to indicate the timeframe for which the patient should be seen.
YES □ NO □ N/A □

_____
_____

d. **CLERKS:** [medical consult request] form is imaged in CareWeb.
YES □ NO □ N/A □

_____
_____

e. **CLERKS:** Is there observable evidence that consult request guidelines for specialist departments exist?
YES □ NO □ N/A □

f. **CLERKS:** Make appointments for patients throughout [health system] (not necessarily schedule the appointment)
YES □ NO □ N/A □
_____
_____
_

g. **PCP:** Is there observable evidence that PCP and specialist communicate in a timely manner about necessary patient issues, and information provided is adequate? (Principle – Coordinated Care)
YES □ NO □ N/A □
_____
_____

i. **PCP:** If patient completed their specialist appointment in a timely manner (as deemed important by the PCP?)
_____
_____

ii. **PATIENT:** If patient did not seek specialist care are reasons provided
_____
_____

iii. Are additional subspecialist notes provided?
_____
_____

iv. **PCP:** Are specialist recommendations communicated and is PCP knowledgeable of them?
_____
_____

Categories of Observation: Factors and processes to look for and document observable evidence of:

Relational Organizational Coherence: Organizational learning occurs as a result of social participation in practice. "What is learned is connected to the conditions in which it is learned."

Social Support: "The degree to which a job provides opportunities for advice and assistance from others". Social Support facilitates a focus on the relevance to the issues regardless of social standing or rank within the organization. The characteristics of how people interact while working. Examples: close friendships, people are friendly with each other (the nature of how people talk and interact while working), people have opportunities to get to know each other (relationships exist between people beyond titles), people take a personal interest in each other, people have the opportunity to meet with each other (members included in what matters), clinic manager/medical director is concerned about the welfare of the people who work for him/her, proximity to others.

Accountability: The establishment of who is responsible for particular aspects of a task. Accountability makes responsibilities clear, and contributes to aligning tasks among interdependent members at what points do tasks overlap?

Common Understanding: Local concepts, anecdotes, and narratives developed through practice (*in situ*) that facilitate work processes. The understanding is communal and situated in practice in that both the

process and the social context of the organizational member(s) are resources for overcoming barriers and facilitating work processes

Defined Organizational Structure

Members: How does participant understand their role in the clinic, in relation to tasks, in relation to others in the practice? In relation to PCMH related activities?

Tools: How does participant use technology and tools in practice? How do participants perceive the hardware, software, templates, and the technological tools used to carry out tasks?

Tasks: Members' goals, intentions, and purposes in the organization. Member's perception of tasks related to PCMH activities.

PCMH Design Principles:

1) **A personal physician**: each patient has an ongoing relationship with a personal physician.

2) **Physician-directed practice:** the personal physician leads a multidisciplinary team of caregivers who are collectively responsible for the ongoing care of the patient.

3) **Whole-person orientation:** the personal physician is responsible for providing all of the patient's health care needs or arranging care throughout the system as appropriate (i.e. acute care, chronic care, preventive services, and end-of-life care).

4) **Care is coordinated and/or integrated:** care is coordinated and integrated throughout the healthcare system, facilitated by information technology (IT).

5) **Quality and safety:** evidence-based decision support, IT, performance feedback to physicians, engagement in quality improvement initiatives, patient education, and incorporating feedback from patients are all used in decision making.

6) **Enhanced access:** patients are provided timely access to care and improved communication with caregivers.

Appendix C: Chapter 2

Interview Guide

Purpose: Following the initial short-term site visit observations (Phase I), semi-structured interviews (Phase II) will be conducted with clinicians and staff in the primary care clinics. The purpose of the interview is to collect information from clinicians and staff regarding (a) additional structural, perceptual, and attitudinal information that was unobservable during site visits; and (b) elaboration on the implementation of clinic practices associated with the PCMH in regards to: contextual, individual, and process characteristics that are associated with PCMH collective outcomes.
The questions below present the proposed content for the interviews. The interviewer may revise the wording of these questions slightly or remove questions based on the information shared by the participant during the course of the interview; but the general content of the interviews is represented by the questions shown below.

SECTION 1: OPENING
1. [*Introducing the Study*] [*If applicable, refer to experience observing the interviewee.*] Thank you for your (ongoing) support with this study. As you may know, my objective is to understand your experience with implementing new practices and work processes in the clinic; what you perceive to be challenges or facilitators of change in this clinic. What I learn from this interview will contribute to the understanding of how new practices are implemented differently across health centers, and the different challenges and facilitators, in order to make recommendations for improving the uptake of new practices and maximizing their effectiveness across all clinics. This interview will take approximately 30-45 minutes. I will be interviewing different clinicians and staff members in your clinic to obtain different perspectives. Your participation and your responses will be treated confidentially and all of the findings that come out of this research will be reported anonymously.

2. [*Review Informed Consent, if applicable, and discuss audio-recording.*] This interview will be audio-recorded so that I have an accurate record of your responses. The information you share with me today is confidential. Neither clinic leadership nor anyone else in your clinic will have access to your responses or be able to connect your responses to you personally. The consent form ensures confidentiality. This interview will only be heard by me, and a contracted transcriptionist, who will assign an identifier to your interview transcript, and then any information linking you to the transcript will be destroyed. The audio recording will be destroyed as soon as the transcript is verified.
If at any time you feel the questions are too sensitive, I would be happy to turn off the recorder during that portion of the interview. You may also skip any questions you wish during the interview.

Please let me know if you would like me to clarify any of the questions.

SECTION 2: BACKGROUND QUESTIONS
<u>Defined Organizational Structure – Perception of Role</u>
2.a. What is your role in the clinic and what are your main responsibilities?

[*Probing*]
1. Who do you report to?

[*Follow-up*]
1. How long have you been working as a ____? In this clinic? Within [health system]?

OFFICE STAFF: What is your role in delivering care to patients?

Organizational Learning

2.c. Did I observe a typical day of your work in the clinic?

[*Probing*]

1. Do you consider a typical day of your work in the clinic to be fairly routine?
2. Do you face uncertainty in your work? And if so, how do you deal with uncertainty in your work?

Organizational Learning

2.d. Who are the staff members in the clinic with whom you interact the most?

[*Follow-up*]

1. What do those interactions involve?

Defined Organizational Structure – Perception of Role

2.f. What kind of meetings do you attend?

[*Probing*]

a. Clinic meetings?
b. [health system] meetings?

[*Follow-up*]

a. How often? On a regular basis?
b. What is discussed?
c. How do those meetings influence your work in this clinic?

Factors in the Organizational Context

SECTION 3: IMPLEMENTATION OF ACTIVITIES ASSOCIATED WITH PATIENT-CENTERED MEDICAL HOME

3.a. Now, I would like to hear about how new tasks and practices are introduced in the clinic. (For example, the use of the [point of care] report, transition care, or relate to another component used by informant).Will you please describe how new practices are introduced and incorporated into existing clinic work flows. If it would be helpful, please walk me through a recently introduced process and give me as much detail as you can.

[*Follow-up*]

1. How are your new responsibilities defined and communicated to you?
2. Do you receive training?
3. Who do you discuss problems or successes with in relation to new responsibilities or tasks?
4. Who determines if the clinic is functioning as it should in regards to the new process?
5. Are there certain people who play a key role in incorporating new practices into the clinic?

OFFICE MANAGER/PCP: How do you hear about pilots being done at other clinics?

[*Follow-up*]

a. How do you share that information with staff in your clinic?

This section solicits open-ended descriptions of PCMH implementation

SECTION 4: FIDELITY TO THE PCMH

Now I have some questions about some processes that may have affected your role and responsibilities in the clinic in the past year or two.

4.a. Patient Provider Partnership: *Is the idea that every patient has an ongoing relationship with a personal provider trained to provide first contact, continuous and comprehensive care.*

4.a.1. ALL: What is your familiarity with that idea, and what does the patient-provider partnership mean to you as a physician?

4.a.2. ALL: How do you engage patients in their understanding of your being their primary care provider?

[*Probing*]

a. Do you think patients come in with that idea already understood?
b. What are your thoughts on the patients having ongoing relationships with providers?
c. How is it helpful in patient care?
d. Medical Home information form? (*tool*)

4.a.3. How do you follow-up with patients who are no shows, or don't answer the phone when you call?

4.a.4. How does this clinic reach out to patients who do not visit the practice regularly?

[*Probing*]

a. Is that effective?

4.b. Patient Registries: *Are used to manage patients with certain (chronic) diagnoses, such as diabetes or coronary artery disease. The registries incorporate patient clinical information necessary to manage chronic care and preventive services, they incorporate evidence-based guidelines, and also provide patient information at the point of care. The registry can also be used to generate communication to patients regarding gaps in care.*

4.b.1. ALL: What is your familiarity with [health system] patient registries?

[*Probing for specific registries*]

[*Follow-up*]

a. To what extent do you use these patient registries?
b. Is the information contained in the patient registries accurate, and does it produce information that is usable at the point of care? Can you give me some examples?
c. Is the patient registry fully electronic in your opinion?
d. What is your level of satisfaction with the patient registries? Can you give me any specific examples of why you are satisfied/dissatisfied with the patient registries?

4.b.2. What are the benefits to having Patient Registries in the clinic? For example, the diabetes registry, the CAD registry, or the CHF registry?

[*Probing*]

a. How does the patient registry facilitate the identification of gaps in patient care? (for example an overdue A1C test for a diabetic patient)
b. When did this process begin and how is it different from before the process was introduced? Who is primarily responsible for the task of identifying and scheduling patients with needed services?

[*Follow-up*]

a. How does the patient registry facilitate care for patients with asthma?

4.b.3. What were/are the challenges to using the patient registries or the reports generated by the registry?

4.c. Performance Reports: *Provides clinicians and management with patient level and clinic level information on clinical indicators for the entire population of patients. They are also referred to as Feedback Summaries, Performance Measure Reports, or Benchmarks*

4.c.1. What is your familiarity with Performance Reporting in this clinic?

4.c.2. Do you receive [performance reports]?

4.c.3. How have those reports been helpful in this clinic?

Prompt for the difference between the physician level reports and clinic level reports.

[*Follow-up*]

a. How do you use the performance reports?
b. Why do you/ why don't you use the performance reports?
c. How has your use of the reports changed over time?

4.c.4. What are the challenges to using the performance reports to improve patient care?

4.d. Individual Care Management and Multi-disciplinary Care Teams: *The idea that an integrated team of multi-disciplinary providers follows an organized and systematic approach in the delivery of comprehensive care that addresses each individual patient's full range of healthcare needs.*

4.d.1. ALL: With respect to teamwork and the provision of individualized care, how has your role as a _____ changed over the past couple of years?

4.d.2. Do you feel that you are more a part of a care team than you were in the past?

4.d.3. How is/are the team(s) organized?

[*Probing*]

a. How is teamwork facilitated in the clinic? What do you think enables teamwork, or makes teamwork difficult?
b. Can you describe situations in which teamwork occurs in the clinic?

4.d.4. How is your work is dependent on other people in the clinic?

c. Are there standardized processes for tasks that involve teamwork? (*give examples from observation*)
d. How do you know what your responsibilities are with respect to the care provided to individual patients?

4.d.5. What do you consider to be important information necessary for you to _____ (ask about carrying out role on the team). Where do you get this information?

e. How do team members communicate and exchange information?

4.d.6. What are the goals of the team(s) in this clinic?

[*Probing*]

a. How do you contribute to achieving this goal?

4.d.7. How does teamwork improve care delivery?

4.d.8. What were/are the challenges to working in teams in this clinic?

a. Can you give me specific examples of why you are satisfied or dissatisfied with being part of a care team?

4.d.9.

a. **MD:** Do you use motivational interviewing techniques with any of your patients?
b. **MA:** Review and update patient prompts and medications
c. **MD and MA:** Develop self-management goals with patients for chronic disease management or reinforce goals noted in EMR

d. Probe for specific roles:

4.e. Preventive Services: *Disease prevention practices that focus on identifying and educating patients about their health behaviors and needed immunizations (such as Tetanus), screenings (such as mammogram, colonoscopy, or blood glucose) and other procedures or tests that are intended to reduce their risk of disease and injury, or disease prevention.*

4.e.1. ALL: What is your familiarity with disease prevention programs in this clinic?

[*Probing*]

a. What is your role in this process?
b. Can you give me specific examples of why you are satisfied or dissatisfied with the preventive services programs in this clinic?

4.e.2. How have/do the disease prevention programs improve(d) care delivery in the clinic?

4.e.3. What were/are the challenges to incorporating preventive services into clinic work flows?

4.f. Test Result Tracking: *Involves tracking test results and following-up with each patient for all tests and test results, regardless of the result (whether it's normal or abnormal).*

4.f.1. ALL: What is your familiarity with processes for tracking test results in this clinic?

[*Probing*]

c. What is your role in this process?
d. How often do you ____ [*carry out specified role: mail patient results, call patients with results*]
    - MD: Direct medical assistants and nurses to communicate results to patients
    - MA: Patient follow-up for normal and low complexity test results as directed by provider
    - LPN: Patient follow-up for mildly complex results
    - RN: Patient follow-up for abnormal and complex test results
e. How do you know when it is necessary to follow-up with a patient about their test results? How do you determine what is a significant result?
f. Can you give me specific examples of why you are satisfied or dissatisfied with the process for tracking test results?

4.f.3. What is/has been helpful in using the process of tracking test results in the clinic?

[*Probing*]

a. How does it impact patient care?

4.f.4. What were/are the challenges to tracking test results in the clinic?

4.g. Enhanced Access: *Care is available through systems such as open scheduling, expanded hours and new options for communication between patients, their personal physician, and practice staff.*

4.g.1. ALL: Do you think patient access has increased in the past couple of years?

4.g.2. ALL: What is your familiarity with the availability of appointments for patients?

[*Probing*]
a. What are the extended hours?
b. Has the clinic expanded ways in which patients can access care?
c. Can patients get same day appointments?

4.g.3. What is/has been helpful in having Extended Access in the clinic?

[*Probing*]
a. How does it impact patient care?

4.g.4. What were/are the challenges to having Extended Access in the clinic?

4.h. Coordination of Care: *For every patient with a chronic condition who has been admitted to the hospital and discharged, a mechanism is established for notifying the patient's primary care clinic, so the primary care clinic can follow-up with the patient.*

4.h.1. What is your familiarity with the [transition care] program in the clinic?

[*Follow-up*]
a. What is your role in this process?

4.h.2. Can you tell me the approximate timeframe this initiative was started in your clinic?

[*Probing*]
a. How much change to clinic work flow and patient care did the implementation of [transition care] involve?

4.h.3. How does [transition care] impact this clinic?

[*Probing*]
a. The care delivered in this clinic?

4.h.4. What has been helpful in incorporating [transition care] into the clinic?

4.h.5. What were/are the challenges to incorporating [transition care] in this clinic?

4.i. Specialist Referral: *Means by which PCPs and specialists interact and exchange patient information to provide care to a patient.*
[*Questions likely most relevant to PCPs and office management & staff*]

4.i.1. PCP: How do you communicate with specialists about patient care?

[*Follow-up*]
a. Is the information received from specialists timely and adequate?
b. How often do you collaborate with specialists regarding patient care?

4.i.3. What were/are the challenges to specialist referrals?

SECTION 4: ORGANIZATIONAL LEARNING

[*Ask about group and team processes and the relationships within. Questions about the clinicians, staff, and organization should include both broad and specific topics. Consistent with the aim of the multiple case study design, each new visit should be used to check an emerging understanding of salient factors in the organizational learning process.*]

Organizational Learning

4.a. Now I have some questions about social aspects of how the clinic operates and the relationships and communications within the clinic and how that relates to how care is provided in the clinic. Overall, has that changed at all in the past couple of years? How did those changes occur?

[*Probe for examples or follow-up on previously mentioned changes*]

Defined Organizational Structure – Perception of Role

4.b. Overall, do you think people in this clinic understand their roles, and what they are responsible for and what is expected of them?

[*Probe for why or why not*]

Defined Organizational Structure – Perception Tools and Tasks

4.c. Do you think people in this clinic understand how patient information is collected and used throughout the clinic, and the purpose of the different forms for information that has different functions? For example, do you think people understand how the information collected from the patient based on the clinical reminders on the [point of care] report is fed back into the patient registries?

[*Probe for why or why not*]

Relational Organizational Coherence – Social Support

4.d In the clinic, do you think everyone is included as necessary, or are people left out who should be included in certain things?

[*Probe for examples or follow up from observed examples*]

Relational Organizational Coherence – Accountability

4.e. Do you think people are held accountable in this clinic? And do they hold themselves accountable?

[*Probing*]

a. Why do you say that?
b. What is the source of peoples' accountability? Why don't people hold themselves accountable?

Relational Organizational Coherence – Social Support

4.f. Do you think people in the clinic have good relationships beyond fulfilling what is required of them to do their job?

[*Probe for examples or follow up from observed examples*]

a. How is that initiated?
b. How does that affect how the clinic operates on a day-to-day basis?

SECTION 5: WRAP-UP

TIE THIS BACK TO ANY INSTANCES OF ORGANIZATIONAL LEARNING DISCUSSED IN THE INTERVIEW

5.a.1. Are you familiar with the term Patient-Centered Medical Home?
An ongoing and trusting partnership between a provider/physician-led healthcare team and an informed patient

[*Probing*]

a. What does that concept mean to you?
    a. Continuity?
    b. Coordination of care with providers outside this clinic?
    c. Increasing patient accessibility of providers in this clinic?
b. In your opinion, how does this clinic operate as a patient centered medical home?
c. Have staff in this clinic been trained on the PCMH?

[*Follow-up*]

a. What do you perceive your role to be in the PCMH?
b. Do you perceive that patients have an appreciation for being part of a PCMH?
c. What do you perceive as being the barriers to a clinic being organized as a PCMH?
d. What do you think might facilitate a clinic in being organized as a PCMH?

5.b.1 How do you like your job? Working in this clinic? Why do you say that?

Appendix D: Chapter 2

Codebook

I. OPERATIONAL COMPONENTS & PCMH PRINCIPLES	Operational Components are the explicit clinical and managerial interventions intended to promote a clinic's functioning as a PCMH. Coding Rule for Operational Components: Consider if fidelity (the level of use of the component) can be determined from the text – mere identification or mention of the operational component may not support a fidelity rating (i.e. the determination of the level of use of the component). Principles are the guiding aims or overarching clinic goals underlying how each component works. It is possible to implement an operational component without knowledge of a principle. [1] Coding Rule for Principles: Consider responses to interview questions about the individual PCMH components, responses to interview questions about the PCMH (at end of interview), and data captured in observation that may support level of principle knowledge. *Principles are not coded as N/A
1. Patient-Provider Partnership	Supports the principle that every patient has an ongoing relationship with a personal provider, trained to provide first contact, continuous, and comprehensive care.
A. Principle: Personal Physician	Informant's thoughts/understanding of the principle that every patient has an ongoing relationship with a personal provider trained to provide first contact, continuous, and comprehensive care [2]. Coding Rules: Include data that supports the informant's knowledge and beliefs about the principle of personal physician, focusing on the relationship between the patient and the physician. Exclude data that refers to aspects of the PCMH that could be coded to other principles, such as tasks carried out by informants other than the physician to support the relationship, as such tasks are likely aspects of another principle.
B. Medical Home Information Sheet	Informant acknowledges the Medical Home Form[2] being given to patients to inform their understanding of the clinic as their medical home.
C. Conversation with Patient about PCMH	Informant has purposeful conversation(s) with the patient, with the intention of engaging the patient in the idea of being a part of a PCMH.
D. Discussion of Follow-up Care with Patient	Informant discusses with patient during the encounter when the patient will/should return for the next visit.
E. Patient Appointment Reminders	Clinic has a process in place in which someone (often clerks or MAs) from the clinic calls patients to remind them of their appointment.

F. Patient Appointment Tracking	Clinic has a process in place to review and take action with patients who do not show up for their appointment without cancelling first.
2. Patient Registries	Used to manage patients with certain (chronic) diagnoses (e.g. diabetes, asthma, CHF, and CAD). The registries incorporate patient clinical information necessary to manage care and preventive services, incorporate evidence-based guidelines, and use patient information at the point of care. The registries can also be used to generate communication to patient regarding overdue services (gaps in care.)
A. Principle: Quality & Safety	Information technology is utilized appropriately to support optimal patient care, patient education, and enhanced communication.[1] Example of Principle Internalized: [I: Are you familiar with the patient registries that are used in this clinic?] Somewhat. …our diabetics are on a registry and when they do come in, a lot of their information will automatically pop out forms for either the MAs or the docs to see and fill out, to talk to the patients about doing anything for foot checks, making sure that their medications are up to date, things along that line.
B. Clinic Outreach to Patients	Clinic activities intended to bring patients into clinic for needed services.
C. Reporting on Indicators for Chronic Disease	Report identifies patients who are due for services related to diabetes, chronic heart failure, and asthma.
D. Reporting on Indicators for Vaccines and Immunizations	Report identifies patients who are due for a flu shot or a pneumonia vaccine.
E. Reporting on Preventive Care Interventions	Report identifies patients who are due for a mammogram, pap smear, or colonoscopy.
F. Maintenance of Registry Data	Includes upkeep and accuracy of patient registries. Obtaining information from patients and updating the patient record for clinical reminders, as well as correction of inaccurate registry data (i.e. Misidentification of a patient as being diabetic due to the patient having an A1c drawn for a condition unrelated to diabetes).
3. Performance Reporting	Provides clinicians and clinic management with up-to-date patient and clinic level information on clinical indicators for the entire population of patients.
A. Principle: Quality & Safety	Informant accepts accountability for continuous quality improvement through voluntary engagement in performance measurement and improvement.
B. Provider-Level Performance Reports	Identifies the individual patients who are overdue for services related to asthma, diabetes, and chronic heart failure (statins).
C. Clinic-Level Performance Reports used to Identify and Initiate Quality and Process Improvements	Identification of areas for improvement in the clinic and/or changes made in the clinic resulting from information presented on performance reports.
4. Individualized Management of Patient Care	An organized and systematic approach in the delivery of comprehensive care that addresses each individual patient's full range of healthcare needs.

A. Principle: Whole-Person Orientation	Informant feels that an organized and systematic approach is followed to deliver comprehensive care that addresses each individual patient's full range of healthcare needs [2]. Coding Rule: Informant discussion of role in patient care delivery. Code text that supports the level to which the informant internalizes their role in this principle.
B. Principle: Physician Directed Medical Practice	The personal physician leads a team of individuals at the practice level who feel they are part of a team in the clinic that collectively takes responsibility for the ongoing care of patients [2].
C. Principle: Quality & Safety	Informant advocates for the attainment of optimal, patient-centered outcomes through a care planning process. Evidence-based medicine and clinic decision support tools guide decision-making [2].
D. Care Management	PharmDs and/or RNs have a role in the delivery of patient care that augments the care provided by physicians. In clinics with Care Management, patients are referred to a PharmD or RN for individualized/intensified care.
E. Patient Education	Patient education is provided by RNs or PharmDs to patients with chronic illness.
F. Motivational Interviewing	Informant attempts to help patient overcome psychological barriers to changing/improving health behaviors.
G. Self-Management Goal Setting	The development of documented action plan and self-management goal setting is systematically offered to all patients with a chronic condition for initial focus. Self-management goals should be discussed with patients during their visits with the PharmD, RN, and MD and MAs also have a role in assisting patients in setting the goals.
H. Patient information used at the point of care	Clinical reminders are completed by a MA during patient intake, and the medical record is updated to reflect the status of each clinical reminder for every patient encounter.
I. Patient Medication Reconciliation	Patient medications are reviewed with each patient during each encounter and refilled and reconciled between patient and medical record as appropriate. Medication reconciliation should routinely occur as part of the patient intake by the MA.
J. Obtaining Outside Patient Records	Clinic has a process in place in which someone from the clinic obtains patient records when patients have received care from a provider outside the clinic.
K. Planned Visits	Patients with diabetes and/or asthma have an appointment with their PCP every 3-6 months and more frequently as needed. (Not applicable to RN and PharmD for Care Management)
6. Preventive Services	Disease prevention practices that focus on identifying and educating patients about their health behaviors and needed immunizations, screenings, and other procedures or tests intended to reduce the risk of injury or disease.
A. Principle: Whole-Person Orientation	The personal physician is responsible for providing for all of the patient's health care needs, including preventive services. This principle is also categorized under Individual Care Management and Specialist Referral, but aspects of the principle fall specifically under Preventive Services.

