IMPLEMENTATION OF THE PATIENT CENTERED MEDICAL HOME (PCMH) MODEL: A SYSTEMATIC LITERATURE REVIEW

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A thesis submitted in partial fulfillment of the requirements for a baccalaureate degree in Health Policy and Administration with honors in Health Policy and Administration

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ABSTRACT

As health systems strive to become more patient-centered, primary care practices are encouraged to transform through innovative practice redesign. In the attempt to promote quality improvement with sustainable methods of primary care, the sector is faced with multiple high-performing models from which has evolved the Patient Centered Medical Home (“medical home”) or PCMH. The comprehensive medical home design has developed from various early model elements as the course of PCMH dissemination dates back to 1967. This study examines the patient centered medical home model through its evolution, mode of implementation (i.e. 10 Building Blocks (Bodenheimer et al.)), and its associated outcomes observed within primary care. The purpose of this study is to describe the role of the medical home model in the redesign of U.S. primary care and summarize the effectiveness of PCMH implementation aligned with quality improvement efforts through its 5 functions as defined by the Agency for Healthcare Research and Quality: Comprehensive Care, Patient-Centered Care, Coordinated Care, Accessibility, and Quality and Safety. A systematic literature review of (n=21) studies were conducted to examine the following research question: Are the associated changes in care quality worth the total investment, cost and training endured during patient centered medical home transformation? Three common themes were identified across studies included in the review: the role of disparities, continuous training and personnel effort. Study findings highlight the importance of primary care redesign as a vital investment used to sustain the larger United States health care system.
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Chapter 1

Introduction

Primary care is designed within the context of larger health care system functions and exists to provide an individual with the first point of entry thus designating a continual source of care or medical home (American Academy of Family Physicians, 2017). From this concept derives the Patient Centered Medical Home model or PCMH, a comprehensive care delivery model that centralizes all of an individual’s medical needs and necessary partnerships within a primary care setting (American College of Physicians, 2017). As a method constructed to streamline individuals’ care, the medical home was born amidst national quality improvement efforts in the United States health care system. Although elements of the PCMH model date back 1967, more recent decades characterized by a growing complexity of science and technology, increases in chronic conditions and a poorly functioning delivery system, have pushed for systematic efforts for quality improvement (IOM, 2001). In order to combat environmental shifts, the health care system and its constituents were called on by the Institute of Medicine through its report Crossing the Quality Chasm: A New Health System for the 21st Century, to participate in a more robust and holistic approach to care that is safe, effective, patient-centered, timely, efficient and equitable (IOM, 2001).

In another landmark report, To Err is Human: Building a Safer Health System, the Institute of Medicine identified “medical errors” as a primary determinant of health care quality, nearly contributing to 98,000 hospital deaths in the United States each year (IOM, 1999). Yet, rather than blaming provider carelessness, the IOM identified poor medical conditions and faulty
systems as the root cause for error. Quality improvement on a national scale is thus dependent on a comprehensive redesign of the U.S. health care system, hence supporting the demand for innovative practice models.

In addition to identifying systematic goals, the IOM emphasized involvement from all health care organizations including professional groups and purchasers as quality improvement would depend on the degree and range of commitment by said stakeholders. Early medical home development began with efforts from the American Academy of Family Physicians (AAFP), American Academy of Pediatrics (AAP), American College of Physicians (ACP) and the American Osteopathic Association (AOA). And although more than 19 additional professional organizations have since endorsed the model, the AAFP, AAP, ACP and AOA are officially responsible for establishing the PCMH seven Joint Principles as a guide for early medical home implementation (ACP, 2011). Since the release of medical home Joint Principles in 2007, the National Committee for Quality Assurance (NCQA) established a set of six standards to serve as evaluation criteria for national PCMH recognition (NCQA, 2014). In accordance with the six NCQA standards however, the Agency for Healthcare Research and Quality (AHRQ) condensed the model into five core functions: Patient-centered, Comprehensive, Coordinated, Accessible, and Quality and Safety; which will serve as the primary structure referenced throughout this study (PCPCC, 2016).

Health Policy objectives established within legislative efforts of the 2010 Patient Protection and Affordable Care Act (ACA) and the 2015 Medicare Access and CHIP Reauthorization Act (MACRA) underline efforts of national support for medical home participation. According to the NCQA, by the end of 2010 more than 1,500 practices reported clinician participation in a medical home (NCQA, 2011) which has since evolved into nearly 500
demonstration projects currently tracked nationwide (PCPCC, 2016). Trends of medical home expansion are predicted to continue as recent legislative motives by Medicare and Medicaid programs aim to link provider payments to medical home accreditation (Sessums et al. 2016).

Notably, the participation in medical home transformation must be recognized as only one step toward quality improvement where the effectiveness of implementation, indicative of quality progress, warrants data-driven evaluation. In terms of what exactly medical home transformation should achieve and how it should be assessed there exists much disagreement among stakeholders (Goldman et al., 2015). Additionally, the collection of evaluation data is particularly challenged by the pervasive nature of health systems research, where a change in one sector, such as primary care, is prone to impact social, political and business aspects of the entire system (Akinci & Patel, 2014). Moreover, issues of data reliability are raised with the use of standard evaluation criteria given the medical home framework which literature illustrates is uncharacteristic of a “one size fits all” implementation. Thus, a practice’s composition must be considered when constructing valid evaluation within primary care settings as elements of practice size, affiliated facilities, population demographics and payment models, will vary and ultimately influence model measurements (PCPCC, 2016). Health system experts Bodenheimer et. al. accordingly developed the 10 Building Blocks model to address the complex medical home transformation process. Although the Blocks model does not suggest universal use, its evidence-based framework emphasizes the providers’ feedback as vital measurement during the implementation process.

The purpose of the systematic literature review is to examine the extent of the following statement: *Are the associated changes in care quality worth the total investment, cost and training endured during patient centered medical home transformation?* Despite steady medical
home participation, the current literature suggests a mixed understanding of medical home dissemination strategies which is mainly attributed to differences in political and payer interests by stakeholders and the influence of unique practice compositions (Kilo & Wasson, 2010). Therefore, a systematic review of (n= 21) medical home studies were conducted to analyze and identify key themes associated with medical home implementation. The aim of this study was to understand medical home implementation trends in various practice settings. The results were derived using a qualitative methodology with intent to strengthen current medical home literature and further contribute evidence which may be used to develop methods of quantitative assessment. Current gaps in the field of medical home research were also explicated from the review in hope to guide researchers and policymakers in future implementation efforts.
Chapter 2

Background

The national push for quality improvement prompting the development of innovative practice designs, such as the medical home model, ultimately began with the introduction and acceptance of managed care in the United States (Kilo & Wasson, 2010). The managed care model introduced a new dynamic to the organization and payment of health care, which worked to reduce care costs while improving care quality through various mechanisms (National Library of Medicine, 1990). Despite a quick demise, due to a strife between cost containment motives and the continual desire to improvement patient experiences, managed care introduced the concept of “process improvement” into health care which would become a key part of primary care innovation.

