

# Computerized Survey Adapts to Patients' Skills

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SAN FRANCISCO — The digital divide in your waiting room can be crossed, and technology can compensate for low literacy levels in some patients, said David F. Lobach, M.D.

A randomized, controlled, crossover study of 567 patients found that patients of differing literacy levels and differing levels of computer skills successfully answered a 75-item computerized clinical questionnaire that adapted to their skill levels through a tool named MADELINE (Multimedia Adaptive Data Entry and Learning Interface within a Networked Environment), he said at the triennial congress of the International Medical Informatics Association.

Patients in two clinics (an academic family practice and a health center for indigent patients) were randomized to first complete either a paper version of the questionnaire or the computer version, then the



Patients at different literacy levels were able to answer a computerized questionnaire.

DR. LOBACH

other version, with satisfaction surveys immediately following each version and a separate questionnaire at the end asking them to compare the two modalities. Questions at the beginning of each survey assessed patient literacy and computer skill and ranked them as low or high.

Patients with low literacy levels were less likely to complete the paper questionnaire, compared with highly literate patients; 80% vs. 90%, respectively, answered all questions. Thanks to MADELINE, completion rates increased significantly in both groups, to 96% and 97%, respectively.

"We lessened the digital divide and brought the low-literacy users up to par with the high-literacy users," said Dr. Lobach of Duke University Medical Center, Durham, N.C. He and his associates developed MADELINE over a 3-year period. The U.S. Agency for Healthcare Quality and Research provided most of the funding for the study.

A review of charts on 20% of the patients found comparable accuracy between the paper and computer survey responses.

Low-literacy patients required an average of 28 minutes to complete the computer survey, compared with 16 minutes for the paper version. High-literacy patients completed the computer survey in 15 minutes and the paper survey in 11 minutes.

Approximately 50% of patients had high literacy and high computer skills, 25% had low literacy and computer skills, 15% were highly literate but had low computer skills, and 10% had low literacy but high computer skills.

Patients could take the survey in English or Spanish, and MADELINE can be configured to include other languages and questionnaires. It begins by asking about language preference, then introduces the user to the questionnaire via instructional videos and practice questions. The user then logs on using a number assigned to his or her name and record number and answers six questions to assess literacy and computer skill.

At this point MADELINE presents the

questionnaire in different ways for patients with low or high skills.

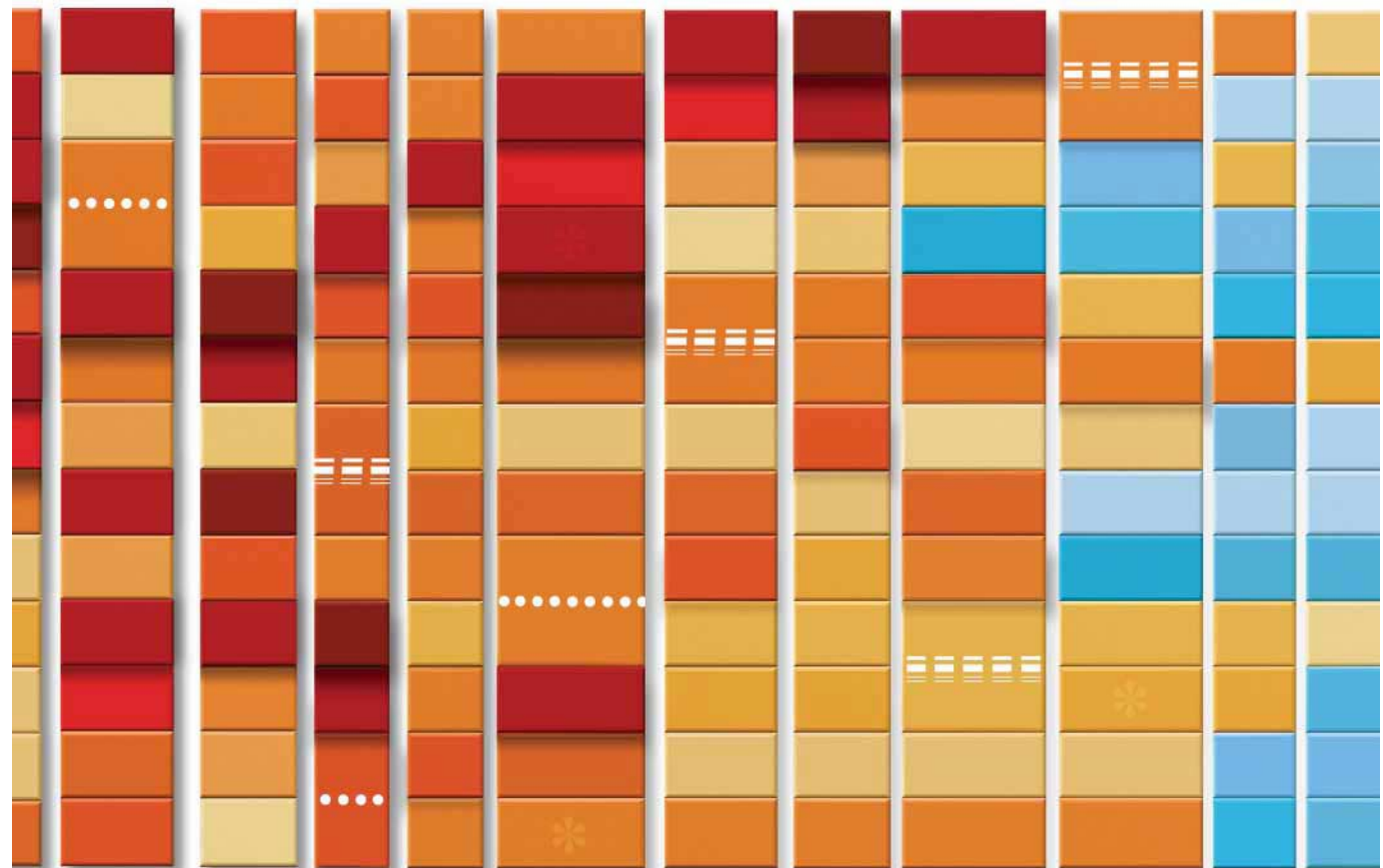
Those with low computer skills, for example, hear an audio component that reads a question on the screen, and they pick an answer by touching the screen. Patients with high computer skills see multiple questions per screen and use a mouse to click on responses.

For low-literacy patients, the program adapts to a fifth-grade reading level and predominantly uses multiple-choice ques-

tions. For high-literacy patients, the program adapts to a 10th- to 12th-grade reading level and has more questions requiring text-entry responses instead of a multiple-choice selection.

Below a fifth-grade reading level "we lost the ability to collect any meaningful information" by paper or computer, Dr. Lobach said.

A report on the patient's answers could be read online or could be printed out after completing the questionnaire. ■



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February 2005

EQJA010