

Addressing Tobacco in Healthcare National Forum Innovations in e-Health and e-Technology for Health Services Research

On February 21, 2007, the Addressing Tobacco in Healthcare Research Network (ATHC) coordinated a pre-conference session prior to the 13th annual meeting of the Society for Research on Nicotine and Tobacco (SRNT) in Austin, Texas. The pre-conference, titled *Innovations in e-Health and e-Technology for Health Services Research* was funded by the Robert Wood Johnson Foundation (RWJF). The program was facilitated by the co-directors of Addressing Tobacco in Healthcare, Susan Curry, PhD, University of Illinois at Chicago, and Michael Fiore, MD, MPH, University of Wisconsin Center for Tobacco Research and Intervention and by C. Tracy Orleans, PhD, Distinguished Fellow and Senior Scientist from the Robert Wood Johnson Foundation.

For the more than ninety national and international participants, this forum afforded an opportunity for researchers, clinicians, and partners to learn about and discuss the potential of e-health to facilitate systems change research and the potential of e-technology to further this goal. The conference began with an overview of the current state and future potential of e-health technology presented by David Ahern, PhD, National Program Director of the Robert Wood Johnson Foundation's Health e-Technologies Initiative housed at Brigham and Women's Hospital in Boston. This overview was followed by presentations covering the accomplishments and challenges of three e-technology initiatives currently operative in the health field. The session concluded with a roundtable discussion with all of the presenters and the audience.

Current and Emerging e-Health Technologies: Is the Future Now?

David K. Ahern, PhD
National Program Director
Health e-Technologies Initiative
Brigham and Women's Hospital, Boston, MA

Dr. Ahern noted that although the United States spends more on health care than other developed countries, we do not have the best health care outcomes. Under our current infrastructure (much of which is unwired and paper-based), medical errors, patient safety, excess care, quality and cost issues continue to burden health systems. It is estimated that 18% of medical errors are due to inadequate access to patient information and 40% of outpatient prescriptions are unnecessary. Despite the existence of evidence-based treatments for many conditions, patients generally receive only about 55% of recommended care. Dr. Ahern suggests that this state of affairs would not be tolerated in industry and is unsustainable for health care in our society. It is here that e-technology holds promise for translating evidence-based medicine into practice.

Among the potential technologies that are impacting delivery of healthcare are:

- Electronic Medical Records (EMR) — Among other features, EMRs can track providers and establish a coherent picture of care.
- Personal Health Records (PHR) — These records consist of information provided by the patient.
- Electronic Health Records (EHR) — A compilation of the EMR and PHR into a shareable health record.
- Web Portals — Emerging computer platforms that allow patients and providers to communicate.
- Mobile Devices — Cell phones, PDAs, and other devices are being viewed as the wave of the future for health care and may, in fact, provide options in underdeveloped countries where the internet is not widely available.
- Medical Devices — Devices that allow remote disease monitoring, providing ongoing patient information to the patient's system of care.
- Ubiquitous computing — Potential for the miniaturization of computers (e.g., embedded in clothing or the environment) to monitor biological and physiological factors of patients at risk.

Dr. Ahern asserts that there is a role for researchers in evaluating how to best establish such systems, thereby, revolutionizing the science of health care. At the moment, the definition of "e-Health" is still evolving. He suggests the term is not about technology, per se. Instead, e-Health refers to "the use of emerging interactive technologies to enable health improvement and health care services". Technology is the tool that allows this to happen. A critical feature of e-Health is interactivity, which will allow for extensive tailoring of treatment.

Despite many advances, several questions remain.

- How do we connect doctors, labs, pharmacies, patients?
- How do we connect systems?
- How do we design technological tools that are patient-centered and usable by patients?
- How do we maintain patients as active collaborators in their health care?

These are some of the challenges facing researchers. These and other questions drive our exploration of e-technology as an aspect of health care. It will be necessary to rethink the randomized clinical trial as we discover how to translate research into real-world practice. It will be important to gather data on how people use portals and how children and adolescents use technology if we hope to leverage these talents for purposes of health promotion and maintenance. Consumer engagement in the transition to e-Health will be crucial if we are to reap the value of technology in health care.

