

Role of Health Information Technologies in the Patient-Centered Medical Home

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Abstract

A national effort to reform primary care, known as the Patient-Centered Medical Home (PCMH), requires fulfillment of six standards determined by the National Committee for Quality Assurance to (1) enhance access and continuity, (2) identify and manage patient populations, (3) plan and manage care, (4) provide self-care and community support, (5) track and coordinate care, and (6) measure and improve performance. Information technologies play a vital role in the support of most, if not all, of these standards. However, given the newness of the PCMH, little is known on how health information technologies (HITs) have been employed to accomplish these objectives. This article will review the role of HITs, including electronic health records, web-based patient portals, telemedicine, and patient registries, with a focus on diabetes care, and how these technologies have been engaged in the establishment of the PCMH. In addition, we will discuss the benefits and potential risks and barriers to employing these technologies, including privacy and security concerns, as well as describe next steps for future work in this important area.

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Introduction

The Patient-Centered Medical Home (PCMH) is a national effort to revolutionize primary care from a system focused on acute health needs to one designed to address chronic conditions and preventive care. At the center of the PCMH is the concept of patient-centered care, described by the Institute of Medicine as health care that is both respectful and responsive to a patient's needs, preferences, and values.¹ The overall goal for the PCMH model is to provide high-quality, comprehensive, coordinated medical care to improve the population's health by addressing the failures and delivery gaps that exist in the current system.² These failures of the U.S. health care system include lower quality, inefficient care, which exists despite the devotion of greater than one-sixth of the country's financial resources.^{3,4}

Implementing the PCMH model was outlined as a priority in the upheld U.S. Affordable Care Act, given the promise of this model to reduce health care expenditures.⁵ As one of the most expensive chronic illnesses, diabetes affects an estimated 26 million Americans, and prevalence continues to increase each year.⁶ In addition to the cost and prevalence of diabetes, the availability of evidence-based guidelines and quality chasm, a gap in high-quality, consistent medical care for this condition make it an ideal focus for practices transitioning to a PCMH model. In fact, diabetes care has been at the center of many early evaluations of PCMH efforts.⁷

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Abbreviations: (EHR) electronic health record, (HIT) health information technology, (NCQA) National Committee for Quality Assurance, (PCMH) Patient-Centered Medical Home

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In order to implement the new health legislation, it is first necessary to define how a primary care practice can transform into a PCMH. The National Committee for Quality Assurance (NCQA) has identified six standards that must be fulfilled to designate a primary care practice as a PCMH. These standards aim to ensure a patient-centered experience of care, manage overall health care costs, and attain process and outcome measures of care quality.^{8,9} To receive NCQA designation, primary care practices must (1) enhance access and continuity, (2) identify and manage patient populations, (3) plan and manage care, (4) provide self-care and community support, (5) track and coordinate care, and (6) measure and improve performance.⁸ Health information technologies (HITs) play a vital role in the support of most, if not all, of these standards.¹⁰ Although evidence remains limited of the specific effects of HITs and their ability to improve chronic disease care and clinical outcomes, positive associations have been found, such as between hemoglobin A1c control among patients with diabetes in practices using a commercially available electronic health record (EHR).¹¹

Current Technology Uses and Gaps

Health information technologies offer substantial opportunities for primary care practices to achieve PCMH status. In fact, in the introduction to the program, NCQA⁸ specifically states, “Although the standards have always pointed practices toward using systems—including electronic health records—to support tracking care, the new program aligns closely with many specific elements of the federal program that rewards clinicians for using health information technology to improve quality (Centers for Medicare & Medicaid Services [CMS] Meaningful Use [MU] Requirements).”

As federal incentives for meaningful use of certified EHRs are driving adoption of these tools, it is important to understand how these tools can be used to improve patient care and population health.¹² Therefore, the purpose of this article is to describe the role of HIT and provide a practical standing of where the field is heading in achieving each of the NCQA standards (Table 1).

