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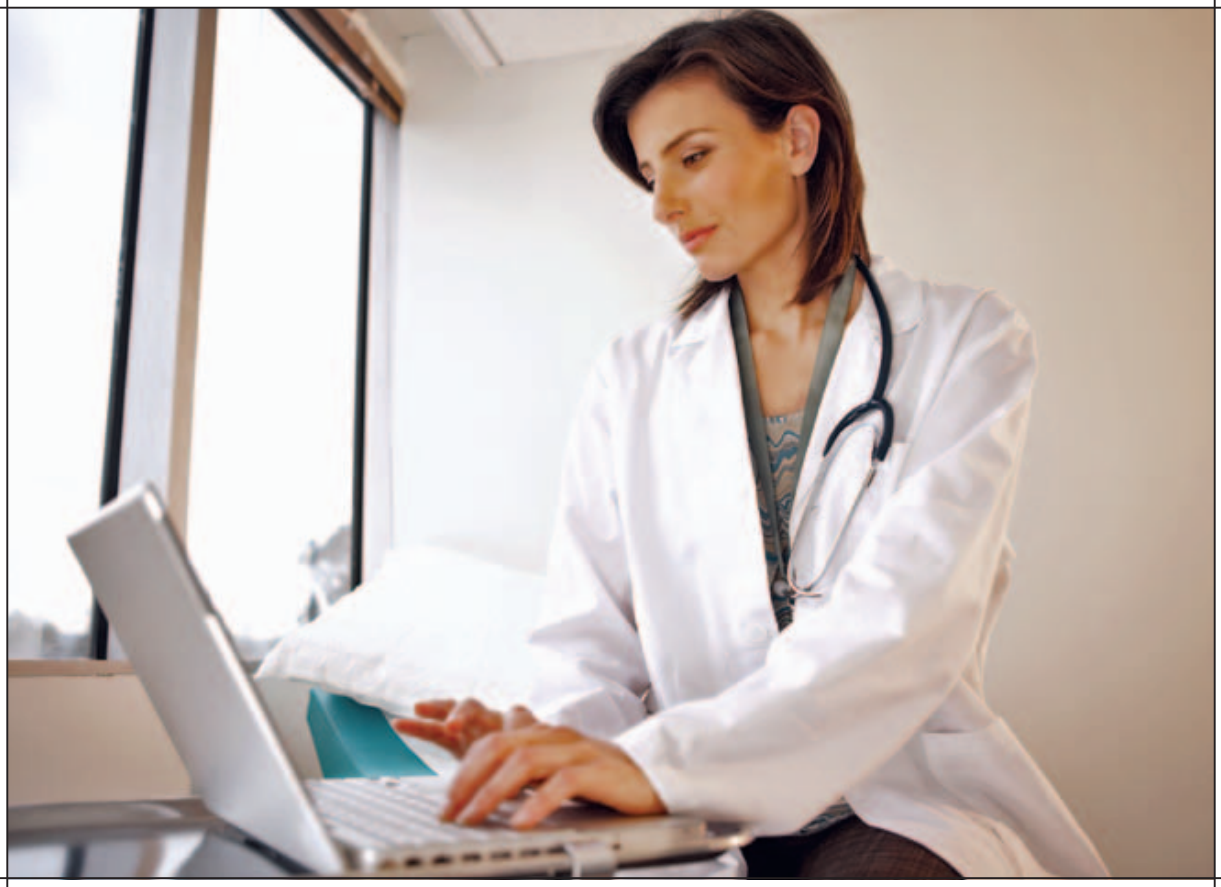


FOCUS

Outcomes Improvement:
Clinical Decision Support/Reporting

PLUS:

- The Patient-Centered Medical Home
- Using the EMR to Achieve Evidence-Based Care

FEATURE

Information Technology Use in the Patient-Centered Medical Home

An Assessment and Discussion

By Liz Seegert, MA; Ilene Hollin; and Stan Kachnowski

ABSTRACT

The patient-centered medical home (PCMH) presents a viable option to reduce healthcare costs and improve outcomes. Health information technology can play a significant role in supporting the hallmarks of PCMH: evidence-based, comprehensive, whole person care that requires a partnership between the primary physician, patient, multi-disciplinary providers and specialists. However, there is little existing research on the adoption, implementation, success and future needs of health IT in PCMH environments. We conducted a literature review to examine the role health IT may play in improving outcomes in PCMH models and pilot programs and analyze the barriers some physicians face in adopting these tools.