Examples of e-Health initiatives in the field

Using Natural Language Processing to Enhance EMRs for Healthcare Quality Research

Brian Hazlehurst, PhD

Medical Informatics Investigator

Center for Health Research

Kaiser Permanente Northwest

Electronic medical records (EMRs) have great potential for improving the quality of healthcare by:

- Allowing distributed access to patient information
- Supporting real-time clinical decisions
- Enabling proactive outreach to patients with chronic illnesses
- Detecting and potentially preventing adverse events
- Assessing care actually delivered in order to improve the delivery process

One of the factors inhibiting the creation of comprehensive EMRs is the amount of patient information recorded in clinicians' free text charting. In a study published by the RAND Corporation (McGlynn, et al., NEJM, June 2003), medical records for 7,000 patients were reviewed to determine quality of care as recorded in paper records. Findings indicated that, on average, Americans receive only about half of recommended medical care. The authors also determined that electronic claims data were able to provide only a third of the information needed to evaluate quality of care while over 50% of the necessary data for a comprehensive EMR was contained in local codes or free text records.

Dr. Hazlehurst reported on efforts to develop a knowledge-based system able to process free-text as well as coded patient information, thus facilitating translation of both types of data into a complete EMR. Dr. Hazlehurst oversaw the development of MediClass, a medical classifier system based on EMR integration, concept identification, and event identification. MediClass uses Natural Language Processing to incorporate both free-text and coded information into an EMR. This system has been implemented in several domains including:

- Measurement of delivery of 5 A's for smoking cessation
- Detection of adverse vaccination reactions
- Identification of severity of diabetic retinopathy
- Identification of family history of cancer
- Assessment of counseling for overweight patients

Continued development of Natural Language Processing may address some of the challenges to creating comprehensive EMRs, resulting in improved patient care.

Iterative Design and Testing of a Tobacco Use Counseling Decision Support System

Theodore W. Marcy, MD, MPH

Office of Health Promotion Research

University of Vermont College of Medicine

Dr. Marcy reported on an intervention to improve outcomes of the Vermont cessation services, including increasing physician interventions with smokers and enhancing use of Vermont's quitline and web-based QuitNet. Prior to this intervention, the addition of free services, including free nicotine replacement therapies (NRTs), had resulted in only modest increases in use. The most significant barriers reported by Vermont physicians were an incorrect perception that patients were unreceptive to tobacco use counseling and inadequate time to address tobacco dependence.

In response, Dr. Marcy and colleagues developed a prototype Clinical Decision Support System (CDSS) designed to integrate patient information with general knowledge about a patient problem and, ultimately, generating the following for the clinician:

- Medical recommendations
- Information on free or subsidized medications
- Counseling information
- Tailored patient handouts
- Referral forms
- Appropriate chart documentation
- Insurance information
- Prescription prompts

The CDSS was developed from information obtained from surveys of physicians and clinic managers. The CDSS was tested for usability and validity. Finally, patient and clinic pilot testing was undertaken. Dr. Marcy noted that clinics are complex environments that develop their own systems which then become embedded and grow with the clinic. This iterative approach allowed the designers to add system improvement and correct for some early errors. As a result, the final prototype of the CDSS proved to be compatible with established office systems and more likely to be used effectively. The CDSS was ultimately programmed on a PDA. The pilot test revealed a number of benefits including:

- Shared decision-making with patients
- Documentation of relative value units (RVUs) for physicians to facilitate Medicare reimbursement
- Medication information and printed instructions

The CDSS holds potential for saving time ordinarily used for documentation and writing instructions for patients. It can also provide rapid retrieval of information, facilitate Medicare reimbursement, and identify patient-specific resources for the physician. Ensuring that such systems are compatible with existing technology can facilitate their use and integration into clinical practice.

Integrating Tobacco Dependence Treatment into Electronic Medical Records at Partners HealthCare

Nancy Rigotti, MD

Director, Tobacco Research & Treatment Center

Massachusetts General Hospital, Harvard Medical School

Dr. Rigotti reported on a Partners HealthCare project, Computerized Electronic Health Record-Assisted Smoking Cessation Effort (CEASCE). The goals of this project were to develop an EMR intervention consistent with the 5A model of smoking cessation, to implement this in clinical practices, and to assess clinician uptake. The CEASCE components included:

- A visual smoking icon on the computer screen
- Written reminders to document and intervene
- An enhanced Health Maintenance Screen
- A Tobacco “Smart Form” containing a list of things the doctor can do to intervene

The Tobacco “Smart Form” integrates decision support, ordering, and documentation. It employs a “one-click” referral to a smoking coordinator or a quitline, generates printable patient handouts, facilitates medication prescriptions, and provides a space in which the intervention can be quickly documented.