Enhance Access and Continuity

This NCQA standard specifically states that primary care practices should provide patients with electronic access to their PCMH, such as through the use of a web-based personal health record or patient portal.⁸ Personal health records

Table 1.
National Committee for Quality Assurance Standards for a Patient-Centered Medical Home and Examples of Achieving These Standards through Health Information Technologies in Diabetes Care

| NCQA standards | Examples of HIT in diabetes care |
|---|---|
| Enhance access and continuity | Receives and processes electronic requests for follow-up visits and prescription refills via a patient portal |
| Identify and manage patient populations | Uses a patient registry to systematically and proactively remind patients and clinicians of needed services (e.g., urine microalbumin screening and eye exams) Proactively identify high-risk patients (e.g., elevated hemoglobin A1c) not seen for 6 months with outreach call for a return visit |
| Plan and manage care | Electronically documents medication lists to facilitate ongoing medication reconciliation and monitor patient adherence Decision support reminders to clinicians for overdue tests Previsit screening of patients through questionnaires |
| Provide self-care and community support | Electronically documents self-management goals and available community resources (e.g., local exercise programs, medication assistance programs) |
| Track and coordinate care | Electronically tracks ophthalmology and other specialist referrals |
| Measure and improve performance | Electronically reports diabetes clinical quality measures to external entities (e.g., federal or state government, payers, and, ultimately, public reporting) to benchmark data to drive quality improvement Identification of high utilization patients (e.g., frequent emergency department admissions) for targeted interventions |

have the opportunity to increase patient engagement and self-efficacy.² In addition, these portable records offer the potential for real-time information exchange of clinical results, such as laboratory tests, when tethered to the EHR as a patient web portal.^{13,14} Several studies suggest patient web portals increase efficiency and productivity of care, benefiting both patient and health care providers.¹⁴ This is particularly relevant in diabetes management, where a patient may be able to obtain laboratory tests, such as a hemoglobin A1c or lipid panel, between scheduled appointments and then receive their results without requiring an appointment or mailed letter from their physician. Laboratory feedback between clinic visits may be an opportunity to increase patient adherence to medications or lifestyle changes, extrapolating from the large body of literature supporting the effectiveness of patient self-monitoring.^{15–18} Patient portals additionally offer the opportunity to process electronic requests for follow-up visits and prescriptions refills, as well as providing educational information, which enhances care access and continuity as well as potentially improving medication adherence.¹⁴

Unfortunately, patients have been slow to adopt web-based personal health records, and primary care practices have been hesitant to share information through web-based forms of communications because of patient privacy concerns.² This is likely the result of several barriers to personal health records, outlined in a literature review of 28 articles, including a lack of understanding or awareness of these tools, low health literacy rates, concerns regarding data accuracy and reliability, data privacy and security protection, and a limited understanding of patients' workflows to understand how such tools can best fit into daily life.^{19,20} Patients with diabetes may particularly benefit from the use of personal health records, given the need for regular blood glucose tracking, medication use, and multiple providers and appointments (e.g., primary care, podiatry, ophthalmology). Future research is necessary to determine how to increase the use of personal health records to benefit patients, as well as how to enable efficient and secure communication between providers and patients using this technology. For example, patient portals can facilitate provider–patient contact for follow-up on a new medication, such as insulin, and for answering questions and ensuring medication adherence and tolerability.

Identify and Manage Patient Populations

In order to meet the standards of a PCMH, primary care practices will be required to collect patient information—including demographics and clinical data—for population management, assess and document patient risk factors, and identify patients for proactive and point-of-care reminders.⁸ One technology-based approach, taken by the University of Pittsburgh primary care clinics, is the use of a web-based data collection system, the Functional Assessment System Tablet, to screen patients in the waiting room for conditions such as substance use.²¹ Integration of the system with the clinic's EHR ensures that providers have access to individual patient results as well as a registry for a variety of health conditions not routinely addressed within the clinical encounter. Physicians in this pilot study found the system easy to understand and useful for patient care, particularly for identifying patients at risk for depression.²¹ Inclusion of depression screening, which is accomplished by many practices through the incorporation of previsit questionnaires, would result in greater identification of this condition, given its high prevalence in patients with diabetes mellitus. Although physicians in the referenced study found the information useful,²¹ there is a gap in the literature as to the appropriate amount of data to give providers without overburdening them.