B. Preventive services are incorporated into patient intake process	The provision of preventive services is part of routine patient care, this is generally reflected in the MAs addressing POC prompts during patient intake, including the administration of immunizations or vaccines, or completing appropriate requisition forms for receiving preventive services outside of the clinic (i.e. colonoscopy).
7. Test Result Tracking	Involves tracking test results and following-up with each patient for all tests and test results, regardless of the result (normal or abnormal)
A. Communication of Test Results to Patients (including undeliverable results)	The clinic has an established protocol for test results that get returned to the clinic through the mail. Pro-activeness of practice in obtaining appropriate patient information for delivering test results. Practice has established timeframes and provider communicates time-frames to patients for test result follow-up. Includes signs hanging in clinic.
8. Extended Access	Patients should have 24 hours access to a clinical decision-maker by phone and access to non-emergency after hours care for urgent care needs.
A. Principle: Enhanced Access	Care is available through systems such as open scheduling, expanded hours and new options for communication between patients, their personal physician and practice staff.
B. Extended Hours	Clinic has evening and weekend hours during which patients can schedule appointments.
C. Appointment Availability	Patients are able to schedule appointments in a timely manner with their preferred (primary) provider.
9. Coordination of Care	Involves establishing mechanisms for notification, tracking, and flagging of patient admit, discharge, or other types of encounters at non-primary care facilities, supporting the exchange of necessary medical records and continued discussion of care arrangements among different providers.
A. Principle: Care is Coordinated/Integrated	Care is coordinated and/or integrated across all elements of the complex health care system and the patient's community [2].
B. Transitions of Care	Transition plans for patients discharged from the hospital. For every patient with a chronic condition who has been admitted and discharged, a mechanism is established for notifying the patient's primary care clinic, so the primary care clinic (RN) can follow-up with the patient.
10. Specialist Referral	Means by which PCPs and specialists interact and exchange patient information to provide care to a patient.
A. Principle: Care is Coordinated	Patient care is coordinated with specialists outside the PCP clinic to meet each patient's full range of needs.
B. Communication/Information Exchange with Specialist	Communication and information exchange between PCPs and specialist providers is timely and accurate.
C. Scheduling of Appointment with Specialist	The clinic has mechanisms in place to facilitate the scheduling of patient appointments with specialist providers. This includes the difficulties involved in scheduling appointments with specialists.
D. Tracking Patient Appointments with Specialist	A process is in place to determine whether or not patients completed specialist referral.

II. FIDELITY TO PCMH OPERATIONAL COMPONENTs [3] (as reflected in the observation and perceived by the informant in the interview) & **KNOWLEDGE OF PCMH PRINCIPLEs [4]** (as reflected in the observation and understood by the informant in the interview)	
A. Nonuse & Not Aware of Principle	Nonuse: Disregard or resistance to the use of a component, or the absence of the component from practice operations. Informant may state explicitly that they do not use the component, or use of the component was not observed. Not Aware: Lack of understanding or misunderstanding of principle, such as understanding the operational aspects, but not the connection of the operational component to achieving the underlying clinic goals. Not understanding the principle beyond one's individual tasks. Example of Not Aware of the Principle of Quality & Safety in the context of Performance Reporting: [I: Are there challenges to using the performance reports to improve care?] Sometimes it's challenging because you get the performance report, but you don't get the list of patients at the same time, so that you can say, "Okay, these are the patients that we need to focus on," probably because that list is huge, I'm assuming. Instead of just getting, "Here's your number, you're at 17%," it's like, "Okay my number of who?"
B. Low Compliance	Informant demonstrates/expresses using the component according to protocol and speaks negatively in reference to the component, or demonstrates/expresses not using the component according to protocol. Example of Low Compliance in the use of Provider-Level Performance Reports: [I: What's your familiarity with the performance reporting in this clinic?] I've gotten them before, I haven't gotten one recently at all. …it's just sort of hard to know what to do with them. I haven't been here that long, so my N is fairly small, and a lot of them, for example, I think you get one on heart failure, almost everybody with heart failure has a cardiologist and so it's sort of easy to say, "Well, they're managed appropriately, or not managed appropriately, because of their specialist." And with a lot of the other stuff, if you do take the time to go and look through, for example, you did recommend the microalbumin to creatinine and the patient forgot it, or things like that, and so it just becomes, like a little bit useless, (laughs) at some point. [I: You said you're not really sure what to do with it?] Yeah, exactly, exactly. And if I saw, like, "Oh, I didn't know I was supposed to be getting this sort of test in everybody with Diabetes, I would change that, but there's really not anything on there that we don't all know we're supposed to be doing. And so then it just becomes again, like another box to check and at some point it becomes insulting really, because you are trying, and it's not like you're not talking to your patients who have diabetes about their diet, but then you have to click a separate box in the PSL to prove that you talked to them about it and all that. I don't mind getting them, but I guess I would say they don't change my practice particularly. …it's really been a very long time since I've seen one. So, I don't know why that is.

A. Compliant Use & Aware of Principle	Compliant Use: Informant demonstrates/expresses using the component according to protocol and: a) does not speak positively or negatively about the component, b) speaks both positively and negatively about the component, or does not use the component according to protocol, but does use it and speaks positively about it. Aware: Understanding how principle contributes to achieving the underlying clinic goals.
B. High Compliance	Informant demonstrates/expresses using the component according to protocol and speaks positively in reference to the component, and also identifies potential areas for improvement.
C. Committed Use & Committed to Principle	Committed Use: Informant demonstrates/states explicitly that they use the component according to protocol and speaks positively in reference in reference to the component without qualifications. (Committed cannot be assigned based solely on observed behavior without commentary made by the informant). Also, committed cannot be assigned to a participant who is not a direct user of the component, this would be coded as high compliance. An example of this is P05, Clinic Outreach to Patients. Committed to Principle: Understanding and appreciating the connection between the principle, the operational components, and the underlying clinic goals.
D. Missing	Degree of use or awareness is not observed and informant does not discuss the operational component or principle during the interview.
E. N/A	Use of component is not applicable to the informant. This determination can be made by directly asking the informant if they are familiar with the component. If the informant was not asked directly about the component, or was asked directly and they state explicitly that they do not use the component, then N/A will be determined based on the assessment of the informant's role across the clinics and within the clinic. Example: When asked during the interview if they are involved in obtaining outside records, MA informants in two different clinics stated that they are not involved in Obtaining Outside Records, and in another clinic the MA informant considers this to be a main responsibility of the MA function, so the other MA informants were then coded as Nonuse, instead of N/A. *N/A is not applied to principles

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Chapter 3: Organizational Learning during Patient-Centered Medical Home Implementation: Findings from a Qualitative Study

Health care reform in the United States calls for comprehensive transformation of the health care system through a shift from a specialized and fragmented system of siloed medical professionals to a coordinated and interdependent system of teams of medical professionals emphasizing primary care, health promotion and disease prevention (Institute of Medicine [IOM], 2001; Reid et al., 2009). The Patient-Centered Medical Home (PCMH) has been set forth as a promising model of care delivery in this transformation, although its implementation has proven to be quite challenging (Nutting, Crabtree, Miller et al., 2011).

Although the general concept of the medical home has existed for decades, its advocate base has expanded in recent years (Backer, 2007). Public and private payers are exerting increasing pressure to adopt the PCMH model, presenting a considerable undertaking for provider organizations (Nutting et al., 2009). The PCMH is comprised of multiple managerial and clinical interventions that must be incorporated into ongoing organizational processes, including the coordination of a full range of clinician and staff roles. Within a PCMH, primary care providers (PCP) must lead teams of professional caregivers and administrative staff within their practice in order to meet the full range of each individual patient's needs. Additionally, PCPs must relate differently to patients, encouraging partnerships with patients and shared decision making. To achieve these changes, PCMH implementation requires a shift away from the traditional hierarchical

model of care delivery that resulted in top-down communication from PCPs to other clinicians and staff, as well as from PCPs to patients. Thus, PCMH implementation will entail considerable changes within primary care delivery (Carrier, Gourevitch, & Shah, 2009).

In order to better understand the factors within primary care practices that promote and support PCMH implementation, this paper explores how organizational learning mechanisms are associated with PCMH implementation in primary care delivery. Organizational learning mechanisms enable individual-level learning (e.g., understanding of the individual's role in an organization) and organizational-level learning (e.g., adapting organizational protocols and work processes), and can therefore account for an organization's internal capacity for change (Popper & Lipshitz, 2000). This study uses ethnographic methods to explore organizational learning during PCMH implementation.

Patient-Centered Medical Home

PCMH transformation is more than the implementation of incremental changes, but requires "epic whole-practice re-imagination and redesign," which can be compromised by change fatigue among clinicians and staff, even in highly motivated practices (Nutting et al., 2009). Recent investigations identify organizational level factors of motivation, capability, and commitment to change to be associated with successful PCMH implementation (Jaen et al., 2009; Nutting, Crabtree, Miller, et al., 2010; Wise, Alexander, Green, Cohen, & Koster, 2011) and suggest that PCMH transformation necessitates that provider organizations have a practice "adaptive reserve" to increase the

internal capacity for change (Crabtree, et al., 2010; Miller, Crabtree, Nutting, Stange, & Jaén, 2010; Nutting, Crabtree, Stewart, et al. 2010).

While the majority of recommendations made from investigations of PCMH transformation assess organizational level factors, they do not delineate intra-organizational facilitators of change that are accessible to practitioners challenged with PCMH implementation. Organizational level factors such as motivation, capacity, and commitment to change are important for an organization to promote change, but the identification of those factors does not provide practitioners with guidance for understanding *how* to achieve PCMH implementation. Facilitation is a clear example of a factor that provides guidance to practitioners on how to achieve PCMH implementation (Nutting et al., 2009; Nutting, Crabtree, Miller et al., 2010). Facilitation is a strategy that involves the promotion of PCMH implementation through a process of accounting for the practice context while supporting organizational development and individual adaptation to the PCMH. A qualitative investigation revealed that clinics perceived benefit in multiple methods of facilitation during PCMH implementation, including: addressing issues related to practice management, work flow and technology; supporting personal transformation in the development of management and leadership skills; negotiating the interface between PCMH components and the practice context; connecting clinics to PCMH learning opportunities; and facilitating change by helping practices to identify the strengths and weaknesses in their relational infrastructure (Nutting, Crabtree, Miller, et al., 2010). In summary, to achieve PCMH implementation, clinics must build their capacity for facilitation.

The intra-organizational practice context in which clinicians and staff interact with each other and with the PCMH operational infrastructure is an important aspect of PCMH implementation in need of further investigation (Nutting, Crabtree, Miller, et al., 2010; Wise et al; 2011). For example, holding regular, effective meetings has been found to be important in PCMH implementation (Stewart, et al., 2010). Despite the importance of moving away from the traditional hierarchical model of care delivery and toward a team based model, intra-organizational factors shown to facilitate implementation and change have been understudied in the PCMH literature.

Investigating intra-organizational factors in health care organizations is complicated because it involves assessing human behavior and interactions in complex environments (Forman, Creswell, Damschroder, Kowalski, & Krein, 2008). Investigating PCMH implementation is further complicated by the complexity of the PCMH which is a multi-faceted model of care delivery involving a full range of clinic roles, including leadership at different organizational levels, front line caregivers, and all clinical and administrative staff members. Additionally, PCMH implementation involves the introduction of new tasks and work processes, some of which necessitate a new understanding of roles, shifts in role boundaries, and increased clinician and staff interdependence in the delivery of care (Edmondson, Bohmer, & Pisano, 2001). Studying these changes necessitates a comprehensive and in-depth investigation of intra-organizational factors associated with PCMH implementation and therefore compels the use of novel methodological approaches not used in prior investigations of PCMH transformation. While prior investigations have not collected detailed information from a full range of clinicians and office staff, this study uses ethnographic methods to explore

intra-organizational factors that have bearing on the process of multiple organizational members incorporating the PCMH as a model of care delivery, into ongoing organizational processes.

Organizational Learning in the Patient-Centered Medical Home

Organizational learning theory has been used to investigate underlying intra-organizational factors associated with change and implementation (Edmondson, et al., 2001; Garud, Dunbar, & Bartel, 2011; Leykeum et al., 2011). Organizational learning is defined as a process of improving behaviors or actions through better knowledge and improved understanding (Fiol & Lyles, 1985). Compared to traditional rational theories of organizational change, organizational learning is more than the observation of change outcomes; it involves the investigation of social processes comprised of individual actions and interactions, such as experimentation with new tasks, unlearning past methods, and taking on novel perspectives of one's role within an organization (Fiol & Lyles, 1985).

Organizational learning is regarded as an iterative process involving evaluation of behavior, the discovery of error or opportunity for correcting behavior, and the revision of behavior to produce specified outcomes (Argyris & Schon, 1996; Kolb, 1984). Although organizational learning is widely acknowledged as important for improving organizational performance, general agreement on a conceptual definition is lacking (Cohen & Sproull, 1991). Frequently cited models of organizational learning are Argyris and Schon's model of single-loop and double-loop learning and Senge's model of adaptive and generative learning (Lähteenmäki, Toivonen, & Mattila, 2001). Central to both models is the process in which an individual takes action, obtains and reflects on

information about the consequences of that action, and then revises their understanding for future actions, resulting in a sustained change. Correspondingly, the process of PCMH implementation involves individuals taking action to adapt to new tasks, sharing and/or receiving information on the results of these actions, and then, if necessary, refining them to more closely align their tasks with those of other individuals within the organization involved in the broader intervention. The goal is to ultimately improve the organization's ability to produce PCMH related outcomes (e.g. improved quality of care and decreased costs).

Organizational learning mechanisms are arrangements within an organizational structure that support the processes through which individuals adapt their behaviors and actions to align with organizational changes and goals. As defined by Lipshitz and Popper, organizational learning mechanisms are:

> "institutionalized structural and procedural arrangements, and informal systematic practices for collecting, analyzing, storing, and disseminating information that is relevant to the performance of the organization and its members. Organizational learning mechanisms are concrete arenas in which the experiences of individual organizational members are first analyzed and shared by organizational members and then become the property of the entire organization either through distribution of lessons learned to relevant units or through changes in standard operating procedures" (Lipshitz & Popper, 2000: 4-5).

In a study of organizational learning in a hospital, Lipshitz and Popper used qualitative methods to identify and describe the occurrence of organizational learning mechanisms in two hospital departments. Organizational learning mechanisms were identified by the presence of systematic patterns of formal or informal information processing including some or all of the following activities: collection, analysis, retention, and dissemination of information, drawing on lessons learned, and putting

lessons to use. The organizational learning mechanisms identified by Lipshitz and Popper included physicians' rounds, reflection in and after surgery, clinical pathological conferences, morbidity and mortality conferences, video demonstrations, review of medical records, periodical review, research reports, journal club, staff meetings, and nursing staff meetings (2000). Their work illustrates how organizational learning mechanisms enable individual-level learning (i.e. understanding of the individual's role in the organization) and organizational-level learning (e.g. adapting organizational protocols and work processes), and therefore can account for an organization's capacity for change.

The identification of organizational learning mechanisms within primary care delivery and descriptions of the characteristics that make them effective can contribute to understanding PCMH implementation. However, this is a complex undertaking involving the assessment of multiple organizational levels of learning (i.e. individual and organizational) and a comprehensive approach to understanding organizational arrangements and practices through which individuals interact and adapt to the clinical and managerial interventions that comprise the PCMH organizational infrastructure. The purpose of this study is to investigate how organizational learning occurs during PCMH implementation, by using the concept of organizational learning mechanisms to guide an exploration of building capacity for change during PCMH implementation.

Research Objective

By using ethnographic methods to carry out an in-depth exploration of how PCMH implementation occurs in primary care delivery, this study describes

organizational learning mechanisms associated with PCMH implementation. The following research question will be addressed:

Research Question: What are the organizational learning mechanisms in primary care delivery associated with PCMH implementation and how do the characteristics of those organizational learning mechanisms differ across clinics with varying levels of PCMH implementation?

Identifying and describing the organizational learning mechanisms associated with PCMH implementation will help elucidate the intra-organizational processes by which varying levels of PCMH implementation occurs, and will assist practitioners in prioritizing the areas on which to focus organizational resources during PCMH implementation.

Study Design and Methods

This study investigated six primary care clinics implementing a PCMH model (Eisenhardt, 1989). An embedded multiple case study design was used to allow for qualitative data collection and analysis at both the individual (e.g., role adaptation) and organizational (e.g., adaptation of clinic workflows) levels. Theoretically heterogeneous cases were purposefully selected to explore how organizational learning occurred during PCMH implementation (Teddlie & Yu, 2007).

Setting

This investigation was carried out in general medicine and family medicine clinics affiliated with a large, academic, integrated health system in the Midwest. The health system is owned by a university and the physicians are full-time employees under the medical school's physician group practice structure. Twenty-five primary care clinics organized under fifteen health centers participate in an incentive program with

documented guidelines for incorporating a PCMH model into health center operations. Health system senior leadership oversees all clinics and determines strategic decisions with which the clinics must comply. Each primary care clinic was mandated to implement a PCMH model and followed standardized guidelines.

The similar organizational structures and PCMH implementation infrastructure across clinics supports the identification of generalizable intra-organizational factors associated with variation in PCMH implementation. The six clinics share an affiliation with the health system and have access to similar system resources, including a system-wide electronic health record, collaborative learning opportunities (e.g. training and meetings), and an incentive structure for PCMH implementation. Additionally, the majority of the tools and processes to support PCMH implementation were designed at the system level. This is an appropriate setting in which to examine how OLMs promote PCMH implementation, because other organizational-level factors known to increase PCMH implementation, such as organizations having relatively more resources and external incentives for PCMH implementation, have been controlled. (Rittenhouse et al, 2011; Crabtree, et al., 2010).

Sampling of Primary Care Clinics

Qualitatively driven research questions are best explored with a small purposefully selected sample of cases to allow for in-depth exploration and rich description of how organizational learning occurs to promote PCMH implementation in primary care clinics (Morse & Niehaus, 2009), achieving theoretical saturation (Glaser & Strauss, 1967), and identifying and describing with confidence the occurrence of OLMs that were replicated across cases (Eisenhardt, 1989). To identify a purposeful sample of

six primary care clinics appropriate for comparative analysis, the fifteen health centers affiliated with the health system were ranked based on varying levels of patient-centeredness and innovativeness. Patient-centeredness is fundamental to the Joint Principles of the PCMH and it is therefore plausible that practices ranked as having a high level of patient-centeredness will be more successful with PCMH implementation. It is also likely that practices ranked as having a high level of innovativeness will exhibit the necessary flexibility and openness to change that would allow for more successful implementation.

The data used to rank the health centers on patient-centeredness and innovativeness were obtained from an employee survey administered on an annual basis to all clinicians and staff employed by the health system. All clinicians and staff received an e-mail inviting them to participate in the anonymous survey. The employee survey includes questions about resources, innovation and flexibility, fairness and recognition, intellectual change, communication, development and training, teamwork and respect, and patient/customer focus, with the emphasis of the questions being on the respondent's perception of the organization. The primary purpose of the initial quantitative sample drawn from existing survey data is to increase the theoretical variability of the qualitative sample. Details of the survey questions and subscale data are provided in Appendix A.

Three centers ranked as having high levels of patient-centeredness and innovativeness, and three centers ranked as having low levels of patient-centeredness and innovativeness were selected from the fifteen health centers. The health centers range in size from 3,436 to 26,465 patient visits over a six month period. Studies on the association between organizational size and innovation implementation have produced

inconsistent findings, and this was found to be the case with the results of the employee survey across the fifteen health centers. Therefore, within the two groups of three centers, two centers were classified as large (i.e. ≥ 13,000 patient visits over a six month period), and one center was classified as small (i.e. < 13,000 patient visits over a six month period). The nine centers that scored in the middle range for patient/customer focus and innovation and flexibility were not included in the purposive sample. The lead investigator was blinded from the rankings so as not to bias collection, analysis, and interpretation of the qualitative data. See Table 7. Sampling of Primary Care Clinics.

[Table 7 about here]

This sampling strategy complies with the criteria for extreme sampling based on the phenomenon of interest in order to reveal insight that might be especially enlightening for understanding PCMH implementation (Lincoln & Guba, 1985). Sampling cases based on two constructs theoretically correlated with aspects of PCMH implementation increases the likelihood of observing and identifying intra-organizational factors associated with variation in PCMH implementation. The purpose of the study was to explore organizational learning mechanisms during PCMH implementation rather than to characterize PCMH implementation across the U.S., the sample was not selected to ensure representation of the population of all adopting primary care clinics, but rather to include sufficient variation to explore how organizational learning mechanisms might facilitate PCMH implementation. The unit of analysis in this study is the primary care clinic, not the health center. If the health center included multiple ambulatory care clinics, the general medicine or family medicine clinic was targeted for analysis. In-depth

comparative case studies of these six primary care clinics broaden understanding of the differences that result in varying levels of PCMH implementation.

Sampling of Study Informants

The primary sources of data are direct observation and structured interviews with study informants working in the six primary care clinics selected for this study. A snowball sampling method was used to obtain a purposive sample of the various roles in each clinic. The primary intent of sampling study informants was to investigate the perspectives of a wide range of clinicians and staff in each clinic. Such breadth of informant perspectives helped to build "ecological validity" into the study design (Lee, 1999) and provided a full array of perspectives on organizational learning during PCMH implementation. This method took into account informants' exposure to different aspects of the PCMH and different learning experiences within the same clinic (Lipshitz & Popper, 2000; Crabtree & Miller, 1999; Miles & Huberman, 1994). Multiple perspectives are also necessary to avoid biased findings with limited relevance among organizational members (Eckstein, 1977.)

One representative of each type of role involved in the PCMH was recruited from each clinic in order to obtain a proportional representation of study informants from the following categories: PCPs (physicians and nurse practitioners), non-PCP clinicians (clinical pharmacists, licensed practical nurses, registered nurses, and medical assistants), and office staff (call center clerk, check-out clerk, manager, receptionist, and panel manager). Initially, informants were recruited through introduction by the clinic manager, and then through subsequent site visits, informants were recruited directly by the lead investigator. All informants who were asked to participate in the study agreed to do so.

The final sample of study informants included 57 individuals representing a variety of roles in each primary care clinic. See Table 8. Sampling of Study Informants.

[Table 8 about here]

Data Collection: Instrumentation

An observation checklist and structured interview guide were developed to ensure the systematic collection of information to allow for making valid comparisons across cases. Both instruments included theoretical concepts identified in the organizational learning literature and adapted to the PCMH implementation context. Because the organizational learning literature has not achieved agreement on theoretical concepts (Huber, 1991; Cohen & Sproull, 1991; Lähteenmäki, et al. 2001), a comprehensive review of the organizational learning literature was conducted from which concepts relevant to PCMH implementation were drawn in order to focus data collection and guide analysis.

PCMH implementation involves clinicians and staff functioning within an organizational structure designed to support individual adaptation to new roles, tasks and clinic processes related to PCMH interventions (Miller et al., 2001). These roles, tasks, and processes also involve the social and relational aspects of teamwork and coordination in order to provide patient-centered care. The organizational learning literature includes work by Lipshitz and Popper that distinguishes learning in an organizational structure and learning by involvement in a social organizational context, or as they phrase it, "learning-in organization and learning-by organization" (2000).

The concept of knowledge reservoirs, defined as the elements of an organization in which knowledge and information is embedded, was used to draw out data from

informants about how organizational learning occurs in the organizational structure of primary care delivery during PCMH implementation. McGrath and Argote (2003) present a theoretical framework in which organizational learning is facilitated by three types of knowledge reservoirs; (1) individual roles, (2) tasks and processes, and (3) tools and technology. These knowledge reservoirs compose an organizational structure in which organizational learning occurs when the three are coordinated and adapted to achieve organizational goals. The organizational learning process is facilitated by individuals' shared expectations resulting from a mutual understanding of the organizational structure. Potential barriers and facilitators of learning were found to reside in the compatibility of the different knowledge reservoirs. A focus on a clear definition of the organizational structure allows for increased compatibility between individual roles, tasks, and tools, which in turn, results in increasingly effective organizational learning and improved organizational performance (Argote & Ingram, 2000).