As the concept of “process improvement” began to drive U.S. health care system reform, a mend developed between system innovation and quality improvement goals, thus launching a growth in implementation science and design (Schoenbaum et al. 1989). Yet, reform would also require coordinated investment by providers and multiple payers as goals for long term improvement would depend on reliable sources of funding. The medical home model thus gained popularity as it demonstrated a strong ability to meet quality improvement outcomes desired by providers and reduced costs desired by payers. Moreover, the PCMH was suggestive of building a stronger primary care base which garnered the potential for reform in other areas of the health care system (Takach et al. 2015). Development of a proper foundation would also align with
recommendations by the Institute of Medicine which states that quality improvement should be fluid throughout the industry and thus branch from primary care (IOM, 2001).

The PCMH ultimately captured a method for redesign that would not only work to improve care quality but would also play a vital role in securing the health system by creating the necessary sustainable foundation of primary care. The crystalizing features of the PCMH gained quick attention by stakeholders but its success would depend on additional key factors. Accordingly, model success would require a sustainable primary care workforce, effective dissemination, and a focus on the patients’ role (Kilo & Wasson, 2010). Prior to PCMH growth, many health care professionals invested in specialty care and were hesitant to focus so much attention on primary care. This was attributed to a mixed understanding by the health care community of the term “medical home” which was eventually branded with recent industry shifts moving from traditional clinician-driven care to collaborative patient-physician relationships hence contributing to the full title “patient-centered medical home” (Kilo & Wasson, 2010). A detailed evolution of the final patient-centered medical home model is outlined in Table 1.
<table>
<thead>
<tr>
<th>Date</th>
<th>Key Events:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1967</td>
<td>● “Medical home” term coined by American Academy of Pediatrics and used for the care of children with special health care needs</td>
</tr>
</tbody>
</table>
| 1970   | ● Computers introduced to Health care field prompting the use of electronic medical records  
       | ● Increased discussion by policy makers regarding care quality and need for practice redesign and care innovation                                                                                           |
| 1978   | ● North Carolina Legislators draft a “health care home” plan for children in the state, consisting of (Sia et al. 2004):  
       | ○ Commitment to the individual  
       | ○ Primary Services  
       | ○ Full-time accessibility  
       | ○ Service Continuity  
       | ○ Comprehensive Record-keeping  
       | ○ Competent Medical Management  
       | ○ Cost-Effective Care  
       | ● Increased emphasis on a community bottom-up approach to care with a focus on prevention, wellness and early intervention                         |
| 1979   | ● Hawaii Legislators adopt state Child Health Plan characterized by (Sia et al. 2004):  
       | ○ Family-centered  
       | ○ Community Based (geographic and financial access)  
       | ○ Comprehensive and Coordinated Care  
       | ○ Use of related local care resources and services  
       | ● Increased emphasis on a community bottom-up approach to care with a focus on prevention, wellness and early intervention                         |
| 1980   | ● Managed care method popularity grows featuring innovative payment and practice organization redesign                                                                                                      |
| 1985   | ● First grant to train primary care physicians to become a medical home awarded to Hawaii Medical Association                                                                                               |
| 1986   | ● First medical home implementation barriers identified and addressed (Sia et al. 2004):  
       | ○ Training manual developed to guide providers’ communication and care coordination  
<pre><code>   | ○ Involvement of nurses in care coordination                                                                                                                                                    |
</code></pre>
<p>| 1989   | ● First conference introducing the medical home held by American Academy of Pediatrics                                                                                                               |</p>
<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>Definition of medical home addressed in AAP policy statement (Kilo &amp; Wasson, 2010):&lt;br&gt;“The AAP believes that the medical care of infants, children, and adolescents ideally should be accessible, continuous, comprehensive, family-centered, coordinated and compassionate and based on trusting relationships”</td>
</tr>
<tr>
<td>1994</td>
<td>Medical Home Training Project created to educate participating health care professionals and patients</td>
</tr>
<tr>
<td>1996</td>
<td>Institute of Medicine publishes <em>Primary Care: America’s Health in a New Era</em> highlighting importance of a sustainable primary care sector</td>
</tr>
<tr>
<td>2001</td>
<td>Institute of Medicine publishes <em>Crossing the Quality Chasm</em> report&lt;br&gt;<em>Future of Family Medicine initiative</em> launched by American Academy of Family Physicians as a guide for health system change via medical home innovation</td>
</tr>
<tr>
<td>2002</td>
<td>Chronic Care Model introduced emphasizing primary care prevention and management&lt;br&gt;AAP expands on medical home policy statement adding <em>components of cultural effectiveness</em> to the original 7 principles; and a list of 37 operational medical home actions</td>
</tr>
<tr>
<td>2004</td>
<td>Elements from Chronic Care Model used to formulate a financially stable primary care model -- applied to medical home model</td>
</tr>
<tr>
<td>2005</td>
<td>Funding given to physician practices by Center for Practice Innovation to promote medical home implementation&lt;br&gt;Medical Home Builder developed by the American College of Physicians (ACP) as an interactive online program&lt;br&gt;Starfield’s six primary care mechanisms published:&lt;br&gt;○ Greater access to needed services&lt;br&gt;○ Better Quality of Care&lt;br&gt;○ Greater focus on Prevention&lt;br&gt;○ Early management of health problems&lt;br&gt;○ Cumulative effect of primary care delivery&lt;br&gt;○ Role of Primary care in reducing unnecessary or harmful specialty services</td>
</tr>
<tr>
<td>2006</td>
<td>The Advanced Medical Home: A Patient-Centered, Physician-Guided Model of Health Care is introduced by ACP to propose primary care delivery and payment reform&lt;br&gt;Patient-Centered Primary Care Collaborative (PCPCC) founded to build national adoption of the medical home&lt;br&gt;The National Demonstration Project launched by American Academy of</td>
</tr>
<tr>
<td>Year</td>
<td>Events</td>
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| 2007     | - PCMH Joint Principles endorsed by the AAFP, AAP, ACP and AOA (IOM, 2007):  
  ○ Personal Physician  
  ○ Physician directed Medical Practice  
  ○ Whole Person Orientation  
  ○ Care coordination/integration  
  ○ Quality and Safety  
  ○ Enhanced Access  
  ○ Payment  |
| 2008     | - PCMH accreditation programs launched by the National Committee for Quality Assurance (NCQA), the Joint Commission and others  
  - Safety Net Medical Home Initiative launched by the Commonwealth Fund  |
| 2010 - present | - Patient Protection and Affordable Care Act (ACA) signed into law prompting investments in PCMH pilots through development and budget increases via Medicare and Medicaid programs  
  - Pioneer Accountable Care Organization (ACO) launched by Center for Medicare and Medicaid Innovation which established an environment for PCMH initiatives  
  - Medical Home programs adopted in 47 states by 2012  
  - MACRA signed into law (2015) prompting a Quality Payment Program incentivizing additional payment for accredited Medical Home Practices |

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http://content.healthaffairs.org/content/29/5/773.abstract

Patient-Centered Primary Care Collaborative. History: Major Milestones for Primary Care and the Medical Home. (2017) Retrieved From

https://www.pcpcc.org/content/history-0

http://pediatrics.aappublications.org/content/113/Supplement_4/1473.long
Chapter 3
The 5 Functions of a PCMH

