

Chapter 9

The Impact of EMRs on Communication Within the Doctor-Patient Relationship

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Introduction

Electronic medical record (EMR) use in clinical care is now the norm [1]. Worldwide, EMR adoption is near universal in many developed countries with primary care doctors reporting EMR utilization rates of over 97% in the United Kingdom, Norway, and the Netherlands [2]. In the United States, adoption rates have not yet reached this level; however, federal incentives and mandates like the Affordable Care Act (ACA) have resulted in significantly increased EMR utilization, with office-based EMR adoption nearly doubling from 42% to 83% between 2008 and 2014 [3]. As physicians increasingly integrate EMRs into clinical practice, it is important to understand the impact on patient–doctor communication and develop strategies to maintain patient-centered interactions in the digital age.

Physicians practicing medicine today need to maintain meaningful interactions with patients while managing the demands of the EMR. Concerns have been raised about the potential of the EMR to distract providers from focusing on patients, which may in turn have a negative impact on the patient–doctor relationship [4–6]. However, EMR use also has the potential to improve patient-centered care by facilitating communication and enhancing understanding and shared decision making [7–10]. It is critical therefore to minimize negative aspects of EMR use and seek ways to use it as a positive patient education and engagement tool.

Insight into this field comes from research examining the impact of EMR use from both patient and physician perspectives. Combining these findings with obser-

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vational studies measuring objective changes in physicians' communication behaviors provides the foundation for understanding best practices to promote patient-centered EMR integration. Translating principles of patient-centered communication from the traditional patient–doctor interaction into the new triad of patient–doctor–computer interaction is essential to preserving the benefits of patient-centered care in the computerized setting. Moreover, using evidence-based best practices to develop and implement patient-centered EMR use curricula helps promote an EMR culture that enhances meaningful patient–doctor communication.

This chapter describes the impact of EMR use on clinical care and patient–doctor communication. We will explore research that examines physician behaviors thought to both impede and enhance patient-centered communication, elucidate patient perspectives on physician EMR utilization, and identify best practices for patient-centered EMR use. Lastly, we will introduce curricular strategies to teach patient-centered EMR use to students, resident trainees and faculty to promote and reinforce optimal patient–doctor–computer engagement across the continuum.

Impact of EMR Use on Patient-Centered Care

The Institute of Medicine (IOM) defines patient-centered care as “care that is respectful of and responsive to individual patient preferences, needs, and values and ensures that patient values guide all clinical decisions” [11]. Moreover, the IOM has identified patient centeredness as one of the six domains that define quality care. The Picker Institute has further expanded the definition of patient-centered care to encompass the provision of high-quality patient education, emotional support, and coordination of care [12].

Integrating patient-centered care strategies has clear benefits for both patient and provider and can be a powerful instrument in the clinician's toolbox to provide effective and meaningful care. Research has found patient-centered care to be associated with fewer malpractice complaints [13], hospitalizations, tests and specialty referrals, and overall lower medical costs [14], which has significant bearing on quality metrics for healthcare systems. In addition, studies have found that patient-centered care is associated with higher patient and physician satisfaction [15, 16].

As clinicians integrate EMRs into clinical practice, the patient–doctor communication dynamic has to adapt to accommodate the computer as the third party in the room. In this new environment, it is important to understand how EMR use impacts efforts to provide patient-centered care. Interestingly, EMR adoption has sometimes been heralded as an initial step toward providing patient-centered care [17, 18]. However, integrating EMRs into clinical practice can only be considered patient-centered if it helps to enhance patient education, foster patient–doctor relationships and communication, and promote coordination of care. Conversely, when EMR use is not integrated well by practitioners, it can have a negative impact on the patient–doctor relationship.

Today's physicians should be taught what pitfalls to avoid and how to incorporate key EMR communication skills into their practice to promote patient-centered

communication. It is important for practitioners to routinely elicit, reflect upon, and respond to feedback on their patient–doctor–computer communication skills as part of their professional development and dedication to lifelong learning [19].

Additionally, in order to promote a culture of positive EMR use, providers need to advocate for improved EMR design from the standpoint of the patient and providers, call for national standards on EMR education, and work to implement curricula to help physicians focus on the patient instead of the EMR [20]. By doing so, medical educators can better prepare learners for the realities of practicing medicine today and pave the way to an era of truly meaningful EMR use.

