Brief Communication

Technologies in the Patient-Centered Medical Home: Examining the Model from an Enterprise Perspective

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Abstract

Fee-for-service reimbursement has fragmented the healthcare system. Providers are paid based on the number of services rendered instead of quality, leading to the cost of care rising at a faster rate than its value. One approach to counter this is the Patient-Centered Medical Home (PCMH), a primary care model that emphasizes team-based medicine, a partnership between patients and providers, and expanded access and communication. The transition to PCMH is facilitated by innovative technologies, such as telemedicine for additional services, electronic medical records to document patients' health needs, and online portals for electronic visits and communication between patients and providers. Implementing these technologies involves tremendous investment of funds and time from practices and healthcare organizations. Although PCMH does not require such technologies, they facilitate its success, as care coordination and population management necessitated by the model are difficult to do without. This article argues that there is a paradox in PCMH and technology is at its center. Although PCMH intends to be cost effective by reducing hospital admissions and ER visits through providing better preventative services, it is actually a financial risk due to the very real upfront costs of implementing and sustaining technologies needed to carry out the intent of the PCMH model, which may not be made up immediately, if ever. This article delves into the rationale behind why payers, providers, and patients have adopted PCMH regardless of this risk and in doing so, maps out the roles that innovative technologies play in the conversion to PCMH.

Key words: *technology, policy, medical records, telemedicine, business administration/economics*

Introduction

I n 2008, the United States spent over $2.3 trillion on healthcare, which is more than triple the 714 billion spent in 1990.[1] Curbing this growth is a priority for policy making. The government, employers, and consumers are fighting to keep up with rising costs. At the same time, providers are also frustrated as they try to improve the quality of care they deliver, but can only do so much due to the fee-for-service payment scheme. How can the healthcare system, which is described as high in cost but low in value, be fixed? How can quality, cost, and accessibility be addressed together?

The Patient-Centered Medical Home (PCMH) has been deemed as one method to resolve some of the difficulties in the system with regard to cost, quality, and accessibility.[2] The model brings together traditional ideas of primary care with new responsibilities and technologies to systematically enhance patients' health.[3–5] PCMH was first introduced in 1967 by the American Academy of Pediatrics as a method to include families in the care of children with special health needs and to archive children's medical records so they can be easily accessible by all providers. PCMH (also referenced as Medical Home at times in this article) is not a place, but a method for delivering primary care that is continuous, comprehensive, and most importantly, patient centered and cost effective.[6,7]

Champions of PCMH suggest that this primary care model fits a system that is "fragmented, impersonal, and overly focused on high-cost specialty care."[8] Payers and providers are working to transform the culture of medicine and to integrate new technologies into clinics and communities. Innovative methods of communication and documentation, such as online patient portals, electronic medical records (EMRs), and telemedicine, have become essential for PCMH to succeed. In a system based on quantity, practitioners are typically only paid for face-to-face visits when email or phone consultations or the use of telemedicine could be used to meet the patients' needs.[9] These new methods for care could streamline a practice's workflow and make for more efficient appointments, which are two objectives of PCMH. For example, Carilion Clinic, a large healthcare organization based in southwest Virginia with 37 primary care practices across the region and 180 primary care providers, is beginning a program to investigate how telemedicine can be used to deliver mental health services, medication management, and physical fitness classes via teleconferencing in its primary care practices. Carilion is transitioning its family practices to PCMH and believes that telemedicine is one option to deliver more comprehensive care to patients and to live up to the model's intent of caring for all of a patient's health needs in a cost-effective manner.

The purpose of this article is to examine the perspectives of three major stakeholders in PCMH–payers, providers, and patients–using discussions from a workshop on Medical Home in June 2010 held in Alexandria, Virginia. All stakeholders are trying to reach the same endpoint: lowering costs while providing or receiving high quality care. However, Medical Home could be a financial risk due to the funds needed upfront for personnel training, implementation of new

technologies for communication and documentation, and the reorganization of space to accommodate care coordination activities and new technological devices. This article argues that there is a paradox in PCMH and technology is at the very heart of it. Medical Home aims at improving the coordination and comprehensiveness of care, and many practices who have made the transition have discovered this is difficult to do without EMRs, disease registries, teleconferencing, or self-management devices, all of which take time and funds.* However, the goal of PCMH is to reduce costs to patients, payers, and providers, which means that the model is actually a financial risk and organizations may not recoup money, within a reasonable amount of time, invested in new technologies for Medical Home. Large healthcare organizations such as Carilion may suffer because offering better primary care can reduce hospital admissions and emergency room visits, both of which create revenue. Why then would an organization adopt a model where there could be tremendous losses as well as gains? This article elucidates the reasons why each of the aforementioned parties has become interested in PCMH and maps out the similarities and differences in their rationales for adoption. In doing so, it points to the roles that technologies and telemedicine plays in PCMH and how such innovations aid the parties in transitioning to Medical Home.