The Agency for Healthcare Research and Quality has defined the medical home model based on a set of five core functions: Patient-Centered, Comprehensive, Coordinated, Accessible, and Quality and Safety. The medical home concept can be seen as a philosophy of care delivery rather than just a place, which supports the models evolving potential as organizations continue to garner evidence on its effectiveness. In fact, many of its current elements originated from earlier intervention programs which is illustrated on the evolution timeline (Table 2). However, regardless of its makeup, the medical home is formulated distinctly to strengthen the fundamental tenets of primary care (Stange, K., 2010). According to Steinberg et al., health systems built on a strong primary care foundation tend to achieve 1) better population health outcomes 2) better quality of care 3) more preventative care 4) lower costs 5) more equitable care and mitigation of health disparities. The multifaceted definitions of the following five functions are thus justified for practice characteristics such as: the size of the practice; the location (i.e. urban vs rural setting); the composition (solo/small practice, mid-size primary care practice, large multi-specialty practice, academic-affiliated practice) the patient population it serves (health status, other social and economic characteristics); whether financial or performance incentives are provided, imply freedom of medical home execution.
Sub-Chapter 1: Comprehensive Care

The delivery of comprehensive care requires a designated team of providers or “care team”. The purpose of this attribute lies within the concept of whole-person care which encompasses all of an individual’s health care needs including physical, mental, preventative, wellness, acute and chronic care. Depending on the composition of the practice, the care team may be diverse and even incorporate virtual members. Comprehensive or “Team-based” care offer several advantages such as improved care efficiency which would promote the expansion of care access due to a more efficient use of time among various available providers. The team-based approach additionally draws on the idea of exposing patients to a wide variety of provider expertise which may imply greater outcomes due to increased patient support. According to an AHRQ report, the creation of sustainable teams relies heavily on the surrounding culture (2016). Thus, maintenance within a particular practice may require adoption guidance and training in order to teach transforming providers how to develop effective relationships.
Quality improvement efforts in recent decades align with providers’ incentive to transform from physician-centered to patient-centered practices (Willard and Bodenheimer, 2012). Patient-centered care requires providers to initiate an effective integration of a patient preferences into the care process. Much of the responsibility is therefore reliant on a provider's communication and coordination which must be consistent among a patient’s various providers, in addition to informing the patient themselves (Akinci and Patel, 2014). This attribute therefore consists of several dimensions which must be carried out holistically as it weighs significantly on a patient's overall experience. A study by Tanco et al. found that a higher degree of perceived compassion by the patient was highly associated with an independent degree of patient trust toward a clinician which evidence further correlates to an increase in physician adherence (2015). Fostering a patient's ability to practice self-care is at the essence of preventative medicine and thus supports the importance of primary care and the role of a patient in the medical home. Accordingly, the National Committee for Quality Assurance found that patient-centered care resulted in a 15% reduction in per-member-per-month costs for medical home practices (NCQA, 2017).
Sub-Chapter 3: Coordinated Care

Care Coordination, according to the AHRQ, entails the exchange of necessary information to all responsible care parties in order to manage the effective arrangement of personnel and resources administered for patient care activities (Friedman et al. 2016). Coordination enables an effective management of costly care services by ensuring that patients within a medical home receive the appropriate care in a timely and informative manner. In just one year, an estimated $774 million were spent on medical home transformation expenses in a study by Herbert et al. which was attributed primarily to hiring new staff for coordination activities. However, after accounting for the costs saved from appropriate utilization of services, as a result of medical home initiatives, the practice experienced financial savings of $596 million (Herbert et al. 2014).

In addition to cost savings, the process of care coordination holds importance for patients suffering from chronic conditions. By coordinating all of a patient's services through a medical home, practices can eliminate issues of access by creating a base for continued communication among the various providers (Akinci & Patel, 2014). A focus on specific patient conditions enables precise administration of services hence creating a better management of chronic diseases and leading to overall improved health outcomes (PCPCCI, 2016). Notably, however, evidence implies cost savings from proper management of chronically suffering populations. According to a three-year medical home pilot by Rosenthal et al. cost savings generated from a decrease in emergency department visits translated to nearly $5 million per year for the associated 100,000 medical home patients. The study identified major reductions in ambulatory-care-sensitive-inpatient-hospital-admissions which are used for patients with two or more comorbidities, thus supporting PCMH capabilities for managing chronically ill patients (2015).
Sub-Chapter 4: Accessible

Access as defined by the Institute of Medicine means having “the timely use of personal health services to achieve the best health outcomes” (1993). However, several barriers can impede an individual’s access to care if the health care system is fragmented. Survey data collected by the Commonwealth Fund suggests gaping barriers to primary care access in the United States whereby underperforming 10 other developed countries (Wagner et al. 2012). The medical home aims to improve this environment specifically through methods of care teams and advanced scheduling technology used to provide continuous access, in addition to fostering patients understanding of health care coverage. PCMH practices may improve patient access with the expansion of consultation services such as telemedicine. According to Le-Brun Harris et al., a patient’s overall care experience is mitigated initially by their perception of access and communication, thus prompting clinicians in a medical home to address these issues directly during patient visits (2013). The patient’s perception weighed on access and communication also highlights the demand for an ongoing care experience which the medical home culture drives through its patient-centered continuum (Shi et al. 2016). Clinicians may also influence patients understanding of access by administering the necessary information about all that a medical home entails. Research by Wagner et al. estimates close to 20% of Medicaid-eligible children with over half being diagnosed with a chronic illness were uninsured as a result of intimidation by parents to enroll due to a lack in necessary coverage information (2012). It is important for medical home providers to be direct in patients understanding as a study by Aysola et al. found
that irrespective of a structural changes experienced within medical home transformation the patient's perception will not be directly influenced (2015).
Sub-Chapter 5: Quality and Safety

The medical home commitment to quality and safety aligns with overarching goals to provide patients with optimal forms of care. With the aid of health information technology and other data tools, practices can monitor quality improvement status by tracking and managing target populations (PCPCC, 2016). According to the Institute of Medicine, the best indication of care safety and quality is through the eyes of the patient, not only as a means to improve patient satisfaction but as a useful source in general regarding how the health system is experienced (IOM, 2001). Factors of Quality and Safety are mitigated by patients’ trust in the delivery of care they receive. In this sense, providers must be cognizant of fostering trust as Lanham et al. observed the appropriateness of communication with a patient is dependent on the level of trust and amount of reflection that occurs within the whole practice (2016). To this end, it is also important to highlight providers’ ability to generate proper population tracking technology. A study by Shi et al. demonstrated the impact of properly utilizing electronic health records as its universal tracking power allows providers to capture appropriate and timely lists of patients who may require preventative services or tests (2016).
Chapter 4
Evaluation of Model Effectiveness

Given the substantial investment required for implementation and maintenance of a medical home, the medical community warrants robust evidence on the effectiveness of the PCMH including both methods for sustainability and refinement. Assessment of medical home effectiveness includes success with dissemination in addition to the success of specific internal activities. Accordingly, the many stakeholders involved in PCMH implementation must be on common ground as the long term investment depends on support and funding of such constitutes, organizations and payers. As such, assessment of specific medical home activities involve input from the patient and associated medical home providers.