KEYWORDS

EMR, EHR, health IT, patient-centered care, medical home, whole patient, evidence based care, primary physician, multi-disciplinary, team-based.

As the nation struggles with skyrocketing healthcare costs, the deployment of new technology, innovative care delivery methods, and revamped payment models are increasingly attractive strategies to help constrain expenditures. One concept receiving significant attention is the patient-centered medical home (PCMH). The PCMH model is a comprehensive, accessible, patient-centered, multi-disciplinary strategy that uses evidence-based medicine and decision support tools to care for the whole patient; it incorporates information technology and uses outcomes measurement to improve quality and safety.[1]

With the passage of the Patient Protection and Affordable Care Act in 2010, the goals of improving patient outcomes, reducing costs and providing ongoing and culturally appropriate care take on new urgency. Several PCMH pilot programs are underway to research, develop, and test how this paradigm can improve quality while lowering costs.[2]

Many hope that if one or more of these models work at the community level, they can be rolled out nationally. By providing

high-quality preventive care, managing chronic disease and modifying payment systems to incorporate care coordination and documentation, the PCMH model has the potential to significantly improve care delivery and outcomes in the United States.

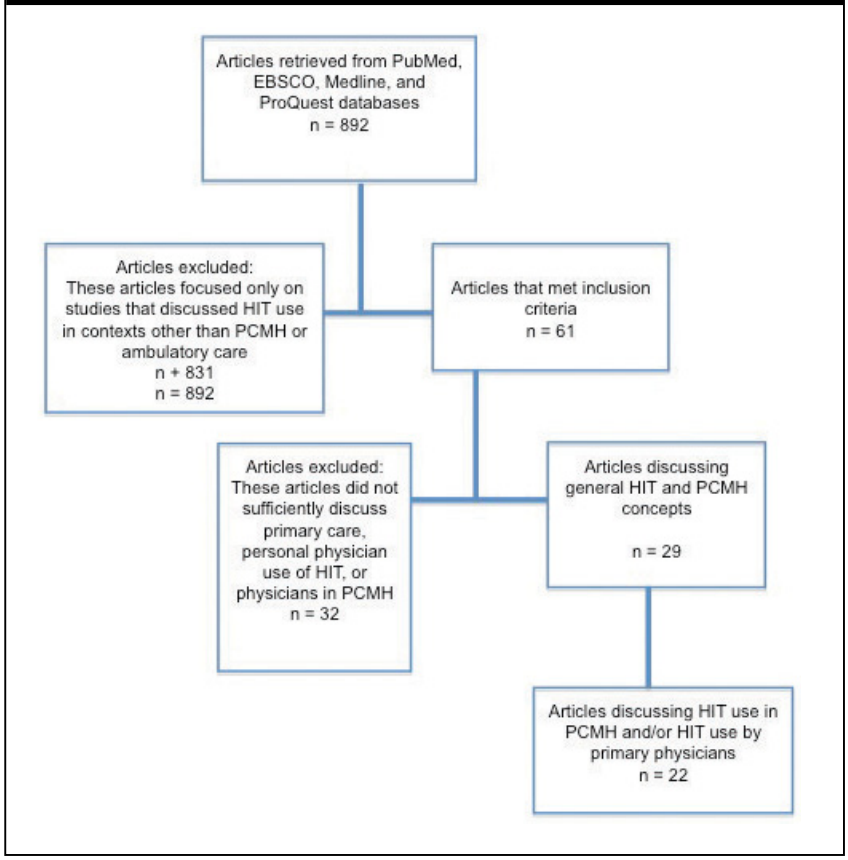
Health information technology, including electronic health records, personal health records, e-prescribing, medication therapy management, remote data capture, home disease management, online appointment scheduling, physician-patient e-mail and electronic lab results can play an essential role in reaching these objectives. Recent investments, such as a $19 billion allocation from the American Recovery and Reinvestment Act of 2009, have boosted development, implementation and maintenance of the health IT structure.[3]