The concept of community of practice, defined as a group of people who share a common goal and interact on an ongoing basis to achieve the goal, was used to elicit information about how organizational learning occurs in the social context of primary care clinics during PCMH implementation (Wenger, McDermott, & Snyder, 2002). Brown and Duguid (1991) found that organizational structure is modified through social interactions and the sharing of insights in the actual context of work. Wenger (1998) presented a theoretical framework in which organizational learning is facilitated by three aspects of communities of practice: (1) mutual engagement, (2) joint enterprise, and (3) shared repertoire. Mutual engagement involves social support, assessed by characterizing how people talk and interact while working, the extent to which relationships exist

between people beyond their circumscribed work roles, and whether people are involved in matters of mutual concern. Joint enterprise involves accountability, assessing how a balance is achieved between ideal practice and actual practice and the extent to which the practice is not overly determined by an external mandate, and if people are responsible to one another. Shared repertoire involves common understanding, the development of local concepts in practice and the identification of the social arrangements that bring together history and uncertainty. In communities of practice, implementation is facilitated by organizational members' shared expectations resulting from understanding developed in the social context of the organization.

Although there has been inadequate research testing these theoretical propositions to understand their impact on organizational learning specifically during PCMH implementation, the concepts of knowledge reservoirs and communities of practice were used to guide data collection in this study in order to generate information in this arena. No hypotheses were proposed *a priori* to test these concepts. The organizational learning concepts and adapted interview questions are presented in Table 9.

[Table 9 about here]

Data Collection: Observations and Interviews

Observations and structured interviews were conducted over a 12 month period, beginning approximately 12 months after initial PCMH implementation efforts by the health system. Observations were conducted prior to interviews, establishing a level of trust necessary when asking potentially sensitive questions about the social contexts in which informants work.

Forty-six observations were conducted with study informants, ranging from 45 minutes to 6 hours and 25 minutes. During the observation, when agreeable, the informant was shadowed as if the investigator were an apprentice learning the participant's job. Notes were taken during the observation period and within 48 hours after the observation, using the observation checklist as a guide. Field notes were documented to provide as objective as possible narrative of how each study informant experienced organizational learning in their clinic.

Observations with study informants were conducted to holistically understand how organizational learning occurred in the context in which PCMH implementation was occurring. The observation as a method of data collection was important for learning about the perceptions of organizational structure and social context which may have been taken for granted by study informants when ingrained into daily work practices, and therefore not acknowledged during interviews.

Approximately one to two months after the observation, a structured interview was conducted with each study informant. The familiarity with each study informant's role and tasks that was gained from the prior observations was used to tailor the interview guide. Before finalizing the interview guide, the field notes from the observation were reviewed and emerging findings obtained from the observation and from other informants were considered. Adjusting the interview guide for each informant facilitated a less structured dimension, allowing for the exploration of different informant's perspectives and the collection of information necessary for corroborating emerging findings.

The interviews were conducted in a quiet and private clinic location that was comfortable for the informant. Forty-six interviews were conducted, ranging from 35

minutes to 99 minutes, and averaging 54 minutes. With the exception of one informant who agreed to participate in the interview but refused to be recorded, all interviews were audio-recorded and transcribed verbatim.

The interviews were designed to collect information on informant perceptions of how organizational learning occurred in the context of their clinics and elicited responses about experiences with adapting to new roles, tasks, and tools in the clinic and how individuals came to understand their roles and tasks, and the use of new tools in the clinic. Questions asked informants to talk about how problems or successes with new task responsibilities were addressed, and how implementation of new interventions was supported and promoted in the clinic. The interview also included questions about the social context in the clinic, and elicited responses about social support, accountability, and common understanding within their clinic. Example interview questions are in Table 9.

Procedures for data collection, storage, and analysis were reviewed and approved by the health system's Institutional Review Board. Study objectives and data collection and storage procedures were explained to each informant and informed consent obtained before observations and interviews. Including field notes and transcripts, a total of 1,271 single-spaced pages of data were collected, coded, and analyzed.

Data Analysis

Phase 1. Deductive and Inductive Coding of the Data

The first phase of data analysis, beginning after the first observational data were collected, consisted of line by line reading of the data (i.e. field notes and transcripts) and

systematic labeling of data segments by the organizational learning concepts and emerging themes. Using an integrated analysis approach, involving deductive and inductive logic, selective and open coding techniques were used (Strauss, 1987). Selective coding involved the deductive identification and labeling of the concepts of organizational learning used to guide data collection and analysis: formal and informal organizational learning mechanisms, individual roles, tasks, tools, mutual engagement, joint enterprise, and shared repertoire (See Table 9). Open coding involved the inductive generation of provisional themes (i.e. subcategories) within the knowledge reservoirs and communities of practice concepts, and the emergent categories of barriers to organizational learning and facilitators of organizational learning.

Coding was facilitated by the involvement of a second experienced qualitative analyst who independently coded twenty-five percent of the interview transcripts to confirm reliability in assigning codes. Codes were assigned to segments of text ranging from sentences to full paragraphs to multiple pages. Some segments of text were coded with a single code and, when more than one code was represented in the text, multiple codes were assigned.

Consensus discussions were held between the lead investigator and the qualitative analyst to discuss two to three transcripts at a time, compare independent coding and achieve agreement on discrepancies in the codes assigned to the text in each transcript. Prior to commencing the coding process, a preliminary codebook was documented to broadly describe the concepts of: 1) organizational learning mechanisms, including formal and informal, 2) knowledge reservoirs, including individual roles, tasks, and tools, and 3) communities of practice, including mutual engagement, joint enterprise, and

shared repertoire. Over the course of independent coding and multiple consensus discussions, inductively identified codes were agreed upon and added to the codebook, and codes were revised to enhance meaning and distinctiveness. See Appendix B. Codebook, for the complete list of codes.

A record of decision making during consensus discussions was documented and maintained by the lead investigator. The purpose of the consensus discussions was to better understand the data and the codes and to identify emerging themes, therefore a traditional inter-rater reliability measure was impractical for this coding process (Kreiner, Hollensbe, & Sheep, 2006). The consensus discussions ensured that different perceptions of the data were discussed, helping to mitigate overly subjective interpretations and researcher bias in the analysis. After twenty-five percent of the transcripts were coded, the lead investigator coded the remaining transcripts and field notes. See Appendix B for the codebook with code definitions and documented coding rules developed to ensure the coding categories were judged by the same criteria.

Coding enabled sorting and resorting data across informants, informant types, and cases to systematically compare and contrast similarly coded segments of field notes and transcripts and to identify recurring themes that arose to identify organizational learning during PCMH implementation (Glaser & Strauss, 1967; Strauss, 1987). The next section describes the systematic comparison of the coded data.

Phase 2. Identifying Organizational Learning Mechanisms

The second phase of analysis involved systematically comparing the coded data across clinics in order to identify organizational learning mechanisms and patterns of organizational learning (Mason, 2002; Strauss, 1987). First, for each clinic, coded data

from the field notes and transcripts were organized by clinic into a single document for broad categories of organizational learning, including formal organizational learning mechanisms, informal organizational learning mechanisms, barriers to organizational learning, facilitators of organizational learning, individual roles, tasks, tools, mutual engagement, joint enterprise, and shared repertoire (Miles & Huberman, 1984).

This phase of analysis was also facilitated by immersion in the data. Immersion, reading over the field notes and interview transcripts multiple times, is important in qualitative data analysis, because it deepens familiarity with the data, elicits recall of data drawn from the investigator's experience as well as knowledge of the literature, and facilitates the identification of patterns emerging from the data (Strauss, 1987). By reviewing, comparing and contrasting the data coded to the various categories of organizational learning and comparing the reoccurring themes to the organizational learning and implementation literatures, differences across clinics were identified.

The interview questions were broad, so as to enable the consideration multiple perspectives. The section of the interview guide that prompted discussion of organizational learning mechanisms asked informants to describe how new practices are introduced and incorporated into existing clinic work flows. The informants were asked to describe in detail a recently introduced process and follow-up interview questions included, for example, "How are your new responsibilities defined and communicated to you?" "Who do you discuss problems or successes with in relation to new responsibilities or tasks?" Interview questions also elicited responses about organizational learning during implementation of specific PCMH interventions. Differences across clinics in barriers and facilitators of organizational learning emerged from the data to support the

identification two formal organizational learning mechanisms (1) clinic meetings and (2) front line leadership, that can potentially increase clinic capacity for organizational learning by enabling both individual-level learning (e.g. understanding of individual's role in the organization) and organizational-level learning (e.g. adapting organizational protocols and work processes), and therefore, reliably promote PCMH implementation.

Clinic participation in piloting PCMH interventions within the health system emerged from the data as a potential organizational learning mechanism, however, such participation did not consistently result in individual level learning throughout the entire clinic. This further reinforced the importance of clinic meetings and front line leadership as organizational learning mechanisms that enable simultaneous individual-level adaptations and organizational-level modifications to promote and support a clinic's capacity for change and PCMH implementation.

In the first clinic from which data was collected, clinic meetings and front line leadership emerged as organizational learning mechanisms that promote and support PCMH implementation. Over the course of data collection and analysis, different characteristics of clinic meetings and front line leadership appeared to vary with PCMH implementation across clinics. Clinic meetings and front line leadership as organizational learning mechanisms were then validated through comparing clinics based on a measure of high, moderate, or low fidelity to the PCMH; discussed in the next section.

Phase 3. Associating Organizational Learning Mechanisms with a Measure of Clinic Fidelity to the PCMH

In a separate but related analysis, the six clinics in the study sample were measured and ranked by level of fidelity to the PCMH. The conceptualization of fidelity

to the PCMH included two organizational levels, 1) the knowledge, attitude and behaviors of clinicians and staff as they adapt their work practices to PCMH principles and operational components, and 2) the fidelity to which the PCMH components are incorporated into clinic practice during implementation. After qualitative categorization of clinic level fidelity to the PCMH components, fidelity to each PCMH component was assigned to each clinic based on a five point scale (1 = nonuse, 2 = low fidelity, 3 = neutral fidelity, 4 = high fidelity, and 5 = committed). The numeric values were then totaled within clinic and across the PCMH components to calculate a cumulative fidelity score for each clinic. Then, to determine relative fidelity ranking across the six clinics, the total range of highest and lowest cumulative fidelity scores (Clinic F = 32 and Clinic B = 23, range = 10) was divided by 3 in order to divide the 6 clinics into tertiles of High Fidelity (≥ 30), Moderate Fidelity ($29 \geq$ and ≤ 26), and Low Fidelity ($25 \geq$). See Table 10. Relative Fidelity Rankings by Clinic. A full description of the evaluation of relative rankings of fidelity to the PCMH across the six primary clinics is discussed in Chapter 2. The next section describes the comparative case analysis that was conducted to further reveal differences in characteristics of clinic meetings and front line leadership that correspond with the clinic rankings of fidelity to the PCMH.

Phase 4. Comparative Case Analysis

The final phase of data analysis followed a case comparison analysis approach to produce findings and propose explanations of variation in PCMH implementation across primary care clinics related to differences in organizational learning mechanisms (Mason, 2002; Strauss, 1987). Systematic comparisons of the coded data between clinics with different rankings of fidelity to the PCMH were made in order to understand how clinic

meetings and front line leadership as organizational learning mechanisms promoted PCMH implementation, and to construct theoretical description of characteristics of clinic meetings and front line leadership from the data (Mason, 2002; Strauss, 1987).

Differences across clinics in how organizational learning occurred in the structure of primary care delivery during PCMH implementation did not emerge from the data. In all clinics, affiliation with the integrated health system and individual professional certification emerged as mechanisms that supported a clinic structure through which organizational learning occurred. In other words, individual's knowledge of their role, tasks, and tools was based on their training as a medical assistant, licensed practical nurse, registered nurse, medical doctor, etc.; or in the case of office staff, they understood the boundaries of their role and tasks, based on not having professional certification. By centralizing training, the health system reinforced standardization and compatibility between roles, tasks, and tools. Overall, differences in organizational learning did not emerge as a result of discrepancies in the understanding of the roles, tasks, and tools that make up the clinic structure. This finding is not surprising based on the nature of health care delivery and the tradition of individually trained, or siloed, medical professionals working together in care delivery. Additionally, in a sample of clinics that are not all affiliated with the same integrated health system, there might be more variation across clinics with respect to the occurrence of organizational learning in the structure of primary care delivery during PCMH implementation.

Differences across clinics in how organizational learning occurred in the context of primary care delivery during PCMH implementation did emerge. Differences arose across clinics in the communities of practice concepts of mutual engagement, joint

enterprise, and shared repertoire for which a number of themes emerged as subcategories within those concepts to facilitate comparing and contrasting characteristics of clinic meetings and front line leadership across clinics. It was through the iterative process of comparing and contrasting characteristics of clinic meetings and front line leadership and differences in organizational learning across clinics became apparent, as a result of different aspects of interactions in the social context of primary care delivery.

Review of the coded data for clinics in which clinic meetings and front line leadership did not emerge as organizational learning mechanisms revealed negative findings (i.e. counter-factual), and helped to refine and analyze the most relevant characteristics of clinic meetings and front-line leadership as organizational learning mechanisms associated with variation in PCMH implementation (Eckstein, 1977). For example, the following quote demonstrates a lack of front-line leadership to facilitate organizational learning during PCMH implementation in a clinic with low fidelity to the PCMH:

> [I: Do you think the physicians appreciate getting that information before they see their patient?] Some of them do and some of them didn't even know […] they didn't even know what this transition was. […] it was not explained well to the doctors. (Non-PCP, Low Fidelity Clinic)

Individual learning was found to occur through informal mechanisms when individuals interacted regularly over the course of the work day, shared a workspace in the clinic, or needed to coordinate individual but dependent tasks. However, such interactions did not result in adaptations being made to organizational protocols and work processes throughout the clinic, and ultimately may have hindered organizational level PCMH implementation by the development of work practices that were not shared at the clinic level.

This method of data analysis involved identifying emerging conceptual insights to characterize clinic meetings and front line leadership as organizational learning mechanisms that promote PCMH implementation. An inductive approach guided the comparing and contrasting of themes emerging from the data collected from different clinics, and also from the organizational learning literature. The literature was also used to inform interpretation of the data. As data collection and analysis proceeded for all six clinics and fifty seven informants concept saturation was achieved, meaning no new themes emerged and no new codes were created, suggesting additional data collection would yield redundant findings and increasing the validity of clinic meetings and front line leadership as organizational learning mechanisms associated with PCMH implementation (Glaser & Strauss, 1967).

Findings

As previously discussed, organizational learning is integral to PCMH implementation, a dynamic intra-organizational process of incorporating new clinical and managerial interventions into ongoing organizational workflows. PCMH implementation necessitates that clinicians and staff adapt their individual practices in order to achieve sustained use of PCMH components, and to ultimately achieve intended PCMH organizational outcomes (e.g. improved quality and reduced costs of care). Informants' perceptions and experiences in their respective clinic contexts revealed common characteristics of clinic meetings and front line leadership as organizational learning mechanisms in clinics with high fidelity to the PCMH. Correspondingly, there were common characteristics that may have impeded organizational learning identified in clinics with low fidelity to the PCMH. In clinics with moderate fidelity to the PCMH,

some characteristics of clinic meetings and front line leadership were similar to high fidelity clinics and some were similar to characteristics of low fidelity clinics.

The frequency, purpose, and inclusiveness of clinic meetings corresponded with variation in clinic fidelity to the PCMH. The presence in a clinic of front-line leadership who facilitated input inclusion, accountability, and competence among staff also corresponded with variation in clinic fidelity to the PCMH. In the remainder of this section, these common characteristics of clinic meetings and front-line leadership that emerged from the data are described.

Clinic Meetings as Organizational Learning Mechanisms

Clinic meetings emerged as important pre-planned organizational arrangements that facilitated organizational learning during PCMH implementation. They provided a forum in which organizational members could share, reflect on, and evaluate information relevant to adapting their roles, while also formally adapting clinic level protocols and processes. In each clinic, various meetings were held to address issues specific to certain clinician and staff roles as well as to address clinic-level issues. Across clinics, three common characteristics of clinic meetings as organizational learning mechanisms emerged. (1) Frequency; meetings were scheduled to facilitate regular and timely reflection and evaluation during the implementation of a new clinic policy. (2) Purpose; the goals of meetings were clear and focused on the discussion of clinic processes. (3) Inclusiveness; staff from across the clinic attended clinic meetings, thus allowing everyone a voice in achieving consensus regarding implementation of clinic policies. What follows is a description of these characteristics in the context of clinics with

relatively higher levels of fidelity to the PCMH, compared to clinics with relatively lower levels.

Frequency. There was variation across clinics in the frequency with which the meetings were scheduled. Clinic meetings intended to address the implementation of new clinic policies that were scheduled more frequently than once per month were perceived by informants as being more effective than clinic meetings that were held once per month or less frequently. In clinics with high fidelity to the PCMH, informants commented that a month would be too long to wait to determine if a new process was working and to make adjustments if necessary. The importance of clinic management support of frequent meetings was also acknowledged in clinics with high fidelity to the PCMH. The following quote is representative of the attitude toward frequent clinic meetings supporting an ongoing discussion of change in clinics with high fidelity to the PCMH.

> …when things are facilitated in the meetings, is the best place for it to start and we will readdress it at our next meeting which is in two weeks, so [we] know, "Okay, we're going to try this and we're going to do this and we're going to put every effort towards this, and in two weeks, we're going to talk about it. And we're going to check and see if this helped us." […] And if it's an improved practice then we could try to implement that and check it again in two weeks with the new process, and we can just continually hammer away at something by having these bi-weekly meetings, if we only met once a month, I think it would be very, very slow progress on anything. (Non-PCP, High Fidelity Clinic)

In clinics with moderate and low fidelity to the PCMH, meetings were described as occurring no more frequently than once per month. Informants did not mention any benefit of attending clinic meetings more frequently than once per month. This may be because, compared to clinics with more frequent clinic meetings, they did not perceive meetings to be effective in implementing changes in roles and processes. The following quote explains how less frequent clinic meetings focused less on ongoing discussion of change, and more on what was going on in the clinic at a particular point in time.

> we have it once a month and we talk about a lot of issues with patients and the clinic and it's not, it doesn't have to be specific to any one thing. It's sort of whatever we're doing at the time, that's the time to talk about it. […] [I: do you determine process improvements, if they're needed, at that meeting?] We try, but often times things go pretty slowly. (PCP, Moderate Fidelity Clinic)

Comparing and contrasting the frequency of meetings across clinics illustrates how clinic meetings are important in organizational learning by supporting ongoing and timely discussions of change and to resolve issues that may hinder PCMH implementation.

Purpose. The variety of meetings held in each clinic resulted in variation across clinics in perceptions of the purpose and goals of the clinic meetings. The main difference in the purpose of clinic meetings identified in the data was that some clinics held meetings with the purpose of discussing clinic processes and other clinics held meetings with the purpose of reporting on clinic performance measures and individual performance issues. In clinics with high fidelity to the PCMH, informants talked positively about the opportunity meetings gave them to discuss whether they thought clinic processes were working effectively or needed to be changed or improved. The following quotes illustrate the use of clinic meetings as a forum for discussing clinic processes and facilitating a clinic-wide understanding of the implementation of clinic processes, rather than focusing more narrowly on changes that needed to be made in individual and/or clinic performance.

> So we kind of do that Plan Do Check Act, and we've planned it in the meeting, we've tried it, we're checking it at the [meeting], and now is it going to work or isn't it going to work… (Non-PCP, High Fidelity Clinic)

> …it helps keep a lot of us on the same page, we can solve little issues […] There's not too much content, as it is process more than anything else. And same thing with the nurse doc meetings, kind of cues us in on what the nurses are doing predominantly with their chronic care management, which is nice, they get our input on what we want them to be doing and we get their input on the types of things that they are doing […] And then for the back staff meeting that includes the MAs, again more process-each tackles different levels of things […] Like how we're

> dealing with certain patients or certain types of patients, or intake processes. (PCP, High Fidelity Clinic)
>
> I think the [meetings] and focusing on the process rather than on the individual, has really made a difference. And again, it usually is process when we look at things. (Office Staff, High Fidelity Clinic)

In contrast, the following quotes from clinics with moderate and low fidelity to the PCMH illustrate the drawbacks of clinic meetings focused on changes that needed to be made in individual and/or clinic performance, rather than discussing how processes could be adapted to mitigate such performance issues.

> We mostly hear the complaints from the providers, where we need to improve. (Office Staff, Moderate Fidelity Clinic)
>
> [I: Would the discussion of the implementation of a new policy in the clinic take place at that meeting] They've announced it at those things, but even then the discussion is really more from the staff point of view, like them talking about, "So is this the MA's job or the nurse's job?" And "When are we going to get trained on this?" And "Will we get paid for the training?" And "Will this happen during our work hours, or is it extra?" And, "What do we do with PTO time?" It's all these non-physician specific questions that are really important to them […] and like, what was the point of that? (PCP, Low Fidelity Clinic)
>
> [Medical Director] just mentions something about what needs to be improved, and "Work on it." […] We find out at the next staff meeting, if there's a change. Statistically, they'd let us know. [I: Do you see things change in the clinic as a result of talking about that at the staff meetings?] Yeah, I do. (Non-PCP, Low Fidelity Clinic)

By focusing on individual and clinic performance, rather than discussing clinic processes, organizational learning was not promoted. The differences in the perceived purposes of clinic meetings across clinics illustrates how they can be an opportunity to align individual roles and tasks with organizational processes and resources, rather than focusing only on the need to improve performance. This appears to result in improved PCMH implementation.

Inclusiveness. Across clinics, clinic meetings provided different levels of opportunity for achieving common understanding among staff regarding changes in clinic processes. In clinics with high fidelity to the PCMH, informants perceived benefits in

having all clinic roles in attendance at meetings. The following quotes demonstrate the perception that, as a means to encourage staff commitment and a shared engagement in PCMH implementation, bringing clinicians and staff together as a team with a common understanding is preferable to each staff member functioning individually.

> …I think [meetings] help us know each other better, because we would be islands. […] Because of all these meetings that we have, everybody's involved, nobody's left out. […] And I think the more you get together as a team, the more you stay a team. If you start staying apart quite a bit then you start functioning individually, and we're all here for the same purpose, which is for the patients. (Non-PCP, High Fidelity Clinic)

> When I go to a meeting, my ideas count. The physicians here are really nice. They work with us. They make us feel like a part of their team. It's not like the physicians are on one team, the MAs are another team, the nurses are… I feel like we're all one big team, instead of everybody's separate, everybody's listed differently. […] There's no rejection, there's always open communication, so I think between the meetings and communicating what everybody's role is, it really works. (Non-PCP, High Fidelity Clinic)

The inclusion of all clinicians and staff types in clinic meetings also helped mitigate what can be the divisive effects of hierarchy in the clinic. The scheduling difficulties encountered due to PCPs and care managers not being in the clinic regularly to attend meetings, was mentioned by informants in clinics with low fidelity to the PCMH, where clinic meeting attendance was often limited to specific clinic roles. Role specific meetings correspond with the traditional expectations that roles in the clinic are standardized within the hierarchy of primary care functions. The PCMH necessitates a higher level of teamwork and coordination throughout the clinic, which was facilitated by inclusive clinic meetings. The following quotes illustrate perceptions of exclusiveness in clinic meetings, and the missed opportunities for coming together as a team to establish common understanding and discuss clinic processes.

> The providers aren't at the staff meeting. They have their own provider meeting […] I think there are good reasons for that, but at the same time, I would also like to see at least once every six months when we can all meet together. Because a lot of times, things that will come up at the meetings are, "well, the providers say this, the providers say that." And I just think that it's better that we all discuss certain things together. Because what I find is after the meeting – and I'm close

> to my doctors – if I talk to them about something that may have come up, then they'll kind of say, "oh, that's not really what was said." [I: How do those meetings influence your work in the clinic?] To be honest with you, I really don't know the answer to that. (Non-PCP, Moderate Fidelity Clinic)

> The only meetings that I really attend are the physician monthly meetings, because that's the only one that we're really invited to attend. There's a staff meeting every week, but I don't think any of the physicians go or I don't even know that they necessarily want us there. I'm sure they would be fine if we went, but it's never come up that any physician has gone to the staff meeting that I know of. [I: Would you want to attend that meeting?] Not really, no. In fact, you know what the reason is, probably is that, it's scheduled while doing our CME stuff, so we wouldn't be able to anyway, so I've never gone to that. (PCP, Moderate Fidelity Clinic)

> We have staff meetings that are periodic. Sometimes they're monthly, sometimes they seem to be every other month and it depends upon actually, they alter the schedule so that some physicians can attend one month and some physicians can attend the other months. […] There's two types of meetings, I think they call it the faculty meeting, where it's mainly the physicians plus the clinic manager […] And that's where they usually introduce new policies to the physicians […] They also have these all staff meetings, which I have gone to, I've gone to several of them and there doesn't seem to be a point to the physicians going. Only a few physicians go, probably 2 or 3 of us go and we're the same ones who go. (PCP, Low Fidelity Clinic)

Comparing and contrasting the varying levels of the inclusiveness of clinic meetings illustrates how meetings play a part in organizational learning by increasing consensus around clinic processes and decreasing ambiguities in individual roles and tasks. Despite being comfortable enough to share concerns with the PCPs in the clinic, one medical assistant discussed a lack of consistency in the expectations regarding clinic functioning that arose from meetings being separated by clinic role. This decreased the potential for organizational learning, because there is no establishment of common understanding of a clinic standard from which individual tasks are carried out.

