



Using Health Information Technology to Support Quality Improvement in Primary Care



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White Paper

Using Health Information Technology to Support Quality Improvement in Primary Care

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Introduction

Revitalizing the primary care system in the United States is critically important to achieving high quality, accessible, and efficient health care for all Americans.¹ The effective use of health information technology (IT) by primary care practices to facilitate quality improvement (QI) can help practices improve their ability to deliver high quality care and improve patient outcomes.

QI involves using data and feedback (1) to track and assess performance over time and (2) to make necessary changes in processes to improve performance (Taylor et al., 2013b).

Examples of activities to support continuous QI include:

- *having a standing QI committee within the practice that meets regularly and reports back to the entire staff on QI activities and progress,*
- *implementing a system for providing and acting on provider and practice-level feedback on selected quality measures,*
- *developing an approach for identifying preventive service needs and gaps in care by running daily reports on patients with scheduled visits,*
- *using decision support tools to remind providers to address these needs at the point of care, and*
- *monitoring progress toward meeting quality goals over time.*

Health IT can support QI in many ways through data extraction and analysis enabled by electronic health records (EHRs), registries, and health information exchange (HIE).

Health IT is currently underused for supporting QI in primary care practices, despite its potential to improve care. To promote greater use of health IT for QI, we interviewed key staff members of two exemplary practices and a health information network and gathered insights and recommendations from published reports and eight nationally recognized experts in health IT development, adoption, and use; clinical practice; QI; primary care transformation; health care policy; and human factors engineering. In this white paper, after providing background and describing our methods, we:

- identify specific health IT tools that can be used to support continuous QI;
- describe factors that promote primary care practices' use of health IT to support QI;
- present case studies from exemplary primary care organizations to guide and assist others seeking successful use of health IT to support QI; and

¹ See www.pcmh.ahrq.gov for AHRQ's definition of a patient-centered medical home and resources related to primary care transformation. For a more detailed discussion about building QI capacity and infrastructure, see two previous [AHRQ briefs and a fact sheet](#) about QI on which this paper builds: Taylor et al. (2013a, 2013b, 2014).

- provide cross-cutting lessons learned and recommendations for primary care practices, health IT developers, and decisionmakers to alleviate barriers faced by practices seeking to use health IT to support QI.

Background

During the past several years, health care policies and incentives have supported the adoption and effective use of health IT to support QI in primary care practices. In particular, in 2009, the Federal Health Information Technology for Economic and Clinical Health (HITECH) Act, enacted under the American Recovery and Reinvestment Act, provided incentives for the *meaningful use* of EHRs. Meaningful use objectives specifically included requirements for using EHR data to improve health care processes and outcomes through activities such as tracking and reporting on quality measures, e-prescribing, implementing decision support, and participating in Health Information Exchange (HIE) (American Recovery and Reinvestment Act of 2009; Blumenthal and Tavenner 2010). In February 2014, the Centers for Medicare & Medicaid Services reported that it had disbursed \$19.2 billion in meaningful use incentives to nearly 441,000 registered providers participating in the Federal EHR meaningful use program (Manos 2014).

In addition, the Patient Protection and Affordable Care Act of 2010 emphasized the role of QI and measurement in its strategic plan for health IT and proposed health IT as a tool to improve patient safety, reduce medical errors, and ensure patient-centered care delivery (Patient Protection and Affordable Care Act of 2010). The Office of the National Coordinator (ONC) for Health Information Technology established 62 Regional Extension Centers in 2010 to provide EHR technical assistance mainly to private practices, and to federally qualified health centers, which increase access to health care for medically underserved communities (Heisey-Grove et al. 2013). Moreover, between 2004 and 2010, the Agency for Healthcare Research & Quality (AHRQ) invested more than \$300 million in contracts and grants to more than 200 communities, hospitals, providers, and health care systems in 48 states focused on expanding understanding of how health IT can improve health care quality (Meyers et al. 2010). ONC and AHRQ continue to invest in this area.

Even with these incentives, health IT to support QI in primary care is often under- or inefficiently used. Part of the reason might be that expansion of EHR use in primary care offices is relatively new. New users of health IT may not yet have mastered more advanced EHR functions needed for QI. Some primary care practices might be surprised that using health IT does not automatically translate to improved quality of care. Rather, using health IT for QI requires purposeful and thoughtful planning, effort, and allocation of resources, all of which entail significant costs to primary care practices in terms of capital, clinician and staff training, and time.² Additionally, specialized training is often required on how to use health IT to understand and improve outcomes of care, along with the opportunity to develop needed skills. Finally, although EHR adoption incentives have assisted many providers in purchasing and implementing health IT, much of the costs for using health IT for QI are borne by the primary care practice. At the same time, some of the potential benefits—including reduced emergency

² Throughout this white paper, the term *clinicians* refers to physicians, nurse practitioners, and physician assistants.

department (ED) visits and hospital readmissions—accrue to payers and patients rather than to primary care practices.