A patient registry is an electronic organization of patients with a given condition and their disease-specific clinical and laboratory quality measures, an example of which is shown in **Figure 1**. Patient registries can provide patient and outcome tracking, thereby improving clinical efficiency and identification of high risk patients.²² For example, a diabetes registry can identify patients most in need of an intervention, such as those with a hemoglobin A1c above their target who have not been seen in 6 months or those with outdated eye examinations, in order to schedule return visits.²³

The Pennsylvania Chronic Care Initiative, a large statewide multipayer-supported medical home effort, involves 102 practices and 518 providers with a focus on diabetes care as the initial target condition.^{7,24} In this initiative, all practices use a registry system to report monthly quality data on measures, including hemoglobin A1c, blood pressure, low-density lipoprotein cholesterol, foot exam, and nephropathy, resulting in improvements in the percentage of patients meeting evidence-based goals. Practices without a registry system were provided a free web-based registry,



Patient Profile - Confidential

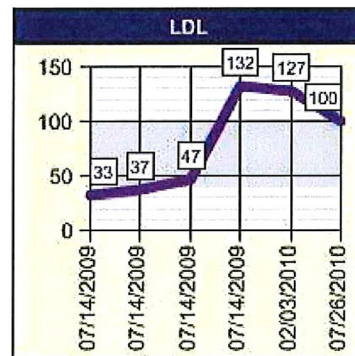
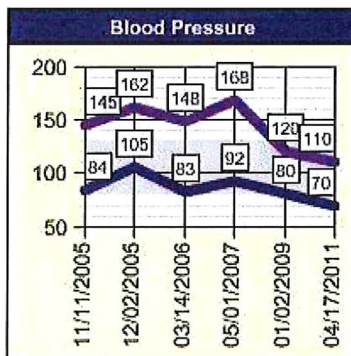
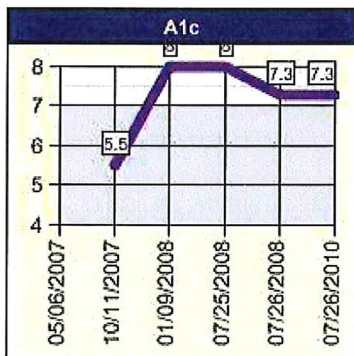
| | | |
|--|---|--|
| Patient Name: John Doe | Printed By: MPAYTON | ACE/ARB Use: Yes |
| Chart Number: 155, 5489 | Date of Birth: 11/18/1957 | Aspirin Use: Contraindicated |
| Type of Diabetes: 2 | Year Diagnosed: 1998 | Statin Use: Contraindicated |
| Last Visit: 07/26/2010 | | Weight: 177 |
| Practice: Middletown | Last Dietitian Visit: 05/04/2011 | BMI: 25 - 04/17/2011 |
| Provider: Frank Jones | Last Education Visit: 05/21/2010 | Tobacco User: Last counseled - <i>Unknown</i> |
| Flu Status: Received - 05/27/2011 | Primary Care Provider: Frank Jones | Primary Care Clinic: Camp Hill Endocrinology |
| Pneumovax Status: 2010, 2005 | Primary Diabetes Provider: George Harrison | Primary Diabetes Clinic: Owl Valley |

Complications:

- | | | | | |
|---|--|--|---|--|
| <input checked="" type="checkbox"/> Amputee | <input type="checkbox"/> CVA/TIAs | <input type="checkbox"/> Dialysis | <input type="checkbox"/> Hypertension | <input type="checkbox"/> Peripheral Neuropathy |
| <input type="checkbox"/> Autonomic Neuropathy | <input type="checkbox"/> Cataracts | <input type="checkbox"/> Erectile Dysfunction | <input type="checkbox"/> Hypoglycemia Unaware | <input type="checkbox"/> Retinopathy |
| <input checked="" type="checkbox"/> Blind | <input checked="" type="checkbox"/> Charcot Foot | <input type="checkbox"/> Gastroparesis | <input type="checkbox"/> Hypothyroidism | |
| <input type="checkbox"/> CAD/MI | <input type="checkbox"/> Chronic Kidney Disease | <input type="checkbox"/> Hx Foot Ulcer | <input checked="" type="checkbox"/> Nephropathy | |
| <input type="checkbox"/> CHF | <input type="checkbox"/> Depression | <input checked="" type="checkbox"/> Hyperlipidemia | <input type="checkbox"/> PAD (PVD) | |

| | | |
|----------------------------|---|--|
| HDL: 47 07/14/2009 | Triglycerides: 134 07/14/2009 | Creatinine: 1.0 06/01/2011 |
| ALT: 111 03/16/2006 | Microalbumin: 0.50 03/09/2010 | Foot Exam: 07/26/2010 - Sensate |
| TSH: <i>Unknown</i> | Micro/Cr Ratio: 200.0 08/01/2010 | Eye Exam: 07/26/2010 - No Retinopathy |

***** THIS PATIENT IS DUE FOR THE FOLLOWING EXAM(S)/LAB(S): *****
Foot Exam, Counseling on Tobacco Cessation, Lipid Panel, HgbA1c, Reminder - consider flu vaccine



Visit Date: _____ **Provider:** _____
Blood Pressure: _____ / _____ **Weight:** _____
Foot Exam: _____ Sensate _____ Insensate **Eye Exam: Date** _____
 _____ Not Done _____ Retinopathy _____ No Retinopathy
 _____ Results Unknown _____ Refused
Date Counseled Tobacco Use: _____

Current Self Care Goals: Medication, Maintain
 Must select new or ongoing goals below.

- | | | | | |
|-----------------------------------|-----------------------------------|-------------------------------------|--|--|
| <input type="checkbox"/> Diet | <input type="checkbox"/> Footcare | <input type="checkbox"/> Medication | <input type="checkbox"/> Stress Management | <input type="checkbox"/> Weight Management |
| <input type="checkbox"/> Exercise | <input type="checkbox"/> Maintain | <input type="checkbox"/> Monitoring | <input type="checkbox"/> Tobacco | <input type="checkbox"/> Other |

Figure 1. Sample of a provider's view of a patient profile from a diabetes registry.

which overcomes a significant barrier for some practices.⁷ **Figure 1** provides an example of a registry and demonstrates how it can streamline care and provide reminders to providers. Electronic health records can also be actively engaged to identify and manage patient populations. For example, EHRs can offer diabetes-specific decision support for laboratory testing and treatment intensification at the time of the visit, which has been shown to improve physiologic control among patients with diabetes.¹¹

Unfortunately, implementing such a system in the PCMH is challenged by a relative dearth of highly functional, multidisease tools.² Although federal incentives for meaningful use of certified EHRs require registry functionality, this feature is lacking in many commercially available EHRs. As a result, most systems require extensive data entry or separate patient registries, which limits the efficiency of these tools. Further, the best way to use registries to manage health proactively at the population level needs to be determined. An example of this would be identifying patients who are overdue for a hemoglobin A1c laboratory test prior to their clinic appointment and then reflexively sending an order for their provider to sign. In this way, entire patient populations can be addressed without requiring additional clinic visits and further overburdening primary care practices. Another example is when patients at greatest need for follow-up, such as patients with a hemoglobin A1c greater than 9% who have not been seen within the prior six months, can be identified and scheduled for an appointment.

