EHRs and Contexts of Use

A Providers’ Perspective on EHR User Experience

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It’s not a new concept. Most modern EHRs, descending from products designed for a desktop experience, are out of date in terms of mobile access. As phones, tablets, and other devices bring a desktop’s display and processing beyond its stationary role, software systems are expected to follow along, providing a continuous experience across a variety of new contexts and platforms of access.

Demands on healthcare providers leave them with a strong need for timely access to relevant medical information, in both inpatient and outpatient settings. Yet particularly with regard to interactions between doctor and patient, there is a delicate balance between technology that supports vs. technology that interferes. This balance becomes difficult to achieve as technology is expected to support increasingly varied and complicated workflows in clinics and hospitals alike.

Today’s complex inpatient and outpatient EHR systems represent significant differences between both forms of care and the organizations that support them. They have different challenges, processes, certification criteria and measures for clinical quality. Efforts to integrate them in a single platform have focused on facilitating the efficient management of workflows, information exchange, and documentation. But this is not enough. We have to understand the fundamental human experiences and priorities of physicians and their patients in different contexts of care to develop the next generation of innovative EHR solutions.

In conversations with doctors from The Brigham and Women’s Hospital, MGH, Cambridge Health Alliance, and other health organizations, we looked at how providers are adjusting to rapidly increasing standards for digital information in healthcare. In this report we explore how EHR systems need to be designed with a better understanding of the different contexts of practice for healthcare professionals and the flexibility required to satisfy their emerging needs.

EHR systems are based on optimizing value, whether in terms of claims accepted, time saved, information exchanged, or overall quality of care.

However, value in a health organization changes based on context, and from stakeholder to stakeholder.

Therefore, when considering the increase in quality expected with more pervasive EHR technology, it’s important to define: quality for whom? In what context? How do we define and measure quality in different situations?
EHR Priorities and Value: A Context-Based Perspective

Priorities and therefore value in a medical environment vary across different contexts of practice. We learned how practitioners use different information gathering, monitoring and sharing techniques based on the context of their interaction with patients and colleagues.

Time invested in a quality doctor-patient interview could generate value in terms of information exchanged, quality of care, and efficiency gains later on. A rounding doctor with many patients to visit may find more value in time saved in between patients. While teaching, a doctor may value information exchange above other factors.

In between rounds and consultations at his hospital, Danny, an endocrinologist, sees patients in his clinic. Although his patient record looks and functions much the same for outpatients and inpatients, for new patients and old patients, Danny is actually working and thinking very differently based on the specific mix of these factors. His story reflects essential insights from our research and is representative of common needs, pain points and aspirations towards context-aware mobile EHR systems.

In our research, THE MEME found differing priorities for two key contexts:

1) Outpatient Care: Calibrating the Doctor-Patient Interview

2) Inpatient Care: Juggling Tasks on Rounds

Most EHRs have one set of standardized views and functions, yet doctors work and think very differently depending on the context in which they operate.
“If they’re in front of me, I don’t want to sit at a computer and look at a screen just to look up the history. I want to know what they have, and what’s going on, so that I can focus on them.” — Danny

A doctor taking the time to hear carefully a patient’s history can draw out potentially sensitive information and make a more informed diagnosis. More time spent informing the patient about the latest medical findings on their condition can enable them with strategies to improve their health. An EHR tailored to the sensitive context of the doctor-patient interview could adjust its display to become less distracting or invasive.

What can we learn from Danny?

With a new patient, Danny’s strategy is to make a big time investment, performing a thorough review of systems and taking extra time to explore a patient’s background while setting the stage for a positive interpersonal relationship. Such initial investment establishes this relationship as a channel for education and a means to increased patient awareness and autonomy.

“For new patients we may have an hour, but some of the more established ones we only have 15, 20 minutes. You have to make good use of time. I find that by putting in the time up front, the follow up visits become easier. They can manage their own diseases process. They get less frustrated if I can tell them what they can expect, what to look for… things like that.”

An EHR that understands the importance of patient encounters, specially at the early stages of a doctor-patient relationship, could provide a different overview of information and prompt more doctor-patient interaction during the first several encounters.

During doctor–patient interviews value comes from support of careful communications where subtle interpersonal dynamics can be crucial. Patients can share information about themselves allowing physicians to understand better who they are, their goals and expectations, seeing them as individuals beyond their medical condition.

“Your heart and soul needs to be with the patient, in the room, showing you care about them, their problems, what’s going on. At the same time, someone’s told you where you need to document it, what list need to be filled, what will get reported on. So you need to make sure as you’re seeing a real person with real issues, that you also have the things that need to be measured in the right place.”

EHR systems can be an effective environment to support the way doctors need to empathize and engage with patients, minimizing disruptions and providing tools to facilitate conversation, easy documentation and meaningful patient interactions.
2) Inpatient Care: Juggling Tasks on Rounds

“There’s very limited information that you can only get at the bedside of the patient, but I can get nearly everything from the computer. And there’s always things I need to discuss with the patient or see what actually happened.”