Treating the iPatient Versus the Real Patient

Dr. Abraham Verghese has drawn attention to the unfortunate practice of treating the “iPatient,” the virtual patient who exists only on the computer screen as a set of labs and studies, while ignoring the real patient seated in the exam room or left alone in their hospital bed [21, 22]. The iPatient plays a prominent role in the modern day practice of medicine. As the time spent caring for the iPatient accelerates due to increasingly complex billing and documentation requirements, physicians may be inclined to make clinical decisions without meaningful direct conversation or input from actual patients [23]. For example, in the hospital setting, physician teams often gather in closed-off work rooms or stand outside patient rooms rounding on their iPpatients, reviewing data on computers or mobile devices without involving the actual patient themselves [24, 25, 41]. Unfortunately, when patient care decisions are implemented without meaningful interaction or communication between caregiver and physician, adverse patient outcomes may arise [21].

The situation in the outpatient setting is not dissimilar, and physicians may be apt to prioritize the iPatient over the patient in the exam [4–6]. Unfortunately, the current state of EMR utilization presents several challenges and frustrations for the physician user. EMR use often entails cumbersome and time-consuming data retrieval and entry. For example, a time motion study examining how clinic doctors spend their time found that for every hour spent providing direct patient care, two additional hours were spent on EMR and desk work during the clinic day and an additional 1–2 h were spent after clinic hours [26]. Interestingly, while in the exam room with patients, physicians spent 53% of their time on direct face to face time and 37% on EMR and desk work [26].

The National Ambulatory Medical Care Survey (NAMCS) is an annual survey administered by the Centers for Disease Control about the provision and use of ambulatory care services in the United States. In 2010, the NAMCS survey found that the average primary care visit was 20 min long [27]. If physicians spend a third of this precious time using the EMR, quality of care may suffer if they do not actively use the EMR to engage patients and enhance communication. In an attempt to be more efficient and seemingly patient centered, some physicians may choose not to use the EMR in exam rooms with patients. This however has its drawbacks by pushing EMR documentation and other work to after visit or after clinic hours,

which creates the potential for key information to be forgotten and eliminates the opportunity to use the EMR to engage patients in their care.

It is not surprising that EMR use has been found to negatively impact physicians' professional satisfaction and contributes to increased rates of physician burnout [28, 29]. Outpatient physicians are feeling increasingly torn between the need to attend to the tasks of the EMR while focusing on patients in the twenty minutes of face time they have with patients. Understanding the challenges and opportunities that EMR integration presents to patient–doctor interactions can help physicians improve their computer-side manner. Additionally, integrating patient-centered EMR strategies into practice may help to improve the quality of patient–doctor communication and has the potential to help physicians reconnect with patients.

Computing in real time in the presence of patients presents several unique challenges. Physicians who cannot touch-type often feel they are unable to pay adequate attention to or maintain enough eye contact with their patients as they document the encounter [30]. In addition, studies demonstrate that increased keyboarding can negatively impact patient-centered communication and may alter the content and style of providers' and patients' speech patterns [30–34]. Even physicians who are tech savvy can struggle with the cognitive overload of trying to be fully present and engaged with the patient while simultaneously trying to review their chart and enter orders [35, 36]. However, rather than choose one of two extremes, either focusing on the iPatient at the sake of the real patient or ignoring the technology and deferring documentation until after the visit, physicians should incorporate patient-centered EMR communication skills to allow them to remain focused on their patients while integrating key EMR tasks. In so doing, physicians can potentially improve their own satisfaction by minimizing after-hours EMR work in addition to creating opportunities to meaningfully engage and educate their patients with the EMR.

It goes without saying that the EMR and the iPatient are not surrogates for the real patient. Physicians must remain committed to making their patients feel heard, allow patients to drive the agenda, and continue to encourage questions and meaningful discussions. At the same time, providers must recognize the need to engage with the EMR and patient in real time to promote accurate documentation, minimize cognitive load, and reduce the burdens of afterhours EMR work. More importantly, if used well, the EMR can be used as a powerful communication-enhancing tool to allow patients to better understand their care, engage in their treatment, and feel more connected with their doctors.

Multitasking and the Perils of Distracted Doctoring

Paying more attention to the iPatient than to the real patient can lead to adverse patient outcomes and result in what is known as “distracted doctoring” [36]. For most physicians, interruptions in clinical care (i.e., returning pages or tending to urgent phone calls) are not a new phenomenon. However, providers today are contending with the constant pull to interact with their ever present smartphones and tablet computers [37]. These mobile devices are commonplace among medical

students, residents, and attending clinicians and may even be provided by medical schools and residency programs in an effort to increase provider efficiency and facilitate team communication [38, 39]. These mobile devices can enhance clinical care, and surveys have shown that providers are using these smart devices to enter orders, view test results, and document in the EMR to improve clinical efficiency [40, 41].