Plan and Manage Care

The NCQA describes this standard as the identification of patients with specific health conditions and the appropriate care management, including previsit planning.⁸ The ability of EHRs to provide point-of-care reminders increases the potential to utilize team-based care, another important aspect of the PCMH. For example, identifying patients who are due for the influenza vaccine or laboratory tests prior to the visit enable another member of the care team (e.g., medical assistant, nurse) to implement appropriate standing orders prior to the doctor's visit.⁷ In addition, the practice must assess patient progress toward and barriers to treatment goals. Other HITs may also be utilized to assist with diabetes care, such as the Comprehensive Diabetes Management Program, a guideline-based interactive web tool.²⁵ This tool can be utilized as a means of organizing a clinic visit for a patient with diabetes, incorporating clinical, laboratory, provider, and patient data with clinical alerts and treatment algorithms to assist team-based care. Further, the Comprehensive Diabetes Management Program has been demonstrated to be effective in helping patients meet evidence-based guidelines for diabetes care.²⁶

Team-based care is most effective when utilizing tools such as the EHR to allow different team members to provide necessary care throughout the clinical encounter.^{7,27,28} For example, patients can complete questionnaires regarding self-care goals while in the waiting room, followed by a brief discussion with the medical assistant upon entering the patient room. This interaction can be highlighted to the provider electronically, who can further emphasize appropriate plans for care, and then be followed by a visit with a diabetes educator to coach the patient in achieving their goals.

Previsit planning is another example of automation, by which the EHR provides a summary of important patient information as the patient is being brought into the clinic room and then generates an automated physician order set based on the patient's individualized health conditions.²⁹ For instance, patients with diabetes who are part of a practice's patient registry are identified at check-in, with the results of their diabetes care measures and automated orders placed for those measures not currently up-to-date. Standing orders for appropriate services can be implemented by nonphysician members in team-based care, increasing clinical efficiency as opposed to simply increasing a physician's workload, as has been suggested.^{7,30}

Provide Self-Care Support and Community Resources

This NCQA standard requires primary care practices to assess patient and family self-management abilities and then work with them to develop a plan for self-care, providing tools and resources.⁸ Achieving this standard is likely the greatest challenge to primary care clinics, which infrequently have focused on care outside the clinic setting. However, it also offers a tremendous opportunity for HITs, which may be ideal to reach patients in real-world settings.

For example, a patient portal may be utilized by a practice to assess their patients' abilities to care for their noted health conditions, set self-management goals, and then direct them to appropriate resources and tools, either online or in person (e.g., local exercise programs, medications assistance programs). Group Health offers patients the opportunity to complete an EHR assessment and then enroll in peer-led self-management support workshops.³¹

Computer-assisted decision support programs present another future area for development to help providers and even patients manage diabetes.³² By interfacing with systems that collect data from glucose meters and an EHR, computer-assisted decision support programs can integrate blood glucose values, medications, and laboratory values to generate recommendations to providers for further adjustments to improve diabetes control.³² For example, the use of web-based glucose uploading and resultant insulin titrating has been shown to improve hemoglobin A1c in type 2 diabetes.³³ A shortage of endocrinologists and a plethora of new diabetes medications result in an increased number of primary care providers engaged in diabetes care and, therefore, an increased need for this type of support.

Additional HITs that can support primary care practices in providing self-care support and resources include eHealth (i.e., electronic health technology) and mHealth (i.e., mobile health technology) applications, defined as consumer informatics focused on health topics.²² These tools allow patients to easily track blood glucose, medication adherence, and dietary intake to improve self-management. Although eHealth applications are widely available, there is a significant paucity of literature describing and evaluating use of this technology as integrated into clinical practice. A review of the impact of mHealth interventions on hemoglobin A1c in diabetes found inconsistent evidence of effectiveness of such interventions, although significant methodological weaknesses were noted among the 24 studies reviewed.³⁴

