CURRENT & EMERGING eHEALTH TECHNOLOGIES: IS THE FUTURE NOW?

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February 21, 2007
OVERVIEW

• Emerging Technologies in Healthcare

• Healthcare Delivery Challenges

• Critical EHR Functions

• Importance of Interoperability
OVERVIEW

• eHealth Research Challenges
• eHealth Opportunities
• Addressing Health Disparities
• Consumer Engagement for Quality
• Conclusions
EMERGING TECHNOLOGIES IN HEALTHCARE

- Electronic Medical Records (EMR)
- Personal Health Records (PHR)
- Electronic Health Records (EHR)
- Web Portals
- Mobile Devices
- Medical Devices
- Ubiquitous Computing
PAPER-BASED RECORDS

• Prone to error
• Lots of information but no data
• Limited decision support
• Do not integrate with eHealthcare
HEALTHCARE DELIVERY CHALLENGES

Medical error, patient safety, quality and cost issues

- State initiatives and the role of technology
- 1 in 4 prescriptions taken by a patient are not known to the treating physician
- 1 in 5 lab and x-ray tests ordered because originals cannot be found
- 40% of outpatient prescriptions unnecessary
HEALTHCARE DELIVERY CHALLENGES

Medical error, patient safety, quality and cost issues

- Patient data unavailable in 81% of cases in one clinic, with an average of 4 missing items per case
- 18% of medical errors are estimated to be due to inadequate availability of patient information
- Patients receive only 54.9% of recommended care
HEALTHCARE DELIVERY CHALLENGES

A fractured and ‘unwired’ healthcare system

• Medicare beneficiaries see 1.3 – 13.8 unique providers annually; on average, 6.4 different providers/yr

• 90% of the >30B healthcare transactions in the US every year are conducted via mail, fax, or phone
CRITICAL EHR FUNCTIONS

Core Functionalities for an Electronic Health Record (EHR) System

- Results Management
- Health Information and Data
- Order Entry/Management
- Decision Support
- Electronic Communication and Conductivity
- Patient Support
- Administrative Processes
- Reporting & Population Health Management
- Disease Registries

PERSONAL HEALTH RECORDS

Project HealthDesign
www.projecthealthdesign.org

Project HealthDesign:
Rethinking the Power and Potential of Personal Health Records

Project HealthDesign supports technology pioneers to design the next generation of personal health record systems in ways that empower patients to better manage their health and health care.

Sign up to Receive Project HealthDesign Updates & Alerts
Have the latest in news and insights delivered to your inbox.
Read More >>
WEB PORTAL

**Patient Gateway**

**Demonstration Patient MRN: 6005**

**Instructions to the Practice**

*Where should the prescription go?*
- Phone or fax into Pharmacy
- Mail it to Pharmacy
- Mail it to me
- Hold it for pick-up

**Select a pharmacy:**
- From My Profile
- CVS Pharmacy #1866

**Other Pharmacy**

- Name: 
- Address: 
- City: 
- State: MA
- Zip: 
- Phone:
IMPORTANCE OF INTEROPERABILITY

- Emerging Standards
- System Integration
- Health Information Exchange/RHIO
- Universal Health Care
WHAT IS eHEALTH?

Editorial

What is e-health?

G Eysenbach

Introduction

Everybody talks about e-health these days, but few people have come up with a clear definition of this comparatively new term. Barely in use before 1999, this term now seems to serve as a general “buzzword” used to characterize not only “Internet medicine”, but also virtually everything related to computers and medicine. The term was apparently first used by industry leaders and marketing people rather than academicians. They created and used this term in line with other “e-words” such as e-commerce, e-government, etc.

characterizes not only a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology.

Original Paper:

What Is eHealth (6): Perspectives on the Evolution of eHealth Research

David K. Abern, PhD, Jennifer M Krenlake, MPH, Judiha M Plaemia, MPH
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Abstract

Background: The field of eHealth holds promise for supporting and enabling health behavior change and the prevention and management of chronic disease.

Objective: In order to establish areas of congruence and controversy among contributors to the early development, evaluation, and dissemination of eHealth applications, as well as the desire to inform an evaluation research funding agenda, 38 semi-structured, qualitative interviews were conducted among stakeholders in eHealth between May 2002 and September 2003.
DEFINITION

eHealth is the use of emerging interactive technologies to enable health improvement and health care services.