Mobile technologies have the potential to improve connectivity to clinical systems and EMRs, enhance efficiency, promote quality and safety, and improve access to patient information and the medical literature. However, while increased technological connectivity can help clinicians [42], it also introduces the risk of multitasking and resultant errors related to distraction [43].

The idea of multitasking centers around the belief that doing more than one task at a time is not only possible but promotes efficiency and saves time [43, 44]. Unfortunately, when dealing with the inherent complexities of patient care, studies have found that providers are unsuccessful at concentrating on complicated computer interactions while attending to the patient simultaneously [32, 45]. Moreover, multitasking can prevent providers from being fully present in the moment when caring for patients, interfere with concentration, and distract providers from the task on hand which can result in medical errors.

Adverse patient outcomes as a result of technology-related multitasking and distracted doctoring have been reported and can have serious consequences. For example, when physicians have multiple patient charts open while working on progress notes and order entry, medical errors related to inadvertently placing orders into the wrong patient's chart have been documented [43, 46]. In another case report, a physician was in the midst of entering an order to stop a blood thinner on an EMR-enabled smartphone when the task was interrupted by a personal text message. The physician responded to the text message and did not complete the order to stop the medication, which resulted in a significant bleeding complication for the patient [47].

The root causes of the errors described above are distraction and interruptions while trying to complete several complicated tasks at once. These examples describe real clinical errors in practice and illustrate how easily multitasking errors can occur. As physicians struggle with the task of processing a patient's concerns, reviewing data in the EMR, placing orders, and documenting the visit in real time, the potential for an oversight or multitasking error looms large. To mitigate these risks, it is important for physicians to accept that true multitasking for complex activities is in fact a myth and work to align their EMR actions with patient-care activities, thus reducing the potential for medical errors.

Research on EMR Use and the Patient–Doctor Communication

In the United States, federal incentives were introduced to promote meaningful use of EMRs with the goals of enhancing patient safety, improving quality, and increasing efficiency. While studies show that EMR use can contribute to these goals, it also introduced new risks and challenges [48]. Among these challenges, the effect

of EMR use on how well patients are able to connect and communicate with their doctors must be considered.

The research on the impact of EMR use on the patient–doctor relationship and communication is mixed. Some studies have found that EMR use can prevent doctors from focusing on patients, impede communication, and be detrimental to providing patient-centered care [5, 49, 50]. Other research has demonstrated a more positive outlook and found that EMR use can enhance communication and improve patient education and engagement [7–10]. In fact, there is tremendous variability in how individual providers use the EMR, and it is important to take these differences into account [33, 51–53]. Researchers have found that a provider’s baseline communication skills can either augment or detract from how well the EMR is integrated into clinical care. Interestingly, adding an EMR into the visit for a provider with poor baseline communication skills can worsen that interaction, while conversely providers who have excellent communication skills at baseline can thrive while integrating the EMR to enhance their patient encounter [6]. This points to the need to tailor specific EMR communication interventions to a provider’s individual skills.

Given the rise in EMR adoption globally, it is important to examine the current literature on the impact of EMR use on patient–doctor communication. Several recent literature reviews have looked at this question, and a summary of the research, lessons learned, and best practices is summarized below [54–57]. These findings can be used to develop curricula to enhance EMR-based communication, promote patient education, and empower patients to be more involved in their care.

Objectively Measured Physician Communication Behaviors

Several studies have utilized behavioral analysis to objectively describe physician communication while using the EMR [55]. These studies examined video-taped patient–doctor–computer interactions or analyzed data from directly observed encounters to identify EMR-related communication behaviors that may positively or negatively impact patient–doctor communication. We will summarize both sets of positive and negative physician behaviors in detail below.

These observational studies also help us understand how physicians and patients spend their time when an EMR is used in clinical care. For example, studies found that physicians devoted on average a third of the clinical interaction to EMR use, with considerable variability ranging from providers who spent as little as 12% to as much as 55% of the time using the computer [30, 46, 51, 58–60]. The amount of time spent using the EMR, however, may not give full representation as to how well the EMR was integrated into the encounter. For example, providers may have used the EMR together with patients to review medications, explain diagnosis or results, and provide patient education resources which in turn can enhance the quality of care. However, if a provider is all-consumed by the computer, fixated on the screen, and unable to maintain a meaningful conversation during the interaction, the patient may feel frus-

trated and disconnected. Thus, it is necessary to explore what specific behaviors are observed and *how* providers use their EMR time during the encounter in order to gain a better understanding of what behaviors should be adopted as best practices.

