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# Analytical Interpretation of the Patient Centered Medical Home: A Meta-Review of the Literature

Bethaney Fehrenkamp

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# Analytical Interpretation of the Patient Centered Medical Home: A Meta-Review of the Literature

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By

Bethaney Fehrenkamp

Bachelors of Science

MASTER'S THESIS

Submitted in Partial Fulfillment of the

Requirements for the Degree of

**Master of Science**

**Health Education**

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# **Analytical Interpretation of the Patient Centered Medical Home: A Meta-Review of the Literature**

**By**

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## **ABSTRACT**

Medical care in the United States is plagued by extremely high costs, inconsistent quality and fragmented delivery at best. In response to these issues new concepts of integrated health care delivery systems have been developed. The Patient-Centered Medical Home (PCMH) is an increasingly popular health care delivery model that emphasizes continuous coordinated patient care. In theory, the PCMH takes a preventative approach to medicine that addresses the individual not the disease, and takes a holistic approach to health care. The PCMH model has been shown to lower health care costs while improving health care outcomes. Despite PCMH being a new movement in the business, little agreement is reached concerning the definition and practice of PCMH, nor specifics on implementation or anticipated barriers. As Americans seek for ways to fix the “health care crisis,” the PCMH offers an alluring model for improved health care delivery while containing the ever escalating costs associated. Appropriate analysis of the feasibility of this model, including limitations and barriers to implementation are necessary at the birth of proposed health care reforms emerge. This article will report relevant research related to cost effectiveness, health care outcomes, and barriers to implementation and utilization of the patient-centered medical home model being applied at the primary level of care.

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# Chapter I - Introduction

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Medical care in the United States is plagued by extremely high costs, inconsistent quality and fragmented delivery at best. Over the past 15 years, the United States has far surpassed most countries in the developed world for total health care expenditures per capita (Concord Coalition, 2009 and The Henry J. Kaiser Foundation, 2011). At the current rate, health care spending in the United States will increase from \$2.5 trillion in 2009 to over \$4.6 trillion in 2020 (Centers for Medicare and Medicaid Services, 2011). Paradoxically, costlier care does not equate to better health outcomes. Many countries that spend far less per capita on health care achieve better outcomes. Within the United States, greater Medicare spending on a state and regional basis tends to correlate with poorer quality of care (The Commonwealth Fund, 2006). This evidences an increase in spending does not necessarily equate to improved health outcomes. A model for healthcare delivery that incorporates improving health outcomes while containing costs is an essential component to the current health care reform in the United States.

Spending among Medicare beneficiaries is not standardized and varies widely throughout the country (Centers for Medicare and Medicaid Services, 2011). The amount of care that a patient receives also varies dramatically by region. This difference in health care spending can be contributed to a multitude of factors related to availability and access to medical care. Considering the epidemiological shift toward chronic diseases, the percentage of health care dollars spent in the last years of life has been rising and is expected to continue to rise. The number of specialists involved in care during the last year of life is steadily increasing in many regions of the country, indicating poor care coordination among the silos of health care delivery (Goodman et al., 2011).

Some of the increased costs have been attributed to non-emergent emergency room utilization. The lack of adequate numbers of providers, along with increased care associated with chronic condition management, has led to excessive wait times to schedule with a primary

physician up to weeks or even months. This delay in availability of treatment and lack of a continuous primary provider contributes to the increase in emergency room utilization for acute conditions.

Patients in rural areas are typically faced with increased barriers to optimal health care delivery. These barriers are typically focused with availability and access constraints. Geographical isolation compounded by difficulties in recruitment and retention of medical practitioners, contributes to rural populations' increased difficulty in accessing and utilizing appropriate medical care. Considering the low patient volume smaller practices are typically less financially appealing to practitioners. Rural patients also face increased challenges with accessing specialty care - as most medical specialists are centralized within urban areas. Ability to pay for specialty care is also a common problem faced by rural populations; as rural populations tend to have fewer opportunities for employment - especially employment that provide employer-sponsored health insurance- leaving a large majority of the rural population uninsured or underinsured (Rosenthal et al., 2001).

In response to these issues, new concepts of integrated health care delivery systems have been developed. These proposed models have different focuses and motivation. The application of the models is dependent upon the motivation for outcome. Patient-centered models of health care delivery focus on the patient's individual well-being and long-term health outcomes, while typically involving a public health approach to medicine as a component. Economic or business models have also been proposed. These models seek to provide coverage to the underinsured or uninsured, but are based on a financial model that adopts a "fee-for-service" philosophy. The economic models of healthcare are not applicable for rural populations as they typically do not generate enough revenue to be profitable and would not be sought by the healthcare corporations.

Examination and evaluations of these models is a crucial component to the current discussions of health care reform in the United States. Our current health care system is broken and has a poor prognosis of surviving the rising costs of treating chronic conditions and sheer patient volume that is predicted to over-burden the current system. Provided with an opportunity to

reform the current healthcare delivery system in the United States, it is vital that we address the multiple components of health. At this crucial moment we must analyze and adopt a model that has the ability to increase healthcare outcomes, decrease health disparities, and be financially feasible without sacrificing patient care. The patient-centered medical home (PCMH) is an increasingly popular model that emphasizes continuous coordinated patient care. In theory, the PCMH adopts a preventative approach to medicine that addresses the individual not the disease, and takes a holistic approach to health care. The PCMH model has been shown to lower costs while improving health care outcomes.

The patient-centered medical home model was originally proposed in 1967, by the American Academy of Pediatrics (AAP), in response to the need for coordinated care of children with chronic conditions. This early form of the model was primarily focused with management of medical records, and did not incorporate a methodology of patient-centeredness. The idea of patient-centered approach to care did not really take root until the 1990's. Considering the recent surge of interest in alternative health care delivery models -that not only increase health outcomes, but contain the ever escalating cost of health care in America- the PCMH model has recently received substantive attention in the political and public arenas. The literature being published considering PCMH is growing exponentially in response to the recent surge of interest in the model. However, limited agreement on language and practical application of the model cause the literature to be sporadic and the concept to be ill-defined. A complete analysis along with agreement on language and underlying concepts is crucial to an accurate analysis of the PCMH.

## **Methodology**

A comprehensive review of literature was conducted on the Patient-Centered Medical Home (PCMH) model, along with a complimentary archival search by reviewing the references of pertinent articles for articles that may have been missed. This paper reviews relevant research related to cost effectiveness, health care outcomes, and barriers to implementation and utilization of the patient-centered medical home model being applied at the primary level of care. The history of the concept within pediatric care- in particular children with special health

care needs- will be examined as relevant to the movement within the area of family medicine. This project utilizes a matrix method of systematic literature review.

From May 2011 through January 2012, a comprehensive literature review was conducted utilizing major electronic professional databases. Key words that were utilized include; Patient-Centered Medical Care, Medical Homes, Primary Medical Practice, Primary Medical Practitioners, along with synonyms currently used within the literature – Accountable-Care Organizations, healing landscapes, medical neighborhoods, integrated care, and coordinated care.

Due to use in pediatric literature; the review of literature focused on the previous ten years of relevant studies (2001-2011). Studies that included analysis of at least one principle of the PCMH model or specifically addressed evaluation of the model were reviewed for inclusion. Articles addressing model application at the rural practice level were also reviewed. Relevant articles outside the stated date range of the analysis, as identified by archival searches, were also evaluated for inclusion in the project. Archival articles which provided essential historical information on the subject were included in the review.

The search included major electronic databases, such as MEDLINE, Psych info, PubMed, Web of Knowledge, and CINAHL. PubMed MeSH terms were utilized for searches within this database. Special attention was paid to journals related to health care delivery and reform, including *Journal of American Medicine*, *Health Policy*, and the *Annals of Family Medicine*, along with attention to major public health journals. Google Scholar was also utilized to locate literature that was not found within the major databases. Seminal authors were identified and contacted via email for additional resources as well. Considering known health inequities of minority populations; special attention was paid to articles mentioning specific ethnic groups.

After the conclusion of the formal literature review (May 2011 – January 2012) the author subscribed to notification of publication of articles mentioning PCMH in the title or abstract and continued to review recently published articles for possible contribution to the topic. This ongoing supplemental review was to address the exponential growth in the literature occurring in this subject area. This review was conducted from mid-January 2012 through early March

2012. The author received weekly notifications of recent publications. On average three articles referencing the PCMH in either the title or abstract were published weekly. These abstracts were then reviewed for inclusion in the review based on contribution of independent discussion or analysis of the model. As of the writing of this review, no additional published articles were included beyond the original time parameters for study inclusion.

### **Matrix Review Approach**

The researcher utilized a matrix methods approach for narrative analysis. This method, as described by Gerrard, provides a structure and process for systematically reviewing the literature that involves keeping a paper trail, organizing documents for review and creating a review matrix to analyze research components across studies (Gerrard, 2011). Following the search methods described previously, the author was able to create a matrix of relevant research articles related to the PCMH model. The matrix method is an organizational tool that allows the researcher to set study criteria to examine across studies. This method also supports a focused analysis of the research area. See appendix one for inclusion of the review matrix.

Over 400 abstracts were reviewed for inclusion in this review. A total of 129 articles were reviewed in entirety, of which 58 provided independent and relevant research on the topic. Utilizing Gerard's Matrix Method (2007) each of the 129 articles utilized were then evaluated and categorized as a primary, secondary, or tertiary article and recorded accordingly. Primary articles refer to the key and significant articles addressing current implementation or evaluation of the PCMH model. Secondary articles refer to the articles that are substantial and important to the review, but are more limited in their overall contribution on the subject. Tertiary articles were included if they possessed one or two of the areas of importance in terms of providing background information or linking concepts of interest. Articles were rated in importance based on their universal application of the PCMH model as related to improving health care outcomes, decreasing health inequities in a rural population, and application to primary health care.

The use of the matrix method allowed the author to electronically sort articles based on the articles contribution to specific principles of the PCMH as well. The sorting feature allowed the author to examine the literature as related to each principle for analysis. Several versions of the matrix were created for use in this analysis. See Appendix two for inclusion of analytical matrix based on the principles of the PCMH.

### **Application to Primary Care**

As the 21<sup>st</sup> century unfolds, primary care in America is endangered. Strain is evident among primary care physicians. Most are stressed, some are exhausted physically and emotionally, and almost all are overwhelmed with crammed schedules, inefficient work environments, and unrewarding administrative tasks (Grumbach and Bodenheimer, 2002). The number of US medical school graduates entering family practice and primary care is decreasing, erasing substantial gains made in the 1990s (Brotherton et al., 2001).

Patients and providers are communicating concerns about the state of primary care. Physicians often complain about a lack of available time to spend with patients. Patients are less able to visit their primary provider when they are in need of care, often waiting weeks or months for an appointment. A 1999 national survey of insured adults found that 27% of the sample that has chronic health conditions had difficulty gaining timely access to care (KFF, 2002). Emergency rooms are now inundated with non-urgent visits, many taking place because of an inability to obtain prompt primary care.

One possible view of the problems facing primary care attributes these problems to inclement external political and financial forces raining down on the primary care practice. One such force is the traditional medical culture of the United States that exalts and financially rewards specialization. Managed care has been considered another major culprit in the troubles experienced by the U.S. physicians. Administrative tasks, challenges to clinical autonomy and income reductions caused by managed care are souring some physicians on the practice of medicine (Grumbach and Bodenheimer, 2002). The managed care gatekeeper role has caused

patients to be apprehensive about rationing of specialty care and financial conflicts of interest for primary care physicians.

Advances in medical care, changing disease patterns, greater demand for clinical accountability, and evolving professional norms are creating heightened expectations for performance in primary care practice. These forces are not unique to the US health care system, but affect primary care practices throughout the developed world. It is clear that primary care in the US is not designed to deliver the accessible, comprehensive, longitudinal and coordinated care required by a 21<sup>st</sup> century health care system. The need for primary care redesign does not mean that other problematic factors affecting primary care should be belittled or overlooked. The U.S. needs to reduce income disparities between generalists and specialists, allowing primary care physicians to play a coordinating role without having the taint of gatekeepers rationing care.

Nations with primary-care-orientated systems tend to have better health outcomes with lower health care costs (Starfield, 1998). Within the US, states with more primary care physicians have better population health indicators (Shi, 1994). Continuity of care, more likely when care is provided by generalists rather than specialists, is associated with greater use of preventative services, reductions in hospitalizations and declines in overall costs (Grumbach and Bodenheimer, 2002).

Providing comprehensive primary care has become exceedingly difficult. From preventative care to chronic care, there is far more for primary physicians to be responsible for. Management of many illnesses has become far more complicated. Care for patients with diabetes illustrates growing demands in chronic illness care. An aging, more sedentary, more obese US population has developed a greater prevalence of type II diabetes mellitus. More aggressive screening combined with less restrictive diagnostic criteria has resulted in earlier detection. An aging population with a greater prevalence of chronic conditions means that physicians often must manage multiple illnesses in the same patient. The difficulty becomes how to appropriately manage these problems within the current system.

The scope of primary care practice has also expanded in the face of growing medicalization of social problems. Depression and other forms of mental illness are increasingly recognized as benefiting from appropriate diagnosis and medical treatment (Grumbach and Bodenheimer, 2002). School problems that once only earned detention now generate queries to the primary care physician about attention-deficient disorder. Primary care providers are expected to screen patients for substance abuse, domestic violence, and risk behaviors. The responsibilities placed upon primary care providers are expanding exponentially while increased pressures surround patient volumes and pay scales, creating a difficult conundrum for providers.

High standards for comprehensiveness of care create a tension surrounding accessibility. The traditional primary care practice was organized to respond to acute and urgent medical problems. Primary care physicians routinely experience the “tyranny of the urgent,” a pressure to relieve symptoms, cure disease, and diagnosis potentially serious conditions crowds out time for preventative care and chronic illness management (Grumbach and Bodenheimer, 2002).

Primary care physicians must also be aware of novel forms of communication technology. As patients are less tolerant of long waits, inconvenient office hours and a system designed around the provider rather than the patient, patient behaviors have begun to evolve as well. First-contact care can no longer exclusively refer to the initial conventional office visit. The computer-literate sector of the population seeks access through email and the internet, raising new accessibility concerns for primary care physicians. Although these trends may lead to greater efficiency and creativity in the medical encounter, destabilization of traditional modes of operating will prove difficult for many physicians.

In order to address the constraints of the current health care delivery system, major innovations in the organization and practice of primary care will be required. Primary care physicians need a new environment in which to work, a climate less permeated with stress and overwork. This new environment must be intertwined with systems of care that improve access and qualities while they relieve physician workload not compound it. Third and most difficult, these changes must take place without major increases in total health care costs,



requiring an extensive redistribution of health care dollars from institutional care to a redesigned primary care home.

Most people in the United States want a “medical home” (Grumbach and Bodenheimer, 2002). Primary care through which physicians address a majority of patients’ health care needs through a long time span was developed to serve as the “medical home.” Although some nomadic patients prefer to navigate their way through episodic encounters with emergency departments and specialty clinics, the majority benefit from and desire a primary care home (Grumbach and Bodenheimer, 2002). Most patients prefer to seek initial care for common problems through their primary care physicians rather than a specialist, with the valued assumption that their primary care provider is knowledgeable about all the medical problems.

Primary care is comprehensive, encompassing a spectrum of preventative, acute, and chronic health care needs. The primary care home is not temporary, but provides longitudinal care with sustained relationships. The primary care home also provides a base from which other health care accommodations – specialists and other health care providers- are arranged and coordinated. Abundant evidence indicates the benefits to patients and health systems of having a primary care home with these essential attributes.

## **Evolution of the PCMH model**

### **Emergence of PCMH in the field of pediatrics**

The first known documentation of the term “medical home” was defined by the AAP (American Academy of Pediatrics) Council on Pediatric Practice and appeared in Standards of Child Health Care, a book published by the American Academy of Pediatrics (AAP) in 1967. Originally this concept was defined as a central source of a child’s pediatric records, and emphasizes the importance of centralized medical records to children with special health care needs. These founders emphasized the need for a complete medical record as a necessary component for adequate health supervision (AAP 2002; Sia et al. et al., 2004). This early concept was primarily focused on the physical location of the records, as an effort to reduce duplications and gaps in services.

Despite the simplicity of this early model, the inability to agree on language and definition of the concept caused it to initially stall in implementation and practice. Although the Standards of Child Health Care was an important guide for the pediatric practice, it failed to define an official AAP policy. It was not until the 1970s that the AAP began to address the policy implications of the term “medical home” (Sia et al., 2004). In 1974, the AAP council began developing a policy statement titled “*Fragmentation of Health Care Services for Children.*” The council noted that the “delays, gaps, duplications, and diffused responsibilities which characterize fragmented care are expensive, inefficient, and sometimes hazardous to health” (AAP, Council on Pediatric Practice, 1977). Unfortunately these characteristics are still a major obstacle in the current health care delivery system nearly four decades later.

The original draft of the policy called for centralization of medical records, and for pediatricians to become advocates for their patients so that they may receive continuous care, without financial or social barriers. These versions of the statement were initially rejected by the AAP Board of Directors, as they believed it was not their place to determine terminology to that degree (Sia et al., 2004). Without a clear agreement on terminology the implementation of the model varied leading to inconsistencies across providers.

It wasn't until 1977 that the AAP Board of Directors could agree on terminology for an official policy regarding the concept of a medical home. This statement again strictly defined a medical home as “...when all the child's medical data are together in one place (medical home) readily accessible to the responsible physician or physicians.” (AAP, 1992; Sia et al., 2004). Ten years after the model's inception the focus was still on physical location of the records. In April 1979, the importance of the medical home –defined as the repository for medical records- was reiterated in the policy statement “*Children Having Care from Multiple Sources*” (AAP, Socioeconomic Survey of Pediatricians: Accessed June 2011). Unfortunately the AAP had again failed to define additional components of the models that would lead to a better understanding of the concept, universal implementation and practice, and ultimately improving health care outcomes. They chose again to focus on the physical location of medical records and failed to

address other principles of the model that may improve health care delivery while containing the ever rising cost of health care.

Following this new policy, all AAP chapters were asked to create a child health plan for their respective chapters incorporating this new policy. Due to the lack of standardization of defining principles, there was variability in the implementation and practice of the model throughout pediatric practices. In 1978-1979 in North Carolina, there were efforts to provide what they considered a medical home to all children through a "Child Health Planning" process. This proposal was rejected by state legislators who were concerned that such an enactment would cause pediatricians to take over too much parental responsibility (Sia et al., 2004). The state legislators did not comprehend the meaning of the ill-defined concept and misunderstood the intentions of the pediatricians. This misunderstanding was due to ill-defined components of the model and inconsistency in implementation and scope of the model, areas that the AAP failed to address when adopting the policy. Consequently, a progressive approach to providing a medical home to all children was not included in the North Carolina child health plan.

Although the legislation never passed the drafts lay a progressive foundation for the future defining of the concept and subsequent model of health care delivery. The drafts referred to specific characteristics for providing a medical home: 1) commitment to the individual, 2) primary services, 3) full-time accessibility, 4) service continuity, 5) comprehensive record keeping, 6) competent medical management, and 7) cost-effective care (Sia et al., 2004). It is these principles that have essentially remained entirely intact in the current definition of PCMH. Had these characteristics been incorporated into the final policy statement the PCMH model could have been in practice, at least within pediatric practices, decades ago. This would have allowed for standards regarding implementation and practice of the model, allowing for more comprehensive analysis and possible incorporation of the model into family practice. It is unknown whether incorporation of this model at an earlier stage would have thwarted escalating costs and fragmented delivery that the current U.S. healthcare system is experiencing.

Nationally, the medical home concept began to evolve from a centralized medical record to a method of providing primary care for a community level, recognizing the importance of addressing needs of the total child and family in relationship to health, education, family support, and the social environments. The concept began incorporating an ecological approach to medicine, increasing understanding of the non-medical determinants to health. This concept assumed a bottom-up approach; shifting the focus toward prevention, wellness and early intervention. This ecological approach is very appealing considering the knowledge of health disparities experienced by minority populations and members with low socioeconomic status.

After initially being referenced in the literature in 1967, the AAP published its first policy statement defining the medical home in 1992. This policy version went beyond the historical focus of location of records and for the first time began expanding the defined policy to include the characteristics previously suggested. In this policy statement, the AAP stated a belief that the medical care of infants, children, and adolescents ideally should be accessible, continuous, comprehensive, family-oriented, coordinated, and compassionate. It should be delivered or directed by a well-trained physician who is able to manage or facilitate essentially all aspects of pediatric care. The physician should be known to the child and family and should be able to develop a relationship of mutual responsibility and trust with them (AAP, 2004).

These characteristics define the “medical home” and describe the care that should be provided in an office setting. However, these “beliefs” that define the underlying values of the concept still fail to adequately address the logistics of how to accomplish universal application of the model. These are idealistic recommendations of what the model “should” look like, but fails to provide implementation strategies or barriers to implementation. While this policy was the most comprehensive inclusion of model principles to date; model application and delivery was still inconsistent between providers. This inconsistent application of the model compounds the ability to evaluate the model across variables.

### **Incorporation of PCMH beyond Pediatrics**

The PCMH model is historically rooted in the field of pediatrics. In 2002, the American Academy of Family Medicine embraced the concept and began moving forward in the field of

family medicine. According to the National Committee for Quality Assurance (NCQA), a nonprofit organization that provides a voluntary certification for medical organizations, the patient-centered medical home is a model of care in which “patients have a direct relationship with a provider who coordinates a cooperative team of healthcare professionals, takes collective responsibility for the care provided to the patient, and arranges for appropriate care with other qualified providers as needed.”

The NCQA first formally licensed patient-centered medical homes in 2008, based on nine standards and six key elements. A scoring system was used to rank the level of certification from level 1 (the lowest) to level 3. From 2008 to the end of 2010, the number of certified medical homes in the United States grew from 28 to 1,506. New York currently has the largest number of medical homes nationally (Longworth, 2011). Small and medium sized practices may face increased challenges in obtaining certification -to be discussed in detail later in the review.