- Internet
- Interactive TV
- Interactive Voice Response Systems (IVRS)
- Internet-enabled cell phones
- Personal Digital Assistants (PDAs)

SUCCESS STORIES

- QuitNet
- CHESS
- HeartAge
- My HealtheVet
- ACOR
- Chronic Disease Self-Management Program
eHEALTH RESEARCH CHALLENGES

Limited Systematic Research

• Methodological Issues
• Adoption Challenges
• Retention Issues
Initial Evaluation of a Real-World Internet Smoking Cessation System

Cobb et al.
April 2005
eHEALTH RESEARCH CHALLENGES

Medical Care

Practical Clinical Trials for Translating Research to Practice
Glasgow et al.
June 2005
eHEALTH RESEARCH CHALLENGES

Evaluation and Program Planning

Mastering the Methodological Challenges for Evaluating eHealth Research

Special Section
November 2006
eHEALTH OPPORTUNITIES

Standards

- CONSORT
- TREND

The CONSORT statement: revised recommendations for improving the quality of reports of parallel-group randomised trials

Improving the Reporting Quality of Nonrandomized Evaluations of Behavioral and Public Health Interventions: The TREND Statement
eHEALTH OPPORTUNITIES

RE-AIM/Common Measures Project

- Reach
- Effectiveness
- Adoption
- Implementation
- Maintenance
# DEMOGRAPHICS

<table>
<thead>
<tr>
<th>Category</th>
<th>column A</th>
<th>column B</th>
<th>column C</th>
<th>column D</th>
<th>cc</th>
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<tbody>
<tr>
<td>Target Population</td>
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<td>Declined to Participate</td>
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<td>S</td>
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<tr>
<td>Registered Research Participants</td>
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<td>Registered; Lost to Attrition</td>
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</tr>
</tbody>
</table>

a. Gender - number female

b. Age - average (SD)

c. Race:
   - White
   - Black/African American
   - Asian
   - Other

d. Ethnicity: Hispanic

e. Education:
   - Less than high school graduate
   - High school graduate
   - College graduate

f. Marital Status:
   - Married
   - Divorced
   - Widowed
   - Never Married
   - Unmarried Couple

g. Employment Status:
   - Employed
   - Homemaker
   - Retired

h. Annual Household Income:
   - $0 - $10,000
   - $20,000 - $49,999
   - $50,000 - $74,999
   - $75,000

i. Primary Language:
   - English
   - Spanish

j. BMI (preferred) OR weight/height OR weight only

k. Number of diagnosed chronic illnesses (e.g., number with >1 chronic illness)

### PORTAL USE

<table>
<thead>
<tr>
<th>Category</th>
<th>Capacity</th>
<th>Plan to Retrieve</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Amount of Use</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. number of log-ons/sessions</td>
<td></td>
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<tr>
<td>b. number of minutes/hours per log-on/session</td>
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<tr>
<td>c. number of distinct pages viewed per log-on/session</td>
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<tr>
<td>d. number of times a distinct page was viewed per log-on/session</td>
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<tr>
<td>e. number of minutes/hours per distinct page per log-on/session</td>
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<tr>
<td>f. other (describe)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Functions Used</strong></td>
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<td></td>
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<tr>
<td>g. secure messaging sent/responded to</td>
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<tr>
<td>h. web medical visits</td>
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<td></td>
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<tr>
<td>i. prescriptions refilled</td>
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<td></td>
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<tr>
<td>j. appointments scheduled</td>
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<td></td>
<td></td>
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<tr>
<td>k. referrals obtained</td>
<td></td>
<td></td>
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<tr>
<td>l. lab results retrieved/viewed</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>m. Electronic Medical Record (EMR) was accessed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n. Personal Health Record (PHR) was accessed</td>
<td></td>
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<tr>
<td>o. health promotion program(s) accessed</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>p. disease management program(s) accessed</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>q. action plan or goals</td>
<td></td>
<td></td>
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<tr>
<td>r. patient tracking of progress (e.g., self-monitoring, logs, etc.)</td>
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</tbody>
</table>

- **Amount of Use**
- **Functions Used**
STRONGLY RECOMMENDED MEASURES

• Quality of Life  
  (CDC Healthy Days 4-item version)

• Health Literacy  
  (Chew, et al. from S-TOFLA)

• Demographic characteristics  
  (modified US census, including height/weight)

• Physical Activity  
  (Rapid Assessment of Physical Activity [RAPA])
If you had money to invest in preventing childhood obesity, especially among traditionally underserved children and teenagers, what information would you need to convince you that spending it on technological programs was a good use of your funds?
Do you think eHealth tools for consumers might have any unintended consequences on healthcare quality?

Do you see eHealth tools as useful to engaging consumers to participate in their healthcare decisions or to be more proactive with their health concerns?
eHEALTH OPPORTUNITIES
Emerging Tools to Bridge the Knowledge Gap

Stewart et al.
*Health Affairs*
January 2007

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Bridging The Inferential Gap: The Electronic Health Record And Clinical Evidence

Emerging tools can help physicians bridge the gap between knowledge they possess and knowledge they do not.