Potentially Negative Behaviors

Observational studies utilizing behavioral analysis of physician EMR use have helped to identify communication behaviors that were perceived by researchers to be negative. For example, as physicians navigate the EMR to review data, they may be prone to ignoring their patients as they engage with the computer. This can result in periods of awkward silence during the clinical interaction, which may leave patients feeling dissatisfied with the quality of communication with their doctors. In addition, researchers reported intermittent periods of silence as physicians engaged with the EMR, and in one study, silence accounted for 12% of the total interaction, with each silent spell lasting an average of 15.7 seconds [61]. From the patient's perspective, these intermittent periods of silence can interrupt the flow of conversation and lead to a disjointed experience.

Studies have also found that EMR use impacts how providers and patients speak to one another. When using EMRs, physicians were found to abruptly change topics, which detracts from the natural style of conversation, making it difficult for patients to maintain their physician's attention and may prevent them from addressing their concerns in depth [32, 46, 51]. Patients were also found to alter their speech patterns by synchronizing their speech with pauses in their physicians' typing, as they tried to modulate their narrative to accommodate their physician's EMR use [32, 62].

The amount of keyboarding, timing of typing and physicians' attitudes toward real-time documentation can also impact patient–doctor communication. Interestingly, some doctors prefer to type when the patient is not looking at the screen and do not allow them to follow along as they navigate the visit [45]. Patients may pick up on this behavior and assume that their doctors are not transparent in their documentation and EMR actions because they have something to hide, which can in turn discourage patients from meaningfully engaging with their doctors or the EMR. In terms of quantifying how much typing is done during clinical interactions, one study found that doctors engage in heavy typing a quarter of the time, which may discourage patients from speaking during these periods [30].

Another important behavior to quantify and understand is the amount of time the physician spends screen gazing versus maintaining eye contact with the patient. Research has shown that the amount of eye contact a provider displays is the most important determinant of a patient's perception of clinician connectedness and empathy, which is essential to building a trusting patient–doctor relationship [63]. Studies found that doctors focus on the screen for 25–55% of the clinical interaction and this behavior can adversely affect the patient–doctor relationship [46]. Not surprisingly, low rates of eye contact are associated with prolonged screen gazing and can result in perceptions of low connectedness from the patient's perspective [59].

In addition to screen gazing, screen positioning can also impact patient–doctor communication. When the screen is not positioned to allow for shared viewing by both patient and physician, lack of transparency and concerns about what is contained in the medical record may arise [64]. Beyond screen visibility, *active* screen sharing involves physicians purposefully inviting patients to view the screen and asking them to follow along as they navigate the chart, which may promote patient engagement and understanding of their health conditions [65, 66]. Unfortunately, studies found that providers share the screen only about 8–10% of the time [59, 66]. Since research has shown that patients have a more positive attitude toward the EMR when they are shown the screen, this easy but critically important act should be a prime target for education to promote patient-centered EMR use [66].

There is considerable variation in the amount of time and manner by which physicians use the EMR with patients. For example, some physicians use the EMR only at the end of the interaction to summarize the encounter, and some use the EMR continuously, while others are very minimal users overall and reserve EMR use for before or after the encounter [52]. Despite this variation, most physicians will start documenting the note in real time in front of patients, and they should in turn be mindful of how this keyboarding may interrupt the flow of conversation [51].

In summary, objective behavioral analysis of physicians and patients has found that increases in provider screen gazing, poor eye contact, heavy keyboarding, and disjointed speech patterns may negatively impact patient–doctor communication [67, 68] (Table 9.1). Equipping providers with the knowledge of some of these potentially negative behaviors can help inform them of what not to do when using the EMR with patients.

Potentially Positive Behaviors

Several physician communication behaviors have been thought to promote communication between patients and physicians. When physicians use EMRs well, they can be powerful tools to clarify diagnosis and treatment plans and can be used to engage patients in meaningful discussions to encourage true partnerships [69–72]. Specific behaviors that seem to facilitate patient-centered interactions included engaging patients to actively screen share by showing them their recent labs, reviewing radiographic images, using decision aids to assist in shared decision making, and inviting patients to engage with EMR data to promote healthy behaviors (e.g., reviewing cholesterol trends to discuss diet changes) [9, 36, 54, 64, 70, 73, 74].