Multiple parts of the health care system however suffer from sufficient evidence on the effectiveness of particular models due to an inconsistent collection of data among specific patient groups (IOM, 2001). The Agency for Healthcare Research and Quality defines four main types of effectiveness evidence, one of which includes outcomes research, a method of data collection that includes the systematic analysis of one or more patient populations (AHRQ, 2001). Despite advances made through outcomes research, there remained a gap on patient related decision making, thus, Congress created the Patient-Centered Outcomes Research Institute (PCORI, 2010) Also referred to as Comparative Effectiveness, this type of inquiry works to specifically derive better informed health care decisions to be used as a tool by patients and their associated caregivers, clinicians, employers, insurers and policy makers. Patient-Centered research is thus applied in clinical settings with a patient-centric focus on shared decision making, an element ingrained in the medical home model (Meyers, 2011).
Shared decision making is rooted in the original “patient-centered care” concept which was created as a means to refocus medical attention back onto the patient and away from the condition (Barry, 2012). The practice of shared decision making is defined by the exchange of information between doctors regarding clinical details and the respective patient's expression of preferences and values related to care delivery (IOM, 2001). The effectiveness of shared decision making is thus dependent on each patient case as its core function aim to produce evidence-based outcomes unique to the patient.
Sub-Chapter 1: Key Stakeholders

It is important to recognize the role and incentives held by all stakeholders involved in medical home transformation because the success of implementation efforts will rely on how each are aligned in the process. Maintaining a national medical home environment requires supportive infrastructure leveraged by funding, policy guidance, and evidence which experts have forecasted to rely heavily on a partnership with Medicare in multiplayer reform (Tackach, 2015). Moreover, as stakeholder incentives ultimately drive the reform environment it is imperative to consider the vast range of PCMH stakeholders from both a macro-system and a practice-specific perspective. Within the larger health care system, contributions to medical home dissemination are supported by professional organizations, government entities, non-profit organizations, and policy makers at both the federal and state level.

The support by Professional Organizations have grown accordingly with medical home expansion in recent years, but the American Academy of Family Physicians (AAFP), American Academy of Pediatrics (AAP), American College of Physicians (ACP) and the American Osteopathic Association (AOA), are recognized for initial promotion of the model by characterizing the model’s Joint Principles (ACP, 2011) Much of the contributions by professional organizations continue to provide updated information and guidance for PCMH implementation.

The Center for Medicare and Medicaid Innovation (CMMI) gained stake in the medical home initiative as an acceleration in Medicare spending was identified through beneficiaries with multiple chronic conditions. While evidence suggests medical home intervention having the
potential to decrease total health care costs, motivation to improve care for the chronically ill is emphasized due to their associated high costs of care (Wagner et al. 2012). In 2015, the Center for Medicare and Medicaid Services developed a billing code specifically to reimburse physicians or other health care professionals based on chronic care management activities (Howard et al. 2016). The billing code was part of the larger Quality Payment Program otherwise known as the Medicare Access and CHIP Reauthorization Act (MACRA) signed into law as a legislative mandate on physician payments of their Medicare Beneficiaries ultimately promoting the use of a PCMH (PCPCC, 2016).

The National Committee for Quality Assurance (NCQA) plays a vital role in the accreditation process of the patient centered medical home and thus provides standards for a practices’ associated reimbursement. As a central figure involved in health care quality improvement, the NCQA uses national statistics to develop quality standards and performance measures for the medical home for use on a broad range of health care entities (NCQA, 2015). When a practice endures a distinct set of structural changes during medical home transformation, such as team-based care, enhanced access and care coordination, they may apply for recognition. Accordingly, the NCQA raises its measurement standards consistently to account for continuous implementation of a medical home. The recognition thus implies continual validation of practice improvement rather than an award for completion. In addition to its strength in emphasizing continuous improvement, the NCQA accreditation process is known for its evaluative flexibility among diverse practice settings and its alignment with national goals to demonstrate health care technology.

So, although other standards to recognize medical home activities exist, the NCQA serves as the most widely adopted form of accreditation and is used as the source for Government
programs such as the Medicare Quality Payment Program. As of 2017, the NCQA recognized a total of 11,974 practices as accredited medical homes. In efforts to advance the United States healthcare system toward higher quality, better patient experience and cost containment, the NCQA works to promote the continued adoption of medical homes nationally through the use of effective and evidence-based accreditation.
Sub-Chapter 2: Implementation Building Blocks

The most common tool used to assess PCMH today is identified through NCQA accreditation. However, implementation measurements accounted by a single platform challenge data validity given the multifactorial dynamic of implementation as a factor of unique practice composition. In recognition of these limitations, researchers from the Department of Family and Community Medicine at the University of California developed a new conceptual model, the 10 Building Blocks of High-Performing Primary Care, which expands on the incremental process identified with medical home implementation. The model is based on a combination of data from existing primary care models and case studies from 23 active practice transformations; contributing data on provider feedback and behavior, specifically through measurements of staff satisfaction, clinical quality metrics and stable finances; placing little emphasis on the patient perspective (Willard and Bodenheimer, 2012). The model guides an incremental implementation of medical home elements as evidence from multiple demonstrations have suggested an interrelated relationship among the 10 building block elements: engaged leadership, data-driven improvement, empanelment, team-based care, patient-team partnership, population management, continuity of care, prompt access to care, comprehensiveness & care coordination and the template of the future. The models’ design, suggesting a strong correlation between blocks ability to drive the development of each other, defines the first respective four as “foundational elements” thus creating a base for the following 6 elements to build upon.

While the framework does not present a universal transformation process, the development is based on reportedly successful initiatives from highly regarded medical home
practices (Bodenheimer et al. 2014). Certain building blocks require transitional periods, which theoretically show quality improvement in practices over the long term. For instance, a primary care setting may focus block redesign of data-driven improvement through implementation of electronic medical records. However, immediate assessment of the medical home may show decreases in care efficiency due to staff acquaintance with unfamiliar technology (Xin et al., 2014). Whereas other blocks such as engaged leadership may be more immediately recognized through a change in practice culture supporting the transformation commitment (Bodenheimer et al. 2014). Through the acknowledgement of various implementation lags specific to a practice composition, the building block framework posits integrative strategies to guide primary care providers in the development of medical home activities. The model’s four foundational blocks: engaged leadership, data-driven improvement, empanelment, and team-based care have been well-established in the literature as key preceptors for continuous practice improvement (Table 1).

The engaged leadership block involves a fully integrative organizational process. Characterized by PCMH principles of care coordination and comprehensiveness (AHRQ) this block incorporates the medical teams understanding of practice-wide intervention (AHRQ, 2016). One primary component of fully engaged care is observed through adequate communication with each patient, which entails providers’ specific attention to communication equalities in the context they may occur (Spooner et al. 2015).

Data-driven improvement is founded upon a practices’ organizational-vision. While technological advancements are designed to enhance health care efficiency, providers must consider patient preference as privacy and information capture are significantly changed (Jenssen
et al. 2015). A patient’s perception of face-to-face quality may be influenced by the incorporation of this building block.

*Empanelment* as a foundation is prioritized by existing industry shifts moving from a physician-centered to a patient-centered environment. Empanelment enables continuous improvement by striking a balance between medical capacity and patient demand. Evidence supports high levels of patient satisfaction as a result of increased staff attention, outreach and monitoring (Neuwirth et al., 2007).

*Team-based care*, as the final foundational block is positioned to accompany empanelment through the creation of designated care teams. Assigning individual patients to medical care teams have been used as an innovative method to increase care capacity and optimize patient quality of care (Christiansen et al., 2015). Achieving true patient-centered care depends on the relationship built between provider and patient.

