Disruptive Innovation in Health Information Technology

Michael L. Cowan MD,
Chief Medical Officer,
BearingPoint, Inc.
Disruptive Innovation:
Executive Summary

Healthcare Industry IT Issues

- Cost, Quality & Access

Promise of Health Information Technology

- Current Status & Projected Progress Line
- Complexity & Expense of System Integration

Potential for Disruption

- Age of Networks
Healthcare in America Today

**Cost:** Captures 1/7 dollars spent in U.S.

**Quality:** Immense Potential
Total Health Spending as % of GDP, 2003

- United States
- Switzerland
- Germany
- France
- Sweden*
- Denmark
- Italy
- Britain
- Japan*
- EU Avg*

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Net costs of health administration and health insurance as percent of national health expenditures

<table>
<thead>
<tr>
<th>Country</th>
<th>Percent of National Health Expenditures Spent on Health Administration and Insurance, 2003</th>
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<td>5.6</td>
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<td>United States</td>
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* Includes claims administration, underwriting, marketing, profits, and other administrative costs; based on premiums minus claims expenses for private insurance.
Data: OECD Health Data 2005.

Source: Commonwealth Fund National Scorecard on U.S. Health System Performance, 2006

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Percent reporting medical mistake, medication error, or lab error in past two years

International comparison

UK=United Kingdom; GER=Germany; NZ=New Zealand; AUS=Australia; CAN=Canada; US=United States.
Data: Analysis of 2005 Commonwealth Fund International Health Policy Survey of Sicker Adults; Schoen et al. 2005a.

Source: Commonwealth Fund National Scorecard on U.S. Health System Performance, 2006
Duplicate Medical Tests, 2005

International comparison

![Bar chart showing the number of duplicate medical tests in different countries.

UK=United Kingdom; NZ=New Zealand; CAN=Canada; AUS=Australia; US=United States; GER=Germany.

Data: Analysis of 2005 Commonwealth Fund International Health Policy Survey of Sicker Adults; Schoen et al. 2005a.

Source: Commonwealth Fund National Scorecard on U.S. Health System Performance, 2006

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Mortality Amenable to Health Care

Deaths per 100,000 population*

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* Age-standardized death rates, ages 0–74; includes ischemic heart disease. World Health Organization, WHO mortality database (Nolte and McKee 2003);

Source: Commonwealth Fund National Scorecard on U.S. Health System Performance, 2006

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Consumer Views of U.S. Healthcare

80% dissatisfied with the cost
- $2.2 Trillion
- Average cost of employer sponsored insurance: $11,765
- Employee contribution $3,226
- Up 87% since 2000 (income up 20%)

44% Satisfied with the quality
- 90% satisfied with their own providers

"We have repeatedly performed the definitive experiment and conclusively proven beyond any shadow of a doubt that paper based Health Records cannot support the complex information requirements of modern healthcare."
Economic Value of National Health Information Network Net Estimated Annual Savings: $132B


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Current Status: No Simple Answers

Economic "Judo" Industry

- Unintended Results of Public Policies
  - Stark and anti kickback rules
  - HIPAA: "Portability and Accountability"

- Economics
  - Poor Response to Cost Pressures
    - New Car
  - Weak Premium for Quality
    - "Your Money or Your Life"
  - Mismatched Return on Investment

- Underdeveloped IT Structure
Misaligned Incentives Drive Lack of Capital

Ambulatory Computer-based Physician Order Entry

Source: Center for Information Technology Leadership, 2003
Disruptive Era "A TRIP TO THE WOODSHED"

April 2004: Bush promised EHRs for all Americans in 10 years

- Established ONC HIT
  - No comparable office elsewhere

- Resulting Acronyms
  - NHIN
  - RHIOs
  - HIE
  - EHR
  - PHR

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Health Information in the 21st Century: Current Activities

- Office of the National Coordinator for Health Information Technology
- Medicare Modernization Act (MMA) of 2003
- eHealth Initiative (EHI)
- National Association of Health Information Technology (NAHIT)
- Electronic Health Initiative (IHE)
- Certifying Commission for Health Information Technology (CCHIT)
- Health Information Technology Standards Panel (HITSP)
- Markle Foundation Connecting for Health
- Many other initiatives, Private, State, Local and Federal
- NHIN Demos October 2005
- 30+ RHIO Initiatives
- HIMSS
- National Alliance for HIT
  - And my dog Rusty
EHR usage study shows slow progress toward Bush's 2014 goal

By Diana Manos, Senior Editor

WASHINGTON – Findings released Wednesday from a first-ever, comprehensive study on the use of electronic health records in the United States revealed that 24.9 percent of physicians use some form of loosely defined EHRs, although fewer than 10 percent employ what researchers define as "a system most likely to benefit patient care."