Front Line Leadership as Organizational Learning Mechanisms

Front line leadership emerged as serving an important function within clinics for facilitating organizational learning during PCMH implementation. Front line leadership was formalized in the roles of the Lead Clerk and the Lead Medical Assistant who were recognized as having authority over the office staff and medical assistants, respectively.

While also responsible for performing tasks in their roles as office staff or medical assistant, in some clinics it was apparent that front line leadership were influential at the clinic level in adapting clinic processes to align with individual tasks and vice versa. During PCMH implementation, office staff or medical assistants approached front line leadership to share, reflect on, and evaluate information relevant to adapting their role in the clinic, while front line leadership facilitated necessary adaptations to clinic processes. As a result, organizational learning occurred in the context of the tasks and processes being carried out at the front lines of care delivery. However, across the six clinics, different perceptions of the authority and effectiveness of front line leadership in facilitating organizational learning were expressed by informants, including front line leaders themselves.

In clinics with high fidelity to the PCMH, front line leadership was recognized by clinic staff with descriptions of "strong," and "excellent," and their presence as front-line leaders was apparent during clinic observations. One clinic manager expressed throughout the interview the confidence she has in the front line leadership in her clinic:

> You can't do it all yourself especially as a manager, you have to get people that have confidence that feel good with it that are not afraid to take a little bit of a risk and that step up and work on it and it really worked well. (Office Staff, High Fidelity Clinic).

In a clinic with low fidelity to the PCMH, front line leadership was not mentioned during interviews, nor was their presence as front line leaders apparent during clinic observations, compared to observations in other clinics. In a clinic with moderate fidelity to the PCMH, front line leadership was identified as being ineffective by multiple informants and there was a demonstrated lack of accountability among staff, low

perception of staff competence in certain clinic processes, and staff did not feel they had adequate input into how the clinic functioned.

Three characteristics of front-line leadership as organizational learning mechanisms emerged: (1) Input inclusion, defined as front line leadership effectively facilitating communication between front line staff and leadership, clinicians and staff throughout the clinic. (2) Accountability, the ability of front line leadership to maintain a constancy of purpose and clear expectations and hold staff responsible for those expectations. (3) Competence, evidenced by front line leadership helping staff to understand their role in clinic processes and how to carry out tasks at the front lines of care delivery while facilitating alignment between individual tasks and clinic processes.

Input Inclusion. Across clinics, front line leadership played different roles in facilitating inclusion of diverse perspectives from all staff during PCMH implementation. Some front line leaders were more effective than others in promoting information sharing and mitigating top down decision-making to insure that staff did not feel they were receiving mandates regarding which they could not voice their opinion. In clinics with high fidelity to the PCMH, informants spoke of front line leaders as points of contact within the clinic who promoted organizational learning through offering advice and support to staff and establishing a common understanding of roles throughout the clinic. Clinicians and staff throughout the clinic could access information from front line leadership and address perceived problems relevant for the effective functioning of the clinic. The following quote demonstrate instances of front line leadership supporting input inclusion in clinics with high fidelity to the PCMH.

> [Lead clerk and clinic manager] will communicate with us what things need to be done better, or suggestions on how they can be done better, or new things that might come up that have to be

> addressed like how to handle different situations and then we can offer suggestions. […] Just to keep us updated on what's going on. And if we need improvement in different areas... we get either feedback from the staff or the manager and the lead clerk will converge and think of different ways to make things run smoother. […] We just need to communicate. (Office Staff, High Fidelity Clinic)

The data also reveal that as a result of front line leadership facilitating input inclusion, they were able to support learning in the context in which new tasks and processes were to be carried out and less involvement was needed by the clinic manager and medical director. In clinics with high fidelity to the PCMH, once a PCMH intervention was adopted by clinic leadership, the important aspects of the intervention were communicated to front line leadership. In clinics where front line leaders did not facilitate input inclusion, informants expressed frustration with feeling disconnected from others in the clinic, and with a clinic environment in which staff received complaints about their work and felt they had no voice in how to improve their task performance or clinic processes overall. The following quotes illustrate an absence of input inclusion among staff in the clinics with moderate fidelity to the PCMH.

> The [staff] are perceived as just the people who make the phone calls. And we're seen only for the errors being made. […] The complaints get directed at the [staff], it doesn't get discussed with the manager or the leads. (Office Staff, Moderate Fidelity Clinic)

> …when you work with different people, different people have different issues. […] the problems that we have is sometimes the information, something new might be started, but it's not conveyed to everyone. A procedure may be changed, the way that we do something, but it's not conveyed to everyone across the board. So, you have certain people doing it this way, certain people still doing it the old way, it causes conflict, because everyone should be on the same page. (Office Staff, Moderate Fidelity Clinic)

By not including input into clinic processes from all staff, organizational learning is impeded. Comparing and contrasting the facilitation of input inclusion by front line leadership across clinics illustrates how front line leadership has an important role in cultivating mutual engagement and common understanding around clinic processes, two

important aspects of organizational learning. When input inclusion is not facilitation, staff can feel disconnected from clinic processes and isolated in their role.

Accountability. Across clinics, there were differences in the extent to which front line leadership established clear role and task expectations among staff in the clinic and held staff responsible for those expectations. Clinics with high fidelity to the PCMH had front line leadership who were perceived as having an important role in clearly defining and communicating expectations to staff and impartially holding them accountable for fulfilling these expectations. The following quote provides evidence of this:

> [Lead MA] is an exceptionally strong leader. And I'm sure she keeps tabs on the MAs quite a bit…So, they're held accountable, and if they're doing something wrong, they will be questioned or reprimanded or whatever. (Office Staff, High Fidelity Clinic)

In clinics with moderate and low fidelity to the PCMH, front line leadership was identified in title only. A lack of accountability was more apparent in these clinics, compared to clinics with high fidelity to the PCMH. During interviews, when asked if staff were held accountable in the clinic, in clinics with low and moderate fidelity to the PCMH informants' answers demonstrated a general absence of accountability among staff in the clinic

> [I: Do you think people in the clinic understand their roles and what is expected of them?] It's needing to move forward. The [staff], I think – they're doing the stuff that they're doing, and they're getting away with doing that because nobody's holding them accountable to doing it. (PCP, Moderate Fidelity Clinic)

> [I: Do you think people are held accountable in this clinic? And do they hold themselves accountable?] No, people are not held accountable. (Office Staff, Moderate Fidelity Clinic)

> [I: overall, do you think people in this clinic understand their roles and what is expected of them?] I think you grow into it after you've been here a while. Probably not right off, because we don't have a whole lot of hard and fast rules. […] [I: Do you think people are held accountable in this clinic? And do people hold themselves accountable?] No. (Non-PCP, Low Fidelity Clinic)

A lack of accountability can impede organizational learning, because tasks are not clear with respect to the responsibilities for particular aspects of clinic processes.

Standardization is challenged at the clinic level and therefore task performance can vary within individual roles. Front line leadership that maintains accountability also maintains a common understanding among staff regarding roles, responsibilities and clinic processes.

Competence. Across clinics, there were differences in informant's perception of their own, or others, knowledge, skills, and ability to carry out roles and perform tasks. In the clinics with high fidelity to the PCMH, front line leadership was involved in making sure people understood their role and were able to effectively perform tasks. They also perceived themselves as integral in bolstering confidence and providing a sense of security among the staff. This was reflected in comments made by front line leaders themselves and clinic staff.

> If the [staff] have any questions or problems, or problems with patients, then I'm the one that they go to. If there's any educational opportunities that I can help them with, it kind of gives them a go to person. If there's any questions about anything, even if it's something that they know and they just want clarification on, it gives them a place to get the information, if I can't get it then I can always access it somewhere else. I'm kind of like a second confidence builder in what they're doing. (Non-PCP, High Fidelity Clinic)

> When a staff member is under performing, their performance may improve if they are helped to improve. (Non-PCP, High Fidelity Clinic)

> I've learned that the best thing to do is, if I just send the email, it may or may not get read in a timely fashion, and it may not get remembered, so I have to talk to them individually and then send an email, as well, to reinforce it. This is what we talked about. Just as a reminder, this is where everything is. This is what you're going to do. And you can always come to me if you have questions. And, and that seems to be the best thing to do because some people learn by reading and some people learn by doing. So, if I can try to do both… (Office Staff, High Fidelity Clinic)

> From a leadership perspective, it's really important to have someone to mentor the [staff] to help them to understand the barriers they face. Someone who knows how to problem solve. It's important to have a leader who has the people skills to not make them feel bad, but to help them figure out how to overcome barriers… (Non-PCP, High Fidelity Clinic)

In clinics with moderate and low PCMH implementation, there was an apparent lack of support of clinic staff in understanding their roles and performing assigned tasks. When staff were asked who they talk to about problems in the clinic, there was an

absence of the front line leadership's role in supporting staff to achieve effective functioning of the clinic, as illustrated in the following quotes.

> [I: Do you talk to [Lead Clerk] about the problems you are having?] No. I don't. […] That's the major problem – that I don't have a set time to do these calls. (Office Staff, Low Fidelity Clinic)

> [I: who do you discuss problems with or successes in relation to using the [Point of Care] report?] Um, I don't know. I guess we all kind of… We all kind of report to [name] as the MA lead, but management and the medical director share with us our stats on the [Point of Care] report all the time. How we're hitting each thing, what we're lacking on. (Non-PCP, Low Fidelity Clinic)

Front line leadership that did not support staff to perform tasks ascribed to them did not support organizational learning. Comparing and contrasting the facilitation of competence by front line leadership across clinics illustrates how this leadership has a pivotal role in creating psychological safety among staff while they take on new tasks during PCMH implementation (Edmondson et al., 2001).

Discussion

Clinic meetings and front line leadership were identified as organizational learning mechanisms that promoted PCMH implementation by supporting individual understanding of roles and tasks while also adapting clinic level protocols and processes, to achieve a community of practice. Aspects of a community of practice were reflected in mutual engagement and common understanding across the various roles involved in PCMH implementation, and were apparent in clinics with high fidelity to the PCMH. In clinics with high fidelity to the PCM, clinicians and staff felt supported in understanding their individual roles while implementing collective changes, as opposed to feeling isolated in their role and responsible for mandated changes. The importance of clinic meetings and the protection of regularly scheduled time to learn as a collective practice have been identified in the PCMH literature as important for successful PCMH

transformation (Stewart, Nutting, Crabtree, et al., 2010). The data from this study reveal differences in the frequency, purpose, and inclusiveness of clinic meetings across clinics, thus providing important insight for understanding how clinic meetings should be organized to promote organizational learning during PCMH implementation. In clinics with higher fidelity to the PCMH, clinic meetings were held frequently (i.e. more than once per month), maintained a clear purpose of discussing clinic processes which facilitated organizational learning, and facilitated inclusion of different clinic roles involved in PCMH implementation. In clinics with moderate and low fidelity to the PCMH, clinic meetings were scheduled as far apart as every other month, did not facilitate organizational learning but focused on individual tasks or clinic performance, and were not inclusive of all clinic roles, which reinforced hierarchy within the clinic rather than mutual engagement and common understanding necessary for organizational learning.

The importance of PCPs as team leaders has been identified in the PCMH literature as important for successful PCMH transformation (Nutting et al., 2009). In this study, front line leadership emerged as also being important for successful PCMH implementation. The data from this study reveal differences across clinics in front line leadership's facilitation of input inclusion, accountability, and competence among staff, providing important insight for PCMH implementation. For example, multiple PCPs in a clinic were less able to support medical assistants in understanding changes in their role during PCMH implementation, because often PCPs had unique preferences regarding the role of the medical assistant in their clinical practice. This expectation of accommodation of individual PCP preferences by medical assistants compromised a standardization of

medical assistants' understanding of their own role and tasks. In clinics with higher fidelity to the PCMH, front line leadership gave staff a voice in clinic processes, maintained clear expectations of tasks and promoted a common understanding of roles and tasks across the clinic to which staff were held accountable. Front line leadership also supported staff competence in carrying out tasks for which they were responsible. In clinics with moderate and low fidelity to the PCMH, front line leadership did not promote input inclusion among staff in the clinic and as a result staff felt isolated in their roles during PCMH implementation or felt that they received contradicting messages on how tasks should be carried out. Front line leadership were also less likely to hold people accountable to their role and tasks, as acknowledged by informants in low and moderate fidelity clinics, and, lastly, staff were left to figure out for themselves how to incorporate new tasks into their existing responsibilities. This finding that front line leadership play an important role in PCMH implementation corresponds with the finding that PCMH implementation necessitates multiple facilitator roles (Nutting, Crabtree, Miller et al., 2010).

Adaptive reserve represents a clinic's internal capabilities for facilitating adaptation and development, and for achieving successful PCMH implementation (Miller et al., 2010). The findings from this study contribute to understanding how to improve the features of a clinic's adaptive reserve. The adaptive reserve concept is based on the relational theory of organizational learning, which emphasizes providing direction and sharing information. The characteristics of both clinic meetings and front line leadership delineate how to improve a primary care clinic's capacity for providing direction and sharing information, and ultimately cultivate an adaptive reserve to support successful

PCMH implementation. Clinic meetings can promote conversations as important collaborative processes that can mediate necessary and unexpected adaptations to individual roles and collective clinic processes. Front line leadership can support the clinic's goals while relating to the needs of individuals, to also mediate necessary and unexpected adaptations to individual roles and collective clinic processes while working to achieve those goals (Miller et al., 2010). PCMH implementation is a complex and ongoing process, and the findings from this study begin to uncover some potential organizational characteristics associated with various degrees of success in PCMH implementation.

Differences across the clinics in barriers and facilitators of organizational learning emerged from the data to support the identification of two formal organizational learning mechanisms, clinic meetings and front line leadership, that can increase clinic capacity for organizational learning by enabling both individual-level learning (e.g. understanding of individual's role in the organization) and organizational-level learning (e.g. adapting organizational protocols and work processes). This finding makes a contribution to the organizational learning literature in that both individual and organizational learning may be necessary for organizational learning to occur. Lipshitz and Popper (2000) illustrate how organizational learning mechanisms enable individual-level learning (i.e. understanding of the individual's role in the organization) and organizational-level learning (e.g. adapting organizational protocols and work processes), and therefore can account for an organization's capacity for change. However, the findings from this study contribute to understanding that organizational learning mechanisms were associated with higher levels of PCMH implementation when they involved both individual-level

and organizational-level learning, because adaptations were made at both organizational levels. Organizational learning is not a single process performed by the entire clinic in a uniform fashion (Popper & Lipshitz, 2000). Rather, organizational learning is an assemblage of interdependent tasks in which different individuals perform in different fashions. This paper contributes to the conceptualization of organizational learning mechanisms by describing characteristics that are actionable to practitioners and transferable to other primary care contexts.

Implications

The results provide evidence of the importance of organizational learning as a component of PCMH implementation. Although giving staff time to train with an innovation has been found to be a positive predictor of implementation success (Klein et al., 2001), training emphasizes individual learning removed from organizational learning. Organizational learning can complement training by integrating individual understanding of role and tasks into the clinic processes involving coordination of tasks. An investment in training over organizational learning may frustrate individuals and limit a collective involvement improving clinic processes to achieve high quality patient care.

The results also provide implications for organizational learning theory and the construct of organizational learning mechanisms. Popper and Lipshitz put forth the concept of organizational learning mechanisms as the presence of systematic patterns of formal or informal information processing that enables individual-level learning (i.e. understanding of the individual's role in the organization) and organizational-level learning (e.g. adapting organizational protocols and work processes), and therefore can account for an organization's capacity for change (2000). The results of this study

indicate that to promote capacity for change, it is necessary for organizational learning mechanisms to simultaneously enable individual-level and organizational-level learning, not one or the other, as concluded by Lipshitz and Popper. The organizational learning mechanisms that emerged from the data to be associated with variation in level of fidelity to the PCMH were formal organizational learning mechanisms, because they facilitated both individual-level and organizational-level adaptations. Based on the data, informal organizational learning mechanisms were not associated with variation in level of fidelity to the PCMH, because they resulted in only individual-level adaptation, not organizational-level adaptations.

Limitations

The six clinics had very different environments which could have influenced the effectiveness of clinic meetings and front line leadership in producing organizational learning. However, this investigation is intended to provide practitioners with actionable recommendations regarding organizational learning mechanisms associated with PCMH implementation, certainly more feasible than changing clinic environment.

Qualitative research is inherently subjective and the validity of the findings is linked to the basic assumptions that guided decisions in the collection of data and interpretation of the data. The use of both observational and interview data from multiple informants within each case, data from multiple theoretically heterogeneous cases, and an additional qualitative analyst increase the validity of the findings.

Conclusions

Clinic meetings and front line leadership emerged as organizational learning mechanisms that can simultaneously facilitate individual-level and organizational-level learning, can therefore promote a clinic's capacity for learning and change. During PCMH implementation, clinic meetings and front line leadership can enable individual adaptation to roles and tasks while also managing adaptations to clinic processes.

This paper makes several contributions to guide practitioners in PCMH implementation, by providing evidence of clinic meetings and front line leadership being associated with successful PCMH implementation, and then describing the characteristics that make them effective in PCMH implementation. This research demonstrates dynamic factors within organizations worthy of attention. The characteristics of the clinic meetings and front line leadership as organizational learning mechanisms provide actionable recommendations for practitioners endeavoring to implement PCMH; for example, investing resources in holding frequent clinic meetings and the professional development of middle management. This paper also makes several contributions to organizational learning theory by providing evidence that organizational learning mechanisms that facilitate both individual-level and organizational-level learning emerged in clinics with more successful PCMH implementation.

Table 7: Sampling of Primary Care Clinics

	Small <13,000 patient visits in 6 months	Large ≥13,000 patient visits in 6 months
High Patient Focus & Innovation	1	2
Low Patient Focus & Innovation	1	2

Table 8: Sampling of Study Informants

Role in Clinic	N
Primary Care Providers (MD, NP)	8
Non-Primary Care Providers (PharmD, LPN, RN, MA)	20
Office Management (Manager, Office Assistant)	29
Total	57

Table 9: Organizational Learning Concepts used in Data Collection Instrument Development

Concept	Conceptual Description for Observation Checklist	Interview Question (IQ) Follow-up Question (FQ) Prompt (P)
Organizational Learning Mechanisms	Are there formal or informal arrangements or practices in the clinic that allow for sharing information relevant to PCMH interventions? How does the clinic have the capacity to learn?	IQ. Please describe how new practices are introduced and incorporated into existing clinic work flows? FQ. How are your new responsibilities defined and communicated to you? FQ. Who do you discuss problems or successes with in relation to new responsibilities or tasks? FQ. Who determines if the clinic is functioning as it should in regards to the new process? FQ. Are there certain people who play a key role in incorporating new practices into the clinic? IQ. What kinds of meetings do you attend? FQ. How often? On a regular basis? FQ. What is discussed? FQ. How do those meetings influence your work in this clinic?
Role	How do organizational members understand their role in relation to their tasks, to others in the clinic, and to PCMH interventions?	IQ. Do you think people in this clinic understand their role, what they are responsible for, and what is expected of them? FQ. Why or why not?
Tools	How do organizational members understand the appropriate use of hardware and software in the clinic and in relation to PCMH interventions?	IQ. Do you think people in this clinic understand how patient information is collected, organized, and used for different functions in the clinic and the purpose of different reports? FQ. Why do you say that?
Tasks	How do organizational members understand the goals, intentions, and purposes of their work in the clinic?	IQ. Do you consider a typical day of your work in the clinic to be fairly routine? IQ. Do you face uncertainty in your work? And if so, how do you deal with uncertainty in your work?

Concept	Conceptual Description for Observation Checklist	Interview Question (IQ) Follow-up Question (FQ) Prompt (P)
Mutual Engagement	Do organizational members have opportunities for advice and assistance from others in the clinic? Is there a focus on the relevance to the issues regardless of social standing or rank within the clinic?	IQ. In the clinic, do you think everyone is included as necessary, or are people left out who should be included in certain things? [Probe for examples or follow-up from observation] IQ. Do you think people in the clinic have good relationships beyond what is required of them to do their job? FQ. How is that initiated? FQ. How does that affect how the clinic operates on a day-to-day basis?
Joint Enterprise	Does clarity exist with respect to who is responsible for particular aspects of a task in the clinic? Are responsibilities clear and are tasks aligned among interdependent members?	IQ. Do you think people are held accountable in this clinic? And do people hold themselves accountable? FQ. Why or why not? FQ. What is the source of peoples' accountability? FQ. Why do/do not people hold themselves accountable?
Shared Repertoire	Are there concepts, anecdotes, or narratives that were developed through working together that facilitate work processes? Is the understanding of tasks and work processes specific to the clinic in that both the established work process and the social context of the organizational member(s) are resources for overcoming barriers and facilitating the work processes.	IQ. Who are the staff members in the clinic with whom you interact the most? FQ. What do those interactions involve?

Table 10: Relative Fidelity Rankings by Clinic

Operational Component	Clinic F	Clinic A	Clinic D	Clinic C	Clinic E	Clinic B
Patient Registries	4	4	3	4	4	3
Patient-Provider Partnership	4	3	5	3	2	3
Transition of Care	4	4	4	4	2	2
Individualized Patient Care	4	4	2	3	3	3
Preventive Services	4	3	4	2	3	2
Extended Access	4	3	3	4	2	2
Specialist Referral	3	4	3	3	3	2
Performance Reporting	3	4	2	1	3	3
Test Result Tracking	2	3	2	2	3	3
Cumulative Fidelity Score	32	32	28	26	25	23
Relative Fidelity Ranking	High	High	Mod	Mod	Low	Low

Nonuse Low Fidelity Neutral High Fidelity Committed

Appendix A: Chapter 3

Employee Survey Questions for the Subscales of Patient-Centeredness and Innovativeness

Patient Focus and/or Customer Focus
1. We anticipate the difficulties our patients and/or customers might face and work to minimize those problems.
2. We address requests and complaints from our patients and/or customers in a manner that is thorough, speedy, and polite.
3. We work to prevent uncertain delays and long waits for our patients and/or customers.
4. We make sure that our work is well-coordinated with the work of other employees at [health system], both inside and outside our team.
5. We go out of our way and take on extra tasks to make sure our patients and/or customers get excellent care.
6. My team is an excellent example of what it means to have good patient focus and/or good customer focus.
Innovation and Flexibility
1. We do a good job of trying out new ideas that solve persistent problems.
2. We are flexible and resourceful when facing unexpected problems.
3. We do a good job of adopting new procedures even when they alter an established work routine.
4. We effectively adopt new procedures that continuously improve quality and lower costs.
5. My team is an excellent example of what it means to have good innovation and flexibility.

Responses were based on a 1 to 7 "never" to "always" scale. The subscales of patient focus and innovation have Cronbach's alphas of 0.943 and 0.920 respectively, indicating the reliability for the subscales is high.