The broad themes identified within each building block relate to an implementation process controlled largely at the discretion of specific practices. While tools to evaluate building block methods continue to refine and develop the scientific community acknowledges the existing potential in hierarchy. Thus, a number of details focused on methodological effectiveness are recommended for future research. Additional empirical detail on block ordering would provide policy makers and providers with evidence to promote more precise facilitation processes.
Figure 1. Implementation Building Blocks (Bodenheimer et al. 2014)
Sub-Chapter 3: Patient Feedback

The contribution of patient perception as a measurement of medical home effectiveness is important as it suggests a degree of perceived hierarchy among model principles (Bodenheimer et al. 2014). Patient data may enable providers to prioritize elements during implementation which would be useful given the degree and lag that comes with medical home investment and the demographics specific to a practice. Although subjective in nature, patient feedback adds valuable insight to a practices perceived quality of care where evidence has shown positive perceptions of care often leading to increased cooperation with clinicians which subsequently leads to better outcomes as a result of trusting relationships (Lebrun-Harris et al. 2013).

Measuring patient perception however cannot be quantitatively generalized from study to study as the characteristics within each study in addition to the size and scope of its design denies causal inference validity. Accordingly, evidence has shown skewed feedback in the event that an evaluation of local practices often leads to a distinct location bias which may not be suggestive of implementation effectiveness (Kennedy, B. et al. 2015).

Health care quality is driven by an element of equity, thus identifying patient perception as a fundamental means to capture disparities within medical home evaluation (IOM, 2009) For one reason, a patient's socioeconomic status (SES) is strongly associated with their perception of primary care (Spooner et al. 2015). A review of the literature revealed patient feedback reports limited by three key characteristics; access (Christiansen et al. 2015), utilization (Xin et al. 2014), and overall experience with primary care (Spooner et al). When subgroup characteristics are unaccounted for, data on patient feedback are challenged by a bias. For example, subjects
interviewed on the components of their medical home experience may share the same medical
needs, thus creating a “target” patient group where the predetermined need by a group may be
subsided by particular elements, ultimately failing to measure the effectiveness of said elements
on the general patient population (Aseltine et al. 2015). Thus, effective medical home evaluation
must consider the complexity created by various subgroup characteristics.

Based on a review of the existing literature, a theoretical framework (Figure 2) was
developed to illustrate confounding factors which have the greatest influence on a patient’s
perception of primary care. Measurement Outcomes were identified in reference to a data set by
the Associated Press-NORC Center for Public Affairs Research on “How Americans Evaluate
Provider Quality in the United States”. As part of a three-part cross-sectional survey funded by
the Robert Wood Johnson Foundation, the research was developed to investigate individuals’
health care decision making based on factors of care quality and value (NORC, 2014). The
evaluative measurements by patients are reflective of PCMH components and thus were applied
to the theoretical framework.
Figure 2. Theoretical Framework for Feedback

Patient Perception of Care Quality

10 Building Blocks Method

Newly reported Patient Perception

Patient SES Factors of Interest
1. Race
2. Insurance Type
3. Gender

Measurable Outcomes of Patient Perception
1. Communication
2. Face-to-face impression
3. Physician Timeliness
4. Impression (face-to-face)
Sub-Chapter 4: Provider Feedback

Medical home components such as the integration of quality and safety and methods of care coordination cannot effectively be captured by patient feedback, hence requiring measurement from the provider side (Commonwealth Fund, 2013). A set of unique implications on the medical home have derived specifically from provider feedback as demonstrated in the 10 Building Blocks model (Bodenheimer et al. 2014). However, data available on all constituents involved in the medical home transformation process are limited as there lacks insight from involvement by health care faculty, staff and administration. According to Rayess et al. medical home training may benefit from community learning activities, as growing evidence warrants holistic involvement from faculty, staff and administration necessary for sustaining a PCMH (2015).

Additionally, evidence is suggestive of medical home transformation reliant on providers’ innovation of medical home mentality which is based on the provider's creative reimagining of their role in the practice, ultimately diffusing away from physician-centric practices. Howard et al. describes the benefits of decentralization as a patient focus group reported a unique harmonization of care provided by the team of clinical staff which they reported especially beneficial for building relational qualities and trust within the practice (2016). In addition to providing clinical variety, data suggests the power of a provider's use of innovative terminology used to strengthen the relational context of care.

The feedback gained from providers, clinical staff and administration garner useful insight that can be used for medical home team training and education. A study by Lanham et al.
observed a decrease in mortality as a result of Medical Team Training which is a process in surgical settings where teams would hold briefings and debriefings with each surgical case (2016). If this dynamic were applied in a medical home, providers may enhance the patient's coordination of care and would also contribute incremental feedback on the improvement process.
Chapter 5

Literature Review

This review sought to explore to date, the status of medical home inquiry and more closely analyze the extent of the following research question: Are the associated changes in care quality worth the total investment, cost and training endured during patient centered medical home transformation? Although the PCMH has been described with much potential in promoting higher care quality, better patient experience and cost containment, the evidence for comprehensive medical home intervention is both limited and mixed (Xin, 2015). Evaluation of the medical home, according to the AHRQ also warrants data from properly studied interventions involving one or more patient populations, thus supporting the continual collection of evidence from a wide range of practices. Additionally, at its core function, a continuation of national medical home transformation is challenged with maintaining sufficient support primarily due to the extensive investment required for continuous quality improvement (PCPCC, 2016). Therefore, the findings derived from this review seek to raise awareness on the national progress of medical home intervention and identify gaps in the research which may be used to expand further inquiry.
Sub-Chapter 1: Method

Three data search engines, ProQuest, PubMed and Google Scholar, were used to conduct the following literature review. As a search method, key terms: “patient centered medical home” “medical home” and “primary care” were used for first review. Initial search criteria were also set only to include studies conducted in the United States and publications no earlier than 2015 when The Medicare Access and CHIP Reauthorization Act (MACRA) was signed into law, signifying the most recent legislation associated with medical home initiatives. A total of 994 titles were assessed from which 74 were selected for further abstract review. Inclusion criteria for full text review required studies that could be freely accessed, and specifically indicated medical home assessment. Studies were excluded if the abstract indicated any application to a specific population such as “Children” or “Chronically ill” patients. Studies conducted within Veterans Affair Facilities were also excluded. A total of (n=21) studies were selected to be independently reviewed. Methods of analysis explicated key details into a literature review matrix (Table 2) which were then synthesized into key themes associated with the most recent studies on medical home implementation.
Sub-Chapter 2: Findings

Of the studies reviewed, 14 utilized data from the provider side, 6 incorporated data from both provider and patient, leaving only 1 focused solely on patient data. The use of health providers’ interpretations of patient’s experience during medical home transformation are important to recognize as evidence from these studies hold particular weight on influencing practice and policy. While the patients’ interpretation is useful for providing insight on varying perception from subgroups, there exists limited evidence on the impact of racial/ethnic disparities with regard to medical home implementation as there has yet to be established a standard set of measurement for patient-reported data (Aysola et al. 2015). Thus, is reflected in the selection of these studies as most medical home evaluative designs, to date, have focused on provider efforts.