The 81-page report, Health Information Technology in the United States: The Information Base for Progress, also showed that only 5 percent of hospitals use computerized physician order entry (CPOE) systems, an indicator of EHR adoption in the in-patient setting.
**Reality:** To date, there is little evidence that efforts have been able to demonstrate ongoing sustainability. In fact, FCG has found only two RHIOs that even claim to have a sustainable business model. One of the biggest problems is that while providers typically pay for the technology, the majority of benefits associated with health information exchange accrue to consumers, health plans, or employers. Without the participation and cooperation of all stakeholders (especially those who actually reap the benefits), any business model quickly falls apart.
RHIO Progress Has Been Slow

On December 31, 2006, the Santa Barbara County Care Data say it’s in our Exchange (SBCCDE) ceased to exist. (now Coordinated by Care Sciences Quovadx)

Why?

- There were no technical difficulties
- There were no legal impediments
- What Killed the Santa Barbara County Care Data Exchange?
  By Bruce Merlin Fried, Esq.
  March 12, 2007
  iHealthbeat, California HealthCare Foundation

- The Santa Barbara County Care Data Exchange is no more. There was hardly an obituary to note its passing. A fitting tribute might have included phrases like: "ahead of its time" or "potential never realized" or "it was harder than it looked."
"We can't solve problems by using the same kind of thinking we used when we created them."

– Albert Einstein
An Underused Alternative: Disruptive Innovation

Disruption: a technological innovation, product, or service that eventually overturns the existing dominant technology or product in the market.

– Wikipedia
Natural History of a Disruptive Innovation
Examples of Disruptive Innovations

In Healthcare

- Pregnancy Testing
- Nurse Practitioners
- Coronary Artery Stents
- Same Day Surgery

In Technology

- Desktop/GUI
- Internet
- Digital Cameras
- E-Mail
- Search Engines

Characteristics

- Shift Control Closer to the Consumer
- Move Functionality to Less Costly and More Convenient Modes
Characteristics of Industries Ripe for Disruption

OVERSHOOT: Industry Exceeds Requirements
- Complexity and/or expense exceeds user needs

UNDERSHOOT: Industry Fails to Meet Minimum Requirements
- Cost & Quality & Convenience

ASYMMETRIES:
- Different levels of value

NON-CONSUMERS: (Dropouts)
- Potential Users Opt-out
Is Healthcare Industry Ripe for Disruption?

**Healthcare Overshoots:** Industry Focus on high-end complex interventions

- Organ Transplants
- Cardiac Surgery
- Resulting Expensive Infrastructure

**Healthcare also Undershoots:** Difficult Navigation for Routine Care

- Earache
- Patient/Provider Information Asymmetry
  - Consumer Empowerment
  - "Doctor Knows Best"

**Asymmetries and Non-consumers**

- 43 million uninsured
- $100B expenditures on alternative medicine
HIT Overshoots: Complexity

- RHIO and NHIN Work
- Semantic Integration of Proprietary Systems and Data
- Software (Electronic Health Record) Solutions
- Complex HIT Systems on Unprecedented Scale
- Competing Standards
Health Information Technology Industry: "In Desperate Need of Disruption"

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HIT also Undershoots the end-user

- EHR
  - Productivity and training costs
    - Investment: ~$40,000 per provider
    - Lost productivity: months
    - Training: variable
    - Break-even point ~ 3 years
  - Changes in business and practice procedures

Result: Non-Consumers

- Hospital CPOE use ~27%
- Small group and solo office practice ~25%
  - 75% don't use EMR and have no plans to ever do so...
Information Management Organizing Principle: The Lesson of Telephone Books

Search Engine

- "Harriet v1.2"
Organizing Principles:
Telephone Directories

First Telephone Book

Alexander Graham Bell was granted a patent on his telephone in 1876. He demonstrated it to visitors to the Philadelphia Centennial Exposition the same year. In early 1878, he installed the first telephone exchange in New Haven, Connecticut. The first telephone "book"—actually, a 70 cm x 21 cm sheet—was issued in New Haven in 1878. Below is a 1978 facsimile of that sheet. To the right is the same text, suitable for searching.

LIST OF SUBSCRIBERS
New Haven District Telephone Company
OFFICE 219 CHAPEL STREET
February 21, 1878

<table>
<thead>
<tr>
<th>Residences</th>
<th>Stores, Factories, &amp;c.</th>
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<td>MERCANTILE CLUB.</td>
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</tbody>
</table>

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LIST OF SUBSCRIBERS.

New Haven District Telephone Company.

OFFICE 819 CHAPEL STREET.

February 21, 1876.

Resident.

Rev. JOHN T. TODD.
J. R. CARRINGTON.
H. B. BIDGELOW.
C. W. SCRANTON.
GEORGE W. COY.
G. L. FERRIS.
H. W. FROST.
M. F. TYLER.
J. H. BROMLEY.
J. H. THOMPSON.
WALTON LEWIS.