Beyond adapting to a personal tablet or phone’s form factor, an EHR can support the fact that the doctor is in a mobile state in a medical environment. A smart system should anticipate the multiple “touch points,” or contexts and platforms of access (which affect a doctor’s role and immediate interests), recognize them, and optimize its interface accordingly.

What can we learn from Danny?

On rounds, Danny the endocrinologist wishes he could quickly pull up a streamlined record or keep a running feed of blood sugars for select patients. Without a responsive system, doctors are left with few options other than writing down information ahead of time or simply functioning without the desired data.

He expresses a common aspiration of many providers:

“My hope was that it as we’re rounding, I could access all of the information real time that I could at a desktop... Unless you have the time to sit down at a computer and look at all this up before you round, you’re operating in the dark.”

While Danny is on the go, he needs to easily view relevant items. Danny needs to know: what has the rest of the team done for this patient recently? What key agenda items, such as surgery, new treatment regimens, or hospital discharge, are currently scheduled for this patient? Which vitals are most important to track for this patient?

Other items, such as history of diagnosis, family history, and insurance information, may become less relevant for a rounding physician. Whether by supporting dictation, or changing its displays, adapting to a new hierarchy of information, an EHR can predict the increased cognitive load of a rounding doctor in order to avoid an information overload that might take valuable time to process.

Danny’s frustration indicates his EHR system’s failure to meet his needs in this context, despite its aspirations to do so. While the same interface might relieve Danny’s workload or meet his needs in a calmer setting, its inability to adapt to a fast-paced time-limited workflow such as rounds indicates a missed design opportunity.

Instead of having one fixed view for all scenarios, an EHR well fitted to its users should adapt its view and functions to accommodate to their location and role-specific needs.
Adapting to Contexts of Care Suggests New Capabilities for EHR Technologies

We learned how context of practice is an essential component in diagnosis, treatment and doctor–patient communication. In-patient and out-patient practices are scenarios of very different work and information flows. Levels of care and coordination can change significantly, creating a very different demand for information access and interaction.

The paradigms of data anytime-anywhere and digital convergence established by mobile devices, cloud computing, and digital services is not yet a complete reality in health care practice. This is an opportunity to think differently about the future capabilities of EHR technologies, in order to reengineer systems and processes towards flexible and mobile experiences that can adapt to practitioners needs in different contexts of care.

In our research, we found that:

1) Doctors aspire to a robust portable EHR experience
2) Doctors aspire to role and context specific flexibility
3) Doctors need increasing support for electronic collaboration
1) Doctors aspire to a robust portable EHR experience

Despite efforts to satisfy clinicians’ demand for mobile access, current EHRs are still far from providing a satisfactory mobile experience. The focus has been on providing remote access to existing EHR desktop based systems, a solution that falls short by not taking full advantage of mobile technology. Providers end up with an interface that was not designed for small touch screens, so retrieving and entering data can be frustrating.

“I bought an iPad hoping that it would simplify things... I thought that having it on the inpatient service would be helpful. Maybe as we were rounding I could put notes, at least jot things down. But I found that to be difficult. Trying to type or scrolling on the go was actually hard. The easiest thing to do was to sit down at a computer and update all the data, and then log everything on a piece of paper to take with me.”

Development of native mobile EHR applications is taking off, but to provide meaningful user experiences a deeper level of understanding of the diversity of contexts of care, as well as doctors’ challenges, is required.

2) Doctors aspire to role and context specific flexibility

Health care professionals work in dynamic environments that require of them agile and flexible responses to different practice challenges. Information systems should provide stable platforms that can adjust or be adjusted to meet these needs.

Standardization of systems and streamlined processes recognize what is common to provide efficiency, but lack the flexibility required to adapt quickly to changing care environments.

“I’m in between patients, I’ve got a few minutes where I can just quickly check things, or if I’m sitting down for lunch I can actually make a few phone calls. It would be helpful not to have to clip through all my telephone encounters or all the other things I don’t need”

A care provider may be at home on a personal desktop, finishing notes from the day. They may be in the cafeteria reviewing patient records before appointments on their mobile device. Or they may be on rounds or in a meeting trying to share and discuss patient’s notes with colleagues to make decisions. We also spoke to doctors about alternative or unexpected contexts in which they see themselves accessing EHR data.

“I remember a specific call from an emergency room while I was driving. They had one of our patients come in saying he had a life threatening medical problem. Had I been able to look in the patient’s chart (which I couldn’t in my car) I could’ve figured out what his medical diagnosis was.”