Although health IT is an important component of a comprehensive PCMH model[4], there has been little published research on topics related to the use of existing technology or future IT needs within the medical home. This article addresses the gap in research by reviewing studies on PCMH pilot clinics. It also analyzes the literature on the benefits and barriers to integrating IT into other settings that exemplify the tenets of PCMH: strong patient-provider communication, a team-based approach to care, and ongoing quality and safety assessments—particularly for patients with chronic diseases.

The latter three concepts are drawn from the 2007 Joint Principles of the Patient-Centered Medical Home. The Joint Principles encompass seven fundamental criteria, developed by the American Academy of Family Physicians, American Academy of Pediatrics, American College of Physicians and American Osteopathic Association.[5]

The PCMH principles include a personal physician who serves as the patient's primary contact and is trained to provide continuous and comprehensive care; a team of healthcare professionals directed by the personal physician, who collectively work and take responsibility for patient care; physician responsibility for whole-person orientation to provide or arrange for the entire spectrum of the patient's healthcare needs in collaboration with other professionals; integrated and coordinated care across all elements of the health-care system (e.g., specialists, second opinions, home healthcare needs, therapies, etc); continuous quality and safety assessments and emphasis through active patient/physician decision-making, using evidence-based medicine and clinical decision-support tools to guide these decisions; enhanced access to healthcare needs, addressed through processes such as open-access scheduling, expanded hours, and improved communication; and streamlined payments that reflect the value added by implementing this type of continuous and comprehensive care.[6]

Figure 1: Literature Review Results



METHODS

Online database literature searches of PubMed, Medline, EBSCO and ProQuest were conducted July through September 2010. A combination of search terms related to the core principles, PCMH, and health IT were used, including: PCMH, Patient Centered Medical Home, Patient-Centered Medical Home, medical home, patient-centered care, personal physician, physician-led team, whole-person orientation, integrated and coordinated care, quality and safety assessment, enhanced access, payment, information technology, electronic health record, electronic medical record, EHR, EMR, and electronic data were employed to obtain relevant research articles. This search yielded 892 articles.

After compilation of all search results, duplicates were discarded and the primary author reviewed the title and abstract of each article and eliminated those that did not specifically address our search criteria. Eligible articles had to address at least

two of the seven joint principles, such as PCMH and health IT or health IT with primary care, evidence-based medicine and/or patient-centered care. This list was further refined from the remaining 61 publications based upon publication date (2004-present), U.S. publication and/or study, and availability of the full text document. Ultimately, 22 articles were selected for inclusion in review and analysis. (See Fig. 1.)

RESULTS AND DISCUSSION

The articles illuminated the financial constraints challenging the widespread adoption of health IT and highlighted the successful use of technology in national pilot projects. Studies also exemplified how health IT can support the ideals of PCMH—in actual PCMH practices and other non-certified but similar settings—to improve outcomes such as patient-provider communication, a team approach to whole-person integrated care, and continuous safety and quality assessments.

Financial Constraints. While health IT—especially electronic health records (EHR)—can support many of the Joint Principles, several challenges remain to achieve full implementation and acceptance, particularly among smaller and solo practices.