Despite these barriers, some exemplary primary care practices and organizations have found ways to effectively use health IT to support QI activities; these practices report that their efforts are meeting with success. To make lessons learned available to more primary care practices and organizations that work with them, this paper:

- describes factors identified from reports and key experts that support greater use of health IT for QI,
- discusses exemplary cases, and
- makes recommendations to support and increase the use of health IT to improve the quality of health care delivery and population health outcomes.

Methods

We performed a targeted search of peer-reviewed and grey literature about the use of health IT for QI in primary care, which identified numerous publications focusing on health IT in primary care and several others focusing on QI in primary care; however, we noted a gap in publications focusing specifically on the use of health IT to support QI in primary care.

In addition, we convened a technical expert panel of eight nationally recognized experts in health IT development, adoption, and use; clinical practice; QI; primary care transformation; health care policy; and human factors engineering. These experts offered examples of effective use of health IT for QI in primary care, views on facilitators of and barriers to these activities, and recommendations for decisionmakers that might increase the use of health IT for QI in primary care.³

Finally, we interviewed clinicians and other QI leaders of three exemplary organizations—including a small independent primary care practice; a large academic primary care practice; and a health information network that supports primary care practices, particularly federally qualified health centers and other safety net clinics—to collect examples of how primary care practices can deploy health IT for QI. We chose these three organizations, which represent different organizational structures and approaches to effective use of health IT for QI, based on recommendations from the expert panel and senior leaders at AHRQ.

Factors Supporting the Use of Health IT for QI in Primary Care

Discussions with experts and representatives of exemplary primary care organizations suggested that to effectively use health IT for QI, primary care practices require four interconnected factors, none of which is sufficient in isolation (Figure 1):

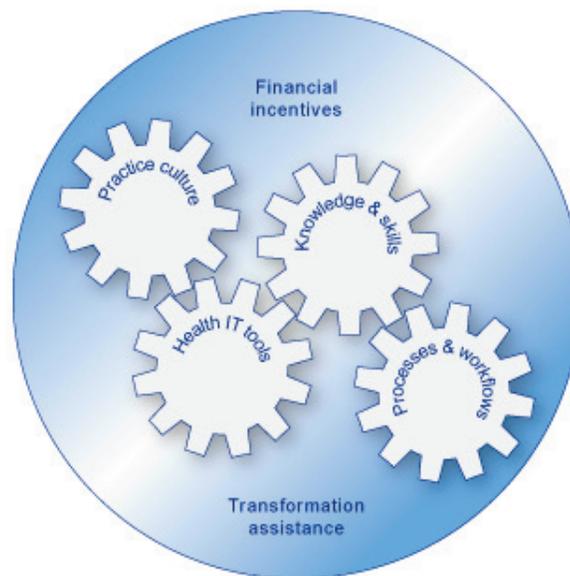
³ The members of the technical expert panel are listed in the Acknowledgements section.

- a **practice culture** with a strong commitment to using health IT for QI,
- **high-functioning health IT tools** to enable tracking and extraction of data,
- **practice clinical team and staff knowledge and skills** related to both health IT and QI, and
- **practice processes and workflows** that incorporate effective use of health IT for QI.

Ideally, these factors are supported by:

- **financial incentives** to offset capital, training, and clinician and staff time costs related to QI activities; and
- **transformation assistance**, to build practice skills, processes, and workflows which may include consultation with experts in IT and QI, practice facilitation or coaching, and access to recognized best practices.

Figure 1. Factors supporting the use of health IT for QI in primary care



Having a **practice culture** with a strong commitment to using health IT for QI comes from a strong commitment by leadership, often a health care champion such as the lead physician or medical director, nurse, or practice manager, who embraces and holds others accountable to the principles and processes of a *learning organization*. A practice that is a learning organization undertakes ongoing, continuous QI work beyond any particular project, and dedicates the necessary time and resources to use health IT for ongoing QI (Taylor et al. 2013a).

Health IT tools that support QI enable the practice to measure, track, and share health care delivery performance measures and monitor how refinements to clinical workflow processes (both internal and external) affect overall patient experience and care coordination across care settings, while seeking to reduce costs and improve patient health outcomes. These tools include:

- **EHRs** that allow for structured data entry, which can be used for basic data collection and for data extraction, analysis, reporting, and tracking. EHRs play a dual role in helping

practices provide quality care to their patients and in facilitating population-level assessments.

- **Registries** (such as for specific diseases, immunizations, preventive health, and procedures) to facilitate identification of gaps in care to maximize usefulness of visits with patients and care management efforts. To be most effective, registries should be interconnected and incorporated into routine practice workflows.
- **Decision support systems** that can prompt decisionmaking consistent with higher quality care.
- **HIE** to capture hospital and ED use, laboratory and test results, medications, immunizations, and other information about patient care that can then be shared across multiple care settings in support of increased care coordination among a patient's various providers. Ideally, interoperable health data exchange will occur at the community and state level through secure electronic transport, but could occur within a delivery system or by obtaining bilateral agreements from providers who serve the same patients as the primary care practice.