In January 2011, the NCQA instituted certification standards that are more stringent, with six standards and a number of key elements in each standard. Each standard has a “must-pass” element (Table 1). The NCQA has increased emphasis on patient-centeredness, including a stronger focus on integrating behavioral health and chronic disease management and involving patients and families in quality improvement with the use of patient surveys. In January 2012, a new standardized patient experience survey was required, known as the Consumer Assessment of Healthcare Providers and Systems (CAHPS) (Longworth, 2011).

**Table 1: Patient Centered Medical Homes: New 2011 National Committee for Quality Assurance Standards**

<b>Standard</b>	<b>Must-Pass Element</b>
<b>Enhance Access Continuity</b>	Access during office Hours
<b>Identify and Manage Patient Populations</b>	Use data for Population Management
<b>Plan and Manage Care</b>	Manage care
<b>Provide self-care support and Community Support</b>	Support self-care process
<b>Track and Coordinate care</b>	Track referrals and follow-up
<b>Measure and Improve Performance</b>	Implement Continuous Quality Improvement

These elements (as described in Table 1) minimally address the primary principles of the PCMH model, yet provide an extension of the original model designs focusing on the location of medical records. The new elements in the NCQA program align more closely with federal programs that are designed to drive quality, including the Centers for Medicare and Medicaid Services Program to encourage the use of the electronic medical records.

Same-day access is now emphasized, as is managing patient populations –rather than just individual patients- with certain chronic diseases, such as diabetes and congestive heart failure. The requirements for tracking and coordinating care have profound implications on how resources are allocated. Ideally, coordinators of chronic disease management are embedded within practices to help manage high-risk patients, although the current reimbursement mechanism does not support this model. Population management would be much more feasible in practices that utilize electronic record keeping methods.

Primary discussions surrounding the concept of the PCMH have traditionally focused on the extremes of the population- that are deemed most vulnerable- the field of pediatrics and managing chronic conditions in the elderly population. It could be that most proposals or pilot testing of the model occurs within these populations due to the single payer structure of

Medicaid and Medicare populations. This enables analysis and testing of the primary six principles of the PCMH without addressing reimbursement reform that enables this model of health care delivery to be effectively accomplished.

## Seven Fundamental Principles of the Patient-Centered Medical Home

In 2007, the American Academy of Family Physicians (AAFP), the American Academy of Pediatrics (AAP), the American College of Physicians, and the American Osteopathic Association announced a joint set of principles defining the patient-centered medical home (Table 2).

**Table 2: Joint Policy Statement: Patient-Centered Medical Home Principles**

Personal Physician	<ul style="list-style-type: none"> <li>• Patients have an ongoing relationship with a personal physician</li> <li>• First contact, continuous and comprehensive care</li> </ul>
Whole-Person Orientation	<ul style="list-style-type: none"> <li>• Medical Home provides for all the patient's health care needs or appropriately arranges care with other qualified professionals</li> <li>• Care for all stages of life: acute care, chronic care, preventative services, and end-of-life care</li> </ul>
Physician Directed Medical Practice	<ul style="list-style-type: none"> <li>• Personal physician leads a team of individuals at the practice level</li> <li>• Collective responsibility for the ongoing care of patients</li> </ul>
Care is Coordinated and/or integrated	<ul style="list-style-type: none"> <li>• Coordination of care across the health care system and patients' community</li> <li>• Care is facilitated by registries, information technology, health information exchange, use of interpreters, and other means</li> </ul>
Quality and Safety	<ul style="list-style-type: none"> <li>• Quality and Safety Improvements are hallmarks of the medical home</li> <li>• Specific Activities could include individualized care plans, evidence-based decision support tools, collection and reporting of quality improvement data, use of information technology, and voluntary certification of practices as medical homes</li> </ul>

Enhanced Access	<ul style="list-style-type: none"> <li>• Patients can easily access their health care via their medical home</li> <li>• Specific improvements could include open access scheduling, expanded hours and enhanced phone or email communication</li> </ul>
Payment	<ul style="list-style-type: none"> <li>• Increased payments support the added level of service and value provided to patients who receive care from a medical home</li> </ul>

Issued jointly by the American Academy of Family Physicians, American College of Physicians, American Academy of Pediatrics, and the American Osteopathic Association

The PCMH model is defined by seven fundamental principles. The first two principles anticipate that every patient will have an ongoing relationship with their personal physician, and that the model reflects a whole-person approach to health care, not just focus on the presenting disease or condition or body system.

The next four principles emphasize the use of improved care procedures within the medical practice. One principle incorporates the use of a team approach to medicine and health, the primary physician leads the team of professionals who are collectively responsible for ensuring adequate and appropriate coordinated care for the individual patient. Another principle integrates the collective patients, coordinating and integrating care across all elements of the health care system. This could be facilitated by the use of patient registries, and other health information technology, such as electronic health records with collective access by all members of the medical team, despite varying physical locations of practices.

The fifth principle of the PCMH focuses on quality and safety. According to this principle, practices will use evidence-based support to enable the health provider to work collaboratively with patients to arrive at optimal care decisions. The literature is robust concerning improved compliance with medical treatment, and therefore improved outcomes when the patient is incorporated into the decision making process.

The sixth principle of the PCMH is concerned with increasing access. This principle goes beyond the physical location of health providers in relation to their patients and insurance logistics. Of course increasing or extending medical clinic hours to alleviate scheduling problems with patients, is an essential component in reducing unnecessary emergency room visits, containing



associated medical costs, and addressing the concept of prevention within the medical model. Access to insurance, or the ability to pay for services, is also a crucial component in accessing medical care, however this component is addressed in the seventh principle, concerning health care reform and financing health care. In the sense of the sixth principle, access is concerned with patient ability to contact their provider within a timely manner. This feature includes timely access to care and improved methods of communication. Proposed methods for improved communication include email and telephone communication between patients and physicians.

The final principle addresses the overarching barrier to the formal principles, payment or financing of health related services. Payment reform encapsulates changes in health care financing and physician payment systems to support the other components of the model. These changes are largely beyond the control of the individual physicians and practices and require intervention from a legislative level. Payment reform is a crucial component to ensuring the effectiveness of the model and the other six principles of care approach. A brief discussion of payment reform will be incorporated into this review. A comprehensive review of health care financing and proposed reform is beyond the scope of this review and will be included in a future supplementary review.

# Chapter II – Synthesis of the Literature

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## **Analysis and Testing of the Model**

The concept of a Patient-Centered Medical Home (PCMH) has captured the attention of many stakeholders to the national debate on health care reform. Some researchers in the field have suggested that thousands of primary care practices will attempt to convert their practices into PCMHs (Nutting et al., 2009). However, little information exists related to implementation and adoption of the model and what information is available is not consistent across implementation and application of the model.

Due to this recent surge of interest in the PCMH model, demonstration projects are underway in numerous states and supported by diverse constituents that include professional organizations, large employers, insurers, non-profit organizations and others (Nutting et al., 2009) These diverse and rapidly growing efforts are being initiated based on an appealing idea, but due to non-standard approaches to implementation offer little direct empirical support for the model. The PCMH model represents an innovative and exciting national conversation that melds core primary care principles, relationship-centered patient care, reimbursement reform, new information technology, and the chronic care model. Unfortunately, the rush to demonstrate operational and financial feasibility of the PCMH model risks premature closure of the larger PCMH conversation and potentially stifles evolution of the PCMH model to meet important patient, practice and system needs.

## **The National Demonstration Project**

The National Demonstration Project (NDP) of the American Academy of Family Physicians (AAFP) was the nation's first large-scale demonstration of primary care practice redesign, based on the emerging principles of the PCMH. This two-year NDP was supported by the AAFP and included an independent, ongoing multimethod evaluation by the authors to examine the feasibility and effectiveness of implementing the principles of the PCMH model. The NDP was launched in June 2006 to test the "New Model of Family Medicine" as outlined in the 2004

report “The Future of Family Medicine” and was updated to be consistent with the emerging consensus principles of the PCMH (National Demonstration Project).

Thirty-six family practices were selected from 337 practices that completed a well-publicized, comprehensive on-line application. Practice selection attempted to maximize a diversity of geography, size, age, and ownership arrangements. The thirty-six participating practices were located in twenty-five states, with eleven situated in rural communities, sixteen in suburban areas, and nine in urban areas. Ten practices were solo physicians, eight were small practices (2-3 physicians), ten were medium sized (4-6 physicians) and eight were considered large practices ( $\geq 7$  physicians). Twenty-two practices were owned by physicians, one was owned by a governing board, and thirteen were owned by larger hospital or medical systems (Nutting et al., 2010).

For the most part, the participating practices were highly motivated to test the new models of care and in many cases had begun a local process of model incorporation (National Demonstration Project). Practices were randomized into either facilitated or self-directed groups. Facilitated practices received ongoing assistance from a change facilitator, as well as ongoing consultation from a panel of experts in practice economics, health information technology, quality improvement, and discounted software technology, training and support. They were also involved in four learning sessions and regular group teleconferencing. Self-directed practices were given access to Web-based practice improvement tools and services, but did not have on-site assistance. They self-organized their own learning session halfway through the 2-year project and participated in the final learning session (National Demonstration Project).

The NDP officially concluded after 2 years in June 2008. An independent evaluation team was responsible for design and continued analysis of the NDP via a multi-method assessment. The evaluation addresses both the effect of the PCMH model on patient and practice outcomes and the effectiveness of the facilitated intervention in bringing about transformation (Nutting et al., 2009). Even though the complete multi-method analysis of the NDP has yet to be fully completed there are early lessons that can be learned. Currently, the analysis of the National

Demonstration Project focuses on provider characteristics and ways to bolster adoption of the model from a provider sense. There is little discussion regarding health outcomes of implementation of the model. However, early evidence from a small number of small scale demonstration projects suggests that the model is having positive effects on both quality and costs of care (Rittenhouse et al., 2011).

Most studies located that evaluated the fundamental principles of adoption focused on certain principles of adoption and failed to address the other components. Health Communication articles would focus on provider communication with patients to create an open dialog of health and therefore address two aspects of the model related to patient-provider dynamics. As far as the financial component; most demonstration projects controlled for the ability to pay for medical services and continued to work within the constraints of the current system of financing health care as this piece of the model tends to involve more than the project is designed to evaluate.

### **Analysis of Adoption of the PCMH in Smaller Practices**

Despite widespread efforts to move forward rapidly with pilot projects and implementation of the patient-centered medical home, there is currently no systematic data of evaluating what components physicians have or have not incorporated into the model. While the National Demonstration Project (NDP) provided an inspirational start, an analysis of the application of the model within smaller practices and practices serving smaller populations is an important component to the evaluation and adoption of the model.

Adoption of the principles of the PCMH is typically found to be better in physician practices that were affiliated with a large medical group. However, most U.S. physicians do not practice in large medical groups. In fact, 35.1 percent of visits to U.S. office based physicians are solo-practitioners, and 88 percent are to practices with nine or fewer physicians (Hing, 2007). Implementing the principles of the PCMH in these smaller practices may be particularly challenging due to fewer staff and less resources to support implementation.

Published studies on the adoption of the PCMH in smaller practices are limited to just three, with only one utilizing a national sample. Two state-specific studies were published regarding Virginia and Massachusetts. In Virginia, most family medicine practices exhibited some elements of the medical home model, but few practices incorporated the full suite of PCMH principles (Goldberg, and Kuzel, 2009). In Massachusetts, the prevalence of medical home capabilities varied widely among 412 primary care practices, and increased adoption was associated with large practice size and affiliation with a larger network of providers (Friedberg et al., 2009).

Rittenhouse et al., examined 1,214 small and medium sized physician practices nationally and found that the use of the medical home processes were low overall. The average adoption of principles across all organizations was a 35% adoption rate of possible processes. Adoption was the greatest for the largest medical groups—those who have more than 140 physicians— and for those owned by large entities such as hospitals, which are more likely to have greater resources (Rittenhouse et al., 2011).

In Rittenhouse's study, practices were awarded points based on presence of adoption of principles of the PCMH model. On average, practices earned 21.7 percent of the possible points for use of medical home principles. Solo and two-physician practices used significantly fewer processes compared to practices in larger categories. These smaller practices were also significantly less likely to use processes facilitated by clinical information technology, such as electronic records, electronic prescribing, chronic illness registries, and electronic records for data collection for quality measures (Rittenhouse et al., 2011). The author was unable to locate any studies comparing health outcomes of smaller facilities without resources for medical technology to those with more resources.

However, solo and two-physician practices were found to be significantly more likely to report that they incorporate feedback from patients and that their physicians communicate with patients via email. Considering the nature of Rittenhouse's study (rating on presence or absence of physical components of the model) it fails to address patient satisfaction with the delivery model or analyze health outcomes and associated costs. There currently is no

empirical evidence weighting the different principles of PCMH relating their importance to patient health outcome or cost containment.

The prevalence of use of processes adopted within the practices varied widely by the type of process, ranging from 73.3 percent for having electronic access to emergency department notes to 2.4 percent for use of depression care managers. In general, the use of nurse care managers was low. Although one-quarter of practices used electronic medical records for progress notes, only 9.5 percent regularly used electronic chronic disease registries and only 8.7 percent reported that a majority of their physicians communicated with patients via email (Rittenhouse et al., 2011).

Most practices were small and comprised of only primary care physicians, and were owned by physicians, although larger practices were more likely to be multispecialty and to be owned by a hospital or Health Maintenance Organization (HMO). The largest practices were more likely to be subject to public reporting and per-per-performance initiatives.

### **Factors Associated with Small Practice Use of Processes**

Implementation of a PCMH model involves extensive start-up costs, once an electronic records platform has been purchased maintenance of the system is relatively cheap. Some of these implementation start-up costs may be prohibitive of full adoption of the model principles by smaller practices. This is evidenced by the larger practices, or those practices owned by larger health care corporations, scoring better on evaluation of adoption of processes related to electronic health information technology and therefore model application scores, while smaller practices score better on patient satisfaction and communication, and presumably relationship, between patient and provider. This relationship may establish a better partnership in health care decision making resulting in more positive health outcomes regardless of model score.

Practices that were exposed to external incentives- such as pay-for-performance, public reporting, and to a much lesser extent the assignment of some financial risk to the practice for the costs of its patients' hospital care- were also found to be significantly more likely to use

medical home processes as scored by Rittenhouse's study (2011). This means that practices that had the opportunity to receive extra income based on clinical quality, use of information technology, and measures of efficiency scored 9.72 percentage points higher on the medical home index compared to practices that had none of these pay-for-performance incentives (Rittenhouse et al., 2011).

### **Transformation into Patient-Centered Medical Homes**

Becoming a PCMH requires transformation from the current operations of the medical practice and change can be difficult. Transformation to a PCMH approach to patient care requires more than a series of incremental changes. Since the early 1990s theories of quality improvement emphasizing sequential plan-do-study-act cycles have dominated change efforts within primary care practices (Langley et al., 1996). Many NDP practices initially chose to take this incremental approach, literally checking off each model component as initiated. These practices were soon overwhelmed with complications. Whereas the traditional approach to quality improvements works for clearly bounded clinical process changes, the NDP experience suggests that transformation to a PCMH requires a continuous, unrelenting process of change at all levels of care whether direct or indirect (Nutting et al., 2009). The PCMH model transformation represents a fundamental reimagination and redesign of practice, replacing old patterns with new ones. Transformation includes new scheduling and access arrangements, new coordination arrangements with other parts of the health care system, new ways of bringing evidence to the point-of-care services, and new strategies for patient engagement along with multiple uses of information and technology systems.

These multiple components of the PCMH model are highly interdependent. Each component, when appropriately implemented, has ripple effects throughout the practice, affecting all other work processes and individual roles within the system. Roles of individuals and the practices' sense of identity and imagination of the meaning of patient care are being changed. Most current practice models are designed to enhance the physician workflow. The PCMH model should be designed to enhance the patient experience. This shift requires a transformation of

ideology of treatment practices and therefore cannot be fully achieved through incremental changes.

Although most participating practices already had an electronic medical record (EMR) in place at the beginning of the project, an initial strategy of the NDP was to further implement technological enhancements supporting a PCMH (i.e. Registries, e-prescribing, patient portals etc.) (National Demonstration Project). These added features included a range of components, some of which were enhancements to the EMR (National Demonstration Project Evaluation). New technology implementation was more difficult and time consuming than originally envisioned. The hodgepodge of information technology marketed to primary care practices resembles more a pile of jigsaw pieces than components of an integrated system. A function as seemingly simple as a disease registry was either absent from EMR systems or extremely difficult to activate and work with (Nutting et al., 2009). Even with discounted pricing and more than usual technical support from vendors, the challenges proved daunting. Making the tasks more difficult was the need to redefine work processes before implementation rather than after. This lesson resonated well with the emerging literature about the EMR in primary practices (Crossen et al, 2005, Kush et al., 2008). The heavy reliance on EMR as a primary component of the PCMH model may place an undue burden on smaller rural practices as resources are more limited, increasing the burden on both financial and time constraints to implementation.

The evaluation of the NDP noted multiple pathways toward the PCMH highly dependent upon the initial conditions at the local practice, health care system, and community level. Even among the most highly motivated NDP practices there was considerable variation in need for assistance (among those with facilitated and self-directed implementation), depending on specific challenges and previous experience with change. Facilitated practices received a spectrum of assistance, including a combination of consultation, coaching and facilitation. Among the self-directed practices, some believed they would have benefitted from assistance, but varied in describing what might have helped. Others reported they did better plotting their own course and time frame with reinforcement from their learning session (Nutting et al.,



2009). Six key themes emerged from the qualitative analysis of the NDP. These themes are illustrated in Table 3.

**Table 3: Qualitative Themes Emerged from NDP Analysis**

1) practice adaptive reserve is critical to managing change,
2) developmental pathways to success may vary by practice,
3) motivation of key practice members is critical
4) the larger system can help or hinder the process of transformation,
5) transformation is more than a series of changes and requires shifts in roles and mental models, and
6) Practices benefit from the multiple roles that facilitators play (Nutting et al., 2010).

These qualitative themes that have emerged during evaluation of the NDP have highlighted areas of potential support for providers attempting to transform to a PCMH delivery model. In reference to the first stated theme; a practice's capacity for organizational learning and development was described as adaptive reserve (Nutting et al, 2010). The magnitude of stress and burden from the unrelenting continual change required to implement components of the NDP model was found to be immense. Nevertheless, data at baseline and over time revealed that practices varied widely on their initial characteristics and that this variation appeared to affect their ability to effectively deal with the ongoing demands of change, thus resulting in different developmental pathways. Many of the practices in both the facilitated and the self-directed groups had a solid core at baseline, manifested by the ability to manage basic finances and general practice operations required for the clinical enterprise. However, it was observed that as pressures for multiple changes intensified many practices struggled and deficits became apparent in their ability to learn and adapt (Nutting et al., 2010).

Deficits in these traits contributed to "change fatigue" for many practices, which often emerged in unexpected ways. Change fatigue resulted in faltering progress and reduced the practice's ability to make continual change over time. Symptoms of Change Fatigue often included unresolved tension and conflict, burnout and turnover, and both passive and active resistance to further change. Importantly, none of the self-directed practices with limited adaptive reserve at baseline did well in implementing NDP model components (Nutting et al., 2010).

A healthy relationship infrastructure was found to be beneficial in combating or protecting against change fatigue. The characteristics of a healthy relationship infrastructure that became immediately obvious in the qualitative analysis of the NDP included both effective communication and trust (National Demonstration Project Evaluators' Report). Having an aligned management model in which clinical care, practice operations, and financial functions share and reflect a consistent vision seemed important in moving a practice in an unwavering direction when faced with making multiple decisions of the magnitude required to implement a PCMH model.

Not surprisingly, practices that were able to successfully implement many NDP model components were often observed to have facilitative leadership. Although a charismatic lead physician who could effectively mobilize the team was an important characteristic, particularly in small practices, it was often not sufficient in larger or more complex practices. Facilitative leaders were observed empowering staff to identify and suggest new ideas and to feel safe in raising concerns about the effects of the changes (Nutting et al., 2010).

As defined in the second qualitative theme, practices followed very different developmental pathways. Even in successful practices progress was often made in fits and starts. The two-steps-forward-one-step-back pattern was a reoccurring one that could often lead to frustration. Nearly all the practices in both facilitated and self-directed groups were able to implement at least some components of the PCMH model, and many were able to implement most components (National Demonstration Project Evaluators' Report). Nevertheless, the practices varied in the components addressed and the difficulty encountered in implementing them. Nearly all participating practices concluded that two years was simply not enough time to implement such a complicated model of health care delivery. Implementing an EMR for example, was a huge undertaking and for those without one at baseline, simply transitioning to an EMR required a lot of time and effort (Nutting et al, 2010).

In reference to qualitative theme three, model implementation includes a wide range of new innovations making maintaining a high level of motivation for change among key practice members an obvious challenge. Practices that were immediately successful in generating

motivation among a range of options often used team building strategies. Addressing the depth of motivation and developing a shared vision among staff was often an initial focus of the facilitators, and when successful led to substantial progress and often strengthening of the relationship infrastructure. Several self-directed practices struggled with translating the initial motivation and enthusiasm from the physician champion to the rest of the practice and some never did. Indeed this hurdle caused several practices to get stuck finding it difficult to move forward in the transformation process (Nutting et al., 2010).

Just as the magnitude of change stressed the practice relationship systems, it also captured the attention of the larger system. In reference to qualitative theme four, the larger system can help or hinder. Thirteen NDP practices were owned by larger hospital or medical organizations. In general these practices had negotiated their involvement in the NDP with their systems managers and in some cases, received not only initial, but ongoing support. Often this support came in the form of management and technological skill and expertise along with additional resources for expanding roles and scope of responsibilities. In several cases, the practices were provided with system-level activities, such as patient education, monitoring populations for needed preventive services, maintaining registries and care management activities. One facilitated practice was encouraged to pilot test their own ideas for use by the larger system. The most helpful systems recognized the need for local practice-level control of the pace and sequence of implementing model components. On the other hand, several practices believed at the beginning they had sufficient latitude to make many of the changes needed to implement model components only to discover the scope and national attention of the NDP activated system-level control mechanisms that were not anticipated. One facilitated practice struggled before eventually dropping out because of system-level institutional review board issues and concern about the loss of proprietary information.

