Electronic health records and support for primary care teamwork

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ABSTRACT

Objective Consensus that enhanced teamwork is necessary for efficient and effective primary care delivery is growing. We sought to identify how electronic health records (EHRs) facilitate and pose challenges to primary care teams as well as how practices are overcoming these challenges.

Methods Practices in this qualitative study were selected from those recognized as patient-centered medical homes via the National Committee for Quality Assurance 2011 tool, which included a section on practice teamwork. We interviewed 63 respondents, ranging from physicians to front-desk staff, from 27 primary care practices ranging in size, type, geography, and population size.

Results EHRs were found to facilitate communication and task delegation in primary care teams through instant messaging, task management software, and the ability to create evidence-based templates for symptom-specific data collection from patients by medical assistants and nurses (which can offload work from physicians). Areas where respondents felt that electronic medical record EHR functionalities were weakest and posed challenges to teamwork included the lack of integrated care manager software and care plans in EHRs, poor practice registry functionality and interoperability, and inadequate ease of tracking patient data in the EHR over time.

Discussion Practices developed solutions for some of the challenges they faced when attempting to use EHRs to support teamwork but wanted more permanent vendor and policy solutions for other challenges.

Conclusions EHR vendors in the United States need to work alongside practicing primary care teams to create more clinically useful EHRs that support dynamic care plans, integrated care management software, more functional and interoperable practice registries, and greater ease of data tracking over time.

Key words: primary health care, team, qualitative research, electronic health record, health services research, teamwork

INTRODUCTION

Over the past decade, a profusion of government- and payer-sponsored initiatives have focused on strengthening the US primary care infrastructure.[1,2] In addition to increased payment, these programs have also increased the care process, population health management, and documentation requirements for primary care providers. Strengthening inter-professional teamwork – ie, coordinated collaboration among primary care physicians and key primary care practice staff, including nurses, medical assistants (MAs), and others – has emerged as a key focus for both policymakers and providers, partly because of growing recognition that physicians cannot shoulder these additional requirements alone. Various stakeholders have noted that better teamwork may free more highly trained clinicians to focus on caring for the most complex patients.[3–8]

Health information technology (HIT) has the potential to provide structural support for enhanced collaboration among primary care team members. Federal initiatives have accelerated the adoption and meaningful use of electronic health records (EHRs)[9,10] concurrent with broader primary care reform initiatives. It is possible for team-based primary care and EHRs to work in tandem, to mutually benefit patients.[11–17] Examples integrating team-based primary care and EHR use include developing consistent behaviors around data entry into the EHR and agreeing on communication methods within the primary care team to facilitate teamwork.[11] Others have found that EHRs reduce some aspects of staff work by allowing simultaneous chart access,[12,13] while increasing other aspects of work, such as creation of new tasks due to limited interconnectivity with diagnostic testing facilities and

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other providers.[12] Some have found that practice teams do not proactively revise their workflows to maximize EHR use.[13] Thus, much remains to be learned about how EHRs pose challenges to primary care teamwork and how practices are overcoming those challenges.

This study examined primary care practices' experiences using EHRs as they strive to function as teams in patient-centered medical homes (PCMHs). We identify how EHRs facilitate and pose challenges to teamwork and how practices overcame such challenges. We describe solutions and identify opportunities to improve care processes as well as EHR functionalities and policies, to support teamwork.

METHODS

Identification of participants

To identify practices using an empiric measure of high-functioning teams, we started with the list of practices recognized as PCMHs as of February 2013, using the National Committee for Quality Assurance (NCQA) 2011 PCMH recognition tool.[18] This tool included a new section on Practice Teams (included in the online Appendix), which focuses on eight team characteristics derived from the literature on teamwork.[3,4,7,19,20]

To obtain a range of practice types for our study, NCQA drew a random sample of PCMHs stratified by region and by a variable that covered both practice size (number of physicians/independent clinicians) and ownership (ie, physician-owned vs. hospital- or health system-owned, etc.). This process included dividing practices into two groups within geographic regions: (1) those achieving 100% of the points on the Practice Teams Element (high team score) and (2) those receiving 0–25% of the points on the Practice Teams Element (low team score). Our goal was to primarily interview practices with high scores (100%) on the team element, but we also interviewed one low-scoring practice per region, for qualitative comparison. We were not aware of a practice's score on the NCQA PCMH Team Element at the time of the interviews.

