

Executive Summary — USMI/DARPA Roundtable Discussion

Beyond The Electronic Health Record: Anticipating The Direction Of Future Technologies

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Technologies exist *today* that can change the electronic health record (EHR) from a “passive archive” to a highly effective interactive tool for healthcare providers, patients and policymakers, and exciting advances in such areas as robotics and virtual reality continue to jump from the drawing board into demonstration testing at rapid pace. Yet, alongside this exciting stream of innovation in healthcare informatics has been reluctance within the medical sector to adopt even a basic EHR.

This reluctance now is being challenged by the federal government in a concerted effort to standardize, certify and encourage growth of the EHR through new incentives and federal-private partnerships. To examine how to anticipate the best future goals for the EHR as it undergoes this desired evolution, which continually must incorporate new technologies, the **U.S. Medicine Institute for Health Studies**, in partnership with the **DARPA Advanced Biomedical Technologies Program**, convened a roundtable discussion among federal agency, congressional and private-sector representatives. The group emphasized it is essential that EHR be “inter-operative” with other data sources and be able to incorporate new technologies as they develop, so that it truly can become an “enabler” of more cost-effective care and a healthier population.

Background

Man and machine lead a symbiotic existence, producing a whole that is greater than either part. While this reinforcing relationship is well recognized in most aspects of American society, from computer gaming to financial transactions, the healthcare sector has been slow to adopt digital technologies and largely continues to rely on a paper record of diagnoses, treatments and outcomes.

Now, however, there is financial and policy stimulus by the federal government to promote standardization and widespread use of the electronic health record (EHR), building on the few health systems, such as that of the Department of Veterans Affairs, already using an EHR extensively and effectively. As the EHR gains greater momentum, questions about its optimum structure and connectivity have intensified: How should data from the many different care delivery sites and devices a patient may encounter — as well as everyday factors, such as stress levels, pollution exposure, diet — be fed into the EHR; how can data be arrayed so disease trends are detected over time and “best practices” developed?

Summary of discussion

The medical record changes every 50 to 70 years, and the group stressed that current efforts to develop the EHR should make it sufficiently adaptable to endure for such a lifespan rather than become obsolete once fully developed. Healthcare is the only sector of the economy without a virtual representation of its product, yet there are modeling and robotic technologies currently extant that can feed into a “holomer,” that is, a virtual representation of the individual. The

“holomer” is a desired format for the EHR, which should developed such that it is a visual rather than a text-based tool.

Initial steps in developing such a “holomer” are being taken. For example, the Armed Forces Institute of Pathology is doing total body scans on military personnel killed in Iraq to provide critical data on wound tracks and effects. Such total body scans can provide individuals a baseline of health status against which future changes can be measured.

Among the other issues addressed during the roundtable discussion:

- A patient record is the life-story of that individual, yet the technology for reading that story remains disjointed. New generations of “computer-savvy” providers should help move the EHR toward being a visual story that develops over time, rather than fragmented pieces of text and images. The story must be presented in a compelling manner, akin to a TV program.
- The EHR must be a training and assessment tool that can help both novice and seasoned professionals “practice” and perfect procedures and treatments before they are delivered.
- EHR robustness will come via the intersection of technologies — engineering, biology and data processing. For example, radio frequency identification (RFID), image analysis, and computer-interpreted situational awareness are migrating from industrial to medical application. “Smart” prostheses can be operated by brain signals, cancer can be diagnosed through shape comparisons, and robotic surgery can be accomplished in super-sterile environments with the surgeon seated at a computer console.
- Ethical and moral issues will accompany the continuing development of the EHR – genetic engineering, body parts replacement, extending longevity, artificial intelligence — and they must be addressed.
- Patient demand will help prompt the medical profession to embrace the EHR. At the same time, there are consumer concerns that must be acknowledged. For example, some pilots in the Iraq conflict removed data chips encoding their health status from identification cards for fear the information would be useful to their captors, should they fall into enemy hands.
- The EHR should be preventive and proactive. It must include the patient in a partnership that is interactive and internet-based.

Participants in this roundtable: James A. Zimble, Past President, USUHS, moderator; Richard Satava of the University of Washington and DARPA, David Brailer of HHS, Jim Miller of GE Reseach, Alexander Tsiaras of Anatomical Travelogue, and Tim Ganous of the University of Maryland, presenters; Cindy Bascetta of GAO; James Bengé of DoD; Ronald Blanck of the North Texas University Health Science Center; Linda Fischetta of VA; Cliff Freeman of VA; Bart Harmon of DoD; Janet Heinrich of GAO; Janice Lee of DoD; H. Stephen Lieber of HIMSS; Lance Manning of DARPA; Ron Pace of the Army Medical Research and Materiel Command/TATRC; James Peake, former Army Surgeon General; Hank Rappaport of VA; Pedro Rivera of Health Net Federal Services; William Rowley of the Institute for Alternative Futures; Diane Thompson of FasterCures; Margaret Van Amringe of JCAHO; Julie Wands of the Bureau of Prisons; Kathleen Weldon of the House Ways and Means Committee; and Michael Zamore of Rep. Patrick Kennedy’s office.