Although most practices made progress in implementing model components, not all were able to use them effectively. This highlights that transformation is more than a series of changes (qualitative theme five). While a two-year time frame is not typically considered brief, in order to implement technology and restructure workflow to use it for new purposes is not a simple

task that can be effectively undertaken in such a short time frame. Changing the overall way the practice sees itself and how it operates in a new paradigm is a challenge in itself. As discussed previously, it was observed that transformation was much more than a series of successful fragmented implementations. Instead, substantial shifts in individual roles and personal identities, and practice-level change in shared values and vision encompassed new approaches to individual and population based care (Nutting et al., 2010). It has been proposed by the independent evaluators that this shift may be been most difficult for physicians, especially those who held deeply held beliefs that primary care providing was based in a strong trusting relationship between a patient and a physician. Permitting other staff members into meaningful patient interactions for team care meant expanding that special relationship, and for many physicians doing so required a change in their identity as a physician. This shift required not only a change in roles of both physicians and staff, but also substantial changes in the way physicians thought about themselves (Nutting et al., 2010).

At the level of the physician group, there also needed to be a greater interaction and transparency among the physicians within a practice and more sharing of how they approach different clinical situations and different patient needs. It became clear to the evaluators that often a given physician could not describe how practice colleagues approached many acute or chronic conditions (Nutting et al., 2010). The traditional loose federation of autonomous physicians is simply not consistent with the sharing and ongoing learning needed for continually improving patient-centered care. Many NDP participating physicians had operated in and valued an independent, autonomous style for so long they resisted looking over others' shoulders as a means of improving patient care (National Demonstration Project Evaluators' Report).

Transformation into a PCMH model as outlined by the NDP required a paradigm shift for the practice as an organization. This requires a practice shifting its view of itself from an organization that processed patients' visits for the convenience of the physician into a practice that views itself as primarily meeting the needs of patients and planning proactive population-based care for groups of patients. This shift involved substantial changes in roles and identities

of staff members, time spent in new activities and rethinking the overall practice processes, values and mission (Nutting et al., 2010). The new conceptualization of a PCMH required different skills, roles, and activities than were found in most practices at baseline of the demonstration project. In small practices, transformation of a single physician appeared to provide adequate critical mass for practice transformation. Whereas in larger practices, personal transformation needed to include a larger critical mass of physicians and staff members to support practice-level transformation and incorporation of new relationships and roles (Nutting et al., 2010).

An overall observational outcome of the National Demonstration Project was determined by comparing the facilitated practices to the self-directed practices. It should not be surprising that practices that received support with the transformation process fared the storm better than those practices that were not provided with extensive support (qualitative theme six). Facilitators took on the role of consultant, coaches, negotiators, and connectors within their role of change facilitators. They approached change at the whole-practice level and attempted to understand the individual strengths and weaknesses of each individual practice. Importantly, the facilitators were careful to emphasize that the practice must retain ownership of the change process, and that it was not the responsibility of the facilitator to come in and make changes for them. In order for change to be sustained the individual practices must take ownership of the transformation and seek the assistance of facilitators when necessary to ease this process.

### **Analyzing the Relationship Characteristic of Care – The Low-Tech Component of the PCMH Model**

Most PCMH demonstration and pilot projects require designation by the National Committee for Quality Assurance (NCQA) as a PCMH before participation. The NCQA's qualification tool however may not be best as measuring PCMH principles, as it underemphasizes the high-touch primary care attributes that are relationship centered (first-contact care, longitudinal and continuous care, comprehensive care, and coordination of care) and over emphasizes the high-tech information technology capabilities.

The NCQA currently gives greater emphasis to high-tech principles rather than the high-touch principles that form of the core of primary care. Thus a practice that scores well on the NCQA qualification may not necessarily practice patient-centered primary care, whereas practices that are strong in relationship centered care may get excluded as a medical home by the NCQA qualification tool.

Several studies have demonstrated the benefits of high-touch primary care attributes in improving health services and outcomes. First-contact care (availability and accessibility of services) is associated with higher rates of breast examinations and Papanicolaou smears, lower hospitalization rates, and lower costs of care (Bindman et al., 1995; Bindman et al., 1996; Forrest and Starfield, 1996). Longitudinal care and continuity of care are associated with higher delivery of preventative services, improved diabetes control, lower health care costs and higher patient satisfaction (Saultz and Lochner, 2005; Blewett et al., 2008). Higher coordination of care has also been associated with higher rates of preventative screenings as well as other cost containment characteristics (decreasing ER visits, hospitalizations etc.) (Ferrante et al., 2010).

### **Cost Effectiveness**

Integrated delivery models, such as patient-centered medical homes, have demonstrated cost-savings while improving patient perspectives of quality of care and health outcomes (Bodenheimer, 2011. Gabby et al., 2011). Reducing hospital admissions and visits to the emergency department shows the greatest cost-savings in these models. Several projects have shown significant cost-savings: the Group Health Cooperative of Puget Sound reduced total costs by \$10 per member per month (reduced from \$498 to \$488,  $P=0.76$ ) with a 16% reduction in hospital admissions ( $P<0.001$ ) (Grumbach, 2011). The Geisinger Health Systems Proven-Health Navigator in Pennsylvania reduced readmissions by 18% ( $P<0.01$ ). They also reported a 7% reduction in total costs per member per month relative to a matched control group also in the Geisinger system, but not in a medical home, although this difference did not reach statistical significance (Grumbach, 2011).

Private-payer demonstration projects of patient-centered medical homes have also shown cost-savings. Blue Cross Blue Shield of South Carolina randomized patients to participate in either a patient-centered medical home or their standard system. The PCMH group reported 36% fewer hospital days, 12.4% fewer emergency room visits, and a 6.5% reduction in total medical and pharmacy costs compared with the controls (Longworth, 2011).

Finally, the use of chronic care coordinators in a PCMH has been shown to be cost-effective and can lower the overall cost of care despite the investment to hire them. Johns Hopkins Guided Care program demonstrated a 24% reduction in hospital days, 15% fewer emergency department visits, and a 37% reduction in days in a skilled nursing facility. The annual net Medicare savings was \$75,000 per coordinator nurse hired (Longworth, 2011).

A five-year follow up study of adults in a national probability sample survey showed that those who had a primary care physician as their regular source of care had one third lower costs and were 19 percent less likely to die prematurely, even after controlling for several other predispositions to mortality (Franks and Fiscella, 1998). One of the first studies of primary care in all 50 U.S. states showed that the number of primary care physicians per population was the only characteristic consistently related to better health outcomes, including overall mortality rates, mortality rates from heart disease and cancer, neonatal mortality, life span and low birth weight. In contrast the number of specialty physicians per population was related to poor outcomes of all these types (Shi, 1994). States that are considered “rural states” typically display the poorest provider to patient ratios.

The greater the number of primary care physicians in the 50 U.S. states, the higher the life expectancy. However, some states have much lower life expectancy than would be expected based on the number of primary care physicians, indicating that other factors, some sociodemographic, some socioeconomic and some possibly related to social policy also influence health indicators (Shi et al., 1999).

The ability to analyze the cost effectiveness or cost savings of the PCMH model is difficult; due to the inconsistent implementation of the model principles and limited time frames of the studies conducted. The National Demonstration Project was the largest national pilot test of

the PCMH model. This study only lasted two years, not allowing for analysis of long term health savings. The majority of researchers agree that a preventative approach to health care would slightly increase costs in the short term with expected financial gains in the long term. This is based on the belief that a healthier population incurs less health related costs. The literature is robust concerning the increased health care costs associated with delaying care.

Smaller pilot studies have reported on the cost savings associated with application of educational components of the PCMH model. These studies are typically focused on one disease-specific intervention (i.e. Type II Diabetes) and typically do report cost savings believed to be produced by the interventions. The majority of these articles are located within Nursing and Health Education journals and typically incorporate a nurse-educator as a primary component and cost of the interventions. These cost analyses are performed as part of the analysis of the health intervention program (Moran et al., 2011).



## Chapter III – Analysis of the Literature

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### **International Comparison of Patient Centeredness and Health Outcomes**

Beyond the discussions of electronic medical technology, cost containment and process of adoption, a more relevant issue for health care systems is whether those features of a PCMH must be present together in order to positively address health outcomes. One researcher found that identification of a particular practitioner provides better service than mere identification of a particular place; exceptions are for appointment keeping and for preventative care for children (Starfield and Shi, 2004). This suggests that patient perception of personal relationship with primary care providers is a crucial component to improving health care outcomes within a PCMH model.

Two international comparisons compared thirteen industrialized countries by the strength of their primary care health systems, documented the relevance of primary care to effectiveness and efficacy of health services in general (Starfield and Shi, 2002; WHO 2000). Primarily care oriented countries – specifically Denmark, Finland, Netherlands, Spain and the United Kingdom- achieve notably better outcomes for health in early childhood, including deaths from injury. It is notable that the United States ranks near the bottom, or at the bottom, on childhood mortality measures and is rated the lowest in primary care orientation of all the countries (Starfield and Shi, 2002). The advantages of primary care are most notable for health outcomes in childhood, although these children grow into adults. The literature concerning access to primary care during childhood related to improved health outcomes in childhood and extrapolated to adulthood is robust.

The environment that the health care is being delivered in is related to degree of patient centeredness in health care delivery. That is, that countries that do not permit or provide strong incentives against locating health facilities or personnel in areas with an already sufficient supply, countries in which health insurance is under the control of a publicly accountable body, and health systems that do not permit more than minimal cost sharing for primary care achieve better health outcomes and at lower overall costs. Another characteristic

related to the nature of patient centeredness were also found to be significant: comprehensiveness of primary care services and family orientation to delivery (Starfield and Shi, 2002).

Another analysis examined eighteen Organization for Economic Cooperation and Development countries, this study examined the relationship between the strength of primary care and mortality (Macinko, Starfield and Shi, 2003). This relationship was found to be consistent despite controlling for other possible influences on mortality such as gross domestic product per capita, total physicians per 1000 population, percentage of elderly people, average number of ambulatory care visits, per capita income, and alcohol and tobacco consumption. The stronger the primary care orientation in the country, the lower the all-cause mortality; potential years of life lost (all causes); potential years of life lost (Macinko, Starfield and Shi, 2003). This is despite the evidence that the stronger the primary care base of health systems, the lower the overall costs for health services (Starfield and Shi, 2002).

Studies have also documented the importance of having access to primary care in other countries, regardless of model of delivery. In the United Kingdom, the number of general practitioners per 100,000 population was found to be related to lower in-hospital standardized mortality (Jarman et al., 1999). In Japan, elderly patients who have a regular physician are less likely to be taking many prescribed medications, compared with comparable people who have no regular source of care (Tsuji-Hayashi et al., 1999). In Spain, a national primary care reform was implemented in stages, with the most deprived areas undergoing the reform first. Within a ten-year period after the reform was initiated, those areas in which it was implemented first had the largest decline in mortality rates associated with hypertension, followed sequentially by the regions in order of implementation (Villalbi et al., 1999).

Comparisons are frequently made between U.S. health care and Canada's. One researcher noted "One of the most frequently cited differences between Canada and the U.S. is the degree to which comprehensive health care is freely available at the point of use, ... and the Canadian emphasis on primary care, demonstrated by a higher per capita proportion of primary care physicians than in the US." (Manuel and Mao, 2002).

Canada is also experiencing similar problems as the United States within its health care system—especially with retaining adequate primary care physicians- and has been developing and testing various models of reform over the past decade. One of these models, Ontario’s Family Health Team (FHT) model, most closely mirrors the principles of the PCMH (Rosser et al, 2011). It has been proposed that Ontario’s FHT may be North America’s largest example of a PCMH. The model is based on multidisciplinary teams and an innovative incentive-based funding system. Nearly two-million Ontarians are served by the 170 FHTs currently in operation. Preliminary observations suggest high satisfaction among patients, higher income and more gratification for family physicians, and trends for more medical students opting to practice in primary care (Rosser et al., 2011).

### **Primary Care Access in Reducing Health Disparities**

Some studies concerning the effectiveness of primary care also suggest that better primary care improves equity in health. Additional evidence comes from studies specifically designed to assess this. A comparison of referral-sensitive (discretionary) hospitalizations and “marker” admissions (urgent, insensitive to primary care) found that compared with the case for marker admissions, an increased supply of primary care physicians was associated with a higher probability of African American hospitalizations than white admissions for referral sensitive admissions. That is, the greater presence of primary care resources may significantly narrow the racial disparity in specialty referrals and improve the referral process for disadvantaged populations (Basu and Clancy, 2001).

Community Health Centers (CHCs) provide an important source of primary care to greater than nine million financially disadvantaged people in America (Shi, 2003). These community centers provide primary care services to underserved communities. To receive grants from the federal government these centers must meet criteria for high-quality primary care. Evaluation of federally qualified CHCs has shown positive effects in reducing health disparities. Because low birth weight is more common among African American than white infants, an appropriate test of the equity-enhancing effect of increased access to primary care is a comparison of the low birth weight percentage in CHCs compared with the general population. The low birth weight

percentage among African American urban infants (1991) was 13.6 compared with 10.4 for African American users of CHCs. For African American rural infants, it was 13.0 compared with 7.4 for rural health center African American infants (Politzer et al., 2001). These differences evidence the impact of primary care on health outcomes.

The equity-enhancing effect of primary care resources (measured as primary care physicians to population ratio) was also shown in a study that examined post neonatal mortality rates in the 50 US states. Socially inequitable states (those with high income inequality) had a 17 percent decrease (from the median) if they were well endowed with primary care physicians, but a 7 percent increase in post neonatal mortality if the region was relatively deprived of primary care physicians. States with relatively equitable distribution of income had a small positive effect of relatively high primary care physicians to population ration and a small negative effect if primary care resources were relatively low (Shi et al., 2001). The same positive effect on equity was shown in the case of stroke mortality. States with high income inequity and relatively high primary care physician to population ratios had lower stroke mortality, whereas those relatively deprived of primary care physicians had increased stroke mortality. States with low income inequality also showed the same effect of high and low primary care resources: a higher ratio of primary care physicians was associated with lower mortality (Shi et al., 2001).

The equity-enhancing effects of primary care are also evident for self-reported health. In a study in 60 nationally representative US communities, areas with high income inequality had a one-third higher rate of self-reporting poor or fair health if the area was poorly endowed with primary care physicians. Areas with moderate income inequity and poor primary care resources had an increase of reporting fair or poor health of half the magnitude (Shi et al., 2001).

While these studies did not specifically address many of the components of the PCMH model it provides valuable empirical evidence of community health clinics providing high-quality care and positively impacting current health disparities among vulnerable populations. Access to primary care will not eliminate health disparities; as socioeconomically disadvantages populations experience significantly poorer “healthy life” scores related to patient perception

of health. Incorporation of community based primary care could begin to address other components of health disparities within their community and could create collaborative partnerships to further reduce disparities related to structural and social determinants of health.

### **Stakeholder Perception of PCMH Model Components**

The notion of a PCMH approach to health care delivery has been featured prominently in policy reform initiatives across the country, with both state and federal legislation focusing on this new model. Stakeholder understanding of the PCMH model, and therefore area of priority of implementation and research within the model, is based on the position the stakeholder holds in the healthcare system. It is important to understand the perceptions and values of the individual stakeholder groups in order to effectively collaborate on PCMH model application and adoption that best suits the needs of all stakeholders and ensures model adoption at the highest efficacy level possible. Those interested in incorporating the PCMH model into healthcare reform legislation need to recognize the individual perspectives of key stakeholders in order to effectively communicate the benefits of model adoption. Stegner and his colleagues conducted in-depth qualitative interviews with key stakeholders in Oregon following the passage of health care reform legislation in 2007.

### **Primary Care Providers**

Primary care clinicians have reported viewing the medical home concept as ambiguous and lacking evidence, despite holding some of the components in high value – like provider-patient relationships and the need for continuous care. As a group they feared that the increased costs associated with implantation of the PCMH model and believed that successful implementation hinged on achieving significant payment reform. One particular primary care provider has been quoted as referring to the PCMH as “better payment for what we’ve always done” (Stegner et al., 2010). Primary care providers identify most strongly with the PCMH principles of personal and longitudinal relationships with patients, whole-person orientation, and care coordination. This particular group of stakeholders views the medical home as a means to strengthen the traditional roles and values of primary care (Stegner et al., 2010).

When asked, providers focused less on the medical home principles that represent significant departures from the current delivery system. Interviewees expressed confusion and doubt about how to operationalize team-based care, primary case management, and enhanced access to care, quality improvement, and patient safety (Stegner et al., 2010). Providers participating in the National Demonstration Project expressed unexpected challenges associated with developing primary care teams, implementing electronic medical records and a number of other aspects related to transforming their current practices (Nutting et al., 2010).

### **Health System Administrators**

Health system administrators and clinic managers, that participated in qualitative research regarding the PCMH concept, identified most strongly with the systems aspects of the medical home model. They focused most on the medical home principles of safety and quality improvement, team based care, and technology issues, such as the implementation of electronic records (Stegner et al., 2010). Not surprising, the group of stakeholders displayed interest in terms of coordinating systems, new staffing models and improving efficiency of workflow. Most administrators reportedly recognized that significant change would be required to transition to a PCMH model of care. Administrators also tended to agree with providers about the importance of payment reform as a means to achieve lasting change. They also expressed worries about additional “unfunded mandates” by insurers and public payers who were portrayed by this group as eager to utilize the PCMH model in an effort to reduce costs. Respondents from this group wondered how their clinics or health systems would pay for the system changes or cope with alterations in the current fee-for-service payment model. Compared with primary care providers, administrators and managers were less likely to verbalize the importance of a personal physician, continuity of care, and whole person approach to health care (Stegner et al., 2010).

### **Insurers and Payers**

Payers and insurers, not surprisingly, reportedly placed the most emphasis on cost containment. They expressed concern about how to quantify the value of care coordination and appeared ambivalent about the idea of increasing compensation for quality and safety, questioning whether these types of improvements should warrant increased payments. Payers

did verbalize a difference between the PCMH model and the current “status quo” of the primary care system. They perceived the current system as not organized effectively to optimize delivery of preventative care (Stegner et al., 2010).

Most payers interviewed expressed hesitation to assume the financial risk for PCMH model demonstrations. One unidentified participant embraced the PCMH model and reportedly has begun funding innovative demonstration projects, however collaboration of this could not be found. Stakeholders in this area all expressed a need for payment reform contingent upon performance indicators and/or cost savings (Stegner et al., 2010).

Payers rarely addressed the PCMH principles involving patient care at the individual level, including the personal physician, whole-person orientation to care, and enhanced access to care. Although payers appeared supportive of these aspects to health care delivery, there was no consensus about whether to provide and finance services such as chronic disease management, case management, and access to 24-hour nurse contact through the medical home (Stegner et al., 2010).

### **Policymakers**

As a group, elected and appointed policymakers had the most diverse perspectives about the PCMH model. This could be due to the diverse backgrounds and individual experiences with the health care system. Most interviewed were supportive of the need to deliver health care at the individual level, including the importance of an individual physician. They also shared concerns about the rising costs associated with health care, and the importance of improving patient safety and health care quality (Stegner et al, 2010). Unique to this group was the heightened awareness of the need for efficient and responsible use of public funds. Thus, their discussions about the PCMH initiatives tended to focus on how to achieve rigorous evaluation of potential models and to demonstrate successful results before widespread adoption and implementation (Stegner et al., 2010).

This group had a wide range of familiarity with medical home concepts, especially in the way it is described by medical professional organizations. Different to the other groups, the policy makers did not discuss the logistics of building a medical home and expressed no fears or

hesitation about the delivery system changes necessary to move toward a comprehensive network of PCMHs (Stegner et al., 2010).

### **Key Stakeholder Conflicts**

The absence of detailed medical home language throughout the literature and within roughly 75% of state bills enacted in 2007 suggests that the details of the medical home will probably be developed by bureaucrats, administrators, and other stakeholders with little legislative guidance (Stegner et al., 2010). In this context it will be critical for those shaping the reforms to understand divergent stakeholder views. Stegner identified three key challenges to reaching a consensus among Oregon medical home stakeholders; payment reform, performance initiatives, and delivery system reform (Stegner et al., 2010). Considering the conflicting stakeholder perceptions related to these components, it can be assumed these key challenges would be faced by any population attempting to reform health care delivery and that they are not specific to the Oregon population of stakeholders.

Payment reform is perhaps the top policy concern of primary care physicians. Primary care clinics face increasing costs and flat or declining reimbursement. Physicians are not likely to support medical home proposals unless they include up-front, reorganized payment schemes and increased payment to support a higher level of care delivered. This should not be construed as a primary care provider's lack of faith in the conceptual approach to health care, but hesitation surrounding increased work demands without increased fee structures. As the current system stands, family physicians manage 3.05 problems per patient encounter. They chart 2.82 problems and bill for 1.97. Ninety percent of patients entering a medical encounter have at least two concerns. Patients over the age of 65 average 3.88 concerns per visit and diabetics average 4.6 concerns per visit (Rosenthal, 2008). Providers are concerned with being able to be financially compensated for the role they already perform within primary health care, while not being over burdened by associated obligations.

Primary care physicians acknowledge that a PCMH approach will cost more money in the short term and seek an acknowledgement to this upfront investment, which should lead to cost savings and better population health in the long term, as a key component to true reform of the



health system (Stegner et al., 2010). Public and private payers are under extreme pressures though to keep costs low, and typically do not analyze the long term benefits of cost savings as their covered population is not typically retained long enough to see the benefit. Provider demand for more money, coupled with unrealistic expectations of short-term cost savings on the part of the payers, could threaten the success of the PCMH approach to health care.

Although the central focus of providers is increased payment, payers and policymakers are equally focused on ensuring that such an investment in primary care will yield tangible results in terms of cost savings and patient outcomes. Payers will establish new requirements for primary care practices that seek increased payments as PCMHs. Providers on the other hand are skeptical of performance initiative schemes, especially “pay-for-performance” (Stegner et al., 2010). As noted previously, providers prefer to hold out for long term gains in population health, which exceed waiting times agreeable to most payers. Managing this conflict between payers and providers will be a critical challenge for policy makers. The most effective initial approach to payment reform may be one of “pay-for-process”, where providers are rewarded for implementing small, incremental changes to the delivery system, although this method of piecemeal adoption of the PCMH model has already proven to be problematic.