For confidentiality reasons, NCQA initially contacted practices by email; then, if no response was received, NCQA reached out by fax and/or phone. The study goals were described to the practices, and they were assured that participation would remain anonymous and have no bearing on their NCQA recognition. Once practices consented to being interviewed, the list of consenting practices was sent to our research group, which is part of a separate organization. Our research assistants conducted an initial screening phone call to confirm practice characteristics (including EHR type and length of use) and to identify a lead clinician who could best speak to the topic of primary care teamwork at the practice. Then, during the interview of the lead clinician, we asked him/her to identify a second (and, if possible, a third) informant who was also involved in the operational aspects of teamwork at their practice.

Our goal was to interview between 25 and 30 practices, given the project design goals and budget. After completing 63 interviews at 27 practices from across the strata, we chose to

end outreach to practices, because we were no longer hearing substantively new information (themes were consistently being repeated).

Interview protocol

The interview protocol was based on a literature review and included general questions about primary care team functioning (Supplementary material online). At the beginning of each interview, we defined the term "primary care team" for the respondent as "two or more people working together to provide primary care for patients." In addition to a range of questions on teamwork, the protocol included specific questions on EHRs and teamwork, such as:

1. How does HIT support teamwork at your practice?
2. How does HIT pose challenges to team functioning? How were these challenges overcome?
3. Has the way particular staff use the EMR changed as teamwork has become more structured?

In-depth interviews

Interviews were conducted between May and December 2013. Every practice completed at least two separate interviews (one with a lead physician and one with a second member of the practice team), and several completed three interviews. Interviews lasted 1 hour, on average. All interviews were conducted via telephone, using a standardized interview protocol, by a two-person team consisting of a senior researcher and a trained research assistant.

The two research assistants on our team had undergone training to do transcription and had experience doing verbatim transcriptions for several prior qualitative studies. In addition, they were trained in EHR and primary care terminology, to ensure their notes for each interview were accurate and thorough. The senior interviewers reviewed the research assistants' notes after each interview.

In addition to categorizing data into the major themes that arose, we also considered whether comments (units of text) fell into the categories of: (1) EHR functionalities, (2) clinical workflows and implementation, and/or (3) other factors external to the practice (eg, perceptions of regulations). We also did a qualitative comparison of practices with low vs. high scores on the NCQA teamwork element, to assess whether there were consistent differences in the types of themes their members raised during in-depth interviews.

Analysis

Given that research on primary care teamwork is in an early stage, we used a combination of descriptive and emergent coding.[21] Three members of the research team reviewed every interview transcript in its entirety and individually created lists of potential themes and codes based on the interviewees' comments. Through an iterative process, the team continued to revisit the code lists in several meetings and reached consensus on the definitions for each. After agreeing on our list of codes and definitions, our second stage of analysis/coding

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Table 1: Respondent and Practice Characteristics

Characteristics	Frequency (Number)
Respondent Type	
Physicians	22
Nurse practitioner/Physician assistant	3
Medical assistant	7
RN/LPN	7
Practice manager	9
Administrative and front desk staff	12
National experts	3
Total Respondents	**63**
Primary Care Population Served	
Adult and pediatric	17
Pediatric-only	3
Adult-only	7
Practice Type	
Independent physician-owned practice	15
Hospital-owned or health system-owned	8
Federally qualified community health center	2
Independent safety net clinic	1
Military	1
Practice Size (Number of Physicians)	
1–2	8
3–10	12
11–20	3
21–50	1
>50	3
Electronic Health Record Use[a]	
EPIC	7
eClinicalWorks	4
NextGen	4
AllScripts	2
McKesson Practice Partners	2
Centricity	1