Clinician and staff knowledge and skills are needed to extract and analyze health IT data, to execute QI methods such as Plan-Do-Study-Act cycles, and to redesign practice workflows to incorporate facilitated changes resulting from QI activities.

Practice processes and workflows consist of structured procedures to measure and report on practice-level and clinician-level data and provide feedback to clinicians, as well as adaptations to daily practice activities, based on QI findings, to improve patient care.

Financial incentives to offset the costs of clinician and staff time spent on QI activities include discounts on health IT, outside support for HIE infrastructure, additional payments from payers, or shared savings models in which part of any savings from fewer ED visits or hospitalizations is shared with participating primary care practices.

Finally, **transformation supports** include activities such as:

- *data feedback and benchmarking* to provide practices with actionable information on their performance, compared with external benchmarks (such as regional or national averages), along with suggestions on how to choose target areas for improvement;
- *practice facilitation or coaching* by external organizations to help practices develop skills related to health IT and QI and organize their approach to QI, provide tools and expertise, and troubleshoot challenges or barriers;
- *expert consultation* (also called peer-to-peer mentoring) to provide practices with specific evidence-based knowledge from clinicians and staff outside the practice; and
- *shared learning opportunities* or learning collaboratives to provide a community for practices to share challenges, lessons learned, and best practices and draw *motivation and inspiration* (Taylor et al. 2014).

Exemplary Uses of Health IT for QI in Primary Care Settings

To illustrate how these factors support the use of health IT for QI, in this section we present case studies of two primary care practices—one small, independent practice and a larger academic system—and a health information network that supports primary care practices, particularly federally qualified health centers and other safety net clinics. All of these organizations report that over time, despite facing challenges, the use of health IT for QI has transformed their approaches to delivering quality care and achieving improved patient outcomes. The case studies provide real-world examples for other primary care practices and organizations working with these practices to develop and expand the use of health IT for QI.

A Small, Independent Primary Care Practice: Foresight Family Physicians, Grand Junction, Colorado

Key Insights from Foresight Family Physicians

- *Small, independent practices are capable of using health IT to support QI.*
- *Having financial incentives and support from payers or demonstration programs is critical.*
- *Participating in a local HIE is one way to get timely notification of patients who have visited the ED or been hospitalized.*
- *Having basic experience with an EHR before using it for QI activities is helpful.*
- *External technical assistance when starting this process is invaluable.*

Foresight Family Physicians is an independent family practice with two physicians, a nurse practitioner, a physician assistant, care managers, a behavioral health provider, and a support staff of medical assistants and office staff. The practice has about 5,300 active patients from diverse socioeconomic backgrounds and has been operating for 25 years in Grand Junction, a small city surrounded by a rural area in western Colorado.

When the Grand Junction medical community began building a HIE in 2004, Foresight began to develop its internal infrastructure (including computer systems, hardware, and software) to receive electronic, rather than paper, clinical results. Foresight's transition from a paper-based health records system to an electronic system occurred in a purposeful way over the course of several years. For a few years, the practice had a hybrid electronic–paper system. In 2007, after much research and discussion, Foresight decided to purchase an EHR: eClinicalWorks. Gregory Reicks, D.O., co-owner of the practice, reported the practice's objectives in implementing the EHR were to “have a better way to look at our entire population and look at specific disease conditions and gaps in care. In total, [to] be more proactive about how we manage our patients instead of just being reactive.” However, even after adopting the EHR, the practice was still

several years away from meeting this goal and leveraging the data collected in its EHR for QI activities.

Participation in two federal initiatives—the Beacon Consortium and the Comprehensive Primary Care (CPC) Initiative—helped Foresight learn how to more effectively use its EHR, particularly for QI. In 2010, Foresight joined the Beacon Consortium, a three-year, federally funded program in 17 regions of the country to demonstrate how strengthening health IT infrastructure can support QI activities. In Colorado, the Beacon Consortium included a learning collaborative and coaching on health IT and QI for 51 primary care practices in predominantly rural counties.⁴ Two years later, the practice became a participant in CMS’s CPC initiative, a multipayer collaboration to strengthen primary care. In this initiative, Medicare works with commercial and state-funded health insurance plans to provide enhanced nonvisit-based payments and the opportunity for a share in savings, performance feedback, and shared learning activities to primary care practices that take on the task of better coordinating care for their patients. Among other activities, participation in CPC requires practices to undertake “continuous improvement driven by data.”⁵

How Health IT Supports Foresight’s QI Activities

Foresight currently uses health IT for QI in several interrelated ways. First, the practice has a standing QI team, which includes four people who meet every two weeks for 1.5 hours. Reicks is the physician lead on the QI committee, and other members include a front office staff member, a back office staff member, and the office manager. The QI committee uses EHR data, extracted by the office manager who has been trained as a data analyst, to discuss quality-related deliverables for various payers and clinical quality measures the practice is tracking. The committee also analyzes clinician-level data and presents these data to the entire staff at a monthly meeting. The Beacon Consortium provided technical assistance and advice to the practice as it established this committee.