Delivery system reform is an underappreciated challenge in transitioning from the current primary care system to the PCMH model. Medical home proposals call for significant changes in the routine operations of primary care clinics. Stegner’s study revealed that many policymakers who are responsible for legislating reform may not acknowledge the complexity of making these changes in the delivery system. Nor do policymakers recognize the controversies that may arise between the different stakeholders with differing interpretations of the model components.

### **Comparison to HMO Attempt of Health Reform**

It is difficult to discuss or evaluate the PCMH model without drawing a parallel to a prior health reform effort that aimed, in part, to building a stronger primary care base within the health care system. I am referring to the managed care boom that occurred in the 1990s. This model

of healthcare management was viewed by many as a way of strengthening patient-provider relations while containing costs. With the benefit of hindsight and retrospective analysis it is now possible to begin to analytically determine the impact that Health Maintenance Organizations (HMOs) had on primary care delivery of services.

A 1988 American Medical Association/AAFP report published in the *Journal of the American Medical Association* concluded that managed care “offers new opportunities for providers of primary care” and that “...this orientation in health care delivery is likely to provide an attractive spectrum of opportunities for present and future primary care physicians” (Gorey, 1988). Though the theory behind managed care appealed to many primary care providers, its focus on cost containment, control of utilization, and the use of providers as gatekeepers led to widespread disappointment. Many of the same pressures that contributed to the downfall of managed care still exist and will create similar challenges as state work to develop and implement medical home models.

When the adequacy of primary care- measured with regard to the extent to which it achieves first contact care, ongoing care over time, comprehensiveness of care, coordination of care, and community orientation is accessed- federally funded Community Health Centers (CHCs) designed to provide primary care to disadvantaged populations in the U.S. are found to outperform health maintenance organizations (HMOs) (Shi et al., 2003). This is a dismal fact considering the barriers to providing high-quality care and decreasing health disparities among federally funded medical clinics.

Without acknowledgement of the complexities of health care reform and consistent implementation and evaluation of the PCMH model, it is possible that the PCMH may face a similar fate as the reform efforts attempted in the 1990s by the establishment of HMOs.

## **Barriers to Implementation**

Nationally, as the medical home concept evolved in the field of pediatrics and gained increased recognition, barriers to implementation became apparent. Three major barriers identified were: 1) training pediatricians to understand the medical home concept; 2) communication and

care coordination for related services in health, family support, and education/special education; and 3) reimbursement for periodic well-child supervision and care coordination (Moore and Tonniges, 2004). While some advancement has been made in this area – specifically related to reimbursement for well-child visits- some would argue these are the primary barriers still in effect today and extend beyond the field of pediatrics.

Initial lessons related to medical practice transformation into PCMHs became evident from the National Demonstration Project (NDP). While the multi-method analysis has yet to be completed in its entirety there are initial lessons related to implementation that can be taken away. First, it was observed that transformation to a PCMH requires a substantial change in the mental models of individuals and practices. Individual clinicians must adopt a different approach to healthcare delivery that moves from the individualistic clinical role to incorporation of other members of the practice to participate in primary care delivery. The practice must also embrace a different paradigm that moves it from an efficient assembly line that processes patients for the clinician's attention to one that meets the individual needs of the patient. While most participating practices had the basic core functions in place to manage finances, practice operations and the clinical enterprise during relatively stable times, few had a systematic strategy for change management (Nutting et al., 2010).

The rapid pace and magnitude of the NDP quickly overran the practices' capacity for change and required them to develop the capacity for organizational learning and development. It was also observed that adaptive reserve is not a constant property of a practice and needs ongoing attention during times of rapid change and stress (Nutting et al., 2010).

Other important lessons learned from the NDP involved pathways to transformation. The pathways are dependent on baseline conditions of the practice, its individual environment, the adaptive reserve of the practice, and the nature and timing of personal and organizational transformation. Practices and facilitators to transformation must realize that local control of the pace and sequence of change is essential and permits the transformational journey to unfold without over prescribing strategy.

Practices that are part of larger systems often will find that they have access to resources and expertise that may be invaluable in the transformation process. System leaders must keep in mind that each practice may follow a unique developmental pathway, and local control and ownership of the process is critical. Small independent practices will often need to expand the resources for change available to them. This expansion could be facilitated by local, state, or national policies that provide support for independent practices during the change process. This transformation process could also be systematically supported from state academies and educational institutions.

### **Policy Implications**

What are the alternatives to refurbishing the primary care home? What if entry of new medical graduates into primary care specialties continues its downward trajectory, leading to a dearth of generalist physicians? One alternative is a system of care that relies almost exclusively on specialist physicians. The 50 percent of chronic disease patients with more than one chronic condition would need to participate in separate, disease-specific programs rather than an integrated approach to primary care. Patients would be responsible for initiating and arranging preventative care services through direct-access services. Comprehensiveness, coordination and care of the whole person would not be dominant values of the system.

Another scenario entails physicians vacating the primary care homes to non-physician clinicians. An exhausted, undercompensated cadre of primary care physicians would retire and be replaced by nurse-practitioners and other non-physician clinicians (Grumbach and Bodenheimer, 2002). A primary care physician workforce would attempt to bridge services provided by non-physician primary care providers and the biomedical specialist physicians. The new generation of primary care clinicians would struggle with the same irrationalities and dysfunction that drove physicians from primary care practice (Grumbach and Bodenheimer, 2002).

With respect to alternatives to refurbishing the primary care home, neither of these proposed scenarios is satisfactory. All health care systems require a durable primary medical home as the

cornerstone of patient care. Although physicians will not play as dominant a role as they once did, future models configured around the multidisciplinary teams will require their strong and continued presence for optimal care. A system based on primary care is essential, but for primary care to survive and flourish it must undergo drastic change. In the words of Donald Berwick, “We are carrying the 19<sup>th</sup> century clinical office into the 21<sup>st</sup> century world. It’s time to retire it.” (Lippman, 2000).

### **Limitations in the literature**

The inconsistent application of the model components led to a difficulty in analyzing expected outcomes and related expenditures of the model. The author attempted to survey all mainstream literature regarding the topic, but may have inadvertently omitted relevant research or discussion of the model based on the language used to define the concept. This was attempted to be addressed by utilizing several synonyms for the model within the literature. Gray literature, or literature that is not published in mainstream academic journals, was also not sought as a primary component of this review.

# Chapter IV – Analysis of the Fundamental Principles of the PCMH Model: Recommendations

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## **Analysis of components of the PCMH**

The PCMH model is technically defined by seven fundamental principles, based on the principles outlined in the joint policy statement (Table 2). The demonstration projects of the model have focused on application and evaluation of components of the model and have therefore not consistently applied or evaluated *all* principles of the model. This inconsistent application has constricted a review of the model as a whole. The author analyzed the literature within each component principle of the model.

While the principles of the PCMH model are independently defined, they are highly interdependent components of the model as a whole. This interdependency was made evident in process evaluations of model implementation. It becomes quite clear in analysis of the model, that the seven separate components can be simplified into broader areas to allow for simpler discussions. The first two principles anticipate that every patient will have an ongoing relationship with their personal physician, and that the model reflects a whole-person approach to health care, not just focus on the presenting disease or condition or body system.

The next four principles emphasize the use of improved care procedures within the medical practice to improve quality of health care delivered. One principle incorporates the use of a team approach to medicine and health, the primary physician leads the team of professionals who are collectively responsible for ensuring adequate and appropriate coordinated care for the individual patient. Another principle integrates the collective patients, coordinating and integrating care across all elements of the health care system. The remaining principles are concerned with increasing access to a standardized quality of health care services. Aspects of these principles could be facilitated by the use of patient registries, and other health

information technology, such as electronic health records with collective access by all members of the medical team, despite varying physical locations of practices.

The literature regarding these quality principles typically focuses on the implementation of electronic medical records (EMR) and other information technology (IT) software applications that would allow for sorting and tracking of patients with chronic conditions. This approach is typically a public health method of population monitoring, reporting on population compliance and trends rather than applying an individual focus.

The final principle addresses the overarching barrier to the formal principles, payment or financing of health related services. Payment reform encapsulates changes in health care financing and physician payment systems to support the other components of the model. These changes are largely beyond the control of the individual physicians and practices and require intervention from a legislative level. Payment reform is a crucial component to ensuring the effectiveness of the model and the other six principles of care approach. A brief discussion of payment reform will be incorporated into this review. A comprehensive review of health care financing and proposed reform is beyond the scope of this review and will be included in a supplementary review.

The following is an analysis of the literature based upon each individual principle components of the PCMH model. The author has included a supplemental discussion of the role of electronic medical records and other tracking systems in the model components and has suggested the incorporation of a trained health educator into the model.

### **Personal Physician Principle**

A primary care practice consists of the people and places where the primary care functions are enacted in pursuit of better health. Health as relationship is a development goal and is facilitated by healing provider-patient relationships. The interpersonal skills of physicians have been found to be a major determinant of patient satisfaction and perception of quality of care. Physicians themselves perceive interpersonal factors to be important indicators of quality. Consistent relationships with providers have been associated with compassion. For instance, parents' perceptions that their children's providers spend enough time with them, respect

them, listen carefully, and provide good explanations of care have been related to continuous patient-provider relationships (Kleinsorge et al., 2010). This is a relationship that must be nurtured over time, illustrating the importance of continuity of care.

Unfortunately a majority of the literature regarding demonstration and pilot projects of this model- even proposed legislation related to providing a medical home- has focused on primarily assigning patients to a medical setting and calling it a “home.” This approach fails to address the relationship component necessary to improve health outcomes. As described earlier, it is the primary providers that express the relationship components to be the most salient.

While patients are not implicitly considered a stakeholder in the health care system, patients report a desire to have a relationship with their physicians and perceive a higher quality of care received from a continuity of care (Grumbach, 1999). There appears to be an inherent value to seeing the same provider for a continuum of health care needs. Currently patients in rural areas inherently experience a greater difficulty with the challenges related the relationship components of the model due to difficulties in retaining practitioners. This is especially true in the native populations, which experience the greatest degree of struggles related to rural medicine.

There is ample evidence of benefits of primary care on improving health services and outcomes, decreasing health disparities and reducing health care costs (Starfield et al., 2005). Ferrante et al., found that seeing the same physician, having a well-visit in the last five years, and having a referral system to link patients to community programs were significantly associated with higher rates of preventative services received (2010). In primary care a longitudinal relationship is an important tool to enlighten a personalized application of strategies that will achieve incremental improvements in the health (Rosenthal, 2008).

Primary care is often evaluated by how well a patient changes behavior or complies with treatment, activities that a patient must do themselves. The relationship principles within the model are posed to potentially support the patients with needed behavior change throughout their lifetime, potentially increasing health outcomes. Americans spend less time with a



primary care physician than patients in countries with better health outcomes (Bindman et al., 2007). It is believed that a stronger provider-patient relationship will aid patients in achieving maximum health. Studies have also demonstrated that continuity of care increased the likelihood that the provider was aware of psychosocial problems that may be impacting health (Rosenthal, 2008; Garg et al., 2009).

Because of the importance of the provider-patient relationship; patients should be allowed the opportunity to choose their own personal physician rather than being arbitrarily assigned to one by their health insurance provider. This decision may be based on personal relationships, recommendations, language spoken by the provider, or proximity to the patient's home (Roby et al., 2010). A stronger cultural connection to the provider may increase patient compliance and related health outcomes. Patients should also be free to change medical homes when they feel their current provider does not meet their needs. Although some researchers have estimated this relationship along with the impact of continuity of care is impacted negatively by repeated changes in providers, even without gaps in assignment to a medical home (Benson et al., 2008).

The question has been proposed whether patients identifying with a particular place or a particular person impacts health. In other words, do patients need to specifically identify with a particular provider or is association with a particular clinic or team of providers sufficient to impact health via the PCMH? It has been demonstrated that for acute medical concerns there is no significant differences between patients identifying with a particular provider or a provider network. However, concerning chronic conditions and care management significant improvements in patient perception of quality of care, associated health outcomes, and cost savings are associated with a stronger connection to a specific provider versus network of providers (Mehrota et al., 2006; Benson et al., 2008).

### **Whole-Person Orientation Approach**

"Patient-as-person," as referred to in the literature, involves an appreciation for the patient's unique perspectives and expression of an illness and the recognition that the patient's illness is a unique experience, one that is influenced by the patient's attitudes, knowledge and current

personal or social context (Carver and Jesse, 2011). Two patients can have varied responses to the same illness or chronic conditions due to their different life experiences and circumstances. Self-management support is a key feature of the PCMH model, and has been shown to improve patient outcomes (Bodenheimer et al., 2002). If a provider has an established relationship with the patient, it is assumed they have a better understanding of the multiple factors influencing the presenting medical concern. This understanding could potentially lead to a better dialog surrounding techniques to empower the patient in self-management techniques.

The sharing of power and responsibility is another aspect of patient-centered care that is currently receiving considerable attention. The Institute of Medicine (IOM), in *Crossing the Quality Chasm Report (2001)* recommended a paradigm shift from provider locus of control to patient locus of control. Although opinions differ regarding the specific format of the relationship between patient and provider, most agree that a relationship between the patient and provider is important. Because a patient's expression and experience with illness may change from moment to moment, the provider's relationship with the patient must also remain flexible. The treatment and support given must reflect the intensity needed by the individual patient at a given point in time.

In this fundamental principle the personal-physician is responsible for providing all the patient's health care needs or for arranging for appropriate care with other, qualified professions. The intent again, is to encourage a team approach in meeting all the patients' acute, chronic and preventive care needs. It is in this sense that this principle has been discussed most in the literature regarding pediatric patients. This discussion focuses on the physician collaborating with and making appropriate referrals to family and educational services.

Culturally effective medical care should recognize the cultural background of families and include relevant beliefs, rituals, and customs in medical care plans. Furthermore, it is recommended that physicians should ensure that families are able to understand the medical care they receive and incorporate oral and written information (in the patients native language) whenever necessary.

While it is impossible to obtain empirical data regarding the relationship between provider and patient, analysis of components that may enhance or restrict such a relationship is possible. Several studies have utilized patient questionnaires regarding satisfaction with medical services to interpret the relationship between providers and patient. The relationship components of the PCMH have the potential to create an environment to support the establishment of meaningful provider-patient relationships, more so than other models of reform currently proposed.

This relationship and subsequent treatment of the patient utilizing a whole-person approach is more difficult within rural settings; considering the challenges faced in recruiting and retaining primary care practitioners within the rural setting. These challenges in recruitment and retention are commonly cited reasons for failing practices within rural and underserved communities, and a common complaint listed by patients related to their health care delivery. If these areas were supported through policy incentives for providers in rural areas, rural providers could potentially report fewer problems in patient relationships than urban providers, due to the constancy of the population and increased community interactions within smaller rural populations.

Unfortunately, even in a perfect setting, a busy practitioner cannot realistically recognize all aspects of the patients as a person and work to share power and responsibility in a manner appropriate to each patient during the limited appointment time allotted. It has been suggested that providers may work to expand the appointment time to ensure patient-centered care (Mead and Bower, 2000). However, seeing fewer patients for a longer period of time is not a realistic solution in the current era of primary care workforce shortage. Additionally the current reimbursement structure does not support expanded patient-centered services, often requiring repeat visits for the management of chronic conditions, contributing to rising health care costs. One solo-physician participating in the National Demonstration Project noted that his practice could implement information technology (IT) elements of a PCMH, but lacked resources to accomplish personalized, relationship-centered tasks. Despite this fact;

smaller practices are typically more likely to report actively seeking feedback from patients regarding ways to improve practice services.

Policies supporting the increase of primary care physicians, especially in areas with low provider-population ratios should be enacted to begin to address the shortage of primary care physicians available to provide care. Medical education curriculum should also be examined to determine the level of training and emphasis provided to future practitioners regarding relationship building and communication techniques to foster effective relationships among providers and patients.

### **Physician Directed Medical Practice**

The Physician Directed Medical Practice principle incorporates the use of a team approach to health care delivery. The primary physician leads a team of professionals who are collectively responsible for ensuring adequate and appropriate coordinated care for the individual patient. This component is more easily addressed within larger medical facilities as individual providers may remain in contact regarding shared patients via the facilities' information technology systems. In larger medical systems if a patient is admitted into the emergency room, the primary provider would receive electronic notification of admission as a cue to action to follow up with the patient. This follow up with the primary physician may decrease repeat hospital admissions and therefore decrease associated health costs.

The difficulties arise in changing provider perspectives related to their patients. Most providers are territorial over the patients and do not see the medical need in sharing patients, as the practice of medicine has typically been an autonomous profession. Providers need to be educated regarding the importance of collaborative care efforts to achieve positive health outcomes within their patients. Providers, especially those in smaller practices, need to be aware of the community resources available to their patients and should be encouraged to establish professional networks within the community.

This principle is inherently interconnected with the next principle of the model – providing care that is coordinated between specialists and holistic care is accomplished by an integrated across health disciplines.

## Coordinated and/or Integrated Care

Medical care that is comprehensive encompasses treatment of both physical and mental health as well as prevention of physical and mental health problems. Preventative care includes immunizations, monitoring growth as well as physical, emotional and social development and receipt of necessary screening prevention strategies. A type of prevention vital to primary care is referred to as anticipatory guidance and involves provision of preventative advice. Some research has suggested that patients are not aware that physicians are available to discuss emotional and behavioral issues or are not comfortable discussing those types of issues with physicians.

Currently the U.S. health care system is complex, confusing and fragmented, and helping patients better navigate this system and coordinating the care they receive is central to the PCMH. However, how best to accomplish these functions in a primary care setting remains unclear (Ferrante et al., 2010). Although many PCMH demonstration projects are focusing on information technology (IT) to help primary care physicians better track and monitor patients, less effort has been directed at helping patients navigate the health care system to ensure that they receive the care they need at the right time. Ineffective navigation of the health care system by patients may lead to poorer outcomes and inefficiencies because of delayed care, failure to receive proper care or treatments, or care being received in more expensive locations (i.e. emergency rooms).

The principle of the physician-directed medical team speaks to the importance of a team approach to care. Ideally this team is cohesive with members that communicate closely with one another. Such teams most often include nurses, but may also involve social workers, dietitians, pharmacists, respiratory therapists and others. Several support roles have been suggested for incorporation into the PCMH model, including case managers, chronic care coordinators, nurse educators and patient navigators. Originally established in the early 1990's as a means of helping minorities and economically disadvantaged people gain access to cancer treatment, patient navigators are now being sought and hired for incorporation into the PCMH model of health care delivery (Walkinshaw, 2011). Patient navigation may be defined as the process of helping patients effectively and efficiently use the health care system (Ferrante et

al., 2010). The use of a dedicated person to assist patients in meeting the navigation challenges described is a potential strategy to help achieve a collaborative, team-based care in the PCMH. However, little is known about the feasibility of this strategy in community-based primary care settings.

Services offered by a patient-navigator or care coordinator are valuable for patients who have complex needs, but integrating such services into primary care settings will require new practice and payment models to encourage practices to think differently about patient-centered care. Future research studies about patient navigation in primary care settings should evaluate process measures and patient assessments of access and coordination as well as improvements in outcomes. Larger studies are also needed to show the effectiveness and cost-savings before this portion of the model is widely disseminated.

### **Quality and Safety**

The fifth principle of the PCMH focuses on quality and safety. According to this principle, practices will use evidence-based support to enable the health provider to work collaboratively with patients to arrive at optimal care decisions. Although not specific to the PCMH model, the literature is robust regarding improved compliance with medical treatment- and therefore improved outcomes- when the patient is incorporated into the decision making process. The term “evidenced-based decision making” has been cited within several research projects and legislation related to health reform. However, this term is poorly defined- if defined at all- leading to inconsistent understanding and application of the concept. Even the standards for PCMH as described by the NCQA (Table 1) include vague elements related to quality, including “must-pass” elements of implementing continuous quality improvement without direction for accomplishment of this task.

Quality and Safety is the most poorly defined principle within the literature base. While it is discussed that electronic record accessibility by providers may reduce duplication of services, this is provided as evidence for the use of electronic records in cost savings, and does not directly discuss the implied patient safety. Literature non-specific to the PCMH regarding patient safety and quality is typically evaluation of software based decision making tools that

providers can purchase. Most concerns related to quality and safety of medicine are related to medical training and are already addressed by the NCQA and other licensing bodies.

The limited amount of empirical evidence available showing the effectiveness of high-tech information technology in improving quality of care in outpatient settings has come mostly from studies in four large institutions with internally developed electronic medical records, academic health centers, or managed care organizations. Studies on effectiveness of health information technology in community primary care settings have shown mixed results. Some studies and demonstration projects have shown that computer-generated patient reminders does improve patient compliance with keeping appointments (Montori et al., 2002), but offers little other insight into the use of electronic records increasing health outcomes.

Ideally, the use of electronic prescribing systems could positively impact patient safety. Although their use has been associated with lowered prescription drug costs, it has not lowered medication errors or adverse drug events (McMullin et al., 2005).

### **Access to Medical Home**

The sixth principle of the PCMH is concerned with increasing access. This principle goes beyond the physical location of health providers in relation to their patients and insurance logistics. Of course increasing or extending medical clinic hours to alleviate scheduling problems with patients, is an essential component in reducing unnecessary emergency room visits, containing associated medical costs, and addressing the concept of prevention within the medical model. Access to insurance, or the ability to pay for services, is also a crucial component in accessing medical care, however this component is typically addressed in the seventh principle, concerning health care reform and financing health care. In the sense of the sixth principle, access is concerned with patient ability to contact their provider within a timely manner. This feature includes timely access to care and improved methods of communication. Proposed methods for improved communication include email and telephone communication between patients and physicians.

A large majority assumes that health insurance will solve most of the problems concerning access to care and that it should greatly reduce or eliminate disparities in health outcomes

between more and less advantaged populations. In fact, this notion is so ingrained that insurance has come to signify “access” to health services, despite a large literature that documents other aspects of access. In 1970 Penchansky and Fox noted that financial access is only one of the several factors that enable access to health services. Insurance is an important enabler to the use of health services, but its presence is hardly a guarantee of appropriate use or receipt of high-quality care (Penchansky and Fox, 1970). Despite this recognition occurring decades prior to current reform efforts, increasing access is still primarily focused on increasing patients with insurance coverage.