Continued

Table 1: Continued

Characteristics	Frequency (Number)
Athenahealth	1
Cattails-MD	1
Practice Fusion	1
e-MDs	1
MedInformatix with Crimson	1
MEDENT	1
CHCS and AHLTA	1
Region	
Mid-Atlantic	4
Midwest	3
Mountain	2
New England	5
Northeast	5
Plains	2
Southeast	4
West	2
PCMH Recognition Level (NCQA)	
Level 1	0
Level 2	5
Level 3	22
Performance on Practice Team Element G in 2011 NCQA PCMH Tool	
0–25% of points	7
100% of points	20
Total Practices	**27**

[a]Note that many practices still partially use paper.

CHCS = Composite Health Care System; AHLTA = Armed Forces Health Longitudinal Technology Application.

involved two team members collaboratively applying the codes to the data using Atlas.ti software.[22]

RESULTS

Participants

The 63 in-depth interviews included 60 participants from 27 primary care practices in 17 states and 3 national experts on primary care teamwork who are also experienced clinicians. Practice and respondent characteristics are provided in Table 1. At the time of the interviews, most practices were using a wide range of off-the-shelf commercial EHRs, though

two practices were using custom institutional EHR systems. Practices had had EHRs in place for, on average, 5 years (range: 2-12 years).

The common benefits of and challenges to using EHRs to support primary care teamwork, as well as practices' solutions to some of those challenges related to three areas: (1) EHR functionalities, (2) clinical workflows and implementation, and (3) perceptions of regulations and organizational policies. While, conceptually, these three areas seem distinct, often the challenges and related solutions that arose from respondent interviews touched on more than one area. So, we herein present our findings (common themes from the interviews) by first briefly discussing ways EHRs facilitated teamwork in primary care practices, then switching our focus to challenges encountered and how they were overcome. In each case, we note which of the three areas our findings relate to.

Facilitation of primary care teamwork by EHRs

As one of the interviewed primary care teamwork experts noted, "EHRs will be the platform for better data driven teamwork." Respondents identified ways that EHRs facilitate primary care teamwork, which are grouped for presentation into two main themes: (1) enhanced communication and (2) redefined team roles/improved delegation.

Enhanced communication

While respondents emphasized the importance of live, in-person communication (eg, in huddles and for touching base on patient care issues throughout the day), they believed EHRs enhanced communication within the practice team via improved access to patient information for all team members, instant messaging, within-chart notes, phone templates that could be routed to team members' inboxes, and task assignments. Some practices used their EHRs to help create a "huddle sheet," which listed patients scheduled for the day and noted pertinent issues for each patient that might not already be noted in the EHR (eg, "be sure that the care manager talks to the patient about his hypertension management after the meeting with the physician today").

Redefined team roles and task delegation

When combined with revised clinical workflows, the EHR can enable non-physicians to assume enhanced roles within the care team, freeing physicians to focus on more complex aspects of care. Respondents explained that EHRs supported easier task delegation and helped avoid task duplication. Task manager software (when part of the EHR) and message distribution from the patient portal to providers' in-boxes were cited as examples of how EHRs enabled such delegation. Standing orders and protocols integrated into EHRs also provided improved structure and guidance for increased team member autonomy – particularly for MAs, licensed practice nurses and registered nurses (RNs) – to perform needed tasks (eg, vaccinations or health screenings) before the physician saw the patient.