To identify gaps in care and needed preventive health screening, the front office staff runs approximately 15 daily registry reports for all patients with appointments that day. This process generates reminders for patients who require screenings for depression, are due for a colonoscopy or mammography, have a body mass index over 30, and other concerns. Results of the registry report analyses appear in the chief complaints section of each patient’s chart and cue the clinician to follow up on each reminder during the office visit. The use of these daily registry reports and reminders for clinicians has improved screening rates and led to more frequent identification of depression, alcohol abuse, and other health needs. This has led to more comprehensive patient care, but has required additional clinician and staff time to address newly uncovered issues. In response, the practice hired a behavioral health counselor to address behavioral health issues and work with patients on lifestyle changes.

⁴ More information on the Beacon Consortium in Colorado is available at <http://www.commonwealthfund.org/Publications/Case-Studies/2013/Apr/Colorado-Beacon-Consortium.aspx>.

⁵ More information on CPC is available at <http://innovation.cms.gov/initiatives/Comprehensive-Primary-Care-Initiative>.

Another way Foresight has effectively used health IT for QI has been through its participation in Grand Junction's HIE, which provides the practice with electronic access to radiology, laboratories, hospital and ED discharge summaries, and visit notes from patient appointments with other specialists. Whenever a Foresight patient goes to a hospital or the ED, the HIE generates an admission transfer discharge (ATD) message, which flows into the practice's EHR and is viewed by a practice staff member as soon as it is available as part of their daily work flow.⁶ The practice uses its EHR to track the timeliness of these ATD messages and then provides feedback to the local hospital on delays. This feedback loop has improved timeliness of these messages, and the practice now typically receives same-day notifications from the hospital.

In addition, the HIE-generated ATD messages enable Foresight's front desk staff to call patients within 24 hours of an ED visit to gauge the patient's condition and set follow-up appointments. During these calls, the front desk staff also follow a script to educate patients on appropriate ED use—for instance, they ask whether the patient was aware that Foresight has clinicians available 24 hours per day and whether the patient called Foresight before going to the ED. Foresight tracks the number of ED visits per month for the practice and has found that having these steps in place has been effective in preventing patients from going back to the ED with the same complaint, or for complaints that can be handled in the office, and in ensuring timely follow-up with patients.

The practice has also seen improvements in readmission rates following a similar outreach effort for patients who have been hospitalized. When alerted by an ATD, Foresight staff members reach out to patients, usually within 72 hours after hospital discharge. After this initial follow-up, the staff member alerts one of the practice's care managers to check in on the patient and schedule a follow-up visit at the practice. Using the EHR to track patients' hospitalizations and readmissions over time, Dr. Reicks reports these posthospitalization follow-up efforts have likely contributed to a decline in readmission rates for any cause during the past six months.

⁶ ATD is referred to as an ADT in some systems.

An Academic Health System: University of Missouri Health System (UMHS), Columbia, Missouri

Key Insights from UMHS Primary Care Clinics

- *In a larger, more integrated system, internal technical support for the use of health IT for QI is a valuable asset.*
- *EHR functionality is crucial, but so is the way EHR features are used. A clear understanding of the primary care practice's needs and goals with regard to the EHR is necessary for successful implementation.*
- *Having primary care clinicians in positions of leadership within an integrated system can shape the system's health IT and QI activities to match primary care goals.*

The UMHS system is a key source of primary care for the surrounding community. Throughout Columbia, Missouri, and nearby counties, UMHS has 51 ambulatory care clinics, 11 of which are primary care clinics. The city has a population of about 100,000, and the family medicine department alone (not counting internal medicine) has approximately 100,000 visits from 40,000 unique patients each year. Ten general internal medicine physicians and approximately 60 family physicians provide primary care to these patients.

UMHS is one of only seven health care systems in the country to have achieved Healthcare Information and Management Systems Society (HIMSS) stage 7 certification in both its inpatient and ambulatory care settings.⁷ This means the entire system is paperless, and clinical information can be shared through the system's HIE networks. The UMHS system (including primary care clinics, specialty clinics, and the hospital) has been using Cerner Power Chart as its EHR for more than 10 years and uses the EHR to share laboratory results, e-prescribe, display dashboards, provide a patient health portal, and maintain various registries. As a HIMSS stage 7 awardee, UMHS analyzes health care data for QI.

UMHS's commitment to QI is facilitated by several system-wide supports and activities. First, UMHS's Center for Health Care Quality runs educational programs on QI. Clinic leaders and other clinicians take classes through the Center and have the option to develop and implement a QI project with support and guidance from the Center. In addition, the Department of Family and Community Medicine has its own director of quality assessment and improvement, who started working with primary care clinics about eight years ago to educate and support clinic staff and clinicians on QI methods and strategies and continues to support practice-level QI efforts. In addition, individual clinicians and primary care clinics receive quarterly email reports on data such as patient satisfaction, days until appointment, and quality and utilization measures. These data are also available via the system's EHR dashboard and are

⁷ More information on HIMSS stage 7 requirements are available at http://www.himssanalytics.org/hc_providers/stage7Award.asp.

reviewed at the clinic level during clinical faculty meetings. Every primary care clinic in the UMHS system is expected to select and work on two QI projects per year.