The benefits of insurance on use of health services in the U.S. are well documented. What is less well known is that insurance enhances the likelihood, but does not guarantee a medical home (Starfield and Shi, 2004). Ability to pay for services impacts utilization of a regular source of care. Gaps in insurance, especially if greater than 6 months in duration are among the six factors associated with not using a regular source of care (Starfield and Shi, 2004). In contrast, many common sociodemographic factors, such as parental education and ethnicity, are not associated with using a regular source of care in a year (Starfield and Shi, 2001).

Not having insurance has a much more important influence on not having a regular source of care than it does on various other aspects of access and use of services. Continuity of well and sick care, a characteristic of the PCMH, is significantly associated with having insurance (Starfield and Shi, 2004). Increased access to medical insurance effects health care by reducing the financial barrier to accessing health care, therefore eliminating delayed access to care which results in elevated medical costs. Increased eligibility for Medicaid significantly reduced rates of hospitalizations for ambulatory care (Kaestner et al., 2001). Increasing Medicaid eligibility leads to greater coverage and greater presence of a regular source of care. However, providing insurance may not positively impact disparities among population subgroups unless quality sources of primary care are available.

Access to health care includes physical factors as well, such as driving distance, availability of public transportation, and waiting time; along with financial factors such as type of payment or insurance accepted as well as whether care is available at the time patients are in need. It has



been suggested that the increase in “non-emergent” emergency room visits is due to a lack of primary care providers and a lack of ability to access available providers during acute medical needs. Typical primary health providers offer services following the typical Monday through Friday workday hours. This may not be convenient for a large sector of the population, who face difficult barriers to access health care. However, this fact is not addressed by the NCQA elements of recognition as a medical home, as the “must-pass element” regarding access addressing ensuring access during office hours, without discussing a need to expand delivery hours of primary care services. Some facilities, or health organizations, have enacted 24-hour nurse hotlines to address to address the principle of increased access to care. However, no studies were located examining the outcomes or effectiveness of such approaches.

When accessing accessibility of care, this concept may be perceived differently by people of different backgrounds. One study found that Caucasian parents, and parents with health insurance, bringing their children to a primary care setting that provided free continuous care were more likely to view the care as consistent and accessible than were African American and uninsured parents receiving care from the same clinic (Kleinsorge et al., 2010).

Some studies referencing access are actually discussing group educational components in managing chronic conditions. The group medical visit has been increasingly incorporated into the access component of the PCMH for increasing access to care for patients with chronic conditions. Pilot projects that address this concept have focused on group visits. These group visits allow patients an opportunity to network with other patients with similar conditions, along with receive educational information which may lead to increased health outcomes and empower patients regarding their health and treatments. These group visits have also been proposed as a means to ensure continuity of care for patients with chronic conditions, especially diabetes, as this would provide for an opportunity to ensure continued monitoring of glucose and A1C levels. Providers could also present information and educational materials to a group of patients with the same condition, potentially reducing the time required for such education within the traditional office visit. One small scale pilot project reported on the cost

effectiveness of such group dynamics, but utilized a nurse educator for the primary clinical and educational roles (Moran et al., 2011).

Other proposed approaches to increasing access and communication within patients and providers have included the use of email as a form of communication. This could simply be in the form of list-serves that could distribute educational materials to patients. These materials could be tailored to the audience and the related health conditions. Email reminders for appointments could also potentially be incorporated to this new-tech approach to patient communication; however this has not been specifically evaluated within the literature.

Ideally patients would have the ability to communicate directly with their provider via email on a variety of health concerns. Potentially some office visits could be avoided with the incorporation of this approach, like requests for prescription refills and questions regarding medications and other treatments. Logistical concerns would have to be addressed regarding confidentiality of medical information. A communication portal that is password protected and encrypted has been suggested as a means of addressing these concerns.

While this form of communication may increase access and communication with some of the population, it is less applicable for “vulnerable” populations, including rural populations. Internet usage is associated with access to a computer and the internet, along with requires a separate set of computer literacy skills necessary to engage in this behavior. Rural populations tend to be less educated with decreased access to computers and the internet; this may inherently discriminate against them regarding increased access to their providers via email.

Appropriate reimbursement for these novel forms of communication has not been proposed in the literature and proves to be a crucial aspect regarding success of the model that remains to be addressed.

### **Financial Component to Health Care**

The final principle of the PCMH model encompasses reimbursement for the other components of the model and therefore is considered implicitly embedded in the other six principles. In

order to provide a high quality of care utilizing the components of the PCMH model, provider reimbursement is an essential component to the overall ability for the model to be successful.

There is widespread agreement that payment reform is an integral component to the success of the PCMH, but little is known about the best method of payment or the optimal size of financial incentives. Several opposing strategies have been proposed in the literature regarding payment reform. Multiple pilots and demonstration projects are currently underway to determine the role of market incentives in driving practice change. A comprehensive review of health care financing and proposed reform is beyond the scope of this review and will be included in a supplementary review.

A possible financial strategy that could be implemented to assist smaller practices in the transformation into PCMHs would be to share resources, such as care managers, through an independent physician association or with assistance from a health plan or government payer, such as Medicaid. Another possible strategy would be to increase external incentives to help motivate practice redesign. Strategies related to this concept would include pay-for-performance, public reporting of practice data and acceptance of financial risk for cost of care. Each of these strategies has been criticized in the literature as a means of encouraging an assembly-line approach to care and weakening the provider-patient relationship. It has also been suggested in the Health Policy literature that grading practices is inherently biased to the health care clinics that serve a large volume of minority and underserved patients. It has been suggested that if providers are graded and these evaluations are made public, it would encourage providers to “cherry-pick” patients that were healthier and from areas with less documented health inequities, furthering the gap regarding access to quality care.

### **Electronic Medical Records (EMRs) and other High-tech Components of the PCMH Model**

The PCMH model has historically referred to the physical location of the patients’ medical records. This has been adapted in the current model as the use of electronic medical records (EMR) within the medical practice. While not a specific defined principle of the model, the use of EMRs is inherent within several of the individual principles of the model. The presence of

EMRs was a primary component of the National Demonstration Project (NDP) and has been attributed as one of the major initial costs associated with transformation into a PCMH.

From a strictly theoretical standpoint the incorporation of a nationwide EMR system seems realistically simple. However, practical application of a national EMR is faced with logistical concerns. Providers practicing within a larger medical complex, or a university medical complex, have the financial resources to establish an EMR within the provider network. This enables multiple providers access to their patients' medical history, provided all medical encounters occur within the provider network. Most of these systems are enabled with a primary provider notification of patients receiving services from other providers, including hospital admissions, Emergency Room utilization and prescription and diagnoses changes. However, as discussed previously, most providers do not practice within large medical complexes.

Providers practicing within smaller practices have resource constraints to establishing and maintaining an EMR. Medical record keeping software has become a booming business. Larger practices can typically receive reduced rates for bulk purchases. Smaller providers could benefit by pooling their available resources to purchase "network packages" for multiple providers. This could also enable providers within the "network" to share medical records of common patients; this could bolster the coordinated and integrated care component of the model. Even if smaller providers do purchase software related to medical record keeping and tracking, without a unification of these records the providers are still limited with their integration abilities.

### **Role of the Health Educator in the PCMH model**

As previously discussed in the coordinated care analysis; several support roles have been suggested for incorporation into the PCMH model. While currently not incorporated into the design of the model; health educators are well positioned to contribute to the PCMH model application of the future. Incorporating a role of a community health educator into the PCMH model has the potential to substantially impact the positive health outcomes expected from the

model, both at the individual and population level of health. Most model demonstrations incorporate a nurse educator as the primary health educator role of the model. While it is not the author's intention to diminish the positive role of skilled nursing staff in the PCMH model, it is proposed that the incorporation of a health educator would supplement the existing clinical roles in the model with skills specific to the field of health education.

Principles of the PCMH model that are especially relevant to the role that health educators might play in a clinical setting include: 1) Physician directed multidisciplinary team approach, 2) attention to coordination and integration of care, and 3) focus on a whole person orientation, including comprehensive care from preventive to end-of-life care. Health educators possess knowledge and skills that can strengthen the physician-directed team by coordinating and integrating care and using a more holistic approach to prevention and disease management.

Health educators possess skills such as providing self-management support coaching, serving as a bridge to other health care and community resources, helping patients adopt and maintain healthy behaviors, helping families build social and physical environments that support behavior change, assist patients in navigating the health care system, providing emotional support and providing assistance with practice-level quality improvements (Holtrop & Jordan, 2010). At the individual and family levels, health educators are trained to deliver health education to individuals and groups. Evidence-based strategies for health behavior improvement such as goal setting, action planning, tailored communications and motivational interviewing, support patient partnerships to improve health behaviors both in primary prevention and in reducing complications of chronic disease (Bodenheimer, 2007). Health educators apply theories and models of behavior change to modify the health behaviors of individuals or groups, potentially impacting patient empowerment and patient involvement in decision making related to health. They are also adept at helping connect clinicians with information and educational resources to meet the challenges patients and their families face in terms of health literacy.

At the community level, health educators have an extensive knowledge of community resources, how to connect people with these resources, how to maintain relationships with

these resources, and how to advocate for patients to access these community resources. Health educators are trained to be attentive to community needs and can either locate or develop materials and strategies that are culturally appropriate. At the systems level, health educators serve as a resource for other health professionals. Health educators are trained in identifying a health problem, developing a plan of action to resolve or impact that problem and evaluating the success of the proposed intervention.

The field of health education has an important role to play in the development of PCMHs, but health education will face a number of challenges in their efforts to contribute to the movement. First, as the PCMH concept is evolving, health educators and their professional organizations must be at the table advocating for inclusion and describing what the profession has to offer clinical practice. Secondly, many primary care providers speak of the challenges of how to finance the care provided by non-physician allied health care providers. Although many health educators in health care settings are employed in staff-model health maintenance organizations, they largely have not been utilized in fee-for-service payment systems.

In at least one promising development, Blue Cross Blue Shield of Michigan is now recognizing and paying on billing codes that reimburse patient visits with “other professionals” for the delivery of chronic disease self-management under the direction of a lead physician (Holtrop and Jordan, 2010). These other professionals include certified health education specialists (CHESs). The level of reimbursement is a relevant issue and attention not only to inclusion in payment, but also level of payment is also required.

The professional training of health educators may need to be changed or supplemented to best equip health educators who serve in clinical settings as team members in the PCMH. Currently, public and community health training programs prepare students to monitor the health status of a community, diagnose and identify health problems, and to promote health and prevent disease by designing, implementing, and evaluating multilevel, community interventions that often feature educational, behavioral and public policy components. Although valuable, this population and systems-based type of training may not adequately prepare students to work in the clinical practice setting.

Health educators who wish to work in the clinical setting may need to improve their understanding of chronic diseases, including how to prevent, treat, and manage such diseases. Health educators in the clinical setting will need to be expert patient counselors, fully proficient at using proven strategies of behavior modification. To work successfully in a clinical setting, health educators will need to be able to translate theory into practice, design and deliver self-management education to individuals, families and groups, and help patients and families build social and physical environments that support healthy behaviors. Furthermore, health educators can play a role in quality improvement at the practice level by identifying quality indicators and being able to track, report, and determine improvement strategies. Health educators possess these skills, but they must be able to be adapted to the primary care clinical environment.

Health educators should understand the primary care environment, the importance of teamwork, clinical practice workflow, accrediting priorities, and how to work within this dynamic practice setting. Courses and continuing education opportunities in medical sociology, health care policy, health communication, motivational interviewing, health psychology and health care administration that focus on clinical microsystems and quality improvement, and health care research would help to achieve this goal. Essential to a better understanding of the primary care environment is for health educators to understand the tradition and culture of that environment and the facilitators and barriers to change. Health educators can play a role in quality improvement at the practice level by being knowledgeable contributors to understanding a practice as a population of individuals. Assessing the need for and developing interventions for a population is a core process skill for health educators and can be adapted to the primary care environment.

Additional challenges will emerge as health educators attempt to craft their role in clinical settings. Coordinating their responsibilities with other members of the health care team will be of utmost importance. Specifically, the skills and competencies of nurses of nurses must be considered in the evolving role of the primary care team during PCMH transformation. Ideally, health educators will position themselves to complement- rather than duplicate- the strengths

of nursing staff. As the PCMH is implemented into more primary care practices, both nurses and health educators will need to understand the distinctions between patient education, self-management, and motivational interviewing. Health care professionals of all types will need to be adept in these skills. This overlapping of various boundaries of specific roles and how these roles will interact with the professional preparation of the PCMH teams is likely to be an ongoing issue.

Lastly, health systems researchers must continue to study and document how health educator involvement affects outcomes and reduces costs. Although health educators have been part of many studies, the analysis of data has typically focused on the impact of the intervention, not on the qualifications or skill sets of the personnel completing the intervention. If implemented properly, the involvement of health educators in this new model of health care delivery has the potential to enhance primary care delivery, improve health related outcomes and reduce related health care costs.

### **Recommendations for Supporting PCMH Practice Transformation**

Transforming a medical practice into a PCMH costs money, as well as time and coordination of a multitude of efforts. Currently available funds and reimbursement are likely to be inadequate for the transitional costs. Pilot programs should include up-front capital to help purchase and implement new informational technologies and additional ongoing operational dollars to support the personnel changes needed to implement better care management. For most practices, full transformation to a PCMH is likely to require more than the three years of the NCQA process. Even in the NDP, with highly motivated and capable practices, full transformation to a PCMH was not achieved within the two years of the project because of the multiple challenges of transforming personal, developing teams, recreating job descriptions and work flow, implementing multiple technologies, building adaptive reserve, accommodating change fatigue, adjusting for encountered problems, learning along the way and maintaining financial integrity. For most practices this transformation is likely to require an ongoing process.



Practice transformation is a developmental process. Recognition and certification should encourage and support a developmental approach. The NCQA has taken the lead in defining some essential components and creating a three-tiered implementation process for recognizing a PCMH. The details of this recognition process may have reached premature closure before the results of the NDP and other demonstrations have emerged. The experiences from the NDP –especially considering the qualitative lessons learned- suggests that becoming a PCMH necessitates that practices work on leadership, development, relationship and communication improvements, along with other aspects of building adaptive reserve to achieve a sustainable success and to avoid unintentional harm to practice, staff and patients. As further information on the change process becomes available, it is recommended that the NCQA re-evaluate its PCMH-recognition process.

A substantial barrier to conversion to a PCMH is the need for most individual physicians to change their professional identity and the socialized ways they currently deliver primary care. It is important for professional organizations that promote PCMH development to understand their role as much more than advocating for a new reimbursement schedule. They should embrace the need to promote new approaches to providing care and managing practices. This endeavor requires new tools, workshops and other learning and personal development formats to assist physicians' transformations within themselves and in their relationships with their practice partners, patients, health care systems and communities. Some new provider skills required for the PCMH include working in practice teams, managing chronic conditions using the chronic care model, incorporating population management, patient partnering and thinking outside of the clinical examination room.

There are many ways to create a PCMH and many different forms a PCMH may take. Either over-specification of the model or prescribing the pathway for achieving it can be counterproductive, frustrating to practice participants, and exacerbate change fatigue. While over-prescribing the process of transformation is considered a hindrance to transformation of practices into a PCMH, a consensus regarding what a PCMH should look like is an important step to universal implementation and evaluation of the model.

## Conclusion

The PCMH model is an encouraging model for increasing health outcomes in the United States; while potentially containing costs associated with medical care. While large scale demonstration projects have been completed on the model, these projects are focused the process issues of transformation and supporting providers through the implementation process. Larger evaluation projects are still needed to determine the potential cost savings and health benefits of the model application.

The key stakeholder conflicts need to be addressed in an effort to encourage collaboration and consistent implementation of the model. Medical education should be augmented to include instruction on the importance of relationship building within primary practice and techniques to foster this relationship. Policies should be enacted to reduce the income disparities between specialists and primary care providers, along with creating a rural health environment that is conducive to recruitment and most importantly retention of qualified care providers. Future providers should be encouraged to practice primary care in order to begin to address the decreasing numbers of primary care providers. Providers should also be provided greater incentives to practice in underserved communities and areas with low provider to patient ratios.

In order to address inconsistencies in the application and evaluation of the model, along with simplify the model for easier understanding; the author suggests condensing the seven principles of the model into broader categories. A condensed version of the model should include two major component areas; relationship principles and delivery principles, with finance reform represented as an overarching principle to the other major components. The relationship component of the condensed model would include principles related to whole-person orientation and primary care provider and should include patient empowerment and self-management of health conditions, continuity of care, as well as other relationship components of the model. The delivery component of the proposed condensed version would include increasing access, novel forms of communication, along with health team components related to coordinated and/or integrated care in conjunction with principles related to quality and safety of the services delivered. As financial reform continues to be a major obstacle in the

proposed changes in care management and the way in which health care services are delivered, this component should be viewed as an overarching principle of the model that enables appropriate reimbursement for the other components of the model.

The PCMH has the potential to positively contribute to the health reform efforts currently underway in the United States. With continued evaluation of the model, along with consistent definition and implementation of all model principles, supplemented by International applications of the model, the PCMH should be incorporated as a primary component to the health reform debates. While the financial component of the model still needs to be addressed, the model has the potential to positively impact costs associated with fragmented medical care.

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# Appendix 1 – Review Matrix

Authors, Title, Journal	Year Pub	PURPOSE	
<b>Primary Articles</b>			
American Academy of Family Physicians, American Academy of Pediatrics, American College of Physicians, American Osteopathic Association. Joint Principles of the patient-centered medical home. Philadelphia (PA): AAFP, AAP, ACP, AOA; 2007 Accessed from <a href="http://www.medicalhomeinfo.org">http://www.medicalhomeinfo.org</a> accessed August 2011	2007	Joint Principles of PCMH, joint policy statement	Joint Principles
American Academy of Family Physicians. AAFP News Now Special Report: Patient-Centered Medical Home. Available at <a href="http://www.aafp.org">www.aafp.org</a> Accessed August 2011	2010	AAFP Statement on the effectiveness of patient-centered approach to medical care	Outcome Anal
Nutting, Paul, William Miller, Benjamin F. Crabtree, Carlos Roberto Jaen, Elizabeth E. Stewart, and Kurt C. Stange "Initial Lessons from the First National Demonstration Project on Practice Transformation to a Patient-Centered Medical Home" <u>Annals of Family Medicine</u> Vol 7 No 3	May/June 2009	Initial lessons from the NDP Evaluator Anal	NDP
American Academy of Pediatrics, Medical Home Initiatives for Children with Special Needs Project Advisory Committee. The Medical Home. <i>Pediatrics</i> . 2002;110:184-186	2002	Peds and application of PCMH in children with special needs	Peds

National Committee for Quality Assurance. Physician Practice Connections. Patient-Centered Medical Home. Available at <a href="http://www.ncqa.org">http://www.ncqa.org</a>	2008	Regulatory body assigning PCMH status, has own criterion for designation focused on tech based applications	Tech principles of PCMH
American College of Physicians. A system in need of change: restructuring payment policies to support Patient-centered care. Position paper of the American College of Physicians. Philadelphia, PA: American College of Physicians; 2006:1-45.	2006	ACP policy on finance reform policies that would allow for implementation and utilization of PCMH	financial reform
An Act Relating to Providing High Quality, Affordable Health Care to Washingtonians Based on the Recommendations of the Blue Ribbon Commission on Health Care Costs and Access, Ch. 259. 2007. Washington Session Laws 6	2007	Washington state application of PCMH based on the recommendations of commission related to pt-centeredness and assignment to MH	Assignment to MH -- Washington Demonstration
Arvantes J. Support for medical home to be focus of upcoming bill. AAFP News Now September 9, 2007	2007	Support for incorporating medical home model into HC reform legislation	
Audet AM, Davis K, Schoenbuam SC. Adoption of patient-centered care practices by physicians: results from a national survey. <i>Archives of Internal Medicine</i> 2006;166:754-9	2006	MDs adoption of PCMH or principles of such National survey	MD perception re adoption
Patient-Centered Primary Care Collaborative. Joint Principles of the Patient-centered Medical Home. February 2007. <a href="http://www.pcpcc.net/node/14">http://www.pcpcc.net/node/14</a> . Accessed October 2011.	2007	Joint Principles of PCMH, joint policy statement	Joint Principles

Basu J, Clancy C. Racial disparity, primary care, and specialty referral. <i>Health Serv Res</i> 2001;36(6 Pt 2):64-77	2001	PC and Racial inequities r/t referral to specialties	Racial inequities and coordinated care
Beasley JW, Hankey TH, Erickson R, et al. How many problems do family physicians manage at each encounter? A WReN study. <i>Annals of Family Medicine</i> . 2004;2:405-10	2004	Typical workload (management of H conditions) of PCP	Workload of MD
Brooks RG, Menachemi N. Physicians' use of email with patients" factors influencing electronic communication and adherence to best practices. <i>Journal Medical Internet Res</i> 2006;8:e2	2006	Anal of use of email in provider-pt communication	communication - access
Patient-Centered Medical Home Collaborative. The Patient-Centered Medical Home Collaborative	Accessed 2011	PCMH model in H reform	Health Reform
Singh R, Singh A, Taylor JS, Rosenthal TC, Singh S, Singh G. Building learning practices with self-empowered teams for improving patient safety. <i>Journal of Health Management</i> 2006;8:91-118	2006	Learning team approach to HC delivery as means of improving pt safety -- error related does not address relationship component	Coordinated Care Health Education
Barr M. The Advanced Medical Home: A Patient-Centered, Physician-Guided model of Health Care. Philadelphia (PA): American College of Physicians; 2006	2006	Discussion of pt-centered approach to medicine from a provider perspective	MD perception re adoption

