

## Physicians Use of Electronic Medical Records: A Cognitive Task Analysis

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### **1. Background and aims**

The motivation to use information systems in healthcare is driven by the expectations that these systems will improve the quality of care, increase patients' safety and cut down medical costs. It has been demonstrated that the use of information technology improves healthcare by increasing adherence to medical guidelines, clinical monitoring based on large-scale screening, data aggregation which is not feasible with paper, and reduction of medical errors.

However, at present information systems in healthcare are not used to their full potential. A number of studies suggest that the use of medical information systems is limited to certain tasks or functions. Others reported differences in system's knowledge, operating skills, satisfaction and usage levels between different user groups which impede utilizing the full potential of information systems in healthcare to improve communication among caregivers. Recent findings suggest that the use of information systems itself might induce new types of medical errors, such as in entering and retrieving information and in coordination and communication processes. Possible consequences include medication errors, orders not being performed and even increased rate of mortality.

The computer is also a new player in the old patient-doctor encounter. It has been proposed that information systems have the potential to help sharing understanding between doctors and patients, thereby educate and empower both and make the patient-doctor encounter more effective. Still, the new patient-doctor-computer relationship is just beginning to be studied, and preliminary results suggest both positive and negative impacts.

The purpose of this study is to reveal patterns of EMR use, the difficult cognitive elements underlying it, types of errors that might occur as result, the impact on patient-doctor communication as well as the role of expertise in EMR use.

### **2. Methods**

In this research-in-progress we conduct a Cognitive Task Analysis (CTA) of primary care physicians' use of Electronic Medical Record (EMR). CTA is a methodology for characterizing and describing the cognitive elements in performing complex tasks which underlie goal generation, decision making, reasoning, information processing, etc. There are various approaches to CTA. In this study we employ the approach suggested by Kushniruk & Patel (2004) for analyzing information systems in biomedicine and the Applied Cognitive Task Analysis method (Militello & Hutton, 1998) with some

modifications. Semi-structured interviews with, and direct observations of physicians with various levels of clinical and EMR expertise are being conducted.

### **3. Preliminary results**

Preliminary results reveal typical stages in the computer assisted patient-doctor encounter, typical errors, best practices used by experts and some of the difficult elements in using EMR. Typical errors include writing in the wrong patient's chart and juxtaposition, i.e. selecting an item from a scroll-down list that is up or down the desired item. The former error was especially susceptible to interruptions such as phone calls or a nurse entering with a question.

Both computer use and patient-doctor communication require physician's focused attention. Therefore, interviewees felt the computer inhibited effective communication with their patients. Experts' strategies to overcome this problem include spatial organization of the computer screen in a way it does not interfere with eye contact and organization of the visit to separate computer use from communicating with the patient.

### **4. Conclusions**

The findings of this study demonstrate that CTA is a useful method for gaining insight into physician's use of EMR, its effect on medical error and patient-doctor communication. Later, we will employ our findings to the development of simulation-based training scenarios, aimed at improving physicians' use of EMR.

### **5. References**

- Kushniruk, A. W., & Patel, V. L. (2004). Cognitive and usability engineering methods for the evaluation of clinical information systems. *Journal of Biomedical Informatics*, 37(1), 56-76.
- Militello, L. G., & Hutton, R. J. (1998). Applied cognitive task analysis (ACTA): a practitioner's toolkit for understanding cognitive task demands. *Ergonomics*, 41(11), 1618-1641.