Other potentially positive behaviors include “signposting” computer use by letting the patients know when the computer will be engaged and trying to maximize eye contact throughout the encounter by touch typing or establishing periodic eye contact during prolonged periods of screen use [46, 54, 64, 66, 70, 73]. Additionally, cessation of computer use when patients discuss sensitive or important topics is thought to be important in establishing rapport as it assures the patient that they are the focus of their provider’s attention [75]. Exhibiting verbal and nonverbal cues of listening, reading aloud, using empathetic language [46], and sharing information on the screen to allow the patient to follow along can all enhance communication

Table 9.1 Summary of negative and positive physician EMR behaviors

Negative EMR communication behaviors	Positive EMR communication behaviors
Long periods of silence while engaging with EMR [61]	Read information on screen aloud to allow patient to follow along and signpost to let the patient know when you will use the EMR [46, 64, 66, 70, 73]
Long periods of typing during visit leading to interruptions in conversation [30, 32, 51, 62]	Talk aloud while typing to promote patient engagement in note writing and accurate documentation [93]
Prolonged screen gazing resulting in poor eye contact [59, 93]	Maximize eye contact by touch-typing and engaging in periodic eye contact during long periods of screen gazing [46, 64, 66, 70, 73]
Screen positioned to allow only the provider to see the screen which leads to lack of transparency [93]	Screen positioned to allow patient and provider to see screen at same time to allow for active screen sharing [9, 46, 64, 70, 73, 74]
Closed body positioning, with provider facing the EMR and having back to patient [93]	Open body positioning (with provider's head, upper, and lower body oriented towards the patient) to promote unspoken and continued engagement [57, 63, 100–102]
Lack of patient engagement with EMR [93]	Use EMR to provide patient education, clarify diagnosis, encourage patients to ask follow-up questions, review studies and radiographic images, integrate decision aids to assist in shared decision making [6, 30, 45, 46, 52, 64, 66, 69–73]
Focus on the EMR during sensitive discussions [93]	Disengage from the EMR during sensitive discussions to focus full attention on the patient [75]
Abrupt topic changes while navigating the EMR, leading to disjointed conversation and visit [32, 46, 51]	Promote natural conversational flow by addressing the patient's concerns, actively sharing the screen to review relevant information, encouraging follow-up questions, probing for understanding, and engaging in shared documentation to summarize assessments and plans together [9, 46, 64, 70, 73, 74]

and promote patient-centered EMR use [46, 54, 64, 66, 70, 73]. Other potentially positive EMR behaviors relate to trying to make computer use unobtrusive by typing softly or speaking aloud while typing to maximize transparency of what is being recorded in the chart [32]. Interestingly, despite variations in physicians' individual styles of EMR use (i.e., heavily technology focused as opposed to more human focus), one study found that patients had high levels of trust and satisfaction with their physician's EMR use regardless of style [33], which may be related to the importance of continuity and the strength of the patient–doctor relationship prior to EMR implementation.

Furthermore, several studies show that when EMRs are used well, integration of this technology has the potential to enhance the patient–doctor interaction by encouraging physicians to clarify diagnoses and encouraging patients to ask follow-

up questions [69, 72]. Given the tremendous potential of the EMR to augment patient engagement, it is important to highlight these positive behaviors when looking to develop effective educational interventions (Table 9.1).

Patient Perceptions of Physician EMR Use

Observational studies identified physician behaviors with potentially positive and negative effects on patient–doctor communication. Interestingly, these studies were based on investigators’ interpretations and it is important to correlate these findings with patients’ actual perceptions of these behaviors through survey-based and qualitative studies.

Of eleven studies that used cross-sectional patient surveys (i.e., asking patients at one time point) to assess patient perceptions of the EMR, eight studies found no change in overall impact of EMR use on patient satisfaction, patient–doctor communication, or the patient–doctor relationship [76–83]. Interestingly, two of these eleven studies showed positive impacts on patient satisfaction as a result of EMR use [74, 84], and the last study demonstrated mixed patient perceptions [85].

When researchers surveyed patients pre- and post-EMR integration, most patients reported no change in overall patient satisfaction, communication, and the patient–doctor relationship as a result of EMR implementation [7, 8, 31, 86–89]. Importantly however, three of these pre-post studies found increased satisfaction with communication and the patient–doctor relationship, as well as an improved perception in the quality of care with EMR use [7, 8, 86].

Beyond general satisfaction measures, patients expressed mixed perceptions when surveyed about what they liked and disliked about their physicians’ EMR use. Overall, most of these patient perceptions were concordant with findings from the observation studies, and, not surprisingly, patients disliked it when their doctors displayed poor eye contact, looked at the screen more than at them, and used closed body language (i.e., having back toward patients) [33, 66–68, 90–92]. Patients reported that extensive typing during the encounter was disruptive and they disliked long periods of silence [67, 68]. On the positive side, patients liked when providers were transparent about what they were doing on the EMR and actively shared the screen to promote open communication [30]. Importantly, some studies found that EMR use improved patient understanding of their conditions, increased perceptions of empowerment, and promoted informed decision-making [7–10].