<p>Rittenhouse D.R., Casalino L.P., Shortell S.M., MClellan S.R., Gillies R.R., Alexander J.A., and M. Drum. "Small and Medium-Sized Physician Practices Use Few Patient-Centered Medical Home Processes" <i>Health Affairs</i>, Vol 30, no 8 (2011): 1575-1584 (published online June 30, 2011; 10.1377/hlthaff.2010.1210)</p>	2011	<p>first national data on the use of MH processes, focus on small and medium-sized practices, ID internal capabilities and external incentives assoc with greater use of MH processes</p>	PCMH Principles
<p>Centers for Medicare and Medicaid Services. National health expenditure projections 2010-2020. <a href="http://www.cms.gov/NationalHealthExpendData">http://www.cms.gov/NationalHealthExpendData</a> Accessed September 2011</p>	2010	<p>Fed -- Expenditures &amp; Projections</p>	HC \$
<p>Fisher E, Goodman D, Skinner J, Bronner K. Health Care spending, quality, and outcomes. More isn't always better. The Dartmouth Atlas of Health Care. The Dartmouth Institute for Health Policy and Clinical Practice, 2009. <a href="http://www.dartmouthatlas.org">http://www.dartmouthatlas.org</a></p>	2009	<p>Reports on regionality of HC \$ and outcomes and quality of care</p>	HC \$
<p>Ferrante JM, Balasubramanian BA, Hudson SV, Crabtree BF., Principles of the Patient-Centered Medical Home and Preventive Services Delivery <i>Annals of Family Medicine</i> March/April 2010</p>	2010	<p>anal principles of PCMH against receipt of preventative services</p>	PCMH Principles
<p>Patient-Centered Primary Care Collaborative. Joint Principles of the Patient-centered Medical Home. February 2007. <a href="http://www.pcpcc.net/node/14">http://www.pcpcc.net/node/14</a>. Accessed October 2011.</p>	2007	<p>Joint Principles of PCMH, joint policy statement</p>	Joint Principles



The Commonwealth Fund. Performance Snapshots, 2006. <a href="http://www.cmwf.org/snapshots">http://www.cmwf.org/snapshots</a> . Accessed September 2011	2006	Commonwealth Fund -- reports on regionality of health care \$ and outcome	regionality of access and outcome
Ferrante JM, Cohen DJ, and Crossen JC. Translating the Patient Navigator Approach to Meet the Needs of Primary Care <i>Journal of American Board of Family Medicine</i> November-December 2010;23;6:736-744	2010	Cross-case comparative analysis of 4 community practices that implement patient navigation. Evidence that pt navigation is useful for pts who have complex needs. The integrated multidisciplinary approach to care of PCMH would incorporate pt navigation	Coordinated Care
Carver MC, and Jessie AT. Patient-Centered Care in a Medical Home. <i>The Online Journal of Issues in Nursing</i> May 31, 2011. Accessed November 16, 2011	2011	Demo project of anal of PCMH in Carilion Clinic - a self- described integrated system of HC delivery.	Demo project
Feifer C, Nemeth L, Nietert PJ, et al. Different Paths to high-quality care: three archetypes of top-performing practice sites. <i>Annals of Family Medicine</i> 2007;5:233-41	2007	Approach to Qual of care -- problem in defining and measuring outcome	measuring outcome
Goroll AH, Berenson RA, Schoenbaum SC et al., Fundamental Reform of payment for adult primary care: comprehensive payment for comprehensive care. <i>Journal of General Internal Medicine</i> . 2007;22:410-415	2007	Payment reform to compensate for comprehensive care delivered within PCMH	financial reform
Stange, Kurt C., Paul A Nutting, William L. Miller, Carlos R. Jaen, Benjamin F. Crabtree, Susan A Flocke, and James M. Gill "Defining and Measuring the Patient-Centered Medical Home" <i>Journal of General Internal Medicine</i> Vol 25 No 6 p 601-612	Jun-10	Defining and Measuring the PCMH and related outcomes	measuring outcome

Hashem A, Chi MT, Friedman CP. Medical Errors as a result of specialization. <i>Journal of Biomedical Information</i> 2003;36:61-9	2003	Qual of care provided by subspecialists -- need for coordinated care	Need for coordinated care
Rittenhouse DR, Shortell SM. The patient-centered medical home: will it stand the test of health reform? <i>JAMA</i> 2009;301:2038-40	2009	PCMH model in H reform	Health Reform
Grumbach K, and Grundy P., Outcomes of Implementing Patient Centered Medical Home Interventions: A review of the evidence from prospective evaluation studies in the United States. Patient-Centered Primary Care Collaborative. November 16, 2010 <a href="http://www.pccpc.net">http://www.pccpc.net</a>	2010	Rvw prospective studies on PCMH in U.S.	Demo project
Health Care Reform Act of 2007, S 1, 2007	2007	Health Care Reform Act referencing MH and Patient-Centered Approach to care. Vague language	Health Reform
Moscovice I, Rosenblatt R. Quality-of-Care Challenges for Rural Health. <i>Journal of Rural Health</i> 2000;16:168-176	2000	Challenges for Rural Health	Rural Health
Stegner RJ, DeVoe JE. Policy Challenges in Building the Medical Home: Do we have a Shared Blueprint? <i>Journal of the American Board of Family Medicine</i> . 2010;23:384-392.	2010	attempt to understand the various stakeholder perspectives surrounding components of the PCMH. Understanding the perspectives allows for tailored messaging to encourage collaborative discussions surrounding PCMH	stakeholder perspectives

Higashi T, Wenger NS, Adams JL, et al. Relationship between number of medical conditions and quality of care. <i>New England Journal of Medicine</i> 2007;356:2496-504	2007	Relationship b/t number of 'conditions' and qual of care received at primary level	Coordinated Care
Hing ES, Burt CW. Office-based medical practices: methods and estimates from the National Ambulatory Medical Care Survey. <i>Adv Data</i> 2007;12(383):1-15	2007	Private based medical practices -- provider perspectives	MD perception re adoption
Kaiser Family Foundation. National Survey on consumer experiences with an attitudes toward health plan. Available at <a href="http://www.kff.org">http://www.kff.org</a>	2001	KFF - Anal of Consumer (Pts) perspectives (Qual based survey on satisfaction)	Pt perspectives
Shi L, Macinko J, Starfield B, Politzer R, Wulu J, Xu J. Primary Care Social Inequalities and all-cause, heart disease and cancer mortality in US counties: a comparison between urban and non-urban areas. <i>Public Health</i> 2005;119:669-710	2005	Comparison of regionality of HC and outcomes (comparison of urban v non-urban -- not nec rural but still applicable when discussing differences in qual of services received)	regionality of access and outcome
Schoen C, Osborn R, Huynh PT et al., Primary Care and Health System Performance: Adults' Experiences in Five Countries. <i>Health Affairs</i> (Milwood) 2004;(Suppl Web Exclusives):W4:487-503	2004	Comparison of Westernized Medicine (Internationally) and the need for PC in improving H outcomes	International Comparison
Kuzel AJ, Skoch EM. Achieving a Patient-Centered Medical Home as determined by the NCQA- at what cost, and to what purpose? <i>Annals of Family Medicine</i> 2009;7:85-6	2009	Analysis of the NCQA qualifications of PCMH designation and the possible compromises to care as a result of tech based focus	NCQA Qual

Miller WL, Crabtree BF, Nutting PA, Stange KC, Jaen CR. Primary Care Practice Development: A Relationship-Centered Approach <i>Annals of Family Medicine</i> 2010;8;1 (Supp):S68-W44	2010	Seminal authors -- relationship centered approach to implementing MHs in PCP	Relationship char
Gabbay RA, Bailit MH, Mauger DT, Wagner EH, Siminerio L., Multipayer patient-centered medical home implementation guided by the chronic care model. <i>Joint Commission Journal Quality and Patient Safety</i> . 2011;37:265-273	2011	Implementation of PCMH, incorporation of chronic care model. Multipayer constraints of PCMH	\$ Reform Insurance Cov
Gutkin Cal, The Future of Family Practice in Canada: The Patient's Medical Home. <i>Canadian Family Physician</i> October 2011. Vol 57:1224	2011	Canadian perspective and application of the PCMH	International Comparison
Maeng, Daniel D., Thomas R. Graf, Duane E Davis, Janet Tomcavage, and Frederick J. Bloom, Jr "Can a patient-Centered Medical Home lead to Better Patient Outcomes? The Quality Implications of Geisinger's Proven Health Navigator" <u><i>American Journal of Medical Quality</i></u>	Aug-11	Effect of PCMHs in improving clinical outcomes	Outcome Anal
McMullen ST, Lonergan TP, Rynearson CS., Twelve month drug cost savings related to use of an electronic prescribing system with integrated decision support in primary care. <i>Journal of Managed Care Pharmacology</i> 2005;11(4):322-332	2005	Cost savings of eRx within PCP -- tech principle of PCMH	CE

Longworth, David L. "Accountable care organizations, the patient-centered medical home, and health care reform: What does it all mean?" <u>Cleveland Clinic Journal of Medicine</u> vol 78 No 9	Sep-11	rvws pt-centered med home & accountable care organizations (ACOs). Discussion of the Centers for Medicare/Medicaid Services' ACO and Shared Savings Proposed Rule	ACO
Vest JR, Bolin JN, Miller TR, Gamm LD, Siegrist TE, and Martinez LE. Review: Medical Homes: "Where you Stand on Definitions Depends on Where you Sit" <i>Med Care Res Rev</i> 2010;67:393	2010	systematic review of literature to identify stakeholder differences in definitions of components of PCMH	stakeholder perspectives
Solberg LI, Asche SE, Fontaine P, Flottesmesch TJ, and Anderson LH. Trends in Quality During Medical Home Transformation <i>Annals of Family Medicine</i> . November/December 2011;9;6:515-521	2011	Anal of satisfaction levels of pts following transformation of Minnesota primary care clinics into PCMHs Transformation and implementation lessons	Demo project
Roby DH, Pourat N, Pirritano MJ, Vrungos SM, Dajee H, Castillo D, and Kominski GF. Impact of Patient-Centered Medical Home Assignment on Emergency Room Visits Among Uninsured Patients in a County Health System. <i>Medical Care Research Review</i> 2010. 67:412	2010	Cost savings anal of avoidable ER visits as related to MH assignment of uninsured pts. Does not anal relationship char or outcome, correlational reporting of home assignment and utilization of ER	CE and Coordinated Care
Rittenhouse, Diane R., David Thom, and Julie A. Schmittdiel "Developing a Policy-Relevant Research Agenda for the Patient-Centered Medical Home: A Focus on Outcomes" <u>Journal of General Internal Medicine</u> Vol 25 No 6 p 593-600	Jun-10	Policy agenda for PCMH	Health Reform

Patient-Centered Primary Care Collaborative. Patient-Centered Medical home: building evidence and momentum: a compilation of PCMH pilot and demonstration projects. Available at <a href="http://www.pcpcc.net">http://www.pcpcc.net</a>	2009	Building evidence on positive impact of PCMH, utilizing data from NDP and other smaller demo projects	NDP
Mehrotra A, Epstein AM, Rosenthal MB. Do integrated medical groups provide higher-quality medical care than individual practice associations? <i>Annals of Internal Medicine</i> 2006;145:826-833	2006	Integrated care models increasing qual of care delivered vs. smaller independently owned practices. This is probably due to things being done in house and not farmed out. Difficulty becomes in measuring qual of care --- typically compliance related with appt keeping does not address relationship components of delivery	coordinated care
Snyder L, Neubauer RL. Pay-for-performance principles that promote patient-centered care: an ethics manifesto. <i>Annals of Internal Medicine</i> 2007;147:792-4	2007	Provider financial incentives at direct odds to mission of the PCMH	Health Reform
Stange KC, Miller WL, Nutting PA, Crabtree BF, Stewart EE, and Jaen CR. Context for Understanding the National Demonstration Project and the Patient-Centered Medical Home. <i>Annals of Family Medicine</i> 2010;8;1:S2-8	2010	Context for anal of the NDP of the PCMH Seminal authors	NDP
The Henry J. Kaiser Foundation. Snapshots: Health Care Costs. Health Care Spending in the United States and OECD Countries. April 2011	2011	KFF - HC Costs and Spending.	HC \$

TransforMED. National Demonstration Project Evaluators' Reports. Http://transformed.com/evaluatorsReports/index.cfm. Accessed October 2011.		Evaluators' Reports of the NDP	NDP
Steele, Glenn D., Jean A. Haynes, Duane E. Davis, Janet Tomcavage, Walter F. Stewart, Tom R. Graf, Ronald A. Paulus, Karena Weikel and Janet Shikles "How Geisinger's Advanced Medical Home Model Argues the Case for Rapid-cycle Innovation" <u>Health Affairs</u> Vol 29 No 11	2010	lessons learned from iterative tests of care reengineering	Geisingers
The Robert Graham Center. The Patient-Centered Medical Home: history, seven core features, evidence and transformational change. Washington, DC: The Robert Graham Center; 2007	2007	Hx and seven core principles of the PCMH	Hx and PCMH Principles
Future of Family Medicine Leadership Committee. The Future of Family Medicine: a collaborative project of the family medicine community. <i>Annals of Family Medicine</i> 2004;2(supp 1):S3-32	2004	Family Medicine Mission - proposed ways to improve pt relationships and H outcomes while containing costs	Relationship principles of PCMH and CE
<b>Secondary Articles</b>			
Backer L. The medical home: an idea whose time has come again. <i>Family Practice Management</i> 2007;14:38-41	2007	Resurgence of interest in the PCMH model	philosophy of incorporation
Bindman AB, Grumbach K, Osmond D, Preventable hospitalizations and access to health care. <i>JAMA</i> 1995;274(4):305-311	1995	Hx CE of preventative approach to HC contingent upon access to HC	CE

Bindman AB, Grumbach K, Osmond D, Vranizan K, Stewart AL. Primary Care and receipt of preventative services. <i>Journal of General Internal Medicine.</i> , 1996;11(5):269-276	1996	Hx rvw of relationship with primary care and receipt of prevention services	Relationship principles of PCMH
Calvin, Sia, Thomas F. Tonniges, Elizabeth Osterhus and Sharon Taba "History of the Medical Home Concept" <i>Pediatrics</i> Vol 113 No 5 p 1473-1478	May-04	Hx of MH concept w/ inception in pediatrics -esp peds w/ chronic conditions	Peds
Coulter A. What do Patients and the Public Want from Primary Care? <i>BMJ</i> 2005;331:1199-2001	2005	Pt perspectives on HC relationship and PC	MD perception re adoption
Rosenthal TC. The medical Home: Growing Evidence to support a new approach to primary care. <i>Journal American Board of Family Medicine.</i> 2008;21(5);427-40	2008	Rosenthal article. Primary Care	PCMH in PC
De Maeseneer JM, De Prins L, Gosset C, Heyerick J. Provider continuity in family medicine: does it make a difference for total health care costs? <i>Annals of Family Medicine</i> 2003;1:144-8	2003	continuity of care and CE	Continuity of care and CE
Engel GL. The need for a new medical model: a challenge for biomedicine. <i>Science</i> 1977;196:129-36	1977	Hx -- displays that the recognition for need for a new model diverging away from biomedicine was present in the 70's. Early beginnings of the Pt-cntrd approach to med beyond the biomed model	HX need for the model
Enthoven AC, Crosson FJ, Shortell SM. Redefining health care : medical homes of archipelagos to navigate? <i>Health Affairs(Milwood)</i> 2007;26:1366-72.	2007	Anal of "coordinated" care	Coordinated Care



Fiscella K, Holt K. Impact of Primary Care Patient Visits on racial and ethnic disparities in preventative care in the United States <i>Journal of the American Board of Family Medicine</i> 2007;20:587-97	2007	PC impact on H disparities	Assignment to MH and racial inequities
Forrest CB, Starfield B. The effect of first-contact care with primary care clinicians on ambulatory health care expenditures. <i>Journal of Family Practice.</i> 1996;43(1):40-48	1996	Hx -- CE of appropriate utilization of PC leading to \$ saving in ambulatory \$, provider-pt relationship	Hx CE of model
Friedberg MW, Safran DG, Coltin KL, Dresser M, Schneider EC. Readiness for the patient-centered medical home: structural capabilities of Massachusetts primary care practices. <i>Journal of General Internal Medicine</i> 2009;24(2):162-9	2009	Anal structural components that hinder or allow for implementation of the PCMH -- specific to Mass clinics	implementation
Garg A, Butz AM, Dworkin PH, Lewis RA, and Serwint JR. Screening for Basic Social Needs at a Medical Home for Low-Income Children. <i>Clinical Pediatrics.</i> 2009. 49;1:32-36	2009	Incorporation of screen for supplemental health determinants within a medical model and utilizing a PCMH. Based in peds but definitely applicable to family practice, PC, and rural pops.	prev care within PCMH
Goldberg DG, Kuzel AJ. Elements of the Patient-Centered Medical Home in Family Practice in Virginia. <i>Annals of Family Medicine</i> 2009;7(4):301-8	2009	discussion of application and outcomes of PCMH model approach to HC in Virginia	Demo project

Green LA, Graham R, Bagley B et al., Task Force 1. Report of the Task Force on patient expectations, core values reintegration and the new model of family medicine. <i>Annals of Family Medicine</i> 2004;2(Supp 1):S33-50	2004	Report of Task force on patient expectations and transformation of family med approach	Relationship principles of PCMH
Grumbach, Kevin, and Thomas Bodenheimer "A primary Care Home for Americans" <i>JAMA</i> Vol 288 No 7 p 889-893	21-Aug-02	challenges facing primary care	challenges facing PC
Holtrop JS, and Jordan TR. The Patient-Centered Medical Home and Why it Matters to Health Educators <i>Health Promotion Practices</i> 2010;11:622	2010	Incorporation of the H Educator within the PCMH	Health Educators
Kellerman R, Kirk L. Principles of the Patient Centered Medical Home. <i>American Family Physician</i> 2007;76:774-5	2007	Discussion of principles of the PCMH	PCMH Principles
Kleinsorge CA, Roberts MC, Roy KM, Rapoff MA. The Program Evaluation of Services in a Primary Care Clinic: Attaining a Medical Home <i>Clinical Pediatrics</i> 2010 49:548	2010	program eval of PCMH application within pediatrics -- applicable at the PC level as Peds have been incorporating the model for the longest length of time and are still experiencing difficulty with fidelity of implementation and outcomes. PC should utilize k of peds for problem forecasting within incorporating the model at the PC level	peds eval of PCMH
Epstein AJ. The role of public clinics in preventable hospitalizations among vulnerable populations. <i>Health Serv Res</i> 2001;36:405-420	2001	Role of Public clinics in providing Prev H Services to vulnerable pops	Access

Groopman J. How Doctors Think. New York (NY): Houghton Mifflin Co., 2007	2007	Provider perspective of HC	MD perception re adoption
Mahar M. Money-driven medicine: the real reason health care costs so much. New York (NY): Harper-Collins Publishers; 2006	2006	Economically driven interests of major stakeholders of medicine contributing to escalating costs of HC	Health Reform
Main DS, Tressler C, Staudenmaier A, Nearing KA, Westfall JM, Silverstein M. Patient Perspectives on the Doctor of the Future. <i>Family Medicine</i> 2002;34:251-7	2002	Pt perspectives on HC relationship	Relationship principles of PCMH
Margolis D, and Bodenheimer T. Transforming Primary Care: From Past Practice to the Practice of the Future <i>Health Affairs</i> 2010;29:5:779-784	2010	Increasing primary care capacity without sacrificing pt qual of care. Suggestion of model to accomplish this. Emphasizes need for new payment models to ensure fidelity in application	Need for coordinated care
Menec VH, Sirski M, Attawar D. Does Continuity of Care matter in a universally insured population? <i>Health Serv Res.</i> 2005;40(2):389-400	2005	Comparing continuity of care in pops with universal insurance -- still cost saving	Health Reform
Margolis P, Stevens R, Bordley WC, Stuart J, Harlan C, Keyes-Elstein L, and Wisseh S., From Concept to Application: The Impact of a Community Wide Intervention to Improve the Delivery of Preventive Services to Children <i>Pediatrics</i> 2001;108:e42	2001	Impact Anal of PCMH approach and related outcomes	Outcome Anal

Moran K, Burson R, Critchett J, and Olla P. Exploring the Cost and Clinical Outcomes of Integrating the Registered-Nurse-Certified Diabetes Educator into the Patient-Centered Medical Home <i>The Diabetes Educator</i> 2011, 37:780	2011	Diabetic case study related to CE of implementing components of coordinated care of PCMH in chronic disease management. Use of RN as Health Educator and H Coordinator in this model.	case study and use of HC coordinator
Mullan F, Primary Care: An endangered Species? <i>National Area Health Education Center Bulletin</i> 2000'17:1, 6-9	2000	Endanger field of primary care discusses challenges faced by PCPs, generalizability to rural HC	PCP
Moore B, Tonniges T. The "every child deserves a medical home" training program: more than a traditional continuing education course. <i>Pediatrics</i> . 2004;113(supp):1479-1484	2004	Training CE for Peds and implementing PCMH	ped
Starfield B, Lemke KW, Bernhardt T, Foldes SS, Forrest CB, Weiner JP. Comorbidity: implications for the importance of primary care in 'case" management. <i>Annals of Family Medicine</i> 2003;1:8-14	2003	Importance of PC in preventative medicine. Discussion of role of pt as consumer in 'case' management. Argues that a population based approach is better than indiv case management. Something we are still fighting over a decade later	PCP and integrated care
Porterfield SL, and DeRigne L. Medical Home and Out-Of-Pocket Medical Costs for Children with Special Health Care Needs. <i>Pediatrics</i> 2011.	2011	lower OOP\$ shown in pts utilizing a PCMH for peds with special needs, primarily dependent upon coordinated care delivery and follow up	Peds and OOP\$
Richman IB, Clark S, Sullivan AF, Camargo CA Jr. National Study of the relation of primary care shortages to emergency department utilization. <i>Academy of Emergency Medicine</i> 2007;14:2279-82	2007	Corr b/t shortage of PC leading to increased ER util and increased costs assoc with acute and chronic care	CE and Coordinated Care