In terms of study design contributions, the review consisted of 9 qualitative studies, 6 quantitative studies and 6 mixed method designs. Most of the qualitative studies consisted of case study methodology and utilized various semi-structured interviews, surveys, and focus groups. Whereas quantitative studies demonstrated a variety of scoring metrics including claims-based data and surveys in addition to generalized estimating equations and scoring panels which researchers designed specifically for the study. This poses a strength in the literature review as key themes could thus derive from a triangulation of evidence types.
Sub-Chapter 3: Key Themes

Role of Disparities

Multiple studies from the review highlight the importance of certain patient characteristics having potential to influence particular medical home performance measures, yet only did the results allow researchers to raise concern and thus prompting future research to account for such disparities. Moreover, researchers acknowledged that the relationship between medical home intervention and certain subpopulations, such as the uninsured, Medicaid and chronically ill, have become increasingly apparent with model linkages to payment. The negative association found between clinical measures and certain subpopulations pointed out the need for additional targeting of these demographic areas (Shi et al. 2016). Evidence from Reibling and Rosenthal revealed that unaccounted social characteristics actually skewed initiative results when comparing various practice settings (2016). Specifically, the researchers discovered a distinct sociodemographic surrounding safety-net hospitals which were often characterized by patients with substantial health challenges, thus contributing to higher per-member-per-month costs. In this sense, the studies outlined the need for practices faced with specific sub-populations to receive additional resources for medical home intervention.

Evidence from several studies also cautioned clinicians and experts to be aware of the dynamic of reimbursement programs as they may cause providers in a medical home to “cherry pick” patients. In other words, if programs mandate PCMH payments based remotely on health outcomes within the practice, then clinicians may be incentivized to exclude patients of a certain
socioeconomic makeup (Miller et al. 2017). Therefore, further research should account for subpopulation characteristics as disparities play a prominent role in medical home effectiveness.

*Continuous Training*

The importance of medical home training and education as an ongoing component of medical home transformation is also a common theme among studies. Discussions explicated the need for more thorough insight on how to provide continual education sessions to clinical staff. A study by Rayess et al. found that educational strategies were not distinct to the teaching by medical personnel, but rather should incorporate preparation and teaching to all practice constituents. Furthermore, researchers identified that education was not enough in the initial teachings of related medical home competencies, and that implementation success would thus rely on frequent teachings and team meetings (2015). Historically training environments tended to silo clinicians and medical personnel hence restricting their access to inter-professional team development. Therefore, the level of engagement by personnel will be ultimately determined by the presence of robust leadership mandating frequent learning sessions (Miller et al. 2017).

*Personnel Effort*

A wide acknowledgement of personnel power was also addressed a major component in the medical home transformation process. Investment of human infrastructure requires more than the proper number of clinical personnel; it also includes an effective means of coordination. As Miller et al. states in addition to robust leadership, a practice will achieve necessary cultural change through the redesign of clinical workflows (2017). To this end, it is recognized that the PCMH model is responsible for environmental shifts from the once vested physician-centric form of delivery to a redistributed collective care team (Howard et al. 2016). The integration of care team delivery has potential to increase primary care capacity when it is effectively
administered. Results from a study by Lanham et al. discovered a significant impact on patient reports of trust and reflection in those practices which staff practiced frequent learning collaboratives (2016). This demonstrated the practices consistency in fostering effective relationships within the care team as it would be reflected on the patient's perception of such care. Methods to build such a culture have not been standardized and thus warrant additional insight from practices exhibiting success. Notably, however, the process of building effective care teams may be financially less expensive than the actual hiring of additional workers but inevitably garners a greater impact on long term medical home effects. As such, Kralewski et al. described the hiring of additional nurses and staff needed for care coordination accounting for around 40% of the total investment costs, while transition activities accounted for much less (12%) but reported being the most difficult and costly from an emotional standpoint (2016). Ultimately, it must be recognized that investment in medical home transformation cannot only be accounted for as pure financial investment whereas the development of human infrastructure can in effect make or break the implementation process.
Chapter 6
Discussion

As health systems push to become more patient-centered, primary care practices are encouraged to transform through innovative implementation methods, such as the patient centered medical home. The literature has illustrated various methods of medical home transformation all of which align with U.S. goals of the triple aim for better health, improved patient experience, and affordable costs (Xin et al. 2015). While the general investment of a medical home has proved extensive effort, there exists mixed evidence on the overall worth of associated practice changes. In the face of uncertainty, there remains a lot to be known regarding the process of practice transformation. However, in the midst of existing evidence it should be acknowledged that the PCMH model is still evolving and any contribution of evidence may prove helpful in its growth.
Sub-Chapter 1: Limitations

The review fosters several important limitations. Given the unique flexibility characterizing medical home transformation, a distinct set of measurements were not defined during examination of the (n=21) studies. In this sense, the study’s findings and respective key themes have derived from a comparison of general similarities and thus do not imply absolute inference on medical home transformation. The process is also limited in its examination of various practice compositions which is in part due to a lack of research control on resources often characterized with a systematic review process. The results from this review must also acknowledge interpretation limitations, as the analysis process was completed solely by the researcher.
Sub-Chapter 2: Future Considerations

While current empirical evidence on the medical home depicts mixed views in its ability to reduce overall costs, it has shown a wide range of evidence on improving health system efficiency. Moreover, the fragmented funding structure observed within the larger U.S. health care system is seen reflected in the niche of medical home intervention. Therefore, future research should focus on the evaluation of medical home intervention among specific populations, such as the uninsured -- a subpopulation characterized by the gaping issue of health care access thus exhibiting a population in particular need of a “medical home” (Reibling and Rosenthal, 2016). Effectiveness of the medical home will be directly impacted by the existence of disparities and thus should be addressed in future evaluations.
Chapter 7 Conclusion

Existing research on the effectiveness of PCMH implementation has proved mixed and uncertain results, however the growing field of evidence has shown the development of medical homes as fundamentally continuous. It must be recognized that change required for medical home transformation is not simply a rebranding of clinical tasks, but an innovation of culture. In this sense, a practice must steer away from the checklist mentality which NCQA standards may otherwise imply, because the investment required to maintain a medical home culture is founded on the practices demonstration of leadership and communication. The literature additionally highlights patient involvement as a vital component of medical home success, where a practice's success of medical home activities may not be fully realized without patients perceiving such elements to its full intent. Ultimately, the patient-centered medical home holds a high degree of potential in changing the U.S. health care landscape, through the work of supportive funding, alignment with stakeholders, and innovative cultural change, primary care practices can substantially contribute to system wide improvement in health, quality and costs.
Appendix A:
Literature Review Matrix