Telemedicine, the provision of health care services such as monitoring through information technology, also presents a HIT domain in need of further development.² Diabetic eye care is an area that has been explored as a focus of telemedicine to meet evidence-based guidelines for care. The Joslin Vision Network program is an example of a teleophthalmological program that has demonstrated validation, cost-effectiveness, and improved clinical outcomes.³⁵ Studies of this program have shown high level of agreements between the Joslin Vision Network program imaging and standard imaging protocol, particularly with respect to sight-threatening retinopathy.³⁶ Further, the Joslin Vision Network teleretinal program has led to increased access to eye care through successful deployment within the Indian Health Service. Additional studies of the program identified improvements in hemoglobin A1c and low-density lipoprotein cholesterol, as well as in eye care, suggesting that a comprehensive telemedicine program for eye care can reduce vision loss as well as other diabetes complications.³⁷

Although telemedicine is an underdeveloped technology, future use is predicted to have a moderate-to-large effect on health care outcomes and cost.² For example, for patients with diabetes, a telemedicine encounter could replace some in-person visits by obtaining data (including blood glucose, recent hypoglycemic episode descriptions, and medication side effects) and forwarding these to providers for their interpretation and resultant medication adjustment. As a result, telemedicine would reduce costs due to patient transportation as well as clinic expenses, such as staff for check-in/check-out and unnecessary vital sign assessments.² In addition, increased email encounters, in combination with other PCMH implementations, have also been found to be cost saving, leading some organizations to schedule time for providers specifically for email communication with patients.³¹

Track and Coordinate Care

Health information technologies offer primary care practices the opportunity to fulfill this NCQA standard by allowing for the tracking, follow-up, and coordination of patient tests, referrals, and outside care. The ability to coordinate patient care is particularly critical in team-based care approaches, where different members of the care team need access to the patient's records and current measures both within and outside the primary care setting. For example, the ability to track eye exam referrals and other specialist referrals is a quality measure that is frequently challenging to follow-up. An EHR allows the opportunity to track the referral and whether the patient was evaluated by ophthalmology, diabetes education, or laboratory testing.

Measure and Improve Performance

This standard requires primary care practices to track care quality and ultimately demonstrate improvements in their performance. The utilization of HITs such as EHRs offer unique opportunities to track improvements in disease management resultant from process changes. Further, the EHR allows practice teams to use patient data to drive quality improvements, such as through the use of a monthly “run chart” to identify the effect of various clinical initiations (e.g., identifying the effect of giving nurses standing orders for the flu vaccine on rates of vaccine receipt). By implementing the role of care managers and other team members in chronic illness care for diabetes, among other quality improvements, practices are able to track changes in measures such as hemoglobin A1c, cholesterol, and blood pressure.³⁸ In fact, team-based care and case management for diabetes are two of the most effective ways to improve diabetes care quality.³⁸ Transparent performance data can help drive improvements in care by creating competitions among providers, both within a practice or across practices in a larger organization. This use of an EHR can identify quality care measures, resulting in improved care quality at both patient and population levels.

A potential major tension in the PCMH exists as a result of the required focus on population health. Primary care has historically focused on individualized patient care. Organizations such as the American Diabetes Association have supported this focus by suggesting individualized patient goals, such as for hemoglobin A1c.³⁹ However, it is challenging to extrapolate individualized goals to a population level. One potential solution to this challenge has been the use of targets above generally acceptable target goals (e.g., reporting hemoglobin A1c > 8%) on Healthcare Effectiveness Data and Information Set measures and for meaningful use requirements.

