

Certification/Adoption Workgroup
Usability Panel
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Written Testimony

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“Usability is possibly the most important factor hindering the widespread adoption of EMRs. Usability has a strong, often direct association with clinical productivity, error rate, user fatigue, and user satisfaction.”(1)

Introduction

Thank you for this opportunity to provide a practitioner’s view of usability. My name is Christine Sinsky and I am a board certified general internist at Medical Associates Clinic in Dubuque, IA. We are a level 3 PCMH and have had an EHR since 2003. The hospital at which I do the majority of my inpatient work installed an EHR around the same time.

In the last five years I have also had the opportunity to work with primary care physicians across the country on practice redesign and the medical home, shadowing physicians in large academic centers and small private practices, in rural community health centers and urban integrated delivery systems. Through these experiences I have seen the beneficial transformation of care through the use of HIT, for example by virtue of access to records across settings, integrated health maintenance reminders, and point of care access to on-line references.

At the same time I have witnessed discouragement among nurses and physicians over the impact EHRs have had on the nature of their professional lives: the quality of the care they can provide, the length of their workday and the diminished joy in practice. Improvements in usability are urgently needed to address this widespread experience of overwhelm. I will share with you a few examples and then offer recommendations.

Dimensions of Usability

Time: Every click, scroll and screen change matters. When the myriad of tasks that compose a nurse or physician’s workday each take several minutes rather than several seconds the process can become untenable. For example:

- **Time to navigate drop-down boxes:** One primary care physician reported it takes 10 min to order a routine mammogram through her CPOE system, a task that should reasonably require no more than a few seconds of clinician time. A brief study in my own practice found the time to enter a typical family history on paper was 23 seconds and in structured text in the EHR was 2 min and 14 seconds. In many systems this type of clerical work is tasked to the physician. Multiply 2 min per task by the number of tasks each day and it isn’t surprising that many physicians report the EHR has added two hours to their workday. This time is not free but comes at a cost of quality of care and professional satisfaction.
- **Requirements of rigid, order pathways:** As part of medication reconciliation for a patient discharged on as needed over the counter loperamide (Imodium). I got stuck in a series of futile, circular hard stops. The EHR demanded to know the exact day, hour and minute the patient should stop the Imodium, details that are not clinically relevant for this medication. After 5 minutes, many clicks and much frustration I had no choice but to input arbitrary data points to be allowed to move on.

- **Cumbersome steps for data acquisition:** Data previously accessible on a one-page flow sheet (i.e. a woman's pap smear results over the past 15 years) are now sequestered in each in individual files at the end of complex navigation pathways, increasing the time and mental work of acquiring each data bit.
- **Task Distribution:** In the first generation of EHR implementations the assumption has often been that the nurse and physician will assume work previously done by others: transcription, order entry, scheduling, and pharmacy. This has resulted in less time for higher level thought about the patient's overall care and less time for relationship building. As one patient put it: "My doctor never looks at me anymore, he is so busy typing. I don't feel like he is listening, and I don't like it."

Cognitive workload

Medical care requires synthesis of complex data sets and makes high demands on information processing and memory. Physicians in many practices are drowning in "dys-organized" data. It cannot be assumed that simply because a piece of information is somewhere within the EHR that it will be easily available to the clinicians caring for the patient. It may be buried in an inaccessible location or overlooked because of poor information display.

- **Clutter:** Just as more care is not always better care, more information is not always better. Low priority information often clutters screens and needlessly increases the cognitive work of information processing.
- **Disorganization:** Medications are not routinely organized in a manner that supports rapid cognitive processing. For example in one record "furosemide 80 mg q am" was listed in the midst of medications on page 1 of the med list. To my surprise I later found an entry for "furosemide 40 mg q pm" much further down the medication list, separated by many intervening medications and on the next page. A single entry of "furosemide 80 mg q am and 40 mg q pm" is more user friendly and requires less mental gymnastics to develop an understanding of the medication regimen.
- **Death by pdf:** Fifty pages of outside records scanned in pdf format are technically "in" the record, but functionally the information is not readily accessible to the clinicians. In our hospital the reports of some in-house procedures, such as cardiac catheterizations, are generated on independent software and are also scanned in to the EHR as pdfs. The user is able to read only a few lines of text at a time through a narrow window. This presents a structural barrier to comprehension.
- **Burnout:** Frequent interruptions in workflow and thought flow add to the mental stress. This combination of increased time pressure, mental stress and frequent interruptions diminishes the joy of work and risks burnout.

Usability Recommendations

We are still in the first generation of EHRs and haven't begun to harness the full power of the EHR to improve care. The question is what kinds of policy decisions and environmental changes will foster the rapid evolution from the current state of usability to one that more clearly matches this potential. I believe the locus of responsibility for this transformation resides at several levels within the healthcare enterprise.

- **Vendors**
 - Develop streamlined methods of entering, retrieving and displaying complex data sets. Include hovering technology and prioritized layers of information display.
 - Display data from disparate sources on a single screen rather than buried in separate silos.

- Create navigation pathways that match the workflow and thought flow of clinical work, rather than expecting that complex clinical workflows should be made to conform to the linear, rigid and fragmented pathways.
- **HIT Professional Associations and Certification Agencies**
 - Develop usability metrics
 - Publicly report usability comparisons across EHR products.
- **Provider Institutions**

The physical and personnel infrastructures at the institutional level need to maximize the utility of the EHR. ONC could consider issuing recommendations (not requirements) with respect to:

 - **Hardware:** Large screens, dual monitors, computers in each room, sufficient bandwidth and processor speed will all greatly enhance usability. The difference between working with one 17 inch monitor and two 24 inch monitors is the difference between having to scroll to pick up pieces of data vs being able to see the big picture all on one screen. An instant rather than 35 second page down load goes a long way to promote usability.
 - **Personnel:** New staffing models are required to maximize the utility and the positive impact of the EHRs. Some organizations have hired clinical assistants who serve as human intermediaries between the provider and the EHR will allow the physician can focus most of his efforts directly on the patient.
- **Regulators**
 - Develop usability standards and testing as part of EHR certification.
 - Require public reporting of comparative vendor performance of usability
 - Foster an innovative vendor environment by
 - Requiring interoperability at the enterprise level to allow the wholesale migration of an organization's data from one vendor to another. Without this the purchaser has little leverage. In the current climate once a purchase has been made the user is essentially locked in.
 - Requiring interoperability at the modular level, ala smart phone apps, so that a purchaser could select the best combination of applications, for example a robust family history module from one vendor and an outstanding medication management module from another.

Conclusion:

Nothing in the past 24 years of my professional career has had as profound an impact on my ability to care for patients as the EHR, much of it for the better, and unexpectedly, some of it for the worse. All of the ways the EHR has made it harder for me to meet my best intentions as a physician can be boiled down to issues of usability: the added time and cognitive workload associated with doing the same work in an electronic format. Usability is a direct determinant of patient safety, quality of care, access to care and professional satisfaction. I am pleased that you are considering its impact. Thank you for this opportunity to share ideas with your committee.

*These perspectives are mine and do not represent the organizations with which I am affiliated.