Appendix B: Chapter 3

Codebook

I.	**Organizational Learning**	Processes that lead to improved behaviors or actions through better knowledge and enhanced understanding [1]. Detection and correction of error. "An experience based process that (a) is conscious and systematic; (b) yields valid information; and (c) results in actions intended to produce new perceptions, goals, and/or behavioral strategies" [2].
1.	Organizational Learning Mechanism (OLM)	Organizational arrangements that allow for collecting, analyzing, retaining, and disseminating information relevant to the performance of the organization and its members [3]. Coding Rule: Organizational learning mechanisms can be formal (meeting) or informal (between coworkers who share a workspace)
2.	Facilitator of Organizational Learning	An individual, aspect of the clinic, or base of knowledge that promotes or supports organizational learning. Example: [I: When you said that they got trained on the template. Was someone training them?] Yes, somebody in ambulatory care. She's a project manager, a registered nurse, she did the transition care training.
	A. Piloting Projects	Informant perception that participating in piloting interventions within the health system promotes change and implementation in the clinic. Example: …being a clinic that does a lot of pilots, we do a lot of the new stuff first, which I kind of like. So, we get to kind of test it out, take it for a spin. You have a chance to input. You can tell them what works, what doesn't work and, and maybe that will help someone else in your shoes.
	B. Clinic Meetings	Informant perception of clinic meeting having a role in effecting change and improvement in the clinic. Coding rule: also code for informant perceiving that clinic meetings are not effective in change.
	C. Front-Line Leadership	Informant perception of the role of front line leadership having a role in effecting change in the clinic. Coding Rule: Include mention of Lead Medical Assistant and Lead Clerk.
3.	Barrier to Organizational Learning	An individual, aspect of the clinic, or lack of knowledge that acts as a barrier to organizational learning. Coding Rule: Include acknowledged absence of OLM during PCMH Implementation Example: Sometimes there's confusion, because those doctors will go to them and change the processes. I've worked on that, explaining to the doctors, when you do that, that's not fair to the staff member, because I am holding them accountable. So I'm pulling them in my office and saying, "Why aren't you doing this? We had clear guidelines, why'd you stop doing that?" "Well, [PCP] told me to quit doing it." So then I explain to the physician, that's not fair to them. Because you're telling them one thing I'm telling them another thing, but then I'm holding them accountable. If you have a change, you need to come through me, so that everybody knows and we can talk about the change as a whole. [I: Is that primarily how then things get communicated, through email?] Yes. And then it's followed up in the meetings. [I: if there are issues or

	something?] Or just because some people don't do a great job of reading their email, and they'll ask the same questions.
II. Communities of Practice (CoP)	Instances of learning and change that is a result of social interactions between organizational members. Code for when learning results from social participation in practice. What is learned is connected to the conditions in which learning occurs as opposed to knowing ones role based on professional certification. Coding Rules: Assigning CoP codes should not occur for instances of one's sole perception of their role in the clinic (this should be coded to Knowledge Reservoirs).
1. Mutual Engagement (Social Support)	Social and interpersonal relationships, support and camaraderie, engaged diversity and the absence of hierarchy. Navigation of social complexity, and community maintenance/maintenance of organizational culture.
A. Inclusion in Daily Interactions	The diversity of roles with whom the informant interacts on a daily basis. Coding Rules: Use this code to capture informant response to the question, "Who would you say are the staff members in the clinic with whom you interact the most?"
B. Competence	Informant's perception of their own, or others', knowledge, skills, and ability to carry out roles and execute tasks that are ascribed to them. Consider that competence may be a manifestation of the social context.
2. Joint Enterprise	Collectively developed understanding of clinic goals (members share goals) and how members hold each other responsible for achieving those goals (mutual accountability) [9, 10]. Joint enterprise represents the establishment of who is responsible for a particular aspect of a task. Responsibilities are clear and tasks are aligned among interdependent organizational members. *Collective orientation to achieving clinic goals is key to this concept.
A. Accountability	Informant expresses a perception that organizational members are held responsible for carrying out particular aspects of tasks in the clinic.
B. Teamwork	Informant's perception of what constitutes the team, who's on the team, and how informant engages in teamwork in the clinic.
C. Communication – Clinic Functioning	Work-related communication. Communication intended to increase clinic functioning capacity.
D. Input Inclusion	Informant perceives an appropriate level of involvement in relevant information and decision-making verses receiving (top down) mandates, or not being able to express their own opinion regarding clinic matters. PCMH implementation involves a diversity of perspectives. Coding Rule: Code the diversity of roles with whom the informant interacts on a daily basis. Examples: I feel like I'm left out on certain things that I should be included. –Non-PCP …so we're not going to be able to bring anything up, because they're just going to telling us. It's an all staff. –Office Staff
3. Shared Repertoire	Local concepts and shared understandings developed through the process of working together over time. The shared understanding is unique to certain organizational members and the shared understanding has been developed to overcome barriers and facilitate work processes [14]. Shared Repertoire is a narrower concept compared to Joint Enterprise in that Shared Repertoire does not necessarily occur across the collective members of the clinic, but often between 2 individuals with different roles and is developed around a task that they share – a locally developed process developed to certain members in the clinic. Examples: I've asked [PCP] about the [point of care] reports, and he just

	kind of, I don't think that he really uses them at all… I mean, he just sort of said, "I could care less really." –Non-PCP
III. Knowledge Reservoirs	Instances of learning and change that is a result of embedded knowledge and information in organizational elements, including informant knowledge of how their role should function, informant knowledge of tasks and knowledge of tools.
1. Individual Role	Informant's perception of their role in the clinic and in providing care. Includes informant description of what they do in the clinic. Also includes perception of others' role in the clinic. Use this code to capture informant response to the question, "What kinds of meetings do you attend?"
A. Front Line Leadership	Informant's perception of the role of front line leadership in the clinic.
2. Tasks	Informant's perception of tasks, and potential barriers and facilitators to carrying out tasks (time, resources, uncertainty). Does informant have an individual sense of the purpose of their work in the clinic?
3. Tools	Informant's perception of tools used in the clinic. Tools include reports, technology, guidelines, and protocols.
IV. Characteristics of OLMs	
1. Clinic Meetings	
A. Inclusiveness	Clinic meetings facilitate engaged diversity. Navigation of social complexity, and contribute to maintaining a community of practice within the clinic - Learning results social participation in practice, from social interactions between organizational members. Coding Rules: Include a perceived absence of hierarchy. Clinic meetings separated or inclusive by clinic role (Leadership, Providers, Staff, etc.). This does not refer to the meetings that include one role only.
B. Purpose	The goals of clinic meetings were clear and focused on the discussion of clinic processes. Coding Rules: Also code for the meetings that include the discussion of individual or clinic performance.
C. Frequency	Clinic meetings were scheduled to facilitate regular and timely reflection and evaluation during implementation. Coding Rules: Include discussion of the frequency of the various meetings held in the clinic.
2. Front Line Leadership	
A. Input Inclusion	See above
B. Accountability	See above
C. Competence	See above

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Chapter 4: An Exploration of Differences in Contextual Factors Related to Fidelity to the Patient-Centered Medical Home

Background

The Patient-Centered Medical Home (PCMH) has been set forth as a promising model of practice redesign in the transformation of the health care system in the United States (Backer, 2007, Crabtree, Nutting, Miller, et al., 2010; Rittenhouse, Shortell, & Fisher, 2009). Emphasizing primary care within the health care system, the PCMH is a model of care delivery designed to promote relationships between patients and primary care providers (PCP), PCP outreach to patients, use of population-based health management methods, engagement of patients in self-management, and coordination of care transitions throughout the health care system. Although disagreement exists on the conceptual definition of the PCMH, there is increasing acceptance that it has the potential to curb the increasing costs and unwarranted variation in quality of care that challenge the health care system in the United States (Vest, et al., 2010).

Payers and policymakers are putting increasing pressure on provider organizations to adopt the PCMH; however, as a model of care delivery, PCMH implementation has proven to be quite challenging (Nutting et al., 2009). Despite myriad demonstration projects, an implementation science approach has not been used to understand the contextual factors that may influence PCMH implementation. Implementation is a dynamic organizational process that occurs between the organizational decision to adopt an innovation and the innovation's assimilation into

ongoing organizational practices; it is the transition period during which organizational members incorporate an innovation into consistent, high quality, and appropriate use, resulting in fidelity to the innovation (Klein & Sorra, 1996). Implementation theory can explain the variation in how or why some organizations implementing an innovation such as the PCMH model of care delivery achieve more consistent, high-quality, and appropriate use (i.e. higher fidelity) than others (Weiner, Lewis, & Linnan, 2009). However, implementing innovations in health care delivery is challenging, and variation in implementation has been explained by a range of contextual factors that may influence the level of fidelity with which an innovation is used in practice (Greenhalgh, Robert, MacFarlane, Bate, & Kyriakidou, 2004; Scott, Plotnikoff, Karunamuni, Bize & Rodgers, 2008; Damschroder et al., 2009; Wallin, 2009; Øvretveit, 2011). Therefore, a comprehensive assessment of the organizational context in which implementation occurs is necessary to understand how the highest levels of fidelity to an innovation are achieved.

Context is the set of circumstances or factors surrounding innovation implementation; including anything not directly part of the innovation or the technical implementation process. Context can include characteristics of the organizational setting, the environment in which the organization operates, and the individuals within the organization (Rousseau, 1978; Kaplan et al., 2010). The Consolidated Framework for Implementation Research (CFIR) is a comprehensive, meta-theoretical framework comprised of thirty-nine factors that may influence innovation implementation (Damschroder et al., 2009). The CFIR was developed to promote implementation theory by synthesizing a number of implementation frameworks to consolidate the myriad

factors associated with innovation implementation. Thirty-nine factors are organized into five major CFIR domains, two of which include contextual factors: the Outer Setting and the Inner Setting. The factors in the Outer Setting domain comprise of an organization's economic, political, and social context (i.e., patient needs and resources, cosmopolitanism, peer pressure, and external policies and incentives). The factors in the Inner Setting domain include structural, cultural, and social context, including: networks and communications, culture, implementation climate (i.e., tension for change, or the perceived need for the change, compatibility of intervention with the organization, relative priority of the intervention in the organization, organizational incentives and rewards, goals and feedback, and learning climate), and readiness for implementation (i.e., leadership engagement, available resources, and access to knowledge and information).

The organizational context in which PCMH implementation occurs is dynamic and multi-dimensional, and the PCMH is a multi-faceted model of care delivery that affects many organizational levels. As such, the CFIR is relevant to this study because it provides a conceptual guide for mapping the contextual factors that emerge as associated with variation in PCMH implementation. The CFIR also appropriately supports a multi-level investigation of individual and organizational factors. A limitation of the CFIR, which reflects a limitation of the field of implementation science in general, is that it is an emerging approach to understanding complex problems in health services, and therefore still evolving. By relating to the CFIR contextual factors that have emerged inductively to be associated with PCMH implementation, this study will contribute to refining and

further developing theoretical constructs germane to the CFIR and implementation science more broadly.

The objective of this study is to explore the characteristics of primary care clinics in which the PCMH is being implemented in order to answer the following research question:

Research Question: What are the contextual factors associated with varying levels of fidelity to the PCMH across primary care clinics?

The PCMH is a multifaceted model of care delivery comprised of several guiding principles and operational components (see Chapter 2 for a detailed description of the PCMH model). Therefore, an exploratory approach to investigating contextual factors associated with fidelity to the PCMH is necessary. A comparative case study design and open-ended ethnographic methods were used to (1) inductively identify common contextual factors across primary care clinics that vary with levels of fidelity to the PCMH, and then (2) relate and align those contextual factors to the CFIR to determine factors that may be missing from the CFIR as well as factors that merit further consideration for understanding PCMH implementation.

This research advances the science of implementation by exploring the influence of context on the implementation of an innovation, the PCMH model of care delivery, and levels of fidelity to that innovation across practice sites. An improved understanding of how context influences PCMH implementation provides insights into factors to consider in PCMH implementation efforts. Despite a growing PCMH implementation knowledge base, a better understanding of contextual factors that influence the implementation of PCMH as a model of care delivery. The CFIR provides an appropriate

framework for organizing the findings from this research. Although complex, the CFIR was not created to be applied in its entirety to implementation studies, and the factors within the CFIR have different levels of maturity in definition and operability (Damschroder et al., 2009). The process of mapping CFIR constructs with inductively identified contextual factors associated with varying levels of PCMH implementation will contribute to the PCMH implementation knowledge base as well as models of implementation science.

Research Design and Methods

An observational cross-sectional case-study design was used to explore the influence of contextual factors on variations in PCMH fidelity and implementation. Ethnographic data collection methods and a grounded theory analysis approach were used. Heterogeneous cases (primary care clinics) were purposefully selected and evaluated to confirm or disconfirm emerging contextual factors that were common across cases (Yin, 2003; Teddlie & Yu, 2007). The emerging contextual factors were then aligned with constructs and factors in the CFIR model for the domains of Outer Setting and Inner Setting. Constructs were not mapped to the other three CFIR domains, Intervention Characteristics, Characteristics of Individuals, and Process, because the focus of this study is on context only with respect to PCMH implementation. The research objective necessitates an exploratory approach in order to identify contextual factors associated with varying levels of fidelity to the PCMH across cases. A measure of fidelity to the PCMH was used to assess and compared levels of implementation across cases.

Setting

This investigation was carried out in general medicine and family medicine clinics affiliated with a large, academic, integrated health system in the Midwest. The health system is owned by a university and the physicians are full-time employees under the medical school's physician group practice structure. Twenty-five primary care clinics organized under fifteen health centers participate in an incentive program with documented guidelines for implementing a PCMH model into health center operations. Health system senior leadership oversees all clinics and determines strategic decisions with which the clinics must comply. Each primary care clinic was mandated by health system senior leadership to implement the PCMH model of care delivery by incorporating clinical processes (e.g., outreach to patients, population-based health management, patients self-management, and care transitions) designed at the system level.

The similar organizational structures and PCMH implementation infrastructure across clinics supports the identification of generalizable contextual factors associated with variation in fidelity to the PCMH. The six clinics share an affiliation with the health system and have access to similar resources, including a system-wide electronic health record, collaborative learning opportunities (e.g. training and meetings), and an incentive structure for PCMH implementation. Additionally, the majority of the tools and processes to support PCMH implementation were designed at the system level. This is an appropriate setting in which to examine PCMH implementation, because factors known to influence PCMH implementation, such as resources and external incentives, are comparable across clinics (Rittenhouse et al, 2011; Crabtree, et al., 2010).

Sampling of Primary Care Clinics

Qualitatively driven research questions are best explored with a small, purposefully selected sample of cases to allow for in-depth exploration and rich description of the context (Morse & Niehaus, 2009), achieving theoretical saturation (Glaser & Strauss, 1967), and identifying and describing the occurrence of factors replicated across cases (Eisenhardt, 1989). To identify a purposeful sample of six primary care clinics (the cases) appropriate for comparative analysis, the fifteen health centers affiliated with the health system were ranked based on varying levels of patient-centeredness and innovativeness. Patient-centeredness is fundamental to the Joint Principles of the PCMH and it is therefore plausible that practices ranked as having a high level of patient-centeredness will be more successful with PCMH implementation. It is also likely that practices ranked as having a high level of innovativeness will exhibit the necessary flexibility and openness to change that would allow for more successful implementation.

The data used to rank the health centers on patient-centeredness and innovativeness were obtained from an employee survey administered on an annual basis to all clinicians and staff employed by the health system. All clinicians and staff received an e-mail inviting them to participate in the anonymous survey. The survey included questions about resources, innovation and flexibility, fairness and recognition, intellectual change, communication, development and training, teamwork and respect, and patient/customer focus, with the emphasis of the questions being on the respondent's perception of the organization. The primary purpose of the initial quantitative sample drawn from existing survey data is to increase the potential variability of the qualitative

sample. Details of the survey questions and subscale data are provided in Appendix A. The purpose of the study was to explore contextual factors associated with PCMH implementation rather than to characterize PCMH implementation across the U.S., therefore the sample was not selected to ensure representation of the population of all adopting primary care clinics, but rather to include sufficient variation to explore contextual factors associated with PCMH implementation.

Three centers ranked as having high levels of patient-centeredness and innovativeness, and three centers ranked as having low levels of patient-centeredness and innovativeness were selected from the fifteen health centers. The health centers range in size from 3,436 to 26,465 patient visits over a six month period. Studies on the association between organizational size and innovation implementation have produced inconsistent findings, and this was found to be the case with the results of the employee survey across the fifteen health centers. Therefore, within the two groups of three centers, two centers were classified as large (i.e. $\geq$ 13,000 patient visits over a six month period), and one center was classified as small (i.e. < 13,000 patient visits over a six month period). The nine centers that scored in the middle range for patient/customer focus and innovation and flexibility were not included in the purposive sample. The lead investigator was blinded from the rankings so as not to bias collection, analysis, and interpretation of the qualitative data. See Table 11. Sampling of Primary Care Clinics.

[Table 11 about here]

The unit of analysis in this study is the primary care clinic, not the health center. If the health center included multiple ambulatory care clinics, the general medicine or family medicine clinic was targeted for analysis. In-depth comparative case studies of

these six primary care clinics broaden understanding of the differences that result in varying levels of PCMH implementation.

Sampling of Study Informants

The primary sources of data are direct observation and formal and informal interviews with study informants working in the six primary care clinics selected for this study. A snowball sampling method was used to obtain a purposive sample of the various roles in each clinic. The primary intent of sampling study informants was to investigate the perspectives of a wide range of clinicians and staff in each clinic. Such breadth of informant perspectives helped to build "ecological validity" into the study design (Lee, 1999) and provided a full array of perspectives on the organizational context during PCMH implementation. Recruiting study informants for variation in clinic role is an appropriate strategy to increase the range of data collected and to amass a holistic understanding of PCMH implementation, because the informants experienced different aspects of the PCMH and different aspects of context within the same clinic (Crabtree & Miller, 1999; Miles & Huberman, 1994). Multiple perspectives are also necessary to avoid biased findings with limited relevance among organizational members (Eckstein, 1977).

One representative of each type of role involved in the PCMH was recruited from each clinic in order to obtain a proportional representation of study informants from the following categories: PCPs (physicians and nurse practitioners), non-PCP clinicians (clinical pharmacists, licensed practical nurses, registered nurses, and medical assistants), and office staff (call center clerk, check-out clerk, clinic manager, receptionist, and panel manager). Initially, informants were recruited through introduction by the clinic manager,

and then through subsequent site visits, informants were recruited directly by the lead investigator. All informants who were asked to participate in the study agreed to do so. The final sample of study informants included 57 individuals representing a variety of roles in each primary care clinic. See Table 12. Sampling of Study Informants.

[Table 12 about here]

Data Collection

Qualitative data were collected with the purpose of exploring contextual factors likely to influence PCMH implementation in the primary care clinics included in the sample. Observations and interviews were conducted over a twelve month period, beginning approximately twelve months after initial PCMH implementation efforts by the health system. Observations of study informants were conducted in order to holistically understand the clinic context and to observe daily activities, practices, and interactions among clinicians, staff and patients. Formal interviews were conducted to elicit informant perceptions of the clinic context.

An observation checklist and structured interview guide were developed to ensure the systematic collection of information to allow for making valid comparisons across cases. The observation checklist was guided by the elements of the PCMH model. The elements of the PCMH comprise of the guiding principles and operational components that make up the model of care delivery being implemented. Particular attention was paid to observing awareness of PCMH principles and use of operational components. The observation was also broadly guided to collect information about physical space, actors, activities and practices, tools, interactions, goals, and perceptions (Spradley, 1980).

Forty-six observations were conducted with study informants, ranging from 45 minutes to 6 hours and 25 minutes. During the observations, when agreeable, the informant was shadowed as if the researcher were an apprentice learning the participant's job. Notes were taken during the observation period. Following each observation, investigator impressions were documented within 48 hours. Field notes were documented to provide as objective as possible a narrative of the clinic context and how individuals experienced the clinic context. The observation as a method of data collection was important for learning about perceptions of organizational structure and social context which may have been taken for granted by study informants when ingrained into daily practices, and therefore not acknowledged during interviews. Themes emerging from the observations were followed up on during interviews.

Approximately one to two months after the observation, a structured interview was conducted with each study informant. Conducting observations prior to interviews established a familiarity with each study informant's role and responsibilities within the context of their respective clinic, which allowed for revision to the interview guide before the interview in order to draw out information necessary for corroborating emergent findings. Before finalizing the interview guide for each informant, the field notes from the observation were reviewed and emerging themes identified for follow-up during the interview, allowing for greater depth and exploration of different informant perspectives.

The interviews were conducted in a quiet and private clinic location that was comfortable for the informant. Forty-six interviews were conducted, ranging from 35 minutes to 99 minutes, and averaging 54 minutes. With the exception of one informant

who agreed to participate in the interview but refused to be recorded, all interviews were audio-recorded and transcribed verbatim.

The interviews were designed to collect information on informant perceptions of PCMH implementation and factors that influenced implementing this model of care delivery. This inductive study focused on PCMH implementation and contextual factors influencing implementation emerged from the data and were mapped to CFIR constructs.

Procedures for data collection, storage, and analysis were reviewed and approved by the health system's Institutional Review Board. Study objectives and data collection and storage procedures were explained to each informant and informed consent obtained before observations and interviews. Including field notes and transcripts, a total of 1,271 single-spaced pages of data were collected, coded, and analyzed.

Data Analysis

Qualitative data analysis began after the first observational data were collected and was guided by a traditional grounded theory approach (Glaser & Strauss, 1967; Corbin & Strauss, 2008). The first phase of coding involved open coding of the field notes and transcripts (Strauss, 1987). Coding generally involves line by line reading of the data (i.e., field notes and transcripts) and systematically labeling segments of data into themes. Open coding involves the generation of provisional concepts from the data to develop theoretical categories not identified a priori (Strauss, 1987). Coding enabled sorting and resorting data across different informants, informant types, and cases to systematically compare and contrast similarly coded segments of field notes and transcripts side-by-side and to identify recurring themes that emerged regarding contextual factors associated with fidelity to the PCMH (Glaser & Strauss, 1967; Strauss,

1987). This strategy allowed for an iterative process of analysis across cases and enabled hypothesis generation from the data.

Coding and the inductive identification of thematic categories were facilitated by immersion in the data and the involvement of a second experienced qualitative analyst to confirm reliability in assigning codes. Immersion, reading over the field notes and interview transcripts multiple times, was important in the qualitative data analysis because it deepened familiarity with the data and individual cases, evoked recall of experiential data drawn from the investigator's experience and knowledge of the literature, and facilitated the identification of themes and patterns emerging from the data (Strauss, 1987). Initial coding was carried out by the lead investigator and qualitative analyst. Twenty-five percent of the interview transcripts were read line-by-line and independently coded by both the lead investigator and the qualitative analyst. For this study, codes were assigned to segments of text ranging from sentences to full paragraphs to multiple pages.

Consensus discussions were held between the lead investigator and the qualitative analyst to discuss two to three transcripts at a time and to compare independent coding and to enhance meaning and distinctiveness of the emerging themes. This process ensured that different perceptions of the data were discussed, helping to mitigate overly subjective interpretations and investigator bias in the analysis. As themes emerged from the data, specific contextual factors were defined, and when necessary, their definition was refined through review of similar constructs in the literature. See Appendix B for the codebook with construct definitions and documented coding rules developed to ensure the coding categories were judged by the same criteria.

After twenty-five percent of the transcripts were coded and coder agreement was at a high level, the lead investigator coded the remaining data. As data collection and analysis proceeded, concept saturation was achieved, and the information collected from additional study informants became redundant and new insights were no longer revealed. This ensured comprehensive exploration of emerging themes and their association with fidelity to the PCMH. Table 13 lists the contextual factors that emerged from the data analysis and provides examples from the data.

[Table 13 about here]

The next phase of analysis involved 1) mapping each of the contextual factors that emerged from the first phase of data analysis to constructs included in the CFIR, 2) refining the definition of each factor, 2) and comparing the qualitative evidence for each factor across the cases. This phase involved constant comparison between the data and the emerging factors (Eisenhardt, 1989). As discussed previously, two CFIR domains include contextual factors: Outer Setting and Inner Setting. The contextual factors that emerged from the data were compared and contrasted with the contextual factors in those three CFIR domains as they are defined in the original manuscript introducing and describing the CFIR (Damschroder et al., 2009). Fifteen factors emerged inductively and were consolidated to eight when conceptually mapped to CFIR factors. One contextual factor, Patient Engagement in Care, emerged to be associated with variation in fidelity to the PCMH, but did not conceptually map to the CFIR. Table 14 lists the seven contextual factors that emerged from the data to map to the CFIR, the CFIR factor to which it mapped, and a categorical labeling of the factor to indicate variation across clinics within each factor. The categorical labels were determined from the data, as an indicator of the

variable influence the factor appeared to have on fidelity to the PCMH. After comparing and contrasting the evidence across clinics and conceptually mapping the inductively identified contextual factors with the CFIR factors, the association between each contextual factor and a measure of fidelity to the PCMH was assessed.