Key Concepts

Medicine today is no longer just about episodic and acute care, but it focuses on the management of chronic illnesses and prevention of complex conditions. For instance, 70% of patients with a psychological disorder will be treated within primary care,[10] and a large portion of these patients suffers from multiple medical conditions. One study in twelve metropolitan areas of the US revealed that patients received only 54% of recommended care. Medical Home tries to rectify the lack of services and need for treatment of complex illnesses by implementing a team approach to medicine based on the following principles launched in 2007 by major physician organizations (*Table 1*).[11] Is PCMH a solution or just another trend in healthcare? Excellent healthcare is said to have a strong primary basis, but the current payment scheme hinders this. Despite the fact that the model could result in a loss of money for specialists and hospitals because it aims at diagnosing and treating conditions early and for primary care practices because of the need for infrastructure, PCMH is the largest recognition program the National Committee for Quality Assurance (NCQA) runs.[12–14]

As of 2011, NCQA recognizes practices as Medical Homes based on six standards. Depending on how many of these criteria a practice

*A primary care practice can have a successful care management program without an EMR, but those with a high functioning EMR tend to achieve higher scores on the NCQA recognition survey. See Solberg S, et al. Practice systems for chronic care: Frequency and dependence on an electronic medical record. *Am J Manage Care* 2005;11:789–796.

Table 1. Patient–Centered Medical Home Principles

Personal physician	Patients have an ongoing relationship with a personal physician
	First contact, continuous and comprehensive care
Physician-directed medical practice	Personal physician leads a team of individuals at the practice level
	Collective responsibility for the ongoing care of patients
Whole-person orientation	Medical home provides for all the patient's health care needs or appropriately arranges care with other qualified professionals
	Care for all stages of life: acute care, chronic care, preventive services, and end-of-life care
Care is coordinated and/or integrated	Coordination of care across the health care system and patient's community
	Care is facilitated by registries, information technology, health information exchange, use of interpreters, and other means
Quality and safety	Quality and safety improvement are hallmarks of the medical home
	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
Enhanced access	Patients can easily access health care via their medical home
	Specific improvements could include open access scheduling, expanded hours, and enhanced phone or e-mail communication
Payment	Increased payments support the added level of service and value provided to patients who receive care from a medical home

Stenger and DeVoe (2010).[37]

meets, it can be recognized as Level 1, Level 2, or Level 3 (one being the minimum criteria are met and three being the most criteria are met). Several standards deal directly with the implementation and use of technology. For instance, in the PCMH 2011 guidelines, under Standard 2 "Identify and Manage Patient Population," NCQA requires "the practice uses an electronic system that records the following as structured (searchable) data for more than 50% of its patients" under Element A "Patient Information," and goes on to list

criteria such as gender, preferred language, race, date of birth, etc. Other standards indirectly address technology, such as Standard 4 "Provide Self-Care Support and Community Resources." Telemedicine can be an optimal way to provide self-management by conducting group education classes or via the Internet that patients can participate in at the practice or home. Although certain technologies are not required for PCMH recognition by the NCQA, they certainly can facilitate the transition and help a practice meet a greater number of criteria. Without them, practices may not qualify as a Level 3 Medical Home, and if the payment scheme changes so that providers are rewarded on quality, it is possible they may not receive greater reimbursement if they cannot reach the benchmarks.

Rationale

Why does interest in PCMH continue to grow if there are real financial risks involved in the model? The rest of this article details this interest through three lenses: payers, providers, and patients. Discovering ways to provide better and more cost-effective care that addresses longitudinal management rather than episodic treatment is essential for these stakeholders. A high-functioning EMR is said to be at the heart of Medical Home. Telehealth can drastically increase patients' access to services and education within primary care, but it is traditionally outside all EMRs and tends not to be reimbursable at the same rate of other face-to-face services.[15] An EMR gives practices the opportunity to better track lab and imaging results, make quality improvements using generated reports, and monitor patients' conditions. These added services could lead to an improvement in the quality of care, increase the value of services, and make practices more efficient.