This NCQA standard also requires primary care practices to track utilization measures, such as rates of hospitalizations and emergency department visits, with a goal of reducing such visits. An information system can capture utilization and costs, such as decreased use of emergency care, and identify future cost savings.³¹

Conclusions

Illustrating how care can be improved by achieving PCMH recognition through the NCQA standards calls to question how primary care practices could possibly fulfill these standards in the absence of HIT. Despite the significant advantages of incorporating HITs into primary care practices, a minority of practices actually utilize EHRs because of the multiple barriers that exist.²² Findings from the 2011 Physician Workflow Study suggest 54% of physicians have adopted an EHR, although one-quarter report their system does not meet meaningful use guidelines.⁴⁰ Barriers to adoption of HITs include issues with information exchange and interoperability between information systems, challenges with technical implementation, low acceptance rates by physicians and patients, and patient access issues due to the digital divide.²²

Unfortunately, a paradox exists for HIT within the PCMH model.⁴¹ Although the overall aim of PCMH is to improve the coordination and comprehensiveness of care that is achievable through information technologies, such technologies are expensive. As the PCMH model also aims to reduce costs associated with health care, the upfront expense of HITs represent a financial risk that may not be recoverable.⁴¹ For example, implementing a completed EHR system requires a significant up-front investment of time and money.¹¹ Even with an EHR in place, implementation of further HIT (e.g., registries, e-prescribing, patient portals) has been found to be more difficult and time consuming than envisioned in the National Demonstration Project on practice transformation to a PCMH.⁴² For example, absence or awkward activation of a patient registry within the EHR often requires complicated workarounds and redefinition of work processes.⁴² Given the significant investment of time, energy, and money required by HIT adoption, the National Demonstration Project recommends that “practices should develop their own plan that projects which technology components they will implement and in what sequence to achieve the care capabilities they desire.”⁴² In addition, payment models will have to take this into account when determining payment reform to better support what is in the patient’s and public’s best interests.⁴¹

Interestingly, the case for HIT adoption can be made through the use of both clinical and economic advantages.⁴³ For example, this technology can provide decision support for physicians, thereby lowering the risk of costly adverse

effects; reduce filing, transcription, and staffing costs through the use of an EHR; decrease duplication of tests; and improve billing—all cost-saving or revenue-generating opportunities.⁴³ Successful HIT implementation requires a series of steps, including appropriate system selection, a collaborative vendor relationship, and proper physician preparation.⁴³ Understanding how to successfully integrate HIT is critical to a practice's transformation into a PCMH.

Future Directions

Despite the advances in HIT in facilitating successful transformation of primary care practices into PCMHs, significant future work is necessary to provide truly comprehensive and coordinated patient-centered care. A futuristic health care scenario models collaboration of multidisciplinary teams led by primary care providers in a PCMH.²⁸ In this scenario, the authors describe the coordination of care of a patient who is admitted to the emergency department. Upon admission, the emergency department physician receives an alert from the Centers for Disease Control about an emerging disease the patient may have, which will help guide diagnostic and therapeutic decisions. Further, the primary care provider receives notification of the patient's admission on their cell phone while they are away at a conference, allowing an opportunity for real-time communication with the emergency department physician. However, this scenario also outlines a barrier that has not yet been overcome: the requirement of security solutions to protect patient privacy. Future developments, such as real-time communication applications, hold promise to allow for the scenario mentioned earlier.²⁸ For example, consider the transition of care for a diabetes patient who is discharged from the hospital after being admitted for diabetic ketoacidosis. Use of this type of technology would result in real-time communication between the inpatient care team and the patient's PCMH, facilitating discussions regarding the hospital course and discharge medications as well as ensuring timely outpatient follow-up to prevent readmission.

Improving the adoption and implementation of currently existing HITs holds tremendous promise to move toward more coordinated health care. For example, having every patient's medical history available at any clinic visit, emergency department admission, or hospital admission through their cloud-based personal health record would revolutionize the way medicine is practiced. Understanding what matters most to patients through surveys completed at health kiosks within the clinic could shape how primary care provides support outside the clinic setting, a mandate of the PCMH. Monitoring patients day-to-day for management of diabetes or hypertension through the use of telemedicine and Wi-Fi-enabled devices has the potential to transform the way we address chronic care. However, further work is needed to make these futuristic directions a reality. By encouraging collaborations between health care providers and information technology experts, new HIT can be developed to improve the PCMH and, most importantly, public health.

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