[Table 14 about here]

Fidelity to the PCMH was evaluated in a separate but concurrent analysis in which the six clinics in the sample were measured and ranked based on fidelity to the PCMH. Variation in fidelity to the PCMH across the six clinics was found, ranging between relative rankings of high, moderate, and low fidelity (Table 15). The conceptualization of fidelity to the PCMH included two organizational levels, 1) the knowledge, attitude and behaviors of clinicians and staff as they adapt their work practices to PCMH principles and operational components, and 2) the fidelity to which the PCMH components are incorporated into clinic practice during implementation. After qualitative categorization of clinic-level fidelity to the PCMH components, levels of fidelity to each PCMH component were assigned to each clinic based on a five-point scale (1 = nonuse, 2 = low fidelity, 3 = neutral fidelity, 4 = high fidelity, and 5 = committed). The numeric values were then totaled within clinic and across the PCMH components to calculate a cumulative fidelity score for each clinic. Then, to determine relative fidelity ranking across the six clinics, the total range of highest and lowest cumulative fidelity scores (Clinic F = 32 and Clinic B = 23, range = 10) was divided by 3 in order to divide the 6 clinics into tertiles of High Fidelity (≥ 30), Moderate Fidelity ($29 \geq$ and ≤ 26), and Low Fidelity ($25 \geq$). See Table 15, Relative Fidelity Rankings by Clinic. A full description of the evaluation of relative rankings of fidelity to the PCMH across

the six primary care clinics is discussed in Chapter 2. The next section describes the findings of the comparative case analysis and the contextual factors that emerged across clinics to map the CFIR factors and to be associated with fidelity to the PCMH.

[Table 15 about here]

Findings

Contextual Factors in the Outer Setting

The CFIR domain of Outer Setting operationalizes the inter-organizational economic, political, and social context within which an organization operates and includes four factors. Three out of the four factors (i.e., cosmopolitanism, peer pressure, and external policies and incentives) in the CFIR model account for characteristics of how an organization relates to other external organizations with respect to networking, competition, or responding to mandates and incentives. The six clinics in the sample are all affiliated with the same large, academic integrated health system, and were therefore tightly integrated themselves and with the overarching health system. Themes relating to cosmopolitanism, peer pressure, or external policies and incentives did not emerge from the data. Two themes, described below, emerged from the data and one (homogeneity of patient population) is congruent with the CFIR domain of outer context.

Homogeneity of the Patient Population. The theme of homogeneity of the patient population, defined as the extent to which patient needs, as well as barriers and facilitators to meet those needs, are perceived as being similar across the patients served by the clinic emerged from the data and closely relates to the CFIR factor of patient needs and resources (See Table 13). Patient needs and resources is defined in the CFIR as the extent to which patient needs, as well as barriers and facilitators to meet those needs, are

accurately known and prioritized by the clinic. A coherent perception of the homogeneity of the patient population was expressed by informants in three out of the four clinics with high and moderate fidelity to the PCMH, and these informant perceptions corroborated with observational data about patient characteristics. In the other clinic with moderate fidelity and one clinic with low fidelity, the patient population was perceived as being heterogeneous. In the clinic with the lowest fidelity rating, different informants expressed different and sometimes conflicting perceptions of the homogeneity of patient population. Table 16 provides evidence of perceptions of homogeneity and heterogeneity of the patient population across the clinics.

Patient Engagement in Care. Patient engagement in care is a second factor that emerged from the data related to the environmental context in which an organization operates. This theme, however, is not congruent with any of the CFIR factors in the Outer Setting domain, or any factors in the other CFIR domains. Patient engagement in care is defined as the extent to which patients are compliant with their care and actively involved in maintaining the patient-provider partnership (See Table 13). Examples from the data that characterize patient engagement in care include diabetic patients maintaining records of their daily blood sugar levels and diet to discuss with providers, and following provider recommendations by actively making changes to their diet and exercise to improve their chronic conditions. Patient engagement in care also includes patients following up on necessary preventive services as recommended by their PCP, for example scheduling a mammogram when a referral is made.

Patient engagement in care was expressed by informants and observed in the two clinics with high fidelity to the PCMH. In one of the moderate fidelity clinics, informants

expressed a lack of patient engagement in care and this was corroborated with observational data about informant interactions with patients. In the other moderate fidelity clinic and both low fidelity clinics, a mix of patient engagement and lack of patient engagement was expressed by informants and this was corroborated with observational data about informant interactions with patients. Table 17 provides evidence of patient engagement in care and patient non-engagement in care across the clinics.

In summary, one emergent theme was congruent with the CFIR domain of Outer Setting and one theme, patient engagement in care, was not congruent with the Outer Setting as defined by constructs in the CFIR model. This finding would suggest that concepts such as patient engagement in care, for example shared decision-making and adherence to recommended care, should be considered as an addition to the CFIR model. Themes relating to cosmopolitanism, peer pressure, or external policies and incentives did not emerge from the data and thus do not provide support for these CFIR concepts in the domain of Outer Setting with respect to PCMH implementation.

Contextual Factors in the Inner Setting

The CFIR domain of Inner Setting operationalizes the intra-organizational context of organizations. The Inner Setting domain includes five broad factors, two of which have multiple sub-factors, characterizing organizational structure, politics, culture, and capacity for change. The factors (and sub-factors) that comprise the Inner Setting domain include: structural characteristics, networks and communications, culture, implementation climate (sub-factors: tension for change and perceived need for the change, compatibility of intervention with the organization, relative priority of the intervention in the organization, organizational incentives and rewards, goals and feedback, and learning

climate), and readiness for implementation (sub-factors: leadership engagement, available resources, and access to knowledge and information).

Structural characteristics is a broad category, defined in the CFIR as the social architecture, age, maturity, and size of an organization. Consistent with previous findings on the association between organizational size and innovation implementation, clinic size, as measured by number of patient visits in a six month period was not found to be associated with level of fidelity to the PCMH, as one of the clinics with the highest level of fidelity to the PCMH and the clinic with the lowest level of fidelity to the PCMH were comparable in size. Two themes, described below, emerged from the data related to structural characteristics.

Stability of Staff. Two themes, turnover and hiring practices, emerged to form stability of staff as an aspect of organizational structure (See Table 13). Turnover, initially defined as the perceived level of changes in personnel in the clinic, including both voluntary and involuntary organizational departure, emerged from the data across clinics (See Table 13 and 18). When asked about change and uncertainty in the clinic, turnover or lack thereof, was often mentioned by informants. Hiring practices initially emerged as a distinct theme in three clinics in which a deliberation during the hiring process was described by informants as being important to finding the right fit of employees when discussing the social context of the clinic. In the two clinics with high fidelity to the PCMH, a low level of turnover was expressed by informants and hiring practices were described as being deliberate, therefore stability of staff was determined to be high. In the two clinics with moderate fidelity to the PCMH and one of the low fidelity clinics, informants expressed a high level of turnover and this was corroborated with

observational data, and therefore stability of staff was determined to be low. In the clinic with the lowest level of fidelity to the PCMH, both a high level of turnover and low a level of turnover in the clinic was expressed by different informants during interviews, and during the observations both employee turnover and stability of staff was observed. Table 18 provides evidence of varying levels of stability of staff across the clinics.

Standardization of Roles. Standardization of roles is a fourth theme that emerged from the data and was determined to be related to two CFIR factors, organizational structure (i.e., the social architecture of the clinic) and implementation climate (i.e., the compatibility of how a new work process fits with existing workflows). The standardization of roles in the clinic is defined as repetitive recognizable patterns of interdependent actions, carried out by multiple organizational members (Rerup & Feldman, 2011). This aspect of organizational context was largely apparent in the role of the medical assistant and the extent to which individual PCP preferences were accommodated by medical assistants[5]. Across clinics, PCPs expressed appreciating working with the same medical assistant on a regular basis (See Table 13). However, the extent to which individual PCP preferences were accommodated by the medical assistants as opposed to the medical assistant roles and responsibilities being standardized in the clinic varied across clinics. In the two clinics with high fidelity to the PCMH, the role of the medical assistant was generally standardized, with the acknowledgment that PCPs had individual preferences that were accommodated, but by and large did not comprise standardization of the role of the medical assistant. Two clinics, one with low fidelity and one with moderate fidelity, did not have standardization of roles in the clinic,

[5] The role of medical assistants in the clinics is to provide clinical and administrative support to PCPs.

as was expressed by multiple informants and was also observed. One clinic with low fidelity to the PCMH also reflected a high level of standardization of roles in the clinic. One clinic with moderate fidelity was determined to have variable standardization of roles in the clinic, because the medical assistants were observed to follow a standardized patient intake process; however, informants expressed the issue of accommodation of PCP preferences causing confusion in the clinic. Overall, some clinics were better able to achieve a balance of standardizing roles while accommodating individual PCP preferences. Table 19 provides evidence of standardized, non-standardized, and variable levels of standardization of roles across clinic.

Multiple themes emerged from the data related to the nature and quality of webs of social networks and communication, and these themes were consolidated into three contextual factors that delineate 1) respectful interactions, the nature and quality of social interactions; 2) camaraderie, the nature and quality of communications, and 3) teamwork, the nature and quality of networks, within the clinic. Each of these themes is described below. These themes align with networks and communication in the CFIR domain of Inner Setting, defined as the nature and quality of webs of social networks and the nature and quality of formal and informal communications within an organization, is another broad category within the CFIR domain of Inner Setting.

Respectful Interactions. Respectful interactions is defined as being cognizant of others at work and paying attention to and taking seriously another person (Dillon, 1992), in contrast to disrespecting, ignoring, neglecting, disregarding, or thoughtlessly dismissing others at work (Spence, Laschinger, & Finegan, 2004). This theme emerged as an aspect of social interactions in the clinics (See Table 13). Trust, defined as having

confident, positive expectations about the actions of others in the clinic initially emerged as a separate theme underlying social interactions. Trust was consolidated with respectful interactions, because trust was used to describe positive expectations of receiving help or assistance in the clinic, as opposed to describing that people will carry out their prescribed tasks, which is an aspect of teamwork. Informants in the two clinics with the highest fidelity to the PCMH described interactions as being polite, friendly, and courteous across all roles in the clinic, which was corroborated by the observation of both respectful interactions and an absence of disrespectful interactions. Informants in the clinics with low fidelity to the PCMH expressed feeling ignored, neglected, or disregarded. Respectful interactions were also prevalent in clinics with low fidelity to the PCMH; however, disrespectful interactions, including gossip and exclusivity, were observed in those clinics, where they were not observed in clinics labeled as respectful. Table 20 provides evidence characterizing respectful interactions and variable (i.e., both respectful and disrespectful) interactions across the clinics.

Camaraderie. Camaraderie is defined as collegial interactions that involve mutual engagement and an absence of hierarchy, and refers to the nature and quality of communication in the clinic. Camaraderie is comprised of work-related and non-work-related communication because the two often occur simultaneously in the work setting (See Table 13). However, in some clinics, camaraderie occurred throughout the clinic, and in others camaraderie emerged as being limited to occurring within certain roles or areas within the clinic. Table 21 provides evidence characterizing camaraderie throughout the clinic or within certain roles. In the clinics with high fidelity to the PCMH, camaraderie occurred regardless of role or the area in the clinic in which people

generally worked. In the clinics with low fidelity to the PCMH, camaraderie was limited to occurring within certain roles or certain areas within the clinic.

Teamwork. Teamwork refers to the nature and quality of networks in the clinic, and is defined in this study by informants' perception of what constitutes the team in their clinic, including who is on the team, and how the informant engages in interdependent tasks with others in the clinic (See Table 13). When asked about task interdependence and interactions with others in the clinic, the informant's perception of team members was often mentioned, therefore the theme of task interdependence was consolidated with teamwork. The majority of clinics had evidence of teamwork throughout the clinic, including two clinics with high fidelity, one clinic with moderate fidelity, and one clinic with low fidelity. In the clinics with evidence of a lack of teamwork throughout the clinic, informants specifically stated that there was a lack of teamwork, or that they did not feel part of a team. Table 22 provides evidence characterizing teamwork throughout clinics and a lack of teamwork throughout clinics.

Organizational Commitment. The theme of organizational commitment, defined as an individual's attachment to the clinic and the goals of the clinic (i.e., high quality patient care), and involvement in the clinic is aimed at supporting the provision of high quality patient care, not necessarily to achieve one's personal or professional goals emerged from the data and closely relates to the CFIR factor of individual identification with organization (Poerter, Steers, Mowday & Boulian, 1974) (See Table 13). Individual identification with organization is defined as a broad construct related to how individuals perceive the organization and their relationship and degree of commitment with the organization. Across all roles, informants in clinics with high fidelity to the PCMH

identified with the organization in which they worked more so than with their individual profession. The clinics with high and moderate fidelity to the PCMH had organizational commitment across roles; however, one of the clinics with low fidelity to the PCMH had variable organizational commitment. A characteristic common to the clinics with low levels of fidelity to the PCMH in which professional commitment was predominant, was that a majority of PCPs practiced part time and had as many, or more, responsibilities outside the clinic compared to the responsibilities they had seeing patients in the clinic. Table 23 provides evidence characterizing organizational commitment across clinics.

In summary, two of the themes that emerged to be congruent with the CFIR domain of Inner Setting were related to the clinics' structure and three of the themes were related to the clinics' social context. One theme emerged to be congruent with the CFIR domain of Characteristics of Individuals, organizational commitment. These findings highlight the breadth of the individual CFIR constructs within the organizing domains. For example, the three themes that emerged as congruent with the CFIR construct of networks and communications, respectful interactions, camaraderie, and teamwork reflect theoretically distinct aspects of the nature and quality of webs of social networks or the nature and quality of formal or informal communications within an organization. The findings also point out the potential for multicollinearity amongst the CFIR constructs, for example the emergence of standardization of roles, a theme that converges with structural characteristics and implementation climate.

Variation in the other CFIR constructs in the Inner Setting domain did not emerge, or emerged from limited study informants. Across clinics, leaders were engaged in PCMH implementation as this was supported by clinic observations, interviews with

clinic managers, and perceptions of clinicians and staff throughout the clinic; however, the importance given to different individual PCMH components varied across clinics (i.e. relative priority, shared perception of the importance of the implementation within the organization). Available resources was perceived to be a barrier to PCMH implementation in the one clinic with the lowest level of fidelity to the PCMH, compared to perceptions resource availability in the two clinics with high fidelity variation did emerge. However, themes mentioned by one study informant and not corroborated by another were not included as emerging themes in this study. The construct of access to knowledge and information about the PCMH was realized in all clinics by their affiliation with the integrated health system. Organizational incentives and rewards were perceived as effective in facilitating PCMH implementation in one of the clinics with the highest level of fidelity to the PCMH, but did not emerge in other clinics. Chapter 2 describes goals and feedback, evaluated as the performance reporting component of the PCMH, as it related to fidelity to the PCMH. Implementation of the performance reporting component was variable across clinics in the sample (See Chapter 2 for further discussion).

Discussion

The purpose of this research is twofold, 1) enhance understanding of PCMH implementation by identifying contextual factors associated with varying levels of fidelity to the PCMH, and 2) contribute to refining and further developing theoretical constructs germane to the CFIR. Table 15 shows a consistent pattern in the two clinics with high fidelity to the PCMH, across the eight contextual factors that emerged from the

data, suggesting an association between the emergent contextual factors and PCMH implementation.

The study extends understanding of contextual factors that have been identified in the literature to influence PCMH implementation. Homogeneity of the patient population relates closely to the concept of attentiveness to the local environment, defined as connections to organizations in the community (Miller et al., 2010). Miller and colleagues (2010) found attentiveness to the local environment to be the practice characteristic that consistently differentiated the practices most able to learn and develop during PCMH implementation, because external relationships strengthened connections to the community in which the practice was located and were therefore sources for learning and developing within the practice. This result also parallels the finding that organizations that are good at understanding patient needs and expectations are more likely to effectively implement change (Shortell et al., 2004).

Patient engagement in care also emerged as a factor related to patient characteristics. The influence of patient characteristics is particularly salient to PCMH implementation, in which providers must promote relationships with patients. A homogeneous patient population can give focus to a clinic's patient-centered initiatives related to PCMH implementation (e.g., responding to the patient) and patients who are engaged in their care take the burden off providers to put resources into actively cultivating relationships with patients.

Respectful interactions, camaraderie, and teamwork throughout the clinic influenced PCMH implementation. Miller and colleagues (2010) identify networks and communication as a key element of a health relationship infrastructure and practice's

adaptive reserve, defined as a clinic's capacity for learning and development, and they posit that both are necessary to achieve PCMH implementation (Nutting et al., 2010). By qualitatively describing how the promotion of polite interactions, courtesy and people getting along throughout the clinic is associated with fidelity to the PCMH, the results presented in this study provide a social context in which networks and communication are established to support PCMH implementation. A social context with these characteristics prevalent throughout the clinic, in combination with a shared organizational commitment, can increase the likelihood of successful PCMH implementation. The findings also corroborate with findings in the PCMH literature proposing that traditional, siloed perceptions of roles in primary care delivery must evolve to team-based perception of roles in order to achieve PCMH transformation (Nutting et al., 2011). Stability of staff may be important to PCMH implementation, because of the aspect of the PCMH that is dependent on maintaining relationships between patients and providers over time. With the team-based element of the PCMH and all providers and staff having a role in maintaining patient relationships, all clinic roles are important.

Limitations

A nationally representative sample of primary care clinics may have generated more contextual factors associated with PCMH implementation. However, controlling for such factors and investigating primary care clinics affiliated with one large, academic, integrated health system brought forth the importance of patient characteristics in PCMH implementation. Although the sample of study informants selected from each clinic was representative of roles involved in PCMH implementation, limited perspectives

respective of all employees in the clinic were obtained. The sample of study informants permitted the inclusion of the perspectives of front line roles involved in PCMH implementation; corroborating these multiple perspectives from within each clinic as opposed to conducting key informant interviews increases reliability and validity of the evidence supporting the factors that emerged to be associated with fidelity to the PCMH. Finally, collecting information on the nature and quality of social interactions that comprise many aspects of organizational context can be sensitive and therefore limited information may be shared; however, the findings are supported by corroboration with observational data, where informants may be hesitant to discuss negative aspects of the social networks, they can be observed, and corroboration between findings from multiple informants in each clinic.

Conclusion and Implications

This study makes several contributions to the examination of PCMH implementation and contextual factors in implementation science; the state of the science of both is such that pre-determined factors of PCMH implementation have not been explicated. Furthermore, the majority of implementation research has been conducted in acute care settings, therefore little is known about the contextual factors that influence implementation of innovations, such as the PCMH model of care delivery, in primary care settings. Patient engagement in care emerged as a factor associated with fidelity to the PCMH, and a factor absent from the CFIR. As health reform focuses on expanding health promotion and disease prevention services in private and public insurance programs, more information is needed to understand mechanisms of patient engagement

in care. In addition, varying levels of patient engagement across provider organizations must be considered in the implementation of those programs.

The CFIR was adapted to the findings of this investigation to frame constructs that confirm previous findings and merit further investigation for understanding PCMH implementation (Damschroder et al., 2009). The exploratory methods used in this study revealed eight factors associated with fidelity to the PCMH: homogeneity of the patient population, patient engagement in care, stability of staff, standardization of roles, respectful interactions, camaraderie, teamwork, and organizational commitment. These factors occur at multiple organizational levels, illustrating the complexity of primary care delivery organizations that must be considered in the policymaking that stimulates PCMH implementation. The PCMH is redefining primary care and if it is to be successfully implemented, policymakers and practitioners alike must consider the need to influence changes in the social context of primary care delivery, as opposed to changes in the structure of the workforce (e.g., headcounts of provider types).

Evidence of PCMH effectiveness in controlling costs and improving quality of care is increasing. However, without a better understanding the organizational contextual factors that influence the fidelity with which a PCMH is implemented into practice, the association between the PCMH model components and intended outcomes cannot be fully understood. This study contributes to understanding, and further highlights the importance of organizational contextual factors associated with variation in PCMH implementation in primary care clinics.

Table 11: Sampling of Primary Care Clinics

	Small <13,000 patient visits in 6 months	Large ≥13,000 patient visits in 6 months
High Patient Focus & Innovation	1	2
Low Patient Focus & Innovation	1	2

Table 12: Sampling of Study Informants

Role in Clinic	N
Primary Care Providers (MD, NP)	8
Non-Primary Care Providers (PharmD, LPN, RN, MA)	20
Office Management (Manager, Office Assistant)	29
Total	57

Table 13: Inductively Identified Contextual Factors

Contextual Factor	Definition	Interview Example	Observation Example
Homogeneity of Patient Population	The extent to which patient needs, as well as barriers and facilitators to meet those needs are perceived as being similar in the clinic's patient population.	…we see a very large variety of patients, but they each have their own challenges… (PCP)	In clinics A, F, and D, over the course of clinic observations, patient characteristics were observed to be homogeneous, which was confirmed during the interviews.
Patient Engagement	The extent to which patients are compliant with their care and actively involved in maintaining the patient provider partnership.	I think most of the things for preventative services that we run into is just patients not showing up (PCP) [I: Do patients ask questions about having the primary care provider? Are they engaged in that idea?] That – no, with this patient population, it's a little different. They're just like, "I'm just going to come in to see whoever I can." (Non-PCP)	During observations it was explained that the clinic has a very high no show rate for care management appointments and patients are often late to their PCP appointments. When they leave the appointment they "never" follow-up on certain aspects of their care, for example obtaining their medical records from providers outside of the health system.
Turnover	Perception of the perceived level of changes in personnel in the clinic, including both voluntary and involuntary organizational departure.	…out in the front, our call center, I mean, there's turnover there like no tomorrow. (PCP)	The line of patients at the reception continued to get longer and longer, because there weren't any staff to check patients out.

Contextual Factor	Definition	Interview Example	Observation Example
Hiring Practices	Perception of the level of deliberation involved in the clinic hiring process.	Recently, I'm trying to hire an employee. That happens quite often. […] I think I do a good job now finding the right employees, but instead of at the beginning when I started where I just wanted to fill that spot and get a body in. I'm really, really picky now. And it will take me 2-3 months to find somebody, because I want to find the right fit for my team. I have a good team and I just want to make the team stronger. (Office Staff)	Hiring practices were not observed.
Standardization of Roles in Practice	Organizational routines, such as the patient intake process, that are repetitive, recognizable patterns of independent actions, carried out by multiple organizational members. Organizational routines are fundamental for accomplishing work in organizations by establishing shared assumptions and frames of reference that give meaning to daily activities and staff expectations (Rerup & Feldman, 2011).	If it's something that the physicians are delegating. They determine who the best person is. […] Sometimes there's confusion, because those physicians will go to them and change the processes. (Office Staff)	By the third patient, it is apparent that [study informant] follows a routine process for patient intake. Just as [study informant] had done with the first two patients. The medical assistants cover for each other frequently and [study informant] confirms the clinic has a fairly standardized intake process across all medical assistants.

Contextual Factor	Definition	Interview Example	Observation Example
Accommodation of Individual Physician Preferences	Shared understandings developed through practice facilitate the PCP's practice. The understanding is unique to mini-teams of PCPs and medical assistants.	once I got a regular MA assigned to me, then it was just much smoother and we could actually start developing a relationship, so once I had a regular MA assigned to me, she and I got together, we talked about preferences for how she liked to do things […] so that we had the same system, and so it worked out much smoother, whereas when I had chaos and [didn't know] who in the world my MA was, there was no point in trying to establish relationships with each of them. – PCP	The medical assistants did patient intake as patients checked in at the clinic, whether or not the patient had an appointment with the PCP with whom the medical assistant supported. Based on the intake process, the mini-teams of PCPs and medical assistants could not be determined during the observations in [clinic C].
Respectful Interactions	Being cognizant of others at work. Paying attention to and taking seriously another person. Disrespect is shown towards a person when he/she is ignored, neglected, disregarded or dismissed lightly or thoughtlessly.	I have respect for each different type of position there is in the office because we couldn't do without any one of them. We all take care of the patient, but just in a different way. (Non-PCP)	Courtesy was observed during all interactions in [clinic A].
Trust	Informant expresses having confident, positive expectations about the actions of others, or expresses that people in the clinic have positive expectations of others not behaving in ways that may be detrimental to the functioning of the clinic.	I'm quite comfortable with going to anyone in the office. (Non-PCP)	Trust was not observed.