**ABSTRACT:** Most clinical decisions involve bridging the inferential gap: Clinicians are required to “fill in” where they lack knowledge or where no knowledge yet exists. In this context we consider how the inferential gap is a product, in part of how knowledge is created, the limits to gaining access to such knowledge, and the variable ways in which knowledge is translated into decisions. We consider how electronic health records (EHRs) will help narrow this gap by accelerating the creation of evidence relevant to everyday practice needs and facilitating real-time use of knowledge in practice. [Health Affairs 26, no. 2 [2007]: w181–w191 (published online 26 January 2007; 10.1377/hlthaff.26.2.w181)]
Original Article

Internet-Based Chronic Disease Self-Management
A Randomized Trial

Kate R. Lorig, DrPH, Philip L. Ritter, PhD, Diana D. Laurent, MPH, and Kathryn Plant, MPH

Background: The small-group Chronic Disease Self-Management Program (CDSMP) has proven effective in changing health-related behaviors and improving health status. An Internet-based CDSMP was developed to reach additional chronic-disease patients.

Objectives: We sought to determine the efficacy of the Internet-based CDSMP.

The leading eHealth journal

Original Paper

Web Portals in Primary Care: An Evaluation of Patient Readiness and Willingness to Pay for Online Services

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PATIENT ENGAGEMENT

- Content aimed toward personal demographics
- Salient and timely messaging
- Support for self-management
- Social support
TAILORED MESSAGING

Can be based upon such personal characteristics as:

- Age
- Race
- Gender
- Ethnicity
- Sexual Orientation
- Primary Language
ADDRESSING HEALTH DISPARITIES

• Targeting and Tailoring Incentives
• Translating Research into Practice
BARRIERS TO ADOPTION

- Limitations of Access
- Cultural Relevance
- Health and Technology Literacy
CONSUMER ENGAGEMENT FOR QUALITY

Searching online for health information is one of the most popular online activities after e-mail and researching a product or service before buying. Popular searches include:

- Medical Treatments
- Environmental Health Hazards
- Mental Health
- Substance Use

The Pew Internet and American Live Project
CONSUMER ENGAGEMENT FOR QUALITY

87% percent of American Internet users believe they find reliable health care information online.

The Pew Internet and American Life Project
The majority of U.S. adults, both online and off, favor the adoption of new medical technologies by their doctors.
CONSUMER ENGAGEMENT FOR QUALITY

Enhanced Patient Activation and Provider Communication/Guideline Implementation
CONSUMER ENGAGEMENT FOR QUALITY

Chronic Care Model

Patients’ Perceptions of Cholesterol, Cardiovascular Disease Risk, and Risk Communication Strategies

Robert E. Goldman, PhD
Donna R. Parker, ScD
Charles B. Eaton, MD
Jeffrey M. Borkan, MD, PhD
Robert Gramling, MD
Rebecca T. Cover, BA
David K. Abern, PhD

ABSTRACT

PURPOSE Despite some recent improvement in knowledge about cholesterol in the United States, patient adherence to cholesterol treatment recommendations remains suboptimal. We undertook a qualitative study that explored patients’ perceptions of cholesterol and cardiovascular disease (CVD) risk and their reactions to 3 strategies for communicating CVD risk.

METHODS We conducted 7 focus groups in New England using open-ended questions and visual risk communication prompts. The multidisciplinary study team performed qualitative content analysis through immersion/crystallization
Laptop computers placed in 15 intervention office/waiting rooms throughout Rhode Island and Southeastern Massachusetts.

Software uses Framingham Risk Equation and determines 10-yr risk of CHD, converts this risk into equivalent risk adjusted age.
PDAs given to 32 Primary Care Providers (PCPs) representing 15 intervention practices.
ATP III Pilot Study – Baseline to Follow Up
June 16, 2006

Combined Data: Percent at LDL Goal by Risk Group (N=594)

<table>
<thead>
<tr>
<th>Risk Group</th>
<th>Baseline</th>
<th>Follow-up</th>
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<tbody>
<tr>
<td>CHD Equiv.</td>
<td>23</td>
<td>50*</td>
</tr>
<tr>
<td>High</td>
<td>36</td>
<td>53*</td>
</tr>
<tr>
<td>Moderate</td>
<td>45</td>
<td>52*</td>
</tr>
<tr>
<td>Low</td>
<td>58</td>
<td>71*</td>
</tr>
</tbody>
</table>

*p<.001
CONCLUSIONS

- eHealth is transforming health care
- Need to continue to support systems-level research and evaluation
- Need to promote success stories
- Demonstrate value proposition and return on investment
THANK YOU

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