

## The Effects of Age, Cognition, and Health Literacy on Use of a Patient Electronic Medical Record

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<b>Organization:</b>	University of Miami
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**Summary:** The use of patient portals of electronic medical records (EMRs) is expanding as patient involvement in disease prevention, management, and decisionmaking is increasingly emphasized in the health care system. To date, there has been little usability testing of patient portals, especially with older adult populations. This study, funded through the Health Services Research Dissertation grant program (R36), systematically assessed the ability of middle-aged and older adults to use a simulated patient portal of an EMR to perform common health management tasks. The study also examined the effects of age, Internet experience, and individual characteristics—such as health literacy, numeracy, and cognitive abilities—on the use of such systems.

Participants included people aged 40-to-85 years with a range of health literacy and numeracy abilities. The specific focus was on three common health management tasks associated with patient portals: 1) medication management; 2) interpreting laboratory test results; and 3) health maintenance activities. By assessing the relationship between individual characteristics and the ability to use a patient portal of an EMR system, the study identified the root of a number of usability problems and then proposed a set of empirically-based interventions to help those who are most likely to have problems interacting with these systems. At the same time, this research aimed to increase the general usability of these systems, which will ultimately benefit all patient populations.

Participants completed background and technology experience questionnaires to gather data including gender, age, ethnicity, educational level, income, health information, medication use, and experience with technology such as computers and the Internet. Participants were also given the Test of Functional Health Literacy in Adults (TOFHLA) and subjective and objective numeracy tests. Following the administration of the testing components of the study, participants completed a tutorial on basic computer skills (e.g., using a mouse, scrolling) and were given basic instruction on how to navigate the EMR record and view its information. Each participant then used the simulated portal to perform fifteen tasks encompassing medication management, review/interpretation of laboratory and other test results, and health maintenance activities. Tasks were designed to evaluate basic, computational, analytical, and statistical numeracy ability. Furthermore, each of the tasks was classified in terms of being “simple” or “complex.” Following the completion of the tasks, participants were asked to complete a portal usability questionnaire. At the completion of data collection, each participant was interviewed briefly to get additional feedback on use of the patient portal.

### Specific Aims:

- Examine the ability of middle-aged and older adults to use a patient portal of an EMR to perform common health management tasks. **(Achieved)**
- Examine the relationships between individual characteristics such as age, cognitive abilities, health literacy, and task performance. **(Achieved)**
- Identify usability problems inherent in the use of patient portals and identify design solutions. **(Achieved)**

**2011 Activities:** At the suggestion of Ms. Taha's academic advisors at the University of Miami, the sample size increased from 80 to 100. However, Ms. Taha felt there might still be insufficient variability in race and ethnicity and so focused on additional recruitment, bringing the total number of participants to 107. A 3-month no-cost extension enabled the completion of the data collection, analysis, and manuscript development, which were the primary focus of activities during this period. This project was completed in November 2011.

**Impact and Findings:** Eighty-five of the participants reported varying levels of Internet experience. To create a variable that captured the participants' overall Internet experience, the duration of their Internet use and their frequency of use was combined into a single score ranging from 1-to-16. The 22 participants (11 middle-aged and 11 older) who reported having no Internet experience were given a score of "0".

After accounting for education, Internet experience was found to be a significant predictor of performance on simple and complex tasks and overall task performance. In addition to education and Internet experience, cognitive variables were also found to significantly predict performance, such that those with lower verbal ability, executive functioning, and reasoning skills had lower performance on tasks. Even after accounting for all of these variables, numeracy was determined to significantly predict performance on complex tasks and overall performance. With regard to task performance, age did not significantly predict performance on simple tasks but it was significant in predicting performance on complex tasks and overall performance. Results from this study also indicated that both middle-aged and older adults tended to overestimate their numeracy skills, and that the older participants had less correlation between subjective and objective numeracy measures than middle-aged participants.

Approximately 89 percent of all participants indicated that they would use a patient portal like the simulation if it were available from their doctor. Of those who indicated that they would not be interested in using a portal, five were middle-aged and seven were older. Many of these participants thought that the portal was "confusing" or "difficult" to use. However, among those who said that they would not use a patient portal like the simulation, only one participant thought there was no benefit in using a portal. The other participants who indicated that they would not use a portal acknowledged certain benefits including the ability to get test results or medication information without having to leave the house or call a doctor, to schedule and keep track of appointments, and to find information pertinent to health conditions through portal links.

Both middle-aged and older participants tended to have a positive opinion of patient portals in general. Ninety-four percent of participants either agreed or somewhat agreed that a patient portal would improve their ability to perform health management tasks, and 95 percent either agreed or somewhat agreed that a patient portal would allow them to get information that would help them understand issues related to their health. However, participants did have some difficulty in using the portal simulation: 40 percent of

participants indicated that it was difficult to navigate within the portal, and 51 percent thought that it was difficult to locate the information that they needed within the portal.

**Target Population:** Adults, Elderly\*, Low Literacy

**Strategic Goal:** Develop and disseminate health IT evidence and evidence-based tools to support patient-centered care, the coordination of care across transitions in care settings, and the use of electronic exchange of health information to improve quality of care.

**Business Goal:** Knowledge Creation

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*\* This target population is one of AHRQ's priority populations.*