Qualitative Studies of Patient Perceptions

While survey studies allow insight into the patient perspective, qualitative analysis of patient interviews allows for a deeper exploration of patient experiences with EMR use. Two early qualitative studies showed a mix of positive, negative, and neutral patient responses; however, these studies were conducted before Affordable

Care Act (ACA) implementation and widespread use of EMRs [66, 91]. In a post-ACA telephone interview study, the majority of patients reported high levels of satisfaction with their physicians' overall use of the computer one year after EMR implementation [93], and patient quotes from this study will be used in the section below to illustrate pros and cons of EMR use from the patient perspective.

Patients liked that EMR use allowed doctors to improve clinical efficiency ("It makes the visit go smoother...they take notes and pull up my record...they don't have to flip through a huge chart"), promoted easy access to health information ("He can go back and look at important test results – he had it at his fingertips"), and enhanced teamwork among physicians ("They refer to each other's notes and communicate about what's going on with me. It makes me comfortable with the care I'm getting"). Patients reported that the EMR helped to promote accurate documentation in real time ("I like that he repeats and recaps what we talked about while he types it in. I am confident he captured what we discussed"), which should encourage providers to engage patients as they write notes in the exam room and use this as an opportunity to review the plan and provide further education.

Patients reported that, when used well, the EMR could be effectively used as a tool to facilitate communication and promoted better understanding of their medical problems and treatment plans ("I had a question ...and he went online and looked it up and gave me the answer' and 'We talked about a condition he thought I had ... he used the computer, pulled up information and printed it out for me"). One patient stated that when their doctor used the EMR with them, they were able to better understand their results and clinical progress ("We talked and looked at results together in the computer...we had an intelligent conversation about my progress"). Patients also liked it when their doctors used images, diagrams, and pictures to help explain their care ("They used diagrams and pictures in the computer to explain my medical condition, they also printed it out so I could take it home to my family").

In the same study, negative perceptions of EMR use was rooted in poor EMR-based communication skills. Patients were frustrated when physicians did not screen share and were not transparent with EMR use, as one patient put it, "I mean I know they're not on Facebook but I don't know what they are doing." Patients identified closed body positioning ("Some [doctors] come in and stare right at the screen, hunkered down...their back to you, it's not patient friendly") and poor eye contact ("He was talking and looking at the computer the whole time. I don't get the human connection") as factors contributing to decreased quality of care. Overall, patients disliked it when physicians were more focused on the computer than on them and when providers did not take advantage of the EMR to discuss their health or provide education. In one patient's words, "I just want my doctor's undivided attention ...the computer takes them away from focusing on you."

The collective findings from these observational, patient survey and qualitative interview studies establish the basis for evidence-based best practices and serve as the foundation for patient-centered EMR use curricula. In addition, the body of research identifying potentially negative EMR behaviors can be particularly instructive for physicians as they work towards improving patient–doctor–EMR communication by highlighting which behavioral pitfalls to avoid.

Improving Computer-Side Manner: Teaching Patient-Centered EMR Use Skills

In the EMR era, a physicians' computer-side manner can be thought of as the modern equivalent of the age-old bedside manner concept. Just as poor bedside manner can leave the patient feeling dissatisfied, frightened, or alone, poor computer-side manner can leave patients feeling ignored or disengaged. In our high-tech times, providers need to be trained to improve their computer-side manner. Doctors should be taught to use the EMR as a communication tool to cultivate relationships with patients and ensure that the computer is not seen as a shield or barrier to high-quality communication or care.

Based on the findings from the studies discussed above, a collection of best practices for patient-centered EMR use is summarized by the mnemonic HUMAN LEVEL [94, 95]. These ten best practices describes behaviors such as "H" for **h**onoring the golden minute by starting the visit technology free and allowing the patient to start with their concerns and "U" for **u**sing the triangle of trust to place the screen in a position to allow both the patient and doctor to see the screen at the same time. The full human level mnemonic is summarized in Fig. 9.1.

Engaging physicians at all levels of training and practice to integrate these patient-centered communication strategies can help mitigate negative patient perceptions and optimize the use of EMRs as patient engagement and empowerment tools. Major medical education organizations, like the Liaison Committee on Medical Education (LCME) and the Alliance for Clinical Education (ACE), have called for adequate EMR training for medical students in order to prepare them to practice in our current healthcare environment [96]. Interestingly, the ACE calls for EMR training to start in preclinical years to allow students to develop sound EMR skills early, which may allow for good habits to take hold before exposure to potentially negative role modeling during clerkships.