PAYERS

It is evident that healthcare systems are "payer-centric." Payers, including employers and insurance companies, should recognize the value in the patient-centered services PCMH provides.[16] Payers have expressed interest in the model as a way to decrease expenditures, because it could lead to a lesser reliance on higher-cost specialty care and better health outcomes. A major policy objective for government payers, including the Centers for Medicare and Medicaid Services (CMS), is to reform the payment scheme to drive changes in the current healthcare system that are based on value rather than volume[17]; this includes recognizing the necessity of and value in videoconferencing, electronic consultations, EMRs, and self-management devices. CMS is hopeful that PCMH can reduce unjustified services, improve healthcare efficiency, increase availability of services, and engage beneficiaries in their own care.[18]

The government is interested in PCMH as a way to decrease healthcare spending and create a healthier population. Likewise, companies have integrated PCMH into healthcare plans. Several fortune 500 companies, including IBM, GE, General Motors, and FedEx, have started programs to acknowledge the added value in Medical Home. Some have joined organizations, such as the Patient Centered Primary Care Collaborative, to promote the model throughout the United States.[19] IBM now covers 100% of primary care for all if its employees. Advanced primary care has meant one-third less cost and 19% lower mortality for IBM staff.[20]

In general, there are five reasons why payers have become interested in PCMH, all of which can be facilitated by the use of innovative technologies. First, it allows for the improvement in the coordination of care, often made easier through interoperable data sharing systems or internal emails, which results in fewer repeat or unnecessary services. Second, it increases the quality of care through more thorough documentation. This can lead to a much healthier population and workforce. Third, it creates better clinical outcomes that can be easily tracked through disease registries connected to EMRs. Fourth, PCMH can improve patient satisfaction in part through online patient services such as electronic consults, which may result in employees not only being happier with practices but with their employers. And lastly, by better documenting patients' health needs in EMRs thus allowing for more efficient visits, PCMH can lower health and lost productivity costs and produce more valuable health benefits.

PROVIDERS

Health plans and employers are interested in supporting efforts to coordinate care among providers only if it improves quality and reduces costs. This leaves providers to prove they are offering high-quality, added-value services to be appropriately reimbursed.[21,22] Providers have attempted to improve the coordination of services and the comprehensiveness of care through implementing high-functioning EMRs with reminders and pop ups for providers and online patient portals, but several structural constraints—most notably reimbursement—leave them with few other options to do so.[23] The federal government has made approximately $20 billion available through the American Recovery and Reinvestment Act of 2009 to provide financial incentives to healthcare organizations and practices that implement EMRs. These payments will be made through the Medicare and Medicaid programs for eligible providers who demonstrate they have achieved "meaningful use" of health information technology. These funds allow organizations to recoup some of the money they have spent on setting up or improving EMRs to enhance the quality of care for their patients, but have not made up through the Medical Home, hospitalizations, or specialty care.

Despite real financial risks, the following are three reasons why larger health organizations have opted to implement the PCMH model.

To better serve patients. At Carilion Clinic, before PCMH, a day's schedule could be booked before opening and capacity was added when needed by double-booking patients. After PCMH, access had improved with extended hours, a percentage of appointments left for same-day use, and patients able to see their provider's schedule online before calling for an appointment.[24]

To address the primary care crisis. The current system should transition from acute care to chronic illness. PCMH encourages treating the whole individual and seeing patients as more than their medical conditions. Previsit huddles at Carilion are facilitated by care coordinators who print out the next day's schedule, which includes the reasons for visits and whether or not the patient is in a priority category. These huddles combined with extensive documentation in the EMR ensure care management is addressed by the entire care team.

To take on new payment opportunities. In the current system, providers are paid for discreet individual services rather than improving the health of their patients. Carilion has used PCMH to encourage financial incentives for reaching quality benchmarks with regard to managing chronic illnesses and for implementing an EMR.

Research shows that when a healthcare system focuses on primary care, patients achieve better outcomes at lower costs,[25] but exceptional primary care includes services not traditionally reimbursed by health plans such as patient education, telemedicine, and new forms of electronic communication between providers and patients.[26] A number of payment reform models are based on the "value" of services rather than on quantity. In the case of the Accountable Care Organization (ACO), an organization should demonstrate the improvement of patients' health conditions by tracking objectives and measures similar to that of meaningful use. If the ACO can demonstrate improvements in the value of care provided, it can receive incentive payments for the total number of patients enrolled. Although PCMH involves one primary care practice, the ACO is "at the other end of the spectrum, housing many practices within one organizing entity."[27] Each ACO is comprised of several providers responsible for the "quality and cost of care" rendered to a set of patients. Carilion, for example, has harmonized the approaches of the ACO, PCMH, and meaningful use in an attempt to improve the quality of care while receiving some funds for their investment in a high-functioning EMR. This trend of value-based payment schemes will open up opportunities for providers to use more innovative technologies such as telemedicine to offer better access to quality services that follow the intent of the PCMH model.