A national demonstration project of 36 practices in 25 states, conducted by the American Academy of Family Physicians, found that small and solo practices had issues with health IT design and implementation, since many systems were targeted to care facilities or larger providers.[7]

Additionally, the investigators pointed out that currently there is no nationally shared online system to coordinate care. Systems that cannot talk to each other impede care and collaboration. It was noted that many practices will need additional financial resources to successfully implement broad scope PCMHs that incorporate robust health IT capabilities. Robustness matters: in a survey of 995 physicians, Menachemi, et al. found that the more full-featured the EHR system, the greater the likelihood of acceptance, satisfaction, and continued use among respondents.[8]

Friedberg, et al. also investigated whether practicing physicians in Massachusetts had implemented value-added capabilities in their practices, such as enhanced access, EHRs, and patient contact and reminder systems.[9] They found that the adoption of specific EHR functionality was widely disparate, depending upon the size of the practice—ranging from 88 percent of respondents being able to access lab or screening data via EHR, to only 44 percent using electronic care reminders. These results aligned with previous studies that found that larger practice sizes equated with higher rates of EHR use and physician involvement in quality enhancement.

Another study of family practices in Virginia showed similar results.[10] Investigators found that while most of the practices surveyed incorporated a personal physician and a whole person approach into a PCMH model of care, initiatives such as EHRs proved daunting, due to financial and/or proficiency constraints. Fewer than 20 percent of practices surveyed reported use of EHRs with problem-specific guidelines and only 19 percent reported patient registries for multiple conditions.

While EHRs and other technologies have numerous advantages for practices of any size, lack of consensus on basic data gathering, cost, vendor focus on larger practices, and steep learning curves put small practices at a distinct disadvantage. Lorenzi et al. estimated use of EHRs in smaller practices to be between 14 and 25 percent in 2006.[11]

They recommended that vendors focus on the needs of small practices to encourage purchase and use of health IT. Cost-effective technology that is easily implemented and understood, and that can be scaled to meet practice needs and growth opportunities may make the health IT investment feasible for smaller practices.

Pilot Programs and Models. Nonetheless, as several model and demonstration projects have shown, a PCMH that incorporates a fully integrated approach – including leveraging health IT—can lead to positive outcomes and greater satisfaction among physicians and patients.[7(p.S82),12,13]

Three separate studies by Crabtree et al., Reid et al., and Nutting et al., analyzed results of PCMH national demonstration projects (NDPs) between 2006 and 2007. These particular projects focused on issues of quality, prevention, outcomes, and use of health IT. [7(p.S83), 12(p.e73),14]

Each group of investigators found that after a Seattle PCMH implemented a secure patient-provider e-mail system, e-mail exchanges rose significantly while adult primary care visits declined. Pre-visit outreach, self-management support, and access to EHRs were also used. Integrating health IT made it easier for physicians and staff to provide proactive care and increase patient satisfaction.

The state of Louisiana launched five medical home pilot programs following the breakdown of their health systems after Hurricane Katrina in 2005. At that time, rates of chronic disease in Louisiana were among the worst in the nation; costs to care for patients were among the highest, while outcomes were among the most dismal.[13 (pp.8-9)] Lack of access to primary care was considered a key culprit. Program organizers recommended an almost total renovation of care delivery, payment, supervision, and frameworks. This included uniform health IT tools such as EHRs, decision support tools, and a system-wide network to help to reduce costs, while improving patient outcomes and clinical standards.

Each of the five model programs emphasized different aspects of a medical home to address specific criteria: special needs children, primary and behavioral health services support, Medicaid reform, improvements in health IT for rural areas, and a redesign of private practice. The Region VII Medical Home Demonstration Project focused specifically on using health IT to improve care coordination and access for those in medically underserved areas. One of this project's goals was to assist practices in becoming PCMH-certified by adopting National Commission on Quality Assurance (NCQA) guidelines through installation of EHRs.

While EHRs are not mandatory for PCMH certification, they help facilitate the process by streamlining and standardizing information.[13(p.32)] However, cost is a strong barrier for many local practitioners. The Consortium for Education, Research, and Technology for North Louisiana is now

MORE PRACTITIONERS WOULD be willing to incorporate health IT in their PCMH endeavors if cost, usability, and reimbursement issues were satisfactorily addressed.

seeking funding to remove this roadblock and to enable broad implementation of health IT to aid providers in the medical home. As of this writing, the program is still being evaluated.