Rosenthal T, Campbell-Heider N. The Rural Health Care Team. In: Geyman JP NT, Hart G, eds. Textbook of Rural Health Care. New York: McGraw-Hill; 2001	2001	Specific reference to the challenges and opportunities to the provider in the rural application of med	Rural Health
Rosser WW, Colwil JM, Kasperski J, and Wilson L. Progress of Ontario's Family Health Team Model: A Patient-Centered Medical Home. <i>Annals of Family Medicine</i> 2011 9;2:165-171.	2011	Ontario's family health team model, implemented in 2005 may be North America's largest example of a PCMH. Preliminary anal and obs of outcome and quality measurements. Applicable to US system when ignoring 7th principle related to payment as Canada has Universal Health Care System.	Canadian Comparison
Nutting, P., Crabtree, B., Miller, M., Stewart, E., Stange, K., and Carlos Roberto Jaen. <i>Journey to the Patient-Centered Medical Home: A Qualitative Analysis of the Experiences of Practices in the National Demonstration Project</i> <i>Annals of Family Medicine</i> Vol 8, Supp 1, 2010	2010	Described experiences of practices in transitioning toward PCMH in the National Demonstration Project	Secondary Article by Nutting et al examining the NDP
Saultz JW, Lochner J. Interpersonal continuity of care and care outcomes: a critical review. <i>Annals of Family Medicine</i> . 2005;3(2):159-166	2005	Relationship char b/t provider and pt impacting Qual of Care and H outcomes	Relationship char
Shi L, Macinko J, Starfield B et al. Primary Care, infant mortality, and low birth weight in the states of the USA. <i>Journal of Epidemiological Community Health</i> 2004;58:374-380	2004	Corr to access to PC Home and better neonatal H outcomes	Access

Ryan S, Riley A, Kang M, Starfield B. The Effects of regular source of care and health need on medical care among rural adolescents. <i>Arch Pediatric and Adolescent Medicine</i> 2001;155:184-90	2001	Effects of PC on rural adol HC	Rural Health
Shi L, Macinko J, Starfield B, Xu J, Politzer R. Primary Care, income inequality, and stroke mortality in the United States: a longitudinal analysis, 1985-1995. <i>Stroke</i> 2003;34:1958-64	2003	Link PC, Income Inequalities and H outcomes (CVA) Access and H disparities	PC and outcome
Strickland B, Jones J, Ghandour R, Kogan M, and Newacheck P., The Medical Home: Health Care Access and Impact for Children and Youth in the United States. <i>Pediatrics</i> 2011;127;604	2011	Peds and application of PCMH in H outcomes	Peds and PCMH
Willis JS, Jenkins WD, Kruse J, Bowrey TS, Hoy RH. Home visits by trained undergraduate pre-health professional students: an extension of the principles of the patient-centered medical home <i>JAGS</i> Setember 2011;59;9:1756-6	2011	Incorporation of pre-med students as H educators within a PCMH	Coordinated Care Health Education
<b>Tertiary Articles</b>			
Hoy B, Wagner L, Hall EOC. Self Care as a Health Resource of elders: an integrative review of the concept. <i>Scandinavian Journal of Caring Science</i> 2007;21:456-466	2007	lit r/w r/t self-care of elders improving as a result of incorporating concepts of the PCMH	Rvw of PCMH in elderly care

Jallinoja P, Absetz P, Kuronen R, et al. The dilemma of patient responsibility for lifestyle change: perceptions of primary care physicians and nurses. <i>Scandinavian Journal of Primary Health Care</i> 2007;25:244-249	2007	Scandinavian study on provider perspectives regarding consumer responsibility for lifestyle changes	International Comparison
Brotherton SE, Simon FA, Etzel SI. US Graduate Medical Education, 2000-2001. <i>JAMA</i> 2001;286:1056-1060	2001	Ratio of PCPs	PCP
Langley GJ., Nolan, KM., Nolan TW., Norman CL., Provost LP., The Improvement Guide: A Practical Approach to Enhancing Organizational Performance. San Francisco, CA: Jossey-Bass; 1996.	1996	Not specific to PCMH, archival discovered r/t organizational change approach and transformation of practices from an organizational standpoint	Organizational reform
Moore LG. Escaping the tyranny of the urgent by delivery planned care. <i>Family Practice Management</i> 2006;13:37-40	2006	Retrospective r/w of HMO and planned care	HMO
Parchman ML, Culler S. Primary Care Physicians and Avoidable Hospitalizations. <i>Journal of Family Practice</i> 1994;39:123-8	1994	Early Lit r/t impact of PC on cost containment (avoidable hospitalizations)	CE
Peckman C. The ACP Medical Home Builder: Good Tools for everyone. Medscape.com posted 11/08/2011. Accessed November 16, 2011.	2011	Information regarding e-technology for assistance of transformation into PCMHs. Software based training and supplemental information for providers and administration	Tech principles of PCMH
Raddish M, Horn SD, Sharkey PD. Continuity of Care: is it cost effective? <i>American Journal of Managed Care</i> 1999;5:727-34	1999	continuity of care and CE	Continuity of care and CE

Royal College of General Practitioners. The Future Direction of General Practice: a Roadmap. London, UK: Royal College of General Practitioners; 2007	2007	UK discussion of future of primary practice -- under a universal system (hybrid)	International Comparison
Shi L. The Relationship between primary care and life chances. <i>Journal of Health Care for the Poor and Underserved</i> 1992;3:321-35	1992	Hx Shi article -- defense for use of PC leading to better H outcomes	PC and outcome
Shi L., Primary Care, specialty care, and life chances. <i>Int Journ Health Serv</i> 1994;24:431-458	1994	Hx -- Shi is seminal author in field of health reform and finance. Linking access to PCP and outcome	PC and outcome
Starfield B, Primary Care. New York, NY: Oxford University Press, 1998	1998	Book on primary care -- includes discussion of primary care relationship r/t HC outcomes and ergo \$	PCP
Starfield B, Shi L, Macinko J. Contribution of Primary Care to Health Systems and Health. <i>Milbank Q.</i> 2005;83(3):457-502	2005	Role of PC in Health	PCP
Starfield, Barbara, and Leiyu Shi "The Medical Home, Access to Care, and Insurance: A review of Evidence" <i>Pediatrics</i> Vol 113p 1493-1498	2004	lit rwg regarding MH and to rwg extent that insurance is r/t having a MH	PCMH and HC \$
The Concord Coalition. Escalating Health Care Costs and the Federal Budget. April 2, 2009. <a href="http://www.concord-coalition.org">http://www.concord-coalition.org</a> Accessed September 2011	2009	Concord Coalition - HC \$ and Fed Budget	Escalating cost HC, projection figures
Grumbach K, Selby JV, Damberg C, et al., Resolving the gatekeeper conundrum. <i>JAMA</i> 1999;282:261-266	1999	Gatekeeper role of MD in HMO model	HMO



University Health System Consortium. Accountable Care Organizations: a measured view for academic medical centers. May 2011	2011	ACOs -- m in academic medical centers	ACO
Valderas JM, Kotzeva A, Espallargues M et al., The impact of measuring patient-reported outcomes in clinical practice: a systematic review of the literature. <i>Qual Life Res</i> 2008;17:179-93	2008	Lit rvw of measurement tools used to obtain outcomes - importance of incorporating pt perspective	measuring outcome
Walkinshaw E. Steering through the medical maze. <i>Canadian Medical Association Journal</i> October 18, 2011;183;15:1698-9	2011	difficulty that pts encounter navigating the HC system - need for simplification or assistance. Discussion of US HC along with international comparisons	Canadian Comparison
Weingarten SR, Lloyd L, Chiou CF, Braunstein GD. Do subspecialists working outside of their specialty provide less efficient and lower-quality care to hospitalized patients than do primary care physicians? <i>Arch Internal Medicine</i> 2002;162:527-532	2002	Can subspecialists provide good qual of care outside their range of practice? Eliminating the need for the PCP...no Subspecialists tend to order unnecc testing and increase cost assoc with PC without improving outcomes. Displays the need for care coord by PC to contain costs and increase outcomes	Specialists care
Gorey T. The future of family practice: implications of the changing environment of medicine. <i>JAMA</i> . 1988;260:1272-9	1988	Defense for HMO development of the 90s wanting a pt-centered approach to HC	HMO
Woolf SH, Johnson RE. The break-even point: when medical advances are less important than improving the fidelity with which they are delivered. <i>Annals of Family Medicine</i> 2005;3:545-552	2005	Anal CE of tech and med advancement in improving outcomes	Tech principles of PCMH

Ebell MH, Siwek J, Weiss BD et al., Strength of Recommendation Taxonomy (SORT): a Patient- Centered approach to grading evidence in the medical literature. <i>Journal of American Board of Family Practice</i> 2004;17:59-67	2004	Anal of tool SORT for decision making model	Tech principles of PCMH
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## Appendix 2 – Review Matrix of Principles of PCMH

Authors, Title, Journal	Year Pub	PURPOSE	
Epstein AJ. The role of public clinics in preventable hospitalizations among vulnerable populations. <i>Health Serv Res</i> 2001;36:405-420	2001	Role of Public clinics in providing Prev H Services to vulnerable pops	Access
Shi L, Macinko J, Starfield B et al. Primary Care, infant mortality, and low birth weight in the states of the USA. <i>Journal of Epidemiological Community Health</i> 2004;58:374-380	2004	Corr to access to PC Home and better neonatal H outcomes	Access
Longworth, David L. "Accountable care organizations, the patient-centered medical home, and health care reform: What does it all mean?" <u>Cleveland Clinic Journal of Medicine</u> vol 78 No 9	Sep-11	rvws pt-centered med home & accountable care organizations (ACOs). Discussion of the Centers for Medicare/Medicaid Services' ACO and Shared Savings Proposed Rule	ACO
University Health System Consortium. Accountable Care Organizations: a measured view for academic medical centers. May 2011	2011	ACOs -- m in academic medical centers	ACO
An Act Relating to Providing High Quality, Affordable Health Care to Washingtonians Based on the Recommendations of the Blue Ribbon Commission on Health Care Costs and Access, Ch. 259. 2007. Washington Session Laws 6	2007	Washington state application of PCMH based on the recommendations of commission related to pt-centeredness and assignment to MH	Assignment to MH -- Washington Demonstration

Fiscella K, Holt K. Impact of Primary Care Patient Visits on racial and ethnic disparities in preventative care in the United States <i>Journal of the American Board of Family Medicine</i> 2007;20:587-97	2007	PC impact on H disparities	Assignment to MH and racial inequities
Rosser WW, Colwil JM, Kasperski J, and Wilson L. Progress of Ontario's Family Health Team Model: A Patient-Centered Medical Home. <i>Annals of Family Medicine</i> 2011 9;2:165-171.	2011	Ontario's family health team model, implemented in 2005 may be North America's largest example of a PCMH. Preliminary anal and obs of outcome and quality measurements. Applicable to US system when ignoring 7th principle related to payment as Canada has Universal Health Care System.	Canadian Comparison
Walkinshaw E. Steering through the medical maze. <i>Canadian Medical Association Journal</i> October 18, 2011;183;15:1698-9	2011	difficulty that pts encounter navigating the HC system - need for simplification or assistance. Discussion of US HC along with international comparisons	Canadian Comparison
Moran K, Burson R, Critchett J, and Olla P. Exploring the Cost and Clinical Outcomes of Integrating the Registered-Nurse-Certified Diabetes Educator into the Patient-Centered Medical Home <i>The Diabetes Educator</i> 2011, 37:780	2011	Diabetic case study related to CE of implementing components of coordinated care of PCMH in chronic disease management. Use of RN as Health Educator and H Coordinator in this model.	case study and use of HC coordinator
McMullen ST, Lonergan TP, Rynearson CS., Twelve month drug cost savings related to use of an electronic prescribing system with integrated decision support in primary care. <i>Journal of Managed Care Pharmacology</i> 2005;11(4):322-332	2005	Cost savings of eRx within PCP -- tech principle of PCMH	CE

Bindman AB, Grumbach K, Osmond D, Preventable hospitalizations and access to health care. <i>JAMA</i> 1995;274(4):305-311	1995	Hx CE of preventative approach to HC contingent upon access to HC	CE
Parchman ML, Culler S. Primary Care Physicians and Avoidable Hospitalizations. <i>Journal of Family Practice</i> 1994;39:123-8	1994	Early Lit r/t impact of PC on cost containment (avoidable hospitalizations)	CE
Roby DH, Pourat N, Pirritano MJ, Vrungos SM, Dajee H, Castillo D, and Kominski GF. Impact of Patient-Centered Medical Home Assignment on Emergency Room Visits Among Uninsured Patients in a County Health System. <i>Medical Care Research Review</i> 2010. 67:412	2010	Cost savings anal of avoidable ER visits as related to MH assignment of uninsured pts. Does not anal relationship char or outcome, correlational reporting of home assignment and utilization of ER	CE and Coordinated Care
Richman IB, Clark S, Sullivan AF, Camargo CA Jr. National Study of the relation of primary care shortages to emergency department utilization. <i>Academy of Emergency Medicine</i> 2007;14:2279-82	2007	Corr b/t shortage of PC leading to increased ER util and increased costs assoc with acute and chronic care	CE and Coordinated Care
Grumbach, Kevin, and Thomas Bodenheimer "A primary Care Home for Americans" <i>JAMA</i> Vol 288 No 7 p 889-893	21-Aug-02	challenges facing primary care	challenges facing PC
Brooks RG, Menachemi N. Physicians' use of email with patients" factors influencing electronic communication and adherence to best practices. <i>Journal Medical Internet Res</i> 2006;8:e2	2006	Anal of use of email in provider-pt communication	communication - access

De Maeseneer JM, De Prins L, Gosset C, Heyerick J. Provider continuity in family medicine: does it make a difference for total health care costs? <i>Annals of Family Medicine</i> 2003;1:144-8	2003	continuity of care and CE	Continuity of care and CE
Raddish M, Horn SD, Sharkey PD. Continuity of Care: is it cost effective? <i>American Journal of Managed Care</i> 1999;5:727-34	1999	continuity of care and CE	Continuity of care and CE
Ferrante JM, Cohen DJ, and Crossen JC. Translating the Patient Navigator Approach to Meet the Needs of Primary Care <i>Journal of American Board of Family Medicine</i> November-December 2010;23;6:736-744	2010	Cross-case comparative analysis of 4 community practices that implement patient navigation. Evidence that pt navigation is useful for pts who have complex needs. The integrated multidisciplinary approach to care of PCMH would incorporate pt navigation	Coordinated Care
Higashi T, Wenger NS, Adams JL, et al. Relationship between number of medical conditions and quality of care. <i>New England Journal of Medicine</i> 2007;356:2496-504	2007	Relationship b/t number of 'conditions' and qual of care received at primary level	Coordinated Care
Mehrotra A, Epstein AM, Rosenthal MB. Do integrated medical groups provide higher-quality medical care than individual practice associations? <i>Annals of Internal Medicine</i> 2006;145:826-833	2006	Integrated care models increasing qual of care delivered vs. smaller independently owned practices. This is probably due to things being done in house and not farmed out. Difficulty becomes in measuring qual of care --- typically compliance related with appt keeping does not address relationship components of delivery	coordinated care

Enthoven AC, Crosson FJ, Shortell SM. Redefining health care : medical homes of archipelagos to navigate? <i>Health Affairs</i> (Milwood) 2007;26:1366-72.	2007	Anal of "coordinated" care	Coordinated Care
Singh R, Singh A, Taylor JS, Rosenthal TC, Singh S, Singh G. Building learning practices with self-empowered teams for improving patient safety. <i>Journal of Health Management</i> 2006;8:91-118	2006	Learning team approach to HC delivery as means of improving pt safety -- error related does not address relationship component	Coordinated Care Health Education
Willis JS, Jenkins WD, Kruse J, Bowrey TS, Hoy RH. Home visits by trained undergraduate pre-health professional students: an extension of the principles of the patient-centered medical home <i>JAGS</i> Setember 2011;59:9:1756-6	2011	Incorporation of pre-med students as H educators within a PCMH	Coordinated Care Health Education
Carver MC, and Jessie AT. Patient-Centered Care in a Medical Home. <i>The Online Journal of Issues in Nursing</i> May 31, 2011. Accessed November 16, 2011	2011	Demo project of anal of PCMH in Carilion Clinic - a self- described integrated system of HC delivery.	Demo project
Grumbach K, and Grundy P., Outcomes of Implementing Patient Centered Medical Home Interventions: A review of the evidence from prospective evaluation studies in the United States. Patient-Centered Primary Care Collaborative. November 16, 2010 <a href="http://www.pcpcc.net">http://www.pcpcc.net</a>	2010	Rvw prospective studies on PCMH in US	Demo project

Solberg LI, Asche SE, Fontaine P, Flottemesch TJ, and Anderson LH. Trends in Quality During Medical Home Transformation <i>Annals of Family Medicine</i> . November/December 2011;9;6:515-521	2011	Anal of satisfaction levels of pts following transformation of Minnesota primary care clinics into PCMHs Transformation and implementation lessons	Demo project
Goldberg DG, Kuzel AJ. Elements of the Patient-Centered Medical Home in Family Practice in Virginia. <i>Annals of Family Medicine</i> 2009;7(4):301-8	2009	discussion of application and outcomes of PCMH model approach to HC in Virginia	Demo project
The Concord Coalition. Escalating Health Care Costs and the Federal Budget. April 2, 2009. <a href="http://www.concord-coalition.org">http://www.concord-coalition.org</a> Accessed September 2011	2009	Concord Coalition - HC \$ and Fed Budget	Escalating cost HC, projection figures
American College of Physicians. A system in need of change: restructuring payment policies to support Patient-centered care. Position paper of the American College of Physicians. Philadelphia, PA: American College of Physicians; 2006:1-45.	2006	ACP policy on finance reform policies that would allow for implementation and utilization of PCMH	financial reform
Goroll AH, Berenson RA, Schoenbaum SC et al., Fundamental Reform of payment for adult primary care: comprehensive payment for comprehensive care. <i>Journal of General Internal Medicine</i> . 2007;22:410-415	2007	Payment reform to compensate for comprehensive care delivered within PCMH	financial reform



Steele, Glenn D., Jean A. Haynes, Duane E. Davis, Janet Tomcavage, Walter F. Stewart, Tom R. Graf, Ronald A. Paulus, Karena Weikel and Janet Shikles "How Geisinger's Advanced Medical Home Model Argues the Case for Rapid-cycle Innovation" <u>Health Affairs</u> Vol 29 No 11	2010	lessons learned from iterative tests of care reengineering	Geisingers
Gabbay RA, Bailit MH, Mauger DT, Wagner EH, Siminerio L., Multipayer patient-centered medical home implementation guided by the chronic care model. Joint Commission Journal Quality and Patient Safety. 2011;37:265-273	2011	Implementation of PCMH, incorporation of chronic care model. Multipayer constraints of PCMH	\$ Reform Insurance Cov
Centers for Medicare and Medicaid Services. National health expenditure projections 2010-2020. <a href="http://www.cms.gov/NationalHealthExpendData">http://www.cms.gov/NationalHealthExpendData</a> Accessed September 2011	2010	Fed -- Expenditures & Projections	HC \$
Fisher E, Goodman D, Skinner J, Bronner K. Health Care spending, quality, and outcomes. More isn't always better. The Dartmouth Atlas of Health Care. The Dartmouth Institute for Health Policy and Clinical Practice, 2009. <a href="http://www.dartmouthatlas.org">http://www.dartmouthatlas.org</a>	2009	Reports on regionality of HC \$ and outcomes and quality of care	HC \$
The Henry J. Kaiser Foundation. Snapshots: Health Care Costs. Health Care Spending in the United States and OECD Countries. April 2011	2011	KFF - HC Costs and Spending.	HC \$

Arvantes J. Support for medical home to be focus of upcoming bill. AAFP News Now September 9, 2007	2007	Support for incorporating medical home model into HC reform legislation	HC Reform
Holtrop JS, and Jordan TR. The Patient-Centered Medical Home and Why it Matters to Health Educators <i>Health Promotion Practices</i> 2010;11:622	2010	Incorporation of the H Educator within the PCMH	Health Educators
Patient-Centered Medical Home Collaborative. The Patient-Centered Medical Home Collaborative	Accessed 2011	PCMH model in H reform	Health Reform
Rittenhouse DR, Shortell SM. The patient-centered medical home: will it stand the test of health reform? <i>JAMA</i> 2009;301:2038-40	2009	PCMH model in H reform	Health Reform
Health Care Reform Act of 2007, S 1, 2007	2007	Health Care Reform Act referencing MH and Patient-Centered Approach to care. Vague language	Health Reform
Rittenhouse, Diane R., David Thom, and Julie A. Schmittiel "Developing a Policy-Relevant Research Agenda for the Patient-Centered Medical Home: A Focus on Outcomes" <i>Journal of General Internal Medicine</i> Vol 25 No 6 p 593-600	Jun-10	Policy agenda for PCMH	Health Reform
Snyder L, Neubauer RL. Pay-for-performance principles that promote patient-centered care: an ethics manifesto. <i>Annals of Internal Medicine</i> 2007;147:792-4	2007	Provider financial incentives at direct odds to mission of the PCMH	Health Reform
Mahar M. Money-driven medicine: the real reason health care costs so much. New York (NY): Harper-Collins Publishers; 2006	2006	Economically driven interests of major stakeholders of medicine contributing to escalating costs of HC	Health Reform

Menec VH, Sirski M, Attawar D. Does Continuity of Care matter in a universally insured population? <i>Health Serv Res.</i> 2005;40(2):389-400	2005	Comparing continuity of care in pops with universal insurance -- still cost saving	Health Reform
Moore LG. Escaping the tyranny of the urgent by delivery planned care. <i>Family Practice Management</i> 2006;13:37-40	2006	Retrospective rvw of HMO and planned care	HMO
Grumbach K, Selby JV, Damberg C, et al., Resolving the gatekeeper conundrum. <i>JAMA</i> 1999;282:261-266	1999	Gatekeeper role of MD in HMO model	HMO
Gorey T. The future of family practice: implications of the changing environment of medicine. <i>JAMA.</i> 1988;260:1272-9	1988	Defense for HMO development of the 90s wanting a pt-centered approach to HC	HMO
The Robert Graham Center. The Patient-Centered Medical Home: history, seven core features, evidence and transformational change. Washington, DC: The Robert Graham Center; 2007	2007	Hx and seven core principles of the PCMH	Hx and PCMH Principles
Forrest CB, Starfield B. The effect of first-contact care with primary care clinicians on ambulatory health care expenditures. <i>Journal of Family Practice.</i> 1996;43(1):40-48	1996	Hx -- CE of appropriate utilization of PC leading to \$ saving in ambulatory \$, provider-pt relationship	Hx CE of model
Engel GL. The need for a new medical model: a challenge for biomedicine. <i>Science</i> 1977;196:129-36	1977	Hx -- displays that the recognition for need for a new model diverging away from biomedicine was present in the 70's. Early beginnings of the Pt-cntrd approach to med beyond the biomed model	HX need for the model