A Maryland physician described how the practice enhanced the role of MAs by using structured, symptom-specific templates (eg, "headache"). The physician created these templates by adapting a model that Anderson initially designed for nurses.[23] In this practice's system, an MA sees the patient before the physician and enters the patient's chief complaint, which brings up 1 of 200 complaint-specific templates. The MA then asks the patient relevant questions from the template. As a result, the practice reported improvements in productivity and has increased its ratio of MAs to physicians from 1:1 to 2:1. Respondents at this and three other practices using a similar process reported that it improved efficiency and allowed physicians to better focus on patients' needs during the encounter. Physicians and MAs both felt that using such a process improved their job satisfaction.

Some teams emphasized delegating tasks that they were required to report on for meaningful use to staff well-suited to carry out these tasks and document them in the EHR. For example, some practices had pharmacists (to whom they gave EHR access) carry out education for patients with complex medication needs; some delegated tobacco cessation counseling to care managers; and many practices had clerical staff enroll patients in the practice's patient portal.

Overcoming challenges to EHR use for primary care teamwork

Practice respondents noted numerous challenges to working with EHRs when trying to function as teams. They also identified how they had overcome challenges and created workarounds, and also noted ways to improve EHR design to better support primary care teamwork (Table 2). Frequently cited EHR challenges related to: population health management (monitoring a panel of patients with specific needs), support for care management, accountability for EHR data, and how to standardize data entry across the team.

Population health management

A practice-based registry refers to a practice's ability to, for the purposes of supporting population health management, generate and maintain computerized lists of patients that permit a team member to identify patients with particular conditions or characteristics who need monitoring or services. Most practices already had patient registries at the time of their interviews, but the extent to which their registries were integrated with their EHRs varied. In our study, about one fifth of practices' EHRs lacked registry functionality. Another third of practices chose not to use the registry that came with their EHR, either because the registry did not meet their needs or because they had a registry in place prior to installing an EHR system. In the latter case, practice resources limited the team's perceived ability to adopt their EHR's registry. Respondents from some of these practices complained that they had to maintain two separate systems that did not communicate with one another. Just under half of practices had EHRs with a built-in registry. Many of these had customized the registries to generate reports for

Table 2: Respondents' Suggestions for How EHRs Could Be Modified to Better Support Primary Care Teamwork

1) Ensure the EHR includes a clinically useful practice patient registry or integrates seamlessly with the practice's registry.
2) Create functionalities to permit easy tracking of an individual patient over time (eg, prior hospitalizations).
3) Create functionalities to permit tracking of population subgroups over time.
4) Build care management software into the EHR or ensure seamless communication between such software and the EHR.
5) Create a clear place for care plans in the EHR, to include agreed upon goals, steps to reach those goals, as well as changes in the care plan over time, as the patients' needs change.
6) Ensure EHRs permit the creation of a huddle sheets and pre-visit planning tools that can be populated with important patient data (eg, medications, problem list).

EHR = Electronic Health Record.

population management and felt the registries met their needs and enabled respective members of the team to fulfill their roles efficiently. Among practices that were dissatisfied with the registries that came with their EHRs, the reasons cited were: challenges in searching and generating useful reports and limited ability to risk-stratify patients (to identify those in need of care management).

To work around both the lack of interoperability and the problem of poor registry functionality within some EHRs, some practices worked with larger affiliated organizations (eg, their parent organization's IT department) or third-party data warehouses to generate reports – for example, on patients with diabetes or asthma – using data gathered from their EHRs. Other practices that were dissatisfied with the registry that came with their EHR purchased third-party software platforms to pull information from their EHRs and generate reports for population management purposes.

Population health management for a primary care practice's patient panel also requires the ability to track the patient panel's data over time, something respondents believed current EHRs do not adequately support. "I don't have an aggregate way of looking at my patient panel so I can't make large decisions about management," an Indiana physician explained. Another physician in Colorado said that, to make the most of teamwork, "You have to know who your high-risk patients are, who isn't showing up, who shouldn't show up," (so the care manager can reach out to those who have not been in touch with the practice). Physicians also pointed out the difficulty of using their EHRs to track patients at the individual level of care. An internist noted that "there is no place in the EHR to track hospitalizations, to see a longitudinal picture of a patient at a glance." To do so, the internist or a team member had to "click on" multiple prior notes and tabs to identify a patient's prior hospitalizations.