Patients and Primary-Care Providers. A strong relationship between the primary care physician and patient is at the crux of a successful PCMH. Instead of a reactive, treatment-based approach, the PCMH model fosters a cooperative effort between patient and provider towards prevention, disease management and wellness.[15]

Health IT facilitates ongoing communication between provider and patient. For example, secure asynchronous communication, such as a password-protected online patient portal, allows patients and providers to exchange information beyond the confines of an exam room. Physicians, nurses and other team members might conduct follow up for chronic disease management or simply respond to a question without disruption of normal workflow.[16] Non-urgent requests, appointment setting, or routine queries can also be conducted via secure online communication.

In a retrospective investigation of secure physician-patient messaging at Kaiser Permanente in California, patients with diabetes and hypertension had increased likelihood of meeting each of the Healthcare Effectiveness Data and Information Set (HEDIS) measures of performance when IT was integrated.[17] Compared to control groups, increased e-mail communication showed a 2 percent to 6.5 percent improvement in HEDIS measures. Although physicians were concerned at first about increased workload, most soon found that e-mail communication with patients actually improved efficiency and outcomes.

However, Kittler et al. noted that while 64 percent of physicians nationally used e-mail, only 13 percent did so to communicate with patients.[18] Despite urging from the Institute of Medicine to integrate e-mail communication with patients into physician practices, physician uncertainty is still an issue. Practitioner hesitation includes assumptions of increased workload, security, privacy issues, and reimbursement models. Kittler's survey of physicians showed that financial compensation for e-mail communication with patients would boost its use by nearly 75 percent.

Real-time interaction via the Internet and remote monitoring of appropriate conditions also can expedite continuous care of patients. Online conferencing or "virtual visits" were found to be as effective as in-person consultations in managing patients with acute, non-urgent health concerns.[17(p.1374)] In addition to saving time and resources, Dixon et al. observed that these advances improved collaboration between provider and patient, and reduced physician burnout.[16]

Asynchronous communication permits care providers to access ongoing patient-generated data such as daily blood glucose levels or blood pressure readings. Practitioners can monitor results and provide feedback or instructions via e-mail, text messages, or pre-recorded telephone messages. Data can also be shared with other specialists via the EHR. Several studies investigating these approaches have shown that patients had better success following medical advice, had improved outcomes, and were more satisfied with the physician relationship when electronic communication was used.[16(p.1367),17(p.1374)]

Concerned with the effect of technology on patient-provider communication in the exam room, Stewart et al. studied EHR use by mental health professionals treating psychiatric patients, an area where face-to-face relationships take on increased significance.[19] The researchers worried that health IT adoption would lead professionals to focus more on the data entry process than on engaging directly with patients, which might adversely affect interpretation and evaluation of some disorders. There was also some apprehension that the introduction of a new record system might lead to increased anxiety for some patients.

Contrary to their hypothesis, EHR versus paper record use showed the same satisfaction scores among adults treated on an outpatient basis. Overall quality of provider-patient interaction remained high regardless of the system employed.[19(p.1475)]

Whole-Person, Integrated Team Approach. The Joint Principles of a PCMH state that the primary care provider, nurses, nurse practitioners, pharmacists, medical assistants, and specialists must be able to communicate to achieve shared goals and track outcomes.[10 (p.302)] The success of health IT in the PCMH model depends in large part on its ability to help providers collaborate and communicate.[18 (p.134), 19 (p.1477)] Bates, et al. examined seven areas within a PCMH that require health IT improvements to achieve a fully functional medical home using EHRs as a foundational tool: clinical decision support systems, registries, care transitions, personal health

INSTEAD OF A REACTIVE, treatment-based approach, the PCMH model fosters a cooperative effort between patient and provider towards prevention, disease management and wellness.

records, telehealth, measurement, and team care.[4 (p.615)] They concluded that if EHRs are to play a central role, there needs to be significant progress in these areas.