Dr. Rigotti discussed some of the difficulties of implementing CEASCE into a randomized trial with 18 practices over a 9-month period. One primary lesson was the need to encourage utilization of the new system. Clinicians needed to be convinced that this system would save time and make their work easier. This study is currently ongoing.

Dr. Rigotti also discussed system efforts to improve delivery of smoking cessation counseling in the inpatient setting. This was prompted, in large part, by the new JCAHO performance measures that incorporate provision of smoking cessation counseling for patients with acute myocardial infarction, community-acquired pneumonia, or heart failure. Improved smoking status identification proved to be one of the most difficult objectives to realize. Ultimately, a smoking status identification screen was added to the electronic admission order template. This screen is modeled on a decision tree which generates an automatic consult with a smoking counselor, automatic provision of a smoking cessation booklet, and, if needed, an order for NRT. Public reporting of performance, which tends to trigger important changes in health care, is effective but not easy – administrative commitment and many resources were required in order to improve performance.

Roundtable Discussion: *Leveraging Technology in Clinical Systems: Opportunities for Research and Practice*

Moderator: David Gustafson, PhD

Discussants: David Ahern, PhD, Brian Hazlehurst, PhD, Theodore Marcy, MD, MPH, Nancy Rigotti, MD

Dr. Gustafson opened the panel discussion by remarking that although we are still in early stages of using e-health technology, we have come far. Even with the technology currently at hand it is possible to make a significant impact on health care practice. Dr. Gustafson noted that there is great potential in new technology but warned that we need to avoid certain pitfalls in our approaches. We can't just assume that people will use websites just because they exist. We need to understand important predictors of whether or not a system change will be utilized such as its potential to immediately reduce labor and make a task easier. We will also need to begin considering outcomes we had not previously considered (e.g., why patients on CHESS in the Lung Cancer Health Study had lower mortality rates).

Audience participants raised questions about enlisting systems outside healthcare in the promotion of lifestyle changes. Dr. Rigotti suggested that once smokers are identified, outside systems could be enlisted. Dr. Ahern noted that employers and insurance companies are beginning to take a lead here. We have a system now that better reinforces service delivery, though further improvements and linkages are needed.

The question of the acceptability of accessing healthcare services through a computer was raised. Panel members were divided in their perspectives with Dr. Gustafson in favor of increased automation. He believes patients are comfortable with the idea of "sitting down in front of a computer to get service." Dr. Marcy held concern for the importance of traditional interactions between physician and patient, while Dr. Rigotti suggested there may be age preferences at work here with older patients preferring face-to-face contacts and younger patients comfortable with virtual interactions.

Discussion ensued as to whether websites ought to connect people to information or to other people. How can we use this technology to change the prevailing belief that people quit smoking when they're ready and mostly unaided? Dr. Rigotti noted that the question really is of two parts: how to change doctors and how to change smokers. We need to get the message to doctors that tobacco dependence treatments are underutilized. Dr. Marcy felt that physicians are beginning to realize the powerful impact that they can have on patient tobacco use. Dr. Ahern agreed that computers would serve best by connecting people to people and Dr. Hazlehurst expressed a need for us to align the interests of organizations, health plans, and other stakeholders to facilitate this.

Final questions concerned the ways in which we might implement connections between websites and people. How do we incorporate reassurance, trust and caring into our technological interventions? How do we achieve a hybrid of caring and technology?

Panel members recommended:

- Looking for affinities or opportunities to link smokers with others like them
- Making technology compatible with storytelling (e.g. using blogging to enable storytelling)
- Use of chat rooms which can provide 24-hour opportunity to get help
- Use of email between patient and physician
- Employing group visits between doctor and patients

Dr. Gustafson remarked on the need to draw on the multiple systems people come in contact with in daily life if we are to have an impact on health.

Closing Comments

Dr. Curry closed this final meeting of ATHC by highlighting the achievements of the last decade. ATHC has been an important initiative of the Robert Wood Johnson Foundation, and has:

- Overseen the normalization of the delivery of tobacco dependence treatment
- Leveraged health care system resources to learn what is needed and what works
- Fostered partnerships between managed care and academia
- Brought new researchers into the field

Systems change research continues to be extremely timely and important, particularly with the advent of e-technology and the growing emphasis on e-health. There is a growing recognition by funders of the importance of this line of research, and many opportunities for continued research and innovation. Although the research network will be ending in 2008, it is the hope of the ATHC Research Network leadership that funders, researchers, and policymakers continue to invest in this important line of inquiry to improve health and health care.