Support for care management
Most practices' EHRs lacked a care management tool or functionality. So, in several practices, care managers (individuals, often RNs, whose role includes helping patients self-manage

their chronic conditions) had to use a separate system. In most EHRs, there was no clear place for care managers to input their notes and track patient progress.

To overcome the problem, some practices customized their EHRs by creating templates, separate tabs, or "pop-ups" for care management documentation. One care manager described how the practice created a "macro" in their EHR to flag patients for care management services: "The doctor uses the macro to set goals after he sees the patient and [on the patient's next visit he] records whether the patient has met the goal . . . If the patient has not met the goal then he will refer them to care management, and that is my trigger to work with the patient. That is all done electronically." The care manager can also identify when this tool should be applied to the patient's chart (eg, for patients with diabetes or coronary artery disease).

Regardless of how practices customized EHRs, the customizations permitted the care manager and physician to document goals for the patient, identify barriers to those goals, and document follow-up visits and progress toward the goals. Care processes and EHR customizations that practices devised as partial workarounds to this and other challenges were viewed as helpful, but not permanent solutions, because respondents felt the workarounds would be lost when practices upgraded their EHRs to newer versions. Respondents believed that EHR vendors need to work alongside practicing clinicians to help create clinically meaningful care plan functionalities within EHRs that can be updated over time, as patient preferences and needs change, and that can be accessed by all relevant team members, including the patient.

Accountability for EHR data
One national expert and respondents from four practices mentioned that the concept of "who was accountable" for data in the EHR (ie, does each data unit entered into the EHR need to be traceable to an individual member of the team?) was a challenge. Some clinicians in practices owned by larger health systems believed that their compliance, coding, and legal departments created barriers to efficient delegation of EHR

Table 3: How Practices Helped Ensure Consistent Data Entry into EHR by Team Members

1) Teach each team member what they are responsible for entering into EHR and where it needs to be entered.

2) Practices continually update standards on how/where to enter data into the record.

3) Implement rules based on protocols set up by a clinician-led committee to allow designated individuals (eg, nurse care manager) to override ICD 9 code on the problem list from 3 to 5 digits.

4) Practices maintain a list of acceptable abbreviations that all providers must use.

5) Use evidence-based templates for MA data entry into the record, where appropriate.

6) Delegate data entry to RN or MA, where it is within their scope-of-practice.

7) Use huddle sheets to help enhance consistent data entry (they are an added vehicle for systematically reminding providers of services and patient information that needs to be entered into the record for quality improvement and clinical quality measures).

8) Use of separate tabs to organize data for behavioral health, counseling visits, referral management, etc.

EHR = Electronic Health Record; MA = Medical Assistant; RN = Registered Nurse.

data entry, due to scope-of-practice concerns. For example, a physician from a practice with trained MAs who helped with data entry said:

> The compliance people say the MA can't go near the HPI (history of the present illness) portion of the electronic record. But, it's a physician-driven algorithm that the MA is following. And, the doctor is then going back through the answers, confirming/editing/embellishing or even deleting what the MA put in if they disagree with what was entered. So, the doctor is still doing his own history, he is just not always doing all the typing. The physician then attests (electronically signs) the record.

One primary care team expert noted:

> We need to view care as a team-based entity with the physician ultimately accountable, but providing some latitude within the team for sharing data entry. The team should be the tracing unit not the individuals on the team. . . .In the paper world, we didn't track data in the chart to the individual RN or MA level, so why do we expect that in an electronic world? It just gets in the way of efficient patient care and task delegation.

As one possible solution, respondents who raised this issue suggested that regulatory and state scope-of-practice boards should consult with primary care clinicians. They also felt that their parent organizations' compliance departments needed to be aware of how to properly interpret existing regulations.