Contextual Factor	Definition	Interview Example	Observation Example
Communication – Work Related	Communication intended to increase clinic functioning.	She has been a wonderful support. She's the lead clerk. She's never once said, "I don't have time for you." So, I feel comfortable asking for help. (Non-PCP)	[Study informant (Non-PCP)] goes to the other side of the clinic to check in with [office staff] about the [registry report] "Anything come up? Do you need me for anything?" The [office staff] doesn't have anything to discuss with [study informant]. Compared to other clinics, where this inquiry may have occurred via e-mail or notification in a patient medical record.
Communication – Not Work Related	Communication that is social, not work related.	[I: who are the other people in the clinic with whom you interact the most?] The other physicians […] And, obviously, my own medical assistant. [I: What do the interactions with physicians involve?] […] Just kind of joking around, hanging out in the office kind of stuff. Not even so much patient care but just chatting with them. […] I think it's pretty friendly, overall. We have lots of parties here, gatherings that facilitate collegiality. I think, of course, you interact most with the people that you're next to all day long […]It's a little bit harder to know all the office staff just because they're so far removed physically from where we're at most of the day. (PCP).	Based on observations conducted in [clinic D], organizational members expressed familiarity with non-work related aspects of each other's lives; however this was limited to certain areas of the clinic.

Contextual Factor	Definition	Interview Example	Observation Example
Teamwork	Perception of what constitutes a team, who is on the team, and how people in the clinic engage in teamwork to achieve clinic goals.	I interact with – actually, it's a total team effort in this office. So, I really interact with everyone. And I depend on them for their assistance with what I don't know, assistance with helping me take care of the patient. (Non-PCP)	Teamwork was coded based on study informant perceptions and was not coded in the observational data.
Task Interdependence	Perception of work being dependent on others in the clinic.	at the team meeting, we go through with the nurse, are you coming up with any problems? Is anything not working well? What could work better? And then with the medical assistant, what's going on with medical assistants? Anything new? Any problems…. And the physicians kind of share their input if they've already been somewhere else outside of the building, they can bring it in and say, "well, we were at this meeting, we discussed this, and now I'm letting you know." So, we all flow together. Even, the scheduler and call center person's there for our team. So, it goes from scheduling to bringing back patients to seeing the patients to the nurse handling patients. (Non-PCP)	Task interdependence was coded based on study informant perceptions and was not coded in the observational data.
Organizational Commitment	Involvement in the clinic is aimed at supporting the provision of high quality patient care, not necessarily to achieve an individual's own goals. Organizational commitment describes employees' attachments to their organization (Porter, Steers, Mowday, & Boulian, 1974).	People who work here, work here because they want to work here. (Non-PCP)	Organizational commitment was not coded in the observational data.

Table 14: Mapping of Contextual Factors to CFIR Constructs and Variation in Fidelity to the PCMH across Clinics

CFIR Construct (CFIR Domain)	Contextual Factor	Clinic F High Fidelity	Clinic A High Fidelity	Clinic D Mod. Fidelity	Clinic C Mod. Fidelity	Clinic E Low Fidelity	Clinic B Low Fidelity
Patient Needs & Resources (Outer Setting)	Homogeneity of Patient Population	Homogeneous	Homogeneous	Homogeneous	Heterogeneous	Heterogeneous	Heterogeneous
Structural Characteristics (Inner Setting)	Stability of Staff	High	High	Low	Variable	Low	Variable
Structural Characteristics (Inner Setting)	Standardization of Roles in Practice	Standardized	Standardized	Not Standardized	Variable	Standardized	Not Standardized
Networks & Communication (Inner Setting)	Respectful Interactions	Respectful	Respectful	Variable	Respectful	Variable	Variable
Networks & Communication (Inner Setting)	Camaraderie	Throughout Clinic	Throughout Clinic	Within Roles	Throughout Clinic	Within Roles	Within Roles
Networks & Communication (Inner Setting)	Teamwork	Throughout Clinic	Throughout Clinic	Not Throughout	Throughout Clinic	Throughout Clinic	Not Throughout
Organizational Identification (Characteristics of Individuals)	Organizational Commitment	Organizational	Organizational	Organizational	Organizational	Variable	Organizational
Not Applicable	Patient Engagement	Engaged	Engaged	Not Engaged	Engaged & Not Engaged	Engaged & Not Engaged	Engaged & Not Engaged

Table 15: Relative Fidelity Rankings by Clinic

Operational Component	Clinic F	Clinic A	Clinic D	Clinic C	Clinic E	Clinic B
Patient Registries	4	4	3	4	4	3
Patient-Provider Partnership	4	3	5	3	2	3
Transition of Care	4	4	4	4	2	2
Individualized Patient Care	4	4	2	3	3	3
Preventive Services	4	3	4	2	3	2
Extended Access	4	3	3	4	2	2
Specialist Referral	3	4	3	3	3	2
Performance Reporting	3	4	2	1	3	3
Test Result Tracking	2	3	2	2	3	3
Cumulative Fidelity Score	32	32	28	26	25	23
Relative Fidelity Ranking	High	High	Mod	Mod	Low	Low

Nonuse Low Fidelity Neutral High Fidelity Committed

Table 16: Evidence Characterizing Homogeneity of the Patient Population

Clinic F High Fidelity *Evidence of a homogeneous patient population*	Clinic A High Fidelity *Evidence of a homogeneous patient population*
Interview Data: …people are fairly consistently educated, middle class, upper class, with the treadmill in the basement, with ways to get things done. And there's good parks here, you can always go to the metro park and walk or bike. The community is structured well. The people in the community usually have enough resources to get things done with their own health. (PCP) Observation Data: Patients were observed to be relatively homogenous.	Interview Data: [Clinic] has a very high [privately insured] population, so we're able to really touch a number of our patients, which is really good. (Office Staff) Observation Data: Patients were observed to be relatively homogenous.
Clinic D Moderate Fidelity *Evidence of a homogeneous patient population*	Clinic C Moderate Fidelity *Evidence of a heterogeneous patient population*
Interview Data: Our patients are ever, ever, ever more sick… … people are just trying to eat and survive…have a roof over their heads and have a place that doesn't have bugs or mold and…stay out of the ER. (Non-PCP) Especially in this patient population because, they need to get here when they get here. A lot of them don't have cars. They use transportation for under-served patients… most of our patients are Medicare. (PCP) Observation Data: Patients were observed to be relatively homogenous.	Interview Data: The patient population is nice in that it's diverse, so there's a lot of chronic care, but there's acute quick visits too that break up the day. (PCP) Observation Data: Patients were observed to be relatively heterogeneous.
Clinic E Low Fidelity *Evidence of a heterogeneous patient population*	Clinic B Low Fidelity *Evidence of a heterogeneous patient population*
Interview Data: I like the mix of patient population (PCP) Observation Data: Patients were observed to be relatively heterogeneous.	Interview Data: …because of their insurance […] they're able to call and get allergy appointments, dermatology appointments, whatever-without a referral from us, and so they were used to that autonomy, they don't want to actually have to go to their primary care doctor to get that referral. That's an annoyance to them, particularly because they are [knowledgeable patients]. They think they at least know when they need to see this, whatever, and so it was an interesting dynamic particularly with the particular patient population that we see in our clinic, probably compared to some of the other clinics. (PCP) The patient population here is a little crazier than at [my other clinic], in terms of chronic pain issues. (PCP) Observation Data: Patients were observed to be relatively heterogeneous.

Table 17: Evidence Characterizing Patient Engagement in Care

Clinic F High Fidelity *Evidence of Patient Engagement in Care*	Clinic A High Fidelity *Evidence of Patient Engagement in Care*
Interview Data: …no problem patients today. There's a lot less of that here, I think, than at some other clinics. […] Just the mix of [Clinic F] patients. It's more educated, people who are semi-engaged in their health. (PCP) Observational Data: Based on observations of interactions with patients in the clinic, patients were generally engaged in their care. For example, diabetic patients maintained records of their daily blood sugar levels and diet to discuss with providers and patients with high blood pressure maintained records of their daily blood pressure levels to discuss with providers.	Interview Data: Most of my patients are pretty routine. If they have hypertension or diabetes they are under control. [I: Are many patients uncontrolled?] No, because then we adjust it, like his hypertension. [This was in reference to a diabetic patient I had observed for whom the PCP had prescribed a diuretic for high blood pressure.] Observational Data: Based on observations of interactions with patients in the clinic, patients were generally engaged in their care. For example, diabetic patients maintained records of their daily blood sugar levels and diet to discuss with providers and patients with high blood pressure maintained records of their daily blood pressure levels to discuss with providers.
Clinic D Moderate Fidelity *Evidence of Patient Non-Engagement in Care*	Clinic C Moderate Fidelity *Evidence of both Patient Engagement and Non-Engagement in Care*
Interview Data: And many [patients] here are less knowledgeable about their [health], we have a patient population that is a lot less proactive with their health care. They really expect to be, kind of babysat a little bit. […] all the meetings with the people from the other [clinics], and they don't really have the problems that we do. Because they don't have the population that we do. (Non-PCP) I think most of the things for preventative services that we run into is just patients not showing up (PCP) Observational Data: During observations it was explained that the clinic has a very high no show rate for care management appointments and patients are often late to their PCP appointments. When they leave the appointment they "never" follow-up on certain aspects of their care, for example obtaining their medical records from providers outside of the health system.	Interview Data: …some of this stuff begins to feel like, for example we call the patients who we already ordered mammograms for and they haven't gotten them and schedule the mammogram for the patient. At some point, I feel like our patients need to take some personal responsibility, too. And so some of this starts to feel a little bit like excessive handholding, not for everybody, but for the person who left the mammogram requisition on the floor of their car (PCP). Observational Data: Based on observations of interactions with patients in the clinic, some patients were engaged in their care and improving their health and some were less so.

Clinic F High Fidelity *Evidence of Patient Engagement in Care*	Clinic A High Fidelity *Evidence of Patient Engagement in Care*
Interview Data: …no problem patients today. There's a lot less of that here, I think, than at some other clinics. […] Just the mix of [clinic F] patients. It's more educated, people who are semi-engaged in their health. (PCP) Observational Data: Based on observations of interactions with patients in the clinic, patients were generally engaged in their care and improving their health. For example, diabetic patients maintained records of their daily blood sugar levels and diet to discuss with providers and patients with high blood pressure maintained records of their daily blood pressure levels to discuss with providers.	Interview Data: Most of my patients are pretty routine. If they have hypertension or diabetes they are under control. [I: Are many patients uncontrolled?] No, because then we adjust it, like his hypertension. [This was in reference to a diabetic patient I had observed for whom the PCP had prescribed a diuretic for high blood pressure.] Observational Data: Based on observations of interactions with patients in the clinic, patients were generally engaged in their care and improving their health. For example, diabetic patients maintained records of their daily blood sugar levels and diet to discuss with providers and patients with high blood pressure maintained records of their daily blood pressure levels to discuss with providers.

Table 18: Evidence Characterizing Stability of Staff

Clinic F High Fidelity *Evidence of Stability of Staff*	Clinic A High Fidelity *Evidence of Stability of Staff*
Interview Data: Our clinic does occasionally lose a physician and get a physician in, but not all that frequently, and a lot of the front staff is very stable and a lot of MAs are very stable, but the MAs are probably our biggest turnover and also the role that most directly impacts my day. (PCP) I'm lucky enough that I usually don't have a very big turnover in staff, so my staff really kind of get to know those little nuances. (Office Staff) Observational Data: Evidence of turnover was not observed.	Interview Data: in general, we've had a very stable staff (PCP). Observational Data: Evidence of turnover was not observed.
Clinic D Moderate Fidelity ***Evidence of Lack of Stability of Staff***	**Clinic C Moderate Fidelity** ***Evidence of Variable Stability of Staff***
Interview Data: …out in the front, our call center, I mean, there's turnover there like no tomorrow. Observational Data: The line of patients at the reception continued to get longer and longer, because there weren't any staff to check patients out.	Interview Data: …we've had a lot of transition here, as far as turnover. […] So, there were actually certain points where I was [supporting] seven doctors. (Non-PCP) Recently, I'm trying to hire an employee. That happens quite often. […] I think I do a good job now finding the right employees, but instead of at the beginning when I started where I just wanted to fill that spot and get a body in. I'm really, really picky now. And it will take me 2-3 months to find somebody, because I want to find the right fit for my team. I have a good team and I just want to make the team stronger. (Office Staff) Observational Data: During observations, new employees were introduced and current employees discussed plans to leave.

Clinic E Low Fidelity *Evidence of Lack of Stability of Staff*	Clinic B Low Fidelity *Evidence of Variable Stability of Staff*
Interview Data: appointment availability has always been a problem at this office, because of many providers being part time due to other obligations and because of just provider turnover. (PCP) [I: do you feel like you've developed relationships with the physicians' patients?] Yes. Absolutely. Absolutely. Unfortunately, my doctors left a lot of them. [I: At this clinic, you've had a lot of turnover.] Yes. (Non-PCP) Observational Data: Evidence of provider turnover was apparent during observations.	Interview Data: [I: …is there staff turnover in this clinic?] Not, not at – not lately. […] for the past three years, except for people leaving because they wanted to and a couple coming in, it's been pretty much the same people. The patients seem to enjoy that, because they have familiar faces and stuff like that. (Non-PCP) And this seems to be a common theme in our practice. We will hire someone and our clinic seems to invest 3 or 6 months into training this new person in their role […] and then about 6 months after they are fully trained, they [go to] another site, which we know pays more. [I: So, there's a lot of turnover?] Yes. (PCP) Well, they've had a large turnover of employees. I'm not quite sure why, but they have. In our office. […] A large turnover. I think people always think the grass is greener on the other side of the street. (Office Staff) Observational Data: Evidence of turnover and employee stability was observed.

Table 19: Evidence Characterizing Standardization of Roles in Clinic

Clinic F High Fidelity *Evidence of Standardization of Roles in Clinic*	Clinic A High Fidelity *Evidence of Standardization of Roles in Clinic*
Interview Data: I think there may be some problems periodically with how people do things. For instance, physicians, we talked about how I triage results and things and we don't all triage them the same. And so, there may sometimes arise some confusions about that. Although, I couldn't specifically say the problem that's come out of that… And then some MAs do some things one way versus another, and for me who works with a lot of the MAs on an infrequent basis, that can create a little bit of tension, or a bigger learning curve when we do work together. (PCP) We can have these team doctors, so if [a doctor] is on vacation, these would be the covering doctors. But as far as the MAs were concerned, each MA is capable of covering any doctor in this clinic, and a lot of times they'll cross, [team A] will cross [team B] and that kind of thing. […] We have some physicians that have been with the practice for a long time that are reluctant to do things that would standardize things and make it easier for everybody. (Non-PCP) as individuals, we have a tendency to do things the way we like to do them. So, yes, there's some variations from doctor to doctor as how they handle certain things. […] my staff really kind of get to know those little nuances. Plus the physicians are really good about being understanding if they're not working with the regular MA and, and knowing that that MA may not, like, know that they like to have the pink sheet on the left hand side. (Office Staff) Observational Data: Based on clinic observations of interactions with patients in the clinic, roles were generally standardized and medical assistants supported each other frequently, although PCP preferences were accommodated with teams of PCPs and medical assistants.	Interview Data: an MA is working on one specific doctor. So, if they're not doing their job, then it like, it's very obvious. And so I think the fact that, you know, there's a lot of work that has to flow through channels. And if somebody is not doing their work, then it becomes a big bottle neck, and it becomes very obvious. Observational Data: Based on clinic observations of interactions with patients in the clinic, roles were generally standardized and medical assistants supported each other frequently, although PCP preferences were accommodated with teams of PCPs and medical assistants.

Clinic D Moderate Fidelity *Evidence of Non-Standardization of Roles in Clinic*	Clinic C Moderate Fidelity *Evidence of Variable Standardization of Roles in Clinic*
Interview Data: I think some of the struggle is that there's not a standardization on what all the MAs are doing. So, if my MA's not here, I'm working with somebody else, and that can be different, different enough that five minutes here or there really does make a huge difference in your day. (PCP) I go ahead and I address all the prompts per [PCP]. Other MAs don't do that with their mini-teams. So, I, personally, don't have the problem because I just go ahead and take care of it. […] I think it makes other people mad, other MAs. Because then if I'm out and then they have to work with those physicians and those physicians expect it from them. And I have to try to explain to my physicians, "this is just something that I do with you. You're not going to necessarily get this with other MAs." (Office Staff) Observational Data: Based on clinic observations, attempts were being made to standardize processes; however, compared to other clinics, clinic processes and roles appeared less standardized.	Interview Data: If it's something that the physicians are delegating. They determine who the best person is. […] Sometimes there's confusion, because those physicians will go to them and change the processes. (Office Staff) Observational Data: Based on clinic observations of interactions with patients in the clinic, roles were generally standardized and medical assistants supported each other frequently, but individual PCP preferences were also accommodated.
Clinic E Low Fidelity *Evidence of Standardization of Roles in Clinic*	Clinic B Low Fidelity *Evidence of Non-Standardization of Roles in Clinic*
Interview Data: [I: You haven't developed any [practices] that are specific to you and [Dr. H]?] Nope. [I: And is that pretty much how all the MAs function in the clinic?] As far as I know. They should be. […] I know it was brought up at the last meeting, nothing was said, like we're not doing it, but it was addressed, we need to be doing more of across the board. […] We should be doing it for every doctor we work for. (Non-PCP) …all providers are a little different, so when the MA has been paired with a provider for a while, they just kind of know how that provider works. The flow is better. But there's also standardized processes, too. All the MAs are set up to [communicate with] providers for orders. All the MAs are asked to ask about certain prompts […] And that's standardized. (PCP) Observational Data: During the clinic observation with the MA, by the third patient, it was apparent that the MA follows a routine process for patient intake. The MAs cover for each other frequently and the MA confirms the clinic has a fairly standardized intake process.	Interview Data: And every doctor is different. Some doctors don't want you to do all of it. Some do. We try to be as uniform, as possible […] Sometimes there are different expectations. You know, some doctors want to do their own foot exams. (Non-PCP) Once I got a regular MA assigned to me, then it was just much smoother and we could actually start developing a relationship. […] we talked about preferences for how she liked to do things, how I liked to do things […] so that we had the same system, and so it worked out much smoother, whereas when I had chaos and [didn't' know] who in the world my MA was, there was no point in trying to establish relationships with each of them. (PCP)

Table 20: Evidence Characterizing Respectful Interactions

Clinic F High Fidelity *Evidence of Respectful Interactions*	Clinic A High Fidelity *Evidence of Respectful Interactions*
Interview Data: …doctors are not, "*Oh, I'm a doctor and you're a medical assistant.*" We're all kind of treated as, we're all people, and then we all have our different roles in the clinic. (Non-PCP) And our docs are very approachable, they're good teachers and if you have questions, they're happy to, you know—they're nice… (Non-PCP) …as a whole, our – most of our team members work together and they're all friendly and helpful. (Office Staff) I think it's important to be mutually respectful to each other for the roles that you play within the clinic. I don't say it much anymore, because they probably got kind of sick and tired of hearing it, but I really do not think one role is more important than another role here. The physicians have a role, my MAs have a role, my nurses have a role, and my front staff have a role. They're all very, very important. You cannot take one of those roles outside of this clinic and have the full picture. (Office Staff) Observational Data: Based on observations of interactions among staff in the clinic, respectful interactions are the norm.	Interview Data: Well, we just try to keep a very courteous tone around the clinic. Just more of a tone thing, I think where you just try to be, everybody tries to be polite, I guess. (PCP) I have respect for each different type of position there is in the office because we couldn't do without any one of them. We all take care of the patient, but just in a different way. […] I'm quite comfortable with going to anyone in the office. (Non-PCP) There's no rejection, there's always open communication. (Non-PCP) Observational Data: Based on observations of interactions among staff in the clinic, respectful interactions are the norm.

Clinic D Moderate Fidelity *Evidence of Variable Levels of Respectful Interactions*	Clinic C Moderate Fidelity *Evidence of Respectful Interactions*
Interview Data: No direct quotes Observational Data: Based on observations of interactions among staff in the clinic, respectful interactions were prevalent however, exclusivity and gossip was observed.	Interview Data: I think that everyone is pleasant and cooperative (PCP) Observational Data: Based on observations of interactions among staff in the clinic, respectful interactions are the norm.
Clinic E Low Fidelity ***Evidence of Variable Levels of Respectful Interactions***	**Clinic B Low Fidelity** ***Evidence of Variable Levels of Respectful Interactions***
Interview Data: …but I think one of the biggest obstacles is that people don't listen to each other. And they interrupt each other. And so, that causes a lot of miscommunication and misunderstanding. (Non-PCP) People taking people the wrong way. So, the way they say things, they don't mean to say it that way, and somebody didn't mean for somebody to take it that way. […] So, just kind of, across the board, watch how you say something to somebody so they don't take it the wrong way. Just kind of keep an open mind of how you might be saying something to somebody. So, they might perceive it in a different way. Observational Data: Based on observations of interactions among staff in the clinic, both respectful and disrespectful interactions occur.	Interview Data: No direct quotes Observational Data: Based on observations of interactions among staff in the clinic, respectful interactions were prevalent however, exclusivity and gossip was observed.

Table 21: Evidence Characterizing Camaraderie

Clinic F High Fidelity *Evidence of Camaraderie Throughout Clinic*	Clinic A High Fidelity *Evidence of Camaraderie Throughout Clinic*
Interview Data: when we have lunch, we sit in the lunch room and there can be doctors, MAs, front staff, nurses, students, all of us and they're eating lunch together. That happens frequently and you wouldn't know the difference between any of us when you're sitting there eating with us, you wouldn't know who was who. (Non-PCP) Observational Data: Organizational members throughout the clinic expressed collegiality and familiarity with non-work related aspects of each other's lives.	Interview Data: There's no rejection, there's always open communication. […] I think it's because we work so close together. […] we do special things for each other. […] I think it makes us work together as a team. It makes us more aware that we're a family here. (Non-PCP) Observational: Organizational members throughout the clinic expressed collegiality and familiarity with non-work related aspects of each other's lives.
Clinic D Moderate Fidelity *Evidence of Camaraderie Within Roles*	Clinic C Moderate Fidelity *Evidence of Camaraderie Throughout Clinic*
Interview Data: we have camaraderie because of the things that we go through with patients and things that we all know what's going on […] I think that is the main thing that makes us, be like, we're all in it together. We're all dealing with the same issues and you know, let's get the job done. (Non-PCP) …between the MAs, I feel like there's good camaraderie between some of the physicians, but I feel like it's very segregated between teams (PCP) Observational Data: Organizational members in the clinic expressed familiarity with non-work related aspects of each other's lives; however this was limited to certain roles or areas of the clinic.	Interview Data: I think there's definitely a camaraderie. […]I think it's largely a fairly good group of people, a nice group of people. A lot of them go out together after work […]and they're all together at their lunch hour and everything. Not that the physicians are excluded, because it's not that way at all, but I think a camaraderie develops by the fact that they work together and it carries over into the work day. Observational Data: Organizational members throughout the clinic expressed collegiality and familiarity with non-work related aspects of each other's lives.
Clinic F High Fidelity *Evidence of Camaraderie Throughout Clinic*	Clinic A High Fidelity *Evidence of Camaraderie Throughout Clinic*
Interview Data: when we have lunch, we sit in the lunch room and there can be doctors, MAs, front staff, nurses, students, all of us and they're eating lunch together. That happens frequently and you wouldn't know the difference between any of us when you're sitting there eating with us, you wouldn't know who was who. (Non-PCP) Observational Data: Organizational members throughout the clinic expressed collegiality and familiarity with non-work related aspects of each other's lives.	Interview Data: There's no rejection, there's always open communication. […] I think it's because we work so close together. When somebody here was in an auto accident, or somebody's off on medical, we pull together and we send them a basket, or we do special things for each other. […] I think it makes us more, work together as a team. It makes us more aware that we're a family here. (Non-PCP) Observational Data: Organizational members throughout the clinic expressed collegiality and familiarity with non-work related aspects of each other's lives.