Physician.

R. E. L. THOMPSON.
A. E. WINCHELL.
C. S. THOMSON, Fair Haven.

Dentist.

R. S. GAYLORD.
R. F. BURWELL.

Miscellaneous.

REGISTER PUBLISHING CO.
POLICE OFFICE.
POST OFFICE.
MERCANTILE CLUB.
QUINNIPLAC CLUB.
F. V. MCDONALD, Yale News.
SHIBLEY BROS. & CO.
M. F. TYLER, Law Chambers.

Store, Factory, etc.

O. A. DORMAN.
STONE & CHIDSEY.
NEW HAVEN RAILWAY CO. State St.
" Cong. St."
" Fair Haven.

ENGLISH & MERSICK.
NEW HAVEN FOLDING CHAIR CO.
H. HOOKER & CO.
W. S. KESSINGER & BON.
H. F. BIDGELOW & CO.
C. G. COWLES & CO.
C. S. MERSICK & CO.
SPENCER & MATTHEWS.
PAUL BOSSERT.
E. S. WHEELER & CO.
ROLLING MILL CO.
APOTHECARY HALL.
R. E. GIBBES.
AMERICAN TEA CO.

Post & Phil. Mkt.
GEO. E. LUM.
A. FOOTE & CO.
STRONG, HARR. & CO.

Bank and Savings Institution.

CRUTTENDEN & CARTER.
BARKER & RANSOM.

Office open from 8 A.M. to 2 P.M.

After March 1st, this Office will be open all night.
Search Applied to Crossword Puzzles

Did you mean: **harmonica virtuoso larry**

No standard web pages containing all your search terms were found.

Your search - **hermonica virtuoso larry** - did not match any documents.

Suggestions:
- Make sure all words are spelled correctly.
- Try different keywords.
- Try more general keywords.
- Try fewer keywords.
Search Applied to Crossword Puzzles
Enterprise Search Solutions: Native Capability

SEARCH ENGINE
- Crawling
- Indexing
- Serving

END USER

MyCo

BROWSER
Enterprise Search Solutions: Native Capability
Search Solutions for the Enterprise: **Harriet v.9.6**
Search Solutions for the Enterprise: Harriet v.9.6

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BearingPoint Extension Platform

- Application Adapters
- Enhanced Security
- XML Transformer

SEARCH ENGINE

- Crawling
- Indexing
- Serving

BearingPoint Enterprise Search Solution

END USER

MyCo

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Search Solutions for the Enterprise:
NOVA RHIO Initial Pilot

Healthcare for Uninsured
- Medications
- Encounters
- Hospitalizations
- Asynchronous Communication
NOVA RHIO Enterprise Search: First Stage

- “Good Enough” Solution
- Solve small problems
- Avoids “boiling the ocean”
Search Solutions for the Enterprise: **Harriet v.9.6**

- Intranet
- File Shares
- Corporate Websites
- Database Feeds
- Secure Content
- ERP Systems
- CRM
- Enterprise Applications

- Application Adapters
- Enhanced Security
- XML Transformer

BearingPoint Extension Platform

**SEARCH ENGINE**
- Crawling
- Indexing
- Serving

BearingPoint Enterprise Search Solution

**END USER**

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Ultimate Goal: Total Health Grid

Public Health Grid

Providers

Consumers

Federal Agencies

Security Services

Directory/Alerting Services

Search Services

Analytical Services

Public Health Departments & 1st Responders

Hospital System

RHIO/HIE

Vocabulary Services

Commercial Lab System

Hospital System

State Health Department

Poison Control Centers

Local Health Department

EMS
"That it will ever come into general use, not withstanding its value, is extremely doubtful because its beneficial application requires much time and gives a good bit of trouble, both to the patient and to the practitioner…"
Anonymous Observation on a New Technology

"That it will ever come into general use, not withstanding its value, is extremely doubtful because its beneficial application requires much time and gives a good bit of trouble, both to the patient and to the practitioner…"

(The Stethoscope)
Health Information Technology
Where Are We Now?

The Hype Cycle

Visibility

Technology Trigger
Peak of Inflated Expectations
Trough of Disillusionment
Slope of Enlightenment
Plateau of Productivity

Maturity

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Health Information Technology
Where Are We Now?

The Hype Cycle

- Technology Trigger
- Peak of Inflated Expectations
- Trough of Disillusionment
- Slope of Enlightenment
- Plateau of Productivity

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The Payoff I: ELECTRONIC HEALTH RECORD

More than a “Record”

- Person Centric Health
- Interactive Decision Support
- New Meaning of “Knowledge”
- Research
- Best Practice
- Collaboration
Anonymous Observation on a New Technology

"Imagination is more important than knowledge."
– Albert Einstein
Health IT Innovation References

- Your Money or Your Life, David Cutler
- Saving Money Saving Lives, Newt Gingrich