Standardizing EHR data entry

Another common challenge is getting team members to enter EHR data in a consistent form and in a consistent location in the record (the problem grows as teams get larger). Consistent methods and terminology for data entry for parts of the EHR such as the problem list, the medication list, and the documentation of patient counseling are particularly important, to ensure data is accessible to other team members and for the purposes of performance reporting. Often, this challenge was overcome by teaching everyone in the practice where and how to enter certain types of data (particularly where to use structured fields; see Table 3). Another common solution to this challenge was clearly defining who on the primary care team enters what information into the EHR. One family physician said, "If you are changing your definition of teamwork to meta-teamwork, everybody has the same goals and a common shared playbook. Everybody understands who does what, and that is codified upfront. For example, in our practice, the MA does the routine depression screening tool. That also helps define accountability for different team members." Another practice enabled its care manager to "override the doctor's ICD9 code on the problem list" for particular conditions, when the patient's lab results met certain criteria, and change a 3-digit ICD9 code to a 5-digit code. This resulted in improved coding consistency and also off-loaded this documentation burden from physicians.

In terms of pulling data for quality reporting, many respondents noted that the process was cumbersome, because different pieces of data were located in many different parts of the record. One physician leader described their solution for tracking tobacco users and noting that they were counseled and when they quit smoking: "We modified the EHR to include a better team tool so that our MAs could now include smoking status as a vital sign as part of their rooming protocols. Now MAs enter the data and it goes to the right place every time."

High vs. low scoring practices

Practices that earned a high score on the NCQA practice team element vs. those that earned a low score (online) primarily differed in their performance on the three sections on training for: patient self-management (which includes care plans), population management, and team communication skills. Practices with high scores seemed more aware of the need for care

plans to assist patients in self-management, and respondents from these practices commented on the lack of EHR support for care plans. Low-scoring practices made fewer comments on EHRs in relation to care plans and population tracking, potentially indicating their lack of awareness about the need to pursue, and use EHRs to support, such activities.

DISCUSSION

In addition to noting how current EHRs both facilitate and pose challenges to primary care teams, this study identified numerous ways that practices overcame the challenges they faced. It also identified challenges that teams were unable to overcome and areas where EHR vendors and the larger clinical, regulatory, and policy community need to address practices' problems.

Some of the EHR functionalities practices want are available now or will be available in certified EHRs under Stage 2 meaningful use reforms. Practices that have access to HIT support and the ability to customize templates may be at an advantage when it comes to maximizing their use of EHRs to support teamwork. But even practices in PCMH initiatives often lack the necessary resources to make the best use of their EHRs.

In other cases, potential functionalities that could support teamwork are either not available or are not well-integrated into many EHRs. Chief among these are practice registries (which provide the ability to track both individual patients and populations over time), care management software, and dynamic care plans. A recent consensus statement by primary care organizations confirmed the importance of and need for seamless integration of such applications into EHRs.[24]

Practice registries. Policymakers can encourage moving toward, and clinicians can demand, better EHR registry functionality as well as improved integration between separate practice-based registry systems and EHRs. Meaningful Use Stage 2's requirement for "patient list creation" (which would permit generation of at least one report listing patients of the eligible provider with a specific condition[25,26]) is an important first step. In the future, it may be useful for such registries to support multi-morbid condition searching and patient risk stratification.

Data tracking over time. Tracking population- and individual-level patient data is particularly relevant to PCMH teams that are expected to improve quality of care while decreasing utilization of high cost-services (eg, hospitalizations and emergency department visits). When such information was present in practices' EHRs, typically from their parent organizations or entities that use a relational database to incorporate practice- and provider-level EHR data into useful and actionable reports, physicians were more satisfied with their ability to use EHRs to improve and track patient care for population health.[27]

Care management software integration with EHRs. Care management software needs to either be part of EHRs or integrate seamlessly with them. Many EHRs predate the care manager role; thus, the necessary software for care managers appeared to be an underdeveloped tool in the practices' EHRs.