How Health IT Supports UMHS Primary Care Clinics' QI Activities

UMHS's EHR enhances QI in multiple ways in the primary care clinics: by providing a mechanism to store and track data; by enabling analysis of these data to improve patient care and satisfaction; and by improving and facilitating communication and information-sharing across providers within the UMHS system. For example, through EHR dashboards, each clinician can track goals related to individual disease processes (both at the population and patient level) and reach out to patients whose chronic conditions are not well controlled to provide additional services, such as extra blood pressure checks for patients with hypertension.

The use of a common EHR across the UMHS system enhances communication and data sharing. Providers using the shared EHR can access a comprehensive view of each patient's history to gain a better understanding of patients' needs. The content of every provider-to-provider and provider-to-patient telephone exchange and fax is captured electronically within this system. Primary care providers have access to progress notes from specialist visits and are notified of ED visits or hospitalizations within the UMHS system and when results of diagnostic tests are available—both those ordered by the primary care clinic and those ordered by other providers in the system. The EHR makes it easy to message other providers in the system. As Dr. Richelle Koopman of UMHS stated, “the ability to see clinical information across specialties makes you a better primary care provider.” In addition to these robust capabilities within the UMHS system, UMHS participates in HIE with several external systems. However, the forms of data across the systems are so variable that this external HIE functionality is limited.

One example of a health IT-supported QI project at a UMHS primary care clinic involved using EHR data to track and reduce appointment no-show rates. UMHS launched a system-wide intervention to send automated telephone reminders to patients with upcoming appointments, which inspired one primary care clinic to investigate which of its patients had failed to show up for appointments in the past. Using the EHR, the QI project team—including patient service representatives, nurses, and physicians—identified patients with a history of no-shows and established a trial system of making personal calls to these patients ahead of appointments. The clinic's personal calls project decreased no-show rates and improved access to appointments, thereby increasing delivery of preventive care to patients.

In addition, primary care providers have used EHR-based registries to identify high-risk patients, enhance services provided to those patients, and increase communication and information-sharing about these patients across the care team. For example, as part of a Centers for Medicare & Medicaid Services innovation project called LIGHT2 (Leveraging Information to Guide High Tech High Touch care), UMHS is using registries to apply risk stratification algorithms based on chronic conditions and service utilization (hospitalizations and outpatient visits) and providing patient engagement and care coordination services appropriate to patients' levels of risk. Nurse care coordinators (NCCs) focus their efforts around the nine domains of care coordination in AHRQ's Care Coordination Atlas.⁸ Within the EHR, the NCCs use a work

⁸ The nine domains include Negotiate Responsibility, Communication, Facilitate Transitions, Assess Needs and Goals, Plan of Care, Monitor Events, Self-Management Support, Community Resources, and Align Resources.

list to track their patient panels. The LIGHT2 work list enables the NCC to quickly assess the patient's risk stratification tier and next appointment date and purpose. The list also includes customized reminders. In addition, the clinic team (including the provider, NCC, and others) has access to a modular single-page EHR summary containing the most pertinent patient information within the record, including a problem list, laboratory test results, medications, allergies, immunizations, health maintenance, and health risk alerts. These summary snapshots enhance previsit planning and during-visit discussions with the patient. Between visits, patients are able to schedule appointments, view laboratory test results, and communicate with providers and NCCs via a secure EHR portal. If a patient is admitted to the hospital or visits the ED, the EHR automatically sends the NCCs an alert. In addition, the NCCs can access an EHR list of high ED users and contact them to recommend calling their primary care provider before going to the ED.

The UMHS primary care teams have used the LIGHT2 EHR and IT tools as important resources for several QI projects. Dashboards within the EHR enable providers and NCCs to drill-down to personal, departmental, or patient-level views of the LIGHT2 project quality measures, track these metrics, and identify areas for improvement. Specific QI projects enabled by this technology have included increasing the percentage of blood pressure control among patients with hypertension, increasing the number of patients with advanced care planning documentation, increasing the number of patients signed up for the secure portal, improving osteoporosis screening, and lowering unnecessary ED visits.

A Health Information Network Organization Working with Safety Net Clinics and Small Practices: OCHIN, Portland, Oregon

Key Insights from OCHIN

- *To achieve buy-in from busy primary care clinicians and staff to use health IT for QI, goals and activities should be framed in terms of their potential impact on patient health outcomes.*
- *Affordability of health IT is a major barrier for safety net providers. Working as part of a larger collaborative or system, in which members can pool resources to purchase and optimize an EHR system and train its staff on its use, is one approach to making health IT for QI more affordable.*

OCHIN is a national, nonprofit organization that provides health IT software and services to health care systems and practices, most of which are safety net clinics serving low-income individuals, small practices, and critical access and rural hospitals. The network is currently active in 19 states and includes more than 80 member practices and more than 4,500 physicians. OCHIN membership allows practices to purchase the Epic EHR at a reduced cost, and OCHIN

supports implementation. OCHIN is also Oregon's Health IT Regional Extension Center;⁹ in this capacity, the organization supports Oregon health care providers as they implement health IT.