EHR systems can be designed to anticipate to an appropriate degree these different contexts and provide flexible viewing and editing options.
3) Doctors need increasing support for electronic collaboration

There is an increased awareness in health care organizations about the risks and costs of poorly coordinated care. EHR systems will have a bigger role to play as a process management platform than just a centralized data base of medical information.

Patient care is usually provided by large teams of professionals that have different workflows, practice in different environments and have particular interactions with the patient. A complex system of information, communications and decision making processes that needs to be carefully coordinated for optimal results.

“...We’re usually consulted by surgeons, the medical team and the ICU team. So as they see patients and put in their progress notes, it’s would be helpful to know what their plans are. Do we need to transfer the patient off the insulin drip? Are the post-op patients that are doing well going to be discharged? If so, I need to start thinking about what their outpatient regimen will be.”

Doctors are still in need of better tools to orchestrate more effectively seemingly disparate efforts, overlapping roles and sometimes unclear tasks. Improved coordination results in high-quality referrals and transitions, and in providing all needed information and resources to optimize patient care.

“If I want to communicate with another doctor taking care of another patient in the hospital, the only sure way is to pick up the phone and call. We don’t have a good communication tool for the inpatient system at all.”

Simple and reliable communication mechanisms, as well as easier ways to produce and access real-time data, can go a long way to facilitate better workflows between medical teams.

“I can write a note that says, “I saw this patient, here is my opinion” and flag it, hoping someone will read it, but I don’t know. That’s not very reliable. It doesn’t facilitate real-time communication about the patient. I may not write my note until 6 hours after I see them so there’s often a delay.”

EHR systems today capture standard medical workflows across different specialties and create structured ways to enter data that follow carefully these scripted processes. It works well for documentation and basic communication purposes. But that is changing. What is required is flexible tools to manage those workflows and processes in real time and in fast-paced complex settings, allowing for more effective collaboration based on tailored sets of patient’s medical information.
Moving Forward: EHRs as Context Aware Coordination Platforms

Acknowledging the large benefits and improvements that EHR systems have brought to medical practice so far doesn’t mean we’re anywhere close to the potential benefits that they can still provide. As existing systems are being upgraded and new solutions envisioned, how are they adapting to the multiplicity of contexts of medical practice? How can they become effective tools that increase the desired efficiency indicators while improving quality of care?

EHRs are entering an era of fast development into a pervasive data infrastructure for health services. It is essential to explore new ways in which EHR systems can take advantage of current and emerging mobile information technologies to adapt to changing environments of practice and provide meaningful experiences.

In our research, we found 2 key areas of opportunity:

1) Capitalize on existing technologies to create a flexible context aware system.

2) Focus on workflow management and coordination to provide increased benefits and value.
Medical information is moving from paper to desktop computer, to mobile devices. EHRs will become the backbone of a networked ecosystem of devices and sensors that will make data ubiquitous and responsive to doctor and patient needs in specific contexts.

- Use sensing technology such as Radio Frequency Identification (RFID), Near Frequency Communications (NFC), bluetooth and WiFi, to connect mobile and medical devices with EHR data, patients, medical staff and the physical environment.

- Develop a location-based system that can collect data from the environment in real time (i.e. specific location, patient identification, members of medical team present, task, schedule, etc.).

- Analyze data collected from the location-based system to provide filtered patient information that matches specific workflow scenarios.

- Provide selected user interfaces and features for doctors with access to context-based patient and medical team data.

- Develop context-specific modes where functionality changes according to specific settings by activity (eg. Turn on Rounds mode, turn on Charting mode).

- At the mobile interface level, provide adequate tools to scale in or scale out of complex data sets.

- During outpatient interviews a shared graphic interface with prioritized information tailored for each patient could facilitate more specific and engaging conversations. This would allow patients to participate directly in data sharing, education, and decision making, helping doctors to be more effective.

1) Capitalize on existing technologies to create a flexible context aware system.
2) Focus on workflow management and coordination to provide increased benefits and value.

EHR systems will evolve from their current model as central repositories of medical data into dynamic platforms for process management, decision making and coordination.

- Develop a coordination dashboard to provide clear visualizations of the patient care process, professionals involved, tasks, real-time updates, milestones, and simple overviews of goals, plans and next steps.

- Highlight information relevant to collaboration and medical team coordination activities. It can be a team centered view of the EHR instead of patient centric or time-based only views.

- Provide visible confirmation of activities performed by all medical staff and team members for a patient. Include real-time tracking of key milestones, if other doctors are currently viewing the same data or have added information historically, etc.

- Easily track changes from last time viewed. What is new to me? Provide updates that make sense to doctors, highlight what they are interested in.

- Provide tools to reinforce connections with patients, including reminders, alerts, motivational and support messages that can help patients manage their recovery or condition over time.

- Allow for process customization in the EHR to tailor specific workflows to unique cases, roles, and participants in the process. The system should allow easy addition of features and steps according to previously established process descriptions and user interfaces.