Table 22: Evidence Characterizing Teamwork

Clinic F High Fidelity *Evidence of Teamwork Throughout Clinic*	Clinic A High Fidelity *Evidence of Teamwork Throughout Clinic*
Interview Data: I could never do this by myself. There's just no way. I couldn't do it without the other nurses […] it wouldn't even be possible. The call center, I really like the girls in the call center, they screen the calls for me so that the calls I'm getting, even though I have a ton of them in my box, they're appropriate for the most part. The MAs, they help if I need help. I help them if I can. What they're doing for the doctor, if they weren't out there, I would have to be and I can't do this and that, too. So, yeah, it's just an all of a team. (Non-PCP) …they know if they need me for anything out on the floor, immunizations or anything, they're more than welcome, they can IM me, they can page me overhead, they can just peak their head around the corner and say, "I need your help." (Non-PCP) We have a good team here. I think they all interact very well, the doctors and the MAs and the RNs and front staff and call center. I'd just say, as a whole, we're one big team… (Office Staff)	Interview Data: I would say the MAs, all the MAs, all the physicians, the phone staff, the check-in staff is on the team. […] Because we all have the same goal, working for the patients. (Non-PCP) I interact with – actually, it's a total team effort in this office. So, I really interact with everyone. And I depend on them for their assistance with what I don't know, assistance with helping me take care of the patient. (Non-PCP)
Clinic D Moderate Fidelity ***Evidence of a Lack of Teamwork Throughout Clinic***	**Clinic C Moderate Fidelity** ***Evidence of Teamwork Throughout Clinic***
Interview Data: No, I don't feel like I'm part of a care team, there is a divide between the MA's and providers and then the clerks. (Office Staff) I feel like we're on our own a little bit. No, I don't feel like I'm part of a team. […] It's just me doing this. (Non-PCP) [Do you think that teamwork improves care delivery?] Very much so. [I: And what has enabled good teamwork?] Communication. (Non-PCP)	Interview Data: and that's always been our goal is to be part of a team, everybody has their individual jobs and responsibilities but we're still part of a larger team to provide good patient care to all of our patients. (Non-PCP) [I: Who are the staff members in the clinic with whom you interact on a regular basis?] Everybody. […] nurses, medical assistants, LPNs, clerks. [What do those interactions involve?] Everything. (Non-PCP)

Clinic F High Fidelity *Evidence of Teamwork Throughout Clinic*	Clinic A High Fidelity *Evidence of Teamwork Throughout Clinic*
Interview Data: I could never do this by myself. There's just no way. I couldn't do it without the other nurses […] it wouldn't even be possible. The call center, I really like the girls in the call center, they screen the calls for me so that the calls I'm getting, even though I have a ton of them in my box, they're appropriate for the most part. The MAs, they help if I need help. I help them if I can. What they're doing for the doctor, if they weren't out there, I would have to be and I can't do this and that, too. So, yeah, it's just an all of a team. (Non-PCP) …they know if they need me for anything out on the floor, immunizations or anything, they're more than welcome, they can IM me, they can page me overhead, they can just peak their head around the corner and say, "I need your help." (Non-PCP) We have a good team here. I think they all interact very well, the doctors and the MAs and the RNs and front staff and call center. I'd just say, as a whole, we're one big team… (Office Staff)	Interview Data: I would say the MAs, all the MAs, all the physicians, the phone staff, the check-in staff is on the team. […] Because we all have the same goal, working for the patients. (Non-PCP) I interact with – actually, it's a total team effort in this office. So, I really interact with everyone. And I depend on them for their assistance with what I don't know, assistance with helping me take care of the patient. (Non-PCP)

Table 23: Evidence to Characterize Organizational Commitment

Clinic F High Fidelity *Evidence of Organizational Commitment*	Clinic A High Fidelity *Evidence of Organizational Commitment*
Interview Data: I really do think that as a team, as a whole clinic, we all recognize that we're here to serve our patients. And I think that's just kind of our culture. Not to say that some days, somebody doesn't want to be bothered because, we're all human, and we all have our bad days. But I think for the most part, we are all open to doing the best we can most efficiently for our patients. (Office Staff) we're always willing to help each other, that's the big thing. In our office, we're probably different than a lot of different offices, because we are all willing to help each other out. Whereas I've been to other offices and sometimes it's very, *"That's my job, it's your job, you need to do that."* And it's not like that here. […] It's within the clinic, it's our physicians, our front staff, MAs, nurses. I've heard that in some of the other offices, they're kind of segregated. If you're RN, you're an RN. If you're front staff, you're front staff. If you're an MA, you're an MA. And if you're a doc, you know. (Non-PCP)	Interview Data: I'm very satisfied, first, because, I think with us all having a common goal and a common purpose and we're all working toward the same thing. (Non-PCP) I won't be someplace where patients aren't the most important thing. I have left offices because of that, so, if I don't believe in the physicians and the care that patients are getting, I'm not going to be here. (Non-PCP)

Clinic D Moderate Fidelity *Evidence of Organizational Commitment*	Clinic C Moderate Fidelity *Evidence of Organizational Commitment*
Interview Data: People who work here, work here because they want to work here. (Non-PCP) …we're committed to making things work. You know, whatever, whatever I can do, whatever anybody else can do to make things go smoother, we're gonna do it. (Non-PCP (P42)	Interview Data: So, I think that's why we have a group, we all work really well together and I think we all had the same, we all have the same outlook, and we all want the same thing, the same, um, the same ending result for this clinic. Everyone runs so smoothly together. And our main concern is our patients and helping the doctors keep everything smoothly and running smoothly and the days going by. But it's because the people. […] That's another thing I noticed, people aren't running out that door. "5:00, I'm out of here!" (Office Staff) I feel like I work with a lot of people who are a lot like me. You know, everybody cares. They don't just care about what they're doing. They care about everybody around them. You know, I care about [Check-out – P27], and I care about [name], and I care about [name]. And they care about me. You know, so, I said, I think it has a lot to do with the people we're hiring. And we're finding the same group of people because you do need people that have a big heart and fantastic customer service. And we have that here. I'm telling you, we do. Everybody here just has the biggest heart and will do anything for you.
Clinic F High Fidelity *Evidence of Organizational Commitment*	Clinic A High Fidelity *Evidence of Organizational Commitment*
Interview Data: I really do think that as a team, as a whole clinic, we all recognize that we're here to serve our patients. And I think that's just kind of our culture. Not to say that some days, somebody doesn't want to be bothered because, we're all human, and we all have our bad days. But I think for the most part, we are all open to doing the best we can most efficiently for our patients. (Office Staff) we're always willing to help each other, that's the big thing. In our office, we're probably different than a lot of different offices, because we are all willing to help each other out. Whereas I've been to other offices and sometimes it's very, *"That's my job, it's your job, you need to do that."* And it's not like that here. […] It's within the clinic, it's our physicians, our front staff, MAs, nurses. I've heard that in some of the other offices, they're kind of segregated. If you're RN, you're an RN. If you're front staff, you're front staff. If you're an MA, you're an MA. And if you're a doc, you know. (Non-PCP)	Interview Data: I'm very satisfied, first, because, I think with us all having a common goal and a common purpose and we're all working toward the same thing. (Non-PCP) I won't be someplace where patients aren't the most important thing. I have left offices because of that, so, if I don't believe in the physicians and the care that patients are getting, I'm not going to be here. (Non-PCP)

Appendix A: Chapter 4

Employee Survey Questions for the Subscales of Patient-Centeredness and Innovativeness

Patient Focus and/or Customer Focus
1. We anticipate the difficulties our patients and/or customers might face and work to minimize those problems.
2. We address requests and complaints from our patients and/or customers in a manner that is thorough, speedy, and polite.
3. We work to prevent uncertain delays and long waits for our patients and/or customers.
4. We make sure that our work is well-coordinated with the work of other employees at [health system], both inside and outside our team.
5. We go out of our way and take on extra tasks to make sure our patients and/or customers get excellent care.
6. My team is an excellent example of what it means to have good patient focus and/or good customer focus.
Innovation and Flexibility
1. We do a good job of trying out new ideas that solve persistent problems.
2. We are flexible and resourceful when facing unexpected problems.
3. We do a good job of adopting new procedures even when they alter an established work routine.
4. We effectively adopt new procedures that continuously improve quality and lower costs.
5. My team is an excellent example of what it means to have good innovation and flexibility.

Responses were based on a 1 to 7 "never" to "always" scale. The subscales of patient focus and innovation have Cronbach's alphas of 0.943 and 0.920 respectively, indicating the reliability for the subscales is high.

Appendix B: Chapter 4

Codebook

I. Organizational Context – Outer Setting	The economic, political, and social context in which the clinic operates.
1. Homogeneity of Patient Population	The extent to which patient needs, as well as barriers and facilitators to meet those needs are perceived as being similar across the clinic's patient population.
2. Patient Engagement	The extent to which patients are compliant with their care and actively involved in maintaining an ongoing relationship with their primary care provider (PCP).
II. Organizational Context – Internal Setting	Characteristics of organizational structure, politics, culture, and capacity for change.
1. Organizational Structure	Structural aspects of the clinic, including comments about size, reporting structure, centralization, number of PCPs, etc. Coding Rule: Include response to the question, "Who do you report to?"
2. Standardization of Roles in Practice	Repetitive recognizable patterns of interdependent actions, carried out by multiple organizational members [1]. Code Rule: Code organizational routines, such as the patient intake process. Example: …we said we want to be standardized so that they'll know our process and how we're going to function in the clinic, that type of thing. But there was a need at [Clinic C] […] We try to standardize as much as we can. We have to bend a little bit. Each clinic's different. Each physician group is different. For the most part, I would say that a lot of our services are standardized.
3. Accommodation of Individual Physician Preferences	Shared understandings developed through practice facilitate the PCP's practice. The understanding is unique to mini-teams of PCPs and medical assistants. Example: once I got a regular MA assigned to me, then it was just much smoother and we could actually start developing a relationship, so once I had a regular MA assigned to me, she and I got together, we talked about preferences for how she liked to do things […] so that we had the same system, and so it worked out much smoother, whereas when I had chaos and [didn't' know] who in the world my MA was, there was no point in trying to establish relationships with each of them. –PCP
4. Turnover	Perception of the level of changes in personnel in the clinic, including both voluntary and involuntary organizational departure.
5. Hiring Practices	Perception of the level of deliberation involved in the clinic hiring process.
6. Communication – Work related	Communication intended to increase clinic functioning capacity.
7. Communication – Not work related	Social communication and camaraderie, not work related. Staff socializing and discussing topics not work related. For example, having knowledge of families and celebrating birthdays.
8. Respectful Interactions	Being cognizant of others at work. Paying attention to and taking seriously another person [2]. Disrespect is shown towards a person when he/she is ignored, neglected, disregarded or dismissed lightly or thoughtlessly [3]. Coding Rule: Informant expresses having respectful/disrespectful

	interactions with others in the clinic.
9. Trust	Informant expresses having confident, positive expectations about the actions of others, or expresses that people in the clinic have positive expectations of others not behaving in ways that may be detrimental to the functioning of the clinic [4].
10. Teamwork	Informant's perception of what constitutes the team, who's on the team, and how informant engages in teamwork in the clinic.
III. Characteristics of Individuals	Operationalizes individual level factors of knowledge and behavior, including, knowledge and beliefs about the intervention, self-efficacy, individual stage of change, individual identification with the organization, and other personal attributes (e.g., motivation, competence, intellectual ability).
1. Organizational Commitment (also capture the opposite in this code: self-centered commitment)	Individual identification with the clinic and the goals of the clinic (i.e. high quality patient care). Involvement in the clinic is aimed at supporting the provision of high quality patient care, not necessarily to achieve an individual's own goals. Organizational commitment describes employees' attachments to their organization [5]. Coding Rule: Code for both organizational commitment and individual/self-centered commitment. Example: I see that they're here for the patient, which pleases me because that's we're I come from. And I would not be in an office that I disagreed with how my patients were taken care of. I've always been that way. I won't be someplace where patients aren't the most important thing. I left offices because of that, so if I don't believe in the physicians and the care that patients are getting, I'm not going to be here.
2. Perception of PCMH	Knowledge, attitude, and value placed on the PCMH, as well as familiarity with facts, truths, and principles related to the PCMH. Coding Rule: Include responses to the question, "What does the PCMH mean to you as a ___?"

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Chapter 5: Conclusions

Central to the research addressed in the three dissertation essays is an exploration of patient-centered medical home (PCMH) implementation in primary care practice and the variation in implementation that occurs across practices. Overall, the essays have investigated multiple organizational levels, individual and organizational, to produce an integrated understanding of variation in PCMH implementation. This final chapter of the dissertation will first review and synthesize the findings from the three essays to present the primary contribution of this research, a conceptual framework of PCMH implementation, then discuss implications from the research and identify limitations and possible directions for future research.

Contributions

The primary contribution of this research is a conceptual framework that offers guidance to researchers, policymakers, and practitioners in understanding PCMH implementation. The conceptual framework delineates factors underlying the fidelity with the PCMH as a model of care delivery is implemented and common characteristics of primary care practices that differ with varying levels of PCMH implementation.

[Figure 3 about here]

Variation in Patient-Centered Medical Home Implementation

The three essays complement each other by demonstrating the occurrence of multiple factors that vary across six primary care clinics during PCMH implementation.

This finding is important in light of the six clinics being affiliated with a large, academic, integrated health system and therefore having comparable organizational structures, including senior leadership, resources, health information systems, access to knowledge and learning collaboratives, and PCMH incentive structures, tools and clinic processes designed at the system level.

There is a paucity of research investigating implementation factors associated with individual PCMH elements, highlighting a limitation this research attempted to overcome. The first essay focuses on variation in implementation of the distinct elements (i.e., principles and operational components) that comprise the PCMH, and holistically assesses a PCMH model of care delivery. Variation in PCMH implementation across the six clinics is described with a measure of fidelity to the PCMH model. Fidelity to the PCMH is a qualitative measure comprised of 1) individual level adoption of the PCMH principles and operational components, and 2) clinic level fidelity to the PCMH. Evidence is provided that an aspect of individual level adoption, knowledge and appreciation of PCMH principles, is important in the fidelity with which the PCMH model is implemented into practice. Furthermore, individual understanding of roles in the clinic was enabled by the priorities set by clinic leadership and primary care providers (PCP), which differed across the six clinics.

The second essay describes the occurrence of organizational learning during PCMH implementation, and provides evidence of common characteristics of clinic meetings and front line leadership as two organizational learning mechanisms associated with higher levels of PCMH implementation. These characteristics include the frequency, purpose, and inclusiveness of clinic meetings and front line leadership who facilitate

input inclusion, accountability, and competence among organizational members. The essay concludes that with these characteristics, clinic meetings and front line leadership can concurrently enable both individual-level and organizational-level learning, and are associated with a clinic's capacity for learning and change. Related to the findings of the first essay, the second essay provides evidence that clinic meetings and front line leadership can influence individual knowledge of PCMH principles and understanding of roles by providing a mechanism through which individual learning is connected to organizational change and vice versa.

The third essay uses an implementation science approach to explore PCMH implementation, and reveals a consistent pattern of contextual factors in clinics with high levels of fidelity to the PCMH. These contextual factors include homogeneity of patient population, patient engagement in care, stability of staff, standardized roles in the practice, respectful interactions, camaraderie, teamwork, and organizational commitment.

Together, the three essays highlight the importance of primary care practices promoting change from within, and strengthening internal organizational mechanisms to support clinicians and staff in obtaining new knowledge of the PCMH and adapting to new roles and clinic processes related to the PCMH. Furthermore, the factors associated with variation in PCMH implementation are consequential in that they may influence the effectiveness of PCMH interventions in achieving improvements in the quality of care and reductions in costs.

Implications

The findings from the three essays lead to a number of implications for: 1) policy and practice, 2) implementation science and organizational learning theory, and 3) research and methods.

Policy and Practice

The question of what are the necessary or sufficient criteria for PCMH implementation is likely to be viewed differently by practitioners and policymakers. As such, policymakers target the payment incentives and changes to organizational structures to support the organizational adoption of health care interventions (Rosenthal et al., 2010). Practitioners may need to target relatively more mutable aspects of organization to support individual and organizational adaptation to health care interventions. There is ongoing debate about the best criteria for PCMH certification and whether the appropriate concepts are being measured to recognize practices as having successfully implemented a PCMH model of care delivery (Burton, Devers, & Berenson, 2011). The findings from this research suggest that an assessment of fidelity to the PCMH and context might be more effective than structural or outcome oriented performance measures and the inclusion of subjective data collection in evaluation may be of benefit. For example, asking providers how they are using patient registries, rather than asking them only if they have a functioning patient registry and assessing quality of implementation, not simply more accessible quantitative measures. Evaluation tools can therefore be used as a mechanism of research dissemination to share best practices for PCMH implementation and provide guidance to practitioners endeavoring to implement the PCMH on what was effective and why, in different contexts. Another example

emerged from essay three in the finding that the clinics in which patients were relatively more engaged in their care had a higher level of fidelity to the PCMH. This brings to light the context in which management, clinicians and staff may prioritize the aspects of PCMH elements that involve patient engagement. Policy must also take into account the variation in patient engagement across clinics.

From a practical standpoint, this research provides implications for implementing organizational change, not specific to PCMH. The collective research findings suggest that social context and individual characteristics influence primary care delivery. This research brings to light the importance of organizational learning mechanisms for enabling changes in individual knowledge and behavior and organizational processes. Essay two provides evidence that when organizational learning mechanisms are in place to enable the alignment of individual change and organizational change, higher levels of PCMH implementation are achieved. This finding is relevant for the investment of resources in the development of clinic meetings and front line leadership as organizational learning mechanisms during implementation. Implementation generally requires an investment of resources and when implementation is not successful, it can impact an organization's bottom line. This research points to an investment in developing organizational learning mechanisms within a clinic to enable change and development in general.

Implementation Science and Organizational Learning Theory

The first and third essays have implications for implementation science in the contribution to the conceptualization of implementation as a multi-level organizational phenomenon. A paucity of research has been conducted to understand the dynamic

factors that arise at the individual level to influence implementation and organizational change (Damschroder et al., 2009). The first essay provides evidence that fidelity, a novel construct in the emerging field of implementation science, is an important construct in understanding the dynamic factors that arise during implementation at the individual level, specifically in the interplay between individuals and the innovation being implemented. The further development of the fidelity construct and the methods used in essay one contribute to opening up the theoretical black box through which implementation occurs by illustrating the variation associated with individual behavior and knowledge in the context of adapting to the use of an innovation in clinical practice.

The third essay uses an implementation science approach to understand the contextual factors that may influence PCMH implementation and also contributes to refining and further developing theoretical constructs germane to a model of implementation science, the Consolidated Framework for Implementation Research (CFIR); a model comprised of thirty-nine factors organized into five major domains, including Intervention Characteristics, Outer Setting, Inner Setting, Characteristics of Individuals, and Process (Damachroder et al., 2009). The findings in the third essay draw attention to the broadness of the individual CFIR constructs within the five domains and identifies that concepts, such as patient engagement in care, should be considered as an addition to the CFIR model. Together, the first and third essays suggest that the construct of fidelity to the intervention may be an appropriate alternative for the domains of Intervention Characteristics and Characteristics of Individuals in implementation science models, by providing a framework in which individual characteristics (e.g., behavior and

knowledge) are assessed in the context of the specific intervention, in order to assess all levels at which implementation occurs.

The second essay has implications for organizational learning theory in its contribution to the further development of the concept of organizational learning mechanisms. This research did not test the specific associations between the characteristics of organizational learning mechanisms and organizational change to conclude a causal relationship. However, essay two provides evidence that the organizational learning mechanisms that simultaneously enable individual-level learning (e.g., understanding of the individual's role in an organization) *and* organizational-level learning (e.g., adapting organizational protocols and work processes), were associated with higher levels of fidelity to the PCMH. Previous research proposed that organizational learning mechanisms that enable *either* individual-level *or* organizational-level learning resulted in change (Lipshitz & Popper, 2000).

Research and Methods

As described in each of the three essays, qualitative methods support the investigation of implementation and organizational learning as multi-faceted phenomena occurring at multiple organizational levels. Qualitative analysis procedures were used in this research to increase internal validity of the findings with respect to the context in which implementation and organizational learning was occurring. In clinical practice, interventions are rarely implemented in isolation from other interventions, making it difficult to quantitatively evaluate individual interventions to identify the associated implementation factors. The inclusion of multiple stakeholder perspectives on the different PCMH elements allowed for corroboration at the organizational level; in a

social context it is expected that different people will experience the same organization differently. Qualitative methods capture this nuance and provide a deeper connection and understanding of the context in which implementation and organizational learning occurs.

Limitations and Future Work

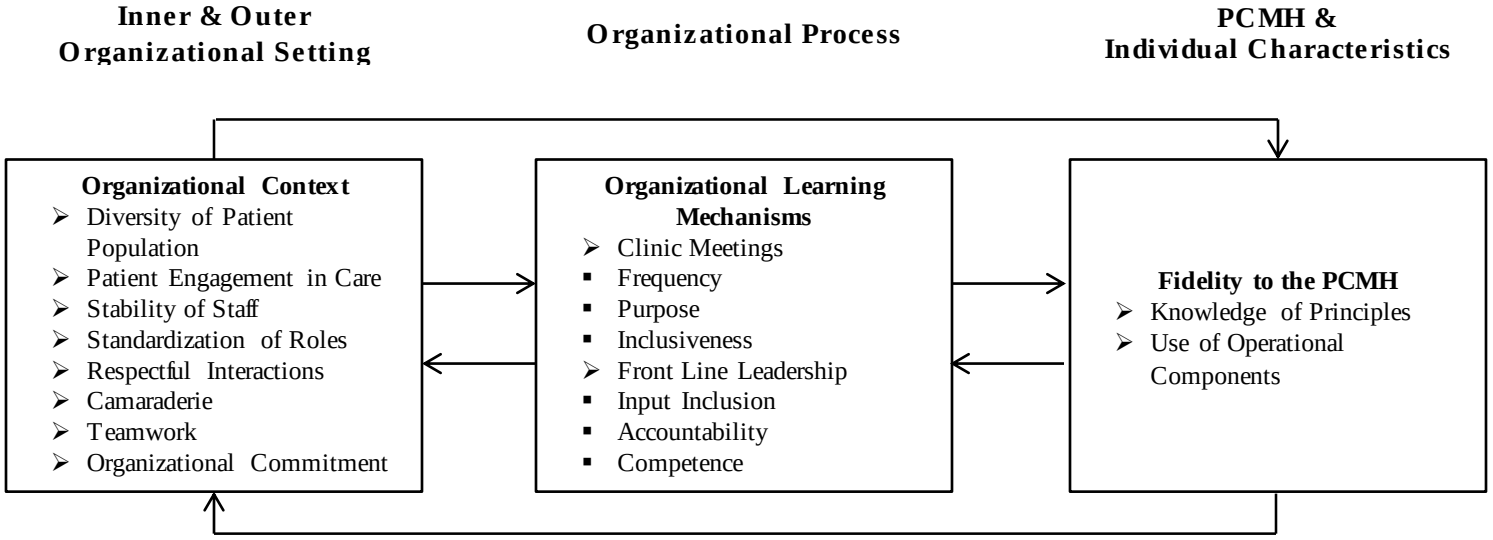
The six primary care clinics in the study sample were all affiliated with a large, academic, integrated health system has limitations to generalizability of the findings to other settings. This study sample affords a context in which all clinics have relatively uniform expectations, guidance, incentives, and resources for PCMH implementation (i.e., best case scenario for understanding social aspects of PCMH implementation), compared to other primary care clinics that would have been included in a nationally representative sample. Even more variation of PCMH implementation and associated factors may occur in private practices and community centers, which may have fewer resources and less advanced health information technology.

The PCMH components evaluated in this study are not comprehensive of all PCMH elements being implemented in the myriad PCMH implementation initiatives occurring across the United States. The PCMH model from which the components were identified is being implemented in over 700 primary care clinics for PCMH certification and payment. Despite the primary care clinics in the sample having similar organizational structures, the third essay provided evidence for variability in contextual factors across the clinics to be associated with different levels of fidelity to the PCMH, based on a cumulative measure of the level to which all components were implemented. Not all PCMH components are supported by evidence, and at this time, few studies provide evidence of the effectiveness of the PCMH as an aggregate model of care delivery or

which components of the model are most important (Vest et al., 2010; Burton, Devers, & Berenson, 2011). Future research would benefit from examining the association between the different contextual factors and variation in the fidelity to the different PCMH components to determine if certain components should be prioritized in some contexts, for example in contexts in which patients are relatively less engaged in their care.

The interpretive nature of qualitative methods involves an inherent level of subjectivity in data collection and analysis. The findings drawn from this research would have been strengthened by triangulation with an additional source of data collected from more objective or validated instruments. Several procedures were included in this analysis to ensure rigor, depth, and a high level of internal validity in revealing findings and drawing conclusions from the qualitative data. However, future research would benefit from quantitative validation and using multivariate analyses to test associations between patient and organizational outcomes and 1) levels of fidelity to the PCMH (essay 1), 2) characteristics of organizational learning mechanisms (essay 2), and 3) variation in contextual factors (essay 3). Such analyses would increase understanding of the significance of the differences found across clinics to be associated with variation in PCMH implementation. However, to date, a core set of standardized PCMH measures has not been validated, further increasing the relevance of qualitative methods to contribute to advancing knowledge on PCMH implementation.

Figure 3: Conceptual Framework for PCMH Implementation



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