PATIENTS

Support from providers and payers is crucial for the success of PCMH, but equally as important is patient buy-in. Results from the National Demonstration Project, a two-year program launched by the American Academy of Family Physicians in June 2006, demonstrate that PCMH needs to consider technological aspects, clinician training, and patient experience simultaneously. Focusing on the first two will not automatically improve the latter.[28,29] Similar to large civilian providers, the Military Health System (MHS) seeks new ways to deliver quality care while cutting its spending. The MHS and TRICARE (a healthcare program serving uniformed service members, retirees, and their families) have 9.5 million beneficiaries and 347,673 medical providers and operate under a complex insurance system that includes both military and civilian providers. Military treatment facilities tend not to employ a large number of specialists forcing patients to see providers in the civilian world. Extensive documentation, disease registries, and interoperable EMR systems can make records easily transferrable between civilian and military providers, thus improving the quality of care and health outcomes in a transient setting where both providers and patients are moving constantly for deployments or to different military bases.

Building care teams comprised of doctors, nurses, physician assistants, and technicians is a way to address the ephemeral environment of the MHS; however, further work is needed to develop an electronic system to transfer patients' EMRs more efficiently between providers.[30] The care team is an appropriate model to improve military "readiness" as military and their family members should be physically and mentally prepared for a variety of situations. Archiving an EMR in a single place that is easily accessible and having preset templates for thorough data entry on the record can help enhance health outcomes of active duty members. Integrating various professionals (specialists, nutritionists, mental health services) is a way to offer adequate care for complex conditions such as Post-Traumatic Stress Disorder, but to do so takes time and funds to develop a capable electronic system.[31]

Studies have shown that people with continuous access to medical care, in particular disease management and preventative medicine, will obtain better health than those with acute care.[32] Edwards Air Force Base has seen improvements in patient satisfaction by 3% with the coming of the Air Force's PCMH. To continue patient engagement with the model, practices should be committed to making continuous quality improvements.* This can be facilitated through electronic disease registries, but this requires that such population management software be implemented, maintained for technical issues, transformed to meet users' needs, and updated regularly by staff.

Patients have their own responsibilities to keep up the relationship with their primary care provider, follow treatment plans that are printed directly from their EMRs, and make recommended lifestyle changes. Much of this is made easier for patients through care coordination at the practice and online patient portals that provide test tracking, appointment requests, and referrals.[33] Patients should see the value in PCMH, as it could bring more convenient care, better overall health, and a productive relationship with their provider. Although such care and relationships come about in part through changing the culture of medicine to reflect more personalized care for each individual patient, they are also made possible by using EMRs to

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*Goldberg et al. (2009) in the *Annals of Family Medicine* found that of the practices surveyed, only half used any type of patient satisfaction survey at the time (2007–2008). The authors made this a recommendation for the future in order to keep up with changing patient needs.

Table 2. NCQA 2011 Standards for Patient–Centered Medical Home Recognition	
PCMH 1: Enhance Access and Continuity	PCMH 2: Identify and Manage Patient Populations
PCMH 3: Plan and Manage Care	PCMH 4: Provide Self-Care and Community Support
PCMH 5: Track and Coordinate Care	PCMH 6: Measure and Improve Performance
NCAQ's Patient-Centered Medical Home (PCMH) 2011, January 31, 2011. Available at http://www.ncqa.org/tabid/631/default.aspx	

better document patients' health needs and medical histories, by providing new methods of communication between providers and patients, and by allowing basic services and consults to be conducted online at the convenience of patients and providers.

Conclusion

Medical Home is believed to improve the quality of care and patients' experiences while altering the course of healthcare spending.[34] Providers and healthcare organizations believe the model will drive changes in how services are reimbursed and increase practice efficiency.[35] Payers view PCMH as offering more flexible payments and a collaborative provider relationship. In the transition to PCMH, it is imperative to not overemphasize practice transformation so much that it takes away from patient-centered care.[36] This has been a critique leveled at the NCQA by practices that find its standards for recognition to emphasize documentation and book keeping more so than quality (*Table 2*).

What is striking here is that conversion of primary care practices to Medical Home is facilitated by the following technological resources: EMRs for documentation, additional computers, population management tools, and care coordination. These require investments and commitments on behalf of practices and healthcare organizations and are made with an expectation of increased payment beyond the current fee-for-service model, which recognizes these added value services. Payment reform will steer current volume-based healthcare delivery to an outcome-driven healthcare system that Medical Home is designed to support. Providers, organizations, patients, and payers should reach an agreement on the payment scheme and the value of extra services, such as new communication technologies and telemedicine to increase access, in order for PCMH to succeed. The PCMH is not particularly new, but rather, it is how primary care was intended to be. Now, the payment model will have to support quality patient-centered care that is not based on volume. If the healthcare payment model evolves into a more "bundled" system based on the care of the aggregate population of patients, the success of technologies will depend on the organization's ability to integrate them within the overall enterprise to improve the quality of services and to support the tracking and documentation of improved outcomes, efficiency, and workflows.

Disclosure Statement

No competing financial interests exist.

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