Friedberg MW, Safran DG, Coltin KL, Dresser M, Schneider EC. Readiness for the patient-centered medical home: structural capabilities of Massachusetts primary care practices. <i>Journal of General Internal Medicine</i> 2009;24(2):162-9	2009	Anal structural components that hinder or allow for implementation of the PCMH -- specific to Mass clinics	implementation
Schoen C, Osborn R, Huynh PT et al., Primary Care and Health System Performance: Adults' Experiences in Five Countries. <i>Health Affairs</i> (Milwood) 2004;(Suppl Web Exclusives):W4:487-503	2004	Comparison of Westernized Medicine (Internationally) and the need for PC in improving H outcomes	International Comparison
Gutkin Cal, The Future of Family Practice in Canada: The Patient's Medical Home. <i>Canadian Family Physician</i> October 2011. Vol 57:1224	2011	Canadian perspective and application of the PCMH	International Comparison
Jallinoja P, Absetz P, Kuronen R, et al. The dilemma of patient responsibility for lifestyle change: perceptions of primary care physicians and nurses. <i>Scandinavian Journal of Primary Health Care</i> 2007;25:244-249	2007	Scandinavian study on provider perspectives regarding consumer responsibility for lifestyle changes	International Comparison
Royal College of General Practitioners. The Future Direction of General Practice: a Roadmap. London, UK: Royal College of General Practitioners; 2007	2007	UK discussion of future of primary practice -- under a universal system (hybrid)	International Comparison

<p>American Academy of Family Physicians, American Academy of Pediatrics, American College of Physicians, American Osteopathic Association. Joint Principles of the patient-centered medical home. Philadelphia (PA): AAFP, AAP, ACP, AOA; 2007 Accessed from <a href="http://www.medicalhomeinfo.org">http://www.medicalhomeinfo.org</a> accessed August 2011</p>	2007	Joint Principles of PCMH, joint policy statement	Joint Principles
<p>Patient-Centered Primary Care Collaborative. Joint Principles of the Patient-centered Medical Home. February 2007. <a href="http://www.pcpcc.net/node/14">http://www.pcpcc.net/node/14</a>. Accessed October 2011.</p>	2007	Joint Principles of PCMH, joint policy statement	Joint Principles
<p>Patient-Centered Primary Care Collaborative. Joint Principles of the Patient-centered Medical Home. February 2007. <a href="http://www.pcpcc.net/node/14">http://www.pcpcc.net/node/14</a>. Accessed October 2011.</p>	2007	Joint Principles of PCMH, joint policy statement	Joint Principles
<p>Audet AM, Davis K, Schoenbuam SC. Adoption of patient-centered care practices by physicians: results from a national survey. <i>Archives of Internal Medicine</i> 2006;166:754-9</p>	2006	MDs adoption of PCMH or principles of such National survey	MD perception re adoption
<p>Barr M. The Advanced Medical Home: A Patient-Centered, Physician-Guided model of Health Care. Philadelphia (PA): American College of Physicians; 2006</p>	2006	Discussion of pt-centered approach to medicine from a provider perspective	MD perception re adoption

Hing ES, Burt CW. Office-based medical practices: methods and estimates from the National Ambulatory Medical Care Survey. <i>Adv Data</i> 2007;12(383):1-15	2007	Private based medical practices -- provider perspectives	MD perception re adoption
Coulter A. What do Patients and the Public Want from Primary Care? <i>BMJ</i> 2005;331:1199-2001	2005	Pt perspectives on HC relationship and PC	MD perception re adoption
Groopman J. How Doctors Think. New York (NY): Houghton Mifflin Co., 2007	2007	Provider perspective of HC	MD perception re adoption
Feifer C, Nemeth L, Nietert PJ, et al. Different Paths to high-quality care: three archetypes of top-performing practice sites. <i>Annals of Family Medicine</i> 2007;5:233-41	2007	Approach to Qual of care -- problem in defining and measuring outcome	measuring outcome
Stange, Kurt C., Paul A Nutting, William L. Miller, Carlos R. Jaen, Benjamin F. Crabtree, Susan A Flocke, and James M. Gill "Defining and Measuring the Patient-Centered Medical Home" <i>Journal of General Internal Medicine</i> Vol 25 No 6 p 601-612	Jun-10	Defining and Measuring the PCMH and related outcomes	measuring outcome
Valderas JM, Kotzeva A, Espallargues M et al., The impact of measuring patient-reported outcomes in clinical practice: a systematic review of the literature. <i>Qual Life Res</i> 2008;17:179-93	2008	Lit rvw of measurement tools used to obtain outcomes - importance of incorporating pt perspective	measuring outcome
Kuzel AJ, Skoch EM. Achieving a Patient-Centered Medical Home as determined by the NCQA- at what cost, and to what purpose? <i>Annals of Family Medicine</i> 2009;7:85-6	2009	Analysis of the NCQA qualifications of PCMH designation and the possible compromises to care as a result of tech based focus	NCQA Qual

<p>Nutting, Paul, William Miller, Benjamin F. Crabtree, Carlos Roberto Jaen, Elizabeth E. Stewart, and Kurt C. Stange        "Initial Lessons from the First National Demonstration Project on Practice Transformation to a Patient-Centered Medical Home"  <u>Annals of Family Medicine</u> Vol 7 No 3</p>	<p>May/June 2009</p>	<p>Initial lessons from the NDP Evaluator Anal</p>	<p>NDP</p>
<p>Patient-Centered Primary Care Collaborative. Patient-Centered Medical home: building evidence and momentum: a compilation of PCMH pilot and demonstration projects. Available at <a href="http://www.pcpcc.net">http://www.pcpcc.net</a></p>	<p>2009</p>	<p>Building evidence on positive impact of PCMH, utilizing data from NDP and other smaller demo projects</p>	<p>NDP</p>
<p>Stange KC, Miller WL, Nutting PA, Crabtree BF, Stewart EE, and Jaen CR. Context for Understanding the National Demonstration Project and the Patient-Centered Medical Home. <i>Annals of Family Medicine</i> 2010;8;1:S2-8</p>	<p>2010</p>	<p>Context for anal of the NDP of the PCMH Seminal authors</p>	<p>NDP</p>
<p>TransforMED. National Demonstration Project Evaluators' Reports. <a href="http://transformed.com/evaluatorsReports/index.cfm">Http://transformed.com/evaluatorsReports/index.cfm</a>. Accessed October 2011.</p>		<p>Evaluators' Reports of the NDP</p>	<p>NDP</p>
<p>Hashem A, Chi MT, Friedman CP. Medical Errors as a result of specialization. <i>Journal of Biomedical Information</i> 2003;36:61-9</p>	<p>2003</p>	<p>Qual of care provided by subspecialists -- need for coordinated care</p>	<p>Need for coordinated care</p>

Margolis D, and Bodenheimer T. Transforming Primary Care: From Past Practice to the Practice of the Future <i>Health Affairs</i> 2010;29:5:779-784	2010	Increasing primary care capacity without sacrificing pt qual of care. Suggestion of model to accomplish this. Emphasizes need for new payment models to ensure fidelity in application	Need for coordinated care
Langley GJ., Nolan, KM., Nolan TW., Norman CL., Provost LP., The Improvement Guide: A Practical Approach to Enhancing Organizational Performance. San Francisco, CA: Jossey-Bass; 1996.	1996	Not specific to PCMH, archival discovered r/t organizational change approach and transformation of practices from an organizational standpoint	Organizational reform
American Academy of Family Physicians. AAFP News Now Special Report: Patient-Centered Medical Home. Available at <a href="http://www.aafp.org">www.aafp.org</a> Accessed August 2011	2010	AAFP Statement on the effectiveness of patient-centered approach to medical care	Outcome Anal
Maeng, Daniel D., Thomas R. Graf, Duane E Davis, Janet Tomcavage, and Frederick J. Bloom, Jr "Can a patient-Centered Medical Home lead to Better Patient Outcomes? The Quality Implications of Geisinger's Proven Health Navigator" <u><a href="#">American Journal of Medical Quality</a></u>	Aug-11	Effect of PCMHs in improving clinical outcomes	Outcome Anal
Margolis P, Stevens R, Bordley WC, Stuart J, Harlan C, Keyes-Elstein L, and Wisseh S., From Concept to Application: The Impact of a Community Wide Intervention to Improve the Delivery of Preventive Services to Children <i>Pediatrics</i> 2001;108:e42	2001	Impact Anal of PCMH approach and related outcomes	Outcome Anal



Shi L, Macinko J, Starfield B, Xu J, Politzer R. Primary Care, income inequality, and stroke mortality in the United States: a longitudinal analysis, 1985-1995. <i>Stroke</i> 2003;34:1958-64	2003	Link PC, Income Inequalities and H outcomes (CVA) Access and H disparities	PC and outcome
Shi L. The Relationship between primary care and life chances. <i>Journal of Health Care for the Poor and Underserved</i> 1992;3:321-35	1992	Hx Shi article -- defense for use of PC leading to better H outcomes	PC and outcome
Shi L., Primary Care, specialty care, and life chances. <i>Int Journ Health Serv</i> 1994;24:431-458	1994	Hx -- Shi is seminal author in field of health reform and finance. Linking access to PCP and outcome	PC and outcome
Starfield, Barbara, and Leiyu Shi "The Medical Home, Access to Care, and Insurance: A review of Evidence" <i>Pediatrics</i> Vol 113p 1493-1498	2004	lit rvw regarding MH and to rvw extent that insurance is r/t having a MH	PCMH and HC \$
Rosenthal TC. The medical Home: Growing Evidence to support a new approach to primary care. <i>Journal American Board of Family Medicine</i> . 2008;21(5);427-40	2008	Rosenthal article. Primary Care	PCMH in PC
Rittenhouse D.R., Casalino L.P., Shortell S.M., Mclellan S.R., Gillies R.R., Alexander J.A., and M. Drum. "Small and Medium-Sized Physician Practices Use Few Patient-Centered Medical Home Processes" <i>Health Affairs</i> , Vol 30, no 8 (2011): 1575-1584 (published online June 30, 2011; 10.1377/hlthaff.2010.1210)	2011	first national data on the use of MH processes, focus on small and medium-sized practices, ID internal capabilities and external incentives assoc with greater use of MH processes	PCMH Principles

Ferrante JM, Balasubramanian BA, Hudson SV, Crabtree BF., Principles of the Patient-Centered Medical Home and Preventive Services Delivery <i>Annals of Family Medicine</i> March/April 2010	2010	anal principles of PCMH against receipt of preventative services	PCMH Principles
Kellerman R, Kirk L. Principles of the Patient Centered Medical Home. <i>American Family Physician</i> 2007;76:774-5	2007	Discussion of principles of the PCMH	PCMH Principles
Brotherton SE, Simon FA, Etzel SI. US Graduate Medical Education, 2000-2001. <i>JAMA</i> 2001;286:1056-1060	2001	Ratio of PCPs	PCP
Starfield B, Primary Care. New York, NY: Oxford University Press, 1998	1998	Book on primary care -- includes discussion of primary care relationship r/t HC outcomes and ergo \$	PCP
Starfield B, Shi L, Macinko J. Contribution of Primary Care to Health Systems and Health. <i>Milbank Q.</i> 2005;83(3):457-502	2005	Role of PC in Health	PCP
Mullan F, Primary Care: An endangered Species? <i>National Area Health Education Center Bulletin</i> 2000'17:1, 6-9	2000	Endanger field of primary care discusses challenges faced by PCPs, generalizability to rural HC	PCP
Starfield B, Lemke KW, Bernhardt T, Foldes SS, Forrest CB, Weiner JP. Comorbidity: implications for the importance of primary care in 'case" management. <i>Annals of Family Medicine</i> 2003;1:8-14	2003	Importance of PC in preventative medicine. Discussion of role of pt as consumer in 'case' management. Argues that a population based approach is better than indiv case management. Something we are still fighting over a decade later	PCP and integrated care

Moore B, Tonniges T. The "every child deserves a medical home" training program: more than a traditional continuing education course. <i>Pediatrics</i> . 2004;113(supp):1479-1484	2004	Training CE for Peds and implementing PCMH	ped
American Academy of Pediatrics, Medical Home Initiatives for Children with Special Needs Project Advisory Committee. The Medical Home. <i>Pediatrics</i> . 2002;110:184-186	2002	Peds and application of PCMH in children with special needs	Peds
Calvin, Sia, Thomas F. Tonniges, Elizabeth Osterhus and Sharon Taba "History of the Medical Home Concept" <i>Pediatrics</i> Vol 113 No 5 p 1473-1478	May-04	Hx of MH concept w/ inception in pediatrics -esp peds w/ chronic conditions	Peds
Porterfield SL, and DeRigne L. Medical Home and Out-Of-Pocket Medical Costs for Children with Special Health Care Needs. <i>Pediatrics</i> 2011.	2011	lower OOP\$ shown in pts utilizing a PCMH for peds with special needs, primarily dependent upon coordinated care delivery and follow up	Peds and OOP\$
Strickland B, Jones J, Ghandour R, Kogan M, and Newacheck P., The Medical Home: Health Care Access and Impact for Children and Youth in the United States. <i>Pediatrics</i> 2011;127;604	2011	Peds and application of PCMH in H outcomes	Peds and PCMH
Kleinsorge CA, Roberts MC, Roy KM, Rapoff MA. The Program Evaluation of Services in a Primary Care Clinic: Attaining a Medical Home <i>Clinical Pediatrics</i> 2010 49:548	2010	program eval of PCMH application within pediatrics -- applicable at the PC level as Peds have been incorporating the model for the longest length of time and are still experiencing difficulty with fidelity of implementation and outcomes. PC should utilize k of peds for	peds eval of PCMH

		problem forecasting within incorporating the model at the PC level	
Backer L. The medical home: an idea whose time has come again. <i>Family Practice Management</i> 2007;14:38-41	2007	Resurgence of interest in the PCMH model	philosophy of incorporation
Garg A, Butz AM, Dworkin PH, Lewis RA, and Serwint JR. Screening for Basic Social Needs at a Medical Home for Low-Income Children. <i>Clinical Pediatrics</i> . 2009. 49;1:32-36	2009	Incorporation of screen for supplemental health determinants within a medical model and utilizing a PCMH. Based in peds but definitely applicable to family practice, PC, and rural pops.	prev care within PCMH
Kaiser Family Foundation. National Survey on consumer experiences with an attitudes toward health plan. Available at <a href="http://www.kff.org">http://www.kff.org</a>	2001	KFF - Anal of Consumer (Pts) perspectives (Qual based survey on satisfaction)	Pt perspectives
Basu J, Clancy C. Racial disparity, primary care, and specialty referral. <i>Health Serv Res</i> 2001;36(6 Pt 2):64-77	2001	PC and Racial inequities r/t referral to specialties	Racial inequities and coordinated care
The Commonwealth Fund. Performance Snapshots, 2006. <a href="http://www.cmwf.org/snapshots">http://www.cmwf.org/snapshots</a> . Accessed September 2011	2006	Commonwealth Fund -- reports on regionality of health care \$ and outcome	regionality of access and outcome

Shi L, Macinko J, Starfield B, Politzer R, Wulu J, Xu J. Primary Care Social Inequalities and all-cause, heart disease and cancer mortality in US counties: a comparison between urban and non-urban areas. <i>Public Health</i> 2005;119:669-710	2005	Comparison of regionality of HC and outcomes (comparison of urban v non-urban -- not nec rural but still applicable when discussing differences in qual of services received)	regionality of access and outcome
Miller WL, Crabtree BF, Nutting PA, Stange KC, Jaen CR. Primary Care Practice Development: A Relationship-Centered Approach <i>Annals of Family Medicine</i> 2010;8;1 (Sup):S68-W44	2010	Seminal authors -- relationship centered approach to implementing MHs in PCP	Relationship char
Saultz JW, Lochner J. Interpersonal continuity of care and care outcomes: a critical review. <i>Annals of Family Medicine</i> . 2005;3(2):159-166	2005	Relationship char b/t provider and pt impacting Qual of Care and H outcomes	Relationship char
Bindman AB, Grumbach K, Osmond D, Vranizan K, Stewart AL. Primary Care and receipt of preventative services. <i>Journal of General Internal Medicine.</i> , 1996;11(5):269-276	1996	Hx rvw of relationship with primary care and receipt of prevention services	Relationship principles of PCMH
Green LA, Graham R, Bagley B et al., Task Force 1. Report of the Task Force on patient expectations, core values reintegration and the new model of family medicine. <i>Annals of Family Medicine</i> 2004;2(Supp 1):S33-50	2004	Report of Task force on patient expectations and transformation of family med approach	Relationship principles of PCMH
Main DS, Tressler C, Staudenmaier A, Nearing KA, Westfall JM, Silverstein M. Patient Perspectives on the Doctor of the Future. <i>Family Medicine</i> 2002;34:251-7	2002	Pt perspectives on HC relationship	Relationship principles of PCMH

<p>Future of Family Medicine Leadership Committee. The Future of Family Medicine: a collaborative project of the family medicine community. <i>Annals of Family Medicine</i> 2004;2(supp 1):S3-32</p>	2004	<p>Family Medicine Mission - proposed ways to improve pt relationships and H outcomes while containing costs</p>	<p>Relationship principles of PCMH and CE</p>
<p>Moscovice I, Rosenblatt R. Quality-of-Care Challenges for Rural Health. <i>Journal of Rural Health</i> 2000;16:168-176</p>	2000	<p>Challenges for Rural Health</p>	<p>Rural Health</p>
<p>Rosenthal T, Campbell-Heider N. The Rural Health Care Team. In: Geyman JP NT, Hart G, eds. Textbook of Rural Health Care. New York: McGraw-Hill; 2001</p>	2001	<p>Specific reference to the challenges and opportunities to the provider in the rural application of med</p>	<p>Rural Health</p>
<p>Ryan S, Riley A, Kang M, Starfield B. The Effects of regular source of care and health need on medical care among rural adolescents. <i>Arch Pediatric and Adolescent Medicine</i> 2001;155:184-90</p>	2001	<p>Effects of PC on rural adol HC</p>	<p>Rural Health</p>
<p>Hoy B, Wagner L, Hall EOC. Self Care as a Health Resource of elders: an integrative review of the concept. <i>Scandinavian Journal of Caring Science</i> 2007;21:456-466</p>	2007	<p>lit r/w r/t self-care of elders improving as a result of incorporating concepts of the PCMH</p>	<p>Rvw of PCMH in elderly care</p>
<p>Nutting, P., Crabtree, B., Miller, M., Stewart, E., Stange, K., and Carlos Roberto Jaen. <i>Journey to the Patient-Centered Medical Home: A Qualitative Analysis of the Experiences of Practices in the National Demonstration Project</i> <i>Annals of Family Medicine</i> Vol 8, Supp 1, 2010</p>	2010	<p>Described experiences of practices in transitioning toward PCMH in the National Demonstration Project</p>	<p>Secondary Article by Nutting et al examining the NDP</p>

Weingarten SR, Lloyd L, Chiou CF, Braunstein GD. Do subspecialists working outside of their specialty provide less efficient and lower-quality care to hospitalized patients than do primary care physicians? <i>Arch Internal Medicine</i> 2002;162:527-532	2002	Can subspecialists provide good qual of care outside their range of practice? Eliminating the need for the PCP...no Subspecialists tend to order unnec testing and increase cost assoc with PC without improving outcomes. Displays the need for care coord by PC to contain costs and increase outcomes	Specialists care
Stegner RJ, DeVoe JE. Policy Challenges in Building the Medical Home: Do we have a Shared Blueprint? <i>Journal of the American Board of Family Medicine</i> . 2010;23:384-392.	2010	attempt to understand the various stakeholder perspectives surrounding components of the PCMH. Understanding the perspectives allows for tailored messaging to encourage collaborative discussions surrounding PCMH	stakeholder perspectives
Vest JR, Bolin JN, Miller TR, Gamm LD, Siegrist TE, and Martinez LE. Review: Medical Homes: "Where you Stand on Definitions Depends on Where you Sit" <i>Med Care Res Rev</i> 2010;67:393	2010	systematic review of literature to identify stakeholder differences in definitions of components of PCMH	stakeholder perspectives
National Committee for Quality Assurance. Physician Practice Connections. Patient-Centered Medical Home. Available at <a href="http://www.ncqa.org">http://www.ncqa.org</a>	2008	Regulatory body assigning PCMH status, has own criterion for designation focused on tech based applications	Tech principles of PCMH
Peckman C. The ACP Medical Home Builder: Good Tools for everyone. Medscape.com posted 11/08/2011. Accessed November 16, 2011.	2011	Information regarding e-technology for assistance of transformation into PCMHs. Software based training and supplemental information for providers and administration	Tech principles of PCMH

Woolf SH, Johnson RE. The break-even point: when medical advances are less important than improving the fidelity with which they are delivered. <i>Annals of Family Medicine</i> 2005;3:545-552	2005	Anal CE of tech and med advancement in improving outcomes	Tech principles of PCMH
Ebell MH, Siwek J, Weiss BD et al., Strength of Recommendation Taxonomy (SORT): a Patient-Centered approach to grading evidence in the medical literature. <i>Journal of American Board of Family Practice</i> 2004;17:59-67	2004	Anal of tool SORT for decision making model	Tech principles of PCMH
Beasley JW, Hankey TH, Erickson R, et al. How many problems do family physicians manage at each encounter? A WReN study. <i>Annals of Family Medicine</i> . 2004;2:405-10	2004	Typical workload (management of H conditions) of PCP	Workload of MD