Table 2. Study Characteristics included in the literature review

<table>
<thead>
<tr>
<th>Title, Authors, Journal</th>
<th>Purpose, Questions, Hypothesis</th>
<th>Measurements</th>
<th>Key Findings</th>
<th>Strengths, Limitations</th>
</tr>
</thead>
</table>
| How nurse-led practices perceive implementation of the patient-centered medical home, Frasso et al. (2017), *Applied Nursing Research - AHRQ* | To investigate PCMH implementation in nurse-led primary care practices and to identify facilitators and barriers | In-depth interviews with providers and staff; qualitative methodology | • Nurse-led practices may experience fewer barriers in PCMH transformation  
• Data categorized by patient-oriented facilitators and organization facilitators | • First study to explore PCMH integration in nurse-led care setting  
• Qualitative results should be used for hypothesis generation rather than causal inferences (issues of generalizability) |
| Encouraging Patient Portal Use in the Patient-Centered Medical Home: Three Stakeholder | To examine factors in the PCMH context that may affect patient portal | Qualitative methodology, semi structured interviews with | • Administrative leaders of PCMH held positive view on enrollment while providers and patients expressed | • Limited to northeastern U.S. primary care clinics  
• Time of assessment only a year |
<table>
<thead>
<tr>
<th>Study Title</th>
<th>Enrollment/Subjects</th>
<th>Methods</th>
<th>Findings/Conclusion</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perspectives, Fix, G. et al. (2016), <em>Journal of Medical Internet Research</em></td>
<td>enrollment; subjects include 3 primary care clinics (2011-2012)</td>
<td>patients and providers</td>
<td>Results highlight the importance of communication among all stakeholders</td>
<td>PCMH capability only assessed at the Health Centers largest site</td>
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<tr>
<td>Characteristics Associated with Patient-Centered Medical Home Capability in Health Centers: A Cross-Sectional Analysis, Gao, Y., (2015) <em>Journal of General Internal Medicine</em></td>
<td>Identify characteristics of PCMH capability in Federal Qualified Health Centers with a focus on patient, neighborhood, and regional characteristics</td>
<td>Quantitative scoring via Commonwealth Fund National Survey of FQHCs through the Safety Net Medical Home Scale</td>
<td>High PCMH capability correlated with Electronic medical records</td>
<td>Capability assessed by Health Center leaders which may lead to subjective perception</td>
</tr>
<tr>
<td>Maximizing the Patient-Centered Medical Home (PCMH) by Choosing Words Wisely, Howard et al., (2016), <em>Journal of the American Board of Family Medicine</em></td>
<td>To describe new terminology used by primary care practices to support PCMH transformational culture</td>
<td>Grounded theory approach used to analyze patterns of 10 practice redesigns using AHRQ data for the PCMH Innovation 2013</td>
<td>Language critical with regard to reinforcing substantive practice changes</td>
<td>Data on language is only from conference representative reports-- lacking extensive onsite observation</td>
</tr>
<tr>
<td>The Patient-Centered Medical Home and Associations with Health Care Quality and Utilization, Kern, L.,</td>
<td>Determine effects of PCMH on care quality and utilization compared to paper records alone and</td>
<td>Prospective cohort study 5 years, including 3 years after PCMH</td>
<td>Modest changes seen in PCMH facilities regarding changes in most utilization</td>
<td>Longer-term studies desirable given the speculated cumulative effects of PCMH intervention</td>
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<td></td>
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<td>Similar quality reports comparing EHRs and paper</td>
<td>Did not account for PCMH</td>
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<td>(2016) <em>Annals of Internal Medicine</em></td>
<td>EHRs alone</td>
<td>implementation; 226 practices across 5 health plans, Level III PCMH; claims-based outcomes and generalized estimating equations</td>
<td>records</td>
<td>capabilities in the control (non-PCMH) group, hence producing a bias toward the null</td>
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<tr>
<td>Implementing the Patient-Centered Medical Home in Complex Adaptive Systems: Becoming a Relationship-centered patient-centered medical home. Flieger, S. (2017). <em>Health Care Management Review</em></td>
<td>Examine the implementation process of 9 PCMH transformations focused on the process of moving from structural PCMH to a relationship-centered PCMH</td>
<td>Nine practices assessed through interviews with administration and clinical staff; data transcribed, coded and analyzed both a priori and emergent themes</td>
<td>• Time specifically designated to discuss and reflect on the PCMH transformation process proved a greater understanding among constituents • Viewing the implementation process as a relationship-centered process rather than a structure had an impact on the overall motivation for practice change</td>
<td>• Site visits and interviews conducted at one point in time, and only retrospectively • Data collection only performed by the author, hence lacking triangulation</td>
</tr>
</tbody>
</table>
| Impact of Case Mix Severity on Quality Improvement in a Patient-centered Medical Home (PCMH) in the Maryland Multi-Payor Program, Khanna, N., (2016) *Journal of the American* | Data analysis on the Maryland Multi-Payor Program about quality of care improvement in primary care practices recognized as PCMH | Quantitative metric assignment using a panel data design with no control group; longitudinal | • 35 of 45 quality metrics reported showed improvement during study period by PCMHs • Higher quality correlated with larger practices, greater proportion of older patients and readmission visits | • Quantitative data provided robust results correlating patient characteristics with PCMH quality improvement • Notable lack of a control group • Limited in observation period—where some practices may
### Facilitators and Barriers to Care Coordination in Patient-centered Medical Homes (PCMHs) from Coordinators’ Perspectives, Friedman, A., (2016). *Journal of the American Board of Family Medicine*

| Facilitators and Barriers | To examine how coordinators define and experience their role in a PCMH | Qualitative 5-month private online discussion forum with 25 care coordinators of PCMH practices (various compositions) | **• Relationship building a key to effective care coordination**  
**• Main facilitators identified: colocation and full practice integration**  
**• Main barriers identified: excessive caseloads and data management responsibilities**  
**• Identified as facilitator and barrier included: clinical IT, availability of community resources, interactions with clinicians and other facilities, patient interactions, and self-care practices** | **• Comfortability among subjects using internet based forum**  
**• Participation bias (no random selection-- on a volunteer basis)**  
**• Subjects not required to answer all questions** |