An important component of this team-based approach is a "whole-person" mindset, which enables the personal physician to take responsibility for all of the patient's healthcare needs, coordinating ancillary care with other qualified professionals. If EHRs are cost-effective and properly implemented, they can support these goals by streamlining care and improving quality and outcomes through clinical decision support, outcome tracking and fluent sharing of vital information.[20]

Consider clinical decision support systems. Berry et al. noted that it is virtually impossible for physicians to recall some 8,000 different diagnoses from memory; however, EHRs can provide an immediate decision support structure that narrows possibilities based on physician-entered criteria.[21] Decision aides help to curtail inaccurate diagnoses and unsuccessful treatment, and protocols based on the latest clinical research can be instantly accessed to provide evidence-based, effective care.

With EHRs, provider-provider communication can be asynchronous, allowing for increased practice efficiency, improved information sharing, reduction of duplicate services and tests, streamlined care processes, and lower costs.[21 (p.163), 22] Additionally, the challenge of illegible physician handwriting disappears through e-prescribing. This improves pharmacist-physician communication and significantly reduces incidence of prescription errors or drug interactions.[21 (p.162)]

Remote accessibility to patient data and the ability to access critical information, such as allergies to certain medications and potential drug-drug interactions, also can improve outcomes and help to avoid adverse events. Additionally, Cohn et al. found that coding reliability and avoidance of duplicate tests and scans improved by as much as 20 percent with proper EHR implementation.[22(p.292)]

PCMH and Chronic-Disease Management. Several studies have shown that health IT can help support the continuous quality and safety assessments and evidence-based decision-making that are central to the PCMH model, particularly when caring for patients with chronic conditions.

Hypertension is one chronic condition that has been shown to benefit from health IT. A multidisciplinary research group developed a technology-based program to manage patients' blood pressure and exchange patient-reported compliance information between providers, while minimizing costly involvement by specialists.[23] Study participants received either printed information alone or information and monitoring by IT-supported management systems, which provided patients with weekly feedback. Patient adherence to ambulatory blood pressure monitoring was tracked and resulted in a statistically significant reduction in primary end-point 24-hour systolic and diastolic readings for the monitored group compared to the control group.

Rinfret et al. also found a 61 percent increase in the proportion of patients achieving clinically appropriate BP guidelines[23 (p.175)], which they attributed to ongoing interaction about the electronically transmitted data between provider and patient between office visits. Physicians provided near real-time feedback to patients, helping them to better manage their disease.

Another study involving diabetes patients from four Veterans Administration (VA) medical centers looked at the long-term effect of home telehealth on preventable hospitalizations.[24] Nurse practitioners or registered nurses monitored daily patient updates via a home messaging device attached to the patient's phone and then coordinated appropriate care. Follow-up, such as speaking with the patient, arranging for an office-based physician visit, coordinating or refilling prescriptions, and helping with technology issues, provided patients with a wide range of support and feedback.

Preventable hospitalizations of veterans using telehealth services were reduced by a statistically significant margin for 18 months after the initial enrollment period compared with the control group. Incidence of lower limb amputations and uncontrolled disease were also lower – even after accounting for socio-demographic and clinical risk factors.

CONCLUSION

Based on the findings in this review, more practitioners would be willing to incorporate health IT in their PCMH endeavors if cost, usability, and reimbursement issues were satisfactorily addressed. As the literature shows, adoption of appropriate health information technology can strengthen numerous aspects of the PCMH model of

care. Using health IT helps to improve provider-provider and provider-patient communication, avoid duplication of tests and other services, increase patient compliance, reduce prescription errors, enhance clinical decision support, lower costs, streamline care delivery, and improve outcomes. However, significant barriers to adoption by small and solo practices remain, and must be addressed before more practitioners incorporate a fully integrated health IT-enabled framework.

Under a medical home paradigm, both the primary physician and patient must become real advocates for this change – and initial research on the synergies between the PCMH model and health IT can help serve as a catalyst. Communication, care coordination, and outcomes can improve when healthcare and technology intersect. As health IT continues to mature and progress, these and future developments will only serve to further advance PCMH delivery and results. **JHIM**

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The Healthcare Innovation and Technology Lab is an independent, cross-disciplinary, research-based organization located in New York City. Using theoretical and applied public health research, the lab develops innovative technological methods and tools that expand healthcare access and improve quality of medical care worldwide.

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