One challenge in teaching patient-centered EMR use curricula to students may be the limitations placed on student access to medical records. There is great variability across institutions regarding student utilization of the EMR, with some institutions barring students from using the EMR completely, some granting full but supervised access, and others allowing partial EMR access with view only privileges without the ability to charting or enter orders [97, 98]. Since the vast majority of students will be using EMRs to provide patient care and in order to adequately prepare them for this reality, medical educators should advocate for student access to EMRs and work toward implementing EMR curricula [98].

Resident education is equally important and timely since these trainees are transitioning to their careers in clinical medicine, starting to develop their own practice styles, and developing core clinical skills. Interns in particular may be primed for training on patient-centered EMR use since they are tasked, often for the first time in their training, with navigating how to meaningfully interact with patients while using the EMR in their daily practice. Residents may also be exposed to negative EMR communication behaviors from observing their faculty or near peers. At the

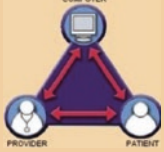
HUMAN LEVEL - 10 Tips to Enhance Patient-Centered EMR Use ^{95,96}		
H	H onor the "Golden Minute"	Make the start of the visit completely technology free . Greet the patient, start with their concerns and establish an agenda for the visit <i>before</i> engaging technology.
U	U se the "Triangle of Trust" 	Create a triangle configuration that puts you, the patient and the computer screen at each of the three corners. This allows you to look at both the patient and screen without shifting your body position, and also enables shared screen viewing.
M	M aximize patient interaction	Encourage patient interaction . Pause for questions and clarification. Allow time for questions and to verify understanding.
A	A cquaint yourself with chart	Review the chart before you enter the room to prepare, inform and contextualize your visit.
N	N ix the screen	When discussing sensitive information, completely disengage from the EMR (look at the patient, turn away from screen, take hands off keyboard, etc.)
L	L et the patient look on	Share things on the screen with your patients.
E	E ye contact	Maintain eye contact with patients as much as possible. Treat patient encounters as you would a conversation with friends or family members.
V	V alue the computer	Praise the benefits of the EMR and take advantage of opportunities to use technology as a tool to engage patients (pull up lab result to review together, utilize graphics, etc.).
E	E xplain what you're doing	Be transparent about everything you do. Avoid long silences, aim for conversational EMR use by explaining what you are doing as you are doing it.
L	L og off	At the end of the visit, log off of the patient's chart while they are still in the exam room. This reassures the patient that their medical information is secure .

Fig. 9.1 Human level mnemonic for patient-centered EMR Use [94, 95]

same time, teaching best practices and providing feedback about their interactions with patients is particularly important since they will soon be role modeling EMR use for junior trainees. Access to resident learners can be challenging due to their long work hours, work-hour restrictions, and crowded curricula. However, finding the opportunity to address these this topic in residency allows for reinforcement of best practices at a critical time in their professional development and should be a priority for medical educators.

Lastly, faculty and practicing physicians also need training on how to integrate and role model best practices [20, 99]. Faculty must be equipped with the tools to

teach and give trainees feedback on these skills in order to meaningfully impact how students and residents use EMRs with patients. Finding time to provide training to faculty is logistically challenging, perhaps even more challenging than with residents or medical students learners. Faculty are often busy juggling demands of busy clinical practices, in addition to managing their teaching responsibilities and scholarly work. In addition, faculty may not be required to participate in skills training sessions, may not have institutional support to take time out of their clinical practice to attend trainings, and are often at the mercy of clinical productivity demands. Despite these challenges, targeting faculty for training is important in addressing the hidden curriculum and empowers faculty to provide meaningful feedback on these skills to their learners.

More importantly, longitudinal training throughout one's career is essential to ensure continued reinforcement of key concepts and successful integration into practice. Training students, residents, and faculty at these different time points in their clinical development allows for opportunities to reinforce training, provides feedback, and allows for individual self-reflection in the clinical context. Despite widespread EMR adoption, calls for improved EMR education and available best practices, longitudinal curricula on patient-centered EMR strategies remain rare [6, 45, 69–71, 90]. Many factors contribute to the dearth of longitudinal curricula, including lack of resources and time to participate in training and lack of formal requirements for training from medical education or professional licensure organizations [99]. Despite these challenges, there are some existing programs that are at the forefront of delivering this longitudinal curricula to students, residents, and faculty.