As a collaborative, OCHIN receives input from its members on which areas of quality measurement and QI are most important. Building on this input, OCHIN has developed a set of common quality indicators for the collaborative that have been accepted by member organizations' clinical leaders. When a practice joins OCHIN, it is provided with this list of indicators as a starting point, but each practice determines its own areas of focus for QI. OCHIN then provides practices with data and analysis to support the practice's QI efforts.

To support these efforts, OCHIN helps member practices approach the use of health IT for QI as a cycle of innovation. As Dr. Scott Fields, chief medical officer for OCHIN, described this process, new OCHIN practices start by documenting established workflows and generating baseline quality-of-care data, as staff in each primary care clinic typically have already established work processes. Practices then use this information to identify potential areas for improvement; OCHIN then assists the practice in using Plan-Do-Study-Act cycles to make changes, with a goal of helping them become learning organizations. If initial small-scale changes show promise, the practice might choose to train its entire staff on a new approach to delivering care, create a new workflow, and then move on to other areas for improvement.

How Health IT Supports OCHIN Members' QI Activities

One way OCHIN members' EHRs enhance QI is by tracking immunization rates and prompting providers to recommend immunizations to particular patients. For example, one OCHIN member clinic discovered only 50 percent of eligible patients had received a pneumococcal vaccine. The clinic raised awareness of the problem among the staff and implemented a reminder system in the EHR. Every quarter, the clinic tracked trends and presented charts to the staff displaying progress over time, which was highly motivating. Over three years of using the reminder system and tracking the measure, the clinic improved the pneumococcal vaccine rate from 50 to 80 percent. Then, the clinic took the additional step of consulting current literature to translate the improvement they achieved to estimate the number of avoided hospitalizations and deaths. As Fields described, this brought the QI progress to life for clinicians and staff, because these kinds of outcomes are "things that...health care providers care about as opposed to just the number [vaccinated]."

OCHIN members also use EHR-based registries and dashboards to track quality indicators for patients with chronic illnesses, produce and record risk scores, and then target care coordination resources to patients most in need of these services. For example, the EHR-based diabetes dashboard displays a number of key indicators, including whether recommended testing is up to date and whether patients' hemoglobin A1c and blood pressure levels are under control. Each indicator produces a score for the patient; patients with outdated tests and health indicators that are not under control receive higher scores. From the scores, the practice is able to determine which patients are most at risk for adverse health events and then direct care coordination services to these patients.

⁹ More information about Regional Extension Centers is available at <http://www.healthit.gov/providers-professionals/regional-extension-centers-recs>.

Lessons Learned

Our targeted review of published reports and discussions with experts and representatives of exemplary primary care organizations yielded several key lessons for clinicians and practice leaders, IT developers, and decisionmakers.

Lessons for *clinicians, practice leaders, and facilitators working with primary care practices* include:

- **Vision and leadership is critical for transforming into a practice that uses health IT for QI.** Practice leadership (in some cases, a clinician; in other cases, another member of the staff) is critical in conveying to the practice as a whole how health care delivery and payment systems are likely to evolve, how health IT and QI play a role in this evolution, and how to take the first steps to transform a primary care practice from one that uses little or no health IT to one that maximizes the use of health IT for QI.

“You have to have a leader who has a vision of what the future might look like for health care delivery and how we will be graded and paid. I saw [pursuing QI through Beacon and CPC participation] as a way for us to begin that journey to a different health care delivery and payment future.”

*Gregory Reicks, D.O.
Foresight Family Physicians*
- **Transformation can be facilitated by emphasizing that using health IT for QI will ultimately help patients.** This is particularly relevant because many primary care practices have extremely limited resources and might view the use of health IT for QI as something extra rather than something that is fundamentally helpful to the practice and to patients. Encouraging the use of health IT for QI is most effective when it is framed in terms of the potential impact this work might have on outcomes that matter to clinicians and staff.

“[Clinician and staff buy-in to using health IT for QI] is usually still about whether or not they believe that the things that we’re measuring really make a difference.”

*Scott Fields, M.D.
OCHIN*
- **Establishing a dedicated QI team, as well as regular communication between the QI team and the rest of the practice, keeps QI activities progressing and builds these activities into regular operations.** Both Foresight Family Physicians and the UMHS primary care system rely on QI teams, which meet regularly and maintain QI activities as a central piece of the practices’ daily operations. These QI teams include four or five staff at all levels, including a clinician champion (and/or a clinician who is skilled with IT), a data analyst, and a member of the front desk staff. The teams regularly present updates and seek feedback from the practice as a whole. OCHIN regularly engages with similar teams within their member practices and uses a clinical oversight group, composed of clinical leaders from member practices, as a central place to discuss clinical QI.

- **Clearly define QI goals, strategies for achieving goals, and how health IT will facilitate the QI process before starting.** Aligning the QI project with the practice’s values or strategic plans ensures the project’s fit with the practice’s mission. Defining QI measures, down to the level of data elements such as numerators and denominators, keeps everyone’s thinking and work aligned and prevents errors and misunderstandings as the project progresses. Using QI methods such as Plan-Do-Study-Act cycles also helps a practice clarify and understand project goals and systematically test approaches on a small scale before spreading the intervention to the entire practice.
- **Consider the effects of a new QI process or policy on the entire practice.** As Tim Hogan, R.R.T., Ph.D, the director of quality assessment and improvement for UMHS’s Department of Family Medicine, expressed, “You have to be sure to consider your upstream and downstream effects. That new policy may take some nurses 5 minutes but it may add 20 minutes to somebody else’s day.” Moreover, the results of QI efforts might include significant changes—such as the addition of staff to address behavioral health needs or reallocation of staff roles and responsibilities—to meet patients’ needs. Some strategies to achieve this include mapping new workflows and testing new processes or policies on a small scale to assess the effects of a change before applying it to the practice as a whole. A practice’s QI team or a collaborative’s leadership team can lead these assessments; for instance, OCHIN’s clinical oversight group works to establish QI-focused workflow strategies for the entire collaborative.
- **Health IT-generated data are powerful in initially inspiring a practice to pursue QI.** QI might be a foreign concept to many clinicians and staff until data specific to the practice (and each provider) are available to share and discuss.
- **Continued surveillance and commitment to improving an issue over time is necessary to sustain QI.** Although data are important, data alone are not sufficient to sustain QI work. As Richelle Koopman, M.D., M.S., from UMHS stated, “There is power to just having the data, but if you have any kind of complex intervention, then it needs continued surveillance and work on it. The thing that I see with a lot of QI projects is after they ‘solved’ the particular issue, [the problem] rebounds [without maintenance work].” Ideally, this ongoing surveillance and commitment to QI will be a key element of one or more employees’ formal job duties. Other facilitators of this process include aligning policies and workflows with new processes and continuously soliciting input from providers and staff on how best to sustain QI achievements.

“[QI] didn’t take off until...I could put [data on] the performance of our clinics in front of the physicians and staff.”

*Tim Hogan R.R.T., Ph.D.
UMHS*

“It is frustrating when you purchase an EHR system and think you are getting a certain set of functions and then learn you need to put more money in to get the good stuff.”

*Richelle Koopman, M.D., M.S.
UMHS*

- **EHRs often do not include every tool a practice wishes to use, and workarounds might be necessary to achieve QI goals.** Often, EHRs do not include every function a primary care practice might desire, or it might cost a practice extra to enable certain EHR functionalities. In the absence of a perfectly optimized EHR, practices might

need to develop workarounds. For example, as part of its participation in CPC, Foresight Family Physicians needed to risk-stratify patients, but the practice discovered that the EHR system for risk stratification was not accurate for patients with multiple comorbidities. To work around this limitation, each clinician uses a Microsoft Excel database to rank his or her own patients, as well as any new patients joining the practice, by assessing the patient's health status, recent ED visits and hospitalizations, and mortality risk. The 10 percent of patients with the highest risk scores are then flagged for care management outreach, with the top third of those patients receiving the most intense care management services. This process of assigning risk takes each clinician several hours annually (plus extra time to perform the process for new patients).

- **Transitioning from using health IT to document visits to using health IT-generated data in a transformative way for QI requires time, training, and workflow shifts.** Establishing systems and enabling health IT for QI does not happen in a day, or sometimes even in a year. This point is well illustrated by the experience of Foresight Family Physicians. It was only when the practice joined the Beacon Consortium 3 years after first implementing its EHR that Foresight began to consider transforming the way the practice was delivering care, using health IT as a tool in that transformation. This involved a significant amount of staff retraining over a couple of years. This training focused on ensuring that data were entered accurately into structured fields to create accurate reports on quality and identify gaps in care, all of which had to be done before changing work processes to improve care and address those gaps.
- **Pursue opportunities for HIE, either at the community level or, as a first step, on a smaller scale.** Sometimes, an entire region or community will establish a formal HIE to share data. However, it is also possible for HIE to occur on a smaller scale, such as by establishing bilateral agreements for data exchange between primary care practices and hospitals or sharing data among providers in an integrated delivery system or hospital system. Primary care practices in communities lacking a formal HIE can still benefit from data exchange through these types of arrangements, while working with other stakeholders to expand the scale of HIE in their communities.
- **Health IT is not only a tool for primary care clinicians and staff; it can also be used to engage patients and families.** Patient portals, health apps linked to the medical home, text messages, and other approaches are becoming increasingly mainstream. As demonstrated through UMHS's experience with the LIGHT2 initiative, patient engagement via health IT can also be central to QI efforts.

Lessons for *IT developers* included:

- **Considering how health IT will be used to support care improvement when designing new tools will help primary care practices use this technology for QI.** IT developers and primary care practices and organizations should work together to ensure that health IT tools—including but not limited to EHRs, registries, and HIEs—serve both the documentation needs of primary care and the need to provide data and feedback to support QI. For example, OCHIN employs developers as well as practicing clinicians, who collaborate both internally and with member practices to design effective and efficient tools for primary care practices.

- **Improving interoperability and information exchange capabilities of health IT will support practice-level efforts to improve care quality.** It is important to consider the various levels of interoperability of health IT that primary care practices require—both within their own practices and health systems and externally with other providers and health systems that treat their patients. Without effective liquidity of patient health data and secure information exchange among health IT systems, primary care practices will face barriers to improvement of care for patients who access care in multiple settings. Not all practices will be part of the same medical record system; therefore, processes and standards for electronic sharing of information across systems is crucial (Krist et al. 2014).

Finally, lessons for *decisionmakers* include:

- **Practices benefit from having the latitude to choose their own QI goals and tailor their approach to using health IT for QI accordingly.** Decisionmakers and policymaking bodies play an important role in defining quality measures and establishing benchmarks and reporting processes. These activities enable comparisons across practices and provide a common set of goals and expectations to which practices can aspire. However, practices benefit from deciding for themselves which specific QI goals are most important to their particular practice, patients, and community. Allowing for at least some degree of self-determination of QI goals is an important motivator for practices because it connects QI activities to the practices’ ultimate goals of better serving their patients.
- **External technical assistance can be invaluable—particularly for small, independent practices interested in using health IT for QI.** Few primary care practices are fortunate enough to have access to their own health IT and QI training and expertise, which underscores the value of external help and coaching. For example, Foresight Family Physicians’ participation in the Beacon Consortium helped the practice use health IT in a more sophisticated way: the practice was able to move past using the EHR as a data repository to leveraging the tool for QI. The Beacon Consortium offered technical assistance that included coaching on how to maximize use of the technology itself, but also on developing the most efficient workflows for achieving QI goals. (For an in-depth discussion of how practice facilitators and coaches can effectively engage primary care practices in QI work, please see Geonnotti et al., 2015.)

“This [cost of health IT] is wiping out practices that are on their own. They can’t afford the infrastructure to do quality reporting work without being part of a larger organization in some way.”

*Scott Fields, M.D.
OCHIN*

- **Affordability of health IT is a major barrier for smaller practices and safety net providers.** Working as part of a larger collaborative or system is one approach to making health IT more affordable for primary care practices. As Fields relayed, OCHIN members pool resources to purchase and optimize the OCHIN Epic EHR for the safety net

environment in ways that individual practices and clinics could not afford. Developing new or expanded sources of financial support for the purchase and implementation of health IT would benefit primary care practices interested in implementing health IT for QI.

- **Expanding the availability of funding to support the use of health IT for QI in primary care creates “breathing room” in clinicians’ schedules to perform this work.** Even when providers highly value the use of health IT for QI to improve patient care, they might avoid volunteering for QI activities because they believe they should be seeing patients to generate income for the practice and themselves. Practices that are able to offer financial incentives for providers to work on QI can offset this reluctance. For instance, using funding from the Beacon Consortium and CPC, Foresight Family Physicians is able to pay clinicians for time spent on QI activities.

“You can’t really do [continuous QI] if all you are getting is fee-for-service revenue. There is not enough time to be able to run a practice, pay your staff, and pay overhead. You’ve got to do what you’ve got to do for that, [which is] seeing patients. You really have to have some additional funding source or human resource.”

*Gregory Reicks, M.D.
Foresight Family Physicians*

Recommendations and Conclusions

Recent health care policies and incentives have encouraged primary care adoption of health IT. Due to barriers such as time and capital costs, lack of provider and staff training in data analysis and QI, and unfamiliarity with the potential benefits of using health IT for QI, similar efforts are needed to encourage and support the expanded use of health IT for QI. With these barriers in mind, we recommend the following next steps for collaboration among primary care practices, practice facilitators, IT developers, and decisionmakers to increase the use of health IT for QI in primary care:

- Share examples of exemplary uses and best practices to inspire and guide primary care practices seeking to create a culture that embraces using health IT for QI.
- Continue to develop and refine technology to produce high-functioning, interoperable health IT tools.
- Empower primary care providers and staff with the necessary knowledge and skills to maximize the use of health IT for QI.
- Provide guidance and tools to help primary care practices redesign processes and workflows to accommodate the effective use of health IT for QI.
- Expand the availability of financial and other transformation incentives and supports.

Although significant obstacles prevent many primary care practices from using health IT for QI, practices in diverse settings have demonstrated it is possible and pays off in improved processes of care and patient outcomes. Additional support for primary care practices seeking to make these transformations—in the form of payment reforms and technical assistance—will help more practices adopt a culture of commitment to using health IT for continuous QI and ultimately ensure patients are receiving the best possible primary care.

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