Others have called for improved support for care management within EHRs.[16]

Care plans. EHR vendors could also engage more with practicing primary care teams to help create clinically meaningful care plan functionalities that relevant team members, including patients, can readily access. Prior work by Chunchu *et al.*[28] demonstrated how challenging care plan use within EHRs can be. Ideally, future EHRs will be able to support care plans that are dynamic (ie, can be changed over time) and goal-oriented and also include patient input. Care plan creation in EHRs also needs to be whole-person-oriented (as opposed to having a separate care plan for each condition), to enable the primary care team to address each patient's overall needs, concerns, and goals with a single plan.

Scope of practice. There is a clear tension between the delegation of tasks within the primary care team and state scope-of-practice laws (which may dictate the tasks a healthcare professional is required to complete or the services they are required to provide). In line with our findings, others have noted the value of off-loading some data entry from the physician or NP to an RN or MA, in order to maximize efficiency and allow clinicians to focus on patient care.[12,13,29] Alignment of professional competencies with legal scope-of-practice needs to be evidence-based and to also take into consideration what is safest for patients and most efficient for teamwork. The patient voice in this discussion is also critical.[30]

What is the accountable unit for documentation in the EHR when care is provided by the team? What some respondents described as the desire of compliance departments to have an "audit trail" in the EHR was felt by some to hamper teamwork. Requiring provider attestation (electronic signature)[31] on an EHR before an MA can carry out routine standing orders can waste physician time.[7] There is no single, widely accepted standard, law, or regulation regarding the use of e-signatures. So, organizations must individually review the various practices surrounding e-signatures, attestation, and authorship of medical record documents in the EHR (rather than being able to default to an accepted practice).

LIMITATIONS

We did not independently evaluate each practice's relative sophistication in terms of EHR use, so it is possible that some practices had EHR functionalities of which they were not aware. However, two independent HIT and primary care delivery experts with extensive knowledge of several different EHRs both confirmed that our practice respondents' experiences with inadequate EHR functionalities were consistent with what they have experienced in their work with primary care practices. In addition, the NCQA practice team element has not yet been validated, but it was the only source of a national sample of PCMHs available that included an empiric measure of practice teams.

CONCLUSIONS

In sum, while EHRs facilitate teamwork in several ways, particularly for communication, reinforcing roles, and task

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delegation, many practices have not been able to customize their EHRs to maximize support for teamwork. In addition, many EHRs need improved functionalities to be able to support teamwork, particularly in the areas of integrated practice registries, care management software integration, whole-person-oriented care plans, and longitudinal data tracking of individual patients and providers' panels over time. To maximize the potential synergy between primary care teamwork and EHRs, clinical workflows need to evolve alongside EHR customization and development of new functionalities, where possible. Practices also need coaching and support to adapt clinical workflows to accomplish team-based tasks and to customize EHRs to match those workflows. To this end, working with well-trained HIT experts could help primary care practices by: (1) bridging the gap between workflow and EHR use and (2) communicating what enhancements practices need and want to outside EHRs vendors. A shift in the policy and regulatory environment toward encouraging providers and EHR vendors away from their utilization for billing/administration documentation and tracing each data unit to the person who entered data and toward putting EHRs to work supporting team-oriented care for individuals and populations could bolster that evolution.

COMPETING INTERESTS STATEMENT

The authors have no competing interests to declare.

AUTHORSHIP

All listed authors meet criteria for authorship. Ann O'Malley is the guarantor of the work and led the design of the proposal, research question development, protocol design, data acquisition, analysis, interpretation, and reporting. Kevin Draper, Rebecca Gourevitch, Dori Cross, and Sarah Scholle all contributed to data collection and analysis as well as revisions of the iterations of the manuscript.

SUPPLEMENTARY MATERIAL

Supplementary material is available online at http://jamia.oxfordjournals.org/.

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