One model for a longitudinal curriculum exists at the University of Chicago. The patient-centered EMR use curricula is introduced to second-year medical students as a one hour lecture within their required clinical skills course and highlights the best practices summarized in the HUMAN LEVEL mnemonic (Fig. 9.1) [94, 95]. The students then participate in a group observed structured clinical exam (GOSCE), during which students interact with a standardized patient (SP) while using the EMR to discuss a chief concern of abdominal pain, review relevant lab results and prior notes, and counsel on lifestyle modification. To create a high-fidelity experience, students navigate a mock patient chart in the EMR. Students receive immediate feedback on their ability to provide patient-centered care while using the EMR from their peers, from the SP, and from a faculty facilitator.

The students receive a refresher on this material prior to their transition to third-year clerkships during a three-day Clinical Biennium which trains rising third-year students in hands-on skills that they will need during their clinical rotations. During the biennium, the students receive a lecture on "Technology Skills for the Wards," reviewing patient-centered EMR use best practices. Lastly, the third-year students have one more opportunity to reinforce this material through the clinical performance experience (CPX), which is a day-long series of OSCEs at the end of their clerkship year. One of the CPX OSCE stations is dedicated to patient-centered EMR use and is modeled after the second-year OSCE, which allows students to once again practice their skills and receive feedback from the SP.

Internal medicine and pediatrics interns and residents also receive a one hour lecture on best practices. The lecture incorporates a trigger video which illustrates poor EMR use and learners discuss barriers to patient-centered care observed in the video before moving on to learn about best practices and practical strategies for implementation. Due to time constraints, an OSCE experience was not possible, however providing this lecture allows interns and residents to be more intentional about integrating the EMR into their clinic and inpatient workflows. In an effort to expand this training to other residency programs, a condensed 15-min patient-centered EMR use curriculum was integrated into the institutionally required EMR training for all incoming interns, residents, and fellows during their orientation to the University of Chicago and offered early exposure to this type of training. This novel partnership with the institutional EMR trainers allows for augmentation of required EMR training to include communication skills and allows for an easy and efficient way to access to trainees.

Lastly, through a faculty development program, faculty from all departments have the opportunity to participate in a free CME-accredited 90-min training that includes a 20 min lecture on best practices followed by a GOSCE based on the student curriculum. Faculty interact with an SP and discuss their chief concern, review relevant data in the mock EMR patient chart, and document various components of the visit including the history of present illness, assessment and plan, and after-visit summary with patient instructions. Faculty receive immediate feedback from their peers, the SP and a faculty facilitator.

This longitudinal patient-centered EMR use curriculum has been well received and allows for targeted training at each stage of one's medical career in order to build on existing knowledge and promotes meaningful integration of this content into the culture of clinical care. These strategies to approach training on patient-centered EMR use can be tailored to different clinical environments and are adaptable to a learner's specific needs.

The EMR is a permanent part of the clinical care environment and clinicians need to work to continually improve their skills. Curricula for patient-centered use and strategies to teach these best practices exist and are feasible to implement. Developing longitudinal curricula on this important topic can help to create a culture of patient-centered EMR use by introducing formal training and feedback mechanisms throughout all stages of physician development.

Conclusion

When used well, the EMR can be a valuable tool for physicians to create meaningful interactions with patients, promote engagement, and enhance patient-centered relationships. Physicians can be taught best practices to integrate patient-centered communication strategies into their EMR workflow.

Ironically, while physicians exhibit potentially negative communication behaviors with EMR use (e.g., interrupted speech patterns, long periods of silence, and

low rates of screen sharing with patients), the majority of studies examining patient perceptions reported no change in overall satisfaction, communication, or the patient–doctor relationship, and some studies showed improved perceptions on these domains. Qualitative studies found that patients are satisfied with their physicians’ EMR use overall and liked that it improved clinical efficiency. Despite these encouraging findings, researchers have identified negative EMR-based communication behaviors that can adversely impact patient doctor communication. For example, patients felt disconnected from their doctors when there was poor eye contact, the physician’s back was to them, or if they sensed a lack of transparency with EMR use. These findings should encourage healthcare providers to embrace EMR use and work toward integrating patient-centered care strategies while managing the demands of the EMR.

Lastly, medical education targeting the continuum of learners can help foster humanistic patient–doctor–computer interactions and improve a physician’s computer-side manner. Moreover, medical educators, health systems, and policy leaders should advocate for inclusion of communication skills content into mandatory EMR training to promote collaborative and humanistic EMR use. In conclusion, understanding the impact of EMR use on patient–doctor communication and implementing evidence-based best practices to promote patient-centered EMR use are fundamental to promoting humanism in the digital age.

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