### Patient-Centered Medical Home Adoption: Results from Aligning Forces for Quality, McHugh, M., et al.

| Analyze various PCMH principles via PCMH index comparing outcome | Data from National Study of Physician Organizations, | **• PCMH technical assistance resources, PCMH promotional materials and peer to peer learning forums** | **• Limited in survey questions only covering four of the seven PCMH principles**  
**• Limited in accurate weighing** |
<table>
<thead>
<tr>
<th>Study</th>
<th>Research Questions</th>
<th>Methodology</th>
<th>Findings</th>
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<tbody>
<tr>
<td>al. (2015) <em>Health Affairs</em></td>
<td>Measures in designated alliance vs. control group</td>
<td>Including surveys with random sample and stratification, includes telephone interviews</td>
<td>Offered in the alliance groups promoted learning collaborative which allowed these practices to earn greater points on the PCMH index - Improvement on care coordination through the study period was greater for alliance groups</td>
</tr>
<tr>
<td>Patient-Centered Medical Home Knowledge and Attitudes of Residents and Faculty: Certification Is Just the First Step, Rayess, F., et al. (2015) <em>Journal of Graduate Medical Education</em></td>
<td>To understand the extent of PCMH knowledge and attitudes absorbed among senior residents and faculty for use of future medical home implementation education</td>
<td>Qualitative approach with semi structured and individual interviews using immersion/crystallization method</td>
<td>Residents expressed generally positive attitudes, but some feared implementation difficulties with small practices - Majority of faculty expressed positive views, but some concerned that PCMH was still hierarchically physician led - Faculty also reported barriers with sufficient time to learn and teach PCMH processes; in education sessions most teaching was general concepts not specific medical home components</td>
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<tr>
<td>Trust and Reflection in Primary Care Practice Redesign, Lanham, H.,</td>
<td>To analyze the dynamic of relationships</td>
<td>Cross-sectional survey of 396 clinicians and</td>
<td>Strongest relationships among the dynamics were observed in high trust and reflection</td>
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<td>Data collected from highly performing PCMH practices posing a bias</td>
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<td>Study</td>
<td>Title</td>
<td>Methodology</td>
<td>Findings</td>
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<tr>
<td>(2016) Health Systems Research</td>
<td>Reflection, sense making and learning as a component of human infrastructure managing primary care redesign</td>
<td>practice staff; Multigroup path analysis and Bayesian estimation method</td>
<td>Reflection conditions: Redesign efforts are highly mitigated by the linkages and strength reflection and learning by human infrastructure</td>
</tr>
<tr>
<td>The (Missed) Potential of the Patient-centered Medical Home for Disparities. Reibling, N., Rosenthal, M., (2016) Medical Care</td>
<td>To investigate disparities within PCMH initiatives</td>
<td>Interview data on 4 state-based PCMH initiatives; included key initiative actors and health policy experts</td>
<td>• The overall need to demonstrate quality improvement through medical home initiatives overshadowed issues of disparities--perhaps indicating too high medical home expectations • Disparities claimed to be more of an issue of a fragmented U.S. health care system rather than organizational issues</td>
</tr>
<tr>
<td>Care Managers and Knowledge Shift in Primary Care Patient-Centered Medical Home</td>
<td>To examine perceptions of care management by patients from their</td>
<td>Qualitative data collection in a mixed methods study of a</td>
<td>• Care managers are a key part of PCMH implementation as they influence production and reproduction of authoritative</td>
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<tr>
<td>Study title</td>
<td>Study purpose</td>
<td>Study Design</td>
<td>Findings</td>
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<tr>
<td>Transformation. Howard, H., Malouin, R., Callow-Rucker, M., (2016) <em>Human Organization</em></td>
<td>care manager as a reflection from medical staff</td>
<td>PCMH transformation in Michigan</td>
<td>- The redistribution of clinical power implying a shift in primary care from an individual physician take to a collective nature</td>
</tr>
<tr>
<td>Payment Reform in the Patient-Centered Medical Home: Enabling and Sustaining Integrated Behavioral Health Care. Miller, B. et al. (2017) <em>American Psychological Association</em></td>
<td>To analyze and describe payment reform that complement PCMH</td>
<td>Qualitative analysis</td>
<td>- Linking payment to PCMH motives may cause “cherry-picking” patients&lt;br&gt;- While PCMH has shown positive outcomes, practices may suffer from sustainable plans after initial transformation funding&lt;br&gt;- Opinions discussed and multiple concepts introduced but lacked data on the conclusive takeaways&lt;br&gt;- Implies larger system implications of integration as medical homes have demonstrated a comprehensive shift as such</td>
</tr>
<tr>
<td>A Tale of Two Family Practice Clinics: How They Adopted Patient-Centered Care, But Couldn’t Sustain It. Kralewski, J., (2016) <em>American Association for Physician Leadership</em></td>
<td>To assess transition costs and financial consequences for practices undergoing medical home transformation and respective savings at patient-level</td>
<td>Case Study methodology, used financial and patient workload and clinical data</td>
<td>- Clinical transition demonstrated high stress on nurses as clinicians left due to unwillingness to adapt to the medical home elements--pressure lead to more billable services which ended in a practice that was financially unstable&lt;br&gt;- More than 40% of transition cost due to hiring more staff&lt;br&gt;- Interpretation of results from limited samples poses a limitation to generalize any results&lt;br&gt;- Highlights demands for PCMH transformation to achieve a balance between improved access and lower costs</td>
</tr>
<tr>
<td>Title</td>
<td>Methodology</td>
<td>Key Findings</td>
<td>Notes</td>
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<tr>
<td>A Difference-in-Difference Analysis of Changes in Quality, Utilization and Cost Following the Colorado Multi-Payer Patient-Centered Medical Home Pilot. Rosenthal, M. et al., (2015) <em>Journal of General Internal Medicine</em></td>
<td>To evaluate effects of PCMH implementation in a multi-payer group in Colorado, focused on changes in utilization, costs and quality</td>
<td>Difference-in-Difference analyses using Healthcare Effectiveness Data and HEIDIS</td>
<td>Only 12% of finances attributed to transition activities, but emotional costs were high</td>
</tr>
<tr>
<td>Patient-centered Medical Home Capability and Clinical Performance in HRSA-supported Health Centers. Shi, L. et al., (2015) <em>Med Care/PMC</em></td>
<td>Evaluate PCMH implementation in health centers to determine associated clinical improvements</td>
<td>Quantitative</td>
<td>Suggestive of PCMH intervention contributing to the reduction in ambulatory care sensitive inpatient hospital admissions for the chronically ill</td>
</tr>
<tr>
<td>The Cost of Sustaining a Patient-Centered Medical Home: Experience From 2</td>
<td>To assess costs to personnel associated with PCMH</td>
<td>Mixed Methods utilizing a cost dimensions’</td>
<td>Results report an average cost of $105,000 per FTE clinician per year for even partial</td>
</tr>
<tr>
<td>Study</td>
<td>Topic</td>
<td>Methodology</td>
<td>Findings</td>
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<tr>
<td>States. Magill, M. et al., (2015) <em>Annals of Family Medicine</em></td>
<td>transformation tool and conducting interviews</td>
<td>• Minimal differences in costs between practices at lower and higher levels of medical home recognition</td>
<td>• Limited by fact that not all PCMH functions were implemented in practices examined</td>
</tr>
<tr>
<td>Categories of Practice Transformation in a Statewide Medical Home Pilot and their Association with Medical Home Recognition. Martsolf, G., (2015) <em>Journal of General Internal Medicine</em></td>
<td>To examine the structural patterns of practices participating in a state initiated PCMH pilot</td>
<td>Quantitative measurements of structural transformation and practice surveys</td>
<td>• Magnitude of the practice transformation was not associated with level of PCMH recognition • Identified four structural patterns: minimal, provider-facing, patient-facing, and brad transformation patterns</td>
</tr>
<tr>
<td>Asking the Patient about Patient-Centered Medical Homes: A Qualitative Analysis. Aysola, J. et al., (2015) <em>Journal of General Internal Medicine</em></td>
<td>Examine patient experiences after PCMH adoption and patient understanding of key model components</td>
<td>Qualitative utilizing surveys and semi-structured interviews followed by a grounded theory analysis</td>
<td>• Very little awareness by patients regarding any PCMH changes in practice structure • Minimal awareness did not affect positive reports by patients</td>
</tr>
<tr>
<td>Making Multipayer Reform Work: What Can Be Learned From Medical</td>
<td>To examine the medical home implementation</td>
<td>Data derived from primary and secondary</td>
<td>• Medical Home initiatives vary widely dependent on the practices surrounding</td>
</tr>
<tr>
<td>Home Initiatives</td>
<td>within a multi payer reform environment</td>
<td>sources, including</td>
<td>insurance market and policy environment-- success of</td>
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Research Experience
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Lead by The Pennsylvania State University
Supervised by Dennis Patrick Scanlon, PhD
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Work Experience
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Analyzed physician compensation to determine fair market valuation opinions for clientele, updated the firm internal benchmark database, contributed to company-wide understanding and education of MACRA legislation, completed External Practice Valuation for clientele

Emergency Department Volunteer
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Mount Nittany Medical Center
State College PA
Provided assistance to nursing and tech staff pertaining to tactical duties and patient transport to various procedures within the Emergency Department

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Athlete for the Penn State Women's Varsity D1 Swim Team
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Secretary for